

Managerial International Macroeconomics
Preliminary and Incomplete

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March 6, 2016

Chapter 1

Introduction

In his 2012 acceptance speech for the prestigious Carlos Diaz-Alejandro Prize, economist Sebastian Edwards shared some very interesting thoughts about our profession. He said that Economics should be a “useful” science. And to be useful it needs to tell stories: stories that are relevant to the everyday person, stories that reflect some of the dilemmas and mechanisms that actually take place in real life, and stories that ultimately are easy to tell, that are convincing, and therefore persuasive and memorable. For a story to have such properties, according to Sebastian, it needs three pillars: (i) it needs to be based on sound theories; (ii) it needs to be data-relevant; and (iii) it needs to be articulated in easily understood language. He feels that our profession has totally forgotten the third component, and that it has mostly neglected the second one. Hence, it has become a theory-based science, with little relevance, and even less ability to communicate with the ordinary person, who should be our main audience, or customer, according to him. I do not agree entirely with Sebastian’s daunting view of our profession, but I do agree to the extent that we have largely failed to make economics more understandable, and, thus, a more “useful” tool for policy discussions.

The purpose of these notes is to try to answer his plea. The goal is to have a set of stories, based on theories, that respond to questions relevant to the layman, that are easily communicated, and, for my own objectives, are easily remembered.

These notes are the outcome of all my years teaching MBA students at MIT Sloan. During that time, I have tried to find a way to explain the complexities of Macroeconomics in terms of “everyday” anecdotes. It is not clear that I have succeeded, nor is it clear that I ever will. However, I have been able to collect great stories from economists all over the globe. Some of them are from very famous economists indeed, while others, even while not so famous, at least are *really really really ridiculously good looking*.¹ In case you are wondering, I belong to the second set which says a lot about the “looks” of the first set.

Let me start with a disclaimer: Macroeconomics, International Economics, and Macro-development are places of conflict in our profession. Individuals have different ideologies and theories, and they defend their views as if nothing else mattered in the world. I personally like the debates. However, I have to recognize that the discussion feels quite removed from real life. Most people react to our arguments and discussion by asking “can you tell me what works?” or “what does the data say?” Well, that is the whole point: either we do not know, or we do not agree on what we think we know. What makes the discussions almost *impossible to resolve* is the fact that we cannot run “experiments” to study macroeconomic events. Some minor aspects of Macroeconomics indeed can be studied with some natural experiments, but the main issues cannot be truly tested in convincing ways. What makes the discussions even more *depressing* is the fact that using the exact same data and similar econometrics procedures, we tend to find different results. I do have my own views, which are admittedly as biased as and probably more confused than most other

¹Derek Zoolander, 2001

macroeconomists. These notes, however, are not about religion nor ideology. They are trying to convey very complex intuition to an audience that does not care about our fights. Hence, I will try to stay away from expressing my opinion as much as possible and concentrate on what can be said about different aspects in the economy. Hopefully, after some punishment, you will be able to understand what is behind the statements any particular economist is supporting i.e. which channel he or she believes is the most relevant one; which constraint he or she is ignoring, and which one he or she is emphasizing. Furthermore, my hope is that you will be able to formulate questions to determine if the views expressed by any economist are properly supported by the data and the theory. In the end, the objective is to provide tools to understand what is happening in Macro-International Economics as opposed to offering a resolution to the debates we have in the profession.

There is an additional benefit if such a goal is achieved. These tools can always be used as weapons of mass humiliation. Yes, WMHs. If you find yourself at a social party in Boston, and there is some obnoxious, arrogant individual in the audience talking about central banking, financial crises, exchange rates, real estate, asset prices, fiscal policy, competitiveness, growth, development, poverty, etc.; and he is so extraordinarily unbearable that you will increase the welfare of the party if he shuts up well, here you have the tools. Or in other words, if he is speaking with the confidence and arrogance that only ignorance provides, then, my friends, here you have the weapons to take care of such a specimen. These tools, as all weapons, should be used with care: only inflict pain on those that are *really really really ridiculously* insufferable.

Chapter 2

Babysitting Cooperative

Before we start I need to ask a question — Are you a bad person? This is not a joke. It is actually quite serious. Are you a well-intentioned person? Just remember the answer for the discussion below.

The section uses the allegory of a babysitting cooperative to explain how the economy works and how policy is used to correct its inherent flaws. Originally conceived by Sweeney and Sweeney (1978), I learned about the babysitting from Paul Krugman. At that time he was a faculty member at MIT and I was a Ph.D. student. He couldn't teach one of his undergraduate classes and asked me to sub. He told me: "to teach the basics of demand-oriented economies, you can use the Babysitting Cooperative". I remember I said something along the lines of "Babysitting What?". "You have kids, don't you?" Paul asked. Apparently that was the only prerequisite needed to understand this "model". So, I read his rendition of the original article, and since then I have not stopped using it.¹ The intuition behind the babysitting cooperative is not only spectacularly simple but it is extraordinarily accurate. Important remark: I have spiced it up to increase its entertainment value, and I have changed the names and nationalities of individuals involved, not to protect them, but to make sure we have the most fun possible. Here it goes:

A bunch of young couples (mostly lawyers) in the DC area realized that kids were quite expensive. Not only did their kids want to be fed (as opposed to breastfed), but they needed to be clothed, entertained, and million of other things that interrupted normal adult leisure time and expenditure patterns. One of the biggest nuisances was babysitting (whining was a close second). So, the group of lawyers decided to get together, create a cooperative, and take care of each others' kids — roughly in the same way extended family takes care of those little basta... *bastions* of love and hope (sorry!). Soon the lawyers realized that it was important to have a fair exchange of kids and hours. Some families had more kids than the others, and some couples partied way more than the others. So they decided to create coupons, where each coupon represented one kid for one hour, and each couple was allotted the same number of coupons to start the cooperative. For the purpose of this explanation, assume each couple started with 10 coupons.

The idea is that if a couple went out and hired a neighbor as a babysitter, they paid with coupons for the babysitting service, where the number of coupons corresponded to the number of hours times kids. So, if you have one kid, and you are quite lame and go to horrible parties that only last three hours, you only need three coupons. On the other hand, if you have an ounce of Latin American blood and you go to some of our "respectable" parties, then you will spend about 40 hours per kid, which already include party and recovery time. In the end, if you want to go out and depending on what you are planning to do you need to babysit to accumulate enough coupons to cover your needs; after you spend all your coupons, you start from scratch, babysitting in order to accumulate coupons. The cycle continues as long as the kids need babysitting and

¹See Krugman (1998) for one of Paul Krugman's articles using the babysitting cooperative to understand US economy's issues.

you need partying.

The babysitting cooperative worked perfectly in the beginning. Everyone was going out and babysitting, and the cost of using babysitting was relatively small: you just had to babysit the kids of others. Therefore, imagine you were planning to stay home to watch a baseball game, you could babysit a bunch of kids and accumulate the coupons almost costlessly. No cash payments were needed — just babysitting coupons — and everyone in the cooperative was happy.

Suddenly, one family, decided to accumulate a lot of coupons. It was strange, but that family for some reason needed to accumulate massive amounts. It had been rumored that the family was from Venezuela, but there is no proof of such calumny; and the only evidence that has been advanced is that they had an “I love Chavez” bumper sticker — so they could have been working for the Carter Center for all we know; or any other communist organization. Irrespectively, let’s assume the family was from Venezuela.

What happened to the cooperative? When the Venezuelans started to babysit and babysit and babysit, the coupons in the hands of the other couples started to decrease rapidly. Soon the other couples had no coupons. They wanted to go out, but to go out they had to babysit... but nobody was going out, so nobody was babysitting. Everybody stayed home, and the cooperative collapsed.

How would you solve this problem? Please, before you continue reading, try to think what solutions you would provide to the cooperative and write them down. Please do so, not for me (I really do not care) but because you are going to be amazed!

Try to think of at least 5 possible solutions; and write them in the space below:

- Option 1: _____
- Option 2: _____
- Option 3: _____
- Option 4: _____
- Option 5: _____

In fact, I have been asking the exact same question in all my Macro classes for the last 17 years; and incredibly, every time, students always offer the same solutions. The following list summarizes most of the possibilities:

1. Kill the Venezuelans, or kick them out of the cooperative
2. Create another cooperative without those bastards (*Well, enough with these options*)
3. Print more coupons
4. Make the coupons expire
5. Cap the coupons
6. Pay for babysitting with dollars
7. Offer other services (*Other services related to babysitting? mmmmh... I know what you are thinking... You are all sick!*)
8. Create credit or IOUs
9. Organize a party and convince the Venezuelans to go out, or simply just force people out
10. Change the ratio between coupons and babysitting hours

Every time I discuss the babysitting cooperative, the same solutions — or permutations of them — are offered. To most of you, the list of possible solutions is not surprising at all. What is surprising, in my view, is that most of these solutions have a one-to-one mapping with actual macroeconomic policies. More

importantly, the reasons why these policies work (or fail) in reality are the same reasons why they work (or fail) in the babysitting cooperative. Of course the framework has limitations, which we discuss in subsection 2.2 in detail.² By a large margin, however, this story is so powerful because it provides a simple intuition for a model of what drives the economy.

2.1 Policies

Let's see why and how the policies you chose help resolve the problem in the cooperative. To do so, I will appeal to system dynamics tools.³

Let me restate the intuition behind the previous story using a simple graph. See Figure 2.1. When a couple decides to go out, they create the need to supply babysitting services. The provision of babysitting services creates a transfer of coupons; and the more coupons a couple has, the more likely it is that it will go out. This virtuous cycle is also known as the Keynesian Multiplier, or the Basic Demand Multiplier. As I discuss below, the multiplier has several impediments and limitations. For the moment, however, let's concentrate on its positive aspects.

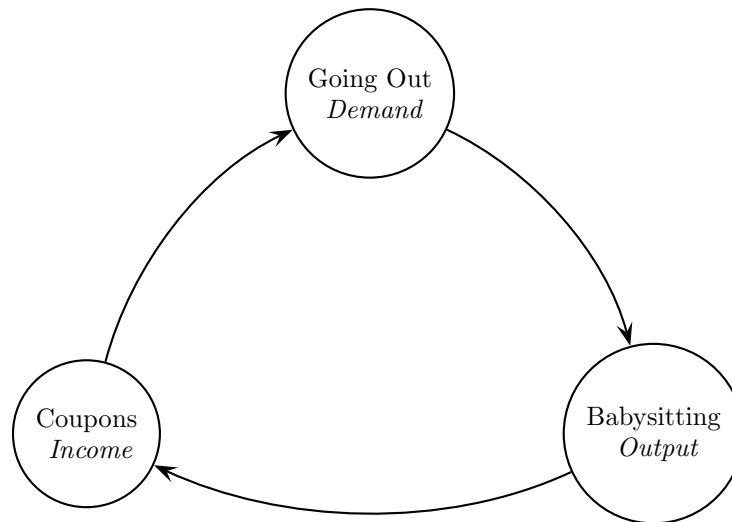


Figure 2.1: Babysitting Cooperative and the Keynesian Multiplier.

Why did the cooperative collapse? The Venezuelans had a very low rate of conversion between coupons and going out (technically, they had a small marginal propensity to consume). They broke the cycle, and the whole economy collapsed. It's that simple. In fact, as will become apparent below, to recover the economy all your policies try to reignite the cycle at some node.

Some words before we start analyzing policies. For some strange reason, we economists do not like to describe the economy as *babysitters*, and *going out*, and language like that. It makes us look really

²See Lora (2009) for a critical view of the aspects not considered in Paul's simple framework.

³WOW!!!! I'm so cool!!! Not like your typical lame Micro or Accounting professor who never talks about cool stuff and is concerned with things that are real but boring, like incentives, markets, organizations, financial statements, regulation, etc. Important but boring. I prefer irrelevant but cool!

unsophisticated. Most of us try to use words that make us sound mysterious and knowledgeable. We tend to prefer *Aggregate Demand*, *Output*, and *Income*. Indeed, the story behind the babysitting cooperative using macroeconomists' terminology will go as follows: Higher demand creates incentives to increase production of services and products. Such activities create income; and the higher the income is, the higher the demand in the economy is. The intuition is the same.

One remark worth highlighting: The willingness to consume out of income — the marginal propensity to consume — could be measured by consumer confidence for instance. In fact, if consumer confidence goes down, consumption falls, creating a reduction in demand, output, and income in the exact same way the Venezuelans collapsed the babysitting cooperative by deciding to hoard coupons. I hope it is not surprising, then, why policy makers and market participants pay tremendous attention to consumer confidence.

2.1.1 Objectives of the policies

What is the objective of macro policies attending the babysitting cooperative? If the cycle is slowed down, it needs to be restarted. To restart the cycle, the policies create a push at one of the nodes or affect the strength of any of the links. The policies that are used in practice try to do exactly that. For example, one way to reactivate the cycle is by increasing the coupons, or by increasing the “going out” activities, or by creating incentives to use the coupons, etc. There is one thing that we do not capture in the babysitting cooperative, though, which is changes in productivity. We will have plenty of time to discuss these issues in later chapters (Chapters (8) to (12)). However, I wanted to point out this limitation of the framework right away. Growth here is entirely driven by the demand, and I hope it is clear that it is not the only mechanism in real life.

A final point before I go into detail for each one of the policies. Have you noticed that all your policies are very discriminatory? Starting from the Tea-Party like policy of killing the Venezuelans; and all the way to the communist-interventionist-Obama type action of “cap on the savings”! All discriminate. Clearly, kicking the Venezuelans out of the cooperative is discriminatory, but do you realize that taxing the coupons is punishing *more* the families that have *more* kids, or that have cultures in which parties are longer (and more fun)? All these policies are discriminatory in one way or another — and that is the reason why economic policy is so contentious. It is reasonable, then, that interest groups are organized around the possible policy choices; and it is not surprising that conflict arises in the policy space. Do you remember the question about intentions? I guess most of you answered yes, but still *YOU* came out with options that were discriminatory. Do not oversimplify or judge politics, please. They are mostly responding to a very natural conflict in the society — as natural as the one that arises from this simple example. Well-intentioned individuals, when faced with the situation created by the babysitting cooperative, become discriminatory and arbitrary. Hence, they become “politicians”.

2.1.2 Mapping with actual policies

Let me start by highlighting what the coupons represent. The coupons in our cooperative are the bills (currency) in any given economy. We exchange those coupons (bills) for goods and services. Every economy has its own coupons to work with. In the Central Bank's accounts, this is called money base, high power money, M0, etc. The coupons are printed by the Central Bank and in fact are their most important liability.⁴ The coupons are an asset for you. It is the cash you have in your wallet, which Jessie J calls *cha-ching* and *ba-bling*.⁵ Of course, payments in modern economies are way more complex than just payments in cash.

⁴In some countries, like the US, the coins are not minted (printed) by the Central Bank but by the Treasury. But those are small and not that important to support the system of payments

⁵By the way, if you do not know who Jessie J is, or that this quote comes from Price Tag, please.... get a life! Listen to some music!

However, every type of payment that takes place is denominated in the coupon issued by the Central Bank and almost always involves an exchange of coupons widely accepted. For the moment, let us oversimplify and assume that all payments are ultimately performed in cash.

Let me discuss now the policies described above. All of them have limitations that I will discuss later; for the moment, though, I will concentrate on the basics. The policy choices that most people discuss can be grouped into four categories: crisis, alternative means of exchange, monetary and fiscal policy, and automatic adjustment (which usually means inflation or deflation).

1. The “crisis” category refers to policies that address the collapse of the cooperative as originally conceived. Policies that redefine membership in the cooperative are indicative of a crisis, and (1) and (2) are ultimate expressions of a failure in the cooperative’s design.

I know that the choices are funny because they sound implausible. However, these policies are not as crazy as you might think. The last time I checked, every country has strict immigration policies. Isn’t that exactly like deciding who can and cannot enter a babysitting cooperative? Countries indeed pay attention to immigration. Of course immigration policy is not perfect and sometimes it makes massive mistakes, such as allowing immature Venezuelan economists with horrible sense of humor to move to the US... *oops* Let me move on.

Not only is immigration policy similar to the “Kicking out the Venezuelans” policy, but international accords are also treated as memberships to exclusive clubs. The European Monetary Union is, after all, a club. Don’t you think the Germans would love to get rid of all the periphery countries in the Euro Zone right now? And the discussion is so clear about this issue that it is in every newspaper.

These policies are part of the toolkit macroeconomists consider. However, it is important to recognize that they are also the reflection of a massive failure in the economy and its institutional design.

Another example of collapse of the cooperative is when we start paying again for babysitting: (6). If we need to go back to the use of dollars, instead of coupons, to pay for the babysitting, that means the economy we designed failed to provide the services it was meant to sustain. In reality, this takes place in every country that suffers a currency or financial crisis. We have several examples in which, after currency crises and recessions, the coupons of the economy (the currency) cease to be useful to (or valued by) the citizens, and the economy starts using the currency of another country, usually a strong currency.

All these redefinitions of membership and currency substitutions as the medium of payment are usually crises, or represent what could be considered a crisis. We address financial and currency crises in Chapter 15

2. The second category of policy is related to alternative means of exchange. For example, the choices (7) and (8).

Regarding policy (7), an interesting example happened in Argentina in 2001-02, when markets were created to exchange one good for another. This is called a barter economy, and nothing can be more inefficient. How can you exchange apples for consulting services? The existence of a coupon (or currency) to do so is what allows people that do not trust each other (or even know each other) to perform such transactions. So, these solutions that sound like clear possibilities do happen in real life, but are usually very costly and distortionary. Again, something deeply wrong in the design led to this outcome.

If there are no coupons in circulation, one possibility is to use credit. In practice, credit is substituting one coupon for another one. In other words, it is replacing a piece of paper with the picture of some ugly-looking-guy with another piece of paper without the picture — but given to you by an equally ugly-looking-guy. This is obviously a possible solution to resolve the problem of lack of coupons. However, credit markets fail more regularly than monetary markets and it is not clear that when the

confidence in the currency falls, the confidence in the other instrument won't also fail. We will devote a significant amount of time in Chapter (15) understanding how banks work, why they go bankrupt, and what type of institutions are needed to have a relatively healthy financial system. The whole purpose of financial regulation is to create the environment where the coupons printed by the financial system are safe, understood, and widely accepted.

3. The third category of policies refers to monetary policy or fiscal policy.

These policies work in different dimensions of the Keynesian Multiplier — or in the system we have depicted. Hence, let me go through them in detail.

Printing more coupons (3), or expansionary monetary policy, is a very common option. In the short run, the couples with the new coupons can start to go out, and the babysitting cooperative is reactivated. If the Venezuelans accumulate a lot of the additional coupons, we can always print more (and more), until we exhaust the Venezuelans. We can call the first printing QE^1 , and the next one QE^2 , and so on, until we reach QE^n (where QE can stand for *Quantitative Easing* or, more poetically, *Quintessential Exasperation*).

An interesting thing to do at this moment is to analyze one of the limitations of monetary policy. Assume that we print but the Venezuelans continue to accumulate. So we print again, and again. Imagine that we have printed so much that each family has 200 coupons and the Venezuelans have $2 * 10^7$ coupons (You know, we Venezuelans need a lot of coupons in case we need to go to a First Communion). In any case, assume that at this point the Venezuelans decide to stop babysitting because they are satisfied with the stock they already have. What will happen? Every family has so many coupons that all of them would like to go out, but nobody is willing to babysit. So? The cooperative collapses. Everybody has to stay home and share time with their kids (uuuggghhhh!!!). In other words, the babysitting collapses in two circumstances: if there are too few coupons or too many! So, printing at the beginning might be positive, but there is a limit. We come back to these points later, but I couldn't let go the prior statements without some comment on the limitations.

On the fiscal policy side (i.e. the government's ability to modify taxation or government expenditures), there are several actions that can improve the situation in different dimensions: actions that improve the demand, the income, and the marginal propensity to consume.

For example, we can force the families to go out, which will create demand. This is option (9). This is equivalent to deciding to increase expenditures on public work, education, etc. We can do the Japanese thing of destroying and building the exact same bridge: yeah, that will teach the consumer that dares to reduce its demand! More seriously, the purpose of this policy is for the government to create the demand the consumers have decided to give up. In this sense, this is an effective way of keeping the demand relatively high, and keeping the *system working*.

Additionally, fiscal policy can create incentives to consume: (4), and (5). The purpose of those policies is to create the urgency of spending the cash. One policy in particular is quite interesting: the expiration of the coupons. I think that in all my years of teaching this possibility always arises. However, what is the likelihood that bills have an expiration date? I think most people would say that this is impossible. If you think so too, you would be completely wrong! As an aside, just for the record, remember you are always wrong. I have been wrong only once in my life — which was a moment of weakness when I thought I was wrong, but I really wasn't.⁶

In any case, let me address this with evidence. In Figure 2.2 you have a bill from Zimbabwe during their recent hyperinflation. The bill was issued on May 2nd 2008 and expires on December 31st 2008. The same happened in Argentina in 2001 with the “Patacones”, which were coupons printed by the Argentinean Provinces.

HA! An expiration date on a bill!

⁶This is a Ricardo Hausmann joke. See the Chapters on the BBNN for a full set of his jokes.

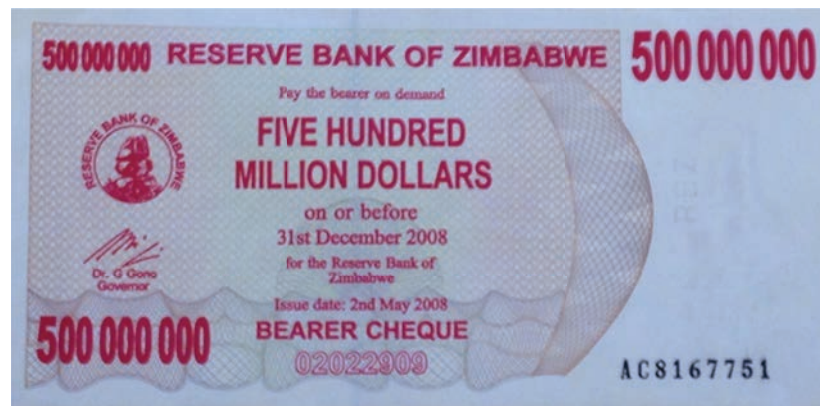


Figure 2.2: Zimbabwe’s 500 Million Bill

In class, we also discuss policies to increase the propensity to consume. For example, taxes on savings — which, to be honest, are rare and do not necessarily increase consumption, but their intuition is still valid within the babysitting cooperative. The idea is to create incentives to consume and not to save. This, to me, is one of the weaknesses of the babysitting cooperative. In this simple framework, we do not have investment, and, therefore, saving coupons is always bad for the economy. That is why the immediate reaction to a fall in the marginal propensity to consume is to punish savers. I will come back to this point, but for the moment, let us assume that indeed the mechanism that dominates is that saving reduces demand, and therefore overall welfare.

Countries have, however, policies to recover confidence and maintain high levels of consumption and demand that do not involve taxing savings. How to do so? Provide tax cuts that expire (e.g. Japan, 1999), offer subsidies for consumption, etc. The “Cash-for-Clunkers” policy (US, 2009), in which individuals were offered cash for their old car (in the hopes that they would turn around and spend that cash, and some, on a new car) is a good example of what can be done to support consumption. So, explicit policies to incentivize consumption do exist, and they affect the strength of the link between income and consumption.

Policies to recover consumer confidence also require “marketing”. How the message is given by our leaders is as important as the policy itself. So, when the president addresses the nation and looks confused or scared, it really does not matter what he/she says — the outcome is not good. We have millions of examples in political competitions, especially during election debates, where presidencies have been lost on a single awkward facial expression.

There are some fiscal policy tools that we do not discuss in the babysitting cooperative because the production side in our framework has been oversimplified. For example, industrial policy (e.g. subsidies or tax cuts to companies) is rarely discussed in this framework, since it is not obvious how we can increase productivity of the babysitting services. But in reality these policies are real possibilities — and potentially effective ones — since they affect production and can reignite the economy. Additionally, in the babysitting cooperative we do not consider tax cuts for consumers — because the families are not taxed in our framework — which, in reality, would increase their available income and, therefore, be a stimulus.

Let me finish by summarizing the intention of any of these policies: *provide a “kick” to one of the nodes in the system to get the economy back on track.* Monetary policy expansion, fiscal expenditures, tax cuts to firms and consumers, incentives to consume, etc. All of these choices are trying to do exactly the same thing: create a “jump start” for the system.

4. Finally, the fourth category is the automatic adjustment that takes place in the economy through inflation or deflation: (10).

The best place to start this intuition is to think about the cooperative when it is collapsing due to having too many coupons. Remember the situation in which we were printing without stop. Assume each family has 200 coupons and the Venezuelans have infinity. Imagine you have 2 kids and need to go out for 5 hours. Usually you would spend 10 coupons. But because everybody has so many coupons, no one answers your request. What can you do? Given that you have 200 coupons, wouldn't you offer more coupons than just 10? Let's say 15? This is inflation. The services provided are exactly the same — 10 kid-hours — but instead of paying 10 coupons you are paying 15. Therefore, the price of one kid-hour service increases from 1 coupon to 1.5 coupons: from a dollar to a dollar and a half!

The opposite occurs when there are too few coupons. Assume now that every family has only two coupons, and the Venezuelans are still trying to babysit. A family could be so desperate to accumulate any number of coupons that it will offer its friends a “break” or a “sale”: “give me any coupon and you can go out for 5 hours”. In the end, the price for every kid-hour comes down and deflation takes place.

So, when there are too many coupons in the economy there is inflation, and when there are too few there is deflation. How do you know how many coupons there should be any given day? When prices are stable, you have the right amount. One of the objectives of Central Banks is to keep inflation at a reasonable level, which varies from country to country. For Japan, this is close to zero; for Brazil, around 6 percent; for the US, around 2 percent. Whenever inflation levels rise above the desired targets, the Central Bank knows there are too many coupons and needs to collect them; when there is less inflation than desired, there are too few coupons and it needs to print. Does this sound like inflation targeting? We'll see more of this later, but the answer is yes.

2.2 Policy Limitations, Constraints, and Things that are Missing

These policies, of course, have limitations. Under certain conditions they are very effective, but under other circumstances they are not. Most of the discussions among economists, and discussions of economic policy, are centered around the differences in opinion that exist about the constraints economies face. When someone argues that a particular policy is ineffective, indeed it is thinking about the constraints that are limiting such policy choice. It is difficult to explain all the possible constraints, so I will concentrate on those I consider particularly important.

2.2.1 Expectations

Expectations can render several of these policy actions completely useless. Let us look at some examples. In fact, the revolution of rational expectations in macroeconomics showed that many of the simple intuitions behind the demand multiplier are nullified if consumers understand the underlying model perfectly. Let me provide some examples.

2.2.1.1 Budget constraint expectations

Imagine individuals anticipate that a tax cut will be followed by a tax increase, which to be honest is kind of a reasonable assumption. If that is the case, what should consumers do when they get the check from the government? If you know you are going to pay in taxes the same amount the government gave you (or even more because you have to include the interest payments), wouldn't you save the check? The answer is yes. So, how effective is the tax cut? It is useless.

In fact, in this particular case the *rational expectation* has a very simple reasoning: governments need to keep a budget constraint! Running a fiscal deficit today needs surpluses in the future. Hence, if consumers anticipate the full path of taxes the fiscal stimulus today is completely ineffective.⁷ Countries that are under severe fiscal problems have to deal with this problem. The anticipation of fiscal discipline in the future makes today's fiscal stimulus less effective.

This has partially happened in Europe. Imagine that after a recession the government tries to reactivate the economy by using fiscal policy. However, if we cut taxes to zero and increase expenditures to infinity, at some point the debt will increase to levels that the country will be unable to afford. At that time, interest rates will increase very rapidly, investment will collapse, and an even bigger recession will start. Obviously the US is not there yet, but Greece seems to have arrived. Expectations are what determine when the debt is "too big". Furthermore, unfortunately, expectations can change rapidly. If you were the president of a nation, or the one responsible of its economy, would you want to subject your citizens to the visceral mood swings of New York? I would be terrified of putting my country in that situation. Imagine: if the Yankees win, then the country's interest rate goes down; if they lose, the interest rates go to infinity! What if they have A-Rod under contract for 200 years?

Expectations play a very important role in the effectiveness of policies, and they are crucial to the performance of the economy. The more vulnerable the country's situation, the more important the formation of those expectations.

2.2.1.2 Inflation expectations

Printing money has the same problem as fiscal policy. In this case the adjustment takes place through inflation expectations.

Imagine that the Central Bank decides to double the amount of currency in the economy; and businesses, anticipating the printing, double the prices of their goods and services. What is the consequence in terms of real activity? No impact!

A numerical example should help.... Assume there are 50 families in the babysitting cooperative, each with 10 coupons, for a total of 500. Imagine that the Venezuelan family has 4 kids and wants to accumulate 576 coupons in order to party for 144 hours sometime in the future (4 kids * 144 party hours = 576 coupons). Obviously, there are not enough coupons. The venezuelans will try to accumulate as many coupons as possible, but in the end the cooperative collapses for sure (i.e. assuming the number of coupons remains constant). One of the solutions was to print. So, imagine we announce we will double the number of coupons. If we double the coupons to increase the supply to 1000 (500*2), this will only be effective, in terms of activity, if the price of the babysitting service does not adjust. If the price doubles with the printing, then the demand by the Venezuelans will go up to 1152 coupons! They need two coupons for each kid-hour. Hence, the problem remains the same.

Of course, in practice, the price would not double right away. This is why monetary policy has some degree of effectiveness. If the cooperative is in recession, then prices tend to go down, and the initial impact of printing does not produce inflation (exactly what has happened in the US since 2008). However, if central banks around the world continue to print without stop, at some point the economy is going to confess, and inflation will come, making fruitless part of the stimulus we have put into the system. I know inflation is going to happen in the world, and I think most people in the profession would agree with that statement, but "when is it going to occur?" is the crucial issue.

⁷This is a very powerful idea first introduced in a seminal paper by Robert Barro (Barro (1979)).

2.2.2 Banks and Financial Systems

The babysitting cooperative does not have a modern banking system. The presence of banks has several implications — as we will see in Chapter 15. Banks exacerbate the swings in the economy, consolidating booms and amplifying crises. With respect to the babysitting cooperative, however, banks can substitute for money.

In fact, when the cooperative runs out of coupons, one of the possibilities is that couples start writing IOUs. So, one family takes care of another family’s kids and receives an IOU that it can use with the same family later. This is a basic form of credit. In order to make this credit even more efficient, we have to make sure the IOU of one family can be used to pay other families (like in the corporate bond market, or the interbank lending market, etc.). In the end, a credit market can substitute the IOUs for coupons, and the recession caused by the hoarding, or saving, of coupons can be averted.

Second, and quite importantly, the presence of banks affects the speed of the Keynesian Multiplier. Governments and central banks have the ability to affect the working of the banking system through regulation and changes in interest rates. We will come back to these points in detail later.

2.2.3 Capital and Investment

The third limitation in the babysitting cooperative is the lack of capital and investment; therefore, the only source of wealth is demand. In other words, in the babysitting cooperative, the only way to improve welfare is to expand the demand, and that can only be done by using coupons (or moving them faster)! In other words, saving goes against spending, and a family saving coupons is bad for the demand (and welfare). Savings, on the other hand, might play an important role in financing investment. That aspect of the economy is not addressed in this framework.

The implication that savings are bad for the economy is very counterintuitive, but the real problem is not the saving itself but the instrument in which the consumers are saving. While the Venezuelans are just stockpiling their savings and keeping them in coupons — which is unproductive —, if we allow individuals (and institutions) to make investments in capital — which is remunerated and productive — the conclusions might shift around.

In most economic models, and in most of your Micro classes, firms use several factors of production.⁸ The possibility of substituting one factor of production for another, and the possibility of investing part of today’s production for the long run, changes dramatically the dynamics of an economy.

As I mentioned above, in the babysitting cooperative, the only instrument of savings is the coupons. If we could “invest” the excess coupons in something useful that generates a return or simply more output in the future, clearly the behavior of the families will be different, and the behavior of the Venezuelan family would not have been so devastating.

Furthermore, if we could “save” part of the excess production in some productive asset, we would not need to save in coupons. In other words, if we could take the actual production of a babysitting hour and save it to be offered later, the Venezuelans might not need to save in coupons. Of course the babysitting hour cannot be saved — and, to me, that is part of the beauty of the model — but if we think about coconuts, storage is clearly possible. More importantly, saving a lot today might imply large production and welfare in the future. Hence, saving is not necessarily “bad”.

⁸I know some of you might have taken classes with good professors in 15.010, but for those of you that learned nothing — i.e. Tom Stoker or Joe Doyle were your faculties — yes, companies actually use not only bodies but other “things and gadgets” to produce.

2.2.4 Production and Productivity

The fourth important problem with the babysitting framework is that it is lacking an important dimension: production and/or productivity.

In the long run, the most important source of wealth and welfare is increases in productivity. This framework is totally silent in this respect. We devote a significant amount of time in these notes to study how productivity increases affect the economy. We do so in the four chapters devoted to the BBNN. As will become clear there, productivity gains are the crucial dimension for sustainable development.

In response to this weakness, we could argue that the babysitting cooperative is a short-run model, one that assumes productivity is constant and that policies devoted to productivity increases, although good, will affect the economy only in the very long run.

This limitation is different from expectations and banks, which indeed affect the short-run behavior of the economy. Productivity is clearly a long-run issue, and, therefore, if we concentrate the intuitions of the babysitting cooperative on a one-to-two year horizon (i.e. short run), the policy prescriptions are likely to be predictable.

2.3 September 11

To finish this Chapter, let me discuss briefly the cost of September 11 and the actions taken immediately following its events. While it may not be immediately clear how the aftermath of September 11 can be understood through the babysitting cooperative model, I will attempt to show how a stalled economy was jumpstarted through policy tools like the ones discussed above.

I think most of us would agree with the following statement: “September 11 was a very costly event”. Why? Seven buildings were destroyed or affected, and about four thousand people died. Is this the source of the cost? I know the loss of lives is very costly, but let’s do the following thought experiment: imagine a small meteor hits New York and seven buildings are destroyed and four thousand people die. Of course the tragedy would have been costly, but do you think the meteor was more or less costly than the terrorist attack? The meteor would have been costly, but the loss in physical and human capital is tiny relative to the supply of both of those factors in the US. Therefore, the cost of the meteor would have been large for the families of the affected, but small relative to the US. This would have been, after all, a small natural disaster. September 11 feels differently, doesn’t it? The reason is that a terrorist attack might happen again, affects consumers’ expectations, and implies (or requires) a policy response — such as investment in security, or changes in behavior, etc. In the end, what makes September 11 very costly is that consumers suffer *fear* for the possibility that it might happen again.

When you are fearful or highly uncertain about the future, what do you do? Would you throw a big party, or would you save? Fear will bring out the little Venezuelan we all have inside. We would start accumulating coupons, thus reducing the strength of the cycle, or the Keynesian Multiplier. Therefore, fear will cause a drop in demand, fall in output, and ultimately a recession.

What does the babysitting cooperative suggest we should do in response to fear? We should print money, cut taxes, increase government expenditures, and create confidence to incentivize consumption. Guess what the US government did? Exactly that! They printed, increased expenditures (excluding the war which is an obvious increase in expenditures but that has little effect on the domestic demand), gave tax cuts in the form of 400 – 700 in checks back to citizens; and they drilled messages full of phrases such as “we will prevail”, “go back to your normal routine”, and “travel to New York”. Despite the criticisms that Bush received for his “go shopping” speech, the policies as a whole were very effective, and, even though the economy suffered three shocks during that time — the dot-com crisis, the Enron scandals, and September 11 — the recession

was very short-lived.

An important question to ask during these events is: “who is fearful?” Not all agents react the same. Just to give you an idea of the actions taken by the Federal Reserve (FED) at that time, in Figure 2.3 you have M1 and Currency in the panel on the left (a), and the reserve requirements and excess reserves in the banking system on the right panel (b). All data comes from the FED (see <http://www.federalreserve.gov/datadownload/default.htm>) and is updated weekly. On panel (a), the total currency in circulation corresponds to the orange line (this is the money supply), while the green line corresponds to the currency in circulation in the hands of consumers. On panel (b), the black line is the reserve requirements in the banking sector, while the red line is the actual reserves. The reserve requirements is the cash that the financial system needs to hold to comply with financial regulation. The purpose of this cash is to cover the risk of depositors leaving the banking system. This cash is in general quite costly to the banking system because they need to pay interest on the deposits while the cash reserves tend to earn zero. So, in general, banks tend to hold the minimum cash possible. The difference between the total reserves (actual) and the required reserves is the excess reserves (i.e. total reserves - required reserves = excess reserves). This is the amount of cash the financial system is willing to hold above the amount required by law.

Going back to panel (a), notice the sharp increase in M1 during September 2001 - a little bit less than 10 percent. Interestingly, this was not demanded by citizens but by the rest of the economy. Notice that the currency in the hands of the consumers moves in a parsimonious manner during this time. It was the financial sector, and in particular the bond market, that needed the support. The banks increased their cash holdings from 8 billion to 44 billion. This means that the banking system felt the impact of the September 11 terrorist attack, and the disruption in the bond market right after it, to be large enough that they quintupled the cash they needed for continuing their normal operations.



(a) M1 and Currency

(b) Reserves and Excess Reserves

Figure 2.3: Fed’s Balance Sheet: M1, Currency and Reserves around Sep 11

A very nice paper from the St. Louis FED by Christopher Neely discusses the exact actions taken by the FED in response to several crises (1987 Stock Market Crash, 1998 Russian Default, and 2001 September 11).⁹ He uses relatively high frequency (daily and weekly) to study September 11. In Figure 2.4, I reproduce his Figure 5 where he documents the changes in asset prices around the attack. “IV” is the implied volatility. Everything else should be easy to recognize.

The main aspect to highlight is the extremely sharp and fast spike the attack produces. Notice that

⁹See Neely (2004)

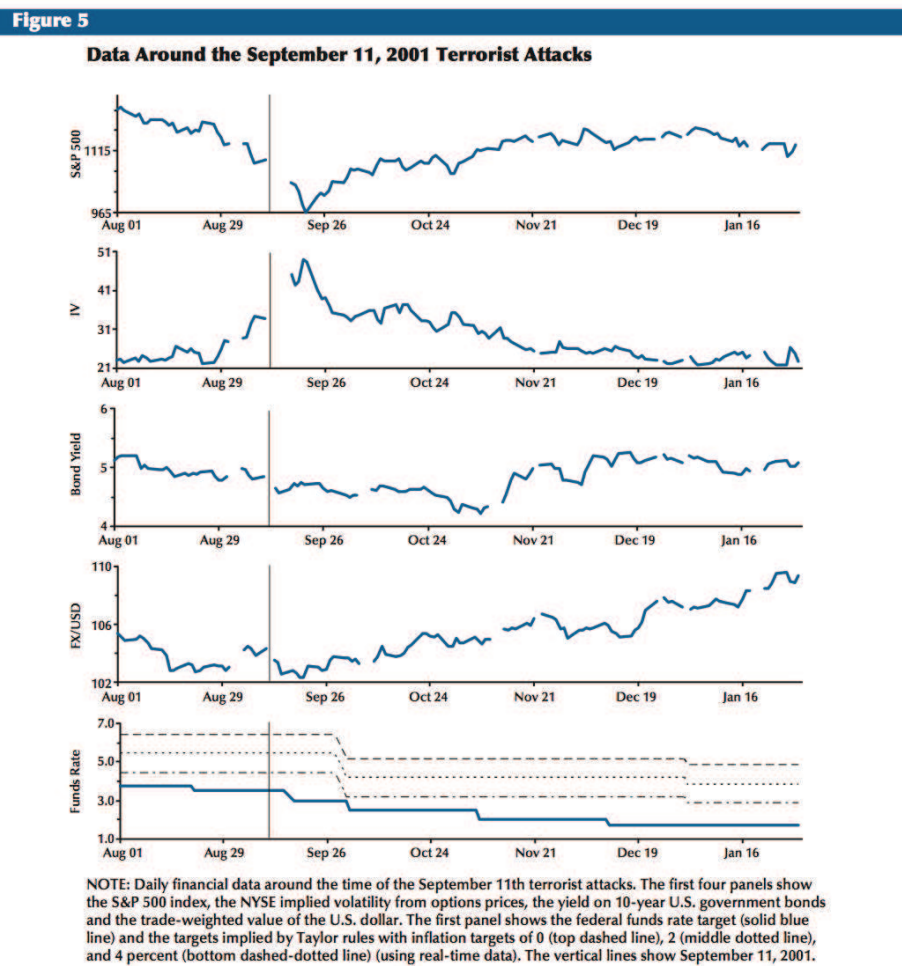


Figure 2.4: Market Reaction around Sep 11

the FED was already reducing interest rates, and the September 11 crisis just accelerated this pace. This means the FED was already responding to underlying weaknesses in the economy, and they responded more aggressively after the attacks.

How was the response? In Figure 2.5, Neely looks at the weekly FED balance sheet. Notice the tremendous spike in lending that takes place right after September 11. There are three mechanisms highlighted in the table: discount, repo, and float. The discount window is where private banks can finance themselves at the central bank's *discount rate*, which is not the same as the *FED's fund rate*, the rate at which private banks can lend to each other. In recent years, the discount rate has been higher than the FED's fund rate, so it is less used than decades ago, except under extraordinary circumstances. The repo, or repurchase agreement, is another way in which the banking system borrows from the central bank. It constitutes the sale of securities together with an agreement for the seller to buy back the securities at a later date. The repurchase price should be greater than the original sale price, the difference effectively representing the interest rate, sometimes called the repo rate. These two are mechanisms in which banks pledge some form of collateral and obtain cash. Finally, the float is the financing that takes place when banks cash checks.

For example, when a bank brings a check to be consolidated, the central bank might provide the cash to the recipient of the check before the amount is credited to the paying bank. This is called the float. What happened following September 11 is that the disruption in air travel affected the payment system — checks had problems arriving to the right place. The FED supported the financial system through all its instruments. In the end, the total “help” is accounted as a deposit in the Central Bank. As can be seen, repos increased by three times, which looks modest when compared to extraordinary increases in lending through the discount window and float. In the end, the total lending by the banking system got accumulated in cash at the FED, and the deposits increased by more than 5 times.

The support from the FED was very effective — and impressive. The banking sector was able to deal with the disruption in the payment system and the panic from the terrorist attack incredibly fast. As can be seen, a month later most of the lending facilities by the FED had returned to normal levels.

Table 2				
Provision of Liquidity in Response to September 11, 2001				
Wednesday figures	Repos	Discount window lending	Float	Deposits at Federal Reserve Banks
Average July 4 to Sep 5	27,298	59	720	19,009
Sep 12	61,005	45,528	22,929	102,704
Sep 19	39,600	2,587	2,345	13,169
Sep 26	51,290	20	-1,437	18,712
Oct 3	32,755	0	173	14,376
Oct 10	33,505	46	5,306	20,986
Oct 17	37,045	1	1,623	27,395
Oct 24	30,050	42	654	18,746

NOTE: Data (in millions of U.S. dollars) were taken from the Board of Governors' H.4.1 releases, July 5 to October 25, 2001. Repos, Discount window lending and Float are labeled "repurchase agreements," "adjustment credit," and "float," respectively, in "factors supplying reserves." Deposits at Federal Reserve Banks are the sum of "service related balances and adjustments" and "reserve balances with F.R. Banks."

Figure 2.5: Weekly FED Balance Sheet

Sometimes policies are very effective, but sometimes they are not. Interestingly, the US Financial Crisis of 2008 does not feel the same way today (8 years later). Even though the actions that followed that crisis were similar to the policy path pursued after September 11, the economy has not responded with the same strength. In fact, it seems as if we have been in recession forever — although technically we have not. Technically, the recession ended in June 2009. Did you get the memo? In Chapter 5, we address the question of why monetary policy has been so ineffective following the 2008 crisis.

Finally, the babysitting cooperative is a very short-run view of the economy. To me, it is a remarkable tool to understand how “things” are interconnected. It explains a great deal of what happens in reality when the economy satisfies certain circumstances. For instance, if we keep capital constant — i.e., no investment — and expectations constant, then the dynamics we have discussed will be replicated in the economy. The intuitions and mechanisms behind policy interventions in the babysitting model are also in line with the policy actions in reality. Having said this, policy actions have limitations. As we give the economy more time to adjust, and consumers more time to form correct expectations (rational expectations), the effectiveness of policies will be reduced. This is an extremely important discussion we need to have. Indeed, most of the disagreement in our profession arises from the different views we have regarding the constraints faced by policy actions, and we will devote several chapters to these issues. Chapters 3 and 4 discuss two short-run models of the economy that provide different perspectives from the babysitting cooperative. Chapters 5 and 6 discuss the channels of Monetary and Fiscal Policy and the constraints they encounter.

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Chapter 3

A “Modern” View of the ISLM

The ISLM is a summary of Keynes’s thinking. This is a model that describes the dynamics of economies in the short run and studies how monetary policy, fiscal policy, and many other things such as consumer’s confidence, affect the economy. It is almost like a formalization of the babysitter cooperative. It has million of critiques, and rightfully so. However, even though from the theoretical point of view it has some holes, it continues to be an excellent way of analyzing and understanding the behavior of economies. Robert Solow once said that all you need to understand the economy is “just the Dornbusch and Fischer, but you have to use it correctly.” The Dornbusch and Fischer is essentially the ISLM model.¹ In practical policy making the ISLM dominates the discussions. The most important assumption required for this model to work is that prices (and in particular wages) are fixed or predetermined in the short run. Of course this is incorrect in the long run, and in some countries it is wrong even in the medium run, but if we are looking at the impact of actions in the very short run (9 months) this is not a crazy assumption.² In fact, Chapter 4 discusses the aggregate supply and aggregate demand model which is an improved version of the ISLM. By the way, in 15.012 (*your beloved and revered Macro class*) we only teach the ASAD. Still I find the ISLM useful and intuitive.

Importantly, this is not an easy chapter. In fact, I have always found students understand things better when they skip this chapter and read it after reading the BBNN chapters. Specially, chapters 8 and 9. To be honest, the derivations of the ISLM are incredibly similar to those in the BBNN, but those are more intuitive. Still, from the content point of view, this chapter should be here.... so.... (you know what I want to say).

Well... enough with all the apologies.

3.1 Model for a closed economy

This model has two schedules that reflect the equilibrium in two markets: goods and money markets. One of the schedules reflects the equilibrium between the supply and the demand of goods: where the implication is that the supply of goods is equal to the demand of goods. The other schedule is the equilibrium in the financial market: where the supply of money is equal to the demand of money. For the sake of simplification

¹See Dornbusch, Fischer, and Startz (2003)

²There are other assumptions that are crucial such as how firms adjust their prices in response to macroeconomic shocks and the prices of competitors. This is a large area of research in economics but most of it is trying to provide theoretical foundations to the ISLM. We concentrate on the intuitions behind the ISLM, let researchers spend our life in trying to make our beautiful theories match the irrelevant particular case called reality.

we assume that the economy is closed. This will help us better understand the basic model; later we will proceed with the more complicated version when there are international transactions on goods and capital. For the moment let us analyze what happens when we have a model that has these ingredients.

Models in macroeconomics are like maps; where the axes are coordinates and the schedules reflect what type of macroeconomic event is taking place. For example, imagine we depict a curve that highlights equilibrium in the labor market. The schedule is intended to capture the circumstances in which the demand and supply of labor are identical. “Circumstances” which are described by output, interest rates, exchange rates, etc. However, there could be other circumstances (other combinations of output and interest rates, for example) in which for a short period of time the demand is higher than the supply (at that moment wages would need to rise to return to equilibrium). The point is that in macroeconomics the schedules already capture equilibriums we consider important, but they also allow us to understand the possible disequilibriums that exist. Hence, they are different from your typical demand-supply models from Micro where the economy or market is supposed to be in the intersection of the schedules at all times unless there is an inefficiency. In Macro we are bombarded with inefficiencies, and sometimes the economy is NOT on the intersection. I hope this becomes clearer below. We will see three important models: ISLM, ASAD, and BBNN. All have at least two schedules, the derivations follow the same spirit, and they all share the “map” intuition I am introducing.

3.1.1 IS

I know I have promised to use the least amount of equations when explaining the models. To explain the IS we need, unfortunately, to clarify the accounting relationship that exists in every economy. This looks like an equation, smells like an equation, but truly is just accounting.

The point behind the IS is that every single good that is produced and supplied needs to be consumed by some agent. This is not a behavioral assumption but simple accounting! This is important because it is not subject to judgement or ideology.

In the babysitter cooperative this takes place automatically. Every time a babysitting service is performed, somebody consumes it. So, the demand and supply of services is equal by construction. When an economy produces coconuts we have to count and track who has the coconuts and what they do with it. In the end, every coconut has to be either consumed or saved or destroyed or transformed, etc. There is no option. Therefore, the equilibrium implies that the supply and demand of goods should equal to each other.

The total supply of goods in an economy is what we call output: denoted by Y . The total demand is what the agents do with all those goods: either they consume (C), invest (I), or the throw them to the garbage (G) – which in some countries the G also stands for government consumption but because in this class we are right wing fanatics it is called garbage. Imposing the fact that the supply of goods is equal to the demand of goods is the basic equation behind the national accounts:

$$Y = C + G + I \tag{3.1}$$

Every country computes the national accounts and this form of computing GDP is what is called the “demand” approach.

We can rearrange this equation such that we equate savings to investment

$$Y - C - G = I \tag{3.2}$$

As can be seen, on the left-hand side we have the total income generated (Y) in the economy minus the expenses ($C + G$). This defines the savings made by consumers and government altogether. The right hand side is the investment.

Isn't this interesting? When we impose that the supply of goods has to be equal to the demand of goods, immediately it has the implication that total savings are equal to investment. This represents the IS in the model - where the IS stands for Investment-Savings.³

The schedule we are going to draw reflects all the combinations of interest rate and output at which the supply and the demand of goods are equated. Those are the circumstances at which there is equilibrium in the good market. The next step is, therefore, to understand how the savings and investment decisions are affected by interest rates, output, confidence, etc.

3.1.1.1 Savings behavior

We are interested in understanding the savings behavior. This all comes from Microeconomics. I know that you all took 15.010 (*your hated Micro class*) and have tried to forget such experience. Specially if Joe Doyle was your teacher. But believe it or not Micro is actually useful. Savings behavior is an intertemporal choice problem. In the economy usually we have two agents making the decision of how much to save: the private sector, and the government.⁴

We know that part of consumers' income is taxed. For simplicity assume the tax rate is fixed and given by τ . The national savings can be written as follows:

$$S = \underbrace{[(1 - \tau)Y - C]}_{\text{Private Savings}} + \underbrace{[\tau Y - G]}_{\text{Public Savings}} \quad (3.3)$$

Where I have just split the output into the proportion that is paid in taxes and the one that remains in the hands of households. The taxes are the income of the government; hence the last term in brackets are the savings of the government, and the first term are the savings of the private sector. Just for completeness governments savings is equal to the negative of the fiscal deficit.

From the microeconomic literature we know that consumers will consume depending on their disposable income and the interest rate. The microeconomic literature does not have a precise answer of what is the effect of interest rates on current consumption because there are two effects that go in opposite directions: the income and substitution effect. The easiest way to understand this intuition is to look at the extremes. It is clear that if the interest rate increases the "return" on saving goes up, and we should move resources from today to the future. This is the substitution effect where we are substituting current welfare - current consumption - for future welfare - saving today for future consumption. However, this is not the only effect. Assume the interest rate is infinitively large. In other words, assume that you get infinity resources tomorrow if you save one dollar or one million dollars today. What do you prefer? Clearly saving today a million dollars imply reducing my consumption today by that amount. But what is the benefit? In both cases I obtain infinite resources tomorrow, so why bother saving today. Why not have a party today and tomorrow? When the interest rate is high it implies that individuals that are saving are richer. If individuals are richer they should consume more in all periods. The first effect implies a reduction in today's consumption, while the second one implies an increase in today's consumption. It is unclear which effect dominates. Again for completeness, consumption in the future increases unambiguously - both effects go in the same direction.

This is an important question in economics. However, we are not interested in solving this problem here, and we will make the assumption that savings and consumption are unaffected by the interest rate. This is obviously a simplification, but empirical research says that both effects roughly cancel each other. When this is the case, we can write consumption purely as a function of income.

In the BabySitter cooperative we discussed the impact of "fear" in the economy. We want to capture

³I always thought it meant Idiots from Sloan, but I have been told otherwise.

⁴By the way, in the open economy version of the ISLM there is another sector that contributes to the savings of the country: the foreigners.

such events in the ISLM. We can interpret that fear is similar to a decrease in consumer confidence. Of course, consumer confidence would depend on other aspects as well. Aspects such as employment conditions, fiscal sustainability, and many others would affect the willingness of consumer to convert their income into consumption. In the consumption literature this willingness is known as the marginal propensity of consumption. So, if a consumer earns 100 dollars, has to pay 20 percent taxes means that the disposable income is 80. How much it consumes from that income is the marginal propensity of consumption.

Individuals and societies are different in this regard. Some societies have a very high saving rate, others are even negative. For example, in my family my wife has an astronomically large saving rate. When MIT increases my salary – which happens once every 200 years – she is extremely happy, not because we can improve our car, but because she can save more money. I am exactly the opposite. I am a true American. You give me 100 dollars and I leverage that 40-to-1 and I purchase a new Canon 5D Mark III – or a new lens. Just for the record I have a crappy Toyota Corolla which should indicate who is the dominating figure in my household. In any case, we want to capture the average behavior in the private savings. To do so, consumption will be related to the disposable income through the marginal propensity of consumption.

$$C = c(1 - \tau)Y$$

Where c (less than one) is the marginal propensity to consume for each additional unit of disposable income $((1 - \tau)Y)$. The marginal propensity to consume is an important aspect of consumption decisions and it fluctuates! For example, when consumer confidence improves it is reflected in a larger propensity to consume. Fear, as what we discussed after the 911 events, imply a smaller propensity to consume.

Under these assumptions, savings in the economy can be written as: (adding the private and public sector savings)

$$\begin{aligned} S &= (1 - c)(1 - \tau)Y + \tau Y - G \\ S &= (1 - c(1 - \tau))Y - G \end{aligned}$$

Note that if Y or τ increase, savings increase. If G or c increase, savings decrease. We will represent this in the following way:

$$S = S \left(\overset{+}{Y}, \bar{G}, \overset{+}{\tau}, \bar{c}, \bar{\text{Confidence}} \right) \quad (3.4)$$

where the signs over the variables summarize the relationship between the variable and savings.

One interesting aspect to discuss is the impact of confidence. If consumers are more confident about the future – so, their expectation of the future is that everything is going to be better than today – it is likely that they will save less! As in the case of the babysitter, when fear strikes, individuals tend to save more; where fear is the opposite of confidence.

3.1.1.2 Investment

Let us now concentrate on investment. It is easy to argue that investments in the economy are inversely proportional to the interest rate. This is Finance 15.401 (*your beloved yet hated basic Finance class*). The nominal interest rate is some measure of the cost of capital, and according to our micro theories, we should observe less accumulation of capital when the interest rate increases. For simplicity we assume that investment is entirely driven by interest rates and business confidence. Of course there are other things that matter for investment; such as credit availability, health of the banking system, rule of law and contract enforcement, corporate governance, etc. We will oversimplify and put all these variables as affecting business confidence. Hopefully, you remember they affect investment, but putting every one of them in the equation just makes it long and useless.

$$I = I \left(\bar{i}, \text{Business } \overset{+}{\text{Confidence}} \right) \quad (3.5)$$

Where i is the interest rate, and the sign indicates that an increase in interest rates reduces investment. As in the case of savings, if business confidence improves, then more investment is likely to occur. The opposite is exactly what happens in a financial crisis. Confidence plummets and investment drops with it.

3.1.1.3 Equilibrium

The schedule is derived in Figure 3.1. We are going to depict all the combinations of interest rates and output levels at which the demand and supply of goods are equal. In other words, every point we will depict (the IS schedule) represent an equilibrium in the goods market.

Again, the easiest way to think about the ISLM is that it is a map where the coordinates are output and interest rates (Y and i); where output will be on the x-axis and the interest rate is on the y-axis. We are free to move output and interest rates as we want (two joysticks in the Nintendo) and there are some combinations at which demand equals supply — i.e. the economy is in equilibrium. So, the idea is that we have — for the moment — total freedom in choosing the interest rate and output we desire and only some combinations are consistent with demand equal supply; of course, in the end we will chose them, however, to make sure the demand and the supply of goods are equal. Let us see this in more detail.

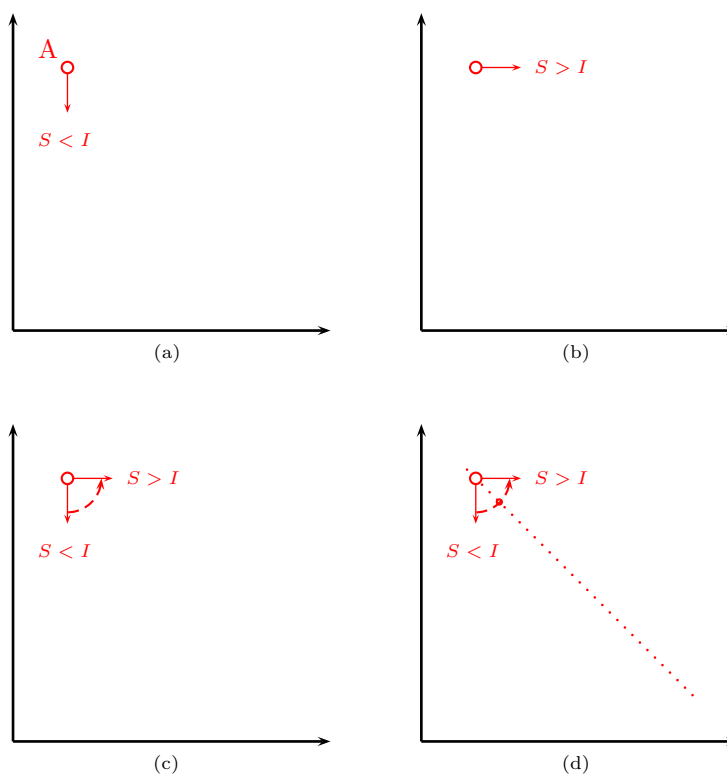


Figure 3.1: ISLM: Investment-Savings

Assume that point A (in panel (a)) is a point in which there is equilibrium: Therefore savings are equal to investment (supply equals demand). The task is to find the next point of equilibrium. Assume we maintain the same output and reduce the interest rate. As we argue before, there is no change in consumption (this is obviously a simplification) and therefore total savings remain the same. However, there is an increase in

investment. This is depicted in Panel (a). Thus this is a point in which savings are smaller than investment, and the economy is not in equilibrium. Assume that we return to equilibrium A. Now, maintaining the same interest rate, we increase output in the economy. According to our behavioral equations investment remains the same, but savings increase. Thus this is a point in which savings is larger than investment (depicted in Panel (b)). So, moving straight to the right puts the economy in a situation of disequilibrium. We have found two points of disequilibrium. One in which savings are larger than investment, and one in which savings are smaller than investment. Going from the point in which savings is larger than investment to the point in which savings is smaller than investment we have to cross a point in which savings is equal to investment (Panel (c) and (d)). What this implies is that all the points in which savings are equal to the investment are represented by a downward sloping curve. The IS (Investment equals Savings).

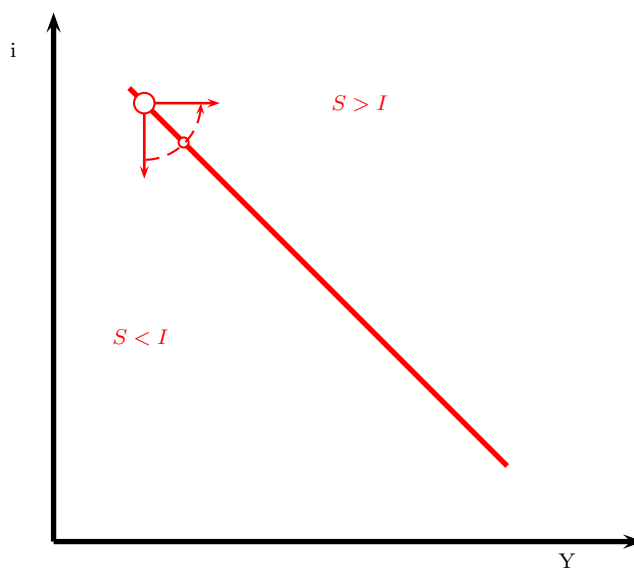


Figure 3.2: ISLM: Investment-Savings (summary)

The intuition is quite simple. If we are at a point in which savings are equal to investment, a reduction in the interest rate will produce an increase in investment that has to be compensated by an increase in savings – so the economy returns to equilibrium. The only way to accomplish the increase in savings is to increase output increasing savings. In other words, the decrease in the interest rate needs to be compensated by an increase in output to return to equilibrium. As long as the economy moves along the IS curve, every decrease in interest rates implies an increase in output.

The line has been constructed by finding the interest rate-output combination that achieves equilibrium. So, changes in interest rates or output move the economy along the IS curve. Everything else in the economy, instead of moving along the curve, moves the curves. For instance, if taxes are changed, then the schedule needs to move – in other words, the combinations of output and interest rate at which savings equal investment change if taxes have shifted.

For example, in Figure 3.3, assume we are at point A. At that point we have that investment is equal to savings. Let’s analyze how a shock moves the schedule.

If there is an increase in government expenditure (or a reduction in taxes, or a reduction in the savings

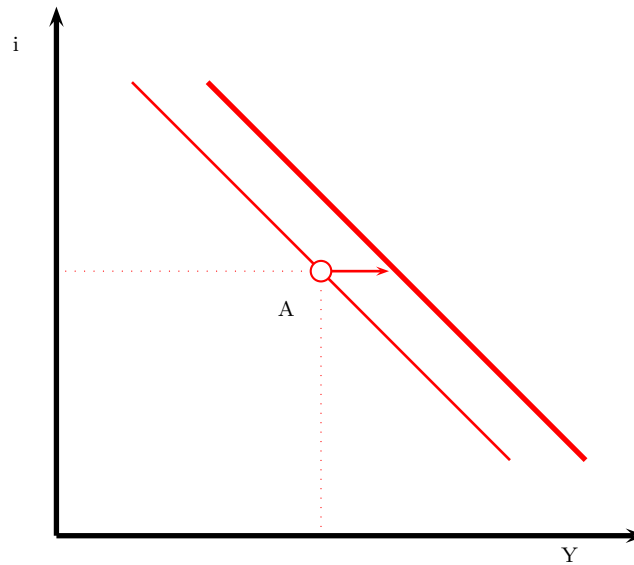


Figure 3.3: IS: Increase in Government Expenditures

rate) total savings in the economy are going to go down. Therefore, at the initial interest rate and the initial output level, point A is no longer an equilibrium. Why? because at that combination of interest rate and output investment remains exactly the same as before, but savings has come down. so, at the original point, with the new government expenditure, investment is not equal to savings. Therefore, the schedule CANNOT cross that point!

In order to return to equilibrium we have to find the new combination of interest rate and output that returns to equilibrium. We do so, by starting from the original point and try to find where the new equilibrium is (relative to the original point). Hence, we try to answer the question: is the new equilibrium to the right or the left? or above versus below?

To return to equilibrium we need to either reduce investment or compensate the loss in savings. Thus, either output goes up (to increase savings), or the interest goes up (to reduce investment), or both. This means that the new equilibrium is to the right/above of the original point. Therefore, the IS schedule has shifted rightward/upward. We will come back to these points later. The purpose of policy in general, is to fine tune the economy to achieve a desired output-interest rate level.

3.1.2 LM

Now lets concentrate on the other market: the equilibrium on the monetary side. Assume there are only two assets: currency and government bonds. Money does not earn interest, but the government bonds carry the market interest rate: i . Currency, however, has a role in the economy given that it allows people to perform transactions that otherwise could have not been implemented (pay cabs, buy coffee, corrupt some officials, etc.).

We assume the supply of currency is determined by the central bank: M_s .

3.1.2.1 Money Demand

The demand for currency is then determined by what the consumers decide to do with their holdings. We assume consumers solve a portfolio problem and allocate part of their wealth (which is proportional to income: Y) as currency and the rest is saved in bonds.

We should expect two things: First, when the interest rate increases a smaller proportion is held in currency. The intuition is that the opportunity cost of holding cash increases. Individuals should shift part of their portfolio toward bonds. Second, when wealth increases individuals should hold more cash. In other words, when wealth increases, the share assigned to money might decrease, but not in such a way that will overcome the initial impact.

In other words, we should expect that an increase in the interest rate reduces the demand for money, and that an increase in output will increase the demand for money. Also, there are other aspects that determine the demand for currency, such as credibility. If there is a reduction in the credibility of the currency the demand for money should fall, the opposite if credibility increases.

You can think of this demand as a transactional demand for money. The more transactions there are, the larger the cash required to perform them. Thus, the demand for money is assumed to behave as follows

$$M_d = M_d \left(i^-, Y^+, \text{Credibility}^+ \right) \quad (3.6)$$

Notice that in the money market is where the interest rate has the portfolio implication it is usually assigned to interest rates. In general when I ask people what does the interest rate do to savings, they tend to say you save more. When I ask why do you say so the immediate answer is a portfolio recomposition description: “I would save more in the savings account”. This is what is captured in the LM curve. Agents recompose their portfolio reducing cash holdings and increasing bond holdings (or savings accounts). This does NOT mean that the agent is saving more! Saving is about what proportion of your income you are not consuming.

In summary, the IS is about the real economy – goods, production, investment, and savings. The LM is about the financial sector and the money market. In the LM consumers are making a portfolio decision between bonds and cash taking the total amount of savings as given. In the IS they assume there exists a portfolio return and decide on how much to consume and how much to save. Two different decisions indeed. For example, assume consumers have some wealth (W) that they allocate between two assets: money (issued by the central bank) and government bonds (issued by the bad guys). The consumer has to decide how much should be allocated to bonds and how much to money. Money produces utility to consumers given that it provides some services. Bonds, on the other hand, pay an interest rate. We are not terribly interested in the particular portfolio problem when thinking through the IS curve. This decision is an issue of the LM – and it should be intuitive that the demand for bonds is a decreasing function of its price. Again, this is exactly the intuition you had when we were talking about savings in the IS curve. Most of you said that if the interest rate increases you increase savings – that answer is wrong (as I probably highlighted in class and made fun of you.... and if I did not make fun of you let me use this recourse to remind you that your intuition is right but the answer is wrong). Let me remind you that because of the income and substitution effects total savings do not necessarily increase. However, savings deposited in bonds (or saving accounts) definitively increase. So, your intuition is correct from the portfolio point of view. And the LM is exactly capturing that financial decision.

3.1.2.2 Equilibrium

Let’s draw the curve then. This is presented in Figure 3.4.

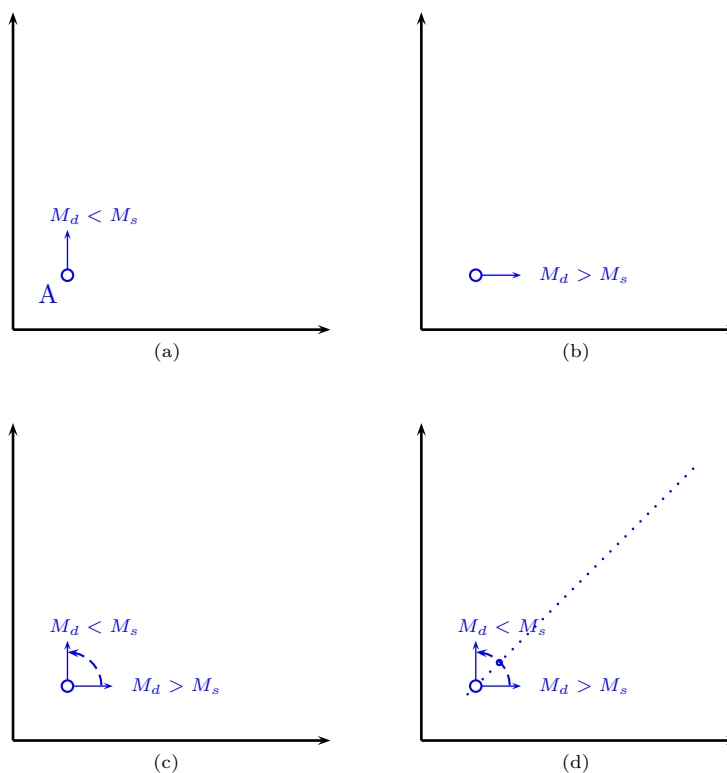


Figure 3.4: ISLM: Liquidity Demand and Money Supply

Assume point A is a place in which the demand for money equals the supply. Assume there is an increase in the interest rate maintaining output constant. We have argued that the demand for money will fall, because the supply is determined exogenously by the central bank, this is a situation in which the demand for money is smaller than the supply. Assume that now we return to point A and we increase output only. Income goes up and the amount required in cash increases. The demand for money is larger than the supply. We have found two disequilibrium points starting from equilibrium A (These are depicted in panels (a) and (b) in Figure 3.4). Moving from one disequilibrium to the other one – from money demand larger than money supply, to money demand smaller than money supply – we will have to cross a point at which the money demand is equal to the money supply. This implies that the LM is an increasing schedule.

Let's see what happens when there is an expansion in the money supply: the central bank is printing! Assume that we are at point A in Figure 3.6, where there is equilibrium in the money market. If the central bank increases the money supply, suddenly A is a place in which the demand for money is smaller than the money supply. Therefore, for the same interest rate and output, point A is no longer an equilibrium. The schedule CANNOT cross that point! To return to equilibrium, then, it is necessary that the demand for money has to increase. This is achieved by increasing output, reducing interest rates, or both.

3.1.2.3 Central Banking

Have you ever heard central bankers talking about money? Don't they usually talk about interest rates only? Well, yes and no.... So, it depends... They do conduct their normal monetary policy using commentary where

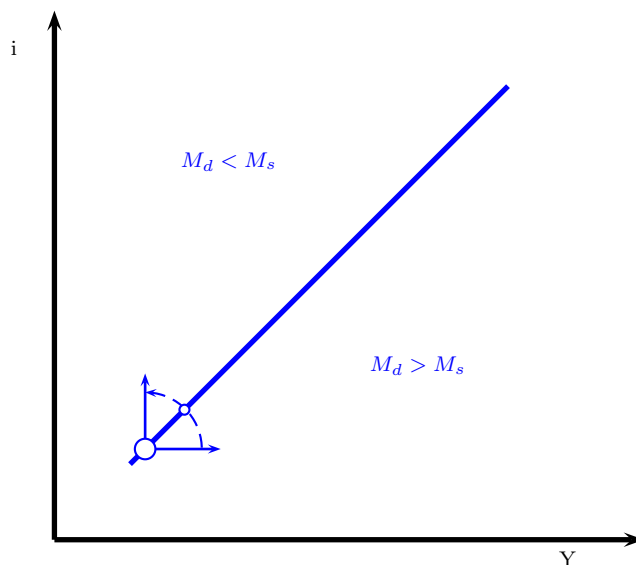


Figure 3.5: ISLM: Liquidity Demand and Money Supply (summary)

the interest rate target is what is usually emphasized. However, in the end, they mostly print. The action of printing, nevertheless, has a direct impact on the interest rate.

In order to explain the intuition let's assume a simple bond: a 1 year zero coupon bond. The price of these bonds is given by $P_b = 1/1 + i$ where i is the yearly interest rate.

In Figure 3.7, Panel (a), the equilibrium in the bond market is shown. The supply of bonds is fixed and vertical, while the demand of coupons is what consumers would like to hold given bond prices. The demand is decreasing in the sense that a smaller price leads to larger demand – or in other words, a higher interest rate implies a higher demand for bonds. Assume that the central bank prints. The transaction they usually perform – known as an open market operation – implies buying treasury bonds and paying with cash. This increases the demand for bonds. In other words, from the perspective of the bond market, when the central bank enters buying bonds that is equivalent to an increase in the demand of bonds. This shifts the demand curve up and to the right. This implies that the equilibrium price increases from P_0 to P_1 . Notice that an increase in the price is exactly a reduction in the interest rate.

Therefore, an increase in the money supply through open market operations leads to an increase in the demand of bonds and a decrease in the interest rate. Because in this market the change in money supply and interest rates are one-to-one a central bank could announce a reduction in interest rate and print until the desired reduction takes place, or it could print certain amount and observe what is the interest rate at which the market clears. In the end, the market arrives to the same point, the only difference is how the policy is announced. We come back to these points in greater detail when the central bank accounting is discussed in Chapter 5.

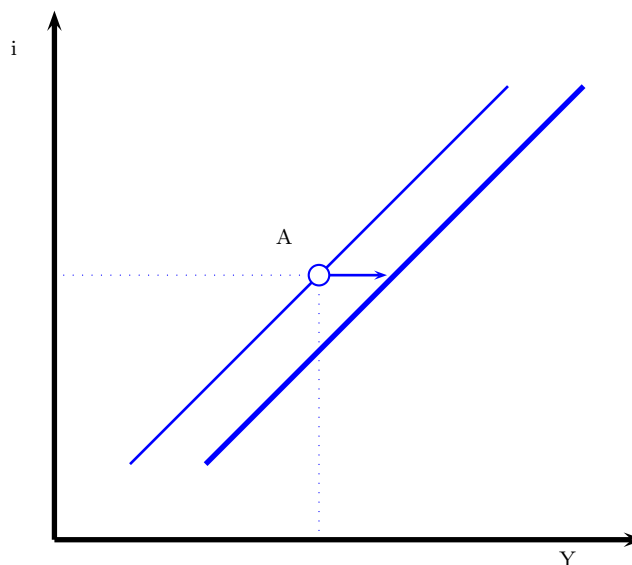


Figure 3.6: LM: Increase in Money Supply

3.2 ISLM: putting all together

Lets now put both schedules together. As any respectable model in economics, there is a downward and an upward schedule. As it should be expected, they intersect once, and we tend to like this point. This model indicates what is the unique combination of output and interest rates that is consistent with both equilibrium in the goods market and equilibrium in the money market.

The usual way in which the ISLM is viewed is as a “policy advise” tool. For example, the typical thinking is as follows:

Imagine you do not like the equilibrium. For example, assume that output is too low – and therefore unemployment is much larger than what is socially acceptable. Then, we could do something to change the equilibrium. Just increase output. We can do this by just increasing government expenditures or printing money.

Assume the interest rate is too high for the level of investment desired to achieve growth in the future. Well, then something can be done to change the equilibrium. Just lower the interest rates. We can achieve this by printing money or by reducing government expenditures.

This is exactly where most of our discussions in macro become a nightmare: one thing is to describe what happens in an economy, another one is how the economy can be manipulated. Rational expectations, for example, assumes that agents are not stupid and therefore because they know the same model that the policy maker knows, any intention to manipulate the economy would be impossible. Agents would anticipate such actions, rendering them useless. Let me discuss both sides of the coin: when things work as described in the ISLM, and when things do not.

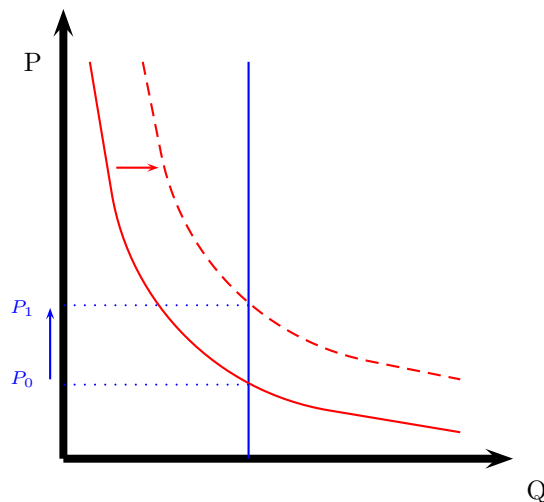


Figure 3.7: Central Bank: Bond Market and Printing

3.2.1 When things work adequately

Let start by analyzing the economy when things are working properly – which if you are from Chicago this is equivalent to assuming individuals are idiots. We have discussed briefly several shocks that move the schedules. The IS moves when taxes, government expenditures, marginal propensity of consumption, consumer confidence, and business confidence move. The LM moves when money supply changes, and when confidence on the currency shifts. Of course, confidence on the currency depends on the health of the financial sector, hence, we can treat them as the same. Whenever any of these variables shift, the schedules move. The key is to understand where they move.

The people that need to “control” the economy treat it as a system where the levers are taxes, government expenditures, monetary policy, etc. In other words, the treasury and the central bank have mandates to “control” the economy and therefore use the tools at their disposal to reduce short term fluctuations. For instance, imagine that consumer confidence drops (and overreacts) to Sep 11, then the government can do something to compensate – at least in the short run. Central banks are supposed to care about inflation, and financial stability, while the Treasury should care about growth, employment, income inequality, etc. It is this need to affect the equilibrium that leads to active economic policy. Sometimes it is abused. Sorry... MOST of the time it is abused. However, the intention is warranted.

First, let us analyze the changes in the IS curve. See Figure 3.9

The idea of how to understand how the schedules move is to follow a simple procedure. Assume we start at the equilibrium A . Assume we keep the interest rate and the output level exactly at those that describe point A . Now assume that either the government expenditure increases (G), or consumer confidence increases (c), or taxes decrease (τ). All three of these actions decrease total savings in the economy for a given level of output and interest rate. In other words, point A used to be on the IS because at that combination of interest rates and output the supply of goods was equal to the demand of goods and therefore savings were equal to investment. But after the shock, savings decrease but investment remains the same. And we know investment does not move because we have not changed the interest rate nor business confidence. So, this implies that the original combination of interest rate and output cannot be an equilibrium anymore. The new IS cannot cross through the original point. In fact, the original point is one in which savings are smaller than investment. The next step is to find the placement of the new equilibrium relative to the old one. In fact, to return to equilibrium we need to move to the right. We need more “output” to increase savings to

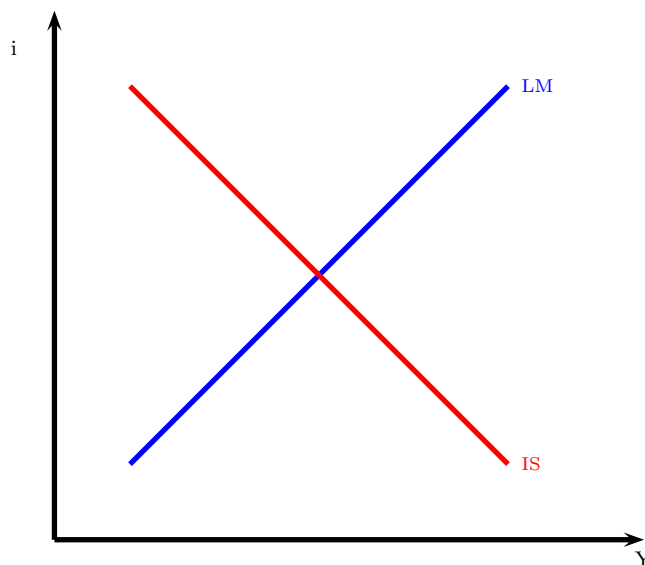


Figure 3.8: ISLM: The Model

its original level. That occurs at the same interest rate but at a higher level of output. The new IS is to the right of the original one and the new equilibrium in the economy is at B – where the level of output is higher and the interest rate is higher.

Let us now turn our attention to the LM schedule. See Figure 3.10. As discussed before the LM moves when the money supply is changed (M). As before we analyze every shock in three steps. First, we start at point A where the goods and money markets are in equilibrium. We are going to fix the interest rate and output of that equilibrium. Second, we shock the economy. Assume we increase the money supply. At the original interest rate and output level the money demand is unchanged. Therefore, the money supply is larger than the money demand. So, point A can no longer be an equilibrium in the money market – the LM cannot cross through that point. On the other hand, because nothing has changed in the IS the original equilibrium is still an equilibrium of the IS. Third, once we know which schedule has moved the question is where it has moved. We know that at the original point A the demand for money is smaller than the supply of money. This means that to return to equilibrium we need to increase the demand for cash. That can happen by reducing interest rates – i.e. there will be a portfolio recomposition from savings accounts to cash. So, the new LM needs to be below the original LM. The LM' is below and to the right of that means that the new equilibrium is one in which interest rates fall and output increases – point B .

I have depicted how the schedules move when there is a change in fiscal or monetary variables. The arrows reflect how the curves move when there is an increase or decrease in the variable highlighted. In summary, an expansionary monetary policy reduces the interest rate and increases output in the short run, and an expansionary fiscal policy (either an increase in expenditures or a tax-cut) increases the interest rate and output. Finally, a decrease in the marginal propensity to save increases the interest rate and output.

A very important discussion in the literature was the slope of the curves (this took place 20-30 years ago). In particular, a very important discussion was whether or not some of these curves are totally vertical or horizontal. The interesting thing is that each of these cases has a particular name and is kind of a particular

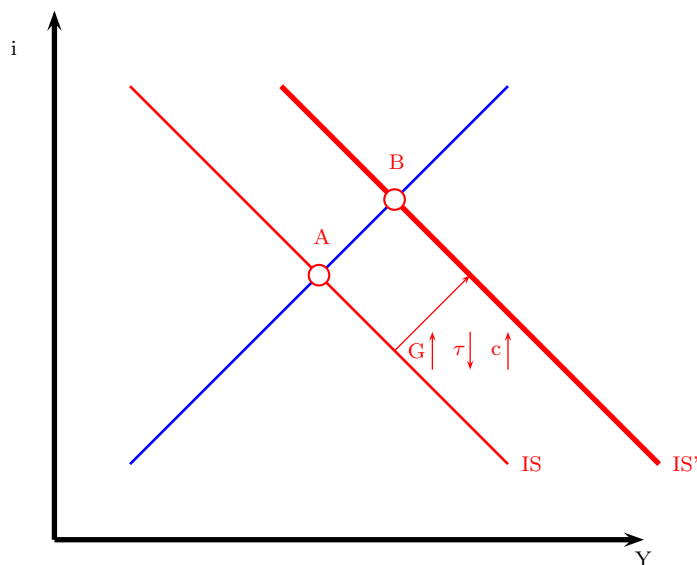


Figure 3.9: ISLM: Shocks to IS

“sickness” that an economy suffers.

3.2.2 Limitations and Restrictions

The ISLM has many limitations and restrictions. For example, it assumes that if the demand increases then output increases. This might be true in the short run, but it is not clear that it is possible to increase output up to infinity by increasing money supply to infinity. There must be a limitation; and the ISLM is obviating it. Second, the mechanisms how this limitations is reflected in the economy is through price adjustment. I will discuss all these limitations by introducing a new framework – the ASAD (Chapter 4). Furthermore, Chapters 5 and 6 are completely devoted to highlight the channels, limitations and restrictions behind the ISLM. Here I would like just to highlight some of them and leave the deeper discussion for later.

I highlight the lack of effectiveness in the ISLM first by looking at special cases where particular slopes of the curves make policy actions more or less effective. These are important cases called Liquidity Trap and Crowding Out. Second, the ISLM assumes agents expectations are not fully rational. This is perhaps its greatest weakness. In general for the ISLM to work the way we have discussed agents have to be either irrational, have problems updating expectations – known as bounded rationality or adaptive expectations. I discuss these two aspects briefly.

3.2.2.1 Liquidity Trap: Ineffectiveness due to “slopes”

After the 2008 crises, and mostly during Japan’s two decades of recession, the word liquidity trap has made it to every news outlet. A liquidity trap is a situation in which printing money fails to lower interest rates – rendering monetary policy ineffective. A liquidity trap is caused when people hoard cash because they

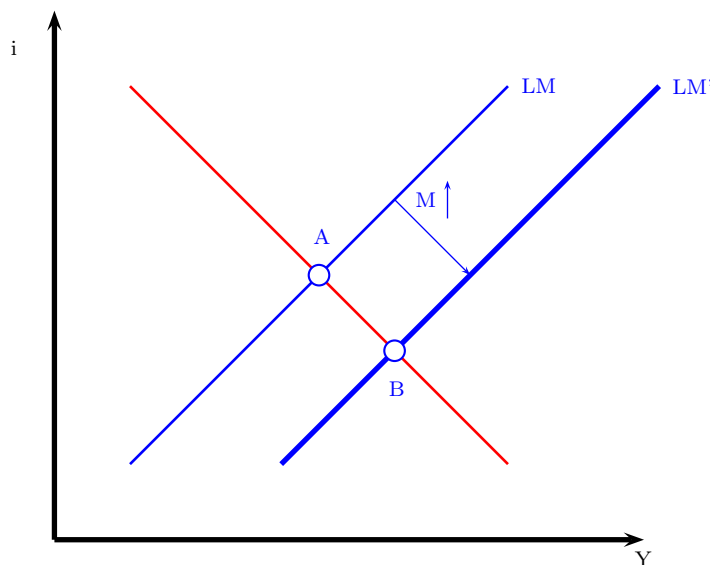


Figure 3.10: ISLM: Shocks to LM

expect an adverse event such as deflation.

One important indication an economy is close to a liquidity trap is that interest rates are close to zero, and increases in the money supply have no implications on interest rates and inflation. Sounds familiar?

The graphical representation of the liquidity trap is quite simple. Assume the LM curve has a flat part – at the beginning when output is very small. If the economy is working on this section, an increase in money supply moves the LM to the right. The problem is that on the flat side the movement to the right implies no change in the equilibrium.

In Figure 3.11 this situation is depicted. The continuous blue line represents the LM curve before the monetary policy expansion. The blue dotted line is the LM after money has been printed. In the section of the LM that is sloped the printing has the usual implications – it moves to the right. If the IS were in that region the expansionary monetary action would imply a reduction in interest rates, and an increase in output and demand. However, as shown in the figure, if the IS crosses the LM on the flat side then the equilibrium of the economy does not move. All the increase in money supply has no implications on interest rates, output, or demand.

This is the “famous” liquidity trap. This is a situation in which central banks become relatively ineffective.

What to do? First, it is important to understand why the economy is operating in such place. Is it because consumers are depressed and they are hoarding cash, or is it because the banking system is over regulated or scared and they are the ones hoarding the cash, etc. The reason why it is important to know why the economy is hoarding cash is important because the second step, which are the policy actions, are conditional on which agents is the one hoarding. The policy actions usually try to resolve the problem leading to the excessive insensitivity. Sometimes it requires deregulation, sometimes it requires a change in expectations, etc. For example, in Japan, because agents have been expecting deflation for so many years,

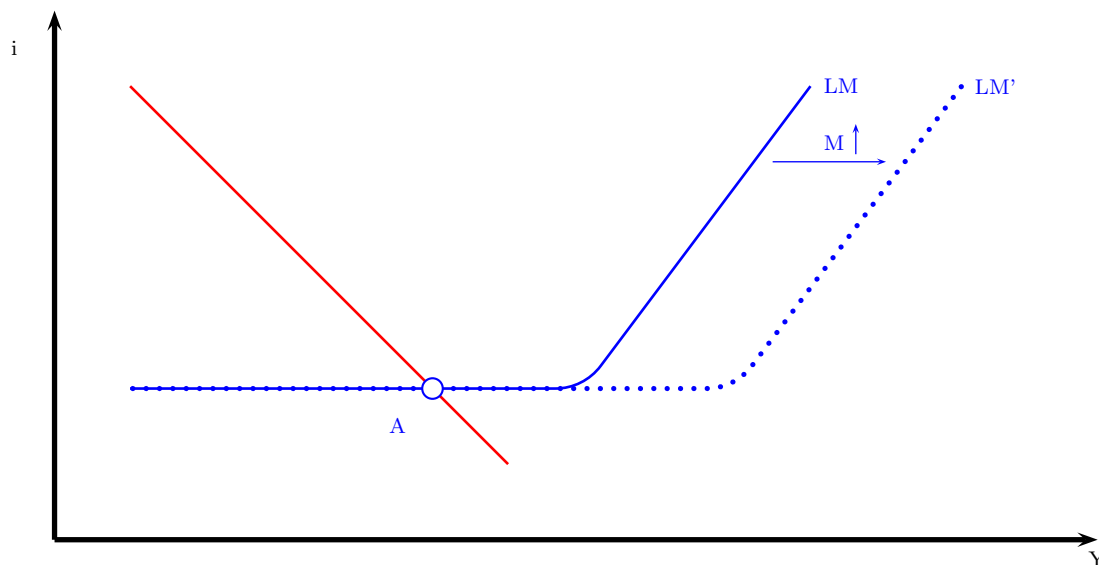


Figure 3.11: Liquidity Trap

they hoard cash. There is no implicit inefficiency in the economy that we could point out, it is just the fact that deflation creates incentives to delay purchases and to hold cash. In this case, the policy action is to create inflation. So, printing excessively and directed to the consumers with the largest marginal propensity of consumption is the correct prescription. If the problem is in the banking sector the medicine is different.

3.2.2.2 Crowding Out: Ineffectiveness due to “slopes”

Crowding Out refers to the situation in which a fiscal expansion has an increase in interest rate so large that the aggregate demand remains constant.

The increase in interest rate after a fiscal expansion is what usually the ISLM prescribes. Remember Figure 3.9 where an expansion in fiscal policy moves the economy from equilibrium A to equilibrium B. In equilibrium B the interest rate is higher, but output is higher as well. Having said that, the increase in the equilibrium interest rate implies that the level of investment is smaller! in other words, the investment in B is smaller than the investment in A. The aggregate demand and output are larger because the increase in G is not totally offset by the decline in investment. Crowding out is exactly the circumstance in which the decline in investment is large enough to reverse the positive effect of the government expenditure increases.

In terms of the ISLM the way we depict this situation is by assuming that the LM curve is vertical. In Figure 3.12 we can see that the increase in government expenditures (moving the IS from IS to IS') moves the equilibrium from A to B. This has no impact on output, and all the government expansion is gone in just higher interest rates.

There are other aspects very interesting about the different implications the slope of the schedules have. Although it is very interesting this is generally well addressed in standard macro textbooks. See Blanchard (2006) and Mankiw (2003) for two very good books on Macroeconomics. Also see the classic Dornbusch,

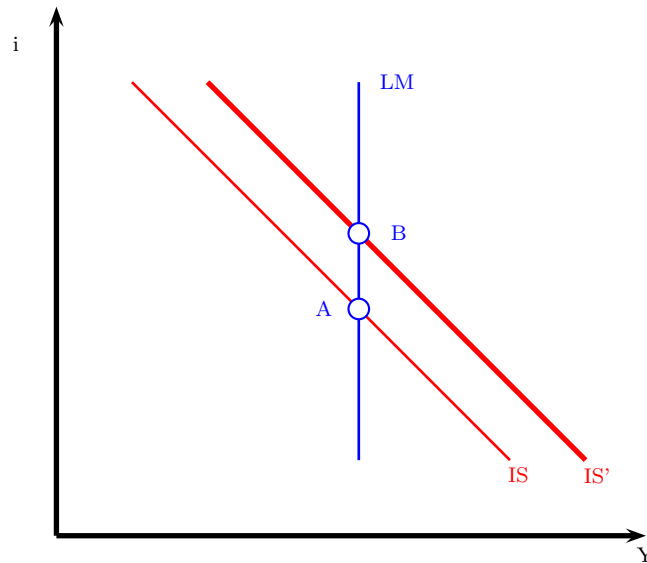


Figure 3.12: Crowding Out

Fischer, and Startz (2003). Everything you need to know about the ISLM (and much more) can be found there.

3.2.2.3 Ineffectiveness based on Rational Expectations

One of the most important critiques to the ISLM came with the rational expectations revolution.

The ISLM needs prices to remain relatively sticky. In fact, in the short run prices need not to adjust, and agents do not anticipate the impact of monetary and fiscal policy decision. This is a very strong assumption. It assumes that governments take actions over and over again and agents are continuously surprised.

For example, if a government increases expenditures or reduces taxes today and agents know that this implies that taxes will need to be increased in the future to pay for the financing of such expenditures, then it is conceivable that agents will not increase their consumption at all. In other words, if they are completely rational they should anticipate the increase in taxes and save the additional resources they receive today. More precisely, imagine that the government gives every household today 1000 dollars and they know the government is going to tax them one month later exactly by 1000 dollars plus the interest rate. What do you think agents would do? Don't you think it is reasonable that agents just save the subsidy in a savings account because they know the government is coming to take away what was given today? If agents have rational expectations they can solve this problem in terms of net present value and increases in expenditure today that imply taxation and/or default years ahead are fully anticipated – rendering tax cuts and expenditure increases ineffective.

The same with monetary policy. Prices should adjust at some point in time, so if the FED doubles the amount of currency in circulation, prices will double. If that occurs the impact in the economy in the long run is null. If agents are rational then they should fully anticipate the impact on prices and there is no need

to delay price adjustments. In fact, that is exactly what happens during a hyperinflation. Prices adjust daily and therefore printing has at most a impact for a day!

In fact, the biggest limitation of the ISLM is its inability to model the limitations of fiscal and monetary policy. The limitation of fiscal policy is the budget constraint – the intertemporal budget constraint. The net present value of revenues has to be equal to the net present value of expenditures. So, an increase in expenditures today needs to be compensated by increases in taxes later. That simple! But the ISLM does not include this restriction. Therefore, whatever the expectations, rational or irrational, the model is unable to answer questions where countries face serious budget constraints. Similarly, the limitation of monetary policy is inflation. If I add a zero to the currency, and I add a zero to every single price in the economy – including wages – the real impact of such action is minuscule or null. So, when prices adjust monetary policy becomes irrelevant. That simple! But the ISLM does not include this restriction neither.

This does not mean that the ISLM is useless. Not at all. It means that it has to be used carefully. In every model in macroeconomics is as important to understand what we include in the models as what is excluded. In the ISLM the budget constraint of the country, and inflation have been excluded. So, in circumstances where inflation or the level of the sovereign debt is dangerous you should be careful in drawing conclusions directly from the ISLM.

Finally, the ASAD model at least deals with inflation – which is a mayor improvement from the ISLM. That is the topic of next chapter.

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Chapter 4

A “Modern” View of the ASAD

In Chapter 3 we summarized the Keynesian thinking in what could be considered the most famous and known framework in macroeconomics. In this chapter we address the Aggregate Supply – Aggregate Demand. This framework is very similar – in principle – to the ISLM in the sense that studies how demand actions (such as monetary and fiscal policy) affects the economy. It has two improvements over the ISLM. First, it allows for a different treatment between the short and long run – So, the supply side of the economy can react. Second, it actually deals with the price level. If you think about it, the ASAD deals with two of the most important critiques the ISLM has.

The derivation of the ASAD is much simpler. Each schedule have an intuitive counterpart from microeconomics. The ASAD actually has three schedules. The aggregate demand, the short run aggregate supply, and the long run aggregate supply. The axes on the ASAD are the aggregate price level (y-axis) and quantities (x-axis).

4.1 Aggregate Demand

The aggregate demand is similar in intuition to what you discussed in 15.010. Do you remember? Demand curves tend to be downward sloping? The difference is that the aggregate demand in a country is given by more than what the consumers consume. In a closed economy it is given by consumption plus investment plus government expenditures – exactly what we discussed in the ISLM. Because of this the intuition that the demand is downward sloping is a little bit more convoluted. For the aggregate demand to be decreasing we need that the demanded quantities to increase when prices decrease. That is true for consumption – as you discussed in microeconomics. However, there is no reason why government consumption needs to increase when prices drop – or investment for that matter. So, we need some discussion or assumptions. We will assume that the aggregate demand is depicted for a constant level of government expenditure and money supply. The fiscal and monetary sides, therefore, are assumed away.

The aggregate demand – in the end – summarize the main aspects discussed in the ISLM. In other words, when money is expanded aggregate demand increases; when taxes are decreased or government expenditures increased the demand goes up as well. The relationship is between prices and quantities – as opposed to equilibrium relationships with interest rates and output like in the ISLM. So, in principle it is much easier to understand.

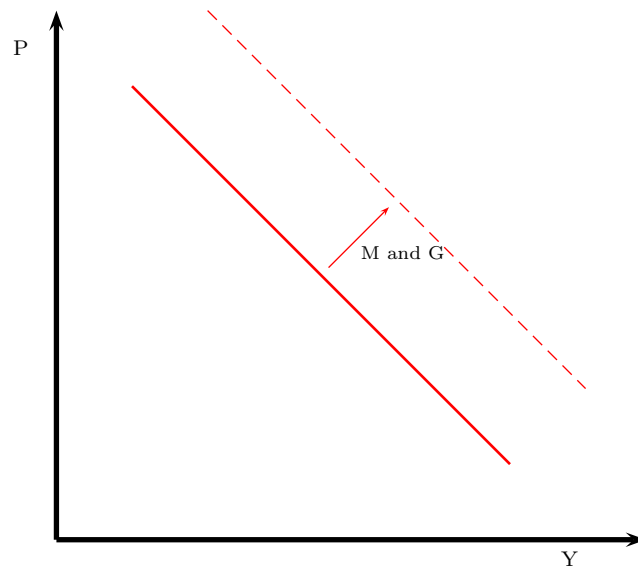


Figure 4.1: Aggregate Demand

4.2 Aggregate Supply

4.3 Equilibrium

4.3.1 Increase in Aggregate Demand: Short and Long Run Consequences

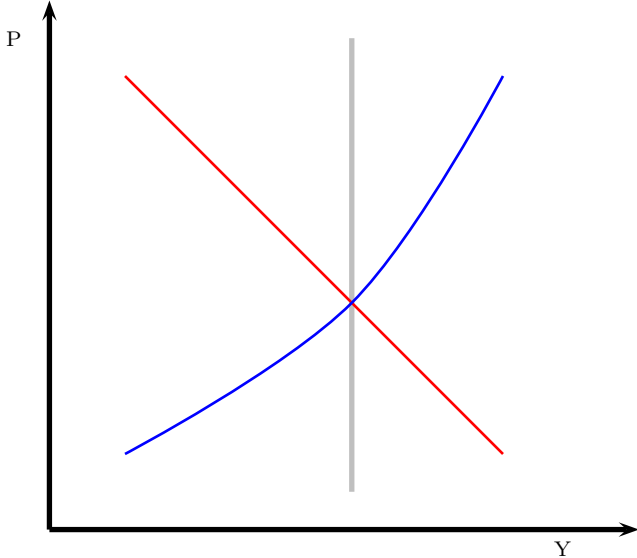


Figure 4.2: ASAD

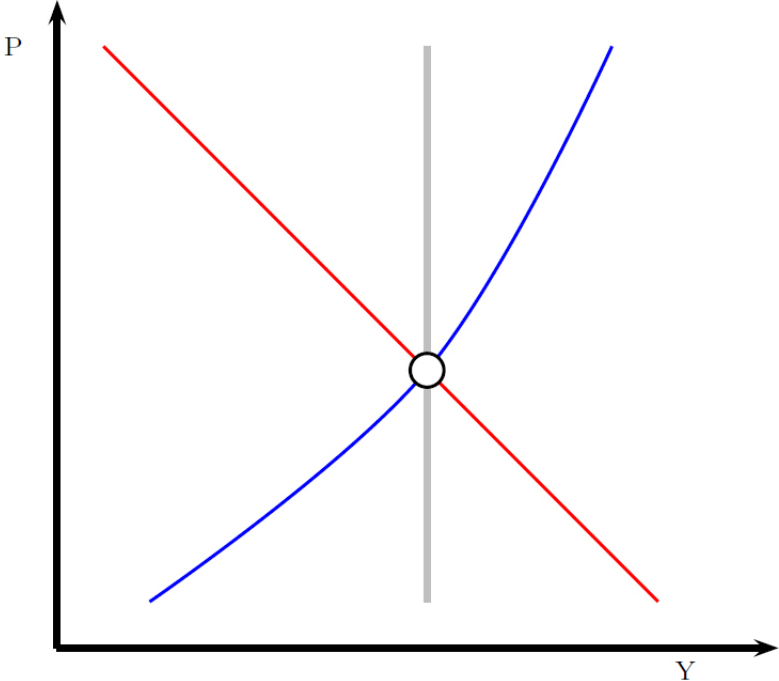


Figure 4.3: ASAD: Inflation through Demand Expansion

Chapter 5

Monetary Policy

In this chapter I discuss monetary policy issues in detail. First, we study Central Bank accounting and how the different transactions affect the balance sheet of several of the agents in the economy. I know... **ACCOUNTING?** Yes, accounting.¹ I know you might think this is conceivably the worst possible subject in the history of human kind: accounting, and Central Bank accounting in particular. However, I promise you that it will be worth it. You have no idea how confusing Central Bank accounting is. In fact, so confusing that most people talk about monetary policy with extraordinarily high degrees of ignorance. Hence, this is important, very counterintuitive, and a great piece of knowledge to make sense of what actually happens.

We also devote time to understand the channels of propagation of monetary policy and the restrictions and limitations monetary policy faces. In other words, we address the circumstances when Monetary Policy is not very effective. Indeed, we address the situation of the US four years after the 2008 crisis; a time during which the Central Bank kept the interest rates at almost zero, where the monetary base was tripled, but the economy failed to recover at the reasonable pace.

5.1 Central Bank Policy

Almost all central banks in the world have a monetary policy committee. This committee meets regularly – every month in Europe, Japan, and the UK and every six weeks (roughly six weeks) in the US – and in those meetings they decide and then announce the course of action.

In normal times they mostly announce an interest rate. Central Banks control a very short rate (usually 1month, 6 weeks, or 3months) and they commit to lend at a particular rate – the policy rate – or to affect a short run lending market – such as the interbank market. In the case of the FED, the meeting is called the FOMC (Federal Open Market Committee) that sets the FFR (Federal Funds Rate) that corresponds to the rate at which banks lend to each other in the interbank market. This is a 6 weeks interest rate.

Every central bank is different, and the tools used are different. This depends on the peculiarities of

¹I know I usually make fun of accounting every time I have. And rightfully so. However, when I look back at my MBA I think the three most important subjects – in terms of how useful they were – were the following three: accounting, micro, and strategy. Firstly, since the day you finished your MBA until the day you die I can assure you will be reading financial statements. Finance or Marketing? You can live without, but accounting? Sorry, you are there for the long run. Secondly, you will be dealing with individuals, asymmetric information, incentives and organizations – So, I'm sorry if you didn't like the torture in the Micro class but all that stuff is fundamental for the rest of your life. Finally, you will have to think about organizations as a whole, and nothing helps you more to do that than strategy. By the way, this is the last time in these notes that I say something nice about those three crappy subjects. From now on assume they just suck. And under no circumstance ever tell the faculty in those areas that I said something nice about them because I have a reputation to protect.

their respective financial markets, and very importantly on the central bank law. Sometimes markets would like their central bank to do something because country “x” did it, but they rarely stop to think if such transaction is actually feasible. For example, everybody wanted the ECB to buy greek debt at the time of turmoil. The problem is that purchasing that debt is illegal according to the ECB governing law.

In the case of central banks actions are important. They are indeed very important. Statements surprisingly, are as important too – which is obviously not the case for the executive. Have you ever heard a president commit to a policy and then flip-flop? Well, central bankers care about their reputation. They have not prostituted themselves just yet, and therefore, when they commit toward a particular policy they try very hard to keep their promise. Of course not all central bankers are good at keeping their promises. The crappier the country, the weaker the promises. Argentina and Russia usually compete to see who is the most pathetic. Although Venezuela has been winning lately.

5.2 Central Bank Accounting

Central Bank accounting is extremely complex and full of legal restrictions. It is impossible for me to explain even a single Central Bank’s accounting rule in 200 pages. So, unless you want to read thousands of pages I will oversimplify the problem.

There are three important accounts in every Central Bank: International Reserves, Domestic Credit, and Money Base. Of course there are more accounts, but if we concentrate on these three we should be able to understand about 95 percent of what is going on. We will be writing T-accounts for different agents in the economy. I will start with the Central Bank first.

1. Assume we are in a crappy economy.

Therefore, to be consistent with the nature of the country the currency needs to be called either Peso or Rupee. Let us settle on Pesos.

2. Let us start with the simplest monetary regime – assume fixed exchange rate.
3. Assume that the exchange rate is one-to-one. So, one Peso is exactly one Dollar. This is a “promise” of the Central Bank. The Central Bank promises to exchange one Peso with one Dollar. If this is not clear, it will become clearer below when I explain more of the structure.
4. The Central Bank prints the Pesos.

The amount of total Pesos printed is registered in a account called Money Base (M). We start by assuming that it has printed 4 Pesos.

The Money Base enters the balance sheet of the Central Bank as a liability. The coupons are instruments issued by the Central Bank which to all of us are assets. The Central Bank is promising that citizens can exchange one Peso for one Dollar – promises are always obligations of the issuer (and therefore a liability).

In the case of the babysitter, the issuer of the coupons promises that you can exchange one coupon for one hour one kid services. The holder of the coupon interprets the coupon as an asset, and the issuer of the coupon is the one that has the obligation to honor the promise – or liability.

5. The Central Bank is backing the Pesos with the International Reserves (R). Let us assume the Central Bank has exactly one Dollar for each Peso. Most reserves in emerging markets are held in “strong” currencies and gold. For the moment we oversimplify all that portfolio decision and assume they are in Dollars.

There is another account in the Central Bank – Domestic Credit (DC) – which we discuss later. For the moment we set it to zero. Under the assumptions we have made so far, the balance sheet of the Central Bank looks as follows:

Central Bank			
R	4	M	4
DC	0		

There are two other balance sheets I would like to describe: Consumers (or private sector) and Government. Those balance sheets are going to look incomplete. The reason is that the main liability of the consumer and the main asset of the Government are not trivial at all, *ex-ante*. I will develop them first and then explain what is missing.

Let us start with the Government, which is the simplest. What are the liabilities of the Government? Sovereign Debt: domestic debt which we identified as *Bond*, and foreign debt which we identify as *FDebt*. In fact, Governments have many forms of debt – short and long, domestic and foreign currency, indexed or nominal, fixed or adjustable, with the private sector, foreigners, or public sector, documented or contingent, etc. I concentrate on domestic and foreign debt only in the discussion below. However, one type of debt I love to highlight is the contingent debt. For example, the implied deficit in Medicare or Social Security are debts that have not been documented properly in the balance sheet, but clearly affect the sustainability of the sovereign debt. These types of debt are domestic debts that have not been written yet. One interesting aspect of these types of debts is that defaulting on each is quite different. Social security promises are easy to renege: The Government can extend the retirement age, it can increase the benefits slower than inflation, etc. Health care? Much harder! It is really hard to default on health care promises. How do you deny a person of a life saving procedure based entirely on “I have no money”? It is possible to have an argument when it is not worth to perform a procedure based on health benefits; but having a procedure that unambiguously would be good to a person, and deny it based on lack of financial resources might lead to significant social unrest. Contingent debt is something that receives very little attention in the practical world, but it can be incredibly large. See Figure 5.1 for the exercise that Morgan Stanley does documenting the sovereign debt. The size of contingent debt can be quite large. So large in the case of the US that Morgan Stanley estimates that the US is more indebted than Greece!

Let us now move to the other side of the balance sheet. What are the assets of the Government? They hold some cash, buildings and state owned enterprises, but those are really a very small part of the assets. So, any other asset? Hard to tell, isn't it? Let me delay this discussion a second.

The third balance sheet I would like to discuss is the private sector – or consumers. First, the balance sheet I would like to discuss is that consolidated balance sheet of the whole private sector; and therefore stocks, corporate bonds, mortgages, and all the derivatives that we issue among ourselves are netted out. In other words, when a company issues a stock, implicitly some individuals issued that stock which is bought by other individuals. It is an asset for one individual but a liability for another. In the consolidated balance sheet all those assets cancel out with the liabilities – they disappear. Imagine there are no international transactions (for a second) then every financial asset is netted out. What is left? The only assets that remain are: cash (which is issued by the Central Bank), the Dollars (issued by the FED), and the bonds and foreign debt held by the consumers and issued by the Government. So, those are the assets we will consider.

What are the liabilities of the consumers? It can't be private debt! All that debt is an asset of some other individual. Hard to tell, isn't it? Well, the liability for the consumer is exactly the asset of the Government. The main liability of the consumer is the fact that the Government can tax the consumers whenever they want. The Government has the ability to *steal from consumers* – sorry I meant *collect taxes from consumers*.

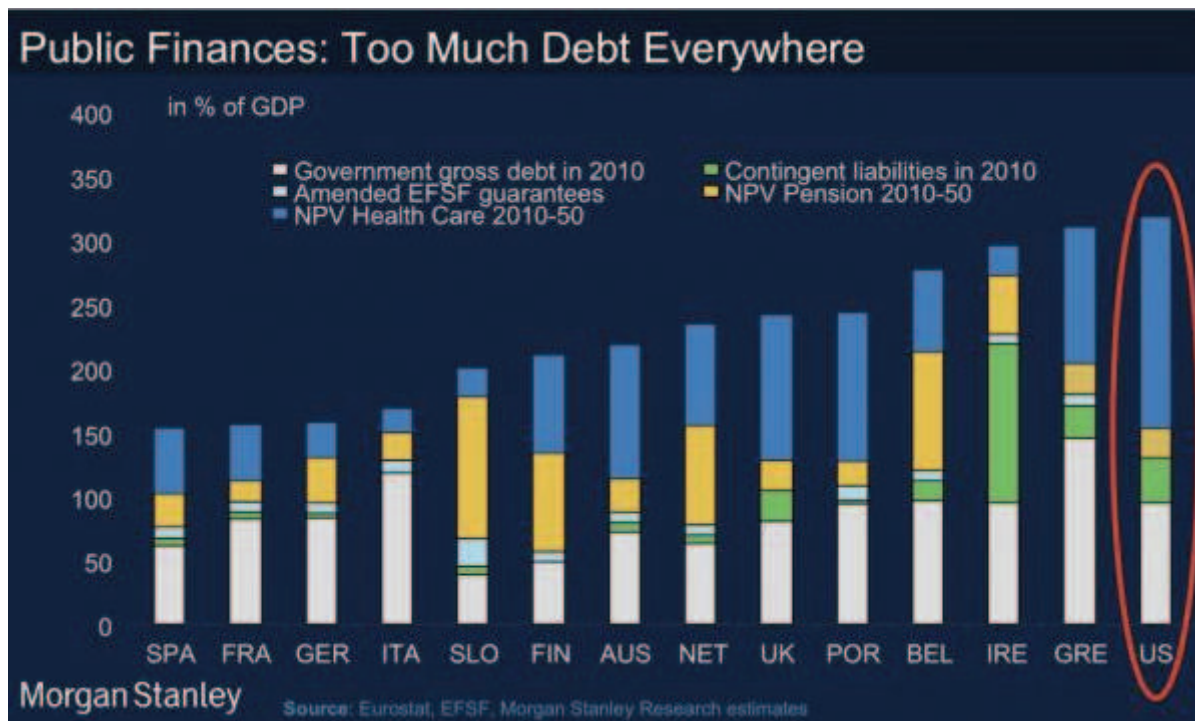


Figure 5.1: MorganStanley Total Sovereign Debt: Includes NPV of Contingent Debt.

This is the main asset of Governments, and the main liability of the consumer. In the balance sheet there should be an account that summarizes the net present value of such taxation. We will obviate this account in this discussion. The only asset of the Government to which we will pay any attention is its holdings of cash. I come back to the issues of debt sustainability in Chapter 6.

I hope you realize that international transactions add liabilities and assets to this story. So, a company borrowing from a foreign country will be accounted as a liability of the private sector. We will start the analysis without these accounts, and introduce them when needed. They are very important, and crucial for some countries. When the markets panic over the possibility that China's holdings of US debt are too high – well, they need the economics and the accounting we discuss here to understand its implication. But the fears are not unfounded.

We start by assuming that all the cash printed by the Central Bank is in hand of the consumers. We also assume that the Government has already issued two Pesos in domestic debt (bond) and it is the consumer the one that holds it. The balance sheets of the three agents we are studying so far are as follows:

Central Bank		Consumers		Government	
R	4	Cash	4	Cash	0
DC	0	Dollar	0	Bond	2
		Bond	2	FDebt	0
		FDebt	0		

You might be wondering how on earth have these balance sheets being accumulated. Do not worry. I will explain that next. Well, I will not explain that exactly, I will explain how the accounts change with the different transitions, so I hope you can imagine how they could have been created in the first place. It is much easier, however, to think about the transactions once a balance sheet already exists. So, let me start with an initial allocation and move from there.

5.3 Central Bank Transactions

In this section we describe several of the transactions in which typical Central Bankers are involved. We are not going to pay attention to “why” Central Banks do things, we will concentrate on “how” things work. Furthermore, I will explain the “spirit” of the transactions to understand which type of accounts are involved. There are a many legal issues in Central Banking – what can be done or not, what are the names of the accounts, what are the names of the instruments, etc. The complexity would need an unreasonably large number of pages to fully describe. However, most of the intuition can be easily captured in simple accounts and transactions.

I would like to reiterate that different Central Banks have very different legal restrictions. The ECB can’t in principle buy sovereign debt that isn’t AAA, but the FED can. The ECB on the other hand can issue bonds that pay certain interest rates, but the FED needs authorization from Congress. In the end, some countries at particular times need to figure out how to circumvent certain restrictions. This is hard, but through time they have realized that they only need someone that knows the law and has no scruples – most of those consultants are from Venezuela’s McKinsey office.

In our setup, the Central Bank is promising to exchange one Peso for one Dollar. We will analyze the strength of such promise. In other words, is it credible or not? For example, in our initial situation, can the consumers go to the Central Bank and exchange every Peso for a Dollar? Of course they can. Every Peso has a Dollar in the balance sheet; and therefore the promise that every Peso is equivalent to a Dollar is highly credible. We will see that there are transactions that deteriorate the quality of this promise.

5.3.1 Foreign Exchange Transactions

The first transaction is exactly the exchange of Pesos for Dollars. This is something that Central Banks do every day. Now, they do not do it directly with consumers – mostly with the banking sector, but that is a minor point. The banking sector is acting on our behalf. Assume that a consumer wants a Dollar, and therefore is willing to exchange one of the Pesos it has. What happens to the coupons?

To illustrate the transaction, I will draw lines over the balance sheets indicating the direction of the coupons. In this case, one Peso bill goes to the Central Bank and the Central Bank sends one Dollar bill to the consumer. The transactions are in red in the balance sheets.

Central Bank		Consumers		Government	
R	4	M	4	Cash	0
DC	0	Cash	4	Bond	2
		Dollar	0	FDebt	0
		Bond	2		
		FDebt	0		

How does the balance sheets look afterwards? The consumer is trivial, it will have 3 on cash and 1 on the Dollar account. What happens to the Central Bank? Where do we put the Peso that just entered the Central Bank? In the reserves? Actually no. The Peso is an asset for the consumer but it is not an asset for the Central Bank.

I understand this is not simple. If two of us were doing the transaction it would be accounted as an exchange of two assets. Therefore, if I were to give you a Dollar for a Peso, you will put the Dollar as an asset, and I will add the additional Peso to my assets as well. The central Bank is different. The Peso is a liability of the Central Bank. In this transaction, it is repurchasing the Peso from the consumer. So, let's follow the typical intuition: the Peso that has just being repurchase is in the "asset" side, but it is netted out with one of the Pesos in the "liability" side. So, in the end, the Peso that enters reduces the Money Base – reduces the liability. The final balance sheet looks as follows:

Central Bank		Consumers		Government	
R	3	Cash	3	Cash	0
DC	0	Dollar	1	Bond	2
		Bond	2	FDebt	0
		FDebt	0		

Some immediate remarks: did the Central Bank lost international reserves? Yes, from 4 to 3. Is the promise of the fixed exchange rate credible? Yes. Indeed it is as credible as it was before. Every Peso in the economy still has a Dollar! There are just less Pesos and less Dollars.

These transactions do not affect the credibility of the Central Bank whatsoever. This transaction is the basis of an exchange rate regime called *currency board*. This is exactly what Argentina used to control their hyperinflation in 1991, and what Hong Kong has been using since forever.²

5.3.2 Open Market Operations

The second most common transaction in a Central Bank is the open market operation – which as its name clearly suggests it is an *operation* in the *open market*. Clear, isn't it? Are we ready to move on to the next transaction? no? I thought so....

The names of the transactions in Central Banks correspond mostly to the legal framework that allows them to take place, rather than a clear description of what they actually are. We will see that most of the transactions bellow have that problem. Well, it is not necessarily a problem, it is just that the name is not very informative. The names are of little help in understanding what the transaction is, and therefore you better spend some time informing yourself to understand what the accounting implications are. That is the only way to understand what it is doing.

The open market operation is when the Central Bank buys Government Bonds from the private sector – the secondary market or better said the *open market*. For the transaction let's assume the Central Bank buys one Peso worth of Government bonds from the private sector paying with one Peso in cash. Flow of all financial coupons is in red, as before.

More counterintuitive accounting. The Government debt is a liability of the Government but it is an

²See Chapter 7 for further discussion. See DiTella and Neuman (2001) for an extremely good historical description of the Currency Board in Argentina.

Central Bank		Consumers		Government	
R	4	M	4	Cash	0
DC	0	Cash	4	Bond	2
		Dollar	0	FDebt	0
		Bond	2		
		FDebt	0		

asset of the Central Bank. This is true even when the Central Bank is part of the Ministry of Finance. So, the bond is accounted in the Central Bank as domestic credit – the Central Bank owns an IOU from the Government, which is equivalent of having lent to the Government; hence the domestic credit denomination.

The balance sheet of the Central Bank has an increase in the asset side (the domestic credit goes up by one) and an increase in the liability side (the money base increases by one). The consumer on the other side has a rebalancing of the assets: cash increases by one and the bond holding decrease by one. The balance sheets look as follows:

Central Bank		Consumers		Government	
R	4	M	5	Cash	0
DC	1	Cash	5	Bond	2
		Dollar	0	FDebt	0
		Bond	1		
		FDebt	0		

Has the Central Bank reserves changed? No. Have the Government debt changed? NO! It is just partially held by the Central Bank, but the total debt remains constant. Is the promise of fixed exchange rate credible? Not as much as before. The Central Bank has 4 Dollars and 5 Pesos. If all five consumers come to get their Dollars there are not enough for all of them.

Let me discuss some aspects tangentially right away: Printing, Credibility and Currency Crises, and Flexible Exchange Rates.

Printing: The two actions we have analyzed so far imply changes in the amount of cash in the economy. This is how Central Banks print Pesos (or collect Pesos). If the Central Bank wants to increase the amount of Pesos in the economy it could start buying Dollars in the market. Every time they buy a Dollar they would be paying with a Peso. Another way of printing is to do transactions in the bond market. If the Central Bank wants to print it can *buy* bonds *paying* with Pesos. So, the total amount of Pesos goes up in both cases.

There is one important difference in the second one. The transaction takes place in the secondary market, therefore it affects the interest rate. The supply of bonds is determined by the treasury. This is the total amount of debt the Government has (2 in our case). Who demand the bonds? Consumers, Central Bank, and when we add them, Foreigners as well.

In Figure 5.2 we show the equilibrium in the market. The solid red line is the original consumer’s demand for Government bonds. It is decreasing highlighting that a larger amount of bonds held in their portfolio

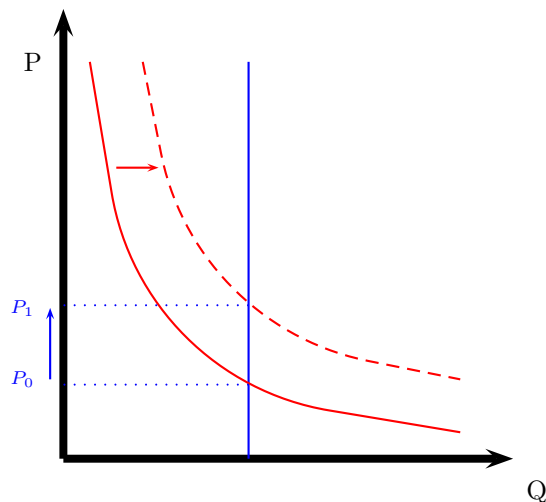


Figure 5.2: Open Market Operation

require a much lower price. These are bonds, and therefore, a lower price implies a higher interest rate.³ When the Central Bank decides to buy bonds in the open market this action is equivalent to an increase in the demand for bonds. So, the demand shifts to the right (the dashed red line). The new equilibrium implies an increase in the price of the bond: from P_0 to P_1 . But an increase in the price of the bond is exactly a reduction in the interest rate.

Let's put all together. When the Central Bank goes out to buy bonds it is printing. The Central Bank is paying the bonds with Pesos after all. So, the quantity of Pesos goes up. That operation has also the implication of lowering the interest rate in the bond market. Hence, printing leads to an increase in the money supply and a reduction of the interest rates. Complicated? Possibly, but worth it.

I am sure you kind of knew this relationship, by the way: “every time the Central Bank prints it reduces the interest rates”. Two points. First, did you know, however, how that happened? Hope you know now. Second, and more importantly, we could have been printing by buying Dollars and that action would not have had an impact on the interest rate. Therefore, you can print and have no change in the interest rate. Therefore, the sentence that you think you knew, that most reporters regurgitate every second, thinking and reciting it as if it were the gospel truth, is actually wrong. It is only true if the transaction performed by the Central Bank is an open market operation. Several Central Banks in the world intervene in the foreign exchange rate market exactly because they want to isolate the local interest rate from the money creation (or printing). This is a typical choice they have in dealing with capital inflows, for instance. Importantly, the open market operation is the most common transaction, so, on most instances the sentence is correct.

How Central Bankers used to work and make announcements in the 80's? Not long ago – I would say before 1985 – most Central Bankers announced the amount of bonds they wanted to purchase, leaving the interest rate to the market. So, they said “we are going to print 100 billion Pesos or buy 100 billion Pesos of debt”, and wait for the market to decide the interest rate. Since the mid 80's Central Bankers decided to adopt a different form of communication. That instead of telling the market how much they were going to purchase, they decided to tell the market which interest rate (price target) they wanted to achieve. Instead

³For example, if the interest rates are fixed for one period, and the bond is a zero coupon bond, then the price and interest rates are related as: $P_b = 1/1 + i$. So, a decrease in the price occurs when the interest rate is higher. Which implies that consumers are willing to hold more bonds only if the interest rate is higher. This is a very simplistic demand and we will come back to some of these points when we talk about fiscal sustainability. The reason is that the demand for bonds not only depend on the interest rate but also on the likelihood of default.

of announcing the quantity, they announce the price: “we want the price to move from P_0 to P_1 ”. They will buy bonds until achieving that. Therefore, now the market decides the quantity and the Central Bank decides the price. With one form of communication the quantity is announced, on the other it is the interest rate. If the price after the two actions is the same, then the Central Bank would have printed the exact same amount of coupons.

I think that due to this change in communication is why the market believes that every time the Central Bank prints the rates go down unambiguously. In the end the mechanisms is exactly the same.

Finally, we have had a lot of printing in the world with no interest rate effect. All the quantitative easing is an example in which printing takes place and the impact on interest rates is zero – of course, part of the lack of impact is due to the fact that the interest rate is near zero, but part of the lack of impact is due to the transaction taking place. See below for further discussion.

Credibility and Currency Crisis: As we saw in the balance sheets, purchasing Government bonds implies that an unbalance between Dollars and Pesos is created – the reserves and pesos are unmatched; while foreign exchange transactions do not have such implication. As I said before, a fixed exchange rate regime where the Central Bank only performs foreign exchange transactions and domestic credit is exactly zero at all times is called a pure currency board; and it is indeed an extremely credible exchange rate regime. The moment the Central Bank does open market operations a wedge between the Dollars and the Pesos arises.

In principle this is not a problem. If individuals hold on to their Pesos nobody notices the imbalance. Furthermore, if only a small proportion of consumers are the ones trading Pesos for Dollars then the mismatch can be quite large and the “promise” of the Central Bank is always upheld. On the other hand, imagine that the credibility of the Central Bank is deteriorated with the size of the mismatch. What should agents do? I would run, and try to be first. The first Peso is fully converted in a Dollar. The problem is the last Peso. This implies that agents have incentives to run against the Central Bank when the mismatch is too large – given the consumer’s expectations, or to run if you see others running. In general this creates the possibility of self-fulfilling equilibria: if no one attacks, the promise on the currency is sustainable, but if all attack, the promise is violated.

In this particular example a currency crisis is the event when the attack performed by the consumers forces the Central Bank to change its promise – or change from a fixed exchange rate regime, to a different exchange rate regime. Speculative attacks is a topic we discuss in Chapter 15. There are many flavors of currency crises and financial crises. This should be an appetizer to what we discuss later.

Flexible Rates: Finally, one way to stop the currency run is to change the promise of the Central Bank. For example, if right after purchasing the bonds the promise becomes 1.25 Pesos for one Dollar, then there is no chance of a speculative attack – at least there is no chance that the Central Bank will need to change its promise. Flexible exchange rates do not move exactly with the reserves – as this example is doing. But it is the case that during a flexible exchange rate, printing without a counter part on international reserves leads to a depreciation. Of course the depreciation depends tremendously on expectations not only on the mismatch between reserves and money base. Again, these are the topics we discuss in Chapter 7

5.3.3 Exports and Capital Inflows

From the Central Bank point of view exporting and experiencing capital inflows look identical. When the private sector exports in practice what they do is to send goods and services to foreign clients who pay in US Dollars. When there are capital inflows, the private sector sells a piece of paper to foreigners – either a stock, bond, option, land, etc. Foreigners pay the “piece of paper” with US Dollars. In the end, both transactions imply that the consumers have additional Dollars.

Assume we add one more agent to the story: foreigners. Assume we start with the exact same balance sheets we had before, except that the foreigner now has two accounts. They own US Dollars or they own Foreign Debt (issued by us, the crappy economy). For the moment assume we have the exact same starting point as before and that Foreigners also own 4 US Dollars.

Central Bank		Consumers		Government		Foreign	
R	4	Cash	4	Cash	0	Dollar	4
DC	0	Dollar	0	Bond	2	FDebt	0
		Bond	2	FDebt	0		
		FDebt	0				

When we sell goods or services (export) or a financial claim (capital inflow) the Foreigner gets something and pays with dollars. Lets assume the service or financial claim has a value of 1 US Dollar. After payment, the balance sheet will reflect the export or capital inflows as an additional dollar for the consumers.

The effects that are going to appear in this transaction are one of the most important aspects behind carry-trade and behind the automatic adjustment we discuss in the BBNN chapters. This occurs when central banks have a fixed exchange rate, or have a managed floating rate. The exports or capital inflows imply an undesirable monetary policy expansion – causing inflation and demand expansion.

I will come back to discuss how monetary policy works in the context of a flexible exchange rate. In the fixed exchange rate quantities adjust (while the price remains fixed) while in the flexible exchange rate the value of the currency adjust (while the quantities remain fixed).

We need to have a much larger framework to understand flexible rate – which by the way are not ver well understood by economist and financial analysts. In fact, I believe this is next to the Oracle’s realm. In any case, what little we understand from flexible rates still needs more structure than what we have discussed so far.

We will keep it simple for the moment and concentrate on what happens to the quantities.

Central Bank		Consumers		Government		Foreign	
R	4	Cash	4	Cash	0	Dollar	3
DC	0	Dollar	1	Bond	2	FDebt	0
		Bond	2	FDebt	0		
		FDebt	0				

So far, there is no effect of this transaction into the domestic economy. Assume that now the consumer decides to exchange the additional dollar into pesos. What they do is go to the Central Bank and give the Dollar and collecting the Peso. In the end, this implies an expansion in the monetary base. This is exactly like the foreign exchange transaction discussed before.

Notice that the export and the capital inflow is causing an “undesirable” monetary policy expansion. The Central Bank is printing not because it wants to print, but because agents are calling on the fix exchange rate promise. They export more and they need the pesos to consume internally. They convert the dollars

Central Bank		Consumers		Government		Foreign					
R	5	M	5	Cash	0	Bond	2	Dollar	3	FDebt	0
DC	0					FDebt	0				

into pesos and cause the same as a monetary policy expansion. We discuss this in Section 5.3.2: Open Market Operations.

A monetary policy expansion means that interest rates are lower than desirable, output is larger, activity is larger, and in the end as suggested by the ADAS the country will experience inflation. If the exchange rate were flexible the capital inflow and the increase in exports leads to a “strengthening” of the currency. The domestic inflation under fixed exchange rate or the “strengthening” of the currency are two sides of the same effect: a real exchange rate appreciation. We come back to these points in Chapter 8.

5.3.4 Taxes and Expenditures

What are the implications of taxes and expenditures to the balance sheets? What are the implications on the promise? Here I am going to analyze an increase in expenditures that is exactly financed with an increase in taxation. In other words, this is a fiscal neutral increase in expenditures.

When the Government taxes its citizens it collects cash for a service – which is what the expenditure is for. So, assume congress has decided to start a party – justified mostly on national security concerns. The idea is to tax the citizens to be able to finance the expenditure – which in this case is exactly stealing from the consumers to get wasted on a party. Taxing is then a direct transfer from the consumers to the Government. Assume the Government taxes one Peso – then one Peso will flow from the consumer to the Government. Assume the tax is paid in cash, then the cash account of the consumer goes down by one, while the cash account of the Government goes up by one. Red line in our figure.

Is the Central Bank affected at all? No. No impact on reserves, no impact on Dollar/Peso ratio, no impact on the total amount of cash, no impact at all. This is just a transfer between consumers and the Government.

An expenditure produces the opposite implication. Once the Government has the cash it can set up the party. In this case, the party will require services from workers and the purchase of significant amounts of Pia Colada. The Government purchases these services from the consumers and pays with its coupon - the cash. So, the coupon just moves from the Government back to the customer (the green arrow) while the service goes from the private sector to the Government. Again, no impact on the balance sheet of the Central Bank.

In the end, a budget balance change in taxes and expenditures has no implications on the balance sheets in the economy. Furthermore, the supply of bonds, and the demand of bonds is also unaffected. The only impact is on the distribution of wealth, efficiency, etc. Some consumers are taxed more, and others receive more services. These policies matter in practice because they imply transfers across citizens. From the Central Bank perspective however they are *neutral*, no balance sheet effect, no bond market effect, and no interest rate effect.⁴

⁴By the way, when I say no effect I mean “no effect” in so far that the expenditure and the taxes are irrelevant from the

Central Bank		Consumers		Government	
R	4	Cash	4	Cash	0
DC	0	Dollar	0	Bond	2
		Bond	2	FDebt	0
		FDebt	0		

5.3.5 Government issues debt to Consumers

One interesting transaction is to study what happens to the balance sheet when the Government issues bond in the local market and uses the money in expenditures. In other words, this is a Government running a deficit and financing the deficit with the domestic private sector.

Assume the government issues one Bond and the consumers pay one Peso for it. The transactions are represented by the red lines in the figure below.

Central Bank		Consumers		Government	
R	4	Cash	3	Cash	1
DC	0	Dollar	0	Bond	3
		Bond	3	FDebt	0
		FDebt	0		

Notice that the total amount of cash is constant so far. The Central Bank accounts are unaffected. There has been only a transfer from the consumer to the Government, and such transaction of cash is in exchange for a new Bond.

When the Government spends the money for the services, the consumers provide the service or good (the party) and the Government pays with cash. The green line in the balance sheets.

Central Bank		Consumers		Government	
R	4	Cash	4	Cash	0
DC	0	Dollar	0	Bond	3
		Bond	3	FDebt	0
		FDebt	0		

Again, is there any effect on the reserves, money base, or the exchange rate promise? No. The balance sheet of the Central Bank is not affected. This transaction has only one consequence. There is an increase

producer and consumer perspective. Imagine the tax adds an inefficiency that the banking sector needs to bear. In that case, the interest rates are affected, not because the bond market is affected but because the taxes or expenditures add or reduce inefficiencies in the economy. In this chapter I will obviate these issues but come back to them when I discuss the BBNN.

in the supply of Government debt: from 2 to 3.

This transaction has an implication on the interest, though. Depicted in Figure 5.3 we present a constant demand of bonds and an increase in the supply of bonds. The increase in the supply shifts the blue line to the right (from the continuous to the dashed) and the equilibrium price drops from P_0 to P_1 . A drop in the price of the bonds leads to an increase in the yields. Therefore, this transaction increases the interest rate of the bonds in the secondary market, but has no impact on the balance sheet of the Central Bank.

What is the implication of these last two transaction in practice? The first one the expenditures are financed with taxes, they have no impact on the balance sheets of the economy, but it requires an increase in the taxation. The second one leads to an increase in the interest rate but taxes do not need to be raised. Imagine you need to increase expenditures in an economy that needs a push in the aggregate demand. Which one do you prefer? Well, I think the answer is “it depends”. If the interest rates are extremely low, debt is also low, and the consumers are already overtaxed, then it might make sense to use the debt financed expenditures. Probably the situation in Spain in 2004! But if the interest rates are extremely large, the debt is also a significant proportion of the GDP, then it really does not matter how overtaxed the consumers are, if the expenditures need to be increased probably it would be better to do so through a balance budget transaction. Probably the situation in Spain in 2011!

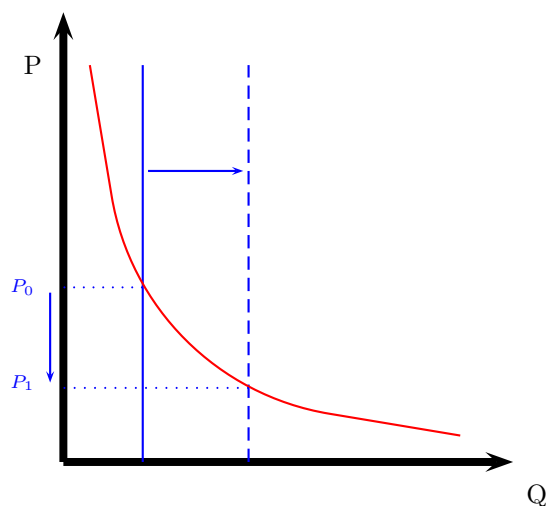


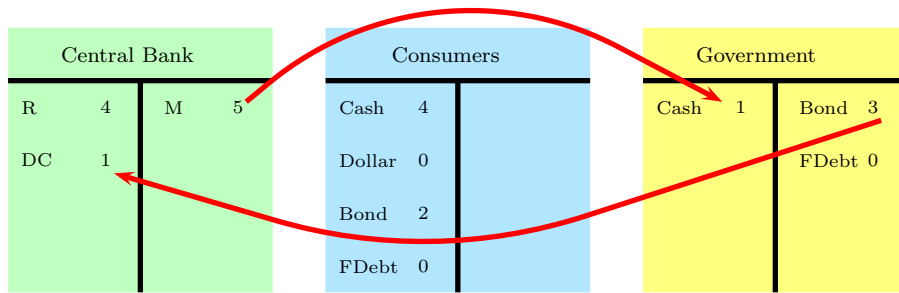
Figure 5.3: Government: Issue Local Debt

5.3.6 Purchase of Government Debt

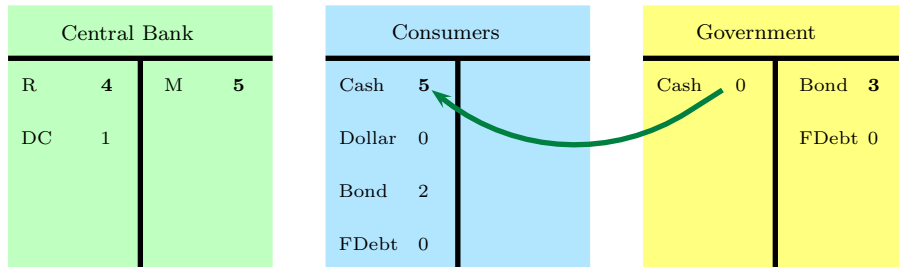
Assume that now the Central Bank purchases bonds directly from the treasury (the Government). This transaction is exactly like combining two of the transactions we have already seen – government financing expenditures with debt + Central Government performing an open market operation. However, in a lot of countries in the history the transaction was done directly between the treasury and the Central Bank. For example, if you remember the German Hyperinflation case you can see this exact discussion in the statement from the central bank president.⁵

Assume the Government sells one bond to the Central Bank for one new peso of cash. The transactions will leave the balance sheet as show bellow. The red lines reflect the flow of financial instruments between the treasury and the Central Bank.

⁵See HBS case 9-798-048 (page 10 in case you are wandering... Paragraph 3-5).



Of course, the selling of the government bond has a purpose – which it is usually related to spending the resources. When the Government does so the one peso in cash goes to the private sector in exchange of services. This implies that the additional peso ends up in the hands of the consumer. Notice that as before, there is a mismatch between the cash in pesos and the amount of reserves. Not every peso has a dollar. Hence, if consumers all decide to exchange their pesos for dollars the country faces a currency crisis. This is exactly the same discussion we had in subsection 5.3.2



5.4 Unconventional Monetary Policy Tools

The 2000’s deep recession in Japan, the 2008 crisis in the US, and the 2010 fiscal crises in Europe led central bankers to reduce their policy rates to near zero. Zero is a particularly interesting bound for interest rates. Interest rates are hard to lower bellow zero, although in 2014-2015 Denmark and Switzerland indeed offered negative interest rates to their depositors. In general, however, a negative interest rate is hard to swallow. Consumers have the option to hold cash. In fact, Japan and Switzerland are two countries where cash is used far more frequently than other countries with similar levels of development. Just to give an idea, in Japan households have about 50 percent of their savings in cash or cash-like accounts, while in the US this portfolio choice is less than 10 percent. Keeping the interest rates too low for too long has consequences in the behavior.

In addition to the change in behavior the the channels of monetary policy – as will be discussed in the next section – rely on the ability of the central bank to control interest rates. An expansionary monetary policy needs a lower interest rate, but once the country has reached zero, it is worth asking, what is next?

The recent crises forced central bankers to think about this question harder, and three tools have been used. This is not a formal classification – given that I haven’t seen one – but this is my classification of the tools: Forward Guidance, Credit Easing, and Quantitative Easing. When Credit and Quantitative Easing are combined it is called QQE (Qualitative and Quantitative Easing).

Before explaining each of the tools lets introduce a new agent – Banks. In fact, the transactions we discuss in this section are all related to banks. So, we need to add some accounts. Banks have four accounts

that are quite important: Cash and Credits on the asset side, and Deposits and Capital on the liabilities side. We start by assuming that all those accounts are with the private sector. In other words, in the previous discussions banks and consumers were consolidated, here we are stripping that balance sheet in two. You will notice that the Central Bank and Government balance sheets will remain identical.

Central Bank		Consumers		Government		Banks	
R	4	Cash	3	Cash	0	Cash	1
DC	0	Dollar	0	Bond	2	Deposit	5
		Bond	2	FDebt	0	Credit	6
		FDebt	0			Capital	2
		Deposit	5				
		Capital	2				
		Loans	6				

We assume that the deposits (5) are owned by consumers, while the credits from the banking sector (6) are the loans reported in the balance sheet of consumers. The capital (or stocks) of the bank (2) is also owned by the consumers. Finally, Banks hold cash (1).

Why banks hold cash? In practice banks hold some cash to attend cash transactions. When the banking sector is working correctly indeed they hold a very small amount. Just to give you an idea, between 2002-2006 the banking sector had about 14 trillion dollars in credits and held on average less than 50 billion dollars in cash. In some countries, however, banks are *forced* to hold cash. This is called reserve requirements and when we discuss the banking sector in detail it will become clear what is the purpose of this type of regulation. However, what should be clear is that this cash is held for regulatory purposes and therefore it cannot be used for speculative purposes. For example, when we discussed in the previous transactions that consumers decide to exchange their pesos for dollars, well, that is much harder to do if the pesos have to be held due to regulation. For the present discussion assume that banks need to hold only one peso of cash.

Credit Easing (CE) and Quantitative Easing (QE) are all transitions between the central bank and banks. This is sometimes called large scale asset purchases. The different between the transactions is what type of asset is purchased, and with which account.

5.4.1 Forward Guidance

Forward Guidance (FG) is a tool that involves communication from the Central Bank. Where the monetary authority signals the path of future short term interest rates. The idea is the following. Assume today's short run interest rate is zero (the three month rate, for example is at the zero bound). The fact that the 3m rate is zero does not imply that the 2yr rate is also zero. It is possible that the 2yr rate is farther from zero. The purpose of FG is to affect the medium and long run rates. For example, even though the central bank has no direct control over the rates, it can signal that is willing to keep the short run rates at zero for "considerable time". The 2yr rate is the compounding of several 3m rates. So, if the central bank is going to keep the short rates at zero for a long period of time then the 2yr rate is likely to fall.

The FG has been effective in this regard. Every time the central bank says they are thinking about unwinding the stimulus, the short rate remains at zero, but the long rates start to go up. When they have signaled that the stimulus will continue to be there for quite sometime, then the medium and long rates tend to fall. Although the communication has been able to move rates, I have severe doubts it has helped the economy. Actually, I think it has made the monetary policy announcements useless, and unnecessarily scrutinized. Markets are trying to find what exactly the words means in terms of actions. One of the most pathetic ones has been happening during 2014 and 2015 where the FED has added a sentence to the monetary policy announcement where they say that the FED will remain "patient". The discussion in 2014

and 2015 is about when the FED is going to start increasing interest rates. Well “patient” means 2 meetings, *apparently*. The market is so desperate to try to operationalize words that has forced the central bank into a corner where now words cannot be used without causing certain degree of ambiguity.

Having said this, there has been some major events in which FG has been very effective in controlling and calming a market. The most famous one in recent years is when Mario Draghi – the head of ECB – was able to crush the panic in financial markets in the midst of the Greek fiscal disaster.

The crises started when markets realized that Greece had lied about their debt, and after it was known that they enter into contracts (with Goldman Sachs by the way) that were forbidden according to the prevailing regulation in the European Commission. But any way, rules are meant to be broken, and the greeks are world experts in this activities second to Italians, Spaniards, Portuguese, Irish, and all their colonies. Well, so maybe the greeks are truly not second... In any case, once it was clear that Greece had to default, and that the fiscal situation in Ireland, Spain and Portugal was extremely weak, markets started to buy and sell the debt from these countries at a very large discount. That implicitly increases the interest rate in those countries deepening the recession and exacerbating the fiscal crises (see Chapter 6). At that time, the sustainability of the Euro was put in question. The ECB in response to the panic offers a program and commits to saving the Euro. The program was truly a crappy program to lend to bankrupted banks. And nobody believed it can do a single thing. So, about two hours later, Mario Draghi runs a press conference and clarifies to the markets that he will do “whatever it takes” to save the Euro. You see, “whatever-it-takes” has different meanings depending of the person. If a swiss says “whatever-it-takes” what does that mean? well, mostly that he is going to do absolutely nothing. That he is probably going to think about it, and he will take a neutral position to make sure nothing ever happens. But, when an italian says “whatever-it-takes”, get ready! I mean, some shooting might be involved. The statement was so powerful that markets cooled down instantaneously and the ECB was never tested! Not a single Euro was lent and the markets calmed down for about two years – that is when Greece continued with their disasters and the ECB needed to actually act.

Another great example happened in Japan when Abe announced that he was going to force the Bank of Japan (BoJ) to get to a 2 percent inflation target (at that time Japan was running a deflation), and that the target was going to be achieved by printing money like a “latino central banker of the 60’s”. Well, that was not exactly the statement but close enough. If the central bank is going to print without stop the Yen needs to devalue. In less than three months from the announcement the Yen devalued almost 30 percent. This had a very nice impact on the exporting companies – who found themselves more competitive just by a tiny statement.

Forward Guidance is about statements. Sometimes they can be very effective in moving asset prices in the desired direction. Sometimes they are less effective. My doubts about the macroeconomic relevance of FG comes from the fact that even if asset prices move, that does not necessarily implies more jobs, more investment, nor more activity in the economy. I will come back to the limitations and restrictions of monetary policy later in this chapter, but let me be precise about the general principle of my doubts: the lack of competitiveness in Greece, Ireland, Italy, Portugal and Spain is NOT going to be resolved by printing money. It is not! Of course printing will generate a transitory depreciation that will transitorily allow the firms to be in better shape – but that’s all. It is a transitory measure. If the economy has long run problems – lack of growth – it better do something that is long lasting; such as improving the education, health, institutions, etc. In my view, Forward Guidance is the most transitory of all possible tools. It is after all just a statement.

5.4.2 Credit Easing and Quantitative Easing

Credit Easing (CE) and Quantitative Easing (QE) are two actions that instead of affecting the price of treasury bonds (interest rate) affects the price of other assets. For instance, Mortgage Back Securities.

Quantitative Easing implies printing (M will go up) and purchasing assets that are of the exact same quality as the ones held by the central bank. In other words, this is an expansion of domestic credit and money. If the Central Bank is purchasing treasuries then the transaction looks identical to the open market operation (OMO) discussed above. Why is then called quantitative easing as opposed to OMO? In the OMO the purpose is to do transactions until certain interest rate is achieved. In the QE there is no objective of interest rates – they are zero after all. The goal is to flood the market with liquidity and the FED decides to whom to flood. It can give the cash to the government and purchase the treasuries directly from them, or to the banks and purchase the treasuries from them, etc. QE however, keeps the portfolio of assets held by the central bank roughly with the same credit standards.

Credit Easing (CE) is exactly the transaction where the Central Bank shifts its portfolio. In fact, CE does not need to involve printing (like what happened after Sep 11). For example, the FED might have some treasuries, and it wants to purchase MBS's at a moment of distress. The FED could sell the treasuries and purchase the MBS's with the proceeds. This keeps the quantity of money constant but changes the portfolio.

CE is a change in the composition of the domestic credit. The purpose of this transaction is to offer liquidity support (“give cash to” in normal human being terms) a market in distress. So, for example, when the MBS and the ABS (credit cards securitization and auto loans securitization) after the 2008 were severely discounted – not because fundamentals but because panic – the FED enters the market and purchases the assets at a premium. The action has the goal to stabilize the price and eliminate the panic. In order to do this transaction the central bank needs to buy assets that are *unconventional*.

When they purchase the unconventional assets and print at the same time (meaning they do not sell part of their assets) then we call the transaction QQE. This is a combination of credit easing and quantitative easing and in general is referred to as quantitative and quantitative easing.

In practice, CE has been extremely effective. If a market is in distress, CE has proven to be a very good tool to calm the panic. Of course, it requires a panic to be able to work, but in the few circumstance where that has taken place CE has proven to be extremely effective. The best tool in my opinion. QE, on the other hand, has the jury still out there. We do not know if the transaction has been effective because it is hard to construct a counterfactual.

Let me describe the QE transaction. Quantitative easing is the action in which the central bank purchases an asset directly from government, banking sector or firms. This is exactly like an open market operation but instead occurring in an open market of bonds freely traded it takes place between the Central Bank and the financial institutions. For a great explanation directly from your friendly Central Banker, see the pamphlet from the Bank of England: Bank of England (1996).

The Central Bank can purchases a lot of different assets – indeed, far too many for me to be able to show every transaction. Let me try to provide some intuition. The Central Bank can buy a new bond issued by the banking sector, or it can purchase the credits it has already provided – where the credits can be of different types and characteristics: secured or non secured, consumer loans, long or short term, AAA or less, etc. Each of these possible transactions requires a regulatory framework indicating what can be purchased and what can't, and at what price or penalty, etc. To complicate things even further, if the Central Bank buys a credit that had already being originated by the banking sector, then the Central Bank is the ultimate “owner” of the loan. However, the Central Bank could provide a loan that uses the exact same credit as collateral – which means that the Central Bank is not the owner. However, if the banking sector creates a new liability then the Central Bank is the “owner” of that debt. In the end, all these transaction just make cash available to the banks.

Let us do directly borrowing by the banks – which is the simplest one to depict. Assume the Banks borrow two pesos from the Central Bank.

We denoted the new bond and NewB which is held in the Central Bank as domestic credit. The Central Bank distinguishes between domestic credit to the public sector (what we did in the previous transactions)

Central Bank		Consumers		Government		Banks		
R	4	Cash	3	Cash	0	Cash	3	
	M	Dollar	0	Bond	2	Deposit	5	
DC	0	Bond	2		FDebt	0	Credit	6
DCPriv	2	FDebt	0				Capital	2
		Deposit	5				NewB	2
		Capital	2					
			Loans					
			6					

and domestic credit to the private sector. Now, very rarely these accounts enter with names this simple. When the FED was rescuing the banking sector in 2008-2010 the names of the accounts correspond to their legal names. Usually something like *Lending Facility* somewhere.

What do banks do with the cash? As I said before the regulation only forces them to hold one peso in cash. They have three now. Hence, they lend the excess cash – and in fact this is exactly the purpose of the Central Bank. By providing cash to the banks its intention is that new credit is created. A new credit to the consumers enters as two additional loans and they now hold the cash. The balance sheets are shown bellow.

Central Bank		Consumers		Government		Banks		
R	4	Cash	5	Cash	0	Cash	1	
	M	Dollar	0	Bond	2	Deposit	5	
DC	0	Bond	2		FDebt	0	Credit	8
DCPriv	2	FDebt	0				Capital	2
		Deposit	5				NewB	2
		Capital	2					
			Loans					
			8					

What is the impact of the banking sector on the “promise” and “creditability” of the peso? Notice that the economy started with a very positive match between dollars and pesos. Even though the Central Bank had one peso for one dollar the promise was even stronger than that because one of the pesos (the one in the banking sector) was “stuck” there. In other words, the reserve requirements in the banking sector creates a demand for pesos that is not easy to shift – or at least is not as easy as the demand for pesos by consumers that can shift to dollars on a second.

Notice that this transaction deteriorates the credibility very rapidly – and in a flexible exchange rate regime we should expect a depreciation. This is exactly what is occurring in January of 2013 in Japan, and what happened in the US through out the 2011-2012. The purchases of private assets by the Central Bank leads to the expectation that the currency needs to depreciate.

5.5 Reserve Requirements

The previous discussion exactly leads to this transaction. Reserve requirements are a very common tool especially in emerging markets.

Imagine the balance is the one just after the quantitative easing has taken place. If the reserve requirements are increased then the expansion of credit does not take place. Is the credibility affected? No. Is the cash that consumers use for their purchases increased? No. So, there is no inflation, and no loss of

credibility. However, this is a short term action. The banks realize a big loss on this transaction. They are holding cash – which is not remunerated – and they are paying interest rates on the New Bond. So, this can't be abused without jeopardizing the health of the banking sector. However, transitorily the increase in reserve requirements works like a tightening of monetary policy.

Central Bank		Consumers		Government		Banks	
R	4	Cash	3	Cash	0	Cash	3
DC	0	Dollar	0	Bond	2	Deposit	5
DCPriv	2	Bond	2	FDebt	0	Credit	6
		FDebt	0			Capital	2
		Deposit	5			NewB	2
		Capital	2				
		Loans	6				

Although the use of reserve requirements is a costly tax for the banking system, it is extremely effective. As we discuss below the limitations and constraints monetary policy faces, we will see that there are several channels. Limiting the credit expansion – or contrary incentivizing the credit expansion – are perhaps the most powerful mechanisms most countries have to control their economy. And reserve requirements is an extremely effective way of controlling credit expansion. In fact, China uses this policy almost exclusively to conduct their monetary policy. The reason is that the other channels are incredibly weak in China. We come back to this points with more structure below.

5.6 Limits and Constraints

As we discussed in Chapter 2 an important limitation of monetary policy effectiveness comes on the formation of expectations. If agents fully anticipate the actions of the Central Bank, and adjust good prices accordingly, the action of monetary policy is useless. However, there are other reasons why monetary policy might not work.

It is easier to explain the mechanisms using an example. In the end, my purpose is to discuss not only what needs to be done in a particular circumstance, but also to realize that such policies do not always work as expected. The main reason is that individuals anticipate the policy actions, and they become less effective. Second, and equally important, sometimes crisis produce disruptions in the usual transmission mechanisms limiting the effectiveness of the policies

5.6.1 US monetary policy between 2008 and 2012

In order to fix some ideas about how this discussion takes place I would like to pose my views on how the US is doing a couple years removed from the 2008 financial crisis. This is being written in Oct 2012, so it is indeed four years later.⁶

A financial crisis implies a dramatic decrease in the aggregate demand. Consumption drops and investment collapses. If we wanted to reestablish equilibrium we need to compensate this decrease in the demand by expansionary fiscal and monetary policy. Indeed, interest rates were dropped immediately, expenditures were increased, and taxes were cut. So, there is no discussion on the principles, Republicans and Democrats

⁶If you are interested in a very good paper explaining the securitization in the subprime mortgages see Ashcraft and Schuermann (2008), also, if you want a review of the literature on the shadow banking sector see Adrian and Ashcraft (2012). These papers are advanced but I believe are extremely good sources.

did the same thing! Republicans, however, had a larger emphasis on tax cuts, while Democrats were pushing for expenditures and entitlements. Nevertheless, both wanted the FED to reduce interest rates to minus infinity. The point is that there is no disagreement on the prescription of policy after a financial crisis.

Four years later it is clear that the demand management policies have been relatively ineffective. The US in 2012 is still struggling to take off, and in fact it is quite likely that it will reenter another recession. Some economists, such as Paul Krugman, have argued that the stimulus was not big enough. He is arguing for very large fiscal expenditures, such that they become truly effective. Others argue that the stimulus has been too large already, causing a budget problem, and the lack of confidence in the market dominates the small positive effect of another Dollar spent. In the end, one is pushing for more expenditures, while the other is supporting other policies.

Instead of discussing the fiscal policy, which is an extremely heated discussion where ideology is dominating the arguments as opposed to practicality, let me discuss monetary policy. The FED since Oct 2008 has printed almost 1.5 trillion Dollars. This is a massive effort that has tripled the amount of cash that the economy usually needs (which is 0.8 trillion – so the total cash in the balance sheet is approaching 2.4!) There is no precedent for this type of monetary expansion in the US. This should have increased lending, increased investment, produced inflation, drop interest rates to zero, etc. Nothing remotely close to that has happened - except for the interest rate! All the cash is accumulated in the banks and firms, instead of new lending, new investments, or job creation, etc. So, why has monetary policy been so ineffective?

Of course, one could argue that the crisis would have been much worse, and in comparison to that possible outcome monetary policy has been extremely effective. However, 1.5 trillions later almost no new investment is taken place. Hence, it is clear that something is precluding the normal functioning of the economy.

The discussion on the ineffectiveness of monetary policy requires a short summary on the channels through which monetary policy works. Lets enumerate the channels first, and discuss efficiency later.

1. Interest rate channel:

The interest rate channel is the one almost everybody knows. When the Central Bank implements an expansionary monetary policy, interest rates tend to go down. The interest rate the Central Bank controls is the short run rate (the policy rate). The expectation is that the reduction of the policy rate leads to a decline of all market rates (short and long) lowering the cost of lending. Therefore lowering the cost of consumption loans, mortgage loans, and investment. Another way to understand this channel is that the interest rate is the cost of capital, and by lowering some of the short rates, the FED is creating incentives for investment.

2. Exchange rate channel:

An expansionary monetary policy leads – in general – to a depreciation of the exchange rate in the long run. The reason is the exchange rate is a relative price between two assets: money at home, and money abroad. By increasing the supply of home currency, its relative price declines. A depreciation of the exchange rate improves the situation of exporting firms, or firms that supply to the domestic economy but that compete with importers. Therefore, a depreciation in the exchange rate is an improvement for a significant proportion of firms

3. Lending channel:

The lending channel works through the liquidity provision in the banking sector. The idea of the lending channel is an expansionary monetary policy floods the banks with cheap financing, and the banks use these funds and excess liquidity to lend to consumers and firms. This theory assumes banks are, in general, thirsty for cash. In other words, assume a bank needs liquidity to provide loans but it does not have it. This means that loans that the bank would have liked to provide could not be made. In this circumstance, if the Central Bank provides the liquidity, then the bank's constraints are relaxed and it is able to provide loans to those firms that were unable to get them.

4. Wealth channel:

Finally, the wealth channel works through the balance sheet of firms and banks, and in particular through the value of assets used for collateral. The idea is that an expansionary monetary policy leads to an increase in asset prices (housing, stocks, bonds, etc.) and this improves the balance sheet of consumers and firms. With the additional capital in hand, consumers can ask for more loans and additional consumption, while firms can ask for more loans and conduct additional invest, etc.

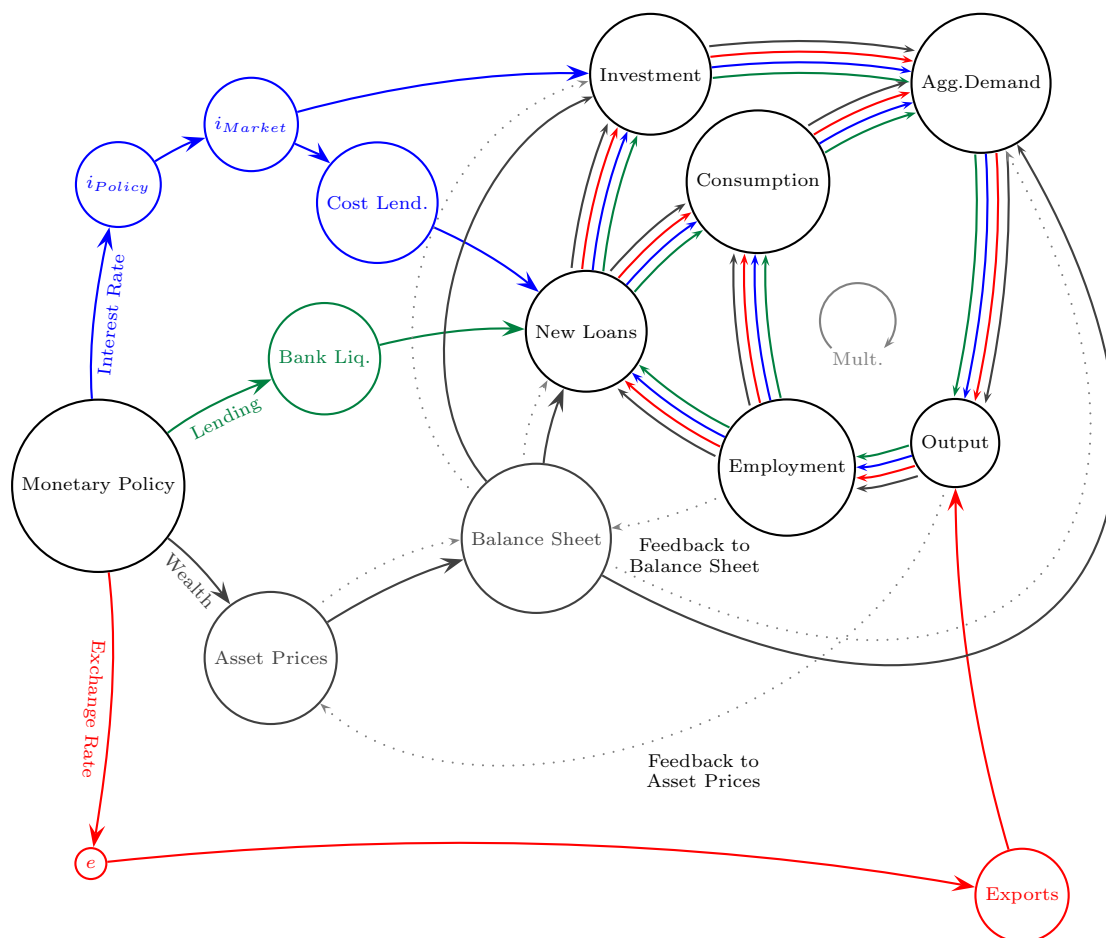


Figure 5.4: Monetary Policy Channels

In Figure 5.4 we show the channels we have discussed. Additionally, we are depicting a multiplier and some feedback loops that might exist in the economy. Here the objective is to highlight how the channels are interconnected with each other (which is crucial for the discussion about limitations). The feedback loops make the functioning of the different channels of monetary policy quite intertwined.

Let us first concentrate on the real economy – which we have identified as a multiplier reminiscent of the BabySitter cooperative. When loans are provided both investment and consumption increase, which leads to an increase in the aggregate demand. The rise in the demand pushes production up, leading to hiring. The additional income from both the higher output and higher levels of employment lead to more loans and higher domestic demand. This is a more complex version of the Keynesian Multiplier we have discussed so

far.

Monetary policy through each of these channels affects the economy from different nodes in the system. The interest rate channel comes from reducing the cost of lending and the cost of capital. The lower cost of lending creates demand for additional loans, while the lower cost of capital leads to higher investment. The exchange rate channel mostly works through production and output – and specifically through the production of exporting firms, or firms competing with imported products. The lending channel increases liquidity and allows banks to provide more loans. Finally, the wealth channel works through asset prices. The increase in the value of assets improves balance sheets (of firms and consumers) that leads to additional loans, outright more investment, and/or higher aggregate demand. The main feedback effect I highlight in the system is the one that runs through asset prices and balance sheets (known as the financial accelerator). The increase in output and higher demand pushes asset prices up, while the increase in employment improves balance sheets of consumers.

Why has monetary policy been so ineffective in the US between 2008 and 2012? Two reasons: first, some of these channels have always being weak in the US and the transmission has never run through them. So, they have never worked in the past and they are not working now. Second, the channels that used to work have become feeble because of the particular circumstances in the US.

The exchange rate channel has always being very weak in the US. The US is the world's best producer at certain products – CPU's, software, airplanes, armament, consulting services, and horrible soccer teams. They will continue to be the world leader in all these products regardless of the cost of labor. On the other hand, the US will never go back to producing T-shirts – regardless of the labor cost. Therefore, a devaluation has a small impact in the economy. This is not the case in Japan, UK, the rest of Europe, and most emerging markets. In those countries the exchange rate channel is strong.

Similarly, the direct channel from lower interest rates to cost of capital to direct investment has always being very weak. The reason is that although investment is sensitive to interest rates, it is less sensitive to short term interest rates – which are the ones that the Central Bank ultimately affects. For instance, if today's printing shifts inflation expectations up, then the reduction of interest rates today imply an increase in the interest rates tomorrow. The impact on investment might be small. This is indeed weak in most countries. In the US, however, the strong channel is through real estate. If the interest rate comes down, then consumers refinance their mortgages and increase their disposable income. However, this is closely related to the wealth channel we discuss below. The house is after all the most important asset in the balance sheet of households.

In principle, having these two weak channels should not be a big issue, because the lending and wealth channels would be at work.

In the recent crisis two things have happened. First, a new regulatory environment is expected in the banking system. We have approved a new regulatory regime. However, no one knows how costly is going to be, how is going to be implemented, what is the time frame, etc. This is true not only in the US but also in Europe.

There is a new Basel III that requires banks to recapitalize. So, does this new regulation need the banks to be recapitalized in three months? a year? ten years? etc. This very high level of uncertainty in the regulation leads banks to stop lending (wouldn't you stop lending if you have no idea how onerous the lending could become?). Hence, irrespectively of how cheap lending is (interest rate channel) or how much liquidity banks have (lending channel), no new loans are created.

Additionally, this crisis has been managed with extraordinary immaturity on the policy circles. I perfectly understand we are upset with the crisis and the role banks played in spreading it and causing it. I also understand we want to punish those banks. However, is the best punishment to impose bad regulation? I mean, does it make sense to make 300 million suffer just to mildly punish a few? What about other possibilities like finding evidence of crime and putting them in jail?

There is a tremendous animosity against the banking sector.

The second aspect is that asset prices, especially housing, have been depressed since 2008. Moreover, bad assets (what has been known as toxic assets) prices are also very low. If the asset prices are extremely low the balance sheet channel does not work. It is like assuming that all balance sheets are so weak that a minor increase in asset prices has no impact on the collateral value of any loan. In fact, it has been impossible to create enough stimulus to increase the value of real estate and the toxic assets – at least not big enough to compensate the decline that they had in the fall of 2008. Therefore, the channel is not at work at all.

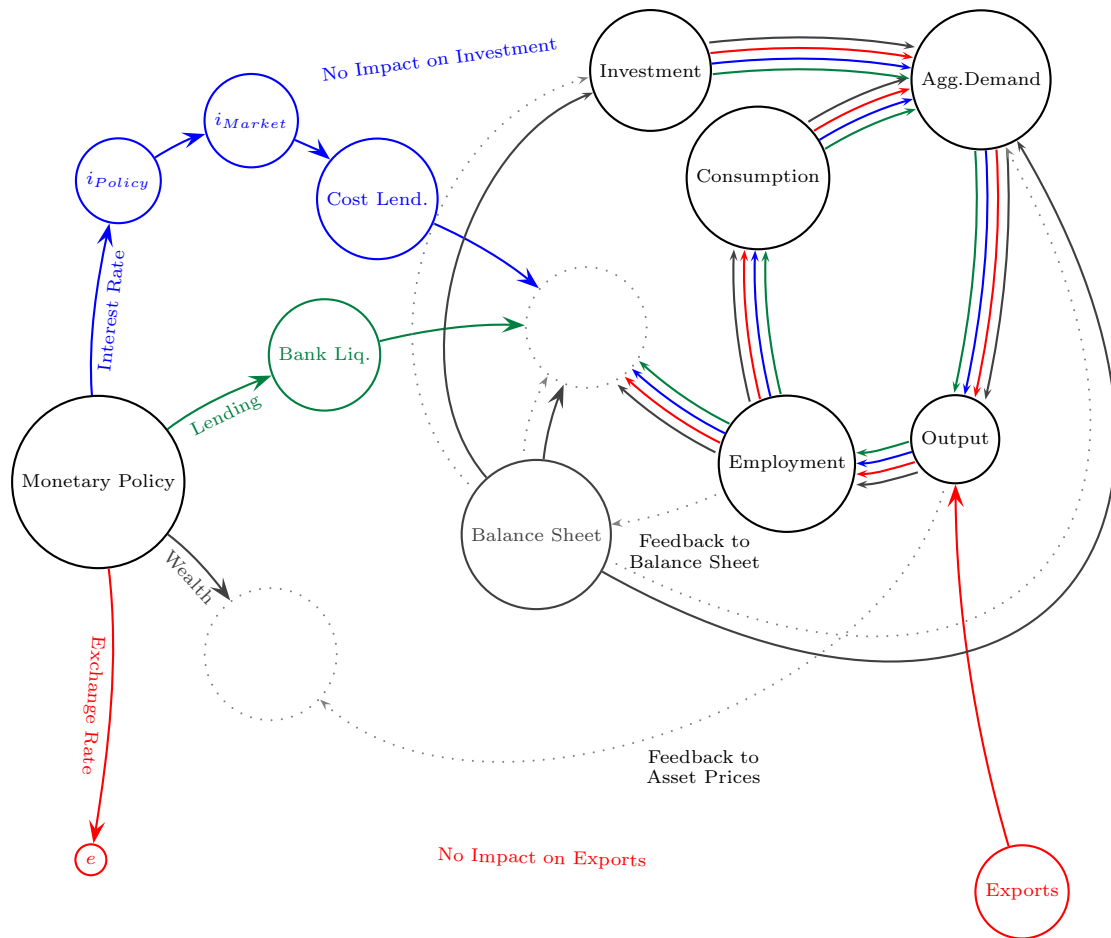


Figure 5.5: Monetary Policy Channels in US 2008-2011.
 Why Monetary Policy effectiveness has been so low since 2008?

In Figure 5.5 we represent the situation. As can be seen, all possible channels are “interrupted”; and therefore, all the tremendous effort from the monetary authority has been – in large extent – wasted. Not because the FED hasn’t done its job of printing. On the contrary, the situation would have been much worse if they would have not acted, but the problem has been that the actions have not being translated into a significant improvement in the economy for the multiplier to start working again. It is conceivable that the best monetary policy action today is to get the new banking law simplified and in place! Sadly this means that we are at a point in which the best monetary policy action is in the hands of Congress – which is obviously a collection of very mature, non-ideological and well intentioned individuals.

Why the consumers have not acted? This is also interesting in the case of the US. Most personal loans are at fix rates. The only mechanism consumers have to enjoy such lower rates and better financial conditions is to refinance or obtain a new loan; because banks are under a “no-lending” mode, new loans are impossible; and because real estate prices are so low, there is very little equity in the hands of consumers impeding refinancing. Hence, the exact same reasons why the channel is not working at the firm level are behind the lack of response on the consumer side. In the past, this situation has been solved by providing “price support” measures at the consumer level.

The FED has acted very courageously in this recession. They have purchased every conceivable asset issued by the banking sector, have tried to keep financial stability and health, and in the end has allowed the economy to suffer a relatively mild recession – mild in comparison to the great depression when unemployment increased from 3 to 25, when output fell by more than 20 percent, and where prices dropped by more than 26 percent – our biggest adjustment in this recession was an unemployment increase from 4.5 to 10.5, a drop of output of less than 5 percent, and a drop of prices of less than 4 percent. So, a small proportion of what happened then. Why? Because the FED has stopped the massive financial crises that we were heading to. However, not everything was perfect. The excess cash instead of being intermediated to the economy got trapped in the banking sector. One of the most striking pictures is the decomposition of the cash holdings between consumers and the rest. This comes from the FED’s balance sheet (publicly available in their web page). Figure 5.6 presents the decomposition.

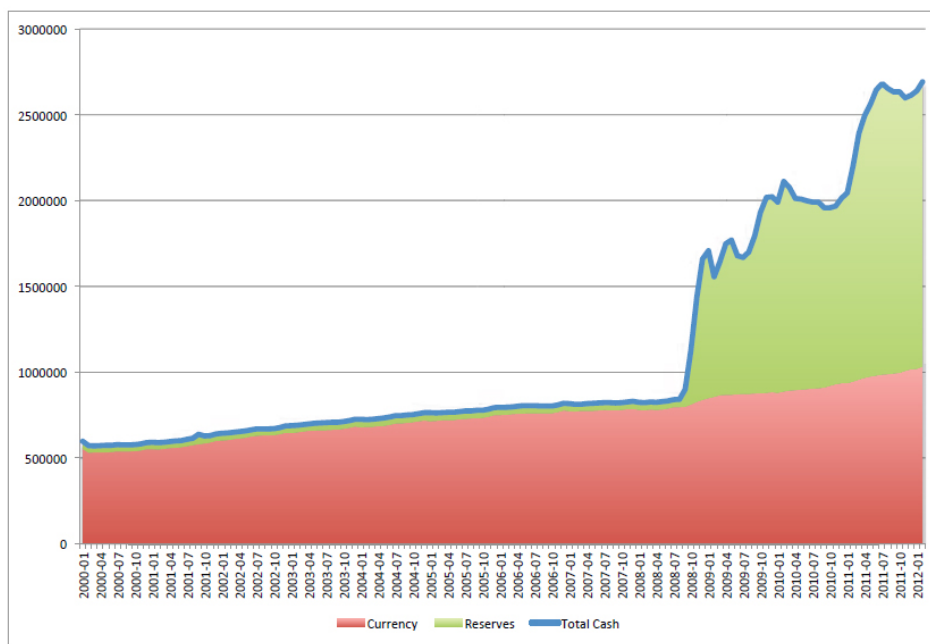


Figure 5.6: Cash Decomposition: FED’s Balance Sheet

The discussion in this subsection is intended to highlight how we can analyze the effectiveness of a particular policy. Things are in general quite convoluted; and therefore studying one particular movement can be as profound and complicated as imaginably possible. What makes that discussion worse is that a lot of the participants have ideological stakes, and instead of trying to find evidence and act accordingly (in a pragmatic way) they are mostly concentrated in trying to prove they were right.

My objective is just to show the complexity involved. Imagine two individuals do not agree on the strength of each of the channels I have just described – or that one person prefers one channel to other, or

one wants to argue “yes, it is effective” and the other “no, it is not”. The discussion will have no end unless empirical support is presented. If you have taken or will take 15.034 you clearly know how difficult is to find empirical evidence in support of a particular theory. Therefore, in general, these discussions are never settled – and that explains why we (economists) spend countless hours arguing. You, as a consumer of macro news, should not be concerned with these discussions. You *should* be concerned with understanding the points of each of the economists killing each other, and then take a pragmatic view of the problem: “What is likely to happen? Given what I know about my country’s politics and economic discussions.” “What is the rationale behind this decision?” or in other words, “Even though I do not agree with the policy implemented, how can it be rationalized?” That is certainly more useful than fighting about ideologies, religions, and slopes.

5.6.2 Debunking Japan’s Deflationary Funk: An opinion.

I know I said earlier that I was going to refrain from expressing my opinion, but I would like to use the tools we have just learned to analyze the Japanese case, and to show you how I usually think about these events. I wrote the following piece in March 2013. So, here is the exert.

Abe-nomics is just about to start, and Kuroda has been chosen to carry the torch. Some hope this means a more dynamic economy, but certainly it is expected to at least be a more inflationary one. Abe wants an aggressive monetary policy, and Kuroda seems to know how to do so. Hence, there is little doubt the press will be working three turns, but will it be enough to change inflation expectations? I believe the inflation target set in the summer of 2012 is quite difficult to achieve. Two reasons why printing is not enough: First, the channels of monetary policy transmission in Japan are quite weak. Second, inflation expectations are not going to change unless a dramatic shift in behavior takes place at the BoJ.

There are four channels of monetary policy transmission: interest rate channel, lending channel, wealth channel, and exchange rate channel. We believe these channels are faint in the current environment in Japan.

The interest rate channel works through investment decisions: The idea is that a drop in interest rate increases the NPV of some projects, and drives investment up. This channel has historically been frail in Japan meaning a drop in interest rates had a very small impact on investment. What is worse is that in the last 15 years with interest rates nearly at zero the channel has just become almost inexistent. As shown in Figure 5.7, short term interest rates (1 month) have been almost zero since 1996.

The second channel is the lending channel. The assumption is that by flooding the banks with cash, they push lending to consumers and firms. The idea is that by improving the balance sheet of banks, and making it more liquid, credit expands. You need healthy banks for this to work, though. For example, in the US this used to be a very strong channel. Today, four years after the crisis, the channel is feeble. Banks are drowned with cash and credit expands very little. Japan has been in the same situation since the beginning of the 90s, and since then the channel has been ineffective.

The wealth channel, one that has received particular attention in the Japanese press, affects the demand through its impact on asset prices. The idea is that actions by the central bank increase asset prices, increasing wealth, and creating additional consumption. For the channel to be effective two conditions are required. First, the central bank has to be able to increase wealth. Second, consumers would need to use part of the windfall and spend it. In Japan, both are tiny.

From the flow of funds national statistics it is possible to compare the savings allocations in Japan and USA (see the BoJ and FED). In Figure 5.8 we present the households savings allocation in the USA and Japan split across cash, public sector bonds, stocks, pensions, and tangible assets (which is usually identified as other). In the evolution of household’s savings in the USA and Japan are shown. Figure 5.8(a) presents how the US households save. The blue region indicates the share in cash and deposits, the red region are the holdings of public bonds (treasuries and municipals), the green region are the holdings in stocks and financial instruments, the purple one is the share of savings in pensions and insurance, and the top region

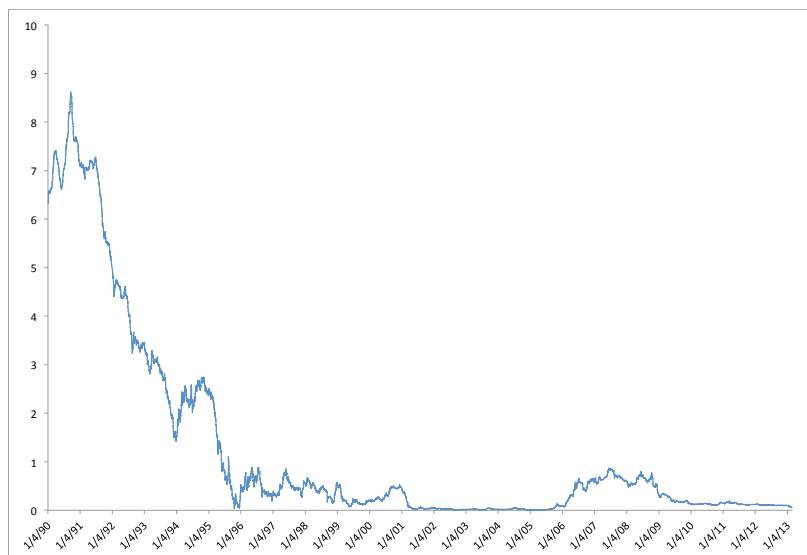


Figure 5.7: Japan Short Term Interest Rates

are tangible assets – real estate, software, etc.

As the figures indicate, in Japan, most of the household savings are in cash, or cash like accounts (more than 54 percent!). They have very little in stocks (less than 7 percent) and tangible assets (less than 9 percent). Most of their savings are in cash, pensions, and insurance that account for a total of 82 percent of their wealth. This means that the BoJ will have almost no impact on the wealth of households. Their actions will have no impact on the price of cash (and if something the inflation will decrease it), and the benefit on asset prices goes to pensions. So, doubling asset prices increases the *useable-wealth-for-consumption* by less than 10 percent. Contrary, in the USA, households have less than 12 percent in cash, and less than 20 in pensions and insurance. Their total wealth in stocks plus tangible assets is more than 62 percent. Therefore, those actions the FED takes that increase asset prices have an immediate impact on consumers wealth. A 10 percent increase in all assets in Japan increases wealth in only 1.8 percent, while it increases it in 6.9 percent in the US.

Not only the wealth impact in the US is bigger than in Japan, but US consumers tend to have a higher marginal rate of consumption out of financial wealth and therefore, the FED has a much bigger impact on actual consumption through the wealth channel.⁷ In Japan the wealth channel has very little change of becoming important in the short run.

Finally, the exchange rate channel has historically being very strong in Japan, but the current situation in the world makes it weaker. The idea of this channel is that a lax monetary policy leads to a depreciation that helps the exporting sector expand. Two conditions are required for this channel to be at work. First, the exporting sector needs to be sensitive to the exchange rate i.e. the country cannot produce and export

⁷See Rigobon and Sack (2003) for estimation and calibration of the wealth effect in the US. See Rigobon and Sack (2004) for estimates on the impact of monetary policy on asset prices in the US

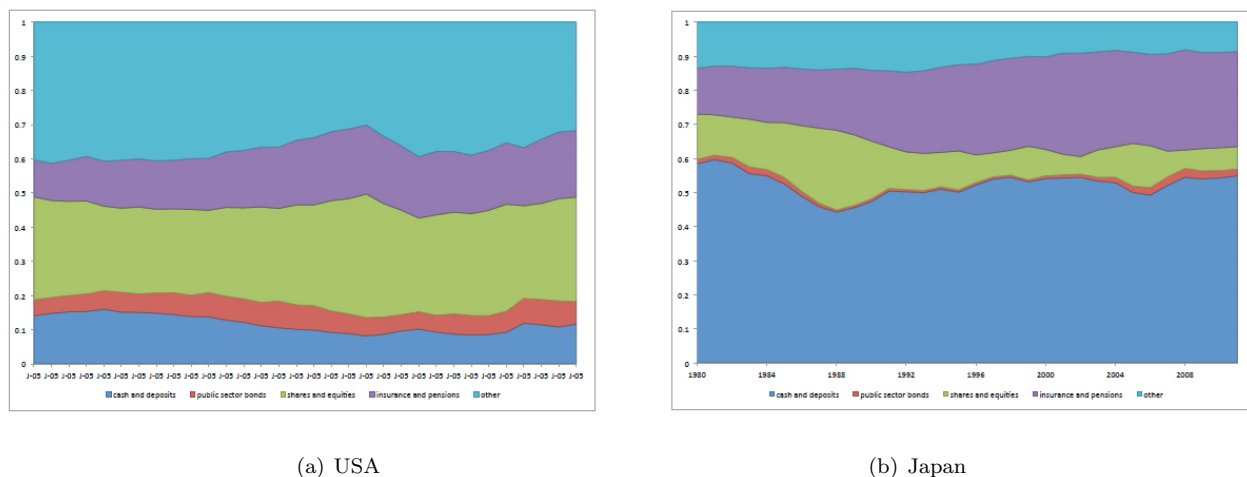


Figure 5.8: Households Flow of Funds: Stocks

commodities. Second, the world demand has to be able to accommodate the larger production. Historically, Japan has relied on this channel to deal with internal crises. However, the world demand right now is tamed, and in a world that is talking about currency wars every other day, it is hard to envision how Japan can unilaterally engineer a significant and long lasting depreciation.

In summary, the interest rate channel is weak and has been puny after almost 15 years of interest rates near zero; the lending channel is anemic because banks' balance sheets are in bad shape; the wealth channel is frail because most of the savings of consumers are in cash and retirement accounts, and the marginal propensity to consume from financial wealth is small; and the exchange rate channel is strong, but in a world where "currency wars" is a major international concern it is hard to obtain a depreciation without some form of retaliation. Therefore, even though the printing in Japan will occur, inflation will be hard to achieve.

If the usual channels of monetary policy are not enough, then an alternative is to change inflation expectations. In other words, the only hope that inflation restarts is that Japanese expect inflation to take place and for that to occur, BoJ messages and actions have to show a serious commitment to inflation. The actions have to be bold enough to make clear in the minds of consumers and investors that not only Japan is going to hit the target, but also that they will not mind be beyond the target. In the end, the target is meant to represent an average and not an upper bound. So, Kuroda better say something like *4 percent is fine* or *anything less than two digits is acceptable* or even better *I just went to Venezuela and they have a very interesting technique on how to create inflation. We are bringing some advisors from there.* That will change expectations, and ultimately, inflation. Anything short than bold and strong statements will not change the minds of consumers. They will wait and see. And if they wait, inflation will not come, and they will be proven correct not to shift expectations. The BoJ better be in *shock and awe* mode.

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Chapter 6

Fiscal Policy

I know that I have said that I was planning to explain everything without equations – which in principle is true. However, I made the point in Chapter 2 that I was going to need accounting relationships several times; and to be honest, accounting sometimes looks like an equation. The dynamic of fiscal debt is one of them.

This section looks at the most basic aspect of fiscal sustainability. As we go along this Chapter more complex and cumbersome aspects of the fiscal accounts would be entertained. We start with the definition of the components of the fiscal accounts, and putting most of the emphasis on the standard fiscal sustainability aspects. Then we devote a full subsection to how to understand the positive and negative feedback loops in the fiscal accounts: both the virtuous and vicious cycles. This system approach is the true one required to understand the fiscal sustainability of a country. The following subsection devotes its time to study the manipulation of fiscal accounts. Nowadays, several countries “lie” about their fiscal stance. It is important to understand the difference between the accounting and what actually is taking place. We start with the Basic definitions first.

6.1 Fiscal Policy: Basics Definitions and Components

The fiscal accounts have three main components: Tax Revenues (T_t), Expenditures (G_t) and Interest payments (I_t). Assume this is measured in domestic currency and they represent the total tax revenues, expenditures and interest payments. I will use the under script “t” to make sure we keep track of time. The reason is that the question of fiscal sustainability is exactly about the path that sovereign debt follows, rather than “todays” debt level.

The tax revenue is usually associated to the country’s GDP (Y_t). We denote the equivalent tax rate as τ . In other words, the tax revenue of the country in year t is the tax rate τ times GDP Y_t . That equivalent tax rate is indeed the share of tax revenues on GDP.

On the expenditure side we do the exact same analysis. The share of government expenditures excluding interest payments is defined as γ . Hence, the total expenditures at time t are γ times Y_t .

Finally, interest payments are the outcome of the average interest rate on sovereign debt i times the size of the sovereign debt. Importantly here is the fact that the debt that matters is the debt that exists at the beginning of the period (or in other words, the debt at the end of the previous year). This is why keeping track of time matters. If we denote the total debt in domestic currency at the end of the year as D_t , then the interest payment at time t is the interest rate (i) times the debt at the end of the previous year (D_{t-1}).

Let us formalize all these definitions.

Definition 1 (Fiscal Accounts). *The components of the fiscal accounts are:*

$$\begin{aligned} \text{Tax Revenues} & : T_t = \tau \times Y_t \\ \text{Fiscal Expenditures} & : G_t = \gamma \times Y_t \\ \text{Interest Payments} & : I_t = \iota \times D_{t-1} \end{aligned}$$

The fiscal surplus (or deficit) has actually two measures. When we talk about deficits it is just the negative of the surplus. One measure is the one that most people discuss publicly and usually referred as *Fiscal Surplus (or Deficit)*. Most people think of the fiscal surplus as the simple calculation of all fiscal revenues minus all fiscal expenditures – which includes interest payments. This is indeed what we call the Nominal Fiscal Surplus. There is another sub definition which is called the Primary Fiscal Surplus. This is tax revenues minus fiscal expenditures – which specifically excludes interest payments.

Definition 2 (Fiscal Surpluses). *The Nominal Fiscal Surplus is Taxes minus Expenditures minus Interest payments, while the Primary surplus is Taxes minus Expenditures. formally,*

$$\underbrace{\underbrace{T_t - G_t}_{\text{Primary Surplus}} - I_t}_{\text{Nominal Surplus}}$$

6.1.1 Fiscal Sustainability

These definitions are important to understand how we think about fiscal sustainability and in particular when we are interested in defining what is the required *fiscal adjustment* to bring an unsustainable debt into a sustainable path.

The accounting of sovereign debt is then quite simple. The change in the debt (measured in total domestic currency) is exactly the nominal fiscal deficit.

$$\Delta D_t = -T_t + G_t + I_t \tag{6.1}$$

We rarely measure debt in domestic currency – which is irrelevant. Well, it is irrelevant from the economic point of view. Reporters, on the other hand, love to say the debt is 12 trillion or 15 trillion just to be able to write the zeros on the news paper. This accomplishes nothing, except to capture the attention of uninformed consumers. We measure debt, however, as a percentage of GDP. Let me do some algebra to simplify the debt dynamic equation (equation 6.1).

$$\begin{aligned} D_t - D_{t-1} & = -T_t + G_t + I_t \\ D_t & = -T_t + G_t + (1 + \iota_t) \times D_{t-1} \end{aligned}$$

Dividing by GDP of year t in both sides

$$\begin{aligned} \frac{D_t}{Y_t} & = -\frac{T_t}{Y_t} + \frac{G_t}{Y_t} + (1 + \iota_t) \frac{D_{t-1}}{Y_t} \\ d_t & = -\tau_t + \gamma_t + (1 + \iota_t) \frac{D_{t-1}}{Y_{t-1}} \frac{Y_{t-1}}{Y_t} \\ d_t & = -\tau_t + \gamma_t + \frac{1 + \iota_t}{1 + g_t} d_{t-1} \end{aligned}$$

The last term can be approximated given that growth rates are usually small. I mean they are on the 2, 3, 4 percent and at a maximum it is 8 or 9. So,

$$\frac{1 + \iota_t}{1 + g_t} \approx 1 + \iota_t - g_t$$

The debt dynamics equation becomes (where I have moved one d_{t-1} to the right hand side):

$$\Delta d_t = -\tau_t + \gamma_t + (\iota_t - g_t)d_{t-1} \quad (6.2)$$

Notice that in equation 6.2 the growth rate of GDP reduces the share of the debt. It works like a negative interest rate. In other words, because the growth rate of most countries is positive it implies that a permanent fiscal deficit is feasible because it is implicitly financed by a growth rate. In other words, if a country is interested in keeping the debt to GDP ratio constant, then the growth rate implies that a small overall deficit is permissible.

What is a sustainable level of debt? It is not clear we have the answer to this. At least, it is not clear that the answer is as simple as just a level. A very nice procedure and definition of *sustainable debt* is to think about the primary fiscal surplus required to keep the debt constant.

Let us see this feature with an example. Assume debt is 60 percent of GDP and the economy is growing at 2 percent. What is the fiscal deficit that can be sustained? Assume sustainability means that the debt remains constant at 60 percent: So $\Delta d_t = 0$. Given the growth rate, we know that debt will be declining at a ratio of $0.02 * 0.60 = 0.012$. This decline in the debt to GDP ratio at 1.2% happens automatically and permanently. Therefore $\tau_t - \gamma_t - \iota_t \times d_{t-1}$ can be negative and equal to -1.2% every year. This is the overall deficit – or nominal deficit – that can be sustained. We can also ask what is the primary surplus consistent with a stable path of debt given certain interest rate. For example, assume the interest rate is 3% which implies interest payments of 1.8% of GDP: $0.03 * 0.60 = 0.018$. If this is the interest payment, then the primary surplus ($\tau_t - \gamma_t$) needs to be $1.8 - 1.2 = 0.6$ percent of GDP.

Don't you find strange that the country can sustain a permanent fiscal deficit? Where is the amortization? Sorry; what a stupid question. I forgot you guys are MBA's and you have been genetically design to borrow forever. Let us assume you are normal people – remember when you used to be an engineer? and actually had to produce something to earn something? On a more serious note... Individuals do not borrow forever, and they tend to pay their debts. So, where is the amortization here, and how can a country have a deficit forever. There are two important differences – at least when I compare a country to myself. First, you might be surprised but I will not live forever. I know! What a shock! But I am quite certain I will die. Second, my growth rate is not positive forever. I know some growth rates are – like the growth rate of my waistline, or the growth rate of my handicap. My income, on the other hand, grows for a while, then plateaus, and finally it drops at retirement. So, an individual with such income profile might borrow at the beginning of its life, but in the anticipation of the drop in income, it will start saving. Saving requires paying the debt! This is the life-cycle hypothesis and it was one of the greatest contribution of Modigliani. Countries, on the other hand, can grow forever, and will live forever.

Sustainable Development

I know some of you might be taking a class on sustainability with John Sterman. So, I think you need a small clarification.

Probably you have heard from John something like “sustainable development is an oxymoron!”. John is right in saying that we cannot grow forever by consuming more energy. He is correct, or at least I agree with that statement. This is a very narrow view of growth, though. In fact, you learned in 15.012 that growth by accumulation of factors (capital and labor) has to slow down – This is exactly what Solow said in his seminal contribution more than 60 years ago. However, growth comes from technological innovation, and technological innovation is the outcome of ideas – and that is unbounded.

Ideas are unbounded, and therefore they imply growth forever. I always ask in my classes the following question: “Please, if you think you are NOT going to have a single good idea the next 25 years, raise your hand”. You know in 20 years how many people have raised their hands to publicly recognize that they are not going to have a single good idea? An easy number: 0! This is not arrogance. I know you are going to have a good idea, and because this is true not only at MIT, but at HKS and HBS, etc. Ideas will produce growth insofar humans spend a single second thinking.

In summary: Growth on ideas is unbounded and sustainable. Growth based exclusively on factor accumulation is bounded and unsustainable.

Debt dynamics is the analysis of the primary surplus required to achieve a constant level of debt – or to attain a certain level of it. The idea is to ask which primary surplus ($\tau - \gamma$) produces a desired path of debt. Let us do this analysis in two steps. First, Let me make very clear when the debt can be exploding. Second, I will show that in an exploding environment we can implement a fiscal adjustment (change the primary surplus) to control the path of debt.

Debt can be exploding. For example, assume that $\tau - \gamma$ is zero, but $\iota > g$. In this case, the change in the debt over GDP grows exponentially at a constant rate of $\iota - g$. A country can stop this process by producing a primary surplus to compensate. Assume the following initial conditions:

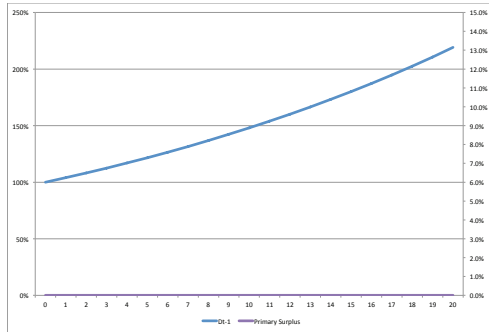
- Assume the initial debt (d_{t-1}) is 100% of GDP
- Assume the growth rate is 1%
- Assume the interest rate is 5%

If the initial primary surplus is zero, the debt will be growing at a four percent rate. How does the debt dynamics look like? Exactly like an exponential. Figure 6.1(a) shows the path assuming that there is no primary fiscal surplus. The horizontal axis are the years; the blue line is the size of the sovereign debt as a percentage of GDP measured on the left vertical axis; and the purple line is the primary surplus as a percentage of GDP measured on the right vertical axis.

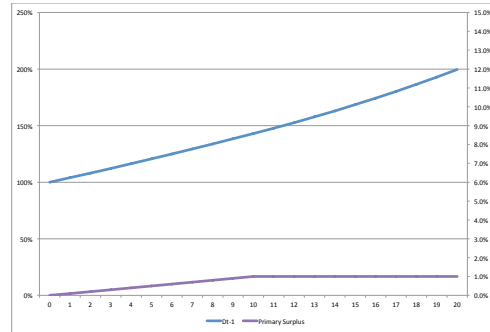
Assume we make a fiscal adjustment. This is where the separation between primary and nominal deficit is good. The efforts on the fiscal side are usually on the primary surplus. Either we increase taxes or decrease expenditures. All that moves the primary fiscal deficit. It is difficult, on the other hand, to change the size of the debt – this is called debt restructuring (or default) and it is usually a very dramatic experience. Changing the interest rate? That is even harder. Countries can do very little about it – except try to grow, improve institutions, etc.

We can ask a very simple question. Assume that for the following 10 years we improve the primary fiscal surplus every year by a fix proportion, how does that changes the path of the sovereign debt? For example, assume we improve every year the primary fiscal surplus by 0.1%. So, on year one the primary surplus is 0.1% of GDP, on year two it is 0.2%, and so on until on year 10 it is 1%. From year 10 until the end of time the primary surplus remains at 1%. How does this changes the path of the debt?

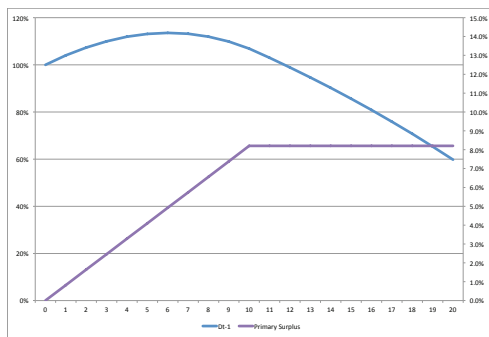
You can do this analysis using a simple spreadsheet ((will post it on the web). Figure 6.1(b) shows the evolution. As can be seen, the debt is still increasing very fast. Without effort the debt increases to 220% in 20 years, and now it is just barely bellow 200%. So, the fiscal effort is not enough to keep the debt at bay.



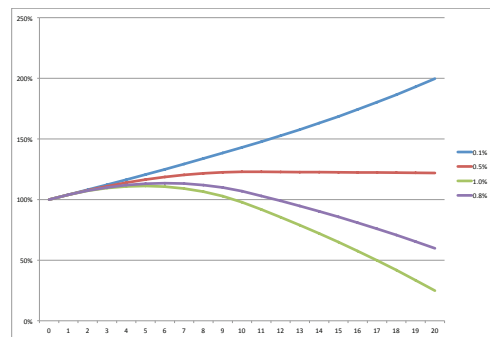
(a) No Adjustment



(b) 10 bps



(c) 82 bps



(d) Several Fiscal Adjustments

Figure 6.1: Debt Evolution

Assume that in fact I ask the question, what has to be the fiscal effort to get the sovereign debt to 60% in year number 20. How big the effort has to be every year? This is a very relevant question today in the world, and especially the developed world. After some trial-and-error you will find that in our example, the yearly effort needs to be 0.82 percent. So, the economy has to move from a zero primary surplus to a 8.2% primary surplus in 10 years to make sure the debt reaches 60% of GDP in 20. Figure 6.1(c) shows the evolution of the debt.

Finally, in Figure 6.1(d) the path of the debt for several fiscal adjustments is presented.

Problem Set: Dynamic Fiscal Sustainability

- In teams (2, 3, or 4) pick the US, Greece, Japan, and any other country of your choice.
- The purpose is to collect macro data on the fiscal accounts and determine whether or not the debt is sustainable.
- The question is “what is the fiscal effort needed to achieve sustainability?”.
- Most of the data can be found in the World Bank data called World Development Indicators.¹
 1. Debt: Central Government Debt (current LCU or % of GDP)
 2. Taxes: Revenue (current LCU or % of GDP). Usually the account at the WB data is called “Revenue, excluding grants”.
 3. Interest Payments: Interest Payments (current LCU or as a % of expenditures)
 4. Fiscal Expenditures: General Government Final Consumption Expenditure (current LCU) or Expense (current LCU). I usually prefer the second one.
 5. Output: GDP (current LCU)
 6. From the Economist Intelligence Unit, or from Trading Economics find the expected growth rate of the country the next three years – assume that is the growth rate for the future.
- Sources of data:
 - World Bank: <http://databank.worldbank.org/ddp/home.do>
 - IMF: Instructions: <http://libguides.mit.edu/imf>
 - EIU: To get the data you have to search for “Country Report Australia” (for example) in web page: <http://search.proquest.com/publicationbrowse>
- Questions:
 1. Find the incremental fiscal effort the next 10 years to stabilize the debt in each of these countries at 60 percent of GDP in year 20.
 2. Given the historical data for the countries, How likely is this primary surplus? In other words, in the last 40-50 years how many times did the government experience the primary surplus you are computing?
 3. If the growth rate increases by an additional one percent, what are the new fiscal adjustments? And how likely the fiscal adjustment would be?
 4. If the interest rate is decreased by one percent from what you are using (if it becomes negative assign zero). What are the new fiscal adjustments? And how likely the fiscal adjustment would be?
 5. Discuss briefly what you have learned in terms of fiscal adjustments. If you had to work on one dimension, which one would you work on?

Just so you have an idea, here you can see a screen snapshot with the US data from the World Bank Database. Because everything is measured in terms of GDP or Expenses it is easy to convert all variables to GDP shares. From here I use debt (first line), revenue as a measure of government’s income (last line), expense (second line), the interest payments (fifth line, which need to be adjusted because they are measured as a share of expenses and not GDP), and the GDP growth (fourth line).

World DataBank World Development Indicators

United States

	2009	2010	2011	2012
Central government debt, total (% of GDP)	76.3	85.6	90.1	93.8
Expense (% of GDP)	25.6	25.9	25.1	23.9
Tax revenue (% of GDP)	8.2	8.8	9.7	10.2
GDP growth (annual %)	-2.8	2.5	1.8	2.8
Interest payments (% of expense)	9.6	9.8	10.8	10.8
General government final consumption expenditure (% of GDP)	16.9	16.9	16.3	15.7
Revenue, excluding grants (% of GDP)	15.7	16.2	16.3	16.5

Figure 6.2: World Bank Fiscal Data for US

6.2 System's view of Fiscal Policy Feedbacks

6.2.1 The Positive Loop

The positive feedback loops all come from the intuition behind the Babysitter cooperative (Chapter 2). The fiscal policy can work through different channels. It can affect the demand exactly as in the Babysitter through expenditures and capital formation, it can affect employment and income through tax changes – also as in the Babysitter, and it can affect productivity (or output) through direct investment and incentives. The positive feedbacks are mostly coming from the standard demand multiplier.

Fiscal policy has many tools. In fact, it would take a whole book just to highlight everything that can be done. Here I am going to concentrate only on those policies that have an impact on demand or output. Important tools are devoted to income inequality, opportunities, social safety net, welfare state, defense, intergenerational transfers, etc. For the moment we let me concentrate on what is commonly used to control the economy in the short run. Let us enumerate the different tools the fiscal authority can use.

1. Demand Policies
 - (a) Government Expenditures
 - (b) Personal Tax Cuts and Subsidies to Consumers
 - (c) Corporate Tax Cuts and Corporate Subsidies
 - (d) Automatic Expenditures
2. Supply Policies
 - (a) Job Preservation Policies
 - (b) Public Investment
 - (c) Productivity Enhancing Policies
 - (d) Balance Sheet Enhancing Policies

In Figure 6.3, I have depicted the different tools and how they affect the economy – again appealing to the systems dynamics intuition we have been using so far. The most basic tool of fiscal policy is government expenditures; public work in particular (depicted in red). The purpose of this policy is to complement private demand. The objective is to increase aggregate demand directly – and from there take advantage of the demand multiplier to obtain further improvements. The improvements in aggregate demand, increase output, which increases employment levels. The increase in employment has a direct impact on consumption, but also the higher level of activity increases new loans which increase investment and consumption even further. This is the demand multiplier at work – exactly as we discussed in Chapter 5. One limitation of this policy action is what is known as crowding out. Crowding out occurs when government expenditures substitute private consumption. So, as the government expands its expenditures, the private sector contracts investment and consumption. If this takes place, then the aggregate demand does not increase – or it increases less than anticipated. Crowding out is indeed a very important problem in practice. It makes policy ineffective. I come back to this point below in subsection ??.

A second policy tool is to affect consumer's income (depicted as brown in Figure 6.3). A personal tax cut or a direct subsidy increases household income and ultimately its consumption. From there the demand multiplier takes care of the rest. This channel, however, requires consumers to be willing to spend the money to work. For instance, if consumers assume that today's tax cut will require future tax increases, it might decide not to consume, rendering the channel ineffective. For example, in a deflationary environment this is quite possible. When prices are going down consumers are delaying their purchases, a tax cut in that context is not very effective.² The effectiveness of a fiscal expansion based on tax cuts and subsidies to consumers

²See sub-section 2.2.1.1

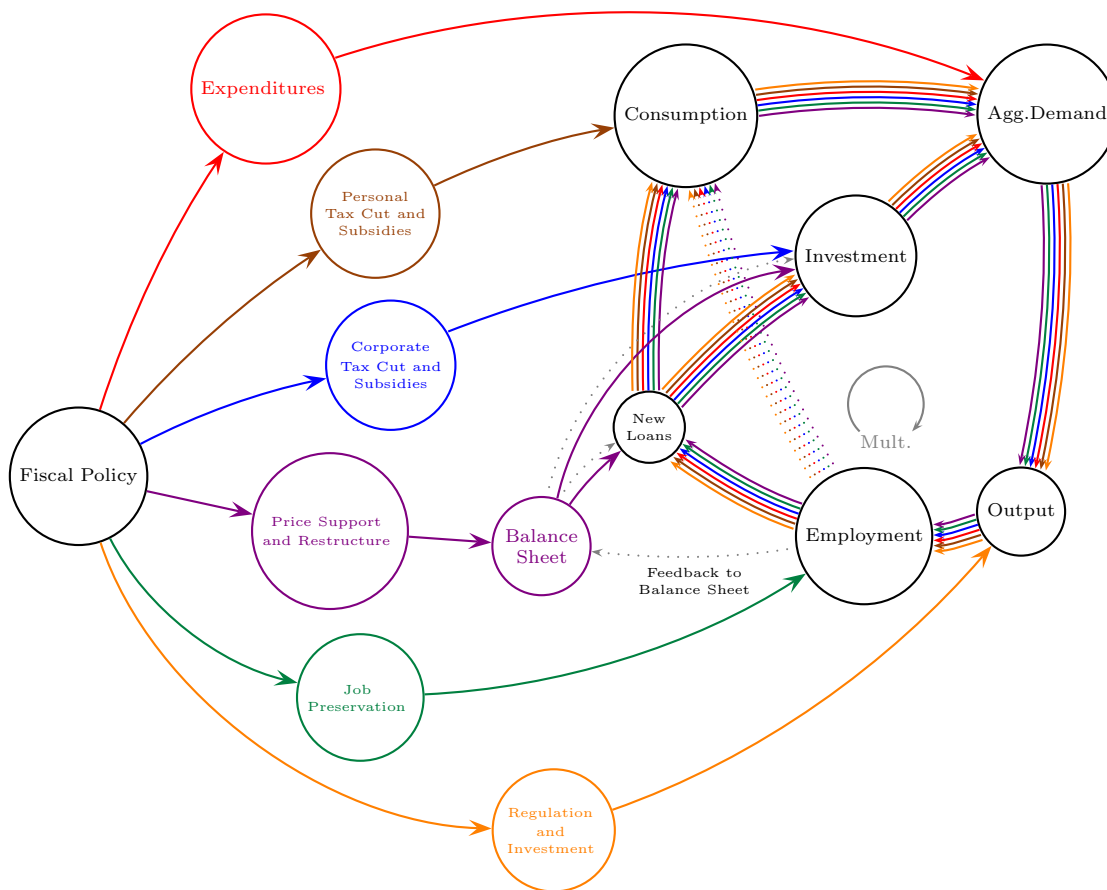


Figure 6.3: Fiscal Policy Channels

depends on the willingness of consumers to convert the additional income into consumption. The marginal propensity of consumption is crucial for understanding the strength of the transmission mechanism. It is easy to imagine that this channel is strong in the US – where consumers are eager to spend money they do not even have – versus the same channel in Japan – who’s households are in “save-everything-you-can” mode.

The third policy action we study are those that affect firm’s incomes (depicted as blue in Figure 6.3). A corporate tax cut or a direct subsidy increases the ability of firms to invest. As in the previous case, an expansion in investment increases aggregate demand – and also productivity (but we cover this in later chapters). This channel, as the one before, requires willingness of the recipient of the tax cut to perform the investment. If firms do not find good investment opportunities, it does not matter how much the taxes are cut, the impact on the economy is null. Moreover, if firms anticipate that today’s subsidy or tax cut will require an opposite action later, then investment – a very long run form of consumption – is less likely to happen. As before, the effectiveness of this channel depends on the willingness of firms to transform the additional income into investment.

The fourth policy tool tries to improve balance sheets (depicted as violet in Figure 6.3). The Treasury has several mechanisms to improve the balance sheet of firms. Once it has improved, then lending and the demand multiplier will be at work. TARP was an example in which the US bought bad securities and

provided very good assets – I mean they purchased crappy stocks and gave the companies cash. This clearly improves the balance sheet. One action is particularly interesting and heavily used in emerging markets – *price support*. For example, assume the government of India assures farmers of a minimum sales price for corn. Independently of the conditions in the market, this implies that the wealth of farmers have a lower bound when supply is excessive. This is an option, it has a value to the farmer, and clearly improves the balance sheet. FDR implemented a price support for hauling during the Great Depression. More recently, when any of the European governments decides to bailout their banking system, they decide to purchase assets (or provide loans) in preferential conditions – where preferential means that the government is paying more than the market price. From the financial crisis point of view this makes sense, and it is the correct policy. It is also o.k. if you feel uneasy about this. Do not worry we will discuss this in Chapter 15. The point here, however, is that governments can take actions that improve the balance sheet by providing loans or buying assets or buying products at a price that is above the market price – that is a *price support* policy. As we have been doing so far, then, what is the limitation? The whole idea of improving the balance sheet is for firms and households to go out and expand the demand. So, they need to get a loan and have a party. However, if the banking system is in bad shape – i.e. the country is going through a credit crunch – then it is unlikely that the improvement in the balance sheet will lead to an increase in investment or consumption.

The fifth policy mostly tries to create employment or reduce the rate of firing (depicted as green in Figure 6.3). This was used quite effectively in Germany in the 2008 financial crises. In fact, the US moved to a similar policy in mid 2011. The idea of this policy is to provide a subsidy to the firms that is conditional to employment. For example, some countries give a tax break for the creation of a new job; or have special considerations for startups. I think one of the most effective policies is to pay (or partially pay) payroll taxes. The idea is that during a recession when the company needs to shrink its labor force because the labor cost is too high the government pays for part of that labor cost. Why this makes sense? Lets explain this with an example: Assume that the unemployment rate is 0 percent and that the country is hit with a negative shock; so big that the unemployment rate should go to 10 percent. In other words, the shock is big enough that companies need to reduce their labor cost by 10 percent. Imagine that the salaries are 100 and that payroll taxes paid by the firm account of 20 percent. Assume the firm has 50 workers, and that workers pay a tax of 25 percent from their wage income. Finally, assume that the country has unemployment insurance which covers 70 percent of the worker's wage. Let see the situation of the society before the recession. What is the labor cost of the firm? $100 * (1 + 0.2) * 50 = 6000$ What are the tax revenues the government receives? The payroll taxes account for 1000 dollars paid by the firm, and the workers pay income taxes of 1250. Once the recession hit, unemployment will increase by 10 percent. The consequences of this are several: First, the company will have a lower labor cost – that is what the firm is pursuing. They want to lower the labor cost and they do so by reducing the activities that are not crucial. In this example, the savings to the firm are 600 dollars. Second, tax revenues decrease. Government revenues go down for two reasons: payroll taxes will come down because there are less workers working, and income taxes decrease because less workers are paying taxes. In sum, the payroll tax revenue will be 900, while the income tax becomes 1125. The revenues of the government decline from 2250 to 2025 (225). Third, now the government has to pay for the unemployed. There are 5 workers unemployed earning 70 percent of their labor income (and not paying taxes!). So, this is an additional cost of 350 for the government. What is the net effect to the society? Firms reduce their expenditure by 600 dollars, while the increase in the fiscal deficit is 575 dollars. I hope it is clear that with these numbers – which are very similar to the regulation in Europe – the savings by the firms are almost identical to the losses of the government. Imagine an alternative scenario where the government tells the companies that the payroll taxes will be reduced to 8 percent if they keep all the workers. What is the labor cost? $100 * (1.08) * 50 = 5400$ which is exactly the same labor cost they would have experience if they fire 10 percent of the labor force. Because all workers are employed, there is no increase in the unemployment insurance, there is the same income tax, and the government only incurs in a drop in the payroll tax of exactly 600 dollars. So, with almost the same fiscal cost we keep everybody working! This is interesting, imagine that there is an additional social cost of unemployment; such as depression, domestic violence, deterioration of skills or unwillingness to retrain, etc. It is conceivable that the loss to the society is

bigger than the savings made by the firm. In fact, if the unemployment insurance is 80 percent of the labor

	Before	Recession		Payroll Tax Subsidy	
Salary	100	100		100	
Payroll Tax	20%	20%		8%	
Income Tax	25%	25%		25%	
Unemployment Insurance	70%	70%		70%	
Workers	50	45		50	
Labor Cost	6000	5400	600	5400	600
Payroll Taxes Total	1000	900		400	
Income Taxes Total	1250	1125		1250	
Unemployment Insurance	0	350		0	
Fiscal Result	2250	1675	575	1650	600

Table 6.1: Payroll Tax Subsidy

income then the payroll tax subsidy actually saves money! Of course, the big impediment of this policy is that the government reduces the payroll taxes and the firing still takes place – or there is bankruptcy. In this case, the fiscal effort is totally wasted.

The last policy affects output through regulation and public investment (depicted as orange in Figure 6.3). Regulation is something we will discuss at some extent in Chapter ?? and its impact on productivity. Let me concentrate exclusively on public investment. Clearly, better infrastructure should improve productivity; increasing output, employment, and starting the demand multiplier engine. So, the positive impact is trivial to understand. The problem however, is when this investment does not payoff. It is useless or crowds out private investment. If that is the case, this policy becomes ineffective. I have already discuss crowding out, but think about how many public projects are useless in our countries. Almost every city and country remembers one of those grandiose projects you want to bury because you are ashamed. You see, this is the great thing about Boston, we are geniuses at PII (Public Idiotic Investment). We have the Big Dig here; built already buried!

Let me summarize the channels through which each project works and its limitations in a table.

Policy	Channel through which it works	Limitation
Expenditures	Aggregate Demand	Crowding Out
Personal Taxes and Subsidies to Households	Consumption	Anticipation of policy reversal
Corporate Taxes and Subsidies to Firms	Investment	Anticipation of policy reversal
Job Preservation	Employment	Bankruptcy
Productivity Enhancing	Output	Long Run
Public Investment	Output	Useless Investment
Balance Sheet enhancing	Balance Sheet and Credit	Credit Crunch
Automatic Adjustment	Household Income	Very short lived

Table 6.2: Fiscal Policy Tools: Channels and Limitations

6.2.2 The Negative Loops

The previous sections talk about how different actions on the fiscal side impact the economy, an also what are the limitations. Fiscal policy, however, has a very important macro implication and therefore I believe that an important constraint to fiscal policy come from the aggregate restrictions. In other words, there is an impact on interest rates and credibility and debt sustainability perceptions that might overcome any positive impact of fiscal policy. In this section I highlight all the vicious cycles and how fiscal and monetary policy can hurt each other.

This section concentrates on the “bad” loops.

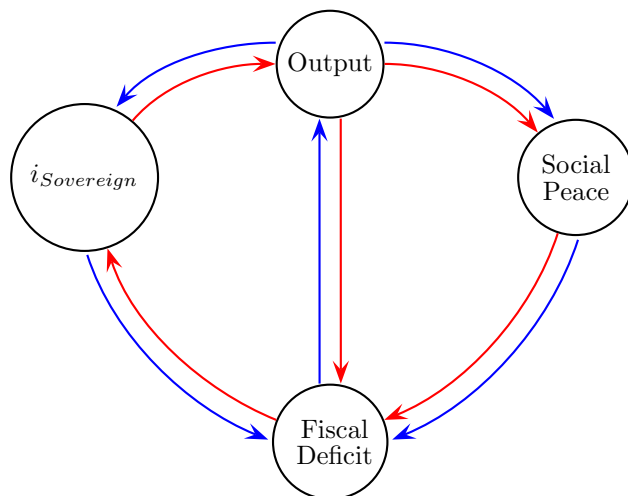


Figure 6.4: Sovereign Debt-Default Cycle

The discussion is much simpler within an example. Let us assume the economy is Spain in 2012. It is in a recession, with extremely large unemployment, with an already large fiscal deficit, and with a sovereign debt level that is relatively large and increasing. Assume the government is interested in increasing expenditures. Figure 6.4 shows the two loops that are at work whenever we implement an active fiscal policy. On the one hand we have the “virtuous” reinforcing loop (the blue arrows), and on the other hand we have a “vicious” cycle (the red arrows).

Sometimes the virtuous cycle is associated with the New-Keynesian view, while the vicious cycle is associated with the credibility-default view.

The virtuous cycle works as follows: the increase in expenditures, increases the demand which leads to an increase in output – as in the ISLM or ASAD. The increase in output has several implications. First, tax revenues improve because consumption, output, and profits rise. In other words, the increase in activity improve the tax revenue. Second, because the economy is performing better interest rates come down. One reason for the decline in interest rates is due to credibility. The “program” is effective, improves the credibility in the macro management, and it is believed that the government will be able to pay the debt in the future. The second reason is that the increase in activity is equivalent to a supply shock that declines the nominal rate. For all these reasons, the decline in interest rate and the better performance of the economy, the government is able to do a little bit more fiscal stimulus – or alternatively the cost of the fiscal stimulus is small. There is another virtuous cycle that derives from the social legitimacy of the program. When output increases and unemployment declines, social tensions reside making the politics of macro management much simpler. In other words, the effectiveness of the fiscal policy “buys” political capital that can be used to support further actions.

The vicious cycle is not exactly the reverse, but works through the same dimensions. The increase in the fiscal deficit leads to an increase in the sovereign debt – which rises doubts about the possibility that the government will ever pay the debt. This decline in credibility increases the sovereign debt interest rate. The increase in the interest rate, increases the lending rate, decreases investment and consumption, leading to a drop in output. The decline in output increases the unemployment rate causing social tensions. Those

social tensions are reflected in the politics of the fiscal program that does not receive support in congress. Riots appear and the initial program needs to be corrected.

The first story sounds good, but the second one is horrible. And it is! Which of the two mechanisms will dominate?

What makes the story worse is that depending on the transmission mechanisms governments have very few alternatives. For example, assume the Spanish government needs to decide between two excluding options: to reduce or increase fiscal expenditures. Let us assume the worse possible transmission mechanisms for each possible choice. In other words, if the government increases expenditures assume the credibility-default channels dominates. Then, the increase in expenditures is actually bad to the economy. To repeat the process: the increase in expenditures, increases the debt, deteriorating credibility, increasing the default probability, increasing interest rates, and exacerbating the recession. If this is the outcome in the market, investors should run and sell spanish bonds immediately. Furthermore, the increase in interest rates and the larger recession implies that citizens should be upset with the government – riots should be brewing around the corner. It is clear that some market participants would think this is the mechanisms at play.

Assume the Spanish government decide to do the exact opposite. I mean, given the gloomy forecast would you try the opposite? Well, what is the opposite? Decrease expenditures. But assume that some market participants think that the usual Keynesian mechanisms is the one that dominates. This policy implies that a decrease in expenditures leads to a drop in output, that deteriorates taxation and creating more unemployment. The high unemployment implies that social tensions will increase, deteriorating the politics of the fiscal expansion, decreasing its support and leading to political fragmentation. In this environment it is clear that the decrease in expenditures is unsustainable – at some point in time the politics will force the government to increase expenditures and favors to those protesting. So, the temporary decline in expenditures is truly not a full fledge sustainable reduction of the deficit, it should be anticipated that the debt is less likely to be paid, and those investors that believe this is the channel at work should run now and sell Spanish debt.

In the end, if there are investors in both camps both have reasons to attack right away. Why wait until the government makes a choice? If you know the attack will take place by at least some of the investors at some point in time, why wait until that take places? The attack should occur as soon as possible. And more importantly, if an attack takes place, the outcome becomes self-fulfilling. Sounds familiar? Let us now look much closer to the details to see if there is a solution that can be proposed to this conundrum.

6.2.2.1 Fiscal Dominance

The transmission mechanisms depend on which institution is the strongest one: does the fiscal authority forces the central bank to discount public debt in exchange for money printing, or is the monetary authority the one that dominates the relationship and forces the fiscal deficit to be financed in local or foreign markets? Who dominates the relationship is important to determine the consequences of fiscal policy.

Figures 6.5 and 6.6 show in detail how the two mechanisms are at play. In the figures we are mostly highlighting the “negative” feedback in the system.

In both cases there is a debt-default cycle as the one described above. This is the cycle in black. The other common cycle is the one that happens through social and political tensions. This is the red cycle. The difference between the two figures is that under fiscal dominance the fiscal deficit is primarily financed in the central bank – causing inflation in the economy; while under monetary dominance the fiscal deficit creates very high interest rates and there implied recession leads to a deflationary spiral.

The cycles work as follows: The debt-default cycle implies that an increase in the fiscal deficit, increases the size of the public debt increasing the probability of default. Markets anticipate the higher default rates

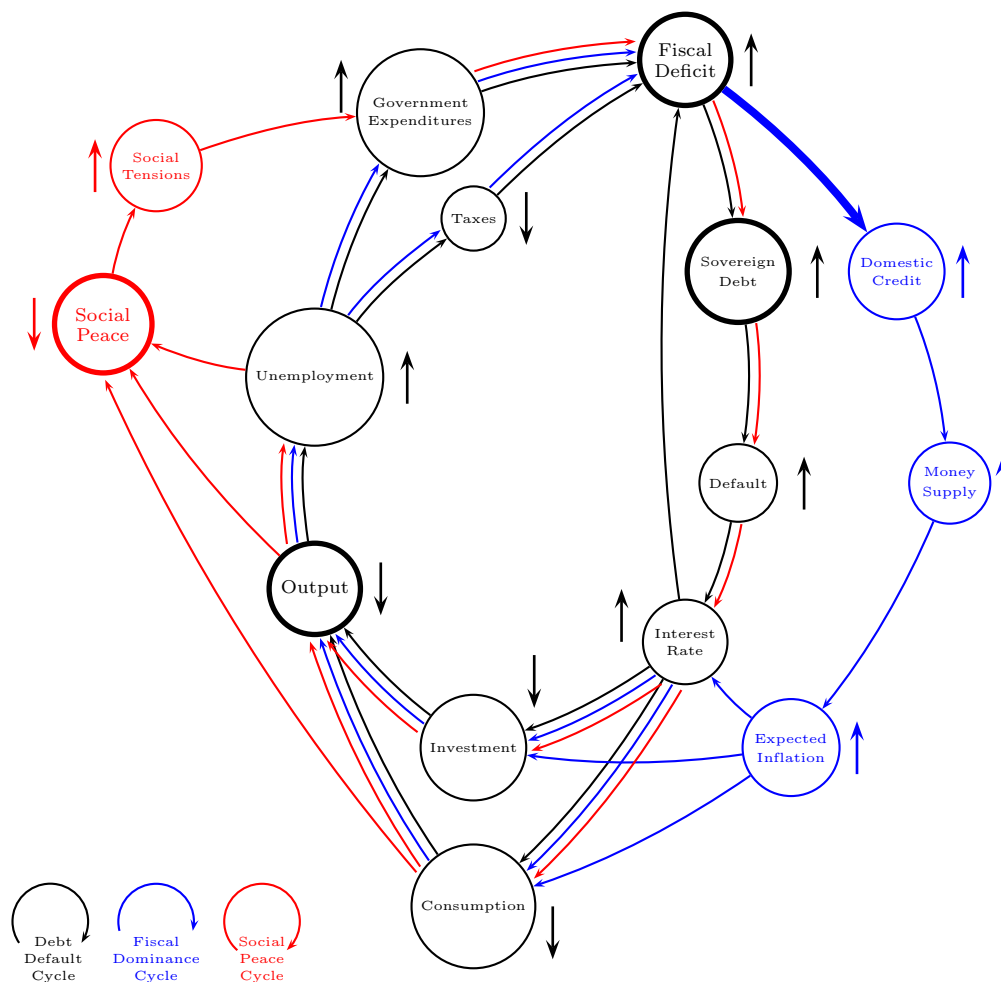


Figure 6.5: Fiscal Policy System's Thinking under Fiscal Dominance

and increase in interest rates. The rise in interest rates reduce investment and consumption, reducing output and causing unemployment. The higher unemployment rate reduces taxation and through the automatic expenditures that exist (unemployment insurance, and some expenses of welfare) expenditures increase leading to a higher fiscal deficit. Furthermore, the increase in the interest rate also increases the interest payments on sovereign debt increasing the fiscal deficit even further.

The social peace cycle comes from the impact that the lower consumption, output and higher unemployment has on the society. Again, start from a fiscal deficit, that leads to higher debt and higher interest rates. Then there is a drop in consumption, investment and output, and an increase in unemployment. This is particularly bad for workers – they have lower consumption and less likely to find a job. Hence, it is possible they complain – social peace is disturbed. The increase in social tensions will force the political elite to respond, and usually the response includes subsidies, expenditures, and favors. All those are costly and increase the fiscal deficit further – that further increase the debt and its interest rate.

The fiscal dominance cycle starts by the possibility that the central bank is being forced to finance the government. The increase in domestic credit, increases inflation (and inflation expectations). The increase in inflation will have implications on interest rates (short run comes down, but long run goes up), investment and consumption. Also, inflation has a negative impact on social peace. In the end, the negative impact of

inflation causes the fiscal deficit to increase. Inflation, however, has some benefits not drawn here – which we discuss later. It actually reduces the short run rate and ameliorates the debt-default channel.

One interesting aspect of depicting the feedback's this way is the fact that an overarching strategy is needed to rid the economy from the problems it has. In this system the problem of acting on only one part of the system is that the propagation and effectiveness of the policy is left out to what the market's wishes. Hence, it is quite possible the right action is taken and the economy moves in the opposite direction. It is quite important, then, to act in the system with several policies at the same time.

Let us go back to Spain. Spain in 2012 had a very large fiscal deficit, a relatively large debt, a significant recession leading to very large unemployment rates, and an extremely fragmented government. If the government reduces the expenditures to solve the fiscal deficit and try to reduce the debt, the economy will exacerbate the recession, the social problems will exacerbate, and the market will attack the economy knowing the policies are only short lived. If the government increases the expenditures the market knows they are not serious about solving the deficit and will attack. So, on the fiscal side it seems little can be done.

Let's now work on the output side alone. Imagine a structural reform is implemented with the goal of increasing the growth rate. In general, however, structural reforms take time to work and in most circumstance they deteriorate output in the short run – and almost always are fiscally costly in the short run. Imagine education. It costs in the short run, it takes a generation to change the average skills, and because people invest more time in school as opposed to producing output falls. If market participants concentrate exclusively on the cost side of the reform – not believing it will actually payoff – then the interest rate will increase, limiting investment, reducing growth, deteriorating the fiscal accounts, and in the end defeating any initial effort.

It should be clear the government needs several levers to control the economy. Assume they say “Eureka! What we need to do is to reduce expenditures to solve the fiscal problem, but at the same time implement structural reforms to create growth. The structural reform will create growth and compensate the negative impact the cut in expenditures might have in the economy. The reduction in expenditures will show the market that the government is serious about the fiscal deficit and the size of the debt. Hence, the commitment to reduce expenditures should be able to convince the market that Spain is going to pay”. The structural reform is trying to move the expectations of those market participants that believe the Keynesian transmission mechanism is at work, and the cut in expenditures is devoted to align the expectations of those market participants that believe the credibility-default mechanism is the one that governs the economy. Good, isn't it? Actually it has two problems. The first, and most obvious, problem is who pays for all this. If the structural reform has short term fiscal costs who finances the operation? This to work needs something called a *Benevolent Bailouter*. In most countries this bailouter is the IMF and WB, but in the case of Spain it should be the German tax payers and the ECB.

If the system is analyzed as a whole it is clear that the next problem is: intolerance or lack of social peace. So, assuming the government is successful in cutting expenditures and convincing the market they will be able to payback the debt, assuming that they implement a structural reform that will produce enough growth to convince the market that in the long run unemployment will decline and the social tensions will reside, and assuming that the country finds someone dumb enough to finance the whole operation at low interest rates, still it is the case the country has the risk that the cut in expenditures in the short run and the implementation of a structural reform cause enough social disruption that the whole program cannot be implemented in its entirety. If the social pressures force the government to increase expenditures elsewhere, or if the drop in output increases automatic expenditures (such as unemployment insurance), or if the structural reform are not successful because workers oppose to them, or citizens simply conspire against the program, then whatever was started will need to be changed.

A comprehensive program requires every single aspect taken care of. A fiscal reform needs to deal with the fiscal deficit, a structural reform needs to take care of the lack of growth or lack of competitiveness,

a stronger monetary authority is required to eliminate the fiscal dominance problem, and a coordinating device needs to take care of the social peace. Furthermore, if the debt is already at unmanageable levels then a debt restructuring is also needed. Of course, Spain is not on the Fiscal Dominance regime, but on the other. Let us see those implications.

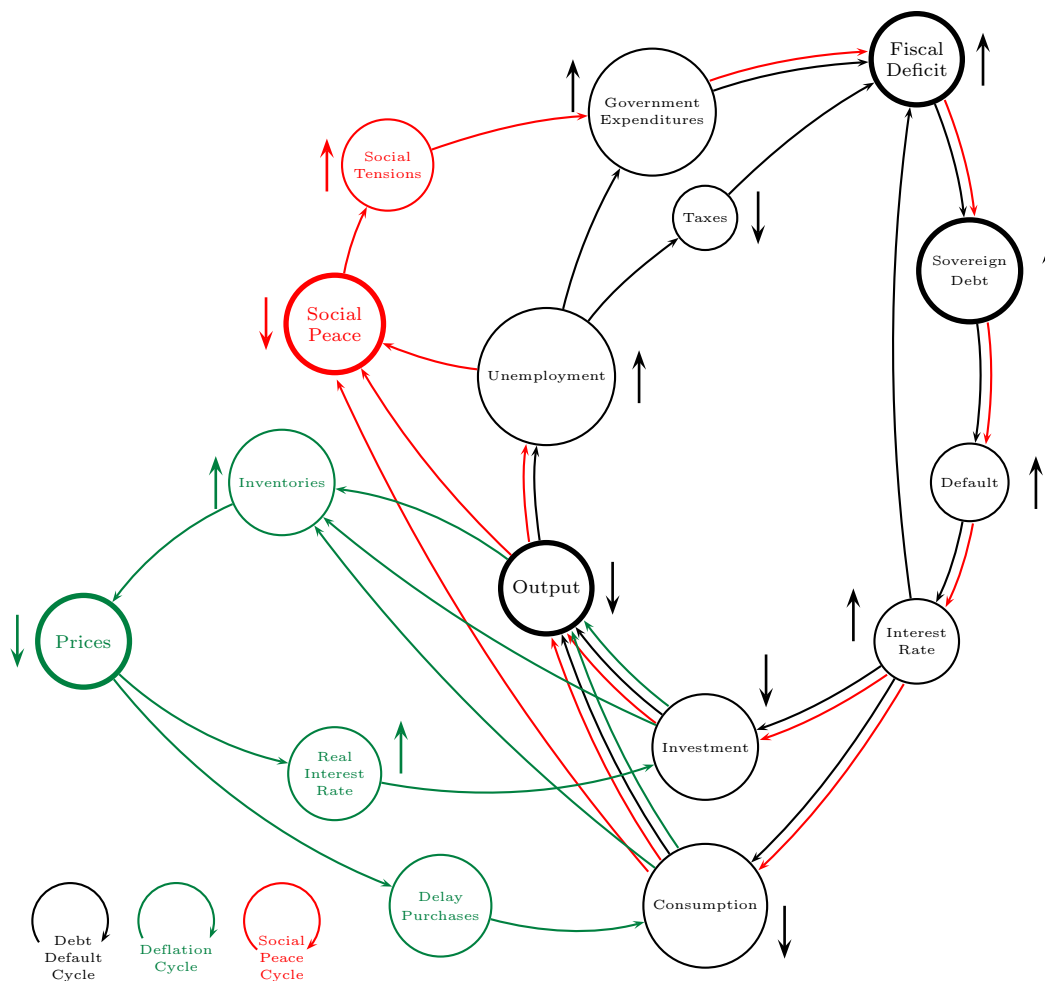


Figure 6.6: Fiscal Policy System's Thinking under Monetary Dominance

6.2.2.2 Monetary Dominance

The case of Monetary Dominance is very similar except that the fiscal authority has no other option than going to the market to finance its debt. The consequence is that the drop in output due to the high interest rates, creates a deflationary cycle (the green cycle).

The drop in consumption and investment causes inventories to rise. Retailers with larger inventories decide to have a sale – lowering prices. But if prices are coming down, and are expected to come down even further, then consumers are better of waiting to consume. This delay in purchases lowers consumption even further causing even higher inventories and a drop in output. Furthermore, the deflation increases the real interest rate reducing investment. This deflationary cycle interacts with the social and default cycles.

From the practical point of view, this is the closest to what is happening in Europe in 2012. Spain has a very high level of debt, with a large fiscal deficit, and is operating under monetary dominance. The government has no option to finance the fiscal deficit in the market, raising interest rates. The drop in consumption and investment is causing a deflationary cycle that leads to further declines in consumption and investment – through delay in purchases and increases in real interest rates. The subsequent drop in output causes unemployment that exacerbates the fiscal deficit situation. The drop in output and unemployment creates social tensions. So, in all dimensions, the economy is performing poorly. Output is falling, unemployment increasing, prices deflating, consumption and investment falling, interest rates (nominal and real) increasing, social tensions rising – which all will lead to higher expenditures and lower tax revenues.

As in the previous case, acting on one dimension does not solve the problem. And this is conceivably the problem Spain is having. All these perverse cycles are at play, counterbalancing any positive impact of the policy choices. The country needs policies on several dimensions: deal with fiscal deficit with a fiscal reform, the debt should be reduced through a restructuring, output must be increased through structural reforms, a coordinating device is needed to deal with social tensions, and policies (conceivably subsidies or tax breaks) that foster consumption and investment to deal with the deflationary cycle.

6.2.3 Despair Alley

The situation we have described is one that I call “Despair Alley”. This is a situation that can arise either under fiscal dominance or monetary dominance. The difference is that in the first one, in addition to the problems indicated here, the country is suffering from inflation, while in the second one it is experiencing deflation.

Definition 3 (Despair Alley). *A country finds itself in a “Despair Alley” when it has simultaneous problems in four areas: growth, stocks, flows, and intolerance.*

- *Growth Problem:*
A country has a growth problem when its growth rate is anemic – meaning it can’t reduce unemployment significantly.
- *Stock Problem:*
A country has a stock problem when its debt size, or leverage, is unmanageable.
- *Flow Problem:*
A country has a flow problem when it runs a large fiscal deficit, or it runs a large current account deficit.
- *Intolerance Problem:*
A country has an intolerance problem when its citizens are unwilling to make even small sacrifices to help a government program.

Growth problems – as discussed in earlier chapters – need structural reforms. The problem of this is in general difficult because reforms take time to increase productivity.

Greece, Ireland, Italy, and Portugal in 2012 were suffering from a severe sovereign debt stock problem – measured in terms of their GDP. If a country has only a stock problem, then the solution is relatively straightforward, at least from a theoretical standpoint. It just needs to restructure the debt, either with a default or some form of “voluntary” reduction in the burden of the debt – where the word voluntary is used in a very loose sense.³

³See HBS case 9-711-088 also see the articles about the Goldman Sachs swap in Balzli (2010), Dunbar (2003) and Wood and Campbell (2010).

In 2012 the US and many European countries had a flow problem. They had large fiscal deficits as the outcome of the 2008 crisis. If a country has only a flow problem, then again, the solution is theoretically simple. If the fiscal deficit is too large, then the government needs to increase taxes, or reduce expenditures, or both. In other words, it only needs a fiscal adjustment. If the problem is from the external accounts then, for example, a real depreciation can be engineered, accompanied by a reduction of domestic aggregate demand if necessary. So, a flow problem requires some reforms – but such decisions are implemented in a relatively benign financial environment.

The last issue, the intolerance problem, usually negates the few benign policy actions countries might adopt to solve growth, flow and stock problems. An intolerance problem occurs when citizens are tired and unwilling to wait for policies to payoff. In the 1990's in Latin America people were tired of the reform processes; in 2012 in the periphery countries the societies were tired of the adjustment programs; and at the same time people at the core of Europe were tired of all the bailout discussions. When the citizens are fed up, they become impatient and demand short-run benefits and policy actions. Therefore, implementing a structural reform to wait until growth appears is unacceptable, any tax reform is opposed, and any cut in expenditures is received with resistance and social tension.

6.3 Fiscal Manipulation

Fiscal Manipulation: IMF Paper Irwin (2012) Venezuela Paper Santos and Villasmil (2013)

6.3.1 Legal but dubious transactions

6.3.1.1 The Greek Swap

Description of the swap can be found in Balzli (2010), Dunbar (2003) and Wood and Campbell (2010).

6.3.1.2 Petrobras and PreSal

Description of the transaction in Goldfajn (2010b) and Goldfajn (2010a). For a general discussion about the computation of fiscal sustainability see Oreng (2012).

6.3.1.3 Brazil: Avoiding Capital Controls

There are capital controls in Brazil to reduce the extent of carry trade. Explain how prepaid exports are used to avoid the controls. The fact is that capital flows are controlled but prepayment for exports are not.

6.3.1.4 Venezuela's debt swap with China

6.3.2 Cash Flow approach to Fiscal Sustainability

6.3.2.1 Dealing with manipulation

6.3.2.2 Dealing with “Ability to pay”

See Ang and Longstaff (2013)

	GDP	Debt/ GDP	Debt/ Tax Revenue		GDP	Debt/ GDP	Debt/ Tax Revenue
United States	14119	94%	305%	Germany	3330	84%	192%
California	1884	7%	163%	France	2649	82%	168%
Texas	1141	2%	65%	Italy	2113	119%	258%
New York	1085	4%	102%	Spain	1460	60%	166%
Florida	729	5%	123%	Netherlands	792	64%	92%
Illinois	621	14%	297%	Belgium	469	97%	198%
New Jersey	478	13%	223%	Austria	385	72%	149%
Ohio	466	3%	72%	Greece	330	143%	365%
Massachusetts	362	14%	272%	Finland	238	48%	142%
Michigan	361	5%	78%	Portugal	228	93%	224%
Nevada	125	3%	119% I	reland	227	95%	279%

Table 6.3: Debt Size: Comparison between US and Europe.

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Chapter 7

Exchange Rate Policy

So far, in these notes, we have discussed mostly closed economy issues. In other words, foreigners are not even an afterthought. This will change. Countries have currencies and the way central banks manage those exchange rates is called exchange rate regime. You probably have heard about fixed versus flexible, but the landscape is much broader. The first part of this chapter discusses those regimes. The second step is to understand what are the theories behind the determination of nominal exchange rates. How do the fixed rates are determined, and managed, and how exchange rates are decided by market participants in the case of a flexible exchange rate. By the way, all our theories fail tremendously. I will discuss some of the most famous and influential theories economists have advanced but if there is an area where our profession has failed dramatically is on explaining flexible exchange rates (well, also growth, inflation, interest rates, stock markets, consumer decision, investment, portfolio choices, competition,.... so, yes, about everywhere economics has failed, but on the exchange rate it is dramatic).

7.1 Exchange Rate Regimes

In Chapter 5 we discussed the balance sheet of the Central Bank – and we discussed foreign exchange rate transactions (under a fixed exchange rate). Indeed, Central Banks organize their relationship with the foreign exchange market using different arrangements, called exchange rate regimes. These regimes imply different regulatory rights and obligations. The possible regimes are vast and difficult to summarize in few pages (it requires a whole book!) they can be characterized along two dimensions: flexibility and credibility.

The regimes that provide the highest flexibility usually imply the lowest credibility, while the regimes that are quite inflexible tend to produce the highest degrees of credibility.

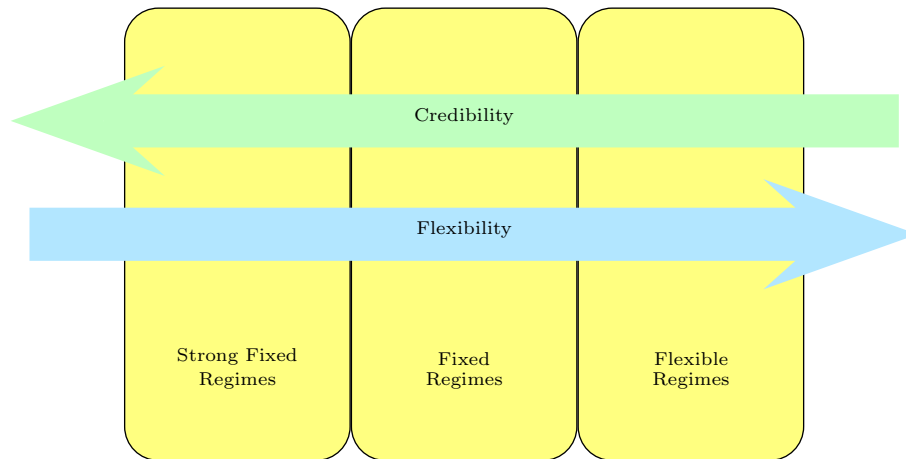


Figure 7.1: Aggregate Demand

7.1.1 Strong Fixed Rates

7.1.2 Fixed Rates

7.1.3 Flexible Rates

7.2 Flexible Exchange Rates: Theories

7.2.1 PPP: Purchasing Power Parity

7.2.2 Interest Rate Parities

7.2.2.1 CIP: Covered Interest Rate Parity

7.2.2.2 UIP: Uncovered Interest Rate Parity

7.3 Comments and Bogs: Internationalization of the Renminbi (May 2013)

One of the hottest topics in the Summer of 2013 has been the internationalization of the Renminbi. It has been such a boiling issue they invited me to a conference in Shanghai to talk – clearly they are running out of speakers. I have written very little about it, I have done very little research on the topic, but ignorance has never stopped me from expressing by biases – so, I went there and made sure to be as insulting as possible when delivering the speech. In any case, my views have been heavily affected by the writings of two great economists: Jeffrey Frankel at the Kennedy School, and Barry Eichengreen at UC Berkley – although I am quite sure they will not subscribe entirely to what I say. If you are interested in actually learning about these issues please read what they have written.¹

What are the facts (as of May 2013)? First, China is a large country (the second one in terms of GDP), it is likely to overtake the US as the largest economy soon (most estimates indicate this might happen between 2020 and 2030), and it is extremely large in terms of international trade and manufacturing of tradable goods. Second, all major international currencies are kind of on free fall mode. The FED, BoJ, BoE, and ECB have hired many Argentinians, or Argentinian educated economists and have been printing without remorse. The next step is of course to start asking Venezuelans for advise to guarantee the demise of the developed world as we know it... So, I will let you know of changes in my travel schedule. In any case, the “printing-like-a-gaucha” of major currencies is weakening all these currencies. There is, therefore, the opportunity for other currencies to take the space. Third, it is not surprising then, that more countries are using today the Renminbi (RMB) for transactions (like Malaysia) and for holding international reserves (such as Brazil entering in a currency swap between Real’s and RMB’s). Hence, the conversation that the RMB might overtake the Dollar in the future... In this section I want to explore the likelihood of this actually happening.

7.3.1 Characteristic of International Currencies

What are the characteristics of international currencies? or in other words, what are the functions that international currencies provide to governments and private sector?

7.3.1.1 Functions of international currencies

7.3.1.2 Factors in determining international currency status

7.3.1.3 Advantages and Disadvantages

What are the advantages and disadvantages of the internationalization of a currency?

¹See Frankel (2012),Eichengreen (2010), and . See also Prasad and Ye (2012) for a very good piece.

7.3.2 International experiences

7.3.2.1 The US Dollar: 1872-1954

7.3.2.2 Why the Yen failed: 1985

7.3.3 The Renminbi: Feasibility and Steps

Can the world sustain more than one dominant international currency?

Where does the RMB performs the best?

Store of Value

There is a difference between good investment and good currency!

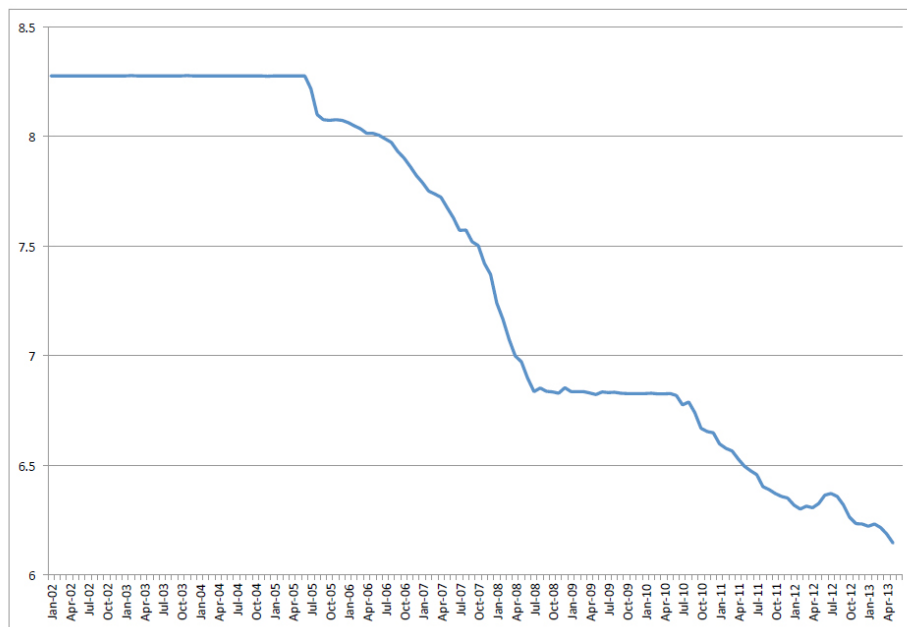


Figure 7.2: Appreciation of the Renminbi against the US Dollar

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Chapter 8

BBNN: Basic Model

This chapter, and the next two, describe one of the most powerful models in open macroeconomics. The model is known by different names: tradables and non-tradables, the dependent economy, and many others. The model was originally developed by two Australians Salter (1959) and Swan (1960). However, the person who made this really understandable to the rest of human kind was Rudi Dornbusch. He wrote many seminal papers, and perhaps the most exciting one in the last 50 years with his famous overshooting model.¹ He also wrote a marvelously simple book that translated most open macro models into simple math (Dornbusch (1980)). This framework (the BBNN) is so fundamental that through the years I have seen paper after paper just reinventing different versions of it. Some are more complicated than others, but all of them end up summarizing the main ingredients we discuss here. In fact, I have kept the name that one of my mentors, Ricardo Hausmann, gave it when I was doing my MBA at IESA in Venezuela: *The BBNN*.²

This model is very important in international economics because it allows us to understand and determine the real exchange rate of an economy; to describe the behavior of the economy when the economy is farther from its equilibrium; to understand the impact of productivity gains, external shocks, and natural disasters; to assess sustainability from the economic point of view; to understand political cycles; to explain how political and social constraints limit economic policy; and it allows us to understand how environmental constraints affect economic policy and growth. The model can be used to diagnose where an economy is located, what is likely to happen to it, how shocks affect the economy, and describe the characteristics behind such equilibrium. In the end, the purpose of this and the following chapters is to go over all these topics and develop the framework in its full extent. However, I would like to explain the intuition behind the BBNN using no equations. In fact, this is very close to the way Ricardo Hausmann taught us the BBNN at IESA. It has evolved a little bit because my jokes are far better than his; therefore, the value added is greater.

The notes are also different because they have been affected by the thinking of my other mentors (Rudi Dornbusch and Ricardo Caballero). Finally, the reason to write these notes is because there is no suitable simple explanation of this framework in the literature. Other attempts at explaining the model use a lot of algebra, but barely describe the intuition behind the model. The point is, therefore, to try to explain the model using as few equations as possible. Indeed, we will use only accounting relationships, but that's it. Again, I truly believe this is the way MBA's should learn Macro.

¹His greatest hits can be found in Dornbusch (1987).

²I know some of you are actually taking Ricardo's class at Harvard... He used to be really funny... Now he is just slightly entertaining. I have kept some of his gems to be used here, though.

8.1 Basic Model

The BBNN is a model of disequilibrium. It summarizes the different conflicts that might arise in an economy, and even though it points to where the equilibrium is, the economy does not have to be there. In other words, even though an equilibrium is well defined, it is rarely the case that an economy is located there. We are going to proceed as follows: First, we define the control variables in the economy: the wage in dollars and the domestic aggregate demand. Second, we discuss how these variables interact with each other to achieve current account balance (the external equilibrium) and full employment (the internal equilibrium). Third, we diagnose where economies are placed, understand their type of disequilibrium, and what are the likely policy actions to restore balance.

Figure 8.1 shows the control variables in the economy. These variables are what the Central Bank, and the Treasury are able to move to “fine-tune” the economy.

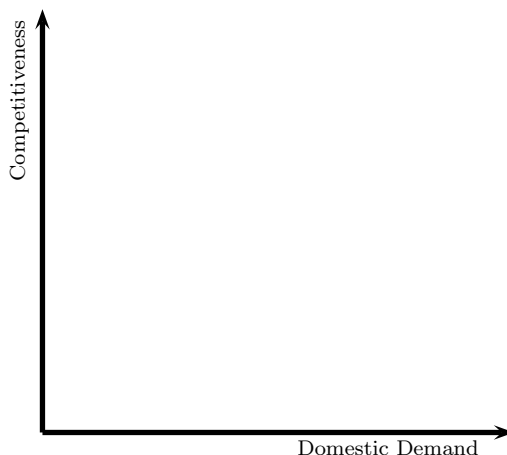


Figure 8.1: BBNN: Control Variables

On the horizontal axis we present a measure of the domestic aggregate demand. In the terminology of the ISLM this corresponds to $C + I + G$. Indeed, all the tools you have studied regarding the management of the aggregate demand in 15.012 (ISLM and ADAS, together with monetary and fiscal policy) are the same tools we use to control this variable in this model. So, an increase in government expenditure expands the demand, a tax cut does the same, printing money or reducing the interest rate also increase the aggregate demand, etc. Finally, in Figure 8.1 the farther to the right, the higher the aggregate demand is.

On the Vertical axis we present a measure of competitiveness. For the moment, to develop the intuition, we are going to assume this just measures the degree of competitiveness of the economy – i.e. the higher the variable the more “competitive” the economy is. Later in this chapter, competitiveness will be further discussed, and we will concentrate on two dimensions the cost of the factors of production, and productivity.

How the control variables are managed?

- The aggregate demand is affected by monetary and fiscal policy. For example, the Central Bank, through its choice of monetary policy decides the interest rate, which ultimately affects the aggregate demand through consumption, savings, and investment decisions. Similarly, the Treasury through

decisions of taxes and expenditures affect consumption, investment, exports, imports, etc.; and in the end, the aggregate demand.

- The degree of competitiveness depends on the cost of the factors of production. Wage policy, such as minimum wages, or wage negotiations in the public sector affect the degree of competitiveness. The degree of competitiveness of a country is also affected by the nominal exchange rate; hence, the choice of exchange rate regime does have an impact on the degree of competitiveness.

We come back to these issues later in the chapter, but the idea is to think that Monetary, Fiscal, and Exchange Rate policy are the tools that allow us to manage the horizontal dimension of the economy in this map. The policy decisions the government makes implicitly chooses the combination of aggregate demand and competitiveness at which the economy operates. In other words, fiscal, monetary and exchange rate policy are the joysticks of our Nintendo - a three dimensional Nintendo (cool!).

8.1.1 BB: External Equilibrium

The BB represents the external equilibrium of the economy – which sounds simple. However, it is much easier to say “external equilibrium” than actually knowing how to measure it.³

The Balance of Payments is the sources and uses of funds statement of a country. It summarizes the transactions between a country and the rest of the world. In particular, sources of funds for a nation, such as exports or loans received and investments performed by foreigners in our country, are recorded as positive. Uses of funds, such as imports or investment in foreign countries, are recorded as negative. When *ALL* the components of the balance of payments are included, it has to add to zero at all times — exactly as it adds to zero in corporate statements. This is true for any country, with any form of international trade restrictions, and for any form of exchange rate regime; fixed, flexible, managed, or crappy. This is an accounting tool, and – as in the balance statement of a company where the left and right side of the balance sheet have to add to the same number — the uses and sources of fund have to add to the exact same number. Therefore, studying the balance of payments by itself is completely uninteresting. In general, we study its components and try to infer from it what the external equilibrium or external sustainability is.⁴

For example, sometimes we concentrate on the balance of payments excluding the Central Bank change in reserves: the balance of payments narrowly defined.⁵ Some concentrate only on the trade balance, or the current account, etc. To clarify the definitions and their relationship let us look at the historical evolution of the *External Sustainability* definition.

Since David Humes seminal work in 1752, “Of the Balance of Trade”, economists have been confronted with the question of external account sustainability. The issue, in principle, is a simple one: are a countrys sources of income today and in the future capable of financing its consumption plan? In practice, however, the answer has been far more elusive. In fact, the definition of the national accounts reflects the evolution in measurement.

Since the 16th century there was a view that promoting trade surpluses was a “good thing” for the country. Power was associated with wealth, and with the ability of nations to accumulate funds by running trade surpluses or by confiscating the wealth of others. Interestingly, things have not changed that much for some countries. David Hume, and most prominently Adam Smith, challenged this view (which was known

³For an excellent discussion on the current issues of external equilibrium measurement please see Obstfeld (2012) and Gourinchas (2007).

⁴We do the same in the balance sheet of a company, we concentrate on its components rather than the difference between assets and liabilities plus capital.

⁵Those taking 15.218 probably are using this exact definition

as Mercantilism).⁶ In terms of measurement, however, In the 1700's most of the world trade was very small and on commodities: agricultural products, process food such as vegetable and animal oils, furs, etc. So, it is not surprising that the definition of external adjustment concentrated on the balance of exports and imports of goods only. On that instance, the definition of the Trade Balance arises, and a definition of sustainability indicating that the value of exports has to be equal to the value of imports comes naturally from it. So, very early, the definition of external balance implied a balance in trade. *And with this new definition, the world was a happy place; we were sure we had found a nice and useful definition of external sustainability; and we could move on to do other important things like invading countries and spying on others.*

After some time, however, it became clear that just concentrating on exports and imports of goods was not enough. Cities and countries that seem very “healthy” had massive trade deficits – like Antwerp; a vibrant financial center that was running a large trade deficit – hence, it was clear that something had to be wrong with the definition of external sustainability. *Soon it was realized that a source of income was unaccounted for: Services!* So, a city that exported financial services could be healthy, but running a negative balance of trade in goods. Today, the exact same thing is true in the city of Boston. What goods do we export? not a single one! The trade balance in goods is extremely negative. We do not export goods; we export bads... lawyers, doctors, financial services, and yes, education (which is not as bad as the other three). We also produce horrible baseball teams with arrogant and entitled players, and myopic ignorant and irresponsible management. We are the world expert at this, by the way. In any case, in Boston the trade balance of goods is extremely negative, but it is financed by the export of services. In the mid 1850's the world changed the definition of external sustainability to include not only goods but services. Still today we compute – in every country – the trade balance of goods (for historical reasons and for the entertainment of reporters) but we also compute “goods and services” which is far more meaningful. *And with this new definition, the world was a happy place again; finally, we were sure we had found a nice and useful definition of external sustainability; and we could move on to do other important things like invading countries and spying on others.*

The period of the gold standard saw an unprecedented increase in international trade, and also international financial transactions. During that time several seemingly “healthy” economies run massive trade balance deficits (of goods and services). *Soon it was realized that a source of income was unaccounted: Factor Payments!* For instance, interest payments, dividends, remittances, etc. are all sources of income of a country that are not related to the export of goods or services. The gold standard ended with massive crises between 1880 and 1910, and it was interrupted by the world wars. In 1945, the Bretton Woods institutions (IMF and WB) were created to support the international monetary system, to encourage free trade, and to offer corrective measures for international imbalances. The response was, therefore, the creation of the modern system behind the balance of payments and the current account. Ahhh! The Current Account! which Ricardo Hausmann clearly defined to human kind as the account that is current. The current account includes the trade balance of goods, the trade balance of services, and the income accounts (interest payments, dividends, transfers, and remittances). *And with this new definition, the world was a happy place again; finally, we were sure we had found a nice and useful definition of external sustainability; and we could move on to do other important things like invading countries and spying on others; and now with aviation as a fully developed industry we could also throw some bombs.*

In fact, we were really happy for a while. The intuition behind the external accounts had a marvelous internal consistency — not only from the practical point of view, but also from the theoretical one. Every source of international income is a source of funds and it was counted as positive, and every use of those funds was accounted as negative in the Balance of Payments. A deficit has to be financed either by borrowing (a use), running savings down or selling international assets (another use), or by running the central bank reserves down (another use). When the borrowing reaches an upper bound, or the savings and/or reserves are zero, the country is unsustainable and needs to change its behavior. This definition had a tremendous

⁶And in fact, in our discussion of the BBNN it will become clear why accumulating surpluses forever is not necessarily a good thing; but let's continue

impact in the way international institutions worked and thought. The current account became the standard to evaluate the sustainability of any given country. However, in the mid 1980's statistical offices around the world started measuring external assets and liabilities. The IMF had been involved for several years trying to compute this properly and the biggest and most influential effort is the one from Lane and Milesi-Ferretti.⁷ They produced estimates of the international assets and liabilities of all countries: The Net Foreign Asset (NFA) positions. That work represented a significant challenge to the common wisdom. For some particular reason, countries that look "healthy" on the current account, looked "unhealthy" on the NFA's, and viceversa. *Soon it was realized that a source of income was unaccounted: Capital Gains!* This is much more harder to understand so we need a very simple example: imagine a US firm buys a warehouse in Italy. Imagine that the real estate price of the warehouse goes up. Is this a source of income for the US? yes! Undoubtedly the US has higher wealth. Now, where is this additional source of wealth documented? If the Italian subsidiary does not mark-to-market the warehouse then even though we all know there is wealth to be distributed, nobody can see it in any financial account. Furthermore, if it is mark-to-market but the profits remain as retained earnings in Italy, the source of income is not documented in the Current Account of the US until the earnings are repatriated. In summary, it is only reported when two things happen: first, if the company sells the warehouse and repatriate the gains; or second when the price of the warehouse is mark-to-market, and also that the company declares dividends due to such profits. It is only in those circumstances that a financial transaction takes place and the income is reported in the current account. The same problem happens if a US company purchases a stock in Europe. The capital gain after the price of the stock increases is only documented in the international accounts once the stock is sold, or profits repatriated! This means that there are significant sources of profits and losses that are not documented in the Current Account (yet) – every capital gain! Ricardo Hausmann calls this "Dark Matter".⁸ There is a large literature trying to resolve this issue – mostly all written in the 2000's. The easiest solution is to define a new account, a current account adjusted by the capital gains. The problem is that we measure such capital gains quite poorly. Unfortunately, we do not have a solution yet... *And without a new definition, the world is an UNHAPPY place; finally, now we recognize that we have NO useful definition of external sustainability, and our only recourse is to hope for divine inspiration and godly intervention to save us from ourselves; hence, instead of invading countries we are devoting our time to search for those answers following our spiritual leaders: Britney Spears and Lindsay Lohan. (Well, and Miley Cyrus lately.)*

In summary, defining exactly what is external sustainability in practice is difficult. What we observe and measure is very different from what we would like to track. From the theoretical point of view, however, it is simple: the NPV of all income must finance the NPV of all the expenditures. In these notes we are going to use three definitions or three dimensions of external sustainability: Trade balance, current account, and the balance of payments (narrowly defined).

1. Trade Balance:

The trade balance is going to be simply exports minus imports of goods and services. We will use this definition when in *our* world the only thing that we trade are goods. We can learn a lot just from this definition. When the BB has this interpretation we will denote it as TB_{BB} .

2. Current Account:

The current account is going to include all dividends, interest rates, and transfers. This definition is going to be used in those instances when we start discussing foreign direct investment, capital flows, and financial crises. We denote it as CA_{BB} .

3. Narrowly Defined Balance of Payments:

The narrowly defined balance of payments includes the current account plus all the capital account excluding central bank changes in reserves. We will use this definition much later when we discuss the

⁷See Lane and Milesi-Ferretti (2001) and Lane and Milesi-Ferretti (2007)

⁸See Hausmann and Sturzenegger (2006).

current situation in the US. We denote this schedule as $\Delta R = 0$. To make sure we remember that this means that the change in reserve is what is zero, and not the full balance of payments.

Importantly, the schedule depicted and identified as the external equilibrium will have different interpretations depending on what we are interested in highlighting. For the moment we are going to assume there are no international capital flows nor capital gains, and therefore all three coincide: All our intuition will be developed using the current account and the trade balance.⁹

The current account is defined as total output minus the domestic aggregate demand: $Y - C - G - I$. All this information can be found in the national accounts. Let us now depict the equilibrium in Figure 8.2. Assume that this is a map, where the coordinates are given by the aggregate demand and the degree of competitiveness, and in this map we are finding the coordinates in which the economy is on external equilibrium. The purpose of this map is to find all the possible combinations of demand and competitiveness at which the current account is in equilibrium – or in other words, exports equal imports. Furthermore, as important it is to know when the current account is at zero, it is just as important to know when the current account is not in equilibrium – which in this case is either a situation of surplus or deficit.

Assume that there is a point at which the trade balance is in equilibrium. This is the circle depicted in Figure 8.2(a). If from that point we increase the demand while the degree of competitiveness remains constant the economy moves to a situation of deficit. Two reasons cause this outcome: First, the increase in the demand will require an increase in imports. The consumers and investors are “eating” more; and therefore, they “eat” more of the products produced inside and more of the products produced outside. Hence, one of the implications is the rise in imports. Second, and equally important, agents are consuming more products produced in the home country, and since competitiveness is the same (which means the firms have the same production capacity), then there are less products available to be exported. Therefore, because the competitiveness is constant and production is constant, the increase in the demand requires an increase in the imports (home agents eat more from foreign products) and a decline in exports (home agents eat more of home products). This implies that the increase in the aggregate demand produces a deterioration of the trade balance; a *Deficit*.

Let us go back to the original point. Now increase the degree of competitiveness keeping the demand the same. In other words, we move up (Figure 8.2(b)). When the country becomes more competitive, firms are able to produce goods that were imported before. Therefore, imports will tend to decline. Furthermore, firms will be able to produce and export goods that the country was unable to export before. Hence, an improvement in exports occurs as well. In the end, an improvement in the competitiveness increases exports, decreases imports, and generates a surplus in the trade balance. In Figure 8.2(c) we see that if we are at the original point, moving east creates a deficit, and moving north creates a surplus. It has to be the case that if we move from the place where there was a deficit, to the place where there is a surplus, there is a point at which the trade balance is zero (depicted in Figure 8.2(d)).

By connecting these points – from the original to the new one – we derive the combination of all aggregate demands and degrees of competitiveness at which the trade balance is in equilibrium – i.e. it is zero.

The exact same intuition can be derived for the current account. The previous explanation uses exports and imports of goods as the example to develop the equilibrium relationship. However, a country could be exporting goods and importing services, or a country could be importing goods and financing them by dividends received from investments abroad. In the end, independently of the sources of income, and the uses of those sources, when the demand increases it creates a deficit in the trade balance of goods, of goods and services, and on the current account; while an increase in competitiveness creates a surplus.

In the case we are describing, because there are no capital flows, the trade balance, the current account, and the balance of payments are identical and therefore, for a while I will be talking about all of them as

⁹An excellent introduction to all the problems measuring the current account can be found in HBS Case 9-706-002: *The US Current Account Deficit*.

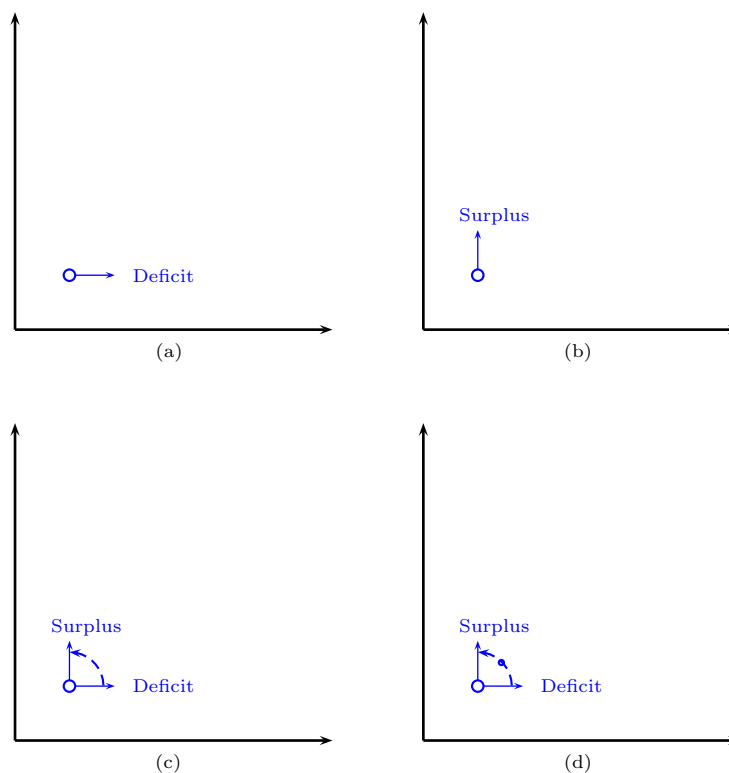


Figure 8.2: BBNN: Balance of Payments Equilibrium

if they were the same thing. In fact, in chapter 10 we discuss the issue of capital inflows and things start to change. However, as I briefly mentioned above, if we interpret the buy and sell of international assets as exports and imports, then everything we say about improving exports can be said about capital inflows. This will become much clearer later, but I did not want to pass the opportunity to highlight that these are issues we are going to cover, even though, for a while, they will be obviated. In fact, for quite some time, our only concerns are exports and imports – as if we were only exporting and importing goods without any accounting and reporting issues.

Figure 8.3 summarizes the external equilibrium. This line is known as the TB_{BB} (for Trade Balance, from the Balance of Payments). These are a collection of points (“coordinates”) where the domestic demand and the degree of competitiveness implies that the current account is in equilibrium (exports equal imports). Starting from the equilibrium (the open circle) an increase in the demand has to be accompanied by an increase in the degree of competitiveness to keep the external accounts in equilibrium. The increase in the demand is driving the current account into deficit, while the competitiveness its driving it toward a surplus.

The deviations from equilibrium are also highlighted in the Figure. Above the TB_{BB} is a situation of surplus, below it is a situation of deficit. For example, where is the US located the first decade of the 21st century? Below the TB_{BB} . In fact, the larger the deficit in the current account, the farther from the TB_{BB} schedule the economy resides. As I mentioned before, in this model understanding where the equilibrium is located, is as important as understanding how to represent different disequilibriums. Where is China? above the TB_{BB} . In fact, how far the economy from the line is indicates how big the disequilibrium is. So, a 2 percent deficit is a dot that is below the TB_{BB} but quite close to the line, while a deficit of 10 percent is

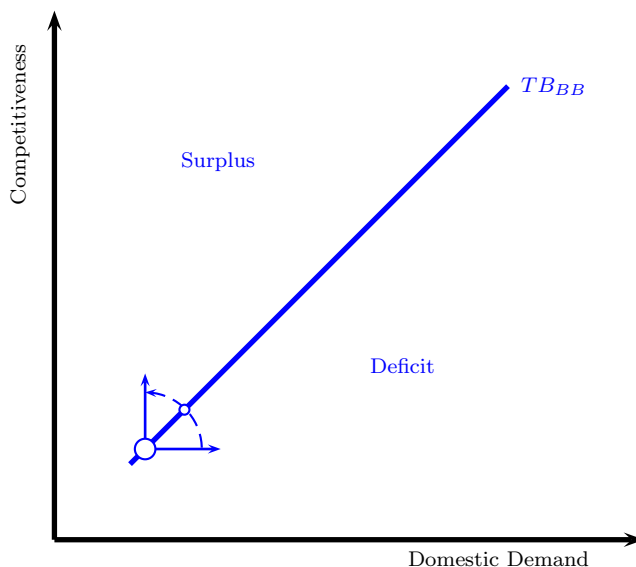


Figure 8.3: BBNN: Balance of Payments Equilibrium (summary)

much further down. We come back to this topic afterwards when we have developed the NN schedule. The diagnostic of any economy involves exactly this activity: to assess how far the economy is from each of the lines.

8.1.1.1 Final remarks on external sustainability

The recent discussion on the appropriateness of the current account actually was motivated in grand measure by the experience of the US. Since the mid 80 the US started running a very large current account deficit. So big that the country moved from being a world creditor to a world debtor – and this is not a tiny economy where this transformation would have been unnoticed by the rest of the world.

How could that be explained? Indeed, this is a large literature in international macroeconomics known as “global imbalances”. Several explanations were offered: expectations, miss-measurement, risk premium, and unsustainable behavior.

The first theory assumes that the US has such a bright future that all consumers knew future income was going to be higher – so high that it justified running a deficit today. By the way, that is exactly what all MBA’s students do. They think that during the MBA they are going to learn something (*fools!*) that is so valuable (*fools or idiots?*) that they borrow while studying (*yep! idiots!*); and indeed every student is running a significant current account deficit – their income is much smaller than their expenses. Is this behavior irresponsible? Well, if the salary indeed increases on average this is the correct action. Basic microeconomic behavior indicates that the consumers should consume approximately the net present value of their income adjusted by risk and precautionary motives. However, if future income is definitively larger than current income almost always consumers try to borrow. The 2000’s were so good that some of these theories received a lot of attention. Now we know they were unfounded - or were founded on unreasonable

expectations.

The second explanation is exactly the one in which sources of income were unaccounted in the current account. There are several economists that offer different reasons why those sources of income existed, and how we should have accounted for them. Most explanations are based on capital gains unreported or unaccounted. In the end, these papers offer not only an explanation why the discrepancy exists, but also produced alternative procedures for accounting international transactions to determine whether or not the US was sustainable. This literature was interesting in the sense that different people using the exact same data and similar reasoning found completely opposite answers to the question of whether the US was or not sustainable.

The third explanation is very similar in the sense that the US has particular production and set of assets that allows it to earn additional income. However, this explanation is based not on something not reported but on the type of assets that the US can issue. Some of the explanations assumed that the assets in the US had particularly benevolent properties that other countries cannot reproduce. This explanation assume that the US debt, for example, is safer and a better asset than the Chinese debt – or the Japanese debt for that matter. This is about the “quality” of the assets and not about a particular capital gain. If the US assets have this additional quality the assets earn a premium over the exact same asset class issued by other countries. This additional source of income could finance US consumption. By the way, most of the papers thought the US was sustainable (*oops...*).

Finally, the fourth explanation was the default: the US is simply unsustainable. These literature was extremely active – and thanks to the 2008 crisis I think the answer was loudly announced. It was good because we wrote hundreds of papers before the crisis, and now we are writing thousands more explaining *why we were wrong, and why we were actually not wrong but right, but something completely unanticipated screwed up our beautifully constructed theories. So, please continue reading our previous models because we are sure they could conceivably might be correct in a fictitious and maybe irrelevant world but for sure it might happen again - or maybe not.*

8.1.2 NN: Internal Equilibrium

Having derived the equilibrium in the external accounts, we now devote attention to the internal accounts. However, it should be completely anticipated that the NN is going to be a downward sloping curve. Why? because any model in economics that respects itself has two schedules, a downward and an upward sloping curves.

The internal market refers to how the economy uses the factors of production. In general we usually talk about the labor market. However, we could perfectly talk about energy, human capital, water, etc. For the moment we will keep the discussion on labor market issues because it is the most important factor. However, I hope that the intuitions are clear enough, and easy enough, that analyzing the situation thinking about a different factor of production becomes straight forward.

What means that the “labor market is in equilibrium”? Does this mean that unemployment is zero? In fact the economic definition of labor market equilibrium has very little to do with the number of people looking for a job (the unemployed) and much more with the wages collected by those individuals just recently employed. This is not an easy intuition. So, instead of defining the equilibrium, let me start by defining the two situations of disequilibrium: *Unemployment and Overheating.*

Imagine the economy is in a situation of *unemployment*; which is mostly where the US has been since 2008. Assume our main problem is that we are interested in hiring a person to type URL’s for the Billion Prices Project (the project in which Alberto and I have been working on for ages). This is a tedious and horrific job! I mean, working with us is already an ordeal; and this is even worse when you think the person will be typing hundreds of thousands of URL’s. In any case, if we are in a situation of unemployment,

probably we need to put a very small ad in the newspaper indicating that we need a qualified person. How many people show up? Roughly 435 show up. 200 physicists that recently realized they have no hope of ever finding a job, all with a Ph.D.'s; 150 mathematicians that simply have no hope whatsoever, also with Ph.D.'s; and the rest are all MBA's that spent far too much time studying marketing, as opposed to be studying accounting and finance. *Sorry!* In summary, we will probably fill the position with someone extraordinarily qualified! More importantly, if it is an MBA, that person for sure has the ability to sing Cumbaya while we hold our hands during board meetings! In the end, people with very high human capital and extraordinary abilities are accepting jobs to which they are overqualified. In other words, the salaries adjusted by their human capital are coming down.

Imagine the opposite – which is mostly what was happening in the US in 2004, or what has been happening with engineers and programmers in China lately. Imagine that is extraordinarily difficult to find people. This is a situation known as *overheating*. Let us think of the same problem Alberto and I have; we still need to hire someone to type the URL's. First, do you think the size of the ad is bigger? Much bigger, no? Second, do you think the ad will say “*Come and type URLs. You bastards!*”, or will the ad say something like, “*Come and work in the most exciting project at MIT. Come and change the way the world computes inflation and other economic indicators. In sum, come and save humankind.*”? I guess the second message might have more appeal. Third, how many people show up? 2. Yes, 2! Both illegal aliens, and one does not even speaks english. What do you do? You end up hiring the person. In real life either we hire the person that is “underqualified” or we try to steal the workers from the competitors. How do we do the second one? By offering them a higher salary. Interestingly, a situation of overheating is one in which either the same workers are offered a higher wage, or less qualified workers are hired at a higher wage. In both cases, salaries adjusted by skill tend to increase.

Therefore, a situation of unemployment is one in which *salaries* tend to go down (in real terms), while a situation of overheating is when *salaries* tend to go up (again in real terms). A situation of equilibrium is one in which *salaries* do not change! So, the equilibrium in the labor market has more to do with salaries and wages, than with bodies searching for a job. The unemployment rate at which salaries are not changing is called the *natural rate of unemployment* (this is where the NN comes from). This is very counterintuitive, so, let me share with you other definitions of the natural rate of unemployment. There is an alternative definition which is the one I use with reporters which is incredibly more simple and super intuitive: The natural rate of unemployment is the unemployment rate that is really, really, really natural. So, it is not the unnatural one. “Wow!!! He must be a genius” I know... I look so smart in front of the media when I use this definition! But I do not want to take full credit for this incredibly profound definition. This is actually one of Ricardo Hausmann's insights.¹⁰ In practice there is no simple way to define the natural rate of unemployment. It is defined through its implications on wages.

Definition 4 (Natural Rate of Unemployment:). *The natural rate of unemployment is the rate of unemployment at which real wages are not changing. Unemployment is a situation where real wages tend to decrease, which overheating is a situation where real wages tend to increase.*

Some remarks are worth highlighting. First, it is quite possible that one country has different levels of unemployment that correspond to the natural rate of unemployment at different points in time. If labor market regulations change, if immigration policies change, if structural reforms are made, if retirement ages are shifted, if discrimination in the labor market is being reduced, if women are more empowered to join the labor force, etc. then all these changes lead to a shift in the labor market conditions that in the end imply a different natural rate of unemployment. Furthermore, it is possible that the natural rate of unemployment shifts around the country. In the south of Italy, the natural rate of unemployment is larger than in the north. The same happens in France, US, Spain, etc. Maybe there are restrictions to move - real estate taxes is always a big barrier - or there is imperfect information in the sense that a job opening in the north has not being properly advertised in the south, or maybe the people from one region do not like the people from the

¹⁰By the way, if you find this joke stupid it is because all of Ricardo's jokes are really, really, really... deep.

other. Whatever the reason the natural rate of unemployment might be very different in different regions of the country.

Notice that the definition is in terms of real wages. In the discussion above I have obviated this issue – implicitly assuming that inflation is zero. However, when we are concerned with the labor market we are mostly examine REAL wages. What is the real wage? Well it is the wage that is really real! In other words, it is not the unreal wage. For example, the real wage is what MBA's earn. We, professors, earn CCC wages: clowny-crappy-crummy wages.¹¹ I know that this might not be terribly clear so let me try to explain it again. Now more seriously: the real wage is the wage adjusted by inflation. It is related to the purchasing power of the workers. So, when there is overheating, the wages are going to increase faster than inflation to provide a higher real wage – a higher capacity to purchase. The opposite occurs under unemployment.

The next step is to study the labor market conditions within the framework we are developing. The equilibrium in the internal market is the combination of demand and competitiveness at which the labor market is on the natural rate of unemployment – i.e. a situation at which real wages are not changing.

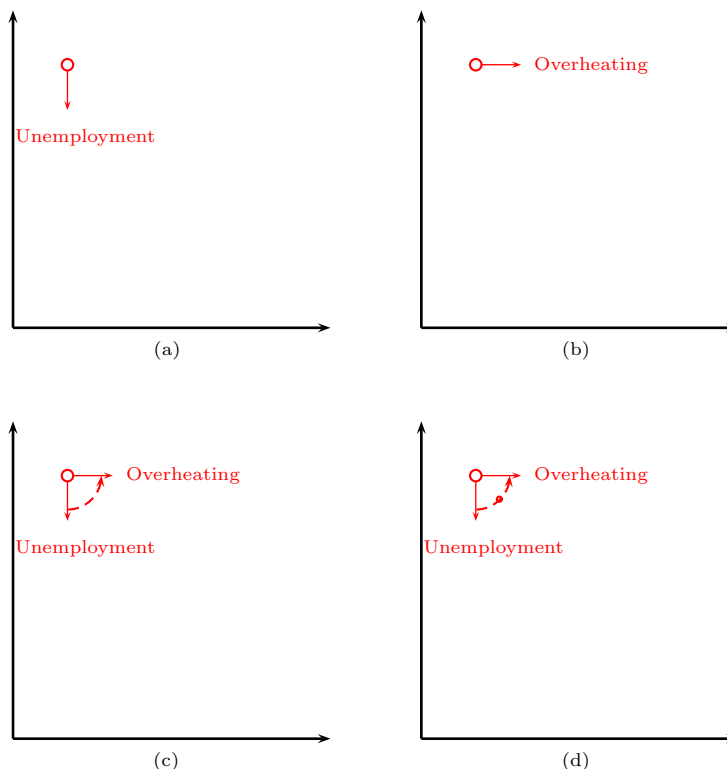


Figure 8.4: BBNN: Labor Market Equilibrium

As we did with the TB_{BB} we will derive the schedule in steps by understanding how changes in demand and competitiveness impact the labor market. in Figure 8.4(a) assume that the circle corresponds to a point in which the labor market is in equilibrium – i.e. wages are constant. If we move south, meaning, if we reduce the degree of competitiveness, firms will have a much harder time competing in international markets and are likely to go bankrupt – at least some of them. The reduction in the degree of competitiveness will

¹¹Another of Ricardo's joke

generate a reduction in production; and therefore, workers will likely be fired. If we are in a situation of equilibrium, the release of workers implies a situation of unemployment. There are going to be less job available and more people searching. Those efforts to find a job will lead the workers to offer the same services at a lower salary – hence, yielding a situation of unemployment.

Let us return to the equilibrium we had before, and now keep competitiveness constant. In Figure 8.4(b) we depict an increase the aggregate domestic demand. Consumers are demanding more domestically produced items, as well as those produced abroad. The increase in the demand for products manufactured in the country will put pressure on the firms, and will lead them to try to hire additional workers. This increase in the demand for workers implies a situation of overheating. Firms will be desperate to try to find workers and will increase wages in the process.

As depicted in Figure 8.4(c), from a situation of unemployment we can move to a situation of overheating, and we have to cross a point at which the labor market is back in equilibrium. That point needs to be south east of the initial point (as shown in Figure 8.4(d)). Therefore, the NN needs to be a downward sloping curve.

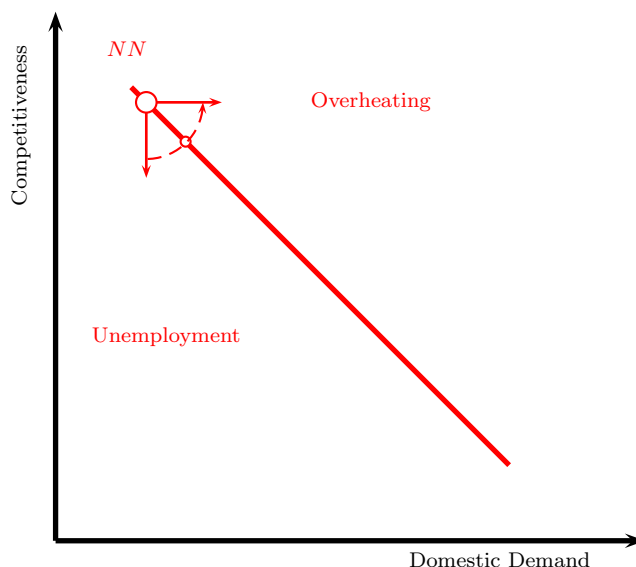


Figure 8.5: BBNN: Labor Market Equilibrium (summary)

Figure 8.5 summarizes the labor market equilibrium. This schedule is known as the NN. Starting from a situation in which wages are not changing, an increase in the demand puts the economy in overheating – hence, above the NN are all combinations of demand and competitiveness in which the labor market is overheated and wages are being pushed up. To return to equilibrium, the situation of overheating requires firms to reduce their demand for labor, which is accomplished by a reduction in the competitiveness. The NN is downward sloping because of this reason: decreases in aggregate demand need to be compensated by increases in the degree of competitiveness to keep demand and supply of labor equal. In other words, the labor loss by the decline in the domestic demand needs to be compensated by an increase in the competitive side to be able to export those products abroad and hire the workers.

Finally, emphasizing on of the most counterintuitive ideas we have discussed so far regarding wages and

labor markets: a situation of overheating implies increases in (real) wages, and a situation of unemployment implies a reduction of (real) wages. This will become very important in the next section when we study the adjustment process, and policy decisions.

8.2 Diagnostic

The framework we are developing is used for several aspects. First, it is used to diagnose the economy: how bad the situation in the labor market is? how bad the situation in the external accounts is? etc. Second, it is used to understand what economic policy should be. In other words, given the diagnostic of the “diseases” afflicting the economy (its disequilibria), the framework is able to answer what the central bank and the treasury should do. Third, the model describes the natural adjustment process to any disequilibrium the economy is undergoing in the absence of policy actions. So, given where the economy is (it’s diagnostic) the framework indicates what is likely to happen if policy is not active. Third, this model is very good at understanding the medium and long run dynamics of the economy. It is very good at answering what will happen to the economy after a shock (and later you will see how many shocks we can interpret). Finally, the model allow us to define what is sustainable, and what is the real exchange rate of equilibrium. We are going to study all these aspects of the model. However, unequivocally the first step that always needs to be taken is the diagnostic.

The diagnostic refers to the placing of the economy within the BBNN. How big is the external disequilibrium? How large is the domestic disequilibrium? etc. One important aspect of the model we have described is it is not an equilibrium model. Typical models assume or force the economy to be on the lines, not this one. In other words, an economy is over the TB_{BB} only if the trade balance is zero; or over the CA_{BB} only if the current account is zero. If it has a deficit it is below, if it has a surplus it is above. In order to do the diagnostic of the economy we need to impose a little more structure than the one we have been developing so far. The bigger the current account deficit it is, the farther the economy is from the BB. The larger the unemployment rate is, the farther the economy is from the NN. The objective is to systematically evaluate an economy and be able to place it within the BBNN, and then track it through time.

The previous section derived the equilibrium of the economy appealing to intuitions behind domestic aggregate demand and the degree of competitiveness of the economy. Before proceeding, it is important to provide more structure to these two concepts. In particular, what exactly do I mean by competitiveness, or demand.

The domestic aggregate demand is defined as: $C + I + G$. So, it is consumption, plus investment, plus government expenditures. If you remember the ISLM or the ASAD models I hope you realize that fiscal and monetary policy are the tools we can use to “control” the aggregate demand. For instance, an increase in government expenditures increases the aggregate demand; a reduction in consumer taxes increases the aggregate demand; a reduction in interest rates increases the aggregate demand. In other words, all those policies and shocks we studied in the ISLM and in the ASAD are shocks that will have an impact in the aggregate demand in the BBNN. So, those shocks and policy actions are the levers used to control this dimension of the economy.

Competitiveness has at least two dimensions: productivity and the cost of labor in comparison to the cost of labor in other countries (of factor of production). In our model, the vertical axis refers exclusively to the cost of the factor of production. Productivity is something that we will reflect in the movement of the schedules (Chapter 9). So, in this model the dimensions of competitiveness are split – the relative cost of the factor is on the vertical axis, while productivity is elsewhere.

The most important factor of production is labor and its international cost can be captured by the “wage in dollars” ($\frac{w}{e}$), where w captures the average wage in the economy in local currency, and e is the nominal exchange rate measured as the quantity of local currency needed to purchase foreign currency. In general,

when I talk about countries I'm thinking about emerging markets, and usually I am mostly concerned with their ability to export to the US. Hence, this is usually the nominal exchange rate between local currency and dollars. Of course, if we were to analyze the US the local currency is the Dollar, and the foreign currency is either Yen, Euros, or a basket of them.

The measuring of competitiveness is inversely proportional to the cost of the factor of production (everything else equal). For the purpose of this analysis we denote this dimension of competitiveness as $\frac{e}{w}$. So, an increase in local wages deteriorates competitiveness, while a depreciation of the exchange rate (an increase in e) improves competitiveness.

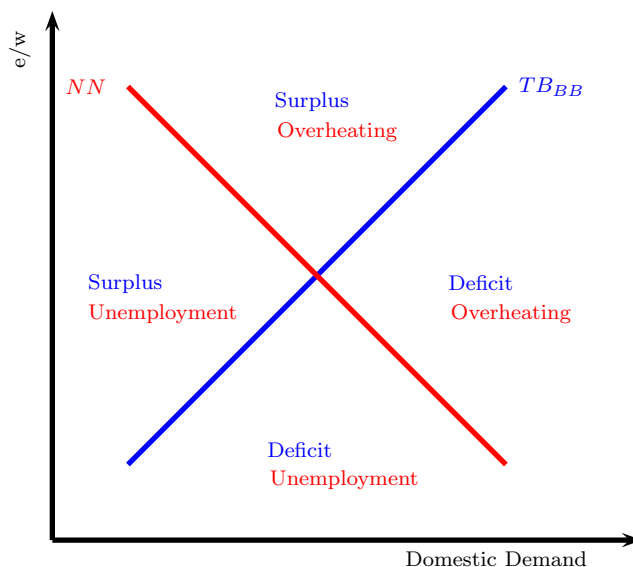


Figure 8.6: BBNN

Let us summarize what we have learned so far. The model characterizes both the equilibrium, and more importantly, the disequilibrium. Figure 8.6 shows the regions where economies might be. This is a model in which disequilibrium is allowed – meaning economies can be unemployed or overheated, and countries might have surpluses or deficits. Therefore, we can use this model to provide a diagnostic of the economy.

The value $\frac{e}{w}$ that corresponds to the equilibrium is associated to the equilibrium real exchange rate. Values above that level are circumstances in which we say that the real exchange rate is depreciated, while realizations below that level are associated with depreciated real exchange rates.

8.2.1 What is the Real Exchange Rate?

What is the real exchange rate? What is the nominal exchange rate? What are their differences and the similarities? The nominal exchange rate refers to the price at which two currencies are exchanged (0.87 Euros for 1 US Dollar). On the other hand, the real exchange rate refers to the relative price of the consumption baskets between two countries.

In principle, it seems as if they have nothing to do with each other, but this is not the case. For example,

assume in the world there is one good and that one country exports the good on the other country. The price of the good in the second country is the price of the first country times the nominal exchange rate. When the relative price of one good across two countries, in local prices, is equal to the nominal exchange rate, we say that the good satisfies the Law of One Price (LOP). In this case, the relative price of the two consumption baskets is exactly the same as the nominal exchange rate – i.e. the nominal and real exchange rates are identical when all goods are traded and their prices satisfy the Law of One Price.

Therefore, if all products are perfectly traded internationally, and the consumption baskets of all countries are identical, the real and nominal exchange rates are different. One source of difference is that countries eat more apples, while the other one eats more meat. If the relative price of apples and meat changes, then the two baskets will have different inflation rates – and the real exchange rate moves.¹² The other reason why prices can differ is because some of the baskets have products that are non-tradable. So, when wages in one country increase, services become more expensive. This implies an increase in the price of the basket of that country appreciating its real exchange rate.

How are nominal and real exchange rates measured in these notes? Assume there are two countries (Home and Foreign). Assume Home is an emerging country (hence lets assume its currency is called *Peso*), and Foreigner is a developed nation (or the rest of the world). For the moment lets assume Foreign is the US. Assume the exchange rate between the two countries is e – where e is the number of Pesos that will be exchange for 1 US Dollar. Two remarks: First, this is not the usual way of defining the exchange rate in the US and UK. In most countries we tend to define the exchange rate as the quantity of local currency needed to purchase one unit of foreign currency. However, in the US and UK it is customary to do it the other way: how many Euros does one Dollar purchases. The first definition is the one we use when we are talking about weaker currencies and is the one we will follow in these notes. For example, in Colombia you exchange 1800 pesos for one dollar. Can you imagine reporting this exchange rate the other way? In any case, in these notes (and in all my classes) the exchange rate is defined as here. Second, under this definition a weaker currency implies we would need *more* local units to purchase one unit of the foreign currency. Therefore, a devaluation implies an increase of e ! Assume the price of the good at home and foreign are given by p_h and p_f respectively. Then,

Definition 5 (Law of One Price). *We say the Strong Law of One Price holds when*

$$p_h = e * p_f$$

We say the Weak Law of One Price holds when

$$\Delta p_h = \Delta e + \Delta p_f$$

The Law of One Price is an active area of research in economics. Even though it makes sense, from the common sense point of view, it almost never holds in reality. For example, the prices of iPods across countries do not satisfy the LOP. However, it is a good starting point.¹³

Even though the definition of the real exchange rate is the ratio of the price of the two consumption baskets, we are not going to use it. We are going to use a much simpler one, and far more useful for the purpose of what I believe this model should be used for (when making managerial decisions). In fact, if any of you are thinking on becoming a central bank president I think you are in the wrong master's program... We will come back to the definition of the real exchange rate later in this chapter (Section 8.3)

We will use the following definition: The real exchange rate is going to be the inverse of the wage in dollars ($\frac{e}{w}$) – it will become clearer below. On the other hand, the equilibrium real exchange rate is that one

¹²All my papers with Anna Pavlova indeed appeal to this aspect of the real exchange rate to understand the relationship between exchange rates and asset prices. See Pavlova and Rigobon (2007), and Pavlova and Rigobon (2008a).

¹³Alberto Cavallo and I are doing extensive research in this area using all the data we have collected in the Billion Prices Project and through PriceStats.

that achieves internal and external equilibrium. I know... it sounds as if there is something metaphysical here, but believe me, this is a much easier way to understand it.

8.2.2 Diagnosing the US in the 2000's

Having discussed the intuition of the model mostly using the Trade Balance (TB_{BB}) when we look at the diagnostic of any country we appeal to the current account (CA_{BB}). The reason for this is that the current account uses other sources of external income – such as remittances, interest payments, dividends – that are quite important for some countries and it would be missed by the trade balance. For instance, in Dominican Republic a significant proportion of their external income comes from remittances. In terms of the intuition and the working of the model, there is absolutely no difference. If you think that the interest rate is the payment for a service (capital services) then exporting an apple is the same as exporting capital and getting remunerated for it.

How to produce the diagnostic of an economy? The only two pieces of information we need are: what is the current account deficit, and what is happening to real wages. I will start with one single point first, and then move to explain the whole decade.

For example, in 2000, the US had a 4.2 percent of GDP current account deficit, an inflation of 3.4 percent (December to December), and wages¹⁴ increased from 4.79 to 4.89 trillion dollars which is 2 percent. Wages and inflation were very close to each other, and if anything real wages were coming down a little bit.

How do we depict this point in the BBNN? The 4 percent deficit is relatively big so the economy should be below the BB and relatively far from it. On the other hand, the drop in real wages of only one percent is very small and therefore the economy should be below the NN but the distance between the point and the NN should be very small.

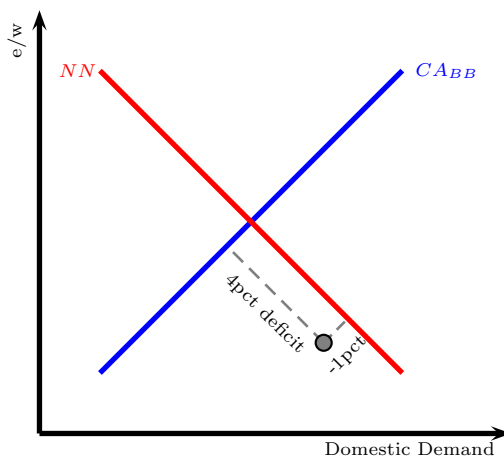


Figure 8.7: US 2001 in the BBNN

Well, now that we have done one point we can track the economy through time and see how it evolves. In Table 8.1 we show the data for the US. The first column is the current account measured as a percentage

¹⁴Compensation of Employees: Wages and Salary Accruals. This is the name of the account. BLS Data

of the GDP – notice that it is negative all the time, but during recessions it becomes much smaller, and during demand booms much higher. The second column is the yearly inflation rate (measured in December of each year). The third column is employee compensation measured yearly and in billions of dollars, and the following column is the labor force of the US. With these two pieces of information we can compute the compensation per worker. The next column is the change in the wage per worker, and the last column is the difference between the wage changes and the inflation rate. Notice the last column moves from negative in 2001-2002 (years of crisis after dot-com, Enron and 9-11) to positive during the boom, and turns negative during the recession.

Year	Current Account	Inflation rate	Compensation	Labor Force	Wages (W)	Change W	Change in Real W
1980	0.1	12.6	1431.2	112.38	12.73		
1981	0.2	9.6	1551.5	113.95	13.61	6.91	-2.69
1982	-0.2	4.6	1605.9	115.56	13.89	2.06	-2.54
1983	-1.1	3.3	1740.1	116.86	14.89	7.2	3.9
1984	-2.4	4.1	1899.5	118.76	15.99	7.39	3.29
1985	-2.8	3.5	2037.1	120.66	16.88	5.57	2.07
1986	-3.3	1.3	2152.2	122.58	17.55	3.97	2.67
1987	-3.4	4.5	2330.7	124.44	18.72	6.67	2.17
1988	-2.4	4.2	2507.1	126.11	19.88	6.2	2
1989	-1.8	4.7	2635.3	128.19	20.55	3.37	-1.33
1990	-1.4	6.3	2773.4	129.15	21.47	4.48	-1.82
1991	0	3	2854.2	129.96	21.96	2.28	-0.72
1992	-0.8	3	3008.8	132.04	22.78	3.73	0.73
1993	-1.3	2.7	3129.9	133.46	23.45	2.94	0.24
1994	-1.7	2.7	3315.6	135.64	24.44	4.22	1.52
1995	-1.5	2.6	3494.4	137.45	25.42	4.01	1.41
1996	-1.6	3.3	3706.2	139.55	26.55	4.45	1.15
1997	-1.7	1.8	3987.6	142.01	28.07	5.73	3.93
1998	-2.4	1.5	4287.1	143.87	29.79	6.13	4.63
1999	-3.2	2.6	4587.8	145.76	31.47	5.64	3.04
2000	-4.2	3.4	4899.5	148.2	33.06	5.05	1.65
2001	-3.9	1.9	4926.8	149.15	33.03	-0.09	-1.99
2002	-4.3	2.2	5016.4	150.24	33.38	1.06	-1.14
2003	-4.7	1.8	5249.4	150.33	34.91	4.58	2.78
2004	-5.3	3.5	5534.4	152.04	36.4	4.27	0.77
2005	-5.9	3.5	5829.7	153.74	37.91	4.15	0.65
2006	-6	2	6227.6	155.95	39.93	5.33	3.33
2007	-5.1	4.3	6523.4	157.25	41.48	3.88	-0.42
2008	-4.7	1.1	6477.3	158.88	40.76	-1.74	-2.84
2009	-2.7	1.8	6284.5	159.4	39.42	-3.29	-5.09

Table 8.1: US data since 1980

One question you might have is where do I get this data? Well, you can pay thousands of dollars to get the data, or you can go to Trading Economics and get the data for free (<http://www.tradingeconomics.com/>). Of course this is entirely up to you. One disadvantage of Trading Economics is that you can see the data in a figure but you cannot download it in a spread sheet: but what are assistants for? Now, more seriously, you can download the data from the graphs. Change the range of the graph to have only two observations, and you will see that the automatic scaling will give you the exact value of the observations. So, to get the data you have to move the range through the sample. Some of you might have access to the IMF and WB data, but after you leave academia to go and work in the private sector, it is likely your organization is not going to pay for the data services. Learn how to do it, and you will be able to replicate this analysis for any country.

By the way, the current account is very simple to obtain. It is a very publicly discussed variable and every country makes the data available to the public through the Central Bank web page. So, if you either search in the Central Bank or even the newspapers, you can obtain the current account. Inflation is very easy as well. Trading Economics is a great source of data. One word of caution, though, not all countries have the quality of information the US has – even in Trading Economics. Current accounts and inflation rates can be found in every country. Of course in some countries we have doubts about the quality or veracity of the data, but little can be done in those cases. The hardest information to find is the workers compensation. In some countries you will not find the wages and salaries as in the US. However, in most countries you find a

line called “Compensation of employees (current LCU)”. This is the total expenses on employees and should be a good proxy for the wages – especially the change in that variable.

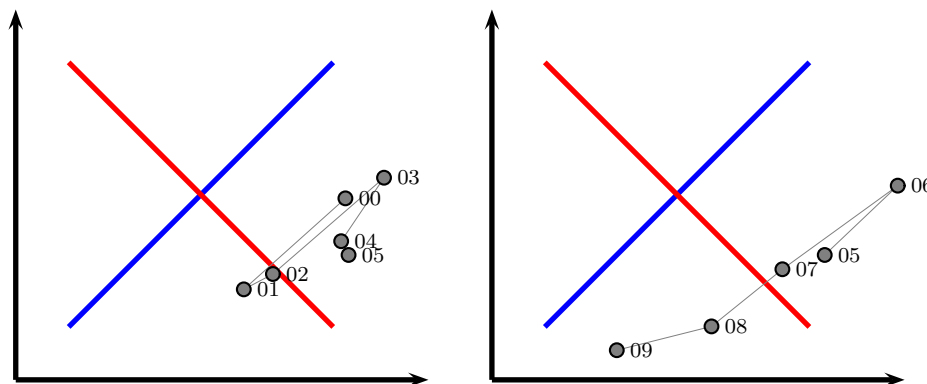


Figure 8.8: US 2001-2010 in the BBNN

We have depicted – approximately – how the US has moved in the BBNN. The path was divided from the 2001 to 2006 (from the recession to the peak of the boom in December 2006), and in another figure from 2006 until December 2010. You can see how the domestic demand is moving all over the place. This is very common in financial crises. The demand (especially consumption and investment) fluctuates wildly.

One word of caution. This is a graphical interpretation of what has happened and getting the exact points is less relevant than getting the big picture. Is the US getting closer to the NN? or the BB? When is this happening? In which quadrant is the economy? Where is it moving? etc. As you will see in our discussion below that getting the quadrants and the general direction of movement is enough to understand a lot of what happens in the world.

A second word of caution. At this moment we have assumed that the schedules are fixed and the only thing that moves is the economy. Generally, this is not the case. In most circumstances both the economy and the schedules are shifting around. We will see this in Chapter 9.

Let us now concentrate in the analysis of the diagnostic. Going back to Figure 8.8 US in 2004-2006 is an economy where the labor market is overheated – salaries were increasing much faster than inflation – and the economy is experiencing a deficit in the current account. Therefore, the US during that period was wandering in the quadrant where there is deficit and overheating. The collapse in consumer confidence, investment, and credit after the financial crisis led to a decline in the aggregate demand. The economy moved to a situation of unemployment and continued with a deficit in the current account. Therefore, the economy is in the lower quadrant. In 2010, wages of the labor force started to increase at the same rate as inflation and the economy moved closer to the NN. One important thing to highlight in this case is even though the economy is near the natural rate of unemployment, the unemployment rate in 2010 is not even close to the unemployment rate that prevailed during 2002 when the economy was also close to the NN. This highlights the fact that a labor market in equilibrium does not necessarily mean the economy is “booming” or “every body has a job”. Being in the natural rate of unemployment just means wages and inflation are changing at the same rate. That’s all!

8.2.2.1 Getting data for the US

The current account deficit, the trade balance, and everything in the balance of payment accounts are statistics that can be found easily on the web. The FED makes this data readily available, and most market participants pay so much attention to them that you can find them everywhere. The change in reserves is also part of the BOP. Furthermore, this data can be found for almost every country in the IMF web page as well. Therefore, the diagnostic of the external accounts is relatively easy. The question is, of course, what definition to us – but I have addressed so already.

The data on real wages is harder to get. The US however, through the BLS, produces almost everything you would like to get. For real earnings they have to tables that report the real earnings for all workers and only the non-supervisory workers. See <http://www.bls.gov/news.release/realer.t01.htm> and <http://www.bls.gov/news.release/realer.t02.htm>.

Table A-1. Current and real (constant 1982-1984 dollars) earnings for all employees on private nonfarm payrolls, seasonally adjusted

	July 2013	May 2014	June 2014 ^(a)	July 2014 ^(a)
Real average hourly earnings ⁽¹⁾	\$10.28	\$10.28	\$10.28	\$10.28
Real average weekly earnings ⁽¹⁾	\$353.51	\$354.77	\$354.73	\$354.56
Consumer Price Index for All Urban Consumers	233.252	237.083	237.693	237.909
Average hourly earnings	\$23.97	\$24.38	\$24.44	\$24.45
Average weekly hours	34.4	34.5	34.5	34.5
Average weekly earnings	\$824.57	\$841.11	\$843.18	\$843.53
OVER-THE-MONTH PERCENT CHANGE				
Real average hourly earnings ⁽¹⁾	-0.2	-0.2	0.0	0.0
Real average weekly earnings ⁽¹⁾	-0.5	-0.1	0.0	0.0
Consumer Price Index for All Urban Consumers	0.2	0.4	0.3	0.1
Average hourly earnings	0.0	0.2	0.2	0.0
Average weekly hours	-0.3	0.0	0.0	0.0
Average weekly earnings	-0.3	0.2	0.2	0.0
OVER-THE-YEAR PERCENT CHANGE				
Real average hourly earnings ⁽¹⁾	0.0	-0.1	-0.2	0.0
Real average weekly earnings ⁽¹⁾	0.0	-0.1	-0.2	0.3
Consumer Price Index for All Urban Consumers	2.0	2.1	2.1	2.0
Average hourly earnings	1.9	2.1	1.9	2.0
Average weekly hours	0.0	0.0	0.0	0.3
Average weekly earnings	1.9	2.1	1.9	2.3

Footnotes
(1) The Consumer Price Index for All Urban Consumers (CPI-U) is used to deflate the earnings series for all employees.
(a) Preliminary

(a) Table A1

Table A-2. Current and real (constant 1982-1984 dollars) earnings for production and nonsupervisory employees on private nonfarm payrolls, seasonally adjusted⁽¹⁾

	July 2013	May 2014	June 2014 ^(a)	July 2014 ^(a)
Real average hourly earnings ⁽²⁾	\$8.77	\$8.81	\$8.79	\$8.80
Real average weekly earnings ⁽²⁾	\$293.89	\$296.78	\$296.32	\$296.67
Consumer Price Index for Urban Wage Earners and Clerical Workers	229.687	233.236	233.941	234.118
Average hourly earnings	\$20.15	\$20.54	\$20.57	\$20.61
Average weekly hours	33.5	33.7	33.7	33.7
Average weekly earnings	\$675.03	\$692.20	\$693.21	\$694.56
OVER-THE-MONTH PERCENT CHANGE				
Real average hourly earnings ⁽²⁾	-0.1	-0.1	-0.2	0.1
Real average weekly earnings ⁽²⁾	-0.6	-0.1	-0.2	0.1
Consumer Price Index for Urban Wage Earners and Clerical Workers	0.2	0.3	0.3	0.1
Average hourly earnings	0.1	0.2	0.1	0.2
Average weekly hours	-0.6	0.0	0.0	0.0
Average weekly earnings	-0.4	0.2	0.1	0.2
OVER-THE-YEAR PERCENT CHANGE				
Real average hourly earnings ⁽²⁾	0.0	0.3	0.1	0.3
Real average weekly earnings ⁽²⁾	-0.6	0.3	0.2	0.9
Consumer Price Index for Urban Wage Earners and Clerical Workers	2.0	2.1	2.0	1.9
Average hourly earnings	2.0	2.4	2.2	2.3
Average weekly hours	-0.6	0.0	0.0	0.6
Average weekly earnings	1.4	2.4	2.2	2.9

Footnotes
(1) Data relate to production employees in mining and logging and manufacturing, construction employees in construction, and nonsupervisory employees in the service-providing industries. These groups account for approximately four-fifths of the total employment on private nonfarm payrolls.
(2) The Consumer Price Index for Urban Wage Earners and Clerical Workers (CPI-W) is used to deflate the earnings series for production and nonsupervisory employees.
(a) Preliminary

(b) Table A2

Figure 8.9: Real Earnings US

8.2.3 Diagnosing China (Spring 2013)

Where is China? This is also an interesting exercise – which we do in class – where not only we look at the country as a whole, but the different regions. For example, in 2007, in the urban areas, China is clearly overheated in the labor market and has a surplus in the current account. So, the economy is in the top quadrant. Singapore is also there. On the other hand, in the rural areas of China, there is contingent unemployment and it has a current account surplus – although a little bit smaller than the special economic zones. This means that *Rural China* is located in the left quadrant. For clarification purposes: Contingent unemployment is that workers have jobs, but in the long run those jobs are not sustainable. In particular, in rural china a lot of workers have a job that is been subsidize through state own enterprises. Those salaries are depressed and wages are increasing at a lower rate than inflation – which implicitly define a situation of unemployment.¹⁵

Different countries are placed in different positions, and different regions can be placed in different positions. The different countries and economies might exhibit different degrees or types of disequilibrium. From the diagnostic point of view, this is a “fun” exercise (fun if you are a nerd...). The beauty of this model is not only to provide a guidance to where the equilibrium is, but more importantly, to where the economy is located today, and what is likely to happen to it in the near future! This is a powerful diagnostic mechanism, that also leads immediately to understand what policy is probably going to occur. How the economy moves dynamically is what we call the Adjustment Process.

8.3 Adjustment Process

In this section, we study how an economy adjusts to the different disequilibriums it is experiencing. The previous sections analyzed the type of disequilibrium and describe how to diagnose an economy. In this section we discuss how policy makers control the economy, and what are the natural forces behind its adjustment process.

8.3.1 Active Adjustment Policy

There are two distinct dimensions on how the economy adjusts that are worth studying: First, what policies are likely to be implemented. For example, what is the Central Bank going to do? or even better, what makes sense for the Central Bank to do? Furthermore, is the fiscal stance going to be expansionary or contractionary? Does it make sense to reduce taxes, or increase expenditures, or both? Should the Central Bank intervene the exchange rate market? In which direction? Is the exchange rate going to appreciate or depreciate? What is going to happen to wages and inflation? Where will the economy be in the long run? How long it take to converge?

Economies can return to the equilibrium by themselves, or they can be “helped” by active fiscal, monetary, and exchange rate policy. In this section we discuss the adjustment that occurs through policies, while in the next subsection we will discuss the adjustment that takes place automatically.

One word of caution before proceeding. Fiscal policy is quite a complex issue, and multitude of tools are available. For example, regarding taxes, in this section we concentrate exclusively on consumer’s taxes – or those taxes that have a direct impact on aggregate demand. Regarding expenses, in general we talk about expenses that affect consumers as well, as opposed to military expenses. In general, what I have in mind in this discussion are personal taxes, VAT, sales tax, on the tax’s side, while expenditure policies are public work and public administration. What is missing? corporate taxes, investment subsidies, public investment,

¹⁵In China’s HBS cases you can see they report about 160 million contingent job losses.

military expenses, etc. For example, in Chapter 12 we discuss issues of the environment and one alternative to reduce emissions is to tax corporations. Those policies have a different behavior in the BBNN than the one I will discuss now. The same happens if we talk about expenditures such as public education, public health, public insurance, etc. Those policies have not only an impact on the aggregate demand but also on efficiency, and ultimately on the schedules. For the moment, we start with the simplest measures and discuss the hardest ones later.

8.3.1.1 Which tools are available to manage the economy?

The aggregate domestic demand can be handled with fiscal and monetary policy. For example, increases in expenditures, reductions of personal taxes, and decreases in interest rates are all going to have a positive effect on the aggregate demand.

Of course, how effective these policies are depends entirely on different issues. In other words, one of the big discussions in economics is whether increasing expenditures will increase the demand just beyond the increase in the expenditures. The discussion is whether the multiplier effect is big, small, or even less than one. However, there is no discussion (or almost no discussion) that if you increase expenditures some of that goes to increase the demand, and if you reduce interest rates, some of that goes to increase the demand. The point here is that a policy that increases the demand will move the economy to the right in the BBNN – irrespectively of where the economy is located. If we do the opposite actions, then the economy is displaced to the left.

So, if the economy is located directly at the right of the equilibrium in the region of overheating and deficit, the central bank can increase interest rates to reduce aggregate demand and move the economy closer to the equilibrium. So, any policy that creates a tightening in the economy will accomplish the desired movement. What are all the possible policies a central bank has to tight monetary policy? Interest rate increases is one of the most popular tools. This one is easy to understand so I will not elaborate further. Increases in bank reserve requirements is another one: when banks are asked to hold higher proportion of cash for the same amount of deposits, credit needs to be curtailed, reducing lending and investment, and dropping the aggregate demand. Between March of 2010 until the summer of 2011 China has increased bank reserves in 5 occasions! They are trying to move to the left in the BBNN... that simple. The policies available for fiscal policy are also varied. The two that receive most attention are tax changes (cuts or increases) and expenditures. Fiscal policy has the ability through regulation to affect the aggregate demand. A change in the tax code might have a big impact on consumer's expenditures, or investment. For example, in the US since the 2008 recession, Congress has been discussing a new financial regulation. Unfortunately we have no idea how it will be implemented, or how costly it is going to be; and therefore, it is not surprising it has generated massive uncertainty and a negative impact on investment.

Fiscal and monetary policy move the economy right and left. How does the economy move up and down? Well, in our case, this is very simple. if the exchange rate devalues (meaning an increase in “e”) the economy becomes more competitive and it moves up. If nominal wages are reduced, competitiveness increases and the economy moves up. So, wage and exchange rate policy moves the economy up and down.

8.3.1.2 Doing economic policy!

Ricardo Hausmann used to say “We are now ready to graduate as Finance Ministers and Central Bankers”. I agree. Our next step is to understand what we need to do from the monetary, fiscal, exchange rate, and salary policy to *lead* or *help* the economy move faster and get closer to the equilibrium.

For example, in Figure 8.10 two economies are depicted where their biggest disequilibrium is in their aggregate demand. One economy is directly to the right of the equilibrium, while the other one is to the

left. If we were interested in “moving” the economy toward the equilibrium what could be done? Imagine we concentrate on the point on the left (blue circle). If we keep the wage in dollars intact, and increase the aggregate demand in the economy, the economy would displace to the right. How can that be done? The panel on the left shows the fiscal policy tools and the panel on the right shows the monetary policy tools.

In the blue circle, if we increase expenditures, reduce taxes (depicted in panel a) and reduce interest rates (depicted in panel b) the aggregate demand of the economy increases and it moves toward the right. This policy choice would reduce the disequilibriums. In fact, the economy was suffering from current account surpluses and unemployment (like Japan since 1989) and the advice this simple model gives is to have a lax fiscal policy (reduce taxes and increase expenditures) at the same time have a lax monetary policy (reduce interest rates and print money) – which by the way is exactly what Japan has been doing for the last 20 years!

In the red circle, the economy is on the other side of the equilibrium and the advices have the same “spirit”. The economy has an overheated labor market and a deficit in the current account. Those were exactly the circumstances the US found itself in 1994-1994. What your be your advice? Fiscal policy: cut expenditures and increase taxes. In other words, run a fiscal surplus – which is exactly what Clinton did. Monetary policy: increase interest rates to slow down the demand – which is exactly what Greenspan did. Isn’t that interesting? This model proposes a path of economic policy that is exactly what we have seen countries do. That should not be surprising... most policy makers have taken this exact same class.

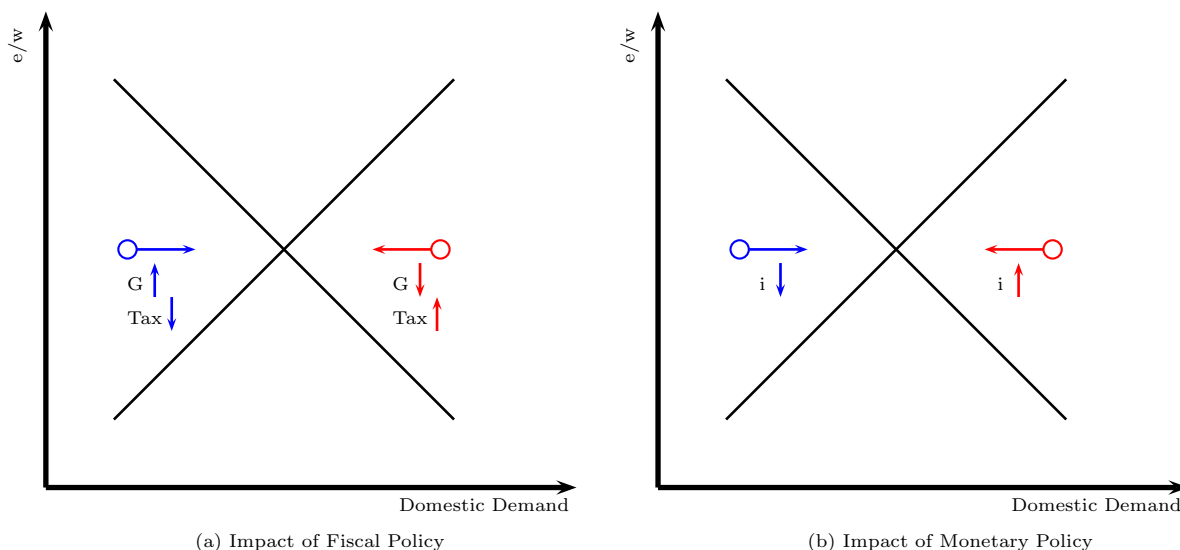


Figure 8.10: Policy tools to manage Aggregate Demand

Having discussed aggregate demand tools, let us turn our attention to the wage in dollars. The situation is depicted in Figure 8.11. In general, when I talk or I think about a particular country I refer to the real wages as the “wage in dollars” – and the reasons are that I always have in mind a small open economy trading with the US; and more importantly, because my mentor and friend Rudi Dornbusch used to call it the *wage-in-dollars*. In this discussion because I am going to talk about all possible countries I need to fix some ideas about how to compute this variable. Hence, I will deviate from my usual rhetoric. Although I will continue talking about the wage in dollars if you find me in the middle of the street, this should be interpreted as the wage in foreign currency – which is the local wage measured in a basket of foreign

currencies – but I’m too stubborn and stupid to change the way I speak. I certainly need to go to Derek Zoolander’s school.

More precisely, the wage in local currency (w) is the average wage of workers in the economy in domestic currency. So, in the US the labor cost in dollars, and in Argentina is the labor cost in pesos. A comment: notice we use the change in the real wage to determine the conditions in the labor market, but we use the wage measured in foreign currency (the level of the wage in foreign currency not its change) to determine the level of competitiveness. I hope this makes clear that the labor market is quite important. Furthermore, there does not need to be inconsistencies between the two; I can have a very high wage in foreign currency and still have wages increasing more than inflation. The exchange rate is the multilateral exchange rate between domestic currency and a basket of foreign currencies. The multilateral currency is obviously a weighted average of foreign currencies. A very popular weighting is using trading patterns – which is obviously called the trade weighted exchange rate. There are other weights: countries GDP’s, or financial markets, etc. We will always have trade weights in mind, but the conclusions are identical if any of the other definitions are used. “ e ” represents the price of the multilateral currency in domestic currency. In other words, e is the amount of domestic currency required to purchase one unit of the multilateral currency. This definition is important because a *devaluation* of the currency implies that *more* domestic currency is required to purchase the same amount of foreign currency. Therefore, a devaluation implies an *increase* in e !

How can the wage in foreign currency be changed? Or more precisely, how can we reduce the wage in foreign currency to gain competitiveness? One alternative is to reduce the wages in local currency, and the other is to depreciate the exchange rate (which in this case, given the notation we are using in these notes, a depreciation implies an increase in e). In panel (a) of Figure 8.11 the effect of changing the nominal exchange rate is shown, while in panel (b) the impact of changing the wage in local currency is depicted. If the economy is on the top quadrant, meaning it has a surplus in the current account and is overheated, the situation can be solved by shifting the economy downward. This requires an increase in the wage in foreign currency – which can be accomplished either by an appreciation of the exchange rate or by directly increasing the wage in local currency. The opposite is required if the economy is in the bottom quadrant. When the economy has a deficit in the current account and it suffers from unemployment, then a reduction in the cost of labor (reduction in the wage in foreign currency) is required.

In summary, the purpose of policy is to move the economy toward the equilibrium and therefore aggregate demand management policies move it east-west, while wage and exchange rate policies (cost of labor policies) move it north-south. If fiscal, monetary, wage, and exchange rate policies are used “correctly” from the BBNN stand point of view – i.e., that policy is used to help the economy get near the equilibrium – then this model unambiguously indicate what needs to be done. In other words, after any economy has being diagnosed, we know immediately what is required to get closer to the equilibrium.

8.3.2 Automatic Adjustment

Even if policy is not active, the economy has an automatic adjustment process. In the BBNN there are “forces” that will lead the economy toward the equilibrium. Those forces are illustrated in Figure 8.12. Panels (a) and (b) show the forces that come from the labor market, while panels (c) and (d) depict the forces that arise from the aggregate demand.

The labor market forces are the easiest to understand. Remember how *overheating* and *unemployment* were defined. Overheating is a situation in which wages will tend to increase, while unemployment is when wages will decrease. This means that an economy located to the right of the NN will experience an increase in wages. Assuming that everything remains constant – no changes in the aggregate demand, and no changes in the nominal exchange rate – the economy will start moving downward until it reaches the NN, and the overheating ends. The situation is symmetric when the economy is found bellow the NN (in the unemployment region). If everything remains constant, then the economy will move upward in a

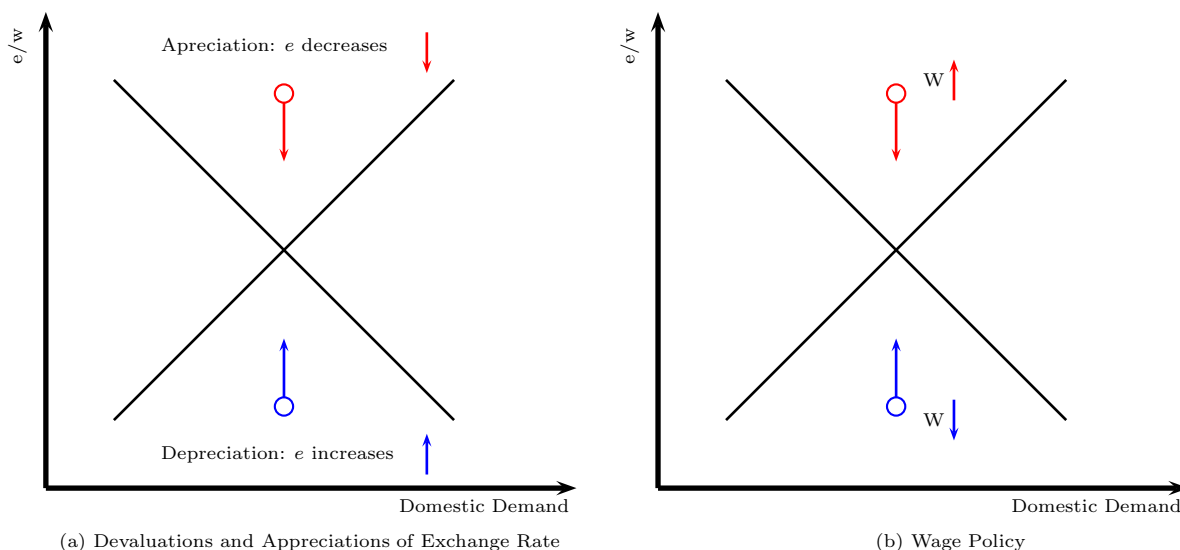


Figure 8.11: Policy tools to manage the Wage in Dollars

parsimonious way.

Panel (a) shows the situation of overheating and the arrows reflect the forces that lead the economy downward. Notice that the downward forces are present in two of the quadrants – both where overheating exists. Panel (b) shows the forces when the economy is experiencing unemployment – i.e. when it is below the NN. Again, when the economy is located in this region there are forces that lead it upwards

Panels (c) and (d) present the forces that move the economy east-west. These are not as easy as those that come from the labor market. Lets study the situation in panel (c) of Figure 8.12. The economy has a current account surplus. What are the implications of a surplus in the external accounts? A surplus means that the country is earning more than what it is spending. Hence, a surplus implies accumulation of savings. If the whole society is accumulating savings at some point in time it will need to start consuming such savings. In other words, in the same way a country cannot borrow forever, it cannot save forever. So, when the economy is having a surplus its demand will tend to increase.

The exact opposite happens when the economy is running a current account deficit. The country is consuming more than what its earning, debt is rising, and at some point in time it will need to reduce its consumption. In other words, the demand needs to decrease.

In Figure 8.13 we present the path the economy follows when the automatic forces drive the adjustment process. When the economy is in the top quadrant, with overheating and surplus, wages increase and the domestic demand tends to increase. This means the economy moves south east until the economy reaches the BB. Exactly on the BB the current account is zero; and therefore there are no east-west forces and only the labor market forces prevail. So the economy moves down to the quadrant where there is a current account deficit and the economy remains with an overheated labor market. Here the labor forces continue to move the economy down, but the demand forces moves it to the left. So, the economy starts moving south west until it reaches the NN. At that moment, unemployment is at the natural rate of unemployment, which by definition implies that wages remain constant. Therefore, the economy moves from right to left due to the only forces present: the demand forces. When the economy moves into the quadrant in the bottom, it

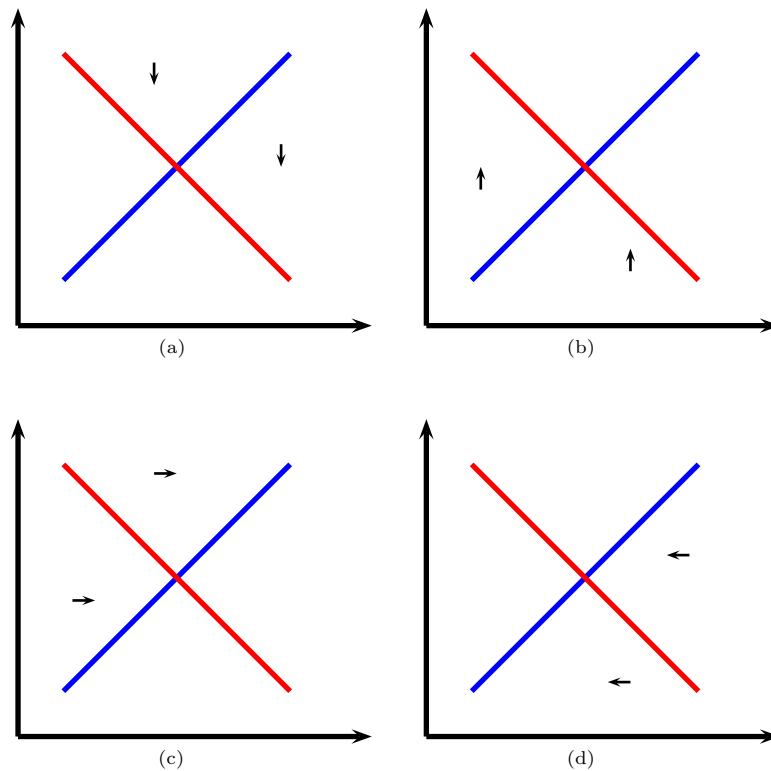


Figure 8.12: BBNN: Forces behind the Automatic Adjustment

exhibits unemployment and current account deficit, which means that wages fall and the demand continues to fall. The drop in wages implies the economy starts moving up, and the drop in the demand means it moves left. Therefore, the economy moves north-west. In the end, the economy moves in a clockwise spiral until it reaches the equilibrium. The path of the economy is depicted by the black line in Figure 8.13.

In summary, there are two mechanisms through which the economy adjusts. Either with active policy – fiscal, monetary, and exchange rate policy – or through the natural forces of the economy – through wage pressures and demand.

8.3.3 Speed of Adjustment

A natural question that arises is how fast is the process of adjustment. Indeed, how fast does the economy reacts to changes in policy, and how fast does the automatic process of adjustment takes? Of course the answer to these questions is *it depends*. In fact, a significant proportion of the ideological discussion in economics comes from disagreements to these questions. Some economists will say that certain policies are simply ineffective, or that it takes forever, while others will argue that particular actions have a significant effect. In the end, I do not think we have a clear answer, and the empirical evidence continues to build supporting the different positions. So, how should we think about these issues? There are some agreements that is worth highlighting:

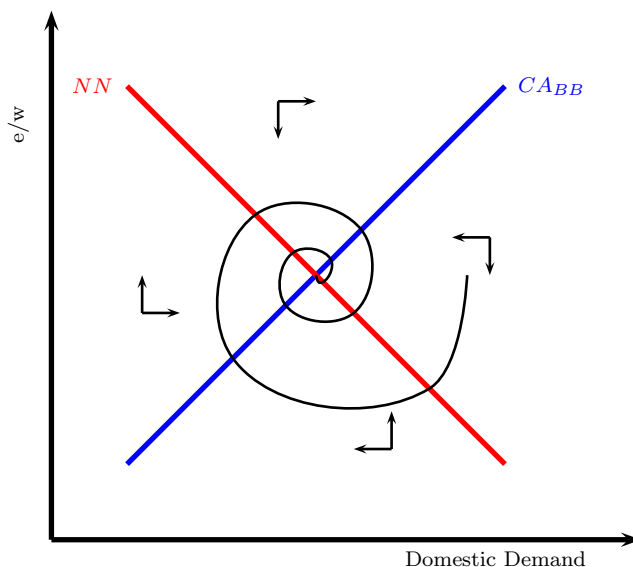


Figure 8.13: BBNN: Automatic Adjustment

1. In general, expansionary fiscal and monetary policy will either increase domestic demand or have no effect. Under perfectly competitive markets, full information, and rational expectations fiscal and monetary policy should be irrelevant. However, if there is any inefficiency, market imperfection, or imperfect information, even under rational expectations, monetary and fiscal policy have the desired effect – that they end up increasing the demand. One aspect determining the degree of effectiveness is how far is the economy from the perfect markets rational expectations paradigm.
2. Increases in wages and depreciations unambiguously reduce the wage in foreign currency. No discussion on that. However, how big is the impact of reducing wages on exports and the degree of competitiveness is an open question. This depends crucially on which theory is driving international trade. If the country is trading based on comparative advantages, a reduction in the labor cost increases competitiveness. However, if the countries are trading because Heckscher-Ohlin considerations, then the change in nominal wages has no impact in trade – because factors prices are equalized internationally.¹⁶ In practice, a reduction in the cost of labor or reduction of the cost of any factor of production should improve the competitive position of firms and therefore some improvement in their exports should be expected. Again, how strong is this mechanism depends on the reasons why the economy is trading in the first place.
3. A situation of overheating increases the cost of labor, while a situation of unemployment decreases real wages. There has been an intense discussion in the literature of what causes the natural rate of unemployment. For example, some theories talk about the unemployment rate that arises from the process of searching for vacancies by the unemployed. It takes time for workers to find the right job and therefore, during that period, they are unemployed – known as search models. Other theories

¹⁶If this is not entirely clear, do not worry. In my course we cover these issues in a different section. The important point is that there are different theories of why countries trade that have different implication on how trade changes when factor prices move around.

talk about the incentives that unemployment generates – known as efficiency wages. Workers are more likely to work hard if the unemployment rate is high. These are examples of equilibrium theories of unemployment where unemployment is a “decision”. There are other theories of unemployment that is the outcome of some inefficiency in the economy. Either wage contracts are fixed, or labor conditions are such that firms decide to adjust to shocks by firing workers. Regardless of what explains the natural rate of unemployment, all these theories imply that a larger level of unemployment will tend to reduce the cost of labor – either workers work longer hours for the same wage, or search more intensively, or firms substitute capital for labor. Whatever the theory, the cost of every unit of labor decreases. The opposite happens when the economy is overheated.

4. A current account leads to an increase in demand in the future. This is unambiguously the case in every theory we have. This is just the existence of a budget constraint and in economics we disagree on everything except on the fact that the net present value of income will be equal to the net present value of expenses.

It is interesting, therefore, that there is little disagreement on the direction of the effects. Some could argue that very badly implemented fiscal policy could be even detrimental – and that is certainly a possibility – but in 99.9 percent of the cases the profession agrees on the direction. The big disagreement appears when we discuss the strength of the movement. For example, a Republican will say that cutting taxes is more effective than increasing expenditures, while a Democrat would argue the opposite. This is an oversimplification but makes the point. You see, both agree on the principle that an expansionary fiscal policy is good for the economy, they are just arguing how such principle needs to be implemented. In other words, what we have done so far is to discuss “principles” and it doesn’t matter from which school of thought the economist is coming from, I believe there is strong agreement about these principles. In some dimension this is good because it allows us to look at this model from a very pragmatic point of view. Also allow us to understand the discussion.

8.3.3.1 Speed of Adjustment (My Views)

Having discussed some aspect of the speed of adjustment I would like to share my views on the topic. I hope I have been clear enough to highlight the fact that there are pros and cons of all theories behind all possible explanations for the speed of convergence. There are a lot of papers arguing in favor of one or the other position. It makes no sense to cite everyone of them. My objective in this section is just to express my reading of all that evidence. So, now is time for me to be ideological...

Regarding the automatic adjustment process. in my view this is a very low process. For example, during a situation of unemployment wages come down but it might take years for that to occur. This is not the case for overheating where the competition for human capital by the firms leads to wage inflation. On the other side, current account surpluses that are converted into higher consumption might take forever. See the case of Singapore or China that have been having surpluses for decades and their demand – even though it goes up – it does not go up enough to reduce the external gap. When countries suffer from current account deficits the adjustments occur through crises. Countries remain in a deficit situation for long periods of time (see Australia and the US) and then only after a massive crisis the demand falls. In the end, the automatic adjustment mechanism is at work, but it takes years, and even decades, for it to lead to equilibrium.

The literature on Purchasing Power Parity shows that it takes between 3 to 5 years to correct half the disequilibrium. Labor market search models also imply very long delays between unemployment and wage reductions – in the order of 5 to 7 years.

Active policy, on the other hand, I believe plays a much bigger role – and indeed can be very effective if used properly. That does not mean that the same policy is always good – if something I’m not religious at all in this regard – but for sure I believe demand management policies play a crucial role in the adjustment

process. The empirical literature can provide some guidance about the delay and effectiveness of the different policies.

Most of the studies in Monetary Policy find that 9 months after the FED increase rates is when prices start to move, and that it takes about 18 to 24 months for the full adjustment to take place. In Europe these estimates are even longer, and Japan takes forever. Emerging Markets, on the other hand, especially those that have had a history of high inflation, tend to react much faster, although estimates smaller than 12 months are very rare. Obviously these estimates vary tremendously on the conditions. As I highlighted in the previous discussion, the delay can be much larger if the conditions are not propitious for the economy to start reacting. However, it is always good to have a benchmark. So, monetary policy takes between 6 to 9 months to start showing impact on prices, and takes between a year and two to have impact on output.

Fiscal Policy is slower. Also, it depends on the form of the policy. Tax cuts work through consumers willingness to spend. Tax cuts might have a very large effect if consumers are eager to spend their income and/or have been constrained for a while. However, imagine consumers are depressed and they are in “saving mode”. In this case, a tax cut might be very ineffective because consumers will save all the extra income. On the other hand, government expenditures are always increasing the demand. In other words, if the government builds a highway, then the demand increases at least by the highway. However, it is easy to find wasteful expenditures (and if you ask someone from the Tea Party they will answer paraphrasing Yogi Berra: “90 percent is waste, and the other half is total waste”).

Fiscal and Monetary policy are very good tools for demand management. However, most of the discussion I see is ideological as opposed to economical. My feeling is that there is a lack of pragmatism that makes actions even more cumbersome. Of course anyone that has ever followed any public discussion on almost any country in the world knows that decisions are driven by too much politics and too little economics. I am aware of this fact as well. The consequence is not only bad choices, but the point I want to make is that it also makes everything else less effective.

Movements on the labor cost side, however, are very effective and used a lot. Exchange depreciations as a mechanism to boost export is one of the most commonly used tools in the world. Almost in every country, after a crisis, the exchange rate depreciates.

8.4 Comments and Bogs: Spain

The crisis in Spain is sad in many dimensions – from the economic point of view, however, it is fascinating. In this subsection I replicate some writings I have done in this regard. They reflect my opinions, though. So, this is more or less the way I use the frameworks we have learned applied to a real case.

8.4.1 Spain: Policy Options (as of December 2011)

The situation of Spain between 2004 and 2007 can be described as follows: First, they had a significant current account deficit. Second, they had inflation, much higher than the rest of European countries. Third, they also had wage inflation that in comparison to the rest of Europe it was very large, but it was just above their own inflation rate. This means that the economy is overheated, with a current account deficit. Given the small inflation in real wages we could argue that they are closer to the NN than to the BB. In Figure 8.14 we have depicted the situation and identified this initial point as *A*.

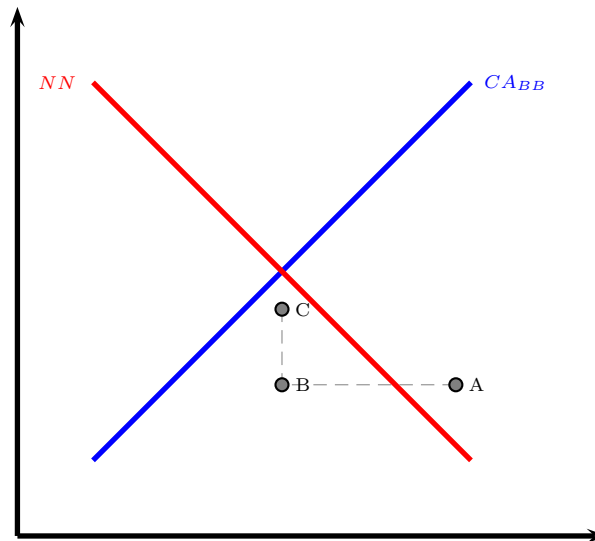


Figure 8.14: Spain 2001-2010 in the BBNN

What would have been required to return to equilibrium? given what we have discussed, they need a depreciation of the exchange rate, a reduction of nominal wages, and a tightening of monetary and fiscal policy. However, they do not “own” a central bank and therefore, changes in the exchange rate cannot be engineered. Also they have to convince other countries to obtain a tightening of monetary policy. Indeed, they tried; but Germany and France were not overheated and the ECB responded to the monetary policy required for the whole region as opposed to attend the needs of one of the countries. Can nominal wages be decreased? In the middle of a boom that seems politically impossible. Therefore, it is not surprising nominal wages did not decrease. So, the only policy option is to move to the left by tightening fiscal policy, but there is little hope of moving up.

In fact, Spain had a fiscal surplus by 2007! So, indeed they were trying to move to the left. Obviously we know what happened afterwards, and it is clear today that their fiscal surplus was not big enough, but *ex-ante* they were trying to move in the right direction. They needed a much bigger tightening.

We are going to discuss a lot of shocks in the following chapter, but let's do an attempt to understand how it has moved and what the policy actions for Spain should be. A financial crisis, as we will see in Chapter 9, have a massive impact on demand. It also has an impact on productivity but we will analyze that later. Let us only concentrate on the demand side. A drop in the demand will move the economy to the left. In Figure 8.14 this is the movement to the left, from point *A* to point *B*.

What is happening in the economy in point *B*? The current account deficit falls but it remains in deficit. Indeed, the current account declined but not enough to cross the BB to become a surplus. The economy that was booming will move from overheating to unemployment. Unemployment in Spain increased from 8 to 22 percent!

In this situation, what would have been the advice? Lower the wage in dollars! Or lower the wage measured in foreign currency. You would like to move up to point *C*. But, they cannot devalue. They can only move left and right with fiscal policy. One alternative is to lower nominal wages. In September of 2010 they tried to implement a reduction of nominal wages. Can you imagine the size of the crisis for public employees to accept a reduction in wages? How much unemployment do you think an graduating MBA needs to accept a salary smaller than the one he or she had before starting the MBA? What about 100 percent?

So, they depended on the ECB to get a devaluation. But monetary policy did not provide enough help. The ECB did not lower rates fast enough, not printed Euros enough; and therefore, the Euro depreciated against some emerging markets, but not against the Dollar or the Pound – their main trading partners. So, Spain did not get a devaluation from the Euro, at least not big enough. They did not get a wage reduction large enough. They were able to reduce wages by 3 percent, when they actually need something closer to 20. So, the only tool they had left was fiscal policy. Which moves the economy in the wrong direction (left-right). In this environment, Spain used fiscal policy as the only mechanisms to ameliorate the crisis. They were in the process of trying to move to *A* as opposed to *C*. They created a massive fiscal problem, they cannot continue borrowing, and therefore their only alternative is to remain in a situation of unemployment and hope the wage reduction takes place through the normal operation of labor markets. If you have read anything about labor markets in Europe you probably know they are not that perfect. This means that the process is going to take even longer!

They have no policy tools and this country is being left with the automatic adjustment as the only mechanisms to get to the equilibrium. Demand will be depressed for a long time; unemployment will be higher for even longer; and standards of living will fall throughout. This is not a good prospect for Spain, but unfortunately it seems to be the real one.

This is very different to what has been happening in Portugal. The effort to get a real depreciation, by forcing nominal wages down is commendable. In fact, I believe that in years to come Portugal will be in much better shape than Spain. Meaning, Portugal will be more likely to take advantage of the growth that will occur when the world economy recovers, than Spain. So, from the economic point of view, Portugal is doing the “right thing”. Interestingly, it is quite likely that the government will lose the elections. There is a deep conflict between achieving economic outcomes and social tension that we discuss in Chapter 12. I delay the discussion of these interesting issues until that Chapter.

8.4.2 Update on Spain (as of October 2014): The Debate about Austerity Programs and Structural Reform.

As of October 2014, the situation in Spain has improved significantly. Several reforms have had a positive impact in the economy.

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Chapter 9

BBNN: Shocks

The previous chapter concentrated on where the economy is, how it moves, and where it is likely to move. All those questions assuming that the schedules are given – or fixed. This chapter discusses what makes the curves move. Let me over-simplify the issue. In the BBNN the economy is described by the wage in dollars and the aggregate demand. Shocks to the wage in dollars and the aggregate demand move the economy, all other shocks... move the schedules. So, labor growth, health, education, productivity, external shocks, reforms, etc. all those possible shocks move the schedules. This is obviously oversimplifying the discussion, but I think it is a good rule of thumb.

9.1 Shocks to the BB

In this section we discuss the shocks that move the BB. One interesting aspect of the shocks to the BB is that they all have the same “flavor”. To understand how the economy moves I will go through one example very carefully (hopefully... carefully). To develop the intuition I will concentrate first on the BB as defined by the Current Account CA_{BB} . The intuition to the Trade Balance (TB_{BB}) is easily transferable.

Assume that the economy receives a positive productivity shock. How can we think about the movement of the schedule? The procedure I use always starts by separating the impact of the shock to the different variables described in the BBNN assuming the economy starts at the equilibrium. For instance, at the moment the productivity increases it has no impact on wages, nor on the exchange rate, nor on consumption, investment, or government expenditures. Hence, the shock has no impact on the variables that position the economy in the BBNN map. By the way this reasoning does not imply that the shock will not ever have an impact on these variables. Certainly that is not the case. In the long run the shock will have an impact, but it is easier to understand how things move if we concentrate exclusively on the immediate impact.

Therefore, if aggregate demand is constant, and the wage in dollars is constant, then what is affected by the productivity shock? Production. indeed, production increases. If the demand is constant, the excess production will be exported, and the economy will experience a surplus in the current account. So the original position of the economy, where the current account was zero and employment was at the natural rate, is now a position in which the current account is in surplus. Surpluses are always located above the CA_{BB} , and therefore this means that the new CA_{BB} needs to be located to the right and below the original CA_{BB} .

Lets do this again with the help of a figure. Assume that the economy produces only coconuts. In Figure 9.1 panel (a) we depict the initial condition of a fictitious economy in equilibrium. So, at the current

aggregate demand and the current wage in dollars the labor market is in equilibrium, and the current account is zero. At that moment, there is a shock that increases production. Assume that this is a shock that purely increase production. This is like the coconut trees are producing more than before. At the exact same aggregate demand and wage in dollars, the demand and supply for labor have not changed so if the economy was in equilibrium before it will continue to be in equilibrium now. However, from the current account point of view things have changed. We now have higher production of coconuts but the exact same consumption of coconuts. Remember that the consumption is the same because we have not changed aggregate demand! So, if the production increases but the local consumption is the same, what can the country do with the excess production? Export to international markets. The implication of this decision is that at the original point, where exports and imports were the same – i.e. the current account was zero – now it is a situation where exports have increased. First thing we should learned from this is that now we know that the BB *cannot* cross through the original point. In other words, the BB has moved. This is depicted in Figure 9.1 panel (b). The second step is to know where it has moved. The original point is now a situation of surplus, therefore, the point has to be above the BB. Immediately after the shock the economy has to look like the situation depicted in Figure 9.1 panel (c).

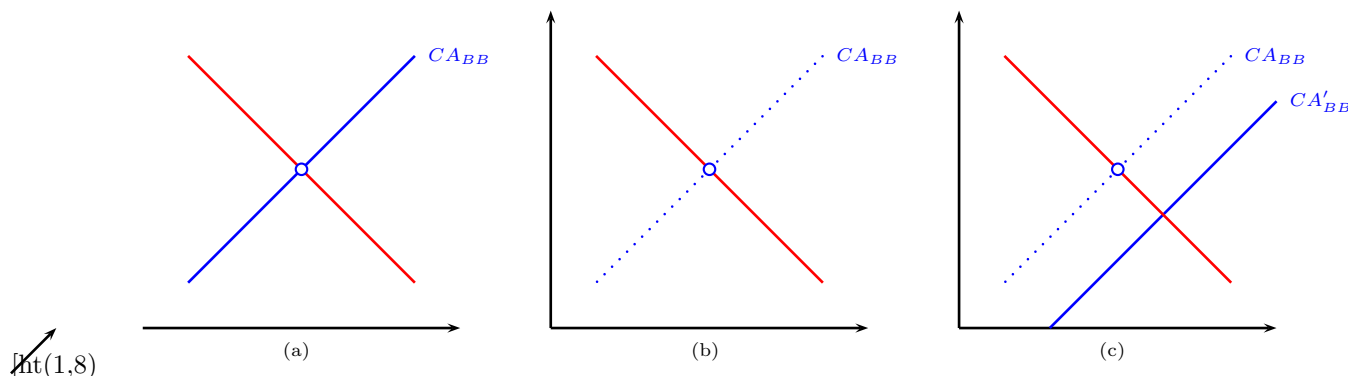


Figure 9.1: Positive Shock to the BB

Another way to understand where the BB moves is to search for the new equilibrium from the initial position. Return to panel (b) and stand over the original equilibrium. We know that we have a current account surplus at that point. The BB needs to cross over a different point where the current account returns to zero. Imagine that we starts walking to the east from the original point. So, at the same wage in dollars we are increasing aggregate demand. The increase in the demand requires more imports and reduces the number of products available to export. This movement tends to reduce the surplus and “catches up”. At some point the current account will return to zero and the BB crosses there. Hence, the BB crosses to the right of the original equilibrium. We can also move north-south. From the original point if we move up the wage in dollars decline making the economy more competitive and increasing the surplus – so that is not the correct direction! Moving south on the other hand, increases the wage in dollars, makes the economy less competitive reducing its production. In the end, if the wages are increased enough the economy reaches zero current account, and the BB needs to cross south of the original equilibrium.

Any of the three ways of thinking will produce the exact same outcome. As depicted in Figure 9.1 panel (c) the BB needs to be to the right and below the original point. In the long run, as we learned from the previous chapter, the economy will move to the new equilibrium. The wage in dollars at that point is higher, and the aggregate demand is larger. In other words, the increase in productivity allows the economy to enjoy a higher level of consumption and a higher wage in dollars. In other words, the economy can afford a higher wages!

How the adjustment takes place can happen in very different ways, as we discuss below. For example, the central bank can allow the exchange rate to appreciate, so, the adjustment takes place that way – this is mostly how Japan has been adjusting for 70 years. If the central bank is stubborn and doesn't want to change the exchange rate, then we know that nominal wages will increase. Inflation will show up to do the adjustment; which is mostly the way China has been adjusting the last 30 years – although lately they are allowing the exchange rate to move a little.

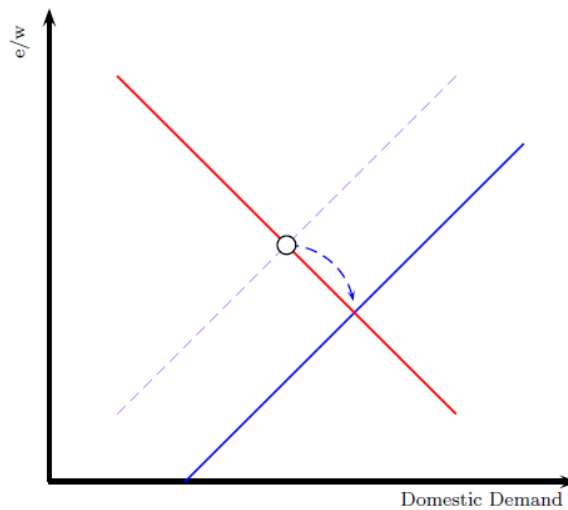


Figure 9.2: Positive Shock to the BB: Animation.

In Figure 9.2 we present the full adjustment in the economy (if you are reading this in a PDF file, this figure is an animation. Click on the figure and the dynamics are shown. From the shock, to where the economy will end up. Of course we do not show exactly how the adjustment takes place.

Now we are ready to have some short discussion about different shocks to the BB. We are mostly going to concentrate on “positive” shocks (increases in production) but it should be obvious that negative shocks just move in the opposite direction.

9.1.1 External Shocks

The first set of shocks are those that come from foreign markets. For example, demand for our products, and international prices of our exports. These shocks are extremely common and in fact the first theories of international contagion were based on these mechanisms. Let us study them in detail.

9.1.1.1 Terms of Trade

Conceivably the shock that has received the most attention in international economics is the movement of import and export prices. The terms of trade of a country are defined as the average price of its exports

divided by the average price of its imports. For example, when oil prices increase, the terms of trade of oil exporters improve, while the terms of trade of importers deteriorate. I do not know if you have paid attention to commodity prices lately, but this seems to be a large source of shocks.

How we can understand its implications on the BB? For simplicity assume that our country is a commodity exporter – oil in Venezuela, copper in Chile, or meat in Argentina. Assume we are in Venezuela then. If the price of oil increases, without changing the production, then for the same demand and same wage in dollars, the economy runs a surplus in the current account. Note that here the surplus is the increase in the value of exports – not necessarily an increase in the quantity exported. In any case, the exports increased... so the movement is exactly as the one described in Figure 9.1.

In the case of commodities, there are several reasons why the price can rise. First, the most common one, there is a negative shock to the supply of the commodity. In the case of oil, there is some social or political confrontation in some other country, that reduces the expected supply and prices increase. Second, and also very common in commodities and the one blamed for the recent rise in agricultural commodities, is the increase in the world demand for the commodity. In recent times, in fact, the growth experienced in China and India has increased the demand for food increasing its price. Obviously this assumes that the supply is given, which is not a bad assumption in the short run. The third reason is speculation. Several papers have studied the role that speculation has had in the price increases in commodities during the first 10 years of the 21st century.¹ Irrespectively of the source of the shock... the price of our exports increases, and that creates the movement in the trade balance (TB_{BB}) and the current account (CA_{BB}).

Notice that here you can see here the famous “Dutch Disease”; which indeed was the outcome of a terms of trade shock: the price of tulips increased to unprecedented levels. When the oil price rises the BB moves to the right. The economy has an increase in the wage in dollars. So, the firms that are exporting but that are not related to oil experience an increase in their cost, which reduces their competitiveness. The non-oil exporting sector shrinks, while the price is high. When the price of oil collapses the opposite takes place. Therefore, the non-oil sector expands and shrinks with the price of oil. This creates a lot of volatility in a sector that in principle should be exempt from such source of volatility. If hedging is costly, then investment in that sector is unprofitable. Therefore, it is not surprising that the manufacturing sector in commodity exporting countries is small and anemic. What is even worse is that according to this model there is nothing that those countries can do. If oil fluctuations are dramatic, then the government needs to have very active policy to avoid the appreciation in the good times, and the depreciation in the bad times. In fact, the stabilization of the wage in dollars – and more generally the real exchange rate – is crucial for the development of the non-commodity sector. I believe Chile is the country that has done the best job in this regard.²

9.1.1.2 Foreign Demand for Local Products

After discussing terms of trade, the other international shock that matters the most is the demand for domestic products. The idea of the shock is that the demand for our country’s products increases – I am old enough to remember the time when sushi was a delicatessen, now you have as many all-you-can-eat sushi places as wendy’s. When the foreign demand for our products increases clearly the value of our exports increases as well. Either the price rises, or the quantities exported increase. In the end, this shock looks identical to the terms of trade depicted in Figure 9.1.

The difference between this shock and the one in the previous subsection, is that in this section we are

¹See Espinasa, Reyes, Manzano, and Rigobon (2011) for a paper disentangling the demand, supply, and speculative shocks for oil markets. See also Parsons (2010) for a very good discussion on how financial transactions in future markets can lead to price increases.

²See my discussion on stabilization funds in ???, and also see the paper Hausmann and Rigobon (2003) where we develop this intuition – it is a little bit technical but all is explained there.

assuming that the demand change is exclusively for the products produced in our country – which are not necessarily commodities – while the shocks in the previous section can be demand, supply, or speculation of world products where our exports are just a small part of that. From the BBNN point of view, however, the shocks are treated identically, or have identical implications on the BB.

This shock has played a very important role in the understanding international contagion. In fact, the first paper on contagion used this fact – that countries trade with each other – to describe the propagation of shocks from one country to the other.³ A very large literature of contagion argues that a shock in one country is transmitted mostly to its trading partners. In our paper Forbes and Rigobon (2002) we develop simple methodological procedures to evaluate the existence of trade channels, and mostly we find that among emerging contagion is propagated to trading partners.⁴

9.1.2 Domestic Shocks to the BB

Having discussed shocks originated in international markets, now it is time to turn our attention to shocks that occur inside the country. Again, the shocks that we cover are those that affect production, or our country's ability to export, etc.

9.1.2.1 Natural Disasters

The most obvious ones to start with are natural disasters shocks. However, natural disasters are complicated and will be re-studied later in this chapter. The reason is that here we are going to assume a very particular natural disaster – one that reduces production but it has no effect on lives. Hence, we assume that this is a hurricane that destroys capital, production, and production capabilities, but that does not have a toll on lives. In other words, the hurricane, earthquake, flooding, fire, etc. only destroy factories (capital), crops (production), or infrastructure (production capabilities).

Just as clarification, conversely to the previous exercises, this is a negative shock. Rarely natural disasters are associated with production increases. Hence, the movement of the BB is in the opposite direction from the ones we have covered so far. In Figure 9.3 the situation is depicted. As we have done before, we start from equilibrium. In panel (a) we start by assuming that before the shock the economy is in internal and external equilibrium. At this point, assume that a natural disaster reduces production. What happens to labor markets? We have assumed a very special shock that has no impact on jobs nor on lives. Therefore, the labor market remains in equilibrium – nothing has changed! What happens to the external equilibrium? There is a current account deficit at the same level of demand and wage in dollars. So the BB cannot cross over the original equilibrium (panel (b)). In particular, keeping the aggregate demand at its original level and keeping wages also constant, the natural disaster reduces production. The drop in production and the constant aggregate demand implies that less products that the country used to export are available, also, some of the local demand needs to be supplied by additional imports – simply because the demand is constant and production drops. Therefore the equilibrium is not in equilibrium anymore, and the BB cannot cross over the original point. Where the BB moves? as we did before there are three ways of resolving this – which all give the same answer (thank god!). First, at the original point there is a current account deficit and labor markets are in equilibrium. So, the NN has to cross there, but deficits only occur below the BB. This implies that the BB should have moved to the left and up (panel (c)). Second, another way of thinking where the BB had to move is to start at the original point and ask what needs to happen to the local demand to return to equilibrium. If there is a deficit in the current account, a reduction in the aggregate demand is required. That means that the equilibrium has to occur at the left of the original point. Finally, the other way to find the equilibrium is to move wages. At the original point there is a deficit because demand

³See Gerlach and Smets (1995)

⁴Also see Forbes (2000), Glick and Rose (1999), and Rijckeghem and Weder (2001).

is much larger than production. If we reduce wages, however, the economy becomes more competitive and production increases. If production increases the gap in the external accounts drops – hence the current account deficit will get resolved at lower wages. Lower wages occur moving up from the original point. The BB needs to cross above the original equilibrium.

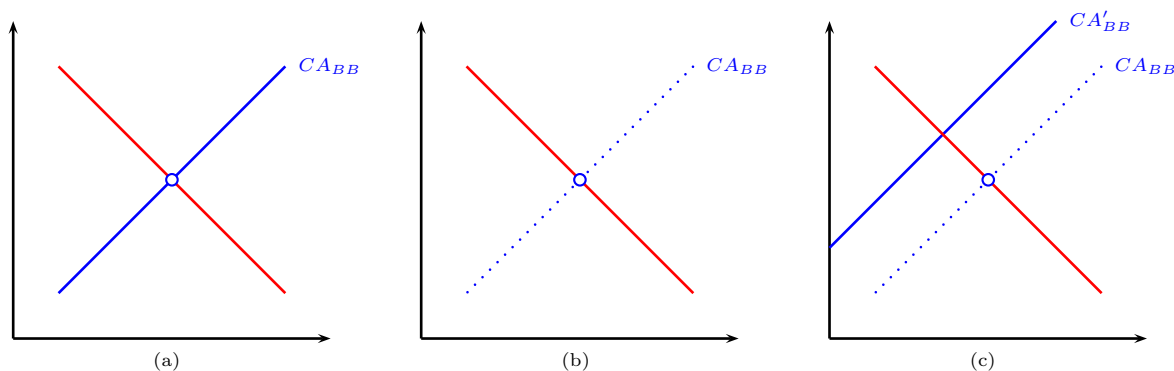


Figure 9.3: Natural Disasters: Pure BB Shock

What the BBNN says about the implications of a natural disaster? In panel (c) Figure 9.3 it is very clear that after a natural disaster the new equilibrium is above and to the left of where the economy is. Therefore, through time, the economy moves to a lower level of demand, and to a lower wage in dollars. In other words, there is a depreciation of the exchange rate and a drop in the aggregate demand – which indeed happens to every Caribbean island after being hit by a hurricane. Furthermore, the natural response after a natural disaster is to try to make up for the lost production by investing and increasing domestic productivity – in other words, to recover the productivity lost from the natural disaster. This is equivalent, as we will see below, to moving the BB to the right.

9.1.2.2 Productivity Increases

Having discussed natural disasters, now the attention turns to productivity increases – or growth enhancing policies. There are four types of policies or actions that can increase productivity: new technologies and capital investment; better managerial practices and organizational structure; better health, education, and other improvements in human capital; improvements in institutions such as contract enforcement, judicial system, and in general the rule of law.

Most of these reforms tend to improve productivity and by consequence production. Also, most of these policies tend to change the supply side with small impact on labor markets. Notice that I have omitted labor reform, immigration, social security, etc.

What are the implications of these reforms? All increase output and therefore they look identical to an increase in the price of the country's exports. So, the BB moves to the right (both the TB_{BB} and CA_{BB}) and all these reforms allow the country to increase its wages and enjoy a higher demand. In other words, improvements in any dimensions allow the country to sustain a much higher standard of living.

There is one extremely important difference: all these reforms have a permanent effect in productivity, while oil prices increase as likely as they decrease. This is extremely crucial from the development point of view. When education has improved, and the economy moves to a higher level of wages some sectors become uncompetitive forever. So, the economy is transformed, but even though this restructuring is costly,

it is permanent. In the case of the demand for exports or export prices, the restructuring is costly and transitory. Some sectors are dismantled in good times, and have to be rebuilt in bad ones. In other words, when oil prices are high some manufacturing sectors go bankrupt, but when oil prices are low those sectors are reborn. If this process of expanding and shrinking is costly – which is – then the volatility is extremely costly. These reforms do not have this problem.

What is the only problem of these reforms? They tend to be slow and hard to achieve. However, there is a pecking order in terms of speed. For example, new technology or new capital tends to increase production and productivity relatively fast – two to three years.

The second policy that has relatively fast impact are those related to changes in organization practices and better managerial practices. Better supply chain management increases productivity in the same frequency (two to three years). In fact, changes in organization structure have received little attention in policy circles, but they have a tremendous impact in practice. By the way, this is not a statement or public recognition that McKinsey has a huge value added – you know how I feel about this. But this is a statement that indeed there are important reorganizations in industries and companies that have very significant improvements in the way they produce.

The third set of policies are very slow. Improvements in education, health, work safety and labor conditions, and most reforms that rise human capital. These reforms also include crime, corruption, poverty alleviation, income distribution improvements (i.e. reducing inequality), freedom of speech, representativeness and protection of minorities, democracy, judicial system, and in general all those aspects that improve not only the productivity at the firm level, but all those reforms that improve standards of living. The assumption is that all these reforms make the economy “better”. The first set – human capital changes – are easily understood by policy makers and are at the forefront of the policy discussion, while the second set – institutional improvements – are rarely emphasized. This does not mean they are unimportant. My personal view is that politicians have given up even thinking about them. However, some societies have gone through those transformations. The dismantling of the USSR, South Africa after Apartheid, Iraq and all the middle east today, are just some of the examples. In fact, I venture to say that we have seen as many of these type of institutional changes as countries being able to improve their education system – mostly the Asian economies.

Finally, there is an important omission in this discussion. All those technologies that improve the environment. We will discuss these improvements in Chapter 12.

9.2 Shock to the NN

After having discussed shocks that move the BB, it is time to turn the attention to the NN. These shocks are less in terms of variety, but their impact is much harder to understand. As we did before, we go over one shock in detail and then discuss several other alternatives. Because of the complexity of the shocks to the NN we have to be more precise. Hence we discuss the movement in the context of the simplest one of the shocks: Immigration of labor.

9.2.1 Immigration and Population Growth

Figure 9.4 depicts how the NN moves when immigration takes place. This is a pure increase in the supply of labor. Assume that that an economy is in equilibrium (panel(a)) and that suddenly immigration occurs. Of course we assume that those immigrants are going to search for a job. What is the implication of these additional workers in the BBNN? The workers have not found a job yet, so, for the same demand and the same wage in dollars the consumption and production of the country does not change. The current account

continues in equilibrium which means that the BB (both the TB_{BB} and CA_{BB}) has to continue to cross through the exact same point it was crossing before.

However, there are more workers searching for a job. Remember our intuition in Section 8.1.2 of what means a situation of overheating and unemployment. We have to think what is the implication of the immigration on the wage dynamics. The economy was in equilibrium, which means that at the prevailing aggregate demand and wage in dollars people that are searching for a job is roughly the same as the vacancies offered. So, wages are not changing. In this environment, if the immigrants are actively searching for a job, then this extra pressure will lead to a decline in wages. If the wages are falling, that means that at the original demand and wage in dollars the economy is facing unemployment. The NN cannot cross this point (panel (b)).

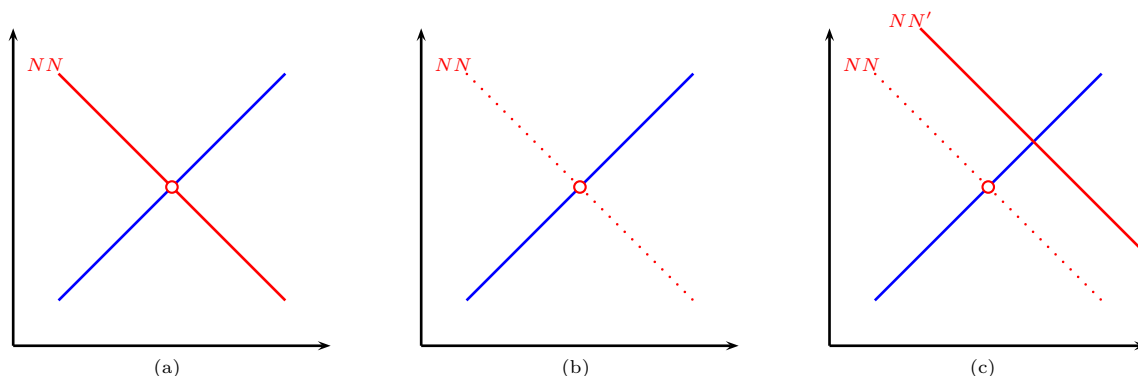


Figure 9.4: Shock to the NN

Where the NN moves? As we did in through out Section 9.1 there are three ways of understanding where the schedule moves. First, if at the original aggregate demand and wage in dollars the economy now is suffering from unemployment then it has to be the case that such point is below and to the left of the NN. So, the new NN needs to be located to the right of where the economy is: See panel (c) in Figure 9.4. Second, let us now move the demand to find where the new equilibrium is. At the original point the economy is suffering from unemployment. If the aggregate demand is increased, companies experience a higher demand for their purchases, which will lead them to try to hire more workers. This increase in the demand for workers compensates the increase in the supply of labor and the pressures on wages to decline are reduced. Therefore, there is a demand large enough where the pressures on wages disappear, wages in dollars are constant, and the labor market returns to equilibrium. This occurs at a larger demand (same wages) and therefore the new NN needs to cross to the right of the original point. Third, and finally, let us move wages to return to equilibrium. Assume that immediately when the immigrants come there is a decline in wages. This movement leads to a decline in the cost of workers, and therefore an increase in hiring. Therefore, there is a wage low enough, that for the same aggregate demand the economy returns to equilibrium. The NN needs to cross above the original equilibrium.

As we did in Section 9.1 let us study what is the implication on the equilibrium after the shock takes place. This is depicted in the animation in Figure 9.5. First, the shock moves the NN up, and then the economy adjusts to the new equilibrium.

The new equilibrium implies a lower wage in dollars and a higher demand. In other words, immigration lowers the wages of the workers but increases the total demand. Is the per-capita demand increasing? probably not. But because there are more workers, the total aggregate demand does.

This leads me to discuss population growth. In fact, population growth is exactly like immigration. In

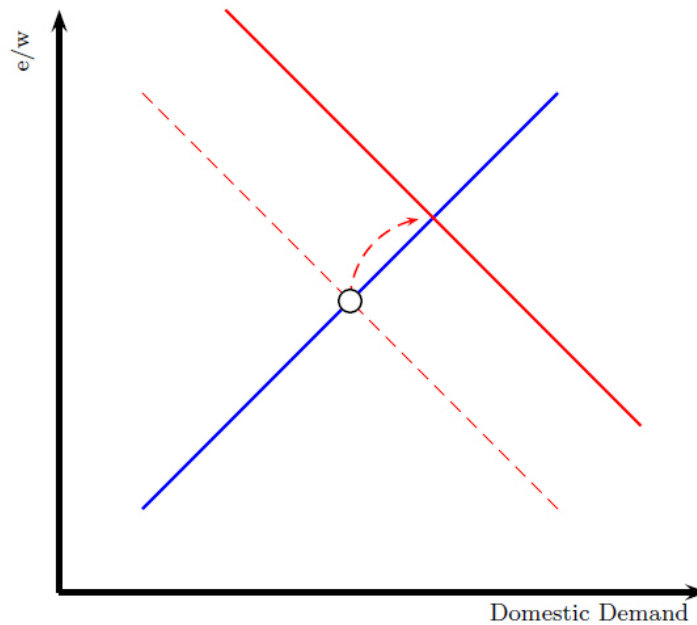


Figure 9.5: Shock to the NN: Animation.

the case of immigration the additional labor force comes from other countries, in the case of population growth the additional labor force comes from the young. In the end, the increase in population leads to an increase in the labor force which ultimately implies a lower real wage. In fact, quite possibly even though the aggregate demand increases, the per-capita demand decreases. So, population growth is impoverishing the country – lowering standards of living both in terms of income and consumption. For many years, this connection was misunderstood. For many years economists and politicians thought that population growth was a way to grow – and indeed the total demand does grow. However, it took hunger and dramatic political crises in the 20th century for this paradigm to be challenged. Nowadays, it is clear that population growth does more harm than good. We will come back to this point in the next chapter – the chapter on sustainability. The reason is that we will see that population growth is not only bad for economic outcomes, but also, political, social, and environmental ones.

9.2.2 Labor Markets

The next three discussions refer to policies and shocks that affect labor markets. We concentrate on labor market participation which also helps to understand issues of migration, on unemployment insurance, and on hiring and firing costs – which also allows us to think about all labor taxes. There are more shocks and policies that affect labor markets – unionization, incentives, etc. – that are not covered here. Labor markets is one of the most complex markets that economists study and it will be impossible to summarize all that research here. Let us concentrate on what I consider the most important ones.

9.2.2.1 Labor Market Participation

Changes in the labor market participation exhibit the exact same patterns as immigration and population growth. In general, if a group of the society decides to “stay home” this is equivalent to a reduction in the labor force, while if the group of the society decides to “join” the labor market, then the supply of labor increases. The “staying home” is like emigration, while the “joining” is immigration. This implies, of course, that wages will tend to go down.

I would like to highlight some differences between immigration, population growth, and labor market participation. The reason is that even though all three look identical in the BBNN – in terms of the schedules moving – they are inherently different.

For example, I believe it is good for the society (in general) if women that were staying home decide to join the labor market. Especially if this decision of joining the labor market is the outcome of them feeling more represented, treated equally, etc.

However, this decision implies a decline in average wages. It is the case that such decision might have a detrimental effect on wages for the whole, but from the welfare point of view, the incorporation of women into the labor market has other beneficial consequences that compensate the drop in wages, that are not entirely captured by the model. These benefits are not collected when the increase in the labor force is due to young men joining, nor when the men joining are foreigners. On the other hand, some countries benefit tremendously of immigration because they can bring individuals with high human capital – or Venezuelans with high entertainment value. Both will have an impact on the NN, but the higher human capital will also have an impact on the BB – displacing it to the right and increasing demand and wages with it. In the end, compensating some of the decline in wages that takes place because of the movement in the NN.

We are going to come back to shocks that are complex and have an impact on both schedules. Women participation in labor markets and high human capital immigration, are two of those examples in which the NN moves to the right, but the welfare and human capital gains move the BB to the right as well, and it is conceivable that the overall effect is unambiguously good – or at least on wages they are just ambiguous.

9.2.2.2 Unemployment Insurance

Some countries have very protective labor laws. There is an extensive literature in economics that studies how these labor market restrictions (protections) affect wages, unemployment, etc. This is a very extensive literature and pretending to summarize it in one section is a little bit too... pretentious. In this section I cover one of the most studied regulations in economics: unemployment insurance.

Unemployment insurance is the resources collected when an individual that was previously working, is suddenly let go. In general, most unemployment insurance offices require individuals to be actively searching for a job in order to be entitled to collect; the individuals always collect a fraction of the original wage; and most of the times, unemployment insurance has an expiration day.

Let us see an interesting example of how distortionary this can be.

A long, long time ago, in a faraway land called France, a crazy king (or ministry of finance) called “Jean Sui Bizarre” implemented the following (bizarre) unemployment insurance policy. Imagine a worker earning 100 a month working for seven years. First, in France working truly does not mean really working *all* the time. They get several weeks of vacation (like five) and about 150 national holidays. So, *working* is a very loose term. In any case, someone “attached-to-a-company-and-sometimes-showing-up-in-the-office-but-always-collecting-money” for seven years, if fired, he/she was entitled to 5 years unemployment insurance earning 70 percent of the original wage. By the way, when the person was working it had to pay taxes (more than 35 percent) while when unemployed it did not have to pay taxes. This law implies that after 7 years

you should go to your boss, slap the bastard, get fired and do not show to work and get a pay increase for 5 years! Would you ever try to keep your job? No, unless you are German! Of course to collect unemployment insurance you have to prove that you are searching for a job... would you search intensively to find and get a job? or would you intensively find a search where you can't get the job?

This is a completely unfair comparison because these numbers are before the massive labor reform they implemented. Nowadays things are much efficient. The salary collected? 65 percent! For how many years? 2! Yeah! As you can see the right wing freaks took over the government and stuck it to the people! From now on you will not make more money unemployed than working!

In Italy they used to have an unemployment insurance for recent graduates from universities. Imagine, an unemployment insurance for someone that has never being employed – Hence, it cannot be unemployed either. No wonder why (we) Italians are so happy.

Of course these laws were changed and today they are just slightly less bizarre. But still labor laws in Europe are extremely protective and lenient. We are going to study two of the most interesting aspects of labor markets. This subsection discusses unemployment insurance, and the next one discusses firing and hiring costs.

Remember the definition of the natural rate of unemployment. This is the rate at which wages do not tend to increase. This means that in a market in which there is some unemployment insurance, there are some individuals searching for a job, some others that are “pretending” to be searching (you have to prove that you are searching to collect unemployment insurance), and some firms are offering vacancies. In equilibrium, the job openings are such that those searching find jobs without a change in wages be required.

In this environment if unemployment insurance benefits are reduced, what is the implication on the NN? To analyze this shock we need to understand if at the original equilibrium (demand and wage in dollars) the shift in the labor law implies pressures to change wages. If the unemployment insurance is reduced, then individuals that were vacationing will start searching for a job more actively. Therefore, we can expect that at the original demand and wage in dollars there are going to be pressures for wages to decline. The original point, therefore, is no longer an equilibrium; it is a point where wages are falling, hence it is a point of unemployment, and it must be located below the NN.

This shock looks identical to an immigration shock, and indeed it can be thought as follows: a reduction in unemployment insurance benefits is equivalent to providing incentives to individuals that were out of the labor market (the ones that were pretending to be searching) to incorporate into the labor market.

9.2.2.3 Hiring and Firing Costs

Hiring and Firing costs are much more complicated to understand. Lets concentrate on one of them, given that their implications are identical. The reason why changes in hiring and firing costs are so difficult to understand is because in general their impact on the natural rate on unemployment is ambiguous.

Assume that to hire a worker a firm incurs in a cost (a fixed cost). What is the implication of this cost? Assume that the economy fluctuates (labor productivity is stochastic) and the firm is interested in hiring a worker. Because the existence of a fixed cost the firm might want to wait for the productivity to increase enough so the profits compensate the fixed cost. This waiting comes from the real option aspect of the hiring cost. This, in principle, looks as if this will lead to a decline in the vacancies and therefore the situation would be one of unemployment. However, the decline in the vacancies also has a counter part on the elimination of jobs. In the same way less vacancies are open the destruction of jobs is also slowed down. A job that is marginally not profitable makes no sense to be eliminated if productivity moves up the next instant. Therefore, it is also optimal to wait before destroying a job. Therefore, there is less creation of vacancies, and less destruction of jobs. What is the impact on unemployment? It depends on which effect

dominates.

There is one important impact on productivity, however. The presence of these types of labor cost implies that the efficiency is lower. Jobs are misallocated. So, this labor market policy, has a bigger impact on productivity than on the natural rate of unemployment. In the end, a reduction in hiring and firing costs can be thought mostly as a productivity increase. These policies and shocks have impact on several dimensions in the economy. This leads to next section's discussions.

9.3 Complex Shocks: *Combinations*

The previous section already discussed some shocks that move primarily one schedule but have the possibility of moving the other. In this section I would like to cover some shocks that are important and produce several movements in the BBNN. In fact, some of them move schedules and the economy at the same time. Of course, the way we will analyze each of them is by decomposing the implications for each – the economy (wages and demand), the external accounts, and the internal accounts (labor market).

9.3.1 Natural Disasters: Production and Lives

We talked about natural disasters before as only having an impact on production. Sometimes the impact on lives is small – for example a flooding will have a big impact on output and a small one on lives – such as the flooding in Thailand in October of 2011. However, clearly that assumption is an oversimplification. In general, these disasters will have an impact on output and also on labor markets. Death has the same impact as emigration in the BBNN. So, a natural disaster moves the BB and the NN to the left. Figure 9.6 depicts the shocks.

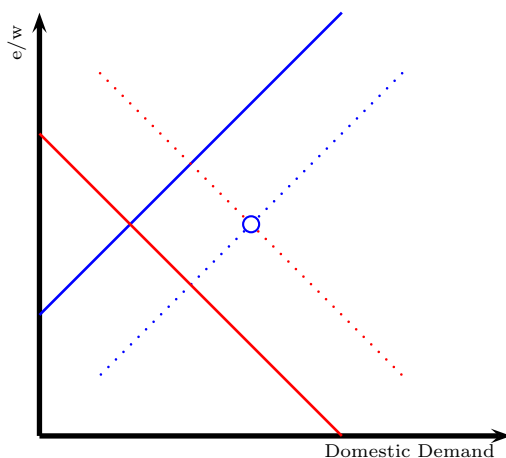


Figure 9.6: Natural Disaster Shock:
Impact on both BB and NN

Notice that unambiguously there is a large drop in the aggregate demand. However, the impact on wages depends on which shock dominates. In Figure 9.6 I have depicted the two to be equally important. If the

impact on production is larger than wages fall, but if the impact on lives is bigger wages increase. Notice that this increase in wages comes from the disappearance of workers.

Finally, wars have the exact same impact as a natural disaster. In the case of civil wars the toll on lives and emigration is extraordinarily large and in general dominates the negative production effect. So, it is fair to say that the NN moves more than the BB. Hence real wages actually go up – however, no one will ever argue that this is good.

9.3.2 Restrictions on International Transactions

The next two subsections discuss policies and shocks that are related to international transactions – from the basic types of restrictions on international trade – tariffs and protectionism arising from subsidies – to the complex dynamics behind capital inflows and capital controls – which we discuss in Chapter 10. Given the tools we have discussed so far, we concentrate on the first shock.

9.3.2.1 Trade Barriers and Protectionism

Trade barriers is one of the most used, and abused, policies in the world. Sectors are protected by raising the tariff of close substitutes that are imported, or sectors are subsidized either directly or indirectly by offering cheap gas and energy, etc.

Assume that a country reduces its trade barriers. Protection can be reduced by lowering its tariffs, by eliminating subsidies to the importing sector – such as the elimination of the subsidies in the cost of electricity, or corporate taxes, etc. – or by reducing the complexity and burden of administrative procedures. In fact, the last one is easily the most costly one of all. When the tariffs are reduced, the BB (both the TB_{BB} and the CA_{BB}) moves to the left. Let us go over the intuition. Assume an economy is on equilibrium and tariffs are lowered. This lowers the domestic price of imports leading to an increase in the demand of foreign goods. There is an increase in imports and leads to a current account deficit. So at the original wage in dollars, and at the original aggregate demand, the economy has a current account deficit. Therefore, the original point needs to be on the deficit region – meaning that the original equilibrium is below and to the right of CA'_{BB} . The movement in the CA_{BB} is depicted in Figure 9.7.

Therefore, a reduction in the tariff creates a deficit in the external accounts, and requires a depreciation of the real exchange rate (a drop in real wages or a depreciation of the nominal exchange rate) to compensate. Wages fall and the aggregate domestic demand needs to fall as well. Clearly, increasing tariffs produce the exact opposite impact; it tends to increase wages and demand. One immediate question is: why don't all countries increase their tariffs? The main reason is that trade protection leads to significant inefficiencies. Economists have highlighted several: Firms and even sectors that should not exist are protected and live for much longer than what is economically sensible. Capital is misallocated because instead of going to the vibrant new sector, goes to the old inefficient and protected sector. Labor does not invest in new skills to build the future, but keeps entrenched in the old rents and old jobs that mostly guarantee that the inefficient status quo will never change. If that is the case, then a reduction in the tariff moves the CA_{BB} to the left, but the elimination of the inefficiency moves the CA_{BB} back to the right (as shown by the green line in Figure 9.7). If the gains in productivity after the elimination of the tariffs are big enough, then the situation actually could improve with the elimination of the tariff.

A very important question, on the other hand, is why countries protect their sectors? One obvious answer is that it allows the countries to enjoy a higher wage, and a higher level of demand. That is certainly the case. But that can't be the reason, because this comes at the expenses of future productivity gains is what we have discussed is correct. The reason is that in the absence of perfect competition there are conditions in which trade protection can be beneficial from the productivity point of view. So its elimination moves the

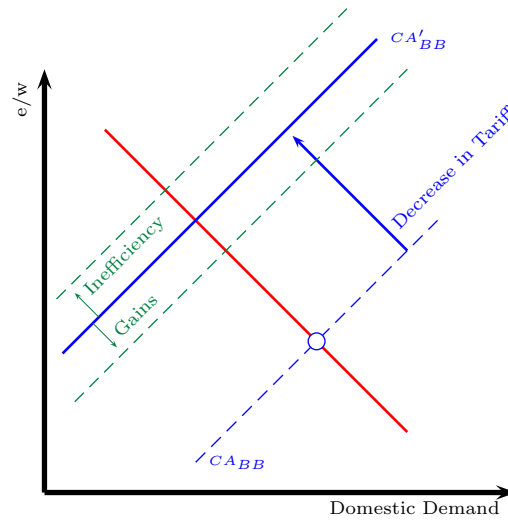


Figure 9.7: Trade Barriers and Protectionism

CA_{BB} twice to the left. Check the notes on comparative advantages for a lengthy discussion on strategic trade policy.⁵

There are, without a doubt, conditions when trade protection is an actually good for productivity, and eliminating the tariff creates an inefficiency. Those situations are not common, and most governments rarely use the policy correctly. However, we should be aware of these conditions to understand the final impact of trade barriers.

⁵See Krugman (1987) for an extremely good and intuitive discussion of this topic. Also see Chapter 14 for a discussion on the gains from trade and the points discussed by Krugman.

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Chapter 10

BBNN: Capital Flows

TO BE COMPLETED!!!

10.1 Fix Exchange Rates

10.2 Flexible Exchange Rates

10.3 OTHERS

10.3.0.1 International Capital Flows and Capital Controls

International Capital Flows is a very difficult shock to analyze. So, I will try to simplify it as much as possible. Assume that the shock comes from a change in preferences by foreigners. In other words, the risk perception of the country improves and foreigners are willing to invest in the country. How the capital enters?

The flows can enter through purchases of financial assets. In this case, citizens receive dollars that they use part to save abroad, and part to increase their consumption. So, if the BB reflects the current account, then the demand increases and the economy runs a current account deficit, and because this capital inflow plays no role in the economy, the schedules remain in the same place. However, this is not the way I like to reflect this shock. The reason is that the BB is actually the Balance of Payments and a shock to capital inflows indeed deteriorates the current account, but improves the balance of payments. I would like to make the point that in almost every circumstance I tend to think of the BB as purely the current account and in general the intuition goes through. But with capital inflows I need to deviate from that simple framework. The easiest way is thinking of capital inflows as an export. When a country exports a potato, foreigners pay in dollars; when it exports consulting services, foreigners pay in dollars; and when it exports pieces of paper that entitle the holder to a flow, foreigners pay in dollars. A financial instrument is just that: a piece of paper that entitles or binds the holder to certain flows. So, when foreigners change their perception of the countries and demand more financial assets, this has the exact same behavior as an increase in the demand of our countries exports. The BB moves to the right! In addition to the shift in the BB, the demand expands – the demand increase occurs for the exact same reason we discussed before.

In Figure 10.1 the shock is depicted. Notice that this leads to overheating and a surplus in the balance of

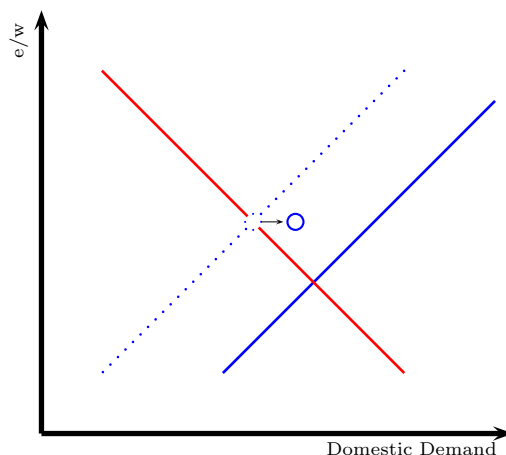


Figure 10.1: Capital Inflows Shock:
BB is the Balance of Payments

payments – but because the capital inflows are doing nothing to production, the economy really is running a current account deficit. The equilibrium implies a higher level of demand and real wages. The economy goes through this “boom” entirely financed by capital inflows. The increase in wages deteriorates the competitiveness of the economy – the real exchange rate is appreciating – and the manufacturing sector is being hurt. This is exactly the discussion we had regarding the dutch disease. At that time it was because of the price the country’s exports increases, here is because of the higher demand for financial assets.

If the capital inflows are permanent then this situation is not a bad outcome. However, if capital flows reverse, the “boom” was completely unnecessary. The manufacturing sector that was dismantled needs to be rebuilt. During 2009 and 2010 most emerging markets and several commodity producers were dealing with massive capital inflows. Europe and the US were on almost a recession and capital was searching for higher yields. They found them in Australia, Canada, NZ, Switzerland and the emerging markets (Brazil, China and South Africa in particular). The exchange rate in these countries had a massive appreciation. In fact, every country was trying to stop the flows from entering. This was so dramatic that even Switzerland intervened in exchange rate markets.

How to stop the capital inflows from entering? There are three possible policies: the most used is to control the expansion through monetary policy, some countries use capital controls, and very few use fiscal policy.

Most countries tight monetary policy to avoid the demand expansion. The idea is that when the capital inflow comes, the central bank increases the interest rate, keeping the demand intact and leaving the economy in original point. If wages do not change, the real exchange rate will remain at the same level, and therefore, the dutch disease does not take place. This is a simple intuition. However, in practice this is a horrible idea. It has taken central banks a long time to realize it – and some still use it. Foreign capital is searching for high yields. So, the use of monetary policy to control the demand actually creates a vicious cycle. Capital flows enter, they increase the local demand, the central bank responds by increasing interest rates, which leads to more capital inflows! In the language of system dynamics this is a reinforcing loop and what creates the positive feedback is the central banks actions. (see Figure 10.2)

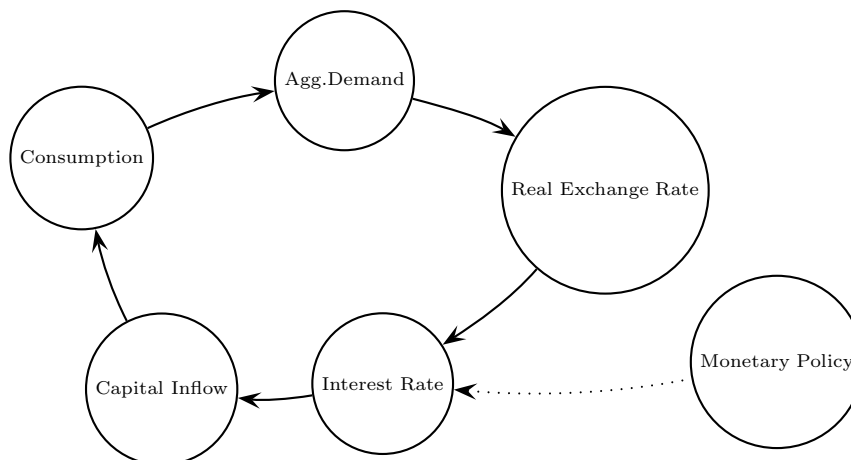


Figure 10.2: Capital Inflows and Monetary Policy

In addition to standard monetary policy (controlling interest rates and money supply) some countries use reserve requirements in the banking sector to control the expansion of credit. When the bank's reserve requirements are increased, banks are forced to hold cash and they cannot provide additional credit. China between March 2010 and June 2011 increased reserve requirements 5 times to curtail credit. By the way, reserve requirements increase interest rates in the exact same way a tightening standard monetary policy tools do.

Some countries appeal to capital controls. Capital controls are usually of two types. First, administrative controls that make it hard for foreigners to purchase assets in the country. China, for example, has stocks that are only for locals, and stocks of the same company to foreigners. Second, taxing foreign transactions. One of the best capital controls was the one used in Chile at the end of the 80's. They taxed short term flows. The bank that received the flow had to pay a tax on the transaction, but if the resources stayed in the country for more than a year then the tax was refunded. Capital controls have the exact opposite movement in the BB and the economy as the one depicted in Figure 10.1. Although capital controls might counteract the capital inflows shock, they introduce significant inefficiencies. For example, the allocation of capital is distorted – some sectors that should not exist are implicitly protected by this measure. Academics that have studied the efficacy and inefficiencies introduced by capital controls have found them to be relatively large. The best survey on this topic is Edwards (1999).¹

The last tool to control the negative impact of capital inflows is fiscal policy. This is by far the most effective one, and the least distortionary one. However, is the hardest to implement. In fact, I believe the only country that uses it effectively is Chile. They have an absolutely extraordinary procedure – unique in many respects.² The idea is to have a tight fiscal policy in response to the capital inflow. Exactly as what monetary policy is trying to achieve. There is a big difference, however. When fiscal policy becomes tighter, interest rates tend to fall – as opposed to increase. In the case of monetary policy, the tightening increases interest rates creating a reinforcing loop, but in the case of fiscal policy, the tightening *reduces* the interest rate creating a balancing force.

¹You can also see my paper with Sebastian Edwards on the exact same topic (Edwards and Rigobon (2009)).

²See Velasco (2011) for an excellent presentation highlighting the Chilean experience.

10.3.1 Currency Crises: BOP crises

In this section we discuss currency crises. There are several types of crisis, and combinations. This literature that started with two extraordinary seminal contributions: Salant and Henderson (1978) and Krugman (1979). The literature on balance of payments crisis studies how crises take place, why they occur, and what are the transmission mechanisms. The literature is extremely extensive and several books have been written about them. In this notes, we mostly concentrate on what are the implications of those crises on the equilibrium.³

Disclaimer: This part of the notes are not self-contained. This section assumes that the reader is familiar with central bank accounts. Also, they assume that the reader knows how central bank transactions affect the balance sheet. I have not written those notes yet, but I assume that if you are taking 15.014 you have taken 15.012 or 15.015 and you know this stuff. If these notes are using by someone worse looking than me, I hope you devote one class to explain your students about central bank accounting... yes, you can always torture the students with some accounting! In fact, it is worth only just to listen to them whine!

Summary: Krugman's model on balance of payment crises (BOP crises) has a very simple intuition. Assume that the central bank has a fixed exchange rate, certain pesos for dollars. Assume that the government runs a fiscal deficit that is financed through domestic credit in the central bank. This transaction implies that the debt of the government is rising, and it goes to the central bank in exchange for cash. So, in the balance sheet of the central bank, initially domestic credit to the public sector rises while the money supply rises. The cash that goes to the government is spent; and therefore transferred to consumers. Consumers find themselves with too much domestic currency and decide to convert it to foreign currency – in other words, consumers recompose their portfolio. They can do such transaction with the financial sector at the exchange rate promised by the central bank. In the end, consumers trade with banks, that ultimately trade with the central bank. The excess cash enters the central bank in exchange for international reserves. So, the ultimate impact of the financing of the government is that all the cash produced comes back to the central bank; and the debt is financed with international reserves. The reserves are coming down and the same speed at which debt rises. At some point in time consumers anticipate the central bank will not be able to keep its promise to exchange pesos for dollars at a fixed rate. This happens when the central bank does not have enough reserves to exchange for the excess pesos. In fact, it happens before that point – as was highlighted by Krugman.⁴

For the purpose of the discussion here the exact mechanism and timing is not that important. So, a balance of payments crisis in Krugman's model is just a fast devaluation. However, currency crisis are in general more costly that just a movement of the nominal exchange rate. Governments cannot continue financing their expenses – notice that they are the cause of the currency crisis to start with – and these cuts have an impact on the demand as much as they have an impact on the nominal exchange rate. They can also affect investment. So, the aggregate demand is likely to fall as well. Furthermore, the crisis might not only hurt the demand but also the supply side.⁵

In the end, what this means is that the show has at least three movements.

1. The economy moves up because the depreciation
2. The economy moves to the left because the drop in the domestic demand
3. The BB moves to the left because all the “inefficiencies” the crisis generates

In Figure 10.3 the situation is depicted. Noticed that I am showing three different possible equilibriums where the economy might end. This is because it is difficult to know which effect dominates. If the depreci-

³To understand currency and financial crisis see my class notes on crises [to be completed].

⁴This is a brilliant intuition that I hope you remember from the classes... check the notes

⁵There is a large literature studying these costs. Again, please see the classes on this matter

ation effect dominates then the economy moves to the overheating and surplus quadrant. If the productivity decline and the depreciation dominate then the economy after the depreciation will remain in with a deficit in the current account, but at least the depreciation improves the situation in the labor market. The worst possible situation is when the demand effect dominates, and the productivity effect is also very negative. Then the economy moves mostly to the left, causing unemployment and a very small improvement in the external accounts.

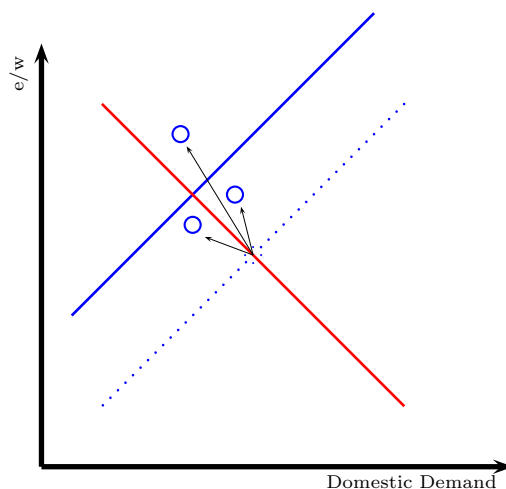


Figure 10.3: Balance of Payments Crisis

The situation in Europe in 2010-11 can be understood through the lenses of this simple framework. Let us see the situation in Greece and Spain. Just prior to joining the Euro and right afterwards, Greece and Spain were receiving transfers from the core of European countries. Greece way more than Spain. Also, they received a “confidence” injection because they were joining France and Germany! All this moved the BB to the right. Today we know this movement was unwarranted, but I do not think that many people knew about this.⁶

The movement of the BB to the right increases aggregate demand. There is an appreciation of the real exchange rate, a loss of competitiveness, and conceivably an unreasonably high level of tax revenues. Especially, consumption taxes. In fact, Spain used to have fiscal surplus just before 2008! This boom created a sense of invincibility that seems to be common to all crisis.

After reality is revealed to all, meaning there is a crisis in the US, aggregate demand drops in these countries, and the government responds with massive expenditures. Taxes plummet and expenditures balloon. There is a massive fiscal deficit that needs to be financed, but there is no central bank to lend. I mean, there

⁶Well, I knew. But not really. Just to give you an indication how irresponsible and crazy I used to be here you have the following story: When I was finishing the Ph.D. in the spring of 1997 obviously I was trying to find a job. One of the places I visited was the IMF. Actually I think I never had a chance to get an offer from them, but I was still trying to get a job. I gave a good seminar explaining my thesis – that implicitly criticized the IMF. In any case, because my paper was dealing about balance of payments crisis they asked what my opinion was about the Euro. I, who was trying to get a job, with a paper that criticized the same institution I was trying to convince to hire me, answered this question with an extraordinary level of maturity: “I think the Euro is a stupid idea. In fact, I’m willing to bet everyone in this room that before 15 years Europe will undergo through a currency crisis. If they don’t I’ll pay a lunch to everybody, but if they do, you have to call me and pay me my lunch”. Of course, as you can imagine, I was never invited to the second round... In any case, that is not the point. I had totally forgotten about my “bet” and on May 2010 when the fiscal problems started for Greece, I received 17 emails from individuals that were at that memorable seminar... And they invited me for a lunch!

is a central bank (the ECB) but that central bank is full of Germans, and Greeks are not allowed in without some escort. And I'm not talking about the good looking escorts Berlusconi tends to hang with. I'm talking about the really ugly looking ones. The fiscal deficit was financed through domestic banks, through creative financial innovation, and sometimes through lies. In the end, Greece, Ireland, Italy, Portugal, and Spain had massive contractions. They would have loved to experience a depreciation, but that never happened (in fact, because the US is in crisis actually the exchange rate moved in the opposite direction). The countries can only move to the left, and they have done in massive proportions.

It is not surprising, then, that there is so much talk about abandoning the Euro. This would allow the countries to depreciate and gain part of the lost competitiveness.

There is a lot more to what I have covered here. I will need at least three more chapters to cover all that. Currency, fiscal, and financial crises is a whole course by itself. Here, I wanted just to give a small taste of the complexity involved and also the usefulness of the BBNN to allow us to understand the issues involved.

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Chapter 11

BBNN: Social Peace

In this chapter I want to expand the standard framework to deal with political, social and environmental constraints. I start discussing political and social constraints in this chapter, and the environmental issues in the following one. I discuss the conflict that might arise between political and economic objectives. The framework allows us to understand when these conflicts arise, and what are the implications to the economy. Finally, a detailed discussion of political cycles, and crisis cycles is covered.

11.1 Social and Political Sustainability

In this section we add one more schedule to the BBNN. The purpose of that schedule is to highlight what is the standard of living at which there is social peace. In other words, at what level of demand and real wages do citizens start to complain.

Summarizing all possible social and political constraints with one schedule is a daunting exercise – not to mention quite insulting to the whole sociology and political science profession. But since when insulting others have ever stopped economists? However, before proceeding I want to reemphasize the issue that this framework is truly oversimplifying everything. It is oversimplifying the production side, the labor side, etc. And therefore, oversimplifying political constraints is just one more step. However, in doing so, the richness of the model’s implications is truly marvelous, and worth doing it.¹

11.1.1 Social Peace Line

As we have seen, the real exchange rate is associated with the inverse of the real wage. The idea is that a lower real wage makes an economy more competitive abroad (and this is good in some social circles.) However, greater competitiveness implies a lower wage in foreign currency to the workers and therefore a lower standard of living (and this does not sound so good in other social circles.) Also, standard’s of living are related to the public provision of goods and the level of the demand. So, a higher demand implies a higher standard of living – all other things equal. The way I want to understand the social peace lines is as the minimum standard of living acceptable by our citizens. Hence, define the social peace curve “SP” as the minimum standard of living below which we experience social problems.

¹So, to all my political scientists friends (Rick Locke for starters) I am going to summarize your whole science by one line – an horizontal line. International economics was summarized by two lines which makes economics twice as important as political science – but who is counting.

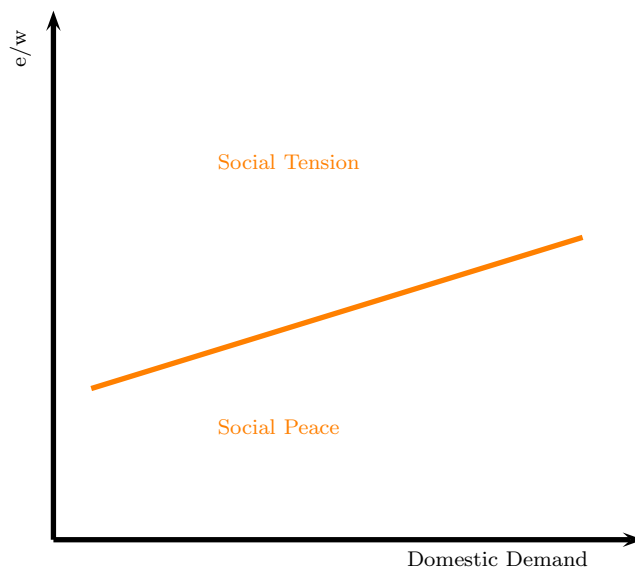


Figure 11.1: Social Peace Line:
Happiness from Wages and Public Provision of Goods

The SP line is upward sloping because we can substitute wage income by consumption or government expenditures. For instance, imagine the following tradeoff: improve healthcare and reduce wages. Clearly there is some degree at which most people would be willing to exchange one for the other. Another tradeoff: improve the quality of the goods consumed and reduce wages. Again, if we assume that better quality goods provide “happiness” then we would be willing to consume more of those goods in exchange of a lower level of income. Of course, there is a question about how to finance such exchange, but the social peace line is not about financing; that is what the BB is for. Here we are mostly interested in happiness.

In general, the way I think about this tradeoff, however, is that most people are willing to give-up a very small reduction of wages for a lot of demand. In other words, the SP line is quite flat. It does not have to be that way, but I think most people will require a very large improvement in public good’s provision to be willing to accept a reduction in wages. So, for the purpose of this discussion I am going to assume that the SP line is flat. In other words, I will assume that social conflict arises exclusively from the wages. This is one important simplification. It assumes that the social peace does not depend on unemployment or aggregate demand. Of course this is a huge simplification, but one that buys a lot of understanding. However, I want to discuss everyone of those issues. Those aspects and circumstances that are left out of the schedule will be considered “shifters” of the schedule. So, those are the “shocks” to the SP line. Therefore, even though the schedule only depends on wages when drawn in the BBNN map, changes in inequality, quality of democracy, legitimacy of the government, corruption, crime, freedom of speech, etc. are analyzed as shocks that move the schedule. We did the exact same thing to the other schedules.

In fact, a nice “good” shock for the SP lines, that I discuss bellow, is the presence of “social pacts” as means to move the SP line up. I will come back to the question of development and growth and you there one very important ingredient to the success of nations is the presence of a coordinating device; which is usually postulated in political circles as a social pact. The coordinating device is something that keeps the

citizens from rioting when wages are too low, when they are making significant sacrifices for the greater good of the country, etc.

In Figure 11.2 the SP line is presented. The idea is that there is a wage level above which citizens are “happy”. So, assume that at $(w/e)_{sp}$ citizens do not complain. That means that for all wages higher than this citizens do not complain either. Remember that in the vertical axis we depict the inverse of the wage in dollars. Therefore, higher wages mean lower e/w . The SP line is an horizontal line that crosses the vertical axis at the minimum wage at which there are no social or political conflicts. Below the schedule salaries are *higher* and therefore there is social peace; above the schedule the salaries are *smaller* and social tensions appear.

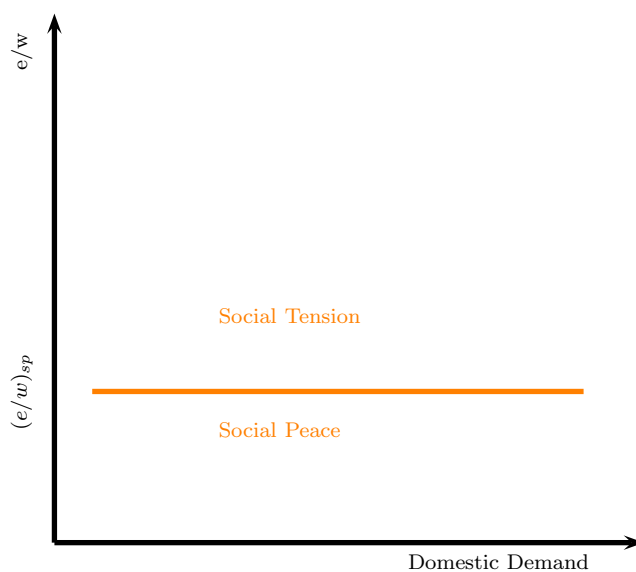


Figure 11.2: Social Peace Line

Of course the schedule moves with these shocks. So, if the quality of democracy improves and citizens experience an increase in the standard of living because of these changes, then they are willing to accept a lower wage without complaining – hence the SP moves up. Similarly, if there are improvements in civil rights, freedom of speech, etc. the idea is that these policies improve standards of living allowing workers to be happier at lower real wages. This is an incredible oversimplification of the problem, but one that is very useful. I come back to these points later.

11.1.2 Latin Triangle

The next step is to put the SP line within the framework we have derived so far. Where does the SP line crosses? Above, below, or through the equilibrium. In principle, nothing forces these curves to cross in the same point. The most interesting case is when the SP line is below the BBNN equilibrium.

The first time the SP line was introduced into the BBNN framework was when Rudi Dornbusch wrote the preface to Ricardo Hausmann book on structural adjustment. This is a book that develops in detail

the BBNN, and Rudi wanted to contribute to the book doing something as “original” to what Ricardo was doing. Well, this is extraordinarily original; and not only original but because it reduces the whole political and social science to one boring horizontal flat line, it is both insulting and accurate. Years later Rudi called it the Latin Triangle – to be more politically correct. Let’s see.

In Figure 11.3 we depicted the three schedules, and as can be seen, there are three equilibria. What is the situation in each equilibrium? In equilibrium A, the economy is on full employment, with the current account in equilibrium, but wages are too small and citizens are rioting. In equilibrium B, the wages are high enough for the citizens not to complain, the external accounts are in equilibrium, but the economy suffers from unemployment. Finally, in equilibrium C wages are high enough to achieve social piece, the economy is un full employment, but the country is running a current account deficit.

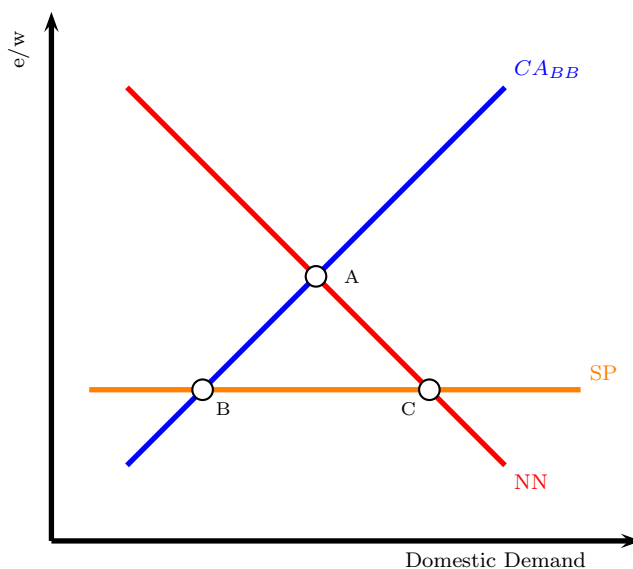


Figure 11.3: BBNN Latin Triangle

The question is, which one shall we choose? There is no simple answer. These three equilibria exactly highlight the conflict between social and economic objectives. Rudi did not called these equilibria A, B, and C. He called A the *IMF* equilibrium, B is *Europe’s* equilibrium, and C is *Populism*.

Each equilibrium has a problem. In the IMF, the economic equilibrium has been achieved, but socially and politically the situation is unsustainable. In equilibrium Europe, even though salaries are high, and standards of living are high, and the current account is in equilibrium, the labor market exhibits significant unemployment. So, wages are high, but for the few that are working. Finally, in the populist equilibrium, wages are high and unemployment is low, but this is at the expenses of a significant current account deficit. Borrowing is needed to keep the economy in this equilibrium, and borrowing forever is not sustainable. In Table 11.1 I have summarized the disequilibrium exhibited by each “equilibrium”.

So, again, which point would you choose? A? B? C? in the middle? Because none of these equilibria are sustainable in the long run, actually the economy cannot be on anyone forever. What happens in reality is that economies cycle among these equilibria.

	Equilibrium	Internal Accounts	External Accounts	Social Peace
A	IMF	✓	✓	Conflict
B	Europe	Unemployment	✓	✓
C	Populism	✓	Deficit	✓

Table 11.1: Characteristics of the Possible Equilibria

Assume the government is relatively conservative starts the economy in A (the IMF). Of course wages are low, but everybody is working and the current account is in equilibrium. The low standards of living slowly leads citizens to some complains. Later the complains increase enough to reach levels where public demonstrations and even riots occur. The complaining takes a toll on the political landscape. The government responds by increasing wages, but because the government is relatively conservative what they do is to move along the BB schedule from point A to point B. As the economy is moving from one to the other, unemployment starts to increase. However, at the beginning the unemployed are few and disorganized, so, politically speaking it is easy to increase wages to calm the masses and make the unemployed – and usually less skilled – pay the cost of the adjustment. However, when the economy reaches point B, the unemployment rate is large enough that workers get organized, and they start putting political pressure. Elections are approaching, and now is the time to make everybody happy. The government keeps salaries high and implements expansionary fiscal and monetary policy. Interest rates drop, taxes are cut, highways are built, and the party is all over the place. The incumbent government moves to C and makes all citizens happy. Of course, they are financing all the expansion through a tremendous current account deficit, and borrowing (usually internationally). Just after the elections, and after there are no resources in the national coffer, the country enters a crisis and needs to cut expenses, increase taxes, and devalue the exchange rate. The country is in a crisis and calls the IMF for help. Of course the IMF is willing to help, but the assessment of the situation reveals that the economy is not competitive, that wages are too high, and that the economy needs and adjustment program. The economy needs to return to conservativeness. And the cycle starts again.

If you do not see yourselves in this cycle, you are from a Nordic country; and you are too young; and you have never read the newspaper or visited any country south of Denmark in your life; and my advice to you is to get a passport and not be afraid to use it. For the rest of you that actually have paid attention to human kind, this cycle is remarkably and scarily realistic.

This cycle runs deep into the economy and comes entirely from the fact that economic objectives sometimes collide with political and social aspirations. It is that simple. Figure 11.4 depicts the cycle. The dotted arrows highlight slow movements, while the solid arrows reflect fast movements. This is not the outcome of stupidity. I know politicians are incompetent. Of course they are. they even need to take an exam to guarantee they are myopic and idiotic enough to run for office. But explaining the outcome of the world as the result of exclusively idiocy is a futile exercise. What is the policy advise? If in a country everybody is incompetent then what should we do? Is there any hope? Why do we even bother to study the situation? I actually think the world has hope, and that most politicians even though extraordinarily incompetent and corrupt are also well intentioned. Hence, I prefer to explain the history of thousands of failures as a problem of inconsistencies and incentives. If that is the case, then we can actually do something to improve the standards of living.

Because I love the implications of this model in this regard, I believe it is worth repeating the cycle not only concentrating on the economics but also on the how the society sees itself, or enjoys its standard of living. A country in the populist equilibrium is financing a standard of living with borrowing. Unemployment is at record low levels, salaries are high, the aggregate demand is at record levels, and the economy has been doing “well” for quite a while. The only bad indicator in the economy is that it is running a current account deficit. So, yes, the economy is not competitive, but if the future is as bright as the past, this is transitory. This false sense of invincibility, mostly driven by repeated previous successes, masks the underlying problems. This is a time of *excess optimism*. The future and present are perceived to be much better than what truly it is.

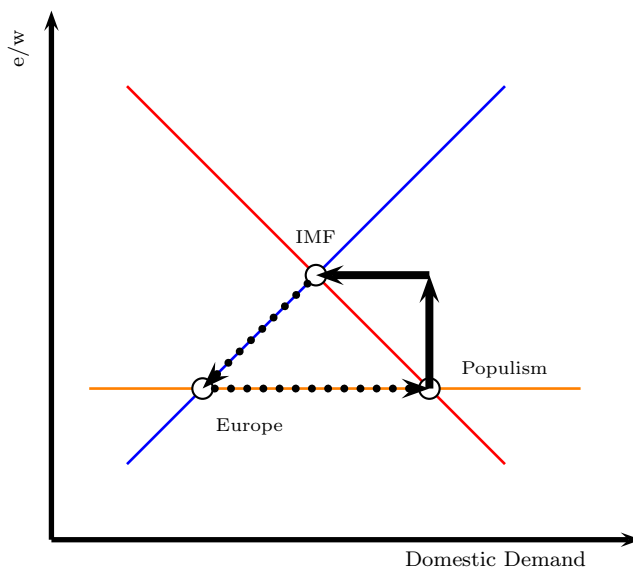


Figure 11.4: Cycle through the Latin Triangle

Elections take place and the incumbent government wins. Of course just after the elections the continuing borrowing takes a toll on the central bank balance sheet. Reserves have plummeted to dangerous levels and the country is attacked. How is that possible? How is it possible that a successful country with a minor weakness is being so unfairly treated? Financial speculation is blamed for the unwarranted attack, of course. The country has no option than to devalue, cut aggregate demand, and call international institutions to repair the damaged financial situation. In fact, in some cases the country defaults on its debt obligations, or at least needs to restructure them. The country is excluded from international financial markets, the interest rate increases to infinity, and a massive credit drought takes place. The government claims that the unfair adjustment is being imposed by these evil international financial institution, and that the country has “no other option”; it is almost as if the country has lost part of its sovereignty. At the IMF equilibrium, economic equilibrium is reestablished, but at expenses of a significant drop in standards of living. On the economic side, the government runs a tight fiscal ship. There is no fiscal deficit, nor an external deficit, and there is full employment. On the social side, however, real wages dropped significantly, the depreciation leads to domestic inflation, and slowly (but surely) the purchasing power of consumers declines. So, even though the economics is sound, the social conditions are not. Poverty increases, inequality deteriorates, and consumers start expressing their discontent privately and publicly. This is a time in which consumers are depressed. The bright future they thought they had has disappeared. The complains make it to the government which deals with the low standards of living by compensating workers with salary increases, or any other favor such as increases in social safety net, transfers, etc. The outcome is that the cost of the workers goes up, but because the country has been excluded from borrowing they cannot run a current account deficit. Hence, the only option is increase the wages by cutting aggregate demand. The expenses by the government are increasing, but at the same time taxes are increasing as well. Slowly the economy is moving to the european equilibrium. Unemployment starts to increase slowly but wages are higher. In other words, at the beginning everybody is employed but upset, and slowly the majority is getting happier (salaries are going up) and few are getting even more upset (the unemployed). Politically this is palatable. Initially the problem can

be addressed by raising unemployment insurance, and the safety net in place. In the mean time, because the country has been running relatively good economic policy, it reenters international financial markets. However, at some time the number of unemployed have increased so much that it is clear that the situation is unsustainable. The government needs to “recover its sovereignty”. In fact, political rhetoric becomes more populist and continuously drills a message where the impositions by foreigners cannot determine the fate of millions of citizens; or that it is unfair that a country that once was successful is at the mercy of heartless financial markets. In response expenses are increased, taxes are cut, interest rates are cut, and all is financed with small doses of borrowing at the beginning. The situation improves and governments wonder why not do more of the same; and they do. Slowly the economy moves toward the populist equilibrium. Every day borrowing more, increasing aggregate demand, and keeping wages high. Citizens feel better, and such is shown in the polls. Elections are nearby and there is no incentives to go back to orthodoxy. This is the time to concentrate on what is important: the welfare of our citizens, and their votes. And so, the cycle repeats itself. Rudi called this the Latin Triangle because in the history of Latin America this event and cycle occurs so many times, and it is so clearly the outcome of the inconsistencies between economic and political goals that is scary.²

Nice intuition for an extraordinarily oversimplified framework, isn't it?

11.1.2.1 What determines the Social Peace line?

It is clear that some societies are happier than other. What determines that level of happiness? or willingness of citizens to be patient with the government? or what determines the “political capital”, and how it deteriorates? There are whole professions and careers devoted to these questions, and I recommend you take one of those classes to understand how these social and political events develop. We all, after all, live in places surrounded by social and political conflict.

Expectations, however, play an important role. Expectations on what is the “usual” or “acceptable” standard of living determines the degree of disappointment. How to understand this? Try to answer the following question, why Venezuelans are so happy? If you have ever met a Venezuelan you will realize that we come from a really crappy country – conceivable the crappiest of them all. We have a president that makes every other president look like a genius. And if you ever feel ashamed about the actions of your political elite, you can always observe the clowns we have. Everything looks horrible! politics, firms, workers, roads, poverty, corruption, crime, etc. By the way, read below some of the crime statistics in Caracas. So, a valid question is, why on earth we are so happy? A simple story might help.

A day in Switzerland: You wake up! Then you go to the bathroom and take a shower. Eat some breakfast. Check the internet. Call a friend. Read the newspaper. Watch some TV for the news and the incorrect weather forecast. Take the car to the train or subway station. Then walk to your office. Work. Back home... more food, more TV, talk to kids and wife, help on the homework, and go to sleep. That is probably it.

A day in Venezuela: You wake up! Then you go to the bathroom and suddenly you realize that you have water. “OH MY GOD!!!!” you start yelling. “There is water!!! Run, take a shower!!!” Then you go to the kitchen. “YES!!! I have electricity! Lets cook some crap!” You received two of the four newspapers you wanted. All of them exclusively talk about Chavez disasters the last 24 hours. Then you watch TV and see Chavez talk about his valve movements – which is way better than the newspapers. Then there is a report that Chavez has died several months before but we still want to watch the reruns. Then “I can't believe it!!!”. Yes, you realize you have internet connection, and you finally have the chance to check that web page you have been meaning to visit for so long. With a tear in your eyes you can watch the weather report, and you gasp with excitement when you can finally see live the weather person making a wrong prediction. You go down the apartment and suddenly “This has to be my day, man!!! The car has not been

²See HBS Case 9-796-123 and HBS Case 9-700-061.

stolen” You drive for two hours for work while everybody is yelling at you. You witness two crashes and 4 muggings while standing in traffic. “*A Miracle!!!*” Yes, you miraculously find a parking spot three miles from the office. You run trying to hide the suitcase while jumping over people that are trying to sell you something, pickpocketing, or both. Then you get to the office. “*Yahoo!!! The elevator is working! I do not have to take the stairs up to the 17th floor*”. When the door opens, with trepidation, you pick to your right. You drop to your knees and you kiss the floor! “*The company has not been expropriated by Chavez, yet*”. 30 second later, “*Yes!!!*”, you still have a job, and an office. You kiss and hug everyone while you enter the office. “*I know that you might never see me again*”. You have a window, but for the first time in 25 years they have cleaned the glass and you realize that you can finally see the building in front of you. “*Yes! They exist!!!*”. When you walk back to your car, you escape three attempts of robbery, and two shootings. You go back to your home after a 3 and a half hour commute that was shorter than your typical 4 hours, and to your surprise, not only your wife is still there, but the house still is. Eat. Talk. Teach your kids how to cheat on the exam. Suddenly, you realize that you have a phone line, and you, voice-cracking, whisper to your wife: *This has to be the best day of my life! There are so many reasons to be happy!*; and she ignores and snores.

Our expectations in Venezuela are so low that we are continuously positively surprised. The poor swiss guy, because he takes everything for granted, simply has no ability to appreciate what we get as a gift every day – hence, that is why we hug and kiss everybody we meet after a 15 second conversation. That is why we are so “happy” and “laid back”. In fact, one person once emailed me a truth for us Venezuelans: “The Australians to us look as laid back as Austrians – and that is not a typo”.

We come back to some of this discussion – on a more serious note, of course – to try to determine what moves the SP curve. In general, it is much easier to understand what moves it as opposed to determine where it actually is.

11.1.2.2 Solutions to the Latin Triangle

How can we solve the problem of indeterminacy? How can we stop the cycle? Notice that in the cycle story the only policies implemented by the government are those that deal with the short run: fiscal expenditures and taxes, monetary policy, wages, and exchange rates. In fact, the cycle cannot be resolved with these tools. As I said in Chapter 8 these are short term tools. So, the answer is not there. Schedules need to be moved. Either the BB moves to the right (or down), the NN moves to the left (or down), or the SP moves up. That simple! We have to make the IMF equilibrium lie within the social peace region.

How can we move the NN to the left? Emigration! And indeed this happens. The country is just a disaster, with one crisis following the other, with one riot following the other, etc. The social situation is so bad that it causes emigration. This is obviously not the best solution, because generally the best human resources are the first ones to leave. But, from a theoretical point of view, this would shift the NN curve down, moving the equilibrium into the social peace area. Another possibility is to increase the social safety net so much that unemployment does not become a problem. Unemployment insurance is so good that the unemployed are not that unhappy. Can you remember the example of the French unemployment insurance in section 9.2.2? The increase in all safety net benefits moves the NN to the left – again, making the economic equilibrium consistent with social peace.

We can move the SP line up. We can either promise the world, and not deliver. Try to get a social pact, and then violate it. In other words, governments can lie to their citizens and teach them to get used to the misery of a lower standard of living. Of course this is the “bad” movement of the SP but I want to highlight it. It does happen that some governments hide the real situation and manipulate their citizens. It does happen that countries try to find a common enemy to distract the nation from the social tensions and increase their nationalistic sentiment: “so we all work and sacrifice for a greater nation”. Argentina in 1983 decided to invade the Malvinas (Faulkland for the British) just to pick a fight. It is the case that

Chavez in Venezuela, and Fidel in Cuba have blamed their domestic disastrous economy on the fact that a powerful enemy, the US, is hurting them. How much of the misery in Cuba is the embargo and how much is incompetence? I know incompetence is a huge part of the explanation, but 100 percent? No way! So, if we cannot disentangle the exact share, imagine someone with less resources than us! Can you see North Korea in the story?

There are other forms to move the SP, but a country that is in the middle of these political cycles looks for a shortcut. What are the incentives to allow for freedom of speech? Better civil right, like the right to protest and meet? Better representation of minorities? More transparency? Yeah right! Let us be more transparent so everyone can actually see how incompetent the government is. Any democratic and political improvement indeed makes the protests deeper and harder to manage. So, a government unwilling to think in the long run does not pursue any of these reforms. The SP moves up, but because individuals get used to misery, not because things truly improve.

Let me show you how flexible you guys are. Let me give you some statistics that are truly scary. Between 2009 and 2011 in Iraq about 3500 civilians have been killed every year. Yes, every year! Iraq has a population of 32 million. So, this is a massive proportion of deaths a year. Venezuela, during the same time, with a population of 25 million, has suffered of 13000 violent civilians deaths! Last time I checked Venezuela is not at war (yet). More importantly, a significant proportion of those are in Caracas. The situation in Venezuela is sad in several dimensions, and crime is just one of them.

I imagine you are shocked by the information. So, with this new info, assume I send you to Caracas and put you in a random hotel. Of course most of you do not speak Spanish, and if you do, you do not have my accent. So, sorry, they will know you are a *gringo*, or *musiu*, as we call you. The question is, do you dare leave your hotel room? Are you courageous enough to show your face out of the window? The first week you will be so scared that I can assure you, you will be bunkered in the room, and praying for the hotel to have room service. But after spending a month watching Venezuelan and Colombian soap operas, you will start figuring out what you can do to avoid crime. Where is it safe to go? Where not to go? How to dress? How to talk? etc. And then you will come out during the day. Looking less touristy, but scared like a turkey before Thanksgiving. Through time, you will learn Spanish, and you will start going out at night. Survival depends on the accent, so natural selection will get you the right one. You will find a job and start a “normal” life. In all this story, crime has not changed. You just adapted to it. Your SP just moved up. Sad but true. We get used to misery – either in the form of crime or on any other form of lower standards of living. In the end, politicians just need to abuse their societies enough, so they get accustomed to it.

Therefore, what is truly the solution? Move the BB to the right. The country needs to generate a productivity increase that guarantees that the labor market and the external equilibria occur in the region of social peace. In this case, we have an equilibrium that is obviously preferable. Clearly, we need a sufficiently big increase in productivity to do so. The economy needs to **grow**! This is the reason why in emerging markets they are so obsessed with growth.

If you were in China in the early 70's, after having gone through the cultural revolution and the hunger it created, do you think you might find yourself in the Latin Triangle. Will you allow protests? Democracy? Will you concentrate on growth? no, no, and yes. And so they did! In fact, today they are in much better shape to allow for more freedoms (civil, speech, opinions, etc.) than 40 years ago. A very interesting case is Singapore. The same situation as in China where at the beginning of its growth process the interventionism and lack of freedoms of the government were massive. Today it is a much freer economy and society. They have a long way to go, of course; but certainly they are in much better shape than in 1965.³

It is critical to understand that the problem cannot be solved with any macroeconomic cosmetics. For example, if we move to a flexible exchange rate, the sustainability of the equilibrium does not change. The real exchange rate is a relative price and therefore does not depend on the nominal regime (for instance,

³See HBS Case 9-794-019 and HBS Case 9-703-040.

the real equilibrium exchange rate would be the same under a fixed or a flexible exchange rate system). Monetary, fiscal, or exchange rate policies do have no impact on the real equilibrium exchange rate. Only structural measures can modify the situation. In other words, the IMF equilibrium is desirable from the point of view of economic equilibria, however it is not sustainable from the social point of view, regardless of the economic policy. When the society is not ready to sustain the IMF equilibrium, only by making structural changes (moving the BB, NN and SP curves) can reach a permanently sustainable equilibrium – to set the equilibrium real exchange rate within the social peace region.

In summary, when we include the social aspects in our model, we find an indeterminacy of the equilibrium, which makes the analysis of adjustment programs quite interesting. In this case, we are talking about social peace, but many other considerations could be included. Keep in mind that the world is a complex place and simple solutions are not always available. The inclusion of the social peace curve in this model gives a quite interesting slant to the discussion and the explanation of historical events. Moreover, it allows us to rationalize past decisions without having to blame ignorance or stupidity. This is fundamental for the study of economic history.

11.1.3 Shocks to the SP line

In this subsection I would like to enumerate and describe in detail all the ways the SP line moves.

11.1.3.1 Habit Formation: Getting used to Misery

As the example I described in the previous subsection where a person gets used to the level of crime, our standards of living evolve through time through different dimensions, and we get used to them. In economics this is called habit formation. The idea is that once a person has had a certain level of consumption, its level of satisfaction decreases for the same level of consumption. In other words, the person takes for granted that such level of consumption is “usual”. This is something that happens quite vividly in housing, entertainment, and food.

The interesting aspect of habit formation is that people get used to lower and higher levels of consumption, and standards of living. The discussion that follows is depicted in Figure 11.5.

Imagine that you keep a country below the SP line for a while. Assume that it is at point B. This means that the standards of living are higher than the minimum acceptable standard of living. The level of happiness of the people is related to the distance between the point and the SP line. If the economy is kept at that point for quite some time, then the consumers start to get used to such level of consumption and wages. In other words, for the same wage and same level of demand, the degree of happiness drops, i.e. they take such standard of living as granted and therefore they are a little bit less happy than before. Less happy means that the distance between the point and the schedule needs to reduce. This only happens if the schedule moves down. The SP schedule shifts from the SP to the SP' line as shown in Figure 11.5.

Similarly, if we keep the economy struggling with a standard of living smaller than the acceptable one – the point is above the SP. This is point A. Agents will get used to the lower standards of living and they will accept them at some point. They reduce their expectations, or hopes, or both. In the end, the degree of unhappiness needs to drop which means that the distance between the point and the schedule drops as well. This only happens if the schedule moves up. The SP schedule shifts from the SP to the SP'' line (see Figure 11.5).

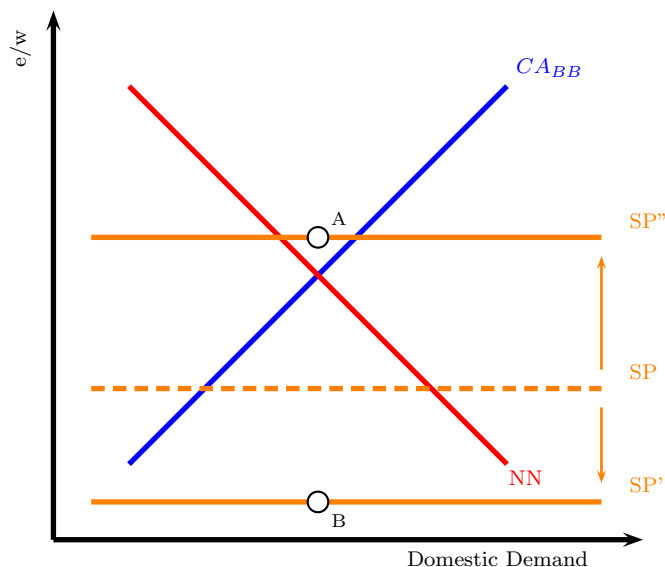


Figure 11.5: Habit Formation: “Getting used to”

11.1.3.2 Political and Social reforms

It is hard to write this section without expressing my own views. I know they are biased, and I apologize *ex ante*; but I cannot imagine doing this without revealing what I think. I truly believe that every nation, once developed, is going to need some form of freedom of speech, representations of minorities, civil rights, freedom of choice, women empowerment and active participation in economics and politics, and equality etc. In other words, I do believe that independently of the path followed by a country we will all end up in something similar, and similar to a democracy. I know not many agree with that, but that is o.k. with me. Having said that, the path of every nation and society is going to be clearly different. Some will start with autocratic and interventionist governments, others will start with immature and dysfunctional democracies.

Given my beliefs, there are some reforms that clearly improve the standards of living: Improve democracy, freedom of speech, improve representation of minorities, improve civil right, women empowerment, less discrimination (in labor markets and everywhere), lower corruption, less crime, lower income inequality, less poverty, etc. Any of these reforms should improve standards of living.

How does the SP move? As in the previous case, assume the economy is over equilibrium A before the reforms. At the given salary and standards of living, citizens are upset. If democracy is improved, for instance, then citizens will be less upset. In the end, if the improvements are large enough citizens will consider the standards of living given by the wage in equilibrium A as acceptable. This situation is depicted in Figure 11.6.

Again, going back to getting used to misery. I am always baffled by the tremendous degree of adaptation we have. I react very badly to corruption today. I remember, however, how used to that I was 30 years ago in Venezuela. In other words, there might be something incredibly costly in the society that we get used to it. It causes inefficiencies but we do not complain about it.

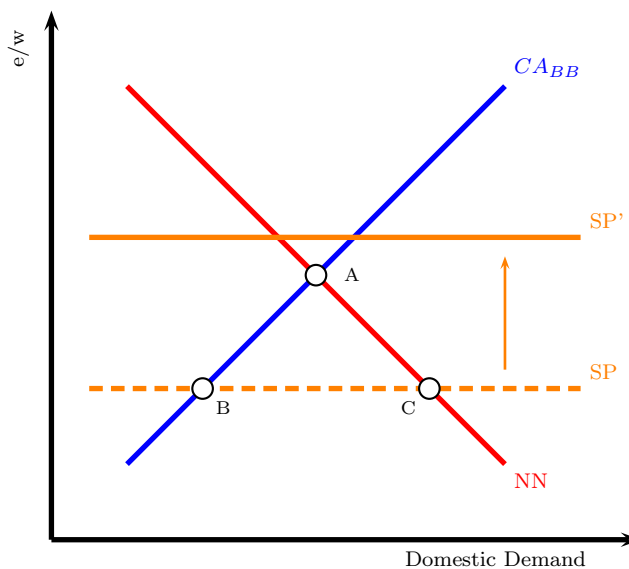


Figure 11.6: Improvements in SP

The most striking experience in this regard, that I know of course, is with my brother. I am going to substitute Bolivars for Dollars so it make sense to you, but the amount I discuss are roughly what was involved in the transaction. This is 30 years ago, when things were much better in Venezuela. Even that long time ago, if you were driving in the middle of the night you could not stop on a stop-sign or a light. Red meant move slowly, and green meant move even more slowly. My brother, following this strategy, just runs over a red light. A policeman stops him. This is roughly the conversation....

- Policeman: “You ran over the read light”.
- Brother: “Yes, just give me the ticket”
- Policeman: “But you are not going to pay the ticket”
- Brother: “Pay? of course not, just give me the ticket”
- Policeman: “But if you want we can solve this thing here”
- Brother: “I have nothing to resolve”
- Policeman: “Well, maybe this will affect you”
- Brother: “But I have no money, only 20 dollars”
- Policeman: “20 will do it”
- Brother: “But I need 10 of those. I’ll give you five”

And the conversation moved on from that until they settled the bribe at about 7 dollars. Bargaining a bribe is perhaps the best reflection that no one cares about it. It is just a tax or a normal transaction that needs to be performed. By the way, this happens in a lot of countries, it is just that bargaining on the bribe in a traffic violation is just beyond pathetic. Bargaining on 10 or 12 percent commission on a construction of a highway is understandable, but this?

I have found many funny cartoon related to crime in governments. This is one of the best I have encountered.



Figure 11.7: Organized Crime

Cartoon © unknown. All rights reserved. This content is excluded from our Creative Commons license. For more information, see <https://ocw.mit.edu/help/faq-fair-use/>.

Reductions in corruption produce massive welfare gains, especially when the environment has accepted corruption as an everyday tax. So, in practice, it is equivalent to a tax cut – that conveys both a sense of fairness and increases aggregate demand.

11.1.3.3 Coordinating Device

What is a coordinating device?

11.1.4 Europe 2011

Europe's sovereign debt situation since 2010 has been a complete mess (just for the record, I'm writing this section in January of 2012).

I would like to look at their experience from the BB-NN-SP point of view. The story is depicted in Figure 11.8.

Assume the periphery countries in Europe (Ireland, Portugal, Spain, Italy, and Greece) start from equilibrium (panel (a)). At this point economic and political equilibrium is feasible. This is of course a simplifying assumption but makes the point. The idea is to assume that these economies start from a situation in which their inconsistencies and internal conflicts are relatively small. When these countries joined the Euro, great expectations were formed; expectations of future growth, and hopes of a more prosperous economy. For consumers and government, they are expecting the BB to move to the right. It has not moved yet, but they

believe it will. If the future is so good, the economy can start spending the money, increasing the salaries, and already enjoy the brighter future. Why not? We do the same! When you guys get a job offer, do you have a party? You do not have the party because you got the money today. You have the party because you know you will have the money for sure in the future. These countries thought so. They truly believe the future was going to be much better and starting enjoying today.

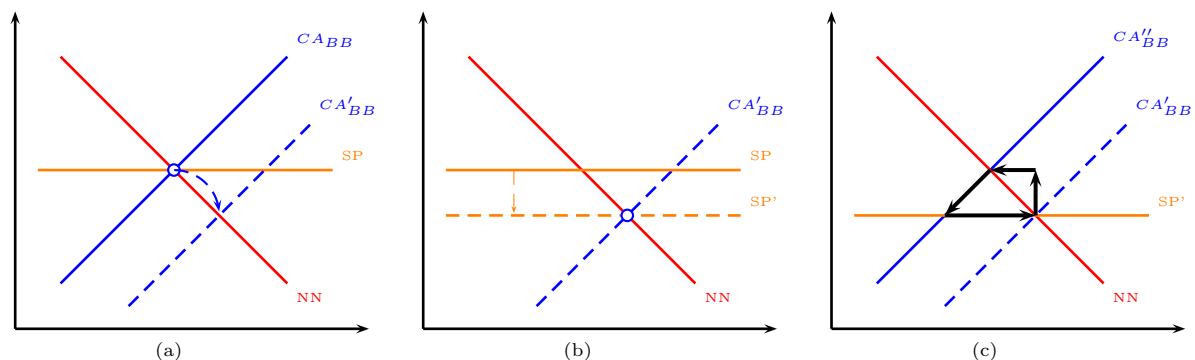


Figure 11.8: Europe 2011's Sovereign Debt

The economy places itself in the equilibrium shown in panel (b). They are acting as if the BB is in BB' . Therefore, the country is running a current account deficit; wages are too high; the economy is not competitive; and the aggregate demand is very large. This is an equilibrium driven by *excessive optimism*. In fact, fiscal accounts look incredibly good. Most taxes are associated to aggregate demand and wages. All personal and payroll taxes are indexed to wages, corporate taxes (profits) will go up when aggregate demand is high, and more importantly, VAT taxes are directly related to consumption. In the excessively optimistic equilibrium wages are too high, and aggregate demand is too high. Hence, fiscal revenues are fictitiously high. The fiscal accounts look in great shape in the medium run. From the social point of view, in the same way citizens get used to misery, they also get used to happiness. The SP line starts to move down slowly. Citizens are used to the higher standards of living, and now they expect them to be permanent.

After several years in the excessive optimism equilibrium, suddenly an event makes the countries realize that the “brighter future” is not that brilliant. Most of the times this is the outcome of a large current account deficit that needs to be corrected. When that happens the economy shifts to panel (c). In this case, the original equilibrium is not consistent with social aspirations, and therefore, the economy enters the Latin Triangle cycle. In the case of Europe, they can't devalue the currency, but they have been decreasing nominal wages. But the reduction of the real wage, leads to riots, and complains. We are at that stage right now.

What is the solution for Europe? Well, one is a prolonged recession and getting used to misery. The idea is to return to the levels of expenditure they had before, and relearn to live with less. That is not always an easy transition, but this is the one that the ECB, Germany and France would like to pursue. That there is a real depreciation through reduction of wages, and that the periphery countries learn to live with a lower level of consumption. Another solution is that they produce the growth they were expecting to generate. This requires, as we have seen, dramatic reforms: to help[firms invest and restructure, to change labor markets, to change the safety net, etc. Growth is the cure for all these inconsistencies; but growth requires policies that are politically costly. Portugal is doing some, Greece is doing none, and Italy is just having fun.

11.1.5 Why is the US sustainable? Institutions for solidarity.

11.1.5.1 Labor Mobility

11.1.5.2 Fiscal Cross-Insurance

11.1.5.3 Fiscal Cross-Subsidy

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Chapter 12

BBNN: Sustainability

In this chapter I introduce environmental restrictions to the same framework. As in the case of political constraints, the challenge of reconciling different and conceivably inconsistent objectives is discussed: where I go over integral solutions to the problems of both the Latin Triangle and the Kyoto Triangle.

12.1 Environmental Sustainability

It is time now to turn our attention to the use of the resources – or the the environmental aspects of the BBNN. As we have been doing all along, we are going to oversimplify the problem, not with the intention of insulting, but to develop a workable framework that will allow us to construct a view of the world.

The section starts by developing the environmental restriction schedule – what is called ER. Then it discusses again the indeterminacy of equilibria. We discuss the problems of each. In this case there is no political cycles as the ones that arise in the Latin Triangle. The reason is that the environment moves much slower than social events. This is in some dimensions making the tensions between the environment and everything else more dangerous. If the environment were deteriorating fast, we probably would have taken corrective actions already. So, in some aspects, the fact that the indeterminacy does not create cycles implies that the economics and the politics is what dominates the choices.

In the end we discuss solutions. We discuss mainly three solutions – one that is based entirely in choosing the appropriate equilibrium; one that is based on technological improvements; and one that is based on population.

12.1.1 Environment Schedule

Understanding and summarizing the impact on the environment is an extraordinarily difficult task. However, we are going to oversimplify the problem by assigning most of the environmental issues to excessive demand – either too much individual consumption, or too much population. In fact, this is not terribly incorrect. Most researchers indeed look at the problem of excessive consumption of natural resources (renewables or not), excessive production and pollution, congestion, and many others, as the outcome of a excessive boom in consumption and population.¹

¹If you are interested you need to see (and take) John Sterman's class on sustainability (or at least take his first class) and you will realize how large the negative impact of population has been on emissions, and consumption.

We assume that there exists a level of aggregate demand at which the impact on the environment is zero. In other words, this is the level of demand at which the environment is sustainable. One interesting aspect of what we are doing is to assume that the sustainability issue does not depend on exchange rates, nor wages – which is a reasonable assumption. This implies that the ER schedule is vertical, as depicted in Figure 12.1. To the right of the ER the environment suffers, and the more to the right, the more it suffers; while to the left of the ER the environment is protected and consumption is sustainable.

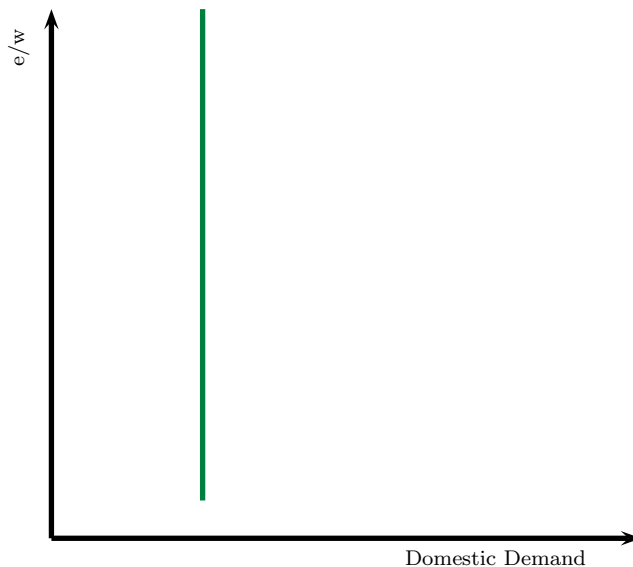


Figure 12.1: ER Schedule

How the different views of the problem of the environment are reflected – or can be summarized – within this framework?

Well, hardcore *I-Do-Not-Care-About-Global-Crap* tea party fans will draw the ER line to the extreme right. They might put the ER so much to the right that all possible equilibria are within the “sustainable environment” region. On the other hand, the *The-World-Is-Going-To-End-Tree-Huggers* will draw the ER all the way to the left – implying that there is no possible equilibrium consistent with the environment. I believe reality is between these two extremes and I will draw the ER relative to the other equilibria mostly reflecting my own views. In fact, even if we agree that the world is truly in the middle of these two extremes, how big the damage has been is also a source of disagreement.

Actually, the evidence is so mixed on the speed at which the world is deteriorating that we cannot settle this dispute by looking at real wages, or the current account, or riots in the streets. Like what we have done for the other variables. In fact, the day the environment “riots”, we are already too late to find a solution, and the damage is possibly irreversible.

So, in this notes I will draw ER where I think it makes sense, and I hope to have a discussion in class to try to summarize all possible views – or at least, I to try to dismiss your incorrect views. I believe that the level of consumption implied by equilibrium in the current account and in the labor markets is already too high to be consistent with a sustainable environment. In other words, my view – and again this is personal and with little evidence behind it – is that the IMF equilibrium is already to the right of the ER for most

countries.

Having said all this, I am sure we will agree on one thing for sure: if everything remains the same - same population, same technology, no shocks, then an increase in the demand increases the negative impact in the environment. This direction of the deterioration is unambiguous; and therefore, independently of where the ER is, moving the economy to the right is worse for the environment, and moving to the left is better.

12.1.2 Kyoto's Triangle

In Figure 12.2 I have depicted the ER together with the BB-NN-SP framework we have developed so far. I have depicted it in such a way that there are only four equilibria.²

The way I have depicted the ER adds one more equilibrium to the ones we have discussed so far. Consistent with my views, I have depicted the ER – crossing through the European equilibrium – implying that the IMF and the populist equilibria are at the right of the ER. This means that the IMF equilibrium is one in which the level of consumption is too high from the environmental point of view – and the populist one is even higher.

Throughout all our discussion of the ER the distance between the ER and where the economy is placed is a measure of the “detriment” exerted to the environment. So, how far to the right the economy is plays an important role in our discussion. This is why the placement of the ER is not trivial at all.

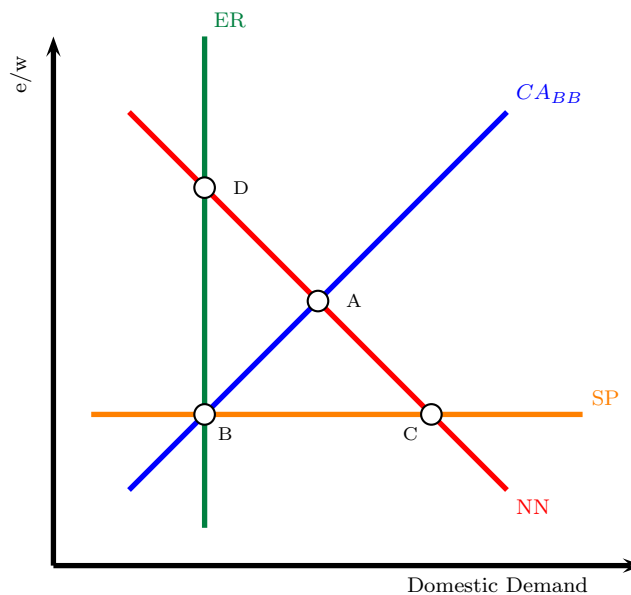


Figure 12.2: BBNN Sustainability

What are the characteristics of each equilibrium? In Table 12.1 we summarize the characteristics. In words, at the IMF equilibrium (A), the economy is in internal and external balance, but it exhibits social

²If I would have moved it slightly to the left or right, we would have five equilibria, but to be honest, these four are the interesting ones. When you have the five equilibria two of them are equivalent in terms of their characteristics – i.e. in terms of their disequilibria

tensions and the demand implies some deterioration of the environment – which I denote simply as polluting. In other words, this is the purely economic equilibrium or financial equilibrium in which the economy is in equilibrium, but socially, politically and environmentally it is not. So, even though there is full employment and there is no current account deficits the economy is not sustainable.

In equilibrium B, or the European equilibrium, the country has equilibrium in the external accounts, it has a relatively high standard of living – given the wage in dollars – and the demand is low enough that the impact in the environment is null. The only problem the country has is the relatively large level of unemployment. So, even though the economy is sustainable from the social and environmental point of view, labor markets are in significant disarray. This is sustainable for a while, but the social safety net required to keep the unemployed content is a large burden for the whole economy.

In the populists equilibrium (C) the political and social equilibrium is satisfied. Salaries are high and employment is at the natural rate. So, in this regard people are very happy! However, the country is running a current account deficit – which requires the country borrowing from foreigners or equivalently running down their savings. In addition, the demand is so high that the environmental impact is the worse from all the possible equilibriums. This is clearly an unsustainable situation. In general, however, the escape valve is the external accounts. So, in most cases is the shutting down of foreign lending what forces the economy to adjust – not the environmental impact.

Finally, equilibrium D is very similar to the European equilibrium. The aggregate demand is low enough that the environmental impact is null. However, instead of making the workers suffer from unemployment, in this equilibrium wages are much lower than in equilibrium. This is a country that because their wages are depressed, the country is running a current account surplus. I tend to call this equilibrium the Kyoto equilibrium, or the Japanese equilibrium. Importantly, saying that the wages in Japan are depressed does not mean that wages in Japan are lower than their counterpart in Cambodia. Wages in Japan are depressed relative to the wages in the IMF equilibrium. In other words, wages are lower than those that would be required to achieve current account equilibrium. Because the wages are small, then the economy runs a current account surplus. This is also an unsustainable situation. First, there is tension in the political system, and more importantly, not all countries in the world can run surpluses – by definition some have to perform the opposite transaction.

	Equilibrium	Labor Market	Current Account	Social Peace	Environment
A	IMF	✓	✓	Conflict	Pollution
B	Europe	Unemployment	✓	✓	✓
C	Populism	✓	Deficit	✓	High Pollution
D	Kyoto	✓	Surplus	Conflict	✓

Table 12.1: Characteristics of the Possible Equilibria in the BB-NN-SP-ER

It should be clear that all equilibriums are unsustainable. However, it should also be clear that countries circle around the Latin Triangle as opposed to experiencing environmental driven policy cycles. We have already discussed how to solve the Latin Triangle, the natural question is then to ask how to solve the Kyoto's Triangle.

12.1.3 Solving Kyoto's Triangle

What moves the ER curve? The shocks that move the ER are very limited. Clearly productivity improvements that consume less resources (and allows to produce the same) are moving the ER to the right. We discuss this in detail in the next section, so here I just state their possibility. The reason is because changes in productivity not only move the ER but also the BB, and hence they need to be studied together.

12.1.3.1 Shift in Consumption Preferences

Except for technological improvements, it seems that moving the ER to the right is a difficult task. There are however, other shocks that can achieve this. The way to think through this is to try to understand how can we improve the standards of living without consuming more. If such arrangement exists, then consumers would be willing to engage in those.

For example, an important tool to reduce the environmental impact of consumption is to move away from private labels and cheap products, to branded goods. This is indeed an idea that was presented to me by an MBA student in the middle of a class — yes, one of you actually had a good idea. We know this is a rare event so I will keep confidential the name of the culprit. And NO, it was not this year that I got the comment. It was ages ago! You guys have actually not produced a single good comment so far and we are close to page 200 on the notes. So, do not even try I have given up.

Let us return to the shift from fakes and no labels to branded products. It is well known that people like brands. To my daughter (the little one), buying a jean in Costco does not have the same appeal that buying it in Abercrombie. In fact, I can't see the difference, hence all my jeans are from Costco or Walmart, but her jeans (or her ONLY two jeans) are from Abercrombie, and Hollister. Branded products generate satisfaction for some consumers. They are more expensive, but people are willing to purchase them, because of the additional status they provide.

Think about the environmental impact of this transaction. The jeans from Hollister have roughly the same amount of cotton than the ones from Costco; they required roughly the same amount of energy to be manufactured; but they are five times more costly; and people are happier paying more for them and wearing them! So, for the same income or the same expenditure on jeans the consumer that buys branded products purchases less jeans for the same amount of money. Which implies that such consumer actually spends the same amount of money in way less cotton!

The value added in the branded product is in the design, in the idea, and its reputation; and from the environmental point of view designs and ideas have very little negative impact. They consume less energy, less cotton, less resources, and surprisingly, they generate more utility to the consumer than the Costco jeans.

Of course an immediate question is what do we do with the poor? What if a person cannot afford a branded jean? I have no problem with making affordable jeans available to the world, but it is important to remember that such action has an environmental cost. If the tradeoff is understood we can have a conversation. I actually think that because we have no idea how to solve the problem of poverty what we tend to do is to provide excess goods and services as if the problem of poverty is all on the lack of consumption and income. I think we need to think harder. This attitude – although good – will certainly have a very negative impact on the environment. I come back to this point later when I discuss development macroeconomics.

Figure 12.3 shows the impact of changes in consumption patterns. In principle, consumers are consuming the exact same amount of money – they are just spending it differently. So, because the environmental impact of the same aggregate demand is smaller, then the shift in consumption is equivalent to displacing the ER to the right.

In the end, if the movement is big enough, equilibrium A becomes consistent with environmental restrictions. The assumption is that the shift in consumption from one type of good to the other is painless from the aggregate demand point of view. This is not the case when taxes need to be included, or when markets need to be created, with the objective of internalizing an externality. This is discussed in subsection 12.1.3.2

Finally, it is important to remember that this movement is not correcting the Latin Triangle problem, and actions that lead to solve those issues might end up exacerbating the environmental constraints. We

come to these issues below in subsection 12.1.3.3.

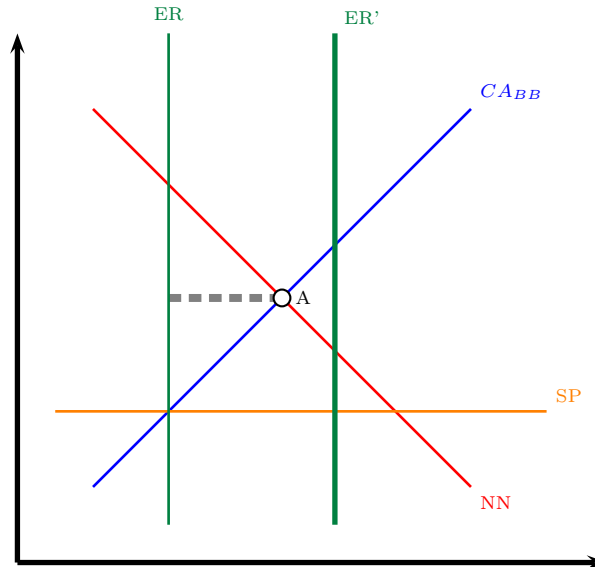


Figure 12.3: BBNN Sustainability and Consumption Shifts

12.1.3.2 Taxes to Shift Consumption and Production Preferences

Unfortunately, there are not a lot of examples in which consumers voluntarily would shift their consumption in favor of those items that are more environmentally friendly. In fact, the previous example is one in which my daughter has the right preferences but i'm too cheap to do the shift. The government can certainly help.

For example, another important example of how shifts in the demand can improve the environment is the consumption of proteins. A consumer can eat a big, delicious, juicy steak, or chew on two pounds of horrible flavorless beans. Certainly consuming proteins from beans has a much smaller impact on the environment. In this particular case cows are the second biggest producer of methane – a bad greenhouse gas. However, it is not clear that eating beans is much better than a steak. And in this particular case, it is harder to change the preferences of consumers.

A solution, a very good solution indeed, is to tax meat. When consumers do not want to shift their preferences the environmentally damaging goods can be taxed. In fact, the best example is taxing gasoline. Studies have shown that to repair the environmental damage of one gallon of gasoline requires about 10 to 12 dollars. So, doesn't it make sense to put this as the tax? And not only change consumption patterns but also collect the resources required to repair the damage?

Sometimes the taxes can be substituted by a market – a market that internalizes the externalities of pollution and in the pricing system the “correct” tax is levied.³

What is the impact of a tax or a creation of a market in the BBNN? Figure 12.4 depicts the typical

³See HBS UV2543-PDF-ENG, HBS 9-209-064 and HBS 9-708-026.

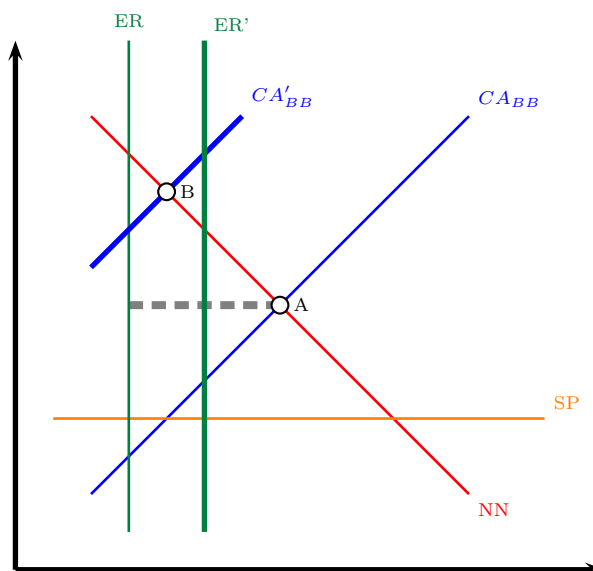


Figure 12.4: BBNN Sustainability and Tax Changes

impact. This is a complex shock in the sense that moves two schedules, the BB and the ER.

The taxes shift consumption or production away from the polluting activity and toward the non polluting ones. This produces a reduction in the demand, and because we are taxing some forms of production they produce a decline in competitiveness.

[to be completed]

12.1.3.3 Productivity Improvements

As we discussed earlier, there are technological improvements that would increase production without increasing the use of resources. In fact, this is perhaps the alternative that receives most of the attention in the public discussion. However, technological improvements have two implications – yes, they improve the ER and therefore a country could sustain a larger demand with a smaller impact on the environment – but also the technological improvement increases productivity and displaces the BB to the right. Which schedule shifts the most? the BB or the ER? This is indeed a crucial question.

In Figure 12.5 I have depicted three possibilities. In panel (a), I have depicted a technological improvement that has a large impact on production, but a small one on the environment. Let me discuss this case in detail. The original equilibrium is denoted by the schedules BB, NN, SP, and ER. As can be seen, the IMF equilibrium in this case is one in which there is a negative impact in the environment. The negative impact is highlighted by the horizontal gray dashed line. When the technological improvement takes place, the BB moves to the BB', while the ER moves to ER'. In this new set of schedules, the IMF equilibrium implies a much higher standard of living (good), a higher demand (good in principle), social peace (good, because the economy is below the SP line), but the environmental impact, measured by the length of the dashed line, has increased.

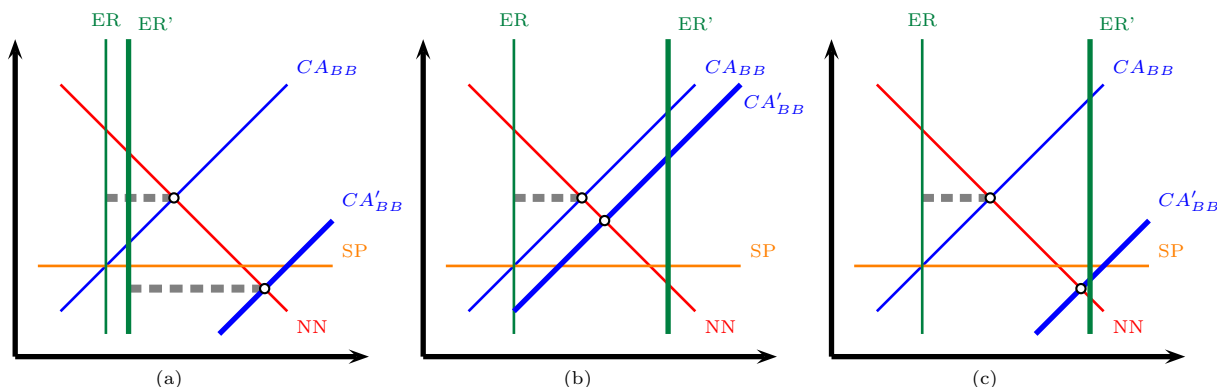


Figure 12.5: BBNN Sustainability and Productivity Improvements

This is a very bad productivity increase from the environmental point of view. Having said that, this is a very good improvement from the standard of living and political points of view. In fact, imagine you are the president of China, with social tensions arising, and your ministry of development proposes a policy that has the impact just described on your country. Wouldn't you take it? Imagine this is China in 1970? Coming from hunger and the cultural revolution! Would you accept it? Of course you would, and even though this is a bad idea from the long run aspect of the world, it solves real and important unsustainable considerations to the country immediately.

What is worse from this type of productivity increases is that in the short run the environmental impact is reduced. This is particularly true when the economy remains in the initial equilibrium. In other words, it is common that a new investment for the same level of production has a smaller footprint. However, because the new productivity makes the country richer, the economy moves from the initial equilibrium to the long run one. Such increase in demand leads to the negative consequences.⁴

Panel (b) shows a productivity increase that has a massive impact on the ER, but a small one on the BB. As before, the shock moves the schedule to ER' and BB'. Notice that in this case, the improvement on the environment is so big that the IMF equilibrium is to the left of the ER', meaning that there is no gray line – there is no negative environmental outcome of this type of productivity increase.

This country, however, is suffering from the Latin Triangle, and their implied cycles. So, even though the environment is sustainable, the economy and the politics are not. Finally, panel (c) shows the perfect productivity increase, that solves both the Latin triangle and the environmental conflict.

The first example is an environmentally damaging process of growth. This is a process of growth that indeed took place in every country during their industrialization. Those productivity increases and technological improvements increased wages and demand, but deteriorated the environment. Countries at different times went through this process. China and India are doing it right now, and because we are paying attention to the environment now much more than in the 40's we are trying to limit this process of development in some of these nations. Their argument is that Europe did it before and they should be entitled to do it now. Both views, in my opinion are wrong. They are emphasizing short run objectives as opposed to long run sustainable considerations.

For instance, having China keep consuming the same as what they were consuming in the 60's seems unreasonable. I mean, they suffered from hunger and millions died! Do we seriously think that the world

⁴I think John Sterman's fear of some productivity increases in economics is summarized by this example. In fact, he is really concerned about technological improvements that lead to more consumption – which ultimately imply a higher footprint.

would be sustainable and peaceful if developed nations force the chinese into such level of consumption? On the other hand, I think is quite reasonable to ask car to have the power they had in the 60's. I love cars, but I cannot understand the benefit of heavier vehicles, that can drive at 140 miles an hour.

The solution is to understand that productivity increases are required and their mixture is not irrelevant. Their mixture is crucial, and relatively rich countries can afford to be pickier on which improvements to implement, but poor countries are in need of any.

12.1.3.4 Population: An easy way out

One very easy solution to the problem of the environment is to decrease population growth, so much that population in the world declines. This is not easy. For some reason people would like to invest in health to live longer. Which means that those bodies will remain for longer, eating much more, and producing more and more methane. However, a significant decrease in population growth does the trick.

In Figure 12.6 we present the outcome of lowering the labor supply in each country. This shock is making the European equilibrium sustainable from the labor point of view. I call this the *easy solution* because a lot of the problems we have today stem from the fact that we are 6.5 billion people as opposed to a couple of millions. So, by reversing the source of the excess demand, we solve the problem.

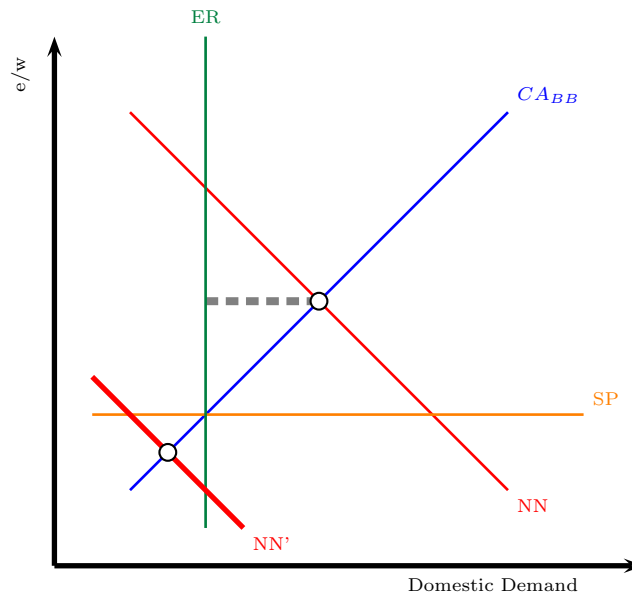


Figure 12.6: BBNN Sustainability and Population

However, this seems to me like an impossible task. For one, I really do not want to live shorter, nor I would like to offer one of my kids in sacrifice. I do, however, can promise some colleagues that I would be glad to volunteer. In practice, even though this is a possibility, this is not going to happen without a catastrophic event – a war, or the environment rioting against us.

12.1.3.5 Learn to Live with Indeterminacy

Finally, before moving to some technicalities at the end of this chapter, I would like to propose what I think is a solution in the short run. Solutions or actions for rich countries. Countries like the US, Europe and Japan can afford to drop their aggregate demand and finance the unemployment – or low employment – through a safety net. This can be achieved by taxing those products that are environmentally damaging, by creating markets that price correctly those externalities, and by taxing consumption directly. This is painful but necessary. I am of the opinion that we need to start acting now. Developed nations can afford to do so, and moving to the European equilibrium, and solving the unemployment problems with the proper safety net seems to be the only medium run solution – until technology catches up.

Developing markets, on the other hand, cannot be expected to replicate this, not to take similar actions. In their case, the problem of lack of provision of basic services, implies that they cannot afford a significant decline in the aggregate demand. So, from the environmental point of view, I believe we have to come to terms that a significant proportion of countries will need to “subsidize” others. In other words, developed nations have to do an effort for their countries, and part of the emerging markets, while developing nations can catch up.

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Chapter 14

Trade: Comparative Advantages

The classical theory of comparative advantages started almost 200 years ago (1818) when David Ricardo made his seminal contribution. Ricardos view of the world was fantastically simple and tremendously influential. So influential that in 150 years it became the paradigm of international economics.

The theory of comparative advantages has a very simple message but a relatively loaded message: we gain when we exploit our differences. This is true not only for countries but in our everyday lives – like it or not. When we get together in working teams we divide the tasks such that everybody can do what they do best. When we play baseball each one takes the position that is best fit for each player. It does not make any sense to put some scared of the ball in first base, nor someone unable to throw to be a pitcher, etc. We always improve and gain when we can assign tasks to those that can perform them better. Ricardos views about trade are the same. Countries should produce what they do best. As in the baseball example this is not an absolute term, but a relative one. Countries should produce what they do best, relative to others.

Ricardos classical theory of comparative advantage is not an ordinary appeal to common sense. Actually, it is the outcome of a formal maximization problem in which firms choose production, using technologies that exhibit constant returns to scale and face perfect competition. Thats it! However, I do not think I need to torture you with a framework, I will like to discuss a numerical exercise that provides almost all the relevant intuition instead.

14.1 A Benevolent Dr. Evil

The purpose of this exercise is to understand all the forms of conflict that arise when two countries trade. Our objective is going to be a very simple one: to maximize world production using the exact same resources. In fact, this is mostly what we would love to do to improve our standards of living, and also protecting the environment. Imagine producing what we produce today, but more efficiently... using less oil and energy, less water and pollutants, etc. However, achieving efficient has costs – political costs. Here we address them.

For the rest of the section think of me as Dr. Evil and you my friends.... just my *mini-me's*.

14.1.1 Problem

To keep things as simple as possible lets assume that there are only two countries in the world, that there are only two goods (apples and bananas), The only difference that exist in our countries is the fact that they

produce using different technologies – in other words, they use different number of hours to produce apples and bananas.

The purpose is to allocate the production of labor in each country to maximize world production. There are two other additional simplifying assumptions. First, assume that consumer preferences are as follows: agents consume apples and bananas in equal proportions. This assumption implies that we need to organize production such that the total amount of apples is equal to the total amount of bananas; otherwise, goods are wasted. Second, in order to compute GDP we assume the price of each apple and banana is one dollar.

14.1.2 Case 1: Free Trade versus Fair Trade

In Table 14.1 we present the number of hours required to produce one unit of the respective product. The first entry indicates that in Country 1 we can produce one apple using one hour of work. In this country, we need 3 hours to produce one banana. So, in Country 1, workers are more productive in apples than bananas. Country 2 is symmetric. They need three hours to produce one apple, but one for a banana.

Table 14.1: Case 1

Hours Required	Apples	Bananas
Country 1	1	3
Country 2	3	1

The first step is to evaluate what happens when the countries do not trade. This is known as Autarky. That means that each country has to supply the food that it will be consume in each respective country. So, country 1 needs to supply the exact same amount of apples and bananas to its consumers. The same for country 2.

How can we allocate labors to achieve this? Our work is to maximize production and therefore we will use all the labor available, but if we distribute them half and half (120-120) then the country produces 120 apples and only 40 bananas. Because the country is in autarky and cannot trade, then the country would be wasting 80 apples. Not a good idea. The allocation needs to assign 3 times more labor in bananas than in apples. Allocating 60 hours in apples and 180 in bananas implies that the production is 60 and 60. That actually is the only way to allocate labor and maximize production. Country 2 is symmetric and labor is allocated 180-60. The results are summarized in the first panel of Table 14.2.

The next step is to study what happens when we allow the countries to trade: free trade. However, before doing that, let us explore some simple questions. Who is the most efficient in the world at producing apples? Country 1. Who is the most efficient in the world at producing bananas? Country 2. What does country 1 produces the best (which sector internally they are more efficient)? Apples; and country 2? Bananas.

When you have a country that is the best in the world at something we say that the country has pure competitive advantages.

Now each country can produce in different proportions, but we need to have world production equalized. In other words, country 1 can produce x and y but then country 2 needs to produce y and x such that the total world production of the two products is equal, and there is no waste. This is a very simple exercise in the sense we can specialize each country in what they do best. So, if we put the 240 hours of country 1 in apples the production is 240 apples and no bananas. We can do the opposite in country 2, 240 into bananas, which implies a production of 0 apples and 240 bananas. The world production is 240-240 which is double what we had before. The results are shown in the second panel of Table 14.2

Table 14.2: Results of Case 1

Case	Trade	Country	Labor		Production		GDP		
			Apple	Banana	Apple	Banana	Apple	Banana	Total
Case 1	Autarky	Country1	60	180	60	60	60	60	120
		Country2	180	60	60	60	60	60	120
		World			120	120	120	120	240
	Free Trade	Country1	240	0	240	0	240	0	240
		Country2	0	240	0	240	0	240	240
		World			240	240	240	240	480

Notice that free trade increases world production, and world GDP: from 240 dollars to 480! This gain in efficiency occurs because each country can devote itself to produce what they do best. The countries specialize, and the world benefits from it because we use the limited resources we have much better. Notice that in this case the GDP of both countries increases in the same proportion – both double. Another interesting thing I want to highlight is that country 1 exports apples to country 2, and country 2 exports bananas to country 1. So, you export what you are best! You export where you have competitive advantages – at least in this simple example.

A couple of questions that right now sound stupid, but they will not in the following subsection: first, does country 1 produces what they do best in the world? yes. does it produces what they in particular do best? yes. Is that the same for country 2? yes. Confused? do not worry, it will become clear in a minute.

The free trade has generated a lot of resources. Now, lets share them equitably. It is impossible for me to replicate the theater/parody I do in class. But let me summarize it – and I hope you remember it. Assume I am country 1 and you are country 2. Obviously because free trade is forcing me to trade with you, MBA's, lesser humans, I think the fair share of the world GDP is that you should take 121 and I should make the sacrifice to accept 359. I think this is fair. Because I produce Apples which shares so much with cool products produced by Apple, and you produce Bananas which shares a lot with uncool things as *you-are-a-bananana-republic* then I hope it is clear I am making a huge sacrifice. What do you think? Deal or No Deal?

In fact, can you understand why you **SHOULD** accept this offer? You should accept because your outside option is 120 (autarky) and this clearly improves the welfare of your citizens. What? You are not going to accept this because hurts your confused ego? So, you are putting your feelings before the welfare of your citizens? Isn't that what you hate from the politicians you criticize, and you are doing the same! Shame on you! You selfish bureaucrats! If you are not happy, what is your offer? 240-240? Who said that is fair? In fact, why is this fair? I think you truly believe this is fair mainly because you have a very confused and distorted view of fairness. Are you French? I'm sorry but I'm Republican... so sorry baby. But I am a benevolent liberal Republican so I will improve my offer. I can push it up to 125-355 but I am already giving you much more than what you deserve.

Hard to solve this dilemma, isn't it? How can we split the surplus?

Free trade generates a surplus, how we split it is the result of bargaining, and it is unclear why it has to fall exactly in the middle. In this example I know it is natural to split the surplus in the middle. The two countries are perfectly symmetric and it is difficult to argue for something other than the middle is fair, but in real life this is not the case. Still, I hope this makes clear that *free* has nothing to do with *fair*. Fair refers to the sharing rule of the surplus, and free is about creating it.

I also hope you never use free and fair trade in the same sentence after this example – and especially after the parody I go through in class. That comparison is one of the most ignorant comparisons ever made. That does not mean that free trade is fair. It can be perfectly unfair but mostly because world institutions are not good enough to guarantee all countries enter the negotiation with the same power.

14.1.3 Case 2: Specialization and Uncertainty

Let us now turn our attention to a case in which country 1 is good at everything. The hours per product are shown in Table 14.3. Country 1 is identical, but now country 2 requires 4 hours to produce apples or bananas.

Let us go back to the questions we asked before: Who is the most efficient in the world at producing apples? Country 1. Who is the most efficient in the world at producing bananas? Country 1. What does country 1 produces the best? Apples; and country 2? they are indifferent. In other words, country two is as good at producing apples as it is at producing bananas – which by the way they are horrible in comparison to country 1.

Table 14.3: Case 2

Hours Required	Apples	Bananas
Country 1	1	3
Country 2	4	4

Solving for autarky, the allocation in country 1 is the same as before (60-180). Country 2 allocates 120-120 to apples and bananas and produces 30 and 30. Notice that because Country 2 is less efficient, the world production is 90-90. The GDP of country 1 is 120 and it is 60 for country 2. In line with the BBNN the more productive country is richer, and the less productive is poorer.

Let us move now to free trade. Solving the allocation for free trade is not that easy. The reason is that in this example, one country specialized in one good and the other one produces both. So, to solve the problem we have to be careful of two things: first, that every apple has a banana; and second, that we use all the workers.

Assume we specialize country 2 in bananas. This means that we allocate all 240 hours in bananas and we produce 60. How we allocate workers in country 1? The easiest way to solve the problem is to first allocate enough workers to assure that the 60 bananas have 60 apples. Then, the hours left we allocate in ratio of 3:1 to increase apples and bananas together. Given that country 1 needs one hour to produce an apple, this means that we can allocate 60 hours to apples and now every banana from country 2 has an apple in country 1. We have 180 hours left, though. So, we can allocate 135-45 hours to produce 45-45 apples and bananas in country 1. In the end, the production is 105-105.¹

Table 14.4: Results of Cases 1 and 2

Case	Trade	Country	Labor		Production		GDP		
			Apple	Banana	Apple	Banana	Apple	Banana	Total
Case 1	Autarky	Country1	60	180	60	60	60	60	120
		Country2	180	60	60	60	60	60	120
		World			120	120	120	120	240
	Free Trade	Country1	240	0	240	0	240	0	240
		Country2	0	240	0	240	0	240	240
		World			240	240	240	240	480
Case 2	Autarky	Country1	60	180	60	60	60	60	120
		Country2	120	120	30	30	30	30	60
		World			90	90	90	90	180
	Free Trade	Country1	105	135	105	45	105	45	150
		Country2	0	240	0	60	0	60	60
		World			105	105	105	105	210

¹Please check that this is maximum possible to can achieve

There are several important properties of this solution that we need to discuss: First, clearly there is a surplus – from 90-90 to 105-105 – and therefore the exact same discussion between free and fair appears. Second, notice that the benefits in terms of growth are not equally shared. Country 1 GDP increases from 120 to 150, while Country 2’s GDP stays at 60! Third, one country is specialized while the other one is diversified – in terms of their production. Imagine that each sector has shocks that are idiosyncratic. That means that country 1 would be less risky than country 2! Finally, country 2 exports 30 bananas to country 1, which exports 30 apples to country 2. In other words the production of bananas in country 2 need to be exchange for apples so that country 2 consumes in pairs. This is quite interesting. Country 2 is exporting bananas. Is it because they are the best country on earth at producing bananas? NO! Actually exporting something and being good at it have very little to do, in theory and practice. We come back to this point after the next example.

14.1.4 Case 3: Standard of Living

The last case is quite close to what happens in the data. The hours requires for each production are shown in Table 14.5. Notice that country 1 is good at everything, and country 2 is bad at everything. The only difference is that both country 1 and country 2 strictly prefer to produce apples.

Table 14.5: Case 3

Hours Required	Apples	Bananas
Country 1	1	3
Country 2	3	5

In other words, this is like comparing HighTech (apples) and Agriculture (bananas). In both countries, works are more productive in HighTech than in Agriculture – where “productive” can be thought as value added: HT has indeed a higher value added than Agriculture. This is why I think this example resembles the data. I think every country prefers to produce aircraft, high end electronics, IT, biotech, etc. And they prefer those sectors not because they are sexy but because they have a very high value added. Let us see what the allocation implies.

The maximization of world production implies

Here the process of finding the solution is similar to the one described before. Implications? As before, there is a world surplus – we have improved the standards of living in the world. Second, the benefits are unfairly shared. Country 1 GDP increases from 120 to 144, while Country 2’s GDP decreases from 60 to 48! Third, as before country 2 is specialized while country one is diversified. All these three are in principle identical to the previous example.

Fourth, as before country 2 exports bananas, but what is even worse than in the previous case is the fact that country concentrates on what they do worse! In the previous example, country 2 was indifferent between apples and bananas, but here country 2 really prefers to produce apples and we are forcing them to produce bananas – explaining the reduction in GDP.

Fifth, notice that country 2 exports a product in which they are not good at all! In this example, which sector is the one in which country 2 is less productive? Bananas. Who is the worst on earth at producing bananas? Country 2. Who is the only one that exports bananas in the world? Country 2. Why is this important? Well, most people believe that if a country exports something it must be because “it is good at it!”. This is called in academia as revealed comparative advantages. In other words, by looking at the patters of trade we try to infer what are the implied degree of competitive of a nation. As this example shows, the

Table 14.6: Results of Cases 1 to 3

Case	Trade	Country	Labor		Production		GDP		
			Apple	Banana	Apple	Banana	Apple	Banana	Total
Case 1	Autarky	Country1	60	180	60	60	60	60	120
		Country2	180	60	60	60	60	60	120
		World			120	120	120	120	240
	Free Trade	Country1	240	0	240	0	240	0	240
		Country2	0	240	0	240	0	240	240
		World			240	240	240	240	480
Case 2	Autarky	Country1	60	180	60	60	60	60	120
		Country2	120	120	30	30	30	30	60
		World			90	90	90	90	180
	Free Trade	Country1	105	135	105	45	105	45	150
		Country2	0	240	0	60	0	60	60
		World			105	105	105	105	210
Case 3	Autarky	Country1	60	180	60	60	60	60	120
		Country2	90	150	30	30	30	30	60
		World			90	90	90	90	180
	Free Trade	Country1	96	144	96	48	96	48	144
		Country2	0	240	0	48	0	48	48
		World			96	96	96	96	192

conditions for that to produce the correct inference are quite restrictive. Without further information, the fact that you export something is not informative about the ability of the country in producing such item.

Finally, and more importantly, the only way to sustain this allocation is for country 1 to subsidize country 2 all the time. In other words, the GDP in autarky for country 2 is 60 and it falls to 48. Therefore, country 1 needs to provide $12 + \epsilon$ to country 1 so it participates in free trade. Country 2 is willing to do so, because their increase in GDP is 24, so, it can share part of that with the other country. This example implies that country 2 will be receiving Foreign Aid forever just to improve their income by ϵ ! Depressing, isn't it?

We have seen several sources of conflict in this discussion.

1. Fairness of the sharing rule of the surplus generated by free trade.
2. Specialization.
3. Output Volatility.
4. Specialization on the least productive good, and reduction of GDP.
5. Lifetime AID need.

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Spring 2016

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