

## 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.<sup>1</sup> 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*.<sup>2</sup>

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.

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<sup>1</sup>His greatest hits can be found in Dornbusch (1987).

<sup>2</sup>I 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.

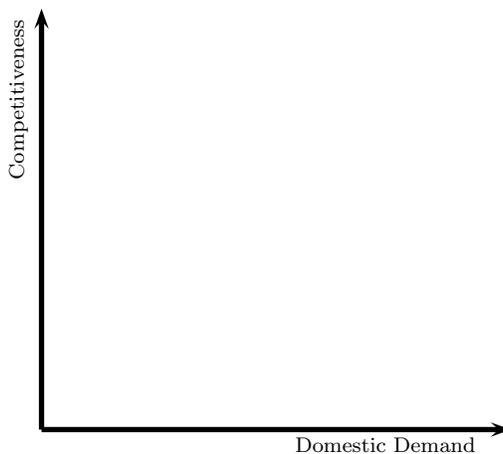


Figure 8.1: BBNN: Control Variables

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.<sup>3</sup>

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.<sup>4</sup>

For example, sometimes we concentrate on the balance of payments excluding the Central Bank change in reserves: the balance of payments narrowly defined.<sup>5</sup> 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

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

<sup>4</sup>We 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.

<sup>5</sup>Those taking 15.218 probably are using this exact definition

as Mercantilism).<sup>6</sup> 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

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<sup>6</sup>And 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.<sup>7</sup> 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".<sup>8</sup> 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

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<sup>7</sup>See Lane and Milesi-Ferretti (2001) and Lane and Milesi-Ferretti (2007)

<sup>8</sup>See 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.<sup>9</sup>

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

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

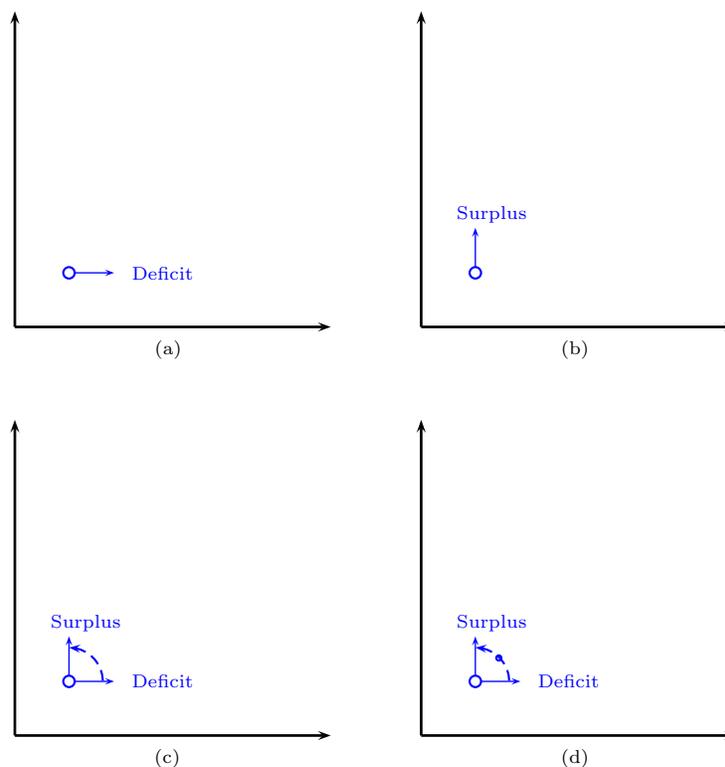


Figure 8.2: BBNN: Balance of Payments Equilibrium

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

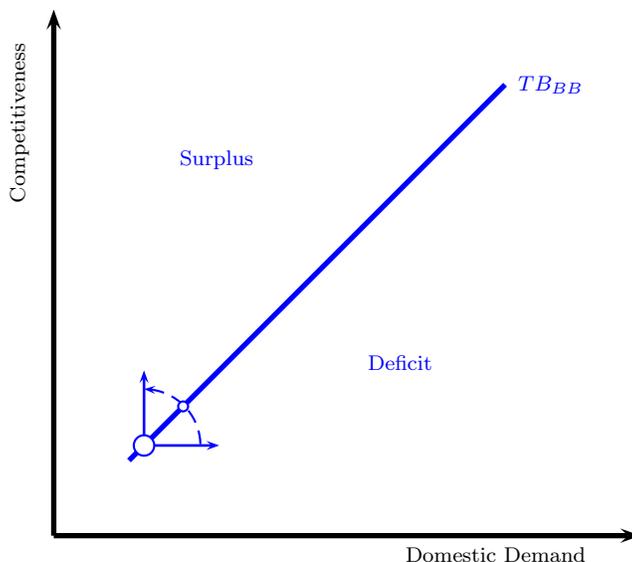


Figure 8.3: BBNN: Balance of Payments Equilibrium (summary)

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.<sup>10</sup> 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

<sup>10</sup>By 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.<sup>11</sup> 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.

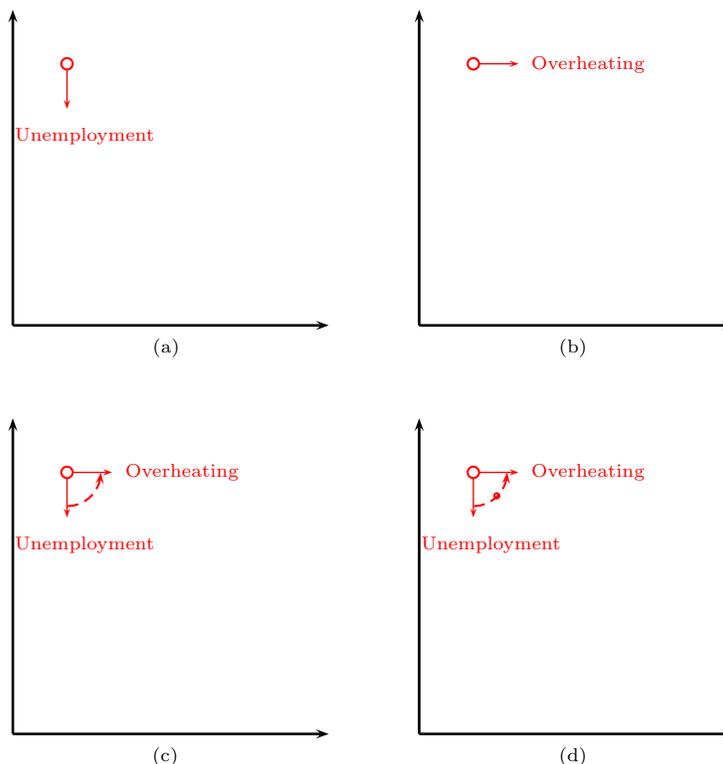


Figure 8.4: BBNN: Labor Market Equilibrium

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

<sup>11</sup>Another 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.

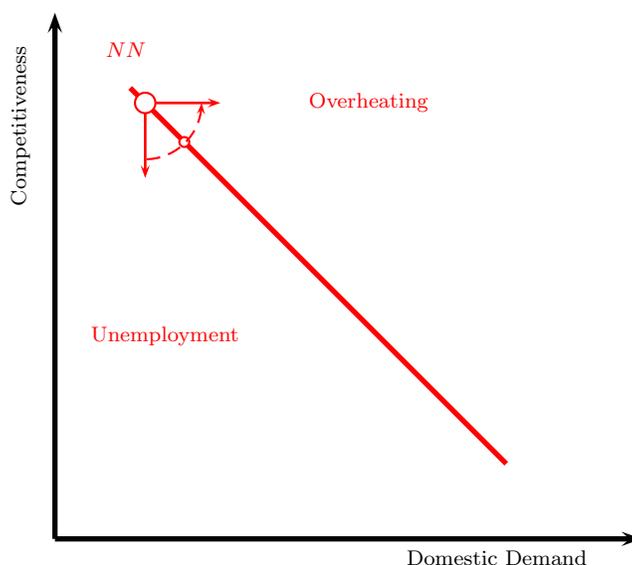


Figure 8.5: BBNN: Labor Market Equilibrium (summary)

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 disequilibriums), 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.

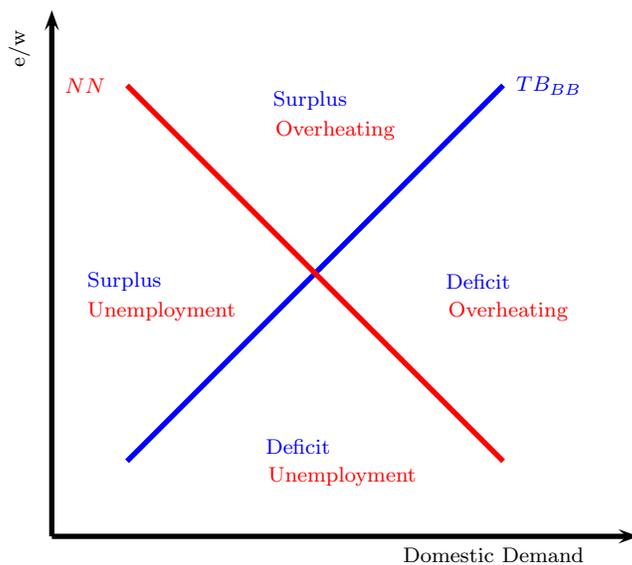


Figure 8.6: BBNN

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.<sup>12</sup> 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.<sup>13</sup>

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

<sup>12</sup>All 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).

<sup>13</sup>Alberto 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 wages<sup>14</sup> 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.

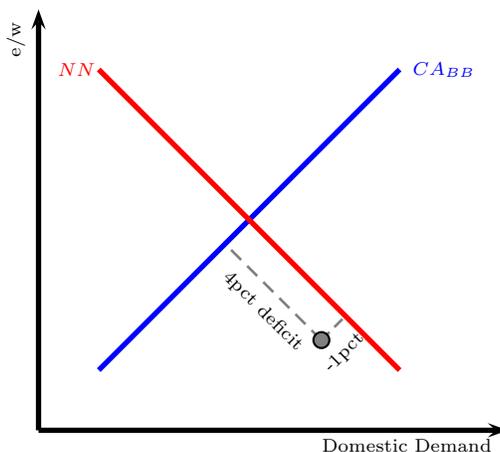


Figure 8.7: US 2001 in the BBNN

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

<sup>14</sup>Compensation 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.

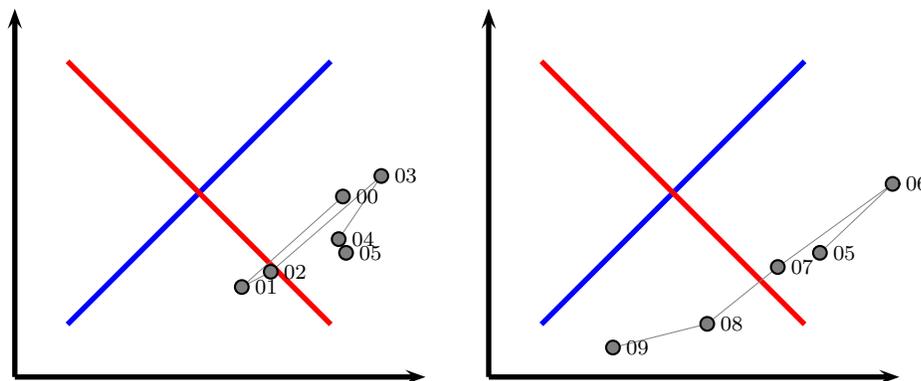


Figure 8.8: US 2001-2010 in the BBNN

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 <sup>(a)</sup>	July 2014 <sup>(a)</sup>
Real average hourly earnings <sup>(1)</sup>	\$10.28	\$10.28	\$10.28	\$10.28
Real average weekly earnings <sup>(1)</sup>	\$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
<b>OVER-THE-MONTH PERCENT CHANGE</b>				
Real average hourly earnings <sup>(1)</sup>	-0.2	-0.2	0.0	0.0
Real average weekly earnings <sup>(1)</sup>	-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
<b>OVER-THE-YEAR PERCENT CHANGE</b>				
Real average hourly earnings <sup>(1)</sup>	0.0	-0.1	-0.2	0.0
Real average weekly earnings <sup>(1)</sup>	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.  
(2) 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<sup>(1)</sup>**

	July 2013	May 2014	June 2014 <sup>(a)</sup>	July 2014 <sup>(a)</sup>
Real average hourly earnings <sup>(2)</sup>	\$8.77	\$8.81	\$8.79	\$8.80
Real average weekly earnings <sup>(2)</sup>	\$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
<b>OVER-THE-MONTH PERCENT CHANGE</b>				
Real average hourly earnings <sup>(2)</sup>	-0.1	-0.1	-0.2	0.1
Real average weekly earnings <sup>(2)</sup>	-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
<b>OVER-THE-YEAR PERCENT CHANGE</b>				
Real average hourly earnings <sup>(2)</sup>	0.0	0.3	0.1	0.3
Real average weekly earnings <sup>(2)</sup>	-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.<sup>15</sup>

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,

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<sup>15</sup>In 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.

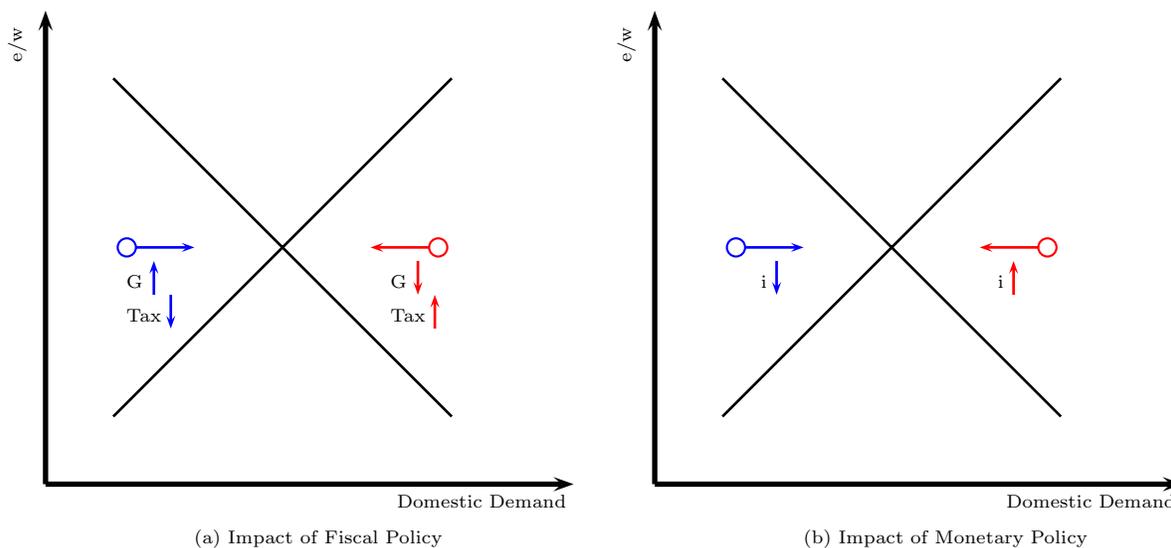


Figure 8.10: Policy tools to manage Aggregate Demand

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

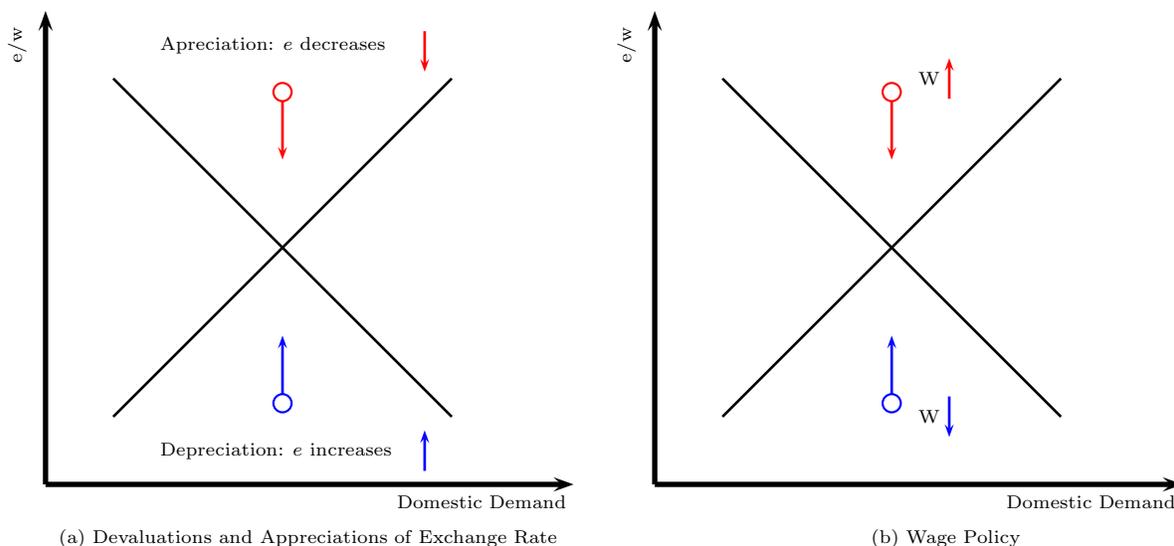


Figure 8.11: Policy tools to manage the Wage in Dollars

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

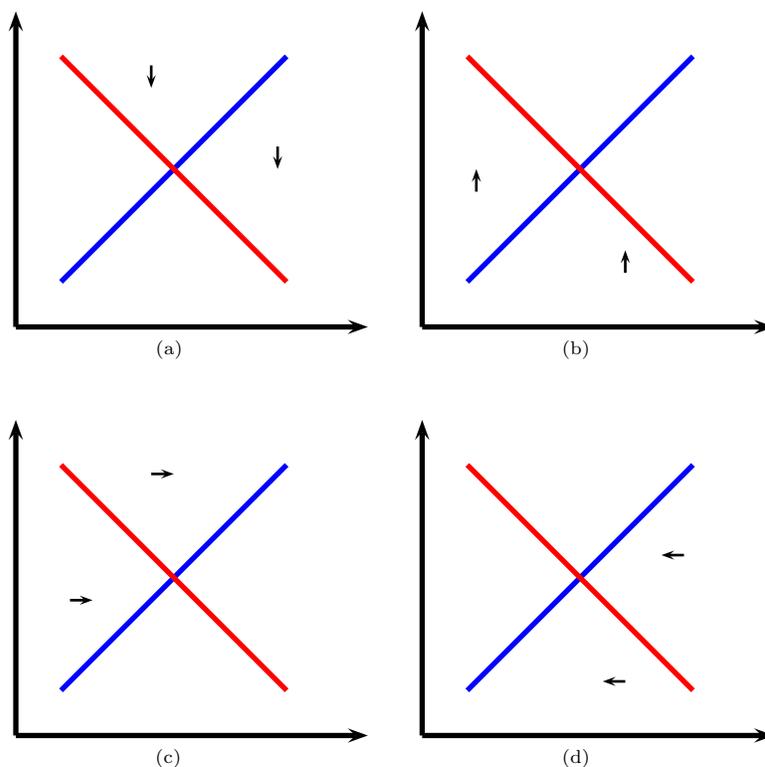


Figure 8.12: BBNN: Forces behind the Automatic Adjustment

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:

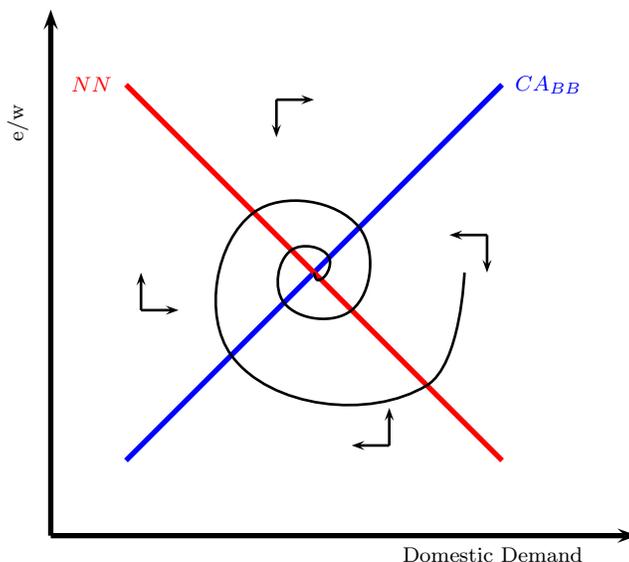


Figure 8.13: BBNN: Automatic Adjustment

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.<sup>16</sup> 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

<sup>16</sup>If 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*.

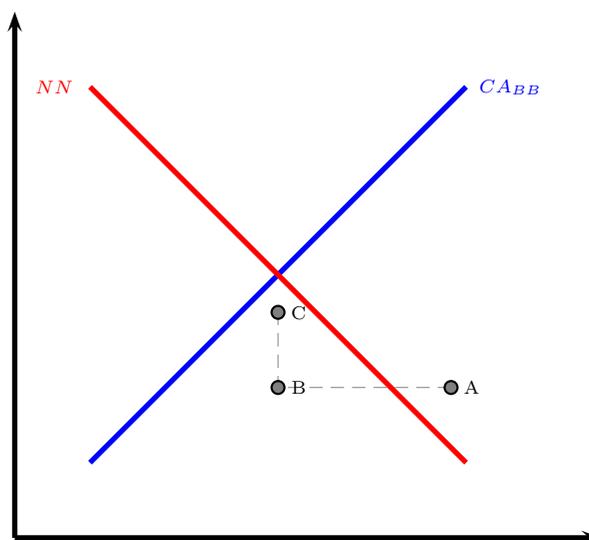


Figure 8.14: Spain 2001-2010 in the BBNN

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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15.014 Applied Macro- and International Economics II  
Spring 2016

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