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I. Introduction

In 1890, Argentina was the sixth richest country in the world in per capita terms. At the beginning of the 20th century, Argentina was a prosperous nation. After the Second World War, Argentina was the third richest country in the Americas in per capita terms. In 2009 it belongs to the least developed countries and is the 59th richest country. What happened? In the last fifty years there have been a large number of governments, and they have all tried to solve the main problem: how to stabilize inflation? Many economic programs have been launched, orthodox and heterodox, but Argentina seems to always fall back to inflation. What impact has it had on the society? Why couldn't any government stop inflation in the long run? And what consequences did the policies have on society? We will provide an overview of Argentine economic history and then concentrate on inflation and its impact. Thanks to the New Keynesian Phillips Curve (NKPC) we will try to determine if there is a long term trade-off between inflation and variables that describe society at large. For those, we have chosen unemployment, the output gap, the wage share and labor productivity. We will show that inflation, unemployment and labor productivity are positively correlated, while inflation, the wage share and the output gap are negatively correlated. And we will see that the backward looking component of inflation is more important than the forward looking. We will also show that the results are contrary to the one found by Gali and Gertler for developed countries, like the USA or Europe.

The thesis is organized as follows: First we provide an overview of the different variables considered. Then we summarize the economic history of Argentina. After that, we will study the NKPC for Argentina with different measures of the marginal costs and the effect of the inflation stabilization policies launched by the government. Finally, we will compare our results to the rest of the World.

2. Main Variables Considered

We begin by defining the main variables that will be considered in this thesis and provide some descriptive statistics to illustrate Argentina's historical performance.

2. A. Inflation

Inflation is defined as a general rise in the level of prices. This means that for a given number of pesos, one can buy fewer goods and services than before. We'll consider inflation as the yearly average growth of consumer prices. Since the end of the Second World War there has been practically no time when Argentina did not have problems with inflation. Is it suffering from chronic inflation? According to Pazos, *"Chronic inflation is characterized by high inflation relative to industrial countries and by persistent inflation. Unlike hyperinflation, which lasts only months and is explosive, chronic inflation may last several decades and is relatively stable"*[1]. Harberger, in 1981 added another condition: the inflation rate must be more than 20% in a minimum period of years (Calvo, 1994). We will see in the next chapter if this was the case for Argentina.

We will later measure inflation as the ratio of difference of the consumer prices in period t and period t-1 on prices in period t:

$$\pi = \frac{p_t - p_{t-1}}{p_t}$$

where π is the inflation rate, p prices and t the time period. Thus, this first equation is the difference between prices at one period and prices in the previous period.

Figure 1 provides a first outlook of the inflation rate since 1945. The overall level is hard to distinguish because of the very peaks. Thus in 1977, 1983, 1984, 1985, 1988, 1989 and 1990, the inflation rate was higher than 200%. The last period corresponds to the convertibility period. We will discuss it on the next chapter.

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[1] From Pazos (1992) (in Calvo, 1994), p. 35.

Figure 1: Inflation rate (Consumer Price Index), 1945-2009[2]

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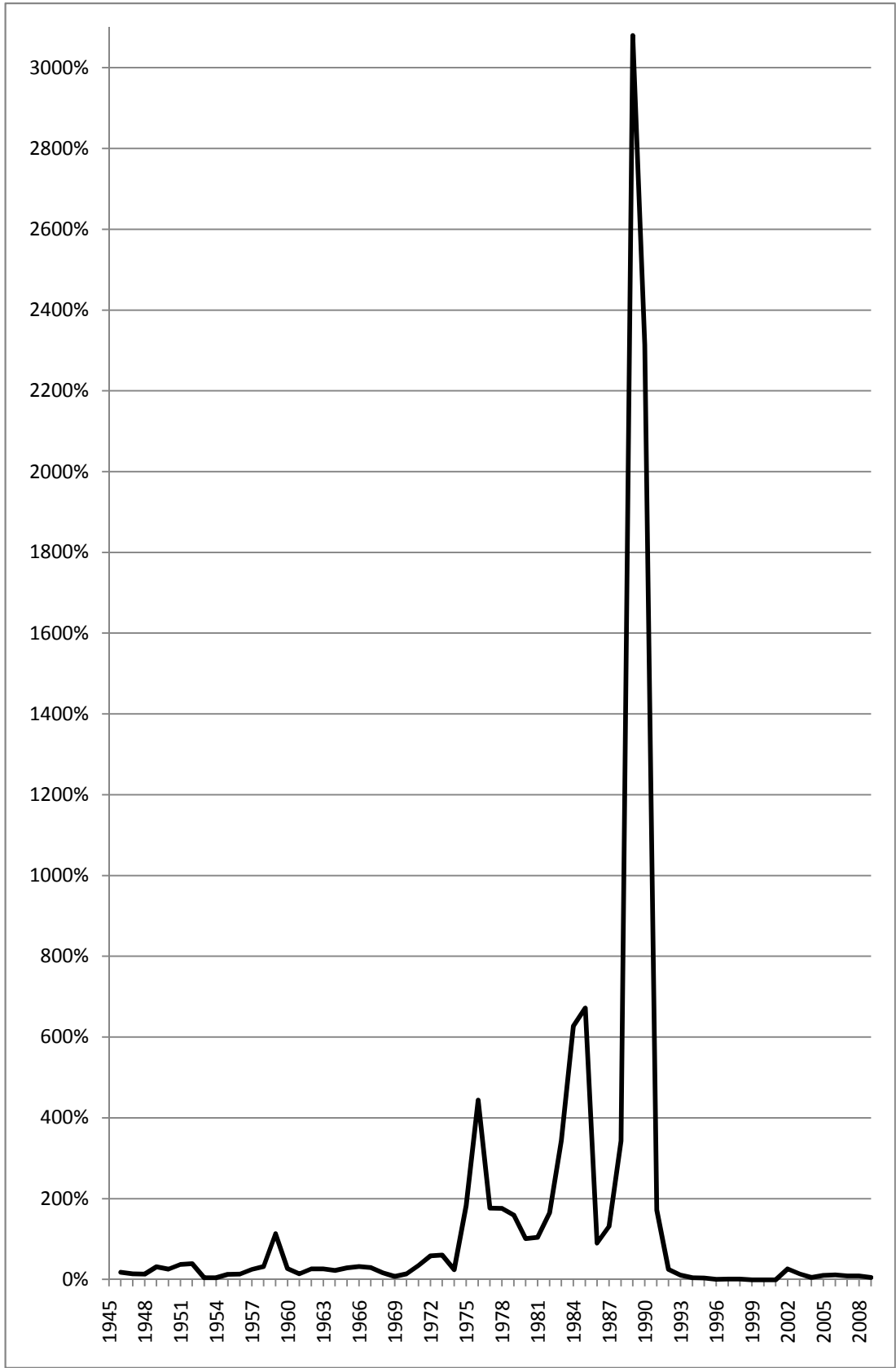
[2] See Annex 2

2. B. Gross Domestic Product and the Output Gap

The gross domestic product (GDP) of a country is the market value of all final goods and services made within that country in a year. It measures the production of an economy and is often used as a measure of economic well-being. Historical data on GDP for Argentina is available in many different units and currency making comparison difficult. Robert Summers, Alan Heston and Bettina Aten (1991) have developed a method to compare GDP time-series among different countries. But in order to do so, the GDP's had to be measured in the same unit. It turned out that using exchange rates to convert the GDP from one country to a common unit wasn't accurate because *"exchange rates are influenced by factors other than relative domestic price levels (…) and are often quite volatile, particularly in the short term"*[3]. In order to eliminate the price level differences between countries, they took the purchasing power parities (PPP's) as a converter. Prices of identical representative goods and services were collected in each participating country.

We use data from the Penn World Table Version 6.3. We will study the PPP converted GDP measured in chain series. This variable makes use of relative prices and is more accurate for intertemporal comparisons: *"Its growth rate for any period is based upon international prices most closely allied with the period"*[4]. The unit will be the international dollar in 2005 constant prices, which is a hypothetical international currency based on the purchasing power of the US Dollar in 2005.

Figure 2: GDP Growth (based on GDP in PPP dollars), 1945-1950[5]

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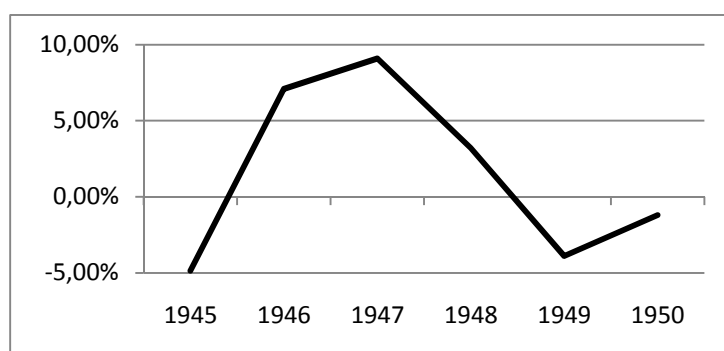
[3] AUS, 2005, p. 14.
[4] Summers, 1991, p. 344.
[5] See Annex 4.a

Figure 3: Real GDP per capita (PPP constant international dollars), 1950-2007[6]
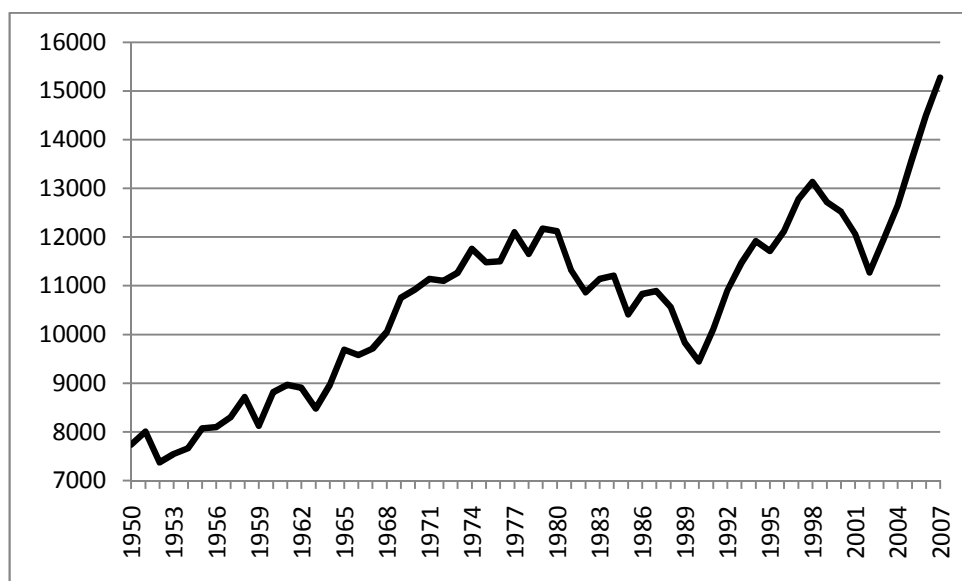
On the first look as Figures 2 and 3, one can observe an overall increase in the per capita GDP from 1945 until 2008. However there are two periods with a significant decrease: between 1989 and 1991 and after 2001. Again, those correspond to the beginning and the end of the convertibility period.

Figure 4: GDP growth (based on PPP GDP), 1950-2007[7]
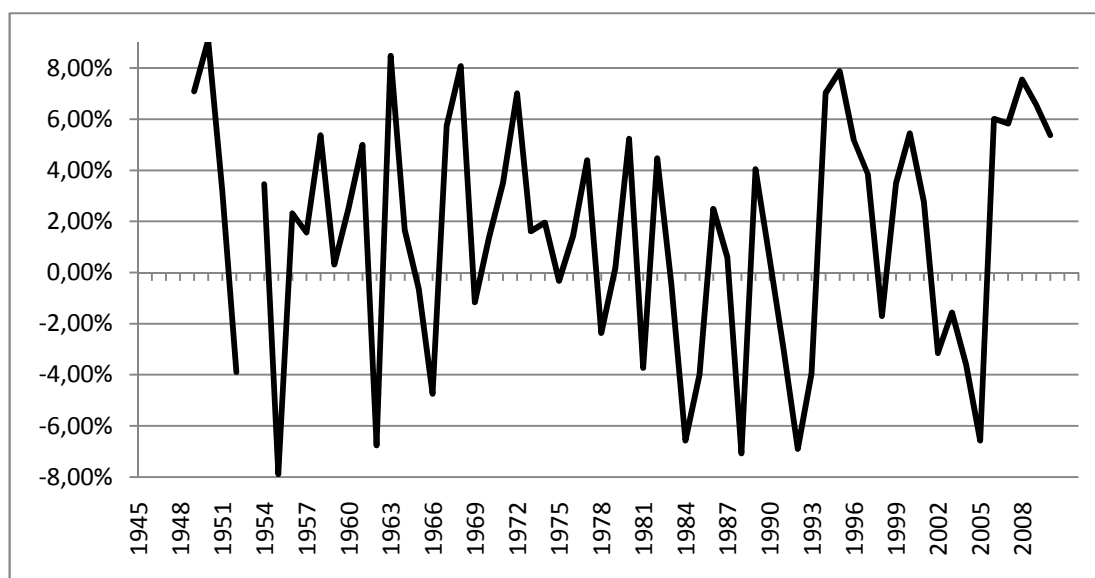
Figure 4 shows that there was no stable GDP growth in Argentina after the Second World War as the sign of its slope frequently keeps changing. This illustrates the Economy in Argentina for this period: unstable.

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[6] See Annex 4.b
[7] See Annex 4.a and 4.b

In our statistical analysis we will also make use of the output gap. This is the difference between potential and actual output, or how far the GDP is from its most efficient level. This is expressed by $y_t - y_t^*$ where y_t^* is the potential output. Constructing the measure of the potential output is not clear and there is no unique way. We will follow Gali and Gertler[8] (1999) and use data on the Hodrick-Prescott detrended output level[9]. As we can see in Figure 5, there were two periods in the second half of the twentieth century where the actual GDP was much lower than the potential GDP, in 1960 and in 1990.

Figure 5: Actual versus potential output
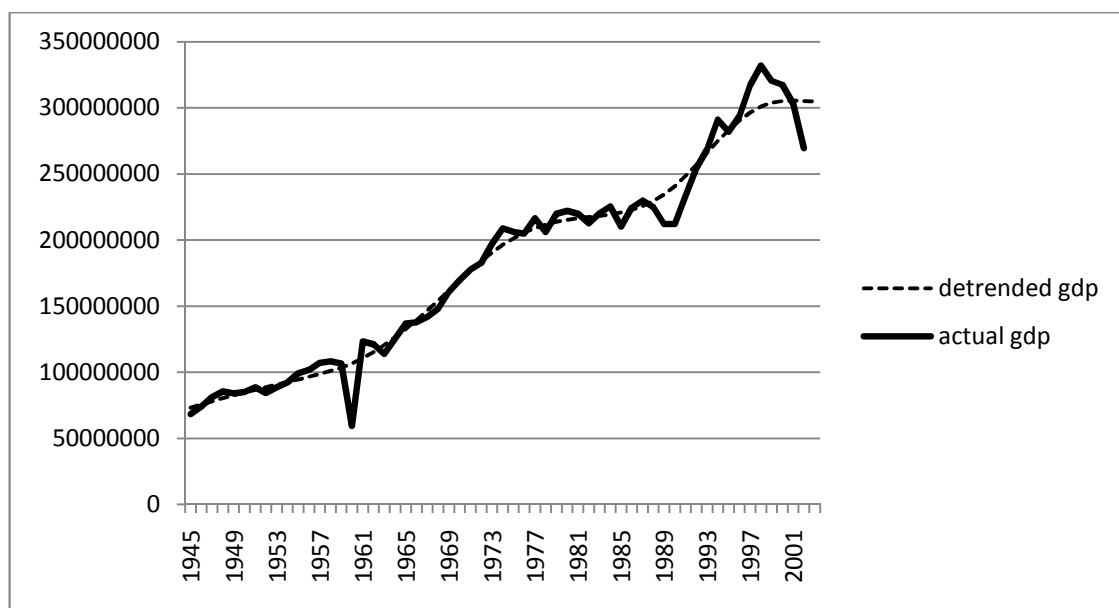
2. C. The fiscal deficit

A fiscal deficit appears when a government's expenditures exceed its revenues. In our sources there were many different definitions. It isn't very clear which sectors are included in the fiscal deficit. Several datasets were compared and although the numbers are not exactly the same the curves always move in the same direction. It was decided to use the definition from Saldanha[10] in which the budget deficit is the

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[8] Gali, 1999.
[9] Computed in Eviews.
[10] Saldanha, 1992.

consolidated public sector deficit which includes the central government, local governments, State enterprises and other non financial institutions.

Consider the following equation (G - T) = (S - I) + (M - X), where (G) represents the government's spending, (T) government's revenue, (S) private savings, (I) domestic spending on private investment and public infrastructure, (M) the import of goods and services and (X) the exports of goods and services. In this equation (G-T) is the fiscal deficit, (S-I) the excess of private savings and (M-X) the current account of the balance of payments[11] which should imply that there are two ways to finance the budget deficit: internal or external debt. The government could either choose to increase the domestic debt or to borrow from abroad and therefore increase the foreign debt. But there is a third way. When the government needs money to finance its deficit, why not printing it itself? Unfortunately, the increase of the money creation can lead to an excess of the demand compared to the supply of goods and services. In this case, the firms will have the incentive to increase their prices and therewith the inflation rate. And that was the case in Argentina on many occasions (Bulacio, 2001; Mussa, 2002).

To measure the fiscal deficit we used data from two different sources: From 1945 to 1961 we used data from Di Tella and Dornbusch,[12] while from 1961 to 2004 we used the data provided by the ministry of the economy.[13] One should be cautious when considering this latter source of date, since as some newspapers pointed out the government had a particular interest to lower the fiscal deficit.[14]

In order to provide some benchmark for the data for Argentina the European Union's legal limit for a fiscal deficit according to the Maastricht criterion is 3% of the GDP. As we can see in Figure 6 Argentina wouldn't have met this criterion for most of the second half of the 20th century.

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[11] See definition in the exchange rate and current account sections.
[12] Di Tella, et al., 1989.
[13] Ministerio de Economia y Producion, Secretaria de Hacienda, 2004.
[14] Bermúdez, 2009.

Figure 6: Fiscal deficit as a share of GDP, 1945-2008[15]
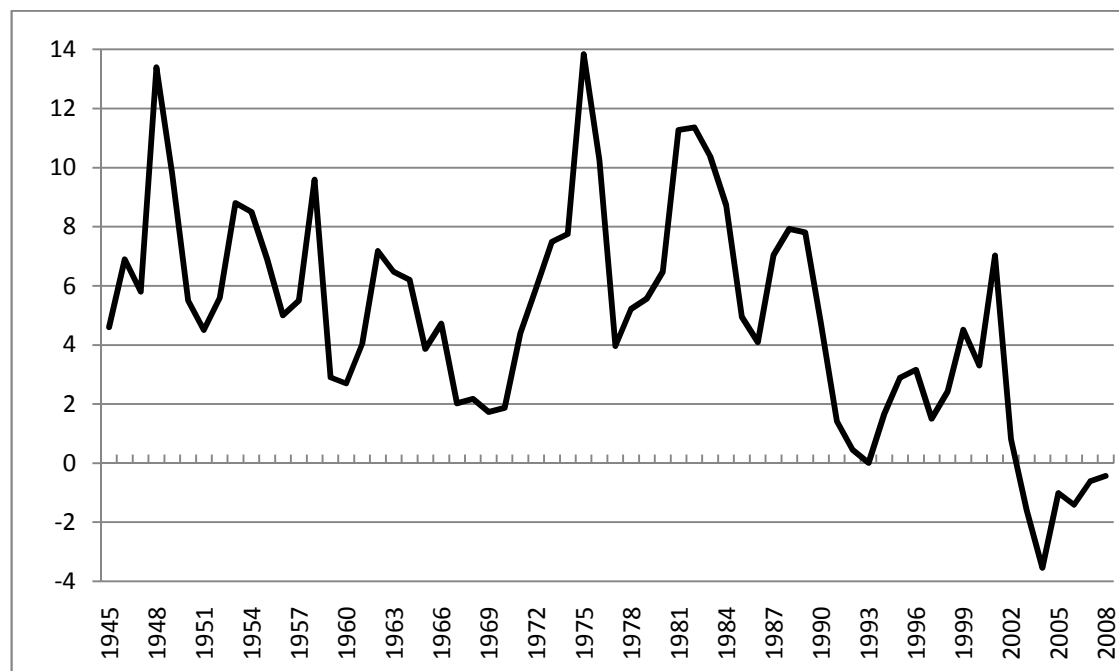
2. D. Exchange rate and Current account

The exchange rate is the rate at which a currency can be converted to another currency. It specifies how much one unit of a currency is worth in the unit of the other currency. We will use the Peso/Dollar exchange rate, which is the number of Argentine currency units one would need in order to purchase one American Dollar. When the rate doesn't take into account inflation differentials between countries, it is called the "nominal exchange rate", as opposed to the real exchange rate, which takes into account differences in prices in the two countries. We consider the real exchange rate taken at the end of a year. In the case of multiple exchange rates we use the average of them all.

The balance of payments accounts for all monetary transactions between a country and the rest of the world. It is composed of the capital and current account. The balance of payments is always balanced but there can be deficit on the current account. It "implies an excess of imports over exports of goods, services, investment

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[15] See Annex 5

income, and unilateral transfers. This leads to an increase in net foreign claims upon the home nation".[16]

There are many different exchange rates systems that have been adopted. One possibility is a fixed exchange rate system whereby the currency of one country is pegged to another and is not allowed to fluctuate. Alternatively, the exchange rate may be allowed to float freely, with the price of the currency responding to changes in demand and supply. Between these two extremes there are many different systems with differing degrees of currency flexibility. The advantage of a stabilized currency is that people may be more keen to invest there is no future risk about the exchange rate. In addition, a fixed exchange rate can act as a means of stabilising inflation, since any rise in domestic prices would lead to a lack of competitiveness both at home and abroad. Since the end of the Second World War there have been many attempts to stabilize inflation in Argentine using the exchange rate as an anchor. Unfortunately, the use of this instrument can also have negative effects: In the case of high inflation a fixed exchange rate makes domestic goods ever more uncompetitive. The increase in the price of domestic goods and the lack of a compensating change in the exchange rate imply that the country's products become less attractive. The resulting increase in imports and decrease in exports leads to a deterioration of the current account. In the case of Argentina however, Frieden and Stein (2001) emphasize that the pegging of the Peso to the Dollar wasn't likely to result in a real appreciation and that in any case the inflation stabilization goal was more important than real appreciation concerns because of Argentina's history of hyperinflation. We'll comment on this theory later[17]. (Frieden and Stein, 2001)

Since 1945, Argentina's government devalued their currency and renamed it four times. From 1945 to 1969 the peso was called "Peso Moneda Nacional" (PMN). In 1970, it was renamed to "Peso Ley" (PL) with one PL being equal to 100 PMN. In 1983 the currency changed again to "Peso Argentino" (PA) being worth 10,000 PL. In 1985 the government decided to change the name of the currency completely and for six years people paid in "Australes", with one Austral being equal to 1000 PA. Since

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[16] Carbaugh, 2007.
[17] See the end of chapter 3.G.

1992, the currency has simply been called the "Peso" and is worth 10000 Australes.[18]

On Figure 7, one can distinguish two peaks for the exchange rate in the 1880's. The second one corresponds to the peaks already observed for inflation and GDP, i.e. during the convertibility period. This is also illustrated on Figure 8 where the current account starts decreasing very low at the beginning of the 1980's

Figure 7: Exchange rate – local currency unit per US dollar[19]
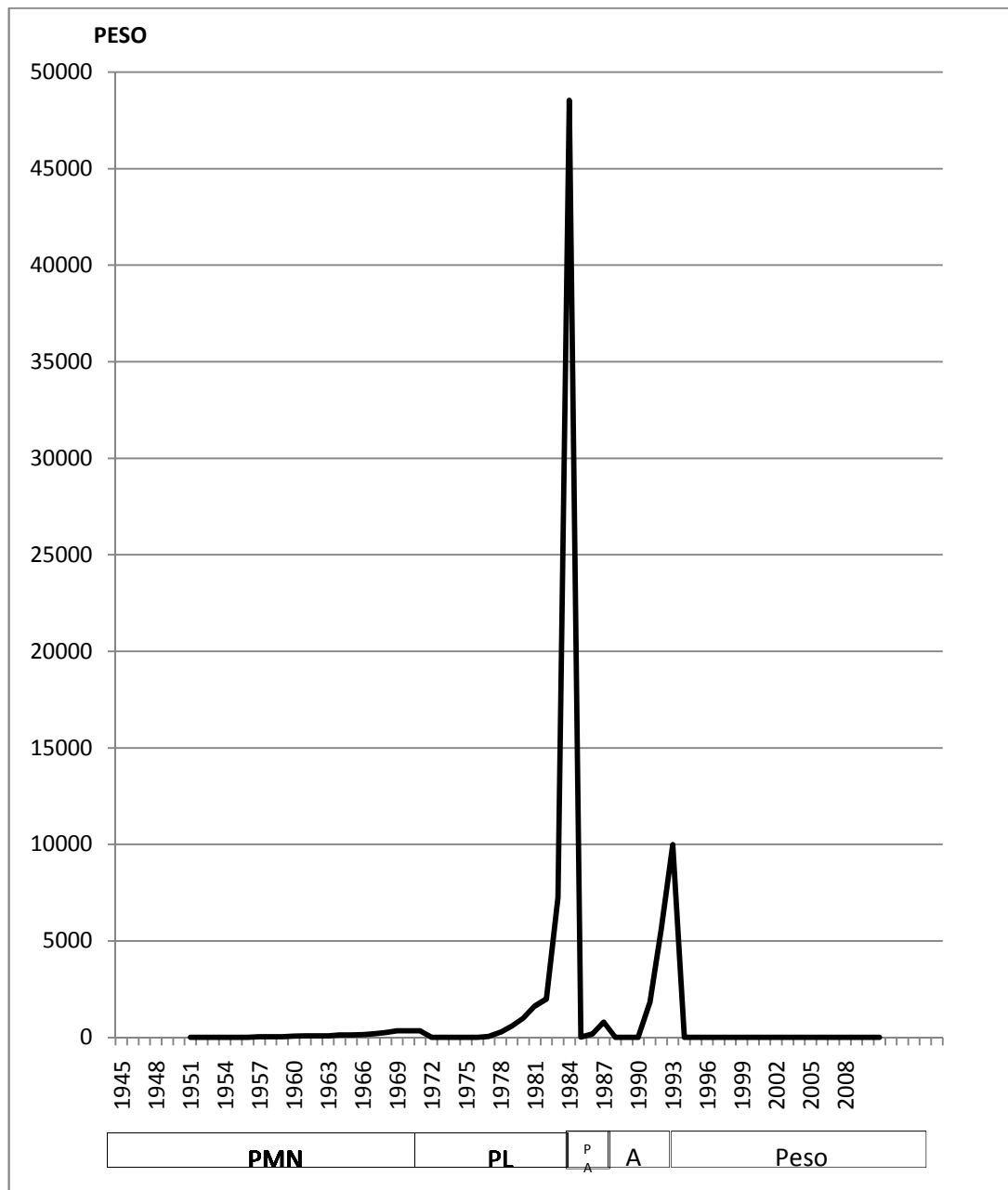
[18] See Annex 6.
[19] See Annex 6.

Figure 8: Current account balance (millions of US dollars)[20]
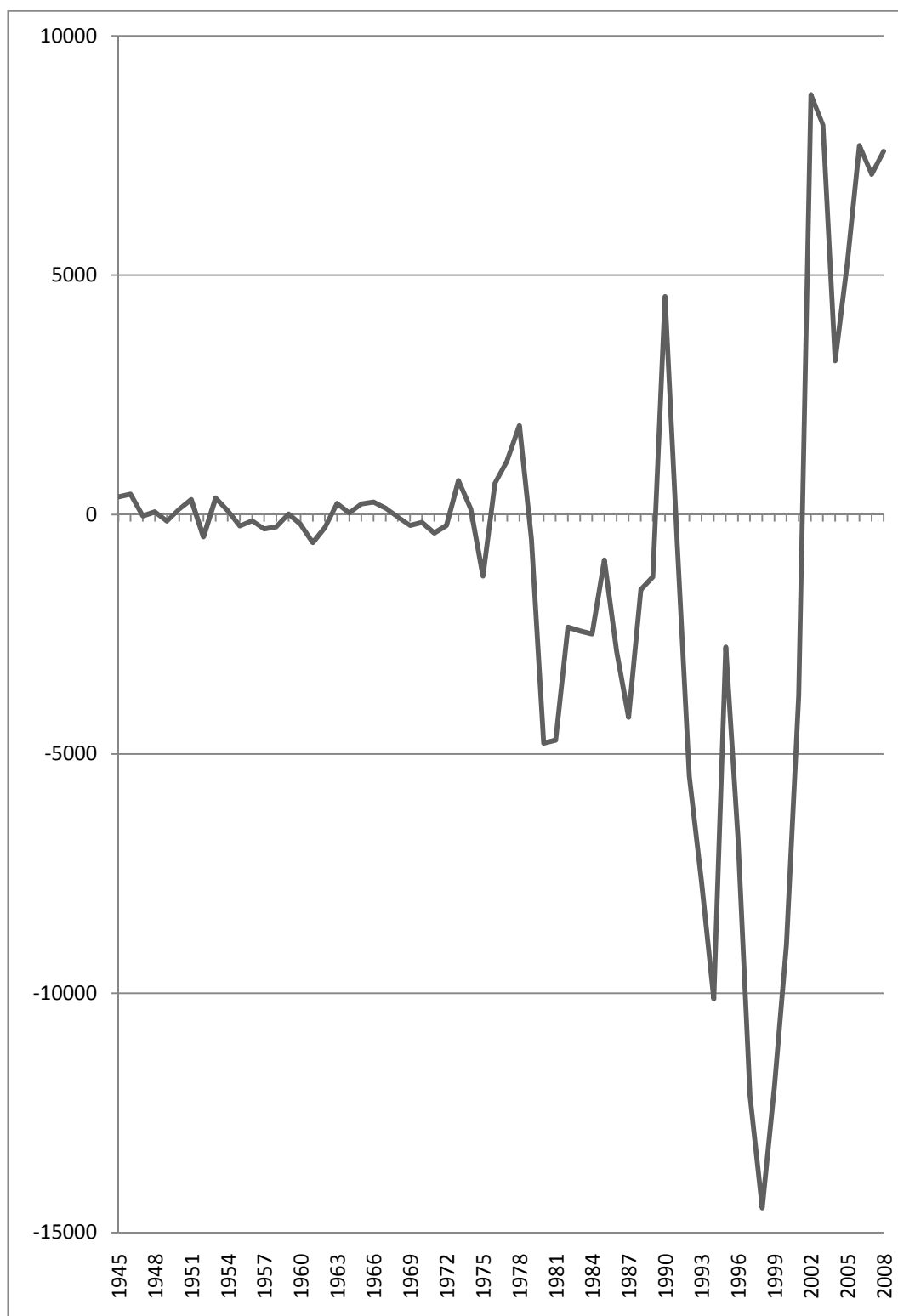
2. E. Marriage

Data on marriages was obtained from the United Nations statistical yearbooks from 1948 to 2009. It will be one of the main instrument variables in the statistical estimation of the Phillips curve. The variable measures the crude marriage rate, i.e. the number of marriages for 1000 persons. Unfortunately there are big gaps in the data and it's difficult to interpret the graph from Figure 9. Still, in the average, it is possible to say that the marriage rate decreased in the post-war period. And a small increasing can be also distinguished in the 1980's and at the beginning of the 1990's.

Figure 9: Crude Marriage rate[21]
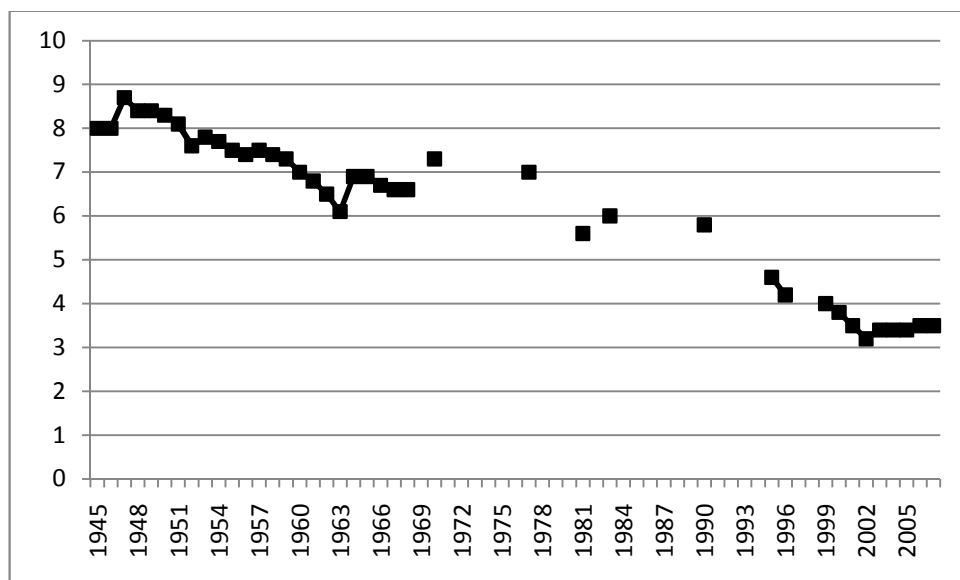
2. F. Real wages and the wage share

The real wage index was taken from Sommavilla[22] for years 1945 to 1980 and from the Economic commission for Latin America and the Caribbean (ECLAC) for years 1980 to 2003. The indices from the two sources have different base years and so the second was recalculated in order for them both to have a common base year of 1970. It is interesting to notice from Figure 10 that the wage level didn't improve much since the end of the Second World War. It was on an increasing path until the

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[21] See Annex 9
[22] Sommavilla, 1996.

beginning of the 1970's. Then it began to be very irregular until the beginning of the 1990's. Since then it seems to be rather stable. The convertibility period also had an impact on this variable as a peak can be noticed at the end of the 1990's as well.

Figure 10: Real wages (1970=100)[23]
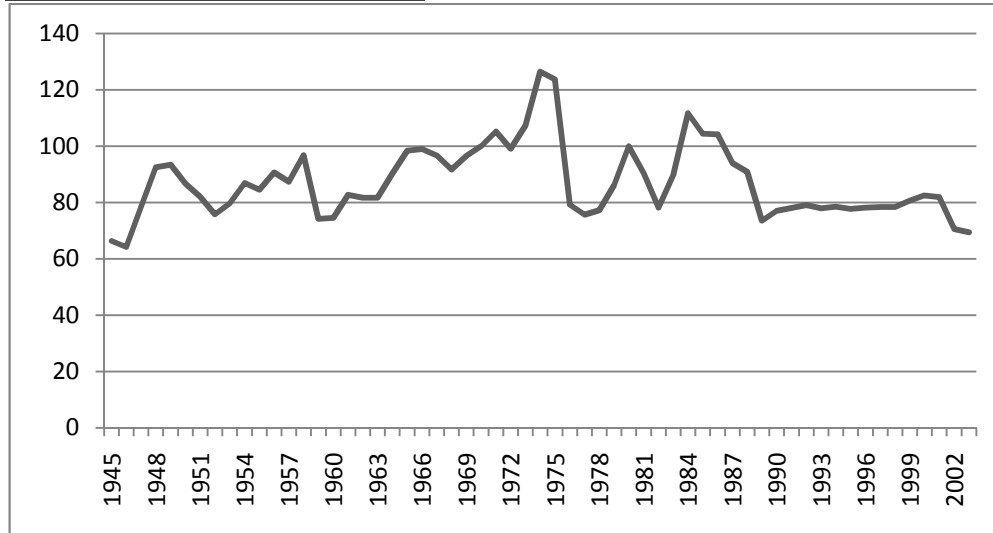
The wage share is measured as labor compensation divided by GDP and is an indicator of the distribution of income between capital and labor. The wage share ws_t can thus be written as:

$$ws_t = \frac{employment \times real\ wages}{GDP}$$

The variable is only defined from 1974 onwards because data on the employment rate is only available from 1974 onwards. In much of the literature, the wage share is used as a measure of the marginal costs of firms.

2. G. Unemployment

The unemployment rate is defined as the percentage of the active population that is unemployed. The data comes from the book of Sommavilla for the years 1963 to 1971 and from the National Institute of Statistics and Censuses of Argentina from 1972 until 2009. In Figure 11 one can see that it has been much higher since 1991 which corresponds to the beginning of the convertibility period. We'll return to this in the next chapter.

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[23] See Annex 9.

Figure 11: Unemployment rate (1963-2009)[23]**Erreur ! Signet non défini.**
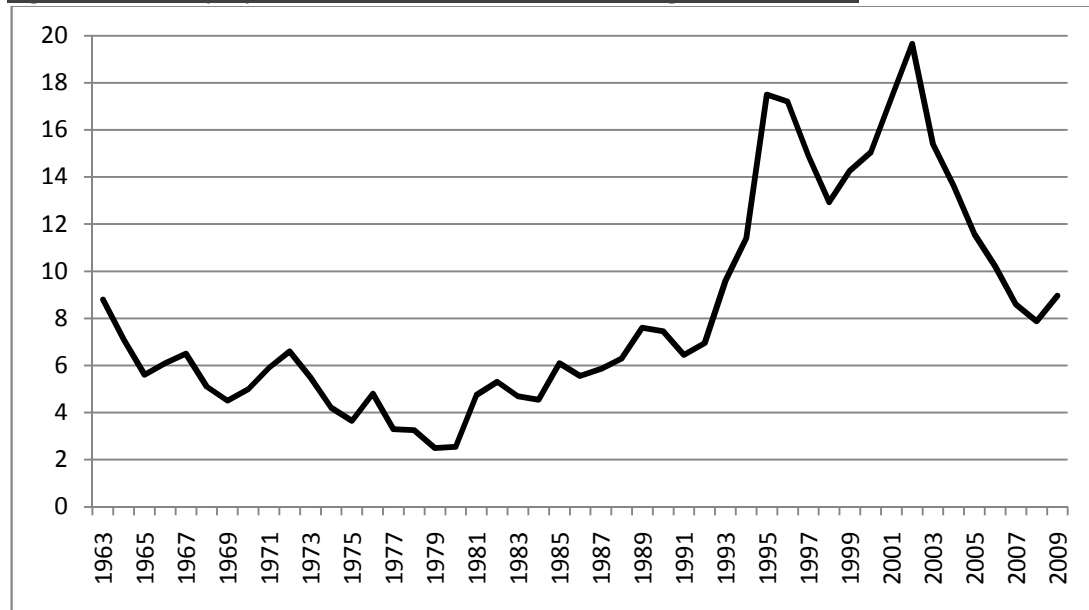
2. H. Employment and the labor productivity

The opposite of the unemployment rate is the employment rate, which measures the percentage of the active population in employment. We used data from the Argentine government, i.e. the national institute the Argentine National Institute of Statistics and Censuses (INDEC) to measure the employment rate. Unfortunately, we weren't able to obtain data before 1974. Considering Figure 12 we can see a negative trend in the long-run employment rate, with the level of employment having declined since 1974.
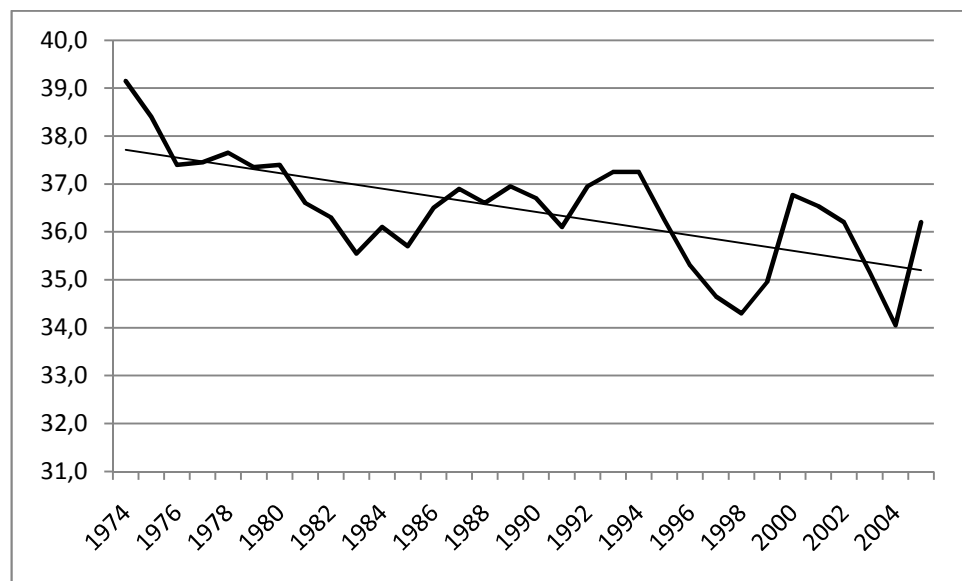
Labor productivity represents the amount of output produced by a worker in a certain amount of time, and is a measure of the "efficiency" of the labor force. It is measured as $\frac{Y_t}{N_t}$, where Y is the output and N the employment rate. A high level of labor productivity can be associated with higher unemployment: if labor productivity increases, firms won't have a high incentive to hire new workers.

2. I. Inflation stabilization policies

In order to stabilize inflation three policies are often used. The first is the use of monetary policy, whereby the government manipulates interest rates to control demand. Higher interest rates discourage borrowing and increase the rate of saving, which decreases aggregate demand and investment. As the demand is lower, the price level will fall. The second policy is to manipulate exchange rates. An increase in the exchange rate is termed an appreciation of the domestic currency, and makes domestic goods more expensive relative to foreign goods. Exports from the domestic country thus become more expensive and the demand for goods as well as for domestic currency declines. Moreover, imports from abroad become relatively cheaper which can lower the production costs and prices of domestic firms. This policy is often accompanied by an incomes policy, which means setting a limit on

wages. Fixing wage limits the extent of "cost inflation". The third possible way to stop price increasing is to use fiscal policy. The aim here is to again lower the level of aggregate demand by reducing the fiscal deficit through increasing taxes and reducing public spending. In practice, policies tend not to be implemented separately. (Jusué, 2008)

We will now concentrate on our country of interest, Argentina. In their article, Erica Jusué and Tomas Navarro (2008) listed the different inflation stabilization policies that have "successfully" been launched in the country since the end of the Second World War. By "successful" the authors mean that these are policies that have not been interrupted by political instability or higher inflation. These programs are listed in Table 1.

Table 1: Targeting variables of inflation stabilization programs[24]

Year	Fixed Exchange rate	devaluation	Floating exchange rate	Decrease of public spending	Tax increase	Interest rates reduction	price limits	Wage limits
1952	X				X		X	X
1959	X						X	X
1967	X	X			X		X	X
1973	X						X	X
1976 1979		X			X			X
1985	X				X	X	X	X
1988		X		X		X	X	X
1989	X		X					
1991	X			X	X			
2002			X					
total	7	3	2	2	5	2	6	7

If one takes a look at the total it is clear that Argentina has mostly employed exchange rate policies accompanied by controls on prices and wages. In fact, out of ten programs the exchange rate was the main anchor in eight of them. On the fiscal side, controlling the budget was never the main anchor of policy. In ten programs the Argentine authorities tried to reduce the fiscal deficit six times, but in all cases this

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[24] See Jusué (2008, pp. 13-19) for a complete description of the stabilization programs

was a secondary policy. The monetary policy instrument was also not used often since the central bank wasn't independent. In fact monetary policy was used only twice. During the Austral plan in 1985 interest rates were targeted, but this policy was again only secondary. The only time when monetary policy was the main policy was in 1988 and the policy didn't even last a year.

To describe the different policies adopted for our analysis we will construct dummy variables that summarize the policies undertaken in different periods of time. The first dummy variable we consider is a general dummy, which we call STAB for stabilization policy dummy. This is constructed as follows: the variable is set equal to 1 for the years where stabilization policies were launched and 0 otherwise. The second dummy is an exchange rate policy dummy, XRpol, which is equal to 1 when the exchange rate was manipulated by the government and 0 otherwise. The third is a fiscal policy dummy, FDpol, which is equal to 1 when the fiscal deficit was manipulated by the government and 0 otherwise. We also construct similar dummy variables for the monetary policy anchor (IRpol) and for price (Pcontrol) and wage (Wcontrol) controls with the value of the dummy being 1 when the variable was one of the government's anchors and 0 otherwise.

3. History of Argentina's political economy since the Second World War

Argentina has had a complicated and unstable economic history since 1945. There have been a large number of governments and many policies have been adopted during this period. We want to examine whether there has been a trade-off between inflation or inflation policies and parameters that reflect society, such as GDP or unemployment, during this period. In this chapter, we will consider the historical performance of Argentina and the political and policy changes implemented during this period. The vertical circle dashed lines represent the inflation stabilization policies.

3. A. 1945-1955: Peron's inflationary policy

Figure 13: CPI, GDP per capita and real wage index 1945-1955 (1945=100)
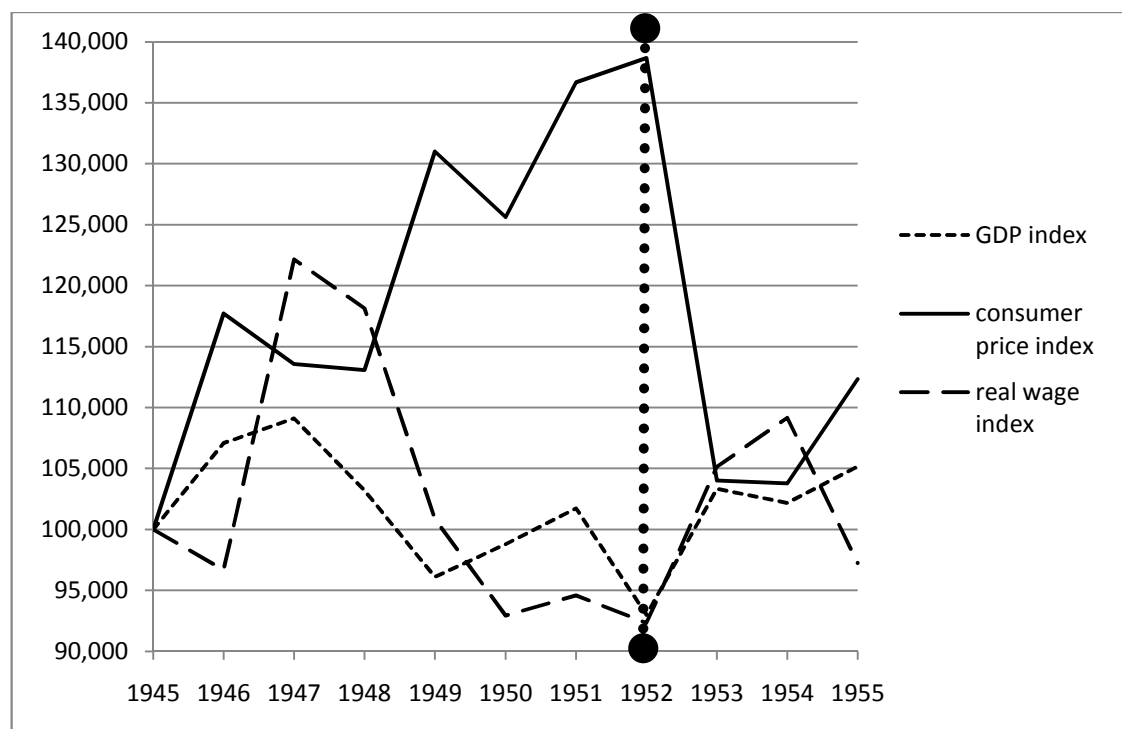
In Argentina during the Second World War manufacturing imports had declined and as a consequence the domestic manufacturing sector had to be developed. Juan Domingo Perón became president on the 4th of June 1946 and was

re-elected in 1951 until September 1955. He undertook several measures in the industrial and agricultural sector as well as in the labor market. In 1945 Argentina's revenue came essentially from agriculture. Its manufacturing sector was producing non basic manufactured goods, such as consumer goods and agricultural equipment, rather than basic items such as heavy machinery. Argentina wasn't efficient in the industrial sector and had become very dependent on imports of these basic items that could only be paid by exporting agricultural items. Perón wanted to support industrialization. To encourage this he kept agricultural prices very low in order to sell agricultural items at a price below the world price and use the profits made from such exports to import capital equipment and intermediate materials. To attain his goal, he launched an inflationary policy and introduced a triple fixed exchange rate system. He also kept an overvalued exchange rate on capital equipment and intermediate materials in order to encourage imports of these items and thereby industrialization, a policy widely known as "import-substitution industrialization, (ISI)"[25]. Peron also increased the number of State employees considerably and thereby artificially maintained the employment rate high. The first three years of his government were a prosperous period with GDP growth being positive as can be observed on Figure 3.

The policies adopted had a number of drawbacks. Firstly, prices began to climb. According to Yordon, this was because prices were following the exchange rates, with the direct consequences being higher agricultural prices and a higher cost of living. Labor demanded wage increases to compensate for price increases and an inflationary cycle took hold. Yordon argues that the only way to get out of the spiral would have been for the workers to accept wage decreases. In addition, public spending increased greatly to finance industrialization and public employees. The Fiscal deficit grew from 4.6% in 1945 to 13.4% in 1948 as can be observed in Figure 6 and was financed with foreign and internal loans. A further drawback of this strategy was the consequential increase in the trade deficit as the imports were encouraged and exports handicapped by the exchange rate. Nevertheless, the ISI strategy was used for a long period. One consequence of low agricultural prices was that the farmers were confronted with the problem of buying expensive raw materials but

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[25] Bonilla, 1999, p. 5.

selling at cheap prices and therefore couldn't expand their production. In Figure 13 we can observed that from 1945 to 1949 prices, wages and GDP seem to move in the same direction. Wages and inflation seem correlated for a while. Unemployment is not reported in this figure but would be distorted as Perón maintained the employment rate high by increasing public labor (Sommavilla, 1996; Bonilla, 1999; Yordon, 1965).

After 1949 the decline in world prices in the agricultural sector, the stagnation of agricultural production and the increase in domestic consumption led to a slowing down of agricultural exports. Furthermore, inflation started to be a concern for the government. In Figure 14 one can observe that prices started to increase in 1949 and never fell back down after that. Anxious, Perón decided to increase domestic agricultural prices relative to industrial prices[26]. As a short term consequence of this new policy, the economic situation in 1951 improved: the fiscal deficit decreased to 4.5% and GDP was growing. Unfortunately the increase in domestic agricultural prices was soon followed by a decreasing in international prices. As a result export earnings due to low agricultural prices declined and budget cutbacks had to be made in order to continue subsidizing manufacturing through imports. But this didn't stop the deficit from increasing or help in reducing inflation. The constant price increases included the governments' up-keep costs, and led to lower purchasing power, which decreased business revenues and business tax revenue. Facing diminished tax revenue and higher up-keep costs the government had to raise its fiscal deficit. This is called the Olivera-Tanzi effect[27] and is observed several times in Argentina. From 1949 until 1952 prices increased a lot while wages decreased. In 1952, the first inflation stabilization policy was attempted by Perón but it could not bring inflation down for any period of time with inflation increasing again in 1954, as illustrated in Figure 13. To sum up the movements of our main variables of interest during Peron's presidency period we can say that there was a negative correlation between prices and wages and between prices and GDP (Yordon, 1965; Gerchunoff, 1989).

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[26] See Annex 1.
[27] World Bank, 1993.

Peron kept creating non-productive positions in Government and State enterprises, which had the effect of increasing the deficit further. Raúl Prebisch an Argentine economist and the director of the CEPAL (Comisión Económica para América Latina or Economic Commission for Latin America) advised the Government to stimulate agriculture by abandoning the multiple-exchange rate, raising agricultural prices, reducing government expenditures and increasing investment in basic industries. For workers, this meant an increase in the cost of living and the removal of the non-productive jobs that Perón had created. And the government spending, according to Prebisch, should be financed not by inflation but by foreign loans and investments.

Figure 14: Prices and wages indices 1948-1961 (1950=100)[28]
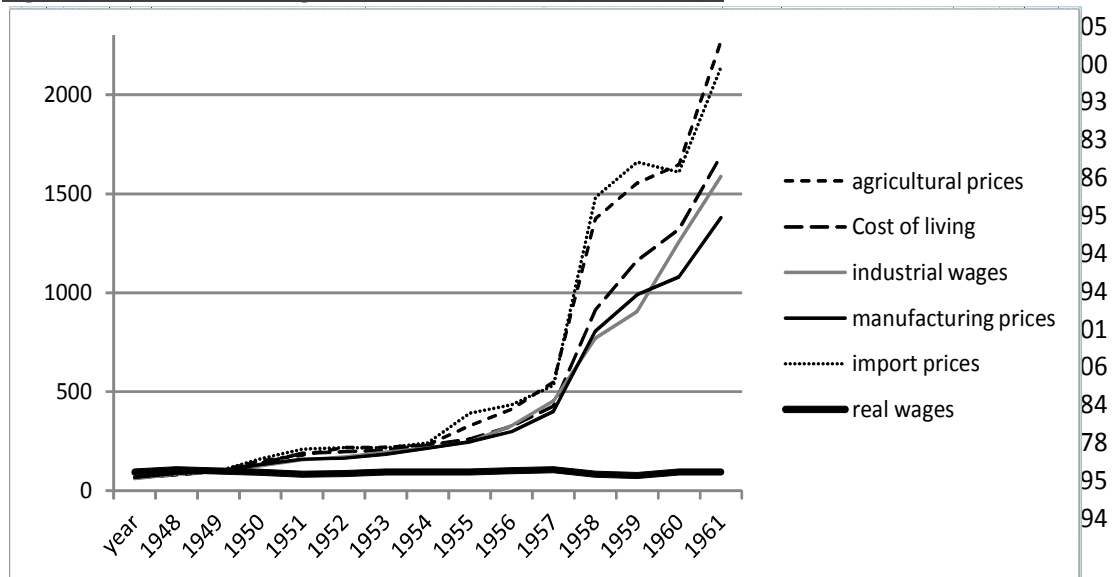
[28] See Annex 4.

3. B. 1955-1973: struggle to take some economic measures

Figure 15: CPI, GDP per Capita and index of real wage 1956-1965 (1945=100)
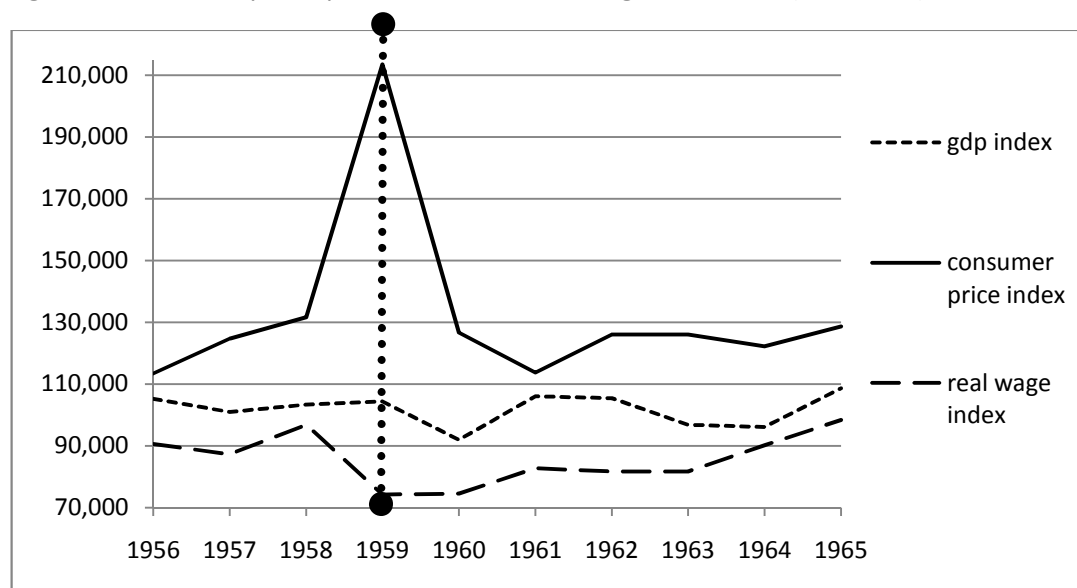
The Government couldn't proceed with the reforms of Raul Prebisch as the people lost trust in them. As the central bank had been nationalized the Government had control over it and constantly printed money. This led to more inflation and opacity of market behaviour. The cost of living increased sharply. People were more and more dissatisfied. The people started to revolt against the Government and, in 1955, Perón was overthrown. With the arrival of Eugenio Arambru as the new head of State conflicts and violence increased. On the economic side, his aim was to increase exports. He devalued the exchange rate making Argentina's exports more competitive on world markets. Despite this policy, the trade deficit continued to increase largely because of the "adverse international situation in terms of flow of Argentine trade"[29] and the "quantitative restrictions practised by the countries purchasing Argentine products"[30]. The devaluation stimulus was offset in 1958 as agricultural prices increased by 85% in 1958. The fiscal deficit also reached a peak of 9.6% (Gerchunoff, 1989; Sommavilla, 1996)

In 1958 Arturo Frondizi became president and inherited an economy in bad shape. He wanted "to push forward the country's economic development",[31] a policy

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[29] See Gerchunoff (1989), p. 105.
[30] See Gerchunoff (1989), p. 105   .
[31] Alexander, 2003.

known as "desarollista" and had ideas similar to those of Peron. In the first year he held his electoral promise of raising wages by 60%. But in 1959 economic pressures were high with prices having soared and the country was facing collapse with a GDP declining by -6.76%. To stop this descent, Frondizi followed the suggestions of Prebisch from 1955. First, he eliminated the workers previously hired by Perón in public enterprises that weren't needed and established a policy of wage restriction. The effect of the wage increases in 1958 was offset in 1959 as Figure 15 reveals. Second, he raised agricultural prices and eliminated controls on trade to stimulate exports. His third measure was to increase fiscal revenues from foreign trade by eliminating quantitative controls on foreign trade and letting the exchange rate float without changing the public expenditures level. As a result of these measures the fiscal deficit was brought down to 2.9% in 1959 and to 2.7% in 1960. Finally, the problem of inflation needed to solve in order to receive loans from abroad. To achieve this, the second inflation stabilization policy was launched. Figure 15 shows that the measures were successful but only in the short term as inflation rose again shortly after. Unfortunately, all of the measures undertaken could only bring about short-term stabilization. In 1961, the current account was again in deficit. In addition, the labor force was again dissatisfied because of the higher cost of living. Wages had increased while inflation had decreased but only for a while, with wages declining and inflation increasing again after a short time. The major sources of revenue were the excise tax – which is charged directly to the producer on each finished item – sales taxes, income taxes and import duties and surcharges. Workers paid 15% of their incomes in taxes and there was no way to increase public revenues by taxing individuals more. Yordon argued that *"there was no acceptable easy means of increasing taxes"*[32]. The government was struggling on all sides: from the military forces which imposed frequent cabinet changes, the labor unions calling for strikes and the inter-services rivalries in the use of force. In March 1962 Frondizi was overthrown. This event was followed by a $350 million capital outflow, an increase in price and a depreciation of the exchange rate. The populous wanted to return to the measures taken by Perón before 1952 and thus to cancel the measures taken by

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[32] Yordon, 1965, p. 85.

Frondizi. The quick replacement of different governments led to economic insecurity and a depreciation of the currency against the dollar. Foreign investors were scared by the political instability, while the unions and firms focused more and more on short-term interests (Yordon, 1965; Petrecolla, 1989).

In 1962, Jose Maria Guido took over the presidency for one year and had many different ministers of the economy, making it difficult to have a real long term policy. Guido started a liberalization wave and intended to eliminate all exchange controls. In this context, he let the peso fluctuate. Furthermore, he reduced foreign trade taxes which added to the budget deficit. This was partly financed by issuing bonds that were used to pay for wages and public employees were forced to sell those bonds back at a discount rate. The budget deficit was also partly financed through domestic debt (De Pablo, 1989).

In 1963, Arturo Illia became president. He re-authorized the Peronist movement. In 1964, he established a minimum wage and a law to control food prices. He tried to regulate the public sector and to ameliorate industrialization. His efforts can be observed in Figure 4, where we observe an increase in GDP growth from -4.75% in 1963 to 5.73% in 1964 and 8.08% in 1965.[33] This was the longest post-war period of positive growth. Illia also managed to bring the fiscal deficit down to 4.72%. The world price for argentine exports was high and agricultural production was able to expand. Over this short period of time, wages increased along with inflation which was often not the case previously and unemployment decreased (Guadagni, 1989).

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[33] See Annex 4.b.

Figure 16: CPI, GDP per capita, the unemployment rate and an index of real wages 1965-1973 (1965=100)
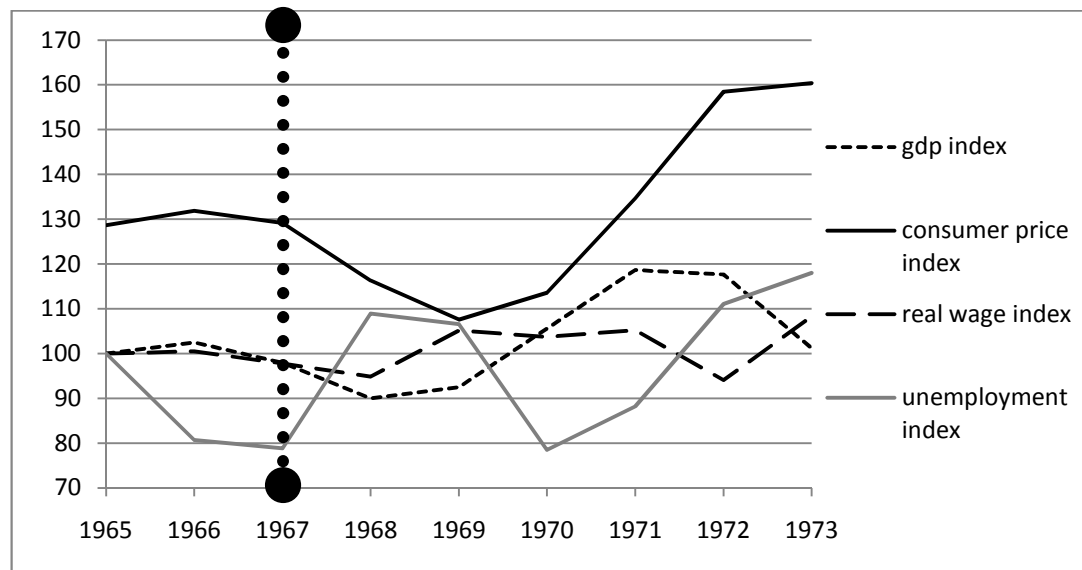
In 1965, the Peronists with Illia as their head won the legislative elections. But in June 1966, the president was overthrown by the military, supported by the unions and some politicians. Juan Carlos Ongania took his place and headed the "*Revolución Argentina".* He devalued the peso by 30%, which was then fixed until 1970. His means of controlling inflation was to restrain wage growth and to restrict price increases. This policy worked as inflation decreased slightly until 1969 as did wages. Unemployment, on the contrary sharply increased. In 1969, beef prices increased sharply and inflation returned (Maynard, 1989).

Juan Carlos Ongania when he became the new head of the State faced strikes and demonstrations. In 1970, the military officers removed him and Roberto Marcelo Levingston Laborda became the new president. He was soon followed by Alejandro Agustín Lanusse who took over between 1971 and 1973. This period of political high instability is reflected in Figure 16. Inflation and unemployment soared and real wages decreased. GDP increased for a few years but started to decrease again in 1972. The authorities did take a number of measures to remedy this situation. Between 1970 and 1971, the minister of the economy increased public expenditures and decreased the tax on capitalization. Still in 1971, the new minister of the economy also launched a public investment policy. As a result the deficit increased to 4.4% in 1971. At the end of that year, the next minister in this domain tried to implement a restrictive policy in order to increase fiscal revenue and reduce the

deficit. But the economic situation was poor – see Figure 4 where GDP growth is shown to be very low between 1970 and 1973. In 1972 Argentina had to borrow from the IMF "under harsh terms"[34] to finance its deficit (Mc Comb, 1997, Filippini, 1989).

To summarize, during this period the relationship between inflation and unemployment and inflation and prices were rather mixed. More often during this period, prices and wages were negatively correlated and inflation and unemployment positively correlated.

3. C. 1973-1976: the return of Perón and high fiscal deficit

Figure 17: CPI, GDP per Capita, the unemployment rate and the real wage index from 1973 to 1976 (1965=100)
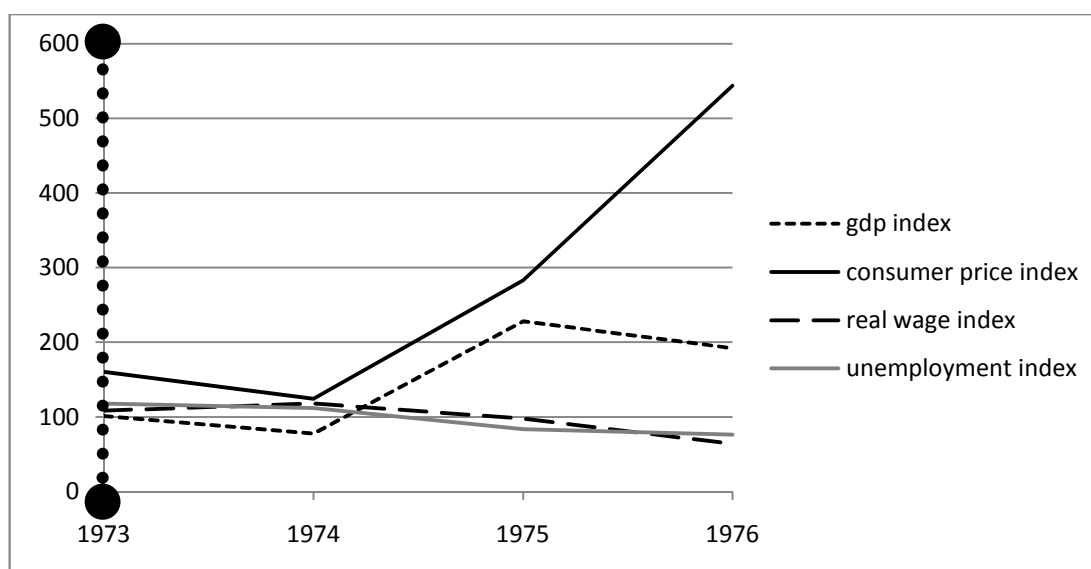
In May 1973, the Peronist candidate Héctor José Cámpora was elected. The new government suggested stopping inflation by bringing business and labor unions together to make agreements on keeping prices and wages stable. New restrictions were imposed on foreign investment. The government gained control of credit and prices and even created a value-added tax. Those measures helped decreasing inflation in the short-run, but at the same time public sector employment grew, and with it public expenditure. This resulted in a larger budget deficit, to which the

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[34] Filippini, 1989, p. 200.

government responded by creating more money which brought political chaos and rising inflation again.

Perón returned with a mandate to solve these problems and was elected president in September 1973. His policy was based on more public spending and therefore he increased the number of State employees as well as their wages. He also cancelled tax receipts. In 1973 and 1974, economic growth was high largely because of the favourable world economic situation and the positive terms of trade, but the negative effects of government intervention appeared quickly. The fiscal deficit grew to 7.5% in 1973. This was financed partly by increasing domestic debt, partly by creating money and partly by fiscal repression. But such policies couldn't continue indefinitely: inflation was too high and money creation had reached its limit.

In June 1974, after the death of Juan Peron, his wife Isabel Peron took over the role of President and proceeded to make some drastic changes. Wages and prices became more flexible. She tried to launch a restrictive monetary and fiscal policy which should have reduced inflation and deficit. But the deficit continued to grow reaching 13.8% in 1975, which was the highest since the war. In the same year, the current account balance turned negative and the peso had to be heavily devalued. This marked the beginning of a series of devaluations that started to influence economic behaviour. Also inflation couldn't be stopped by her policy and it soared to 443.8% in 1976. The economic situation was tense and ministers were replaced often. Despite the government having made an agreement with the IMF to reduce its deficit, it was overthrown in March 1976 (Mc Comb, 1997; Di Tella, 1989; Bonilla, 1999).

Figure 17 illustrates what happened during those three years. First, all four variables were moving together and then, approximately at the moment where Peron's wife took over, inflation soared while unemployment, wages and GDP decreased.

3. D. 1976-1983: military governments and dissatisfactions: the "dirty war"
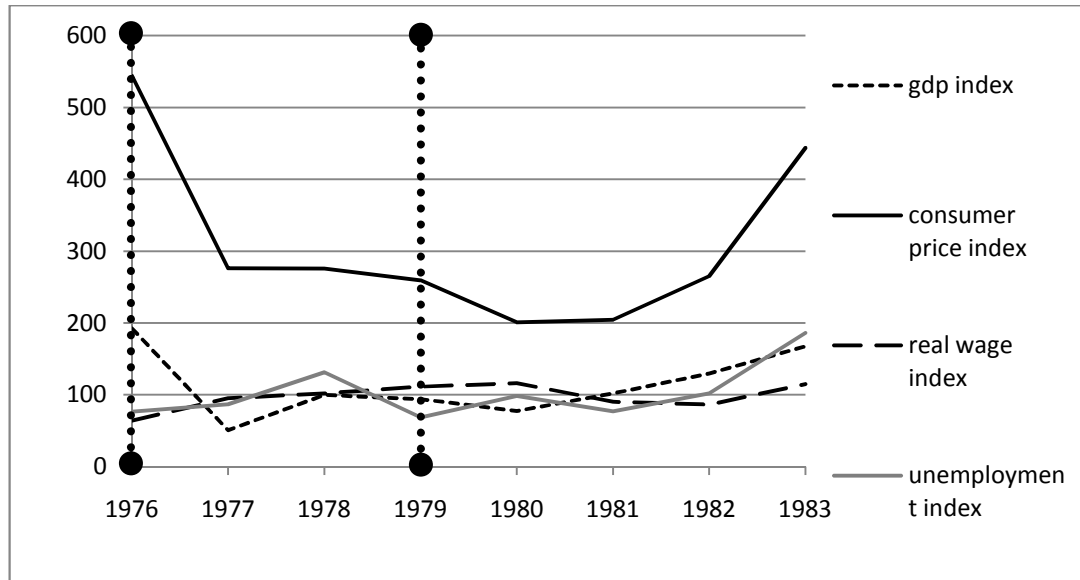
An army commander, Jorge Rafael Videla, became president and took Jose Martinez de Hoz as finance minister. The government started an inflation stabilization policy. The policy seemed to work as, in 1977, the inflation rate decreased to 176%. After that, Argentina financed its deficit more and more by borrowing from abroad and less by creating money. In 1977 and 1978, the positive effect of devaluations could be observed as the terms of trade turned positive. Unfortunately, it was the last time until 1990 that it was above zero. Moreover, the "permanent reliance on foreign finance of the deficit"35 was growing. And even though the inflation rate had decreased, it was still higher than 100%. In 1978 the Government was facing a new crisis. Videla answered by launching, in 1979, for two years an inflation stabilization program based on the exchange rate: a variant of crawling peg called "tablita", in which the exchange rate is adjusted periodically according to a set of indicators. The principle of such a table was to pre-announce devaluations for the next eight months which would adapt to inflation and wages. From the beginning of this program the devaluation rate was set below inflation and led to a huge increase in the exchange rate from 1003.5 pesos per dollars in 1978 to 48545 in 1982. This peak is shown in

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[35] Sjaastad, 1989, p. 271.

Figure 7. Inflation decreased slightly. Videla also decided to launch a foreign trade liberalization policy. He thought declining import price inflation would help to reduce domestic market price inflation but it wasn't successful. The system collapsed in 1981 as the devaluation deviated from the schedule and prices grew again. The government tried to initiate a dual exchange rate system but in the same year it was abandoned to let the peso float. The economic situation was bad. Foreign debt had grown from $9.7 billion in 1977 to $35.7 billion in 1981. GDP growth dropped to its lowest point of -6.6%. The exchange rate based plan was not compatible with fiscal restrictive policy and therefore, the deficit rose to 6.5% in 1980 and 11.3% in 1981 (Sjaastad, 1989; Dornbusch, 1990; Dornbusch, 1984).

Meanwhile a huge financial crisis was taking place in which many people were affected. In 1977 the national bank declared it would insure all deposits. The people could place their money in any institution that offered the best interest rate without incurring any risk. A lot of insecure financial institutions opened at that time. With this kind of insurance the banks and the financial institutions could make risky investments. Problems began to appear in 1978 as the Government decided not to backup 100% of the investments but only $650 for domestic currency deposits, 90% for larger deposits in domestic currency and nothing for deposits in dollars. People started to withdraw their money as they were not sure about the solvency of the financial institutions. In March 1980 the largest banks and financial institutions could not honour withdrawals of the deposits. Three of the major banks had to close. The central bank had to liquidate those institutions and became responsible for at least 90% of the deposits. This led to a huge monetary expansion. The central bank decided to revert to covering 100% of the deposits up to $56000, which could be applied retroactively and to dollars as well. But deposits in private national banks dropped greatly. At the beginning of 1981, the country was nearly out of international reserves (Mc Comb, 1997).

Incapable of dealing with the catastrophic situation three presidents followed each other from 1981 to 1983. Inflation continued to grow, foreign debt increased by $26 billion and the national part of it increased by 20 percentage points. As a consequence, the deficit stayed above 10% during those three years. The measures

taken were quite limited because of political instability. The central bank tried to compensate the continually devalued peso by providing insurance on foreign loans to private sectors firms. But the exchange rate kept depreciating and by 1982, it was unable to honour this insurance. In order to prevent capital flight the Government decided to offer financial institutions bonds up to the same value as the loans they refinanced. The central bank ended up owning several bankrupt firms and faced a big fiscal deficit. The Government then attempted to put a limit on interest rates and improve exchange rate insurance but investors continued to turn away from the Argentine capital market. In December, Leopoldo Galtieri took over. He wanted to return to a liberalization policy. But in 1982 Argentina and the United Kingdom engaged in the Falklands war. Argentina's expenses were very high and the military defeat led to Galtieri's resignation. Between 1976 and 1983 at least 10,000 people "disappeared" in the so-called "dirty war". People asked more and more questions and wanted a return to civilian rule (Dornbusch, 1984, 1990; Mc Comb, 1997).

3. E. 1983-1989: very large inflation rates, Alfonsin and the Austral plan

Figure 19: CPI, GDP per capita, the unemployment rate and an index of real wages 1983 to 1989 (1965=100)[36]
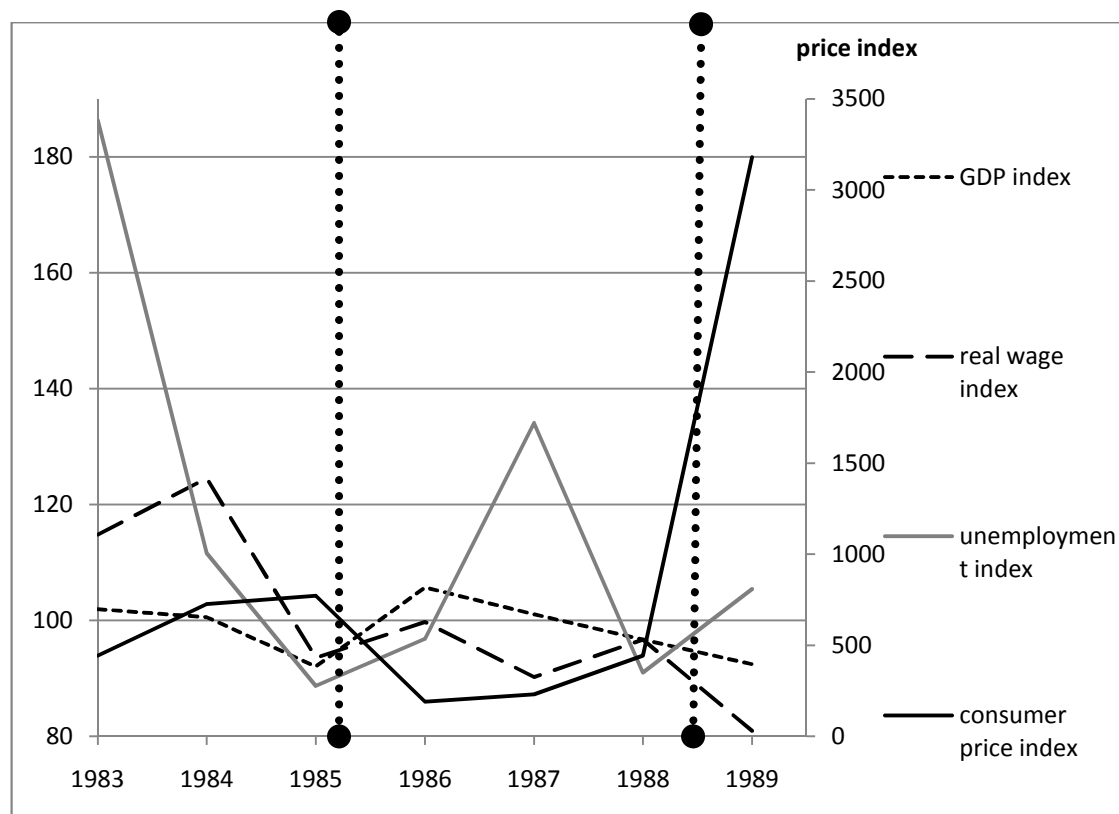
In October 1983 a human rights activist, Dr. Raúl Alfonsin, was elected. By then the Argentine economy was in a really bad shape. Debt levels were huge and nothing seemed to be able to stop inflation. Alfonsin managed to bring the budget deficit down to 5% in 1985 and to increase GDP growth, but he also financed the deficit by increasing the seignorage level, i.e. by printing money. In addition to that, the currency depreciated against the dollar. For these two reasons he didn't succeed in giving an attractive picture of his country to foreign investors. This led to a new financial crisis. The central bank had to stop deposits in dollars for 180 days. "The *flight out of the domestic currency and into goods and dollars*"[37] led to an increase in

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[36] On this graph, we had to build a secondary vertical axe for prices because they were so high that we couldn't distinguish any fluctuations for the other variables.
[37] Mc Comb, 1997.

the general price level and pushed the monthly inflation rate above 30% in May 1985 (Mc Comb, 1997).

In June 1985 the government decided to adopt a heterodox stabilization plan, the Austral plan, described by Kiguel as *"the basic strategy […] attempted to provide a comprehensive response to the large existing imbalances in public finances and to the inertial elements of the inflationary process"*[38]. Its goal was to increase public revenue and reduce expenditures. First, the trade tax was increased. This was a double-edged sword in the long-term because it could handicap the country's export as it was already suffering in this external sector as the foreign investors had. Second, a large increase in domestic credit and money supply was planned. In addition to that, the exchange rate was fixed and the currency was for this short period the Austral which was equal to 1000 Peso Argentino. The introduction of this new currency was accompanied by the promise from the government not to finance the deficit by printing money. But the main measure of the program was the implementation of a freeze-realignment program on three anchors: prices, wages and the exchange rate. They were all frozen and relative prices were realigned in order to avoid distortions. This approach allowed inflation to persist at a lower level. Thus, the exchange rate and public sector prices, which were the two main anchors, were initially overvalued in order to maintain the freeze on nominal values. On the contrary, wages were initially restrained in order to support the fiscal effort and the restrained demand (Mc Comb, 1997; Kiguel, 1989).

This program worked in the short-term and inflation fell. Soon the economy went into an expansionary cycle however, and growing demand began to be a threat for the inflation effort. In fact, the fixed exchange rates were hard to maintain. Furthermore commodity prices had fallen in the rest of the world. As can be seen in Figure 8 the terms of trade deteriorated even more than before the plan. In 1987 the current account had reached -4.2 billion dollars. In addition to that, the government couldn't rein in the social security system or the provincial governments that were spending too much and were majorly responsible for the growing fiscal deficit. Alfonsin' solution was to limit access to the treasury for these public branches in

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[38] Kiguel, 1989, p. 5.

order to create incentives for them to try to balance their budgets. But the program failed and between 1987 and 1989, the deficit stayed at a high level, between 7 and 8%. The ensuing period of hyperinflation had the effect of keeping the deficit high. In 1988 Alfonsin tried one last time to stabilize the economy by launching the Primavera plan- as illustrated in the circle dashed line in Figure 19, but it collapsed a few months after and inflation rose to 3000% (The World Bank, 1993; Mc Comb, 1997).

For this period, it is quite hard to determine a trade-off between inflation and the other variables for two reasons. Firstly, inflation really soared to numbers never seen before in the country. Secondly, the political situation was again not very stable. But in general, we noticed a rather negative relationship between inflation and unemployment and real wages.

3. F. July 1989- April 1991: disastrous start for the Menem administration

In 1989 the country was worse off than before Alfonsin. The high inflation period was producing tax collection lags and "opaqueness over tax returns"[39]. Moreover, the public firms' prices were taken as an indicator for the quality of the government policy, and were therefore kept frozen, which contributed to the fiscal deficit. Money creation increased and with it inflation. The State defaulted on its debt.

In May 1989 Carlos Saul Menem, the Peronist candidate, was elected president. In July hyperinflation had reached 200%. His aim was to restore a market economy and of course to solve the inflation problem.

In the beginning the government launched the "Bunge and Born Plan". This was a moderately heterodox price control program similar to that implemented by Alfonsin. But this plan failed. In December Menem had to abandon all his campaign promises. On the 10th of this month the government deliberately defaulted on its internal debt and prices were allowed to float. The value of the Austral against the dollar depreciated reaching 5585 pesos per dollar in 1990. Withdrawals of bank deposits continued and on the 1st January 1990 the "Bonex plan" was launched. The

[39] World Bank, 1993, p. 5.

main policies were to privatize many public firms and the government replaced short-term domestic debt and time-deposits with ten year bonds. But the much discounted bonds led to a massive capital loss. The deficit that didn't include interest payments was not reduced and had to be repaid by money creation. Inflation reached a peak of 20,000% at the beginning of 1990. Public payments were delayed. In March 1990 more severe fiscal measures were taken but the reforms performed poorly and didn't reduce inflation below 10% per month. Privatization was hard and the measures were only very slowly implemented (Corrales, 2002).

3. G. 1991-2002: Argentina's currency board: pegging the Peso to the Dollar

Figure 20: CPI, GDP per Capita, the unemployment rate and an index of real wages 1991-2002 (1965=100)
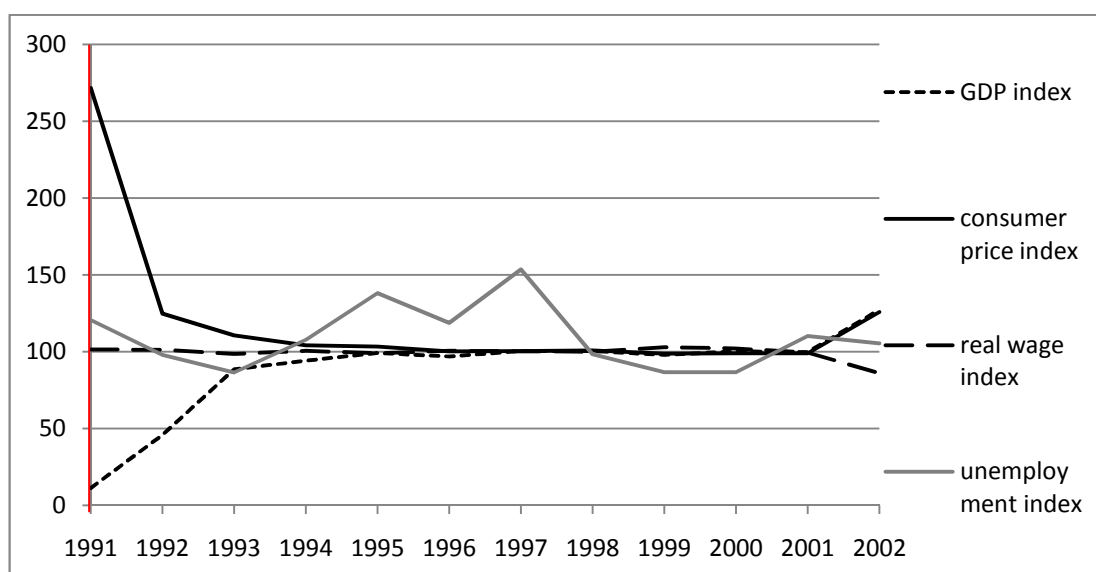
In January 1991 Domingo Cavallo was appointed economy minister. Despite the very tight monetary reforms, inflation was high and the peso value increasing against the dollar: Argentina was again facing a crisis. In April 1991 the Austral was abandoned and the peso was reinstated. From 1991 to 2001 the peso was pegged to the dollar at a ratio of 1:1. This was called the convertibility period or the currency board. It was the longest period in the second half of the 20th century in which the exchange rate remained stable. Such a system comes with its rules and Argentina broke most of them.

The policy first showed impressive results. It was successful at bringing inflation down, GDP grew at a rate of 7% until 1995 and trust was restored to the Argentine financial system.   At the end of 1994 the Mexican economy faced a currency crisis as and the Argentine economy suffered from what was called the tequila effect. This overshadowed Menem's re-election in 1995. Despite GDP growth being 6% after the elections the rest of the economy was starting to fail. Unemployment increased as did inequality. The government was also facing corruption accusations and public debt had increased. As a result Minister Cavallo who was responsible for economic policy was dismissed in 1996. The financial crises in Asia in 1997, Russia in 1998 and Brazil in 1999 affected Argentina strongly, especially that in Brazil which was Argentina's second largest trade partner. The peso pegged to a strong dollar combined with smaller foreign demand made Argentina less competitive. It permanently ran a current account deficit.   After 1995, the current account balance fell and reached a minimum of -14 billion dollars in 1998 (Frenkel, 2007).

In 1999 Fernando de la Rúa was elected president. He launched a program called "el impuestazo" in order to reduce the budget deficit. To achieve these taxes were increased as the government found it difficult to reduce public spending. Moreover, in March of 1999 the IMF accorded a $7.2 billion standby loan to Argentina. The president rapidly lost the support of the people. The unions went on strike to protest against deregulation in the labor market. Unemployment and public debt continued to increase. Moreover there were chronic difficulties in the financial relationship between the central government and the provinces. Investors and lenders lost confidence in Argentina, which led to a liquidity crisis in November 2000. Desperate, the government called Domingo Cavallo back to the ministry of finance on March 20th of 2001. But in the middle of November the government was again running out of liquidity. Withdrawals of deposits increased and foreign exchange reserves decreased. The government had to close banks and freeze bank deposits. After reopening the banks it authorized a withdrawal of only $250 per week. This was called the "Corralito". Unions called for a general strike and chaos in the streets began, with almost thirty people dying. The approach of Cavallo was rejected and he resigned, followed shortly after by the president (Ruddies, 2008).

After three very short-term failed presidencies, Eduardo Duhalde became the fifth president in two weeks. His first measure was to abandon the currency board and to introduce a dual exchange rate system. We mentioned earlier the view of Frieden and Stein that the pegging of the Peso to the Dollar wasn't likely to bring real appreciation and that inflation targeting was more important for decision makers than a real appreciation in a period of hyperinflation. We know now that fixing the exchange rate did bring about a real appreciation and brought the current account in to deficit. Indeed, it is true that authorities chose inflation over the trade balance. This was the major reason for the failure of the currency peg and the highly unstable unemployment rate. Figure 20 shows how the unemployment rate grew before 1998 and then decreased and then increased again. In this case, as prices were kept very stable, it is impossible to define a relationship between inflation and the other variables.

3. H. 2002-2009: stable economy?

Figure 21: CPI, GDP per Capita, the unemployment and an index of real wages 2002-2009 (1965=100)
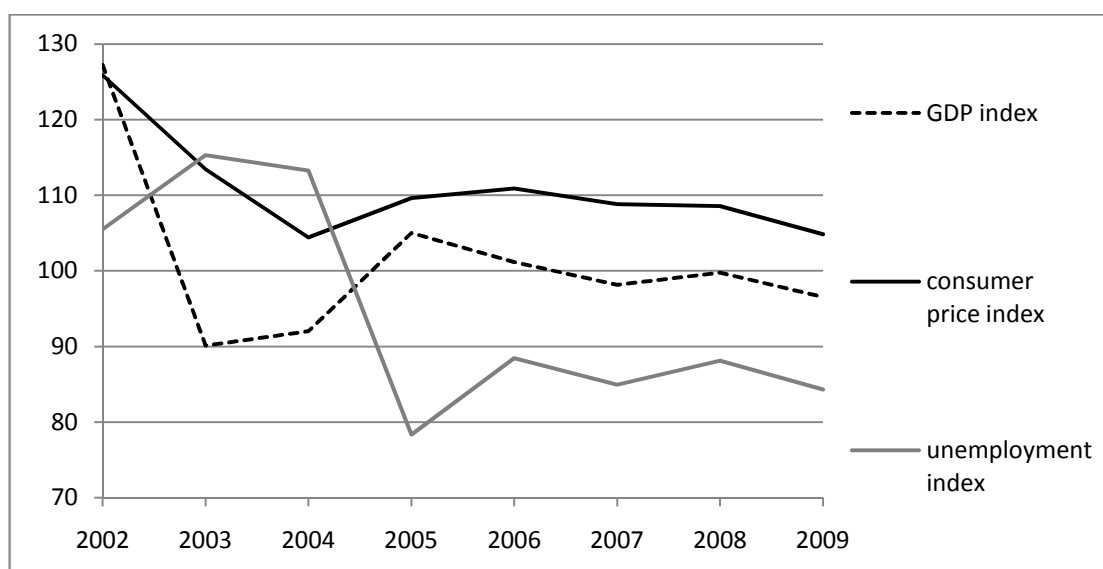
In February 2002 under an IMF agreement Argentina implemented a free floating exchange rate which led to a huge devaluation of the peso. The Central Bank started to intervene by selling dollars to avoid it. The government also regulated

foreign capital outflows and imposed exchange rate controls. The peso stabilized against the dollar (Felder, 2008).

In May 2003 Néstor Kirchner was elected president. The stable and competitive real exchange rate or SCRER was the centre of his program and led Argentina to rapid growth. Since then the peso stayed stable at around 3 pesos per dollar. The annual growth of GDP between 2002 and 2007 was 6.3%. The investment rate also increased sharply. In 2004 the public debt was re-negotiated and reduced and in 2005 the debt with the IMF was paid with the help of Venezuela. The SCRER also had a preventative role for inflation acceleration. In December 2007 Cristina Elizabeth Fernández de Kirchner, Néstor Kirchner's wife, became president (Frenkel, 2008).

But the recovery of consumption and the depreciated currency has led to acceleration in inflation since 2004 despite what the official numbers say. An "alternative" statistical agency published a report that inflation had increased from 26% in 2006 to 30% in 2008. Between 2004 and 2006 there were negotiations between economic authorities and price setters in order to regulate prices, and between workers and unions to regulate wages. But since 2007 the negotiation's effectiveness has slowed down. Wage claims have grown along with the economy's recovery. The labor force is asking for higher wages. Moreover, people's incomes have struggled "to keep up with [the] price increases of the 2000's"[40]. (Felder, 2008; The economist, 2008). In 2009, in the midst of the world financial crisis, the economy is deteriorating and Crisitina Kirchner has become less popular

To summarize we saw that Argentina has faced several periods of hyper- and chronic inflation since 1945 and no policy succeeded in reducing inflation in the long-term. The longest period of stabilization was the currency board, but in the end this also failed.

It was not easy to determinate any trade-off between inflation and unemployment, GDP or wages. In the short term, we observed both positive and negative correlations. In what follows we search for a long-run relationship between these variables.

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[40] Felder, 2008.

5. Empirical evidence for the New Keynesian Phillips Curve in Argentina: influence of inflation and inflation stabilization on society

After vainly trying to determine through graphical representation a trade-off between inflation and other variables that reflect society we now turn to regression techniques. In particular, we analyze the Phillips curve. In 1958 William Phillips conducted a study of inflation in the UK over the previous hundred years. He observed an inverse short term trade-off between wage changes and unemployment. In the 1960's, Paul Samuelson and Robert Solow extended his work and proved that this relationship also held for the USA (Cashell, 2004).

After many critics, a New Keynesian Phillips curve was provided. This is the one we will use basing on several literature. Gali and Gertler (1999) found a positive relationship between wage share and inflation for USA and Gali, Gertler and Lopez-Salido (2001) for Europe. Bardsen, Jansen and Nymoen (2002) support their results for the Euro zone, and specially test the NKPC relationship for United Kingdom and Norway where they also obtain a positive relationship. For Argentina, there was little literature on the Phillips curve, though Nugent and Glezakos (1982) predicted that the inflation-marginal cost trade-off was the opposite for Latin America when compared to developed countries. There argument was stated for the "most agricultural"[41] group of Latin American countries however and they did not include Argentina in the group.

5. A. Unemployment and Inflation

5. A. 1. Phillips curve: the origin

At the beginning, Phillips wanted to show that there was a relationship between inflation and wage changes. The original equation taken from Gilbert (1976) was:

$$\Delta w_t + A = bu_t$$

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[41] Nugent, 1982, p. 331.

where Δw_t is the rate of change in wages, A is a vector of variables that also influence wages and u_t is the unemployment rate. (Gilbert, 1976)

The second step was to change wage changes for inflation. Rewriting the previous equation with the help of Humphrey (1985), the Phillips curve equation with inflation is:

$$\pi = bu_t + A$$

where π is the inflation rate. (Humphrey, 1985)

During the 1970's, the expected inflation, also called inflation inertia, was added to the equation in order to capture the inflationary expectations. The curve became:

$$\pi = \pi^e + bu_t + A$$

where π^e is the expected inflation rate.

Finally, the unemployment rate was replaced with the deviation natural rate of unemployment and the supply shocks variable v replaced A. We obtain the final Phillips curve equation states inflation as a function of the unemployment rate deviation from the natural rate and the supply shocks and expected inflation, also described as the triangle model by Gordon (1991):

$$\pi = v - \beta(u - u^n) + \pi^e$$

where $(u - u^n)$ is the deviation from the natural rate of unemployment. (Gordon, 1991)

In the case of Argentina, we make the simple assumption that people expect inflation to grow at the same rate as the previous period, this is called "adaptive expectations"[42]: $\pi^e = \pi_{t-1}$. Often it is assumed that expectations are based on more than one lag of inflation. We can rewrite the Phillips curve equation in the case of expectations depending on the past h periods as:

$$\pi = \sum_{k=1}^{h} \xi_k \pi_{t-k} - \beta(u - u^n) + v$$

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[42] Mankiw, 2006, p. 388.

where ξ_k is the weight attached to inflation in each period when forming expectations. According to this equation, inflation is a function of past inflation, the deviation of unemployment from the natural rate and supply shocks. This implies that inflation has inertia, i.e. in the case where there would be no supply shock and no deviation from the natural rate of unemployment, inflation would still grow. Robert Solow described this phenomenon in the 1970's: "we have inflation because we expect inflation, and we expect inflation because we've had it"[43]. The second term of this equation is the more important: It shows that lower inflation leads to higher unemployment deviation from the natural rate because of the negative sign before the coefficient ß. In the short run, increasing inflation could be a good instrument for the Government in order to keep the unemployment rate close to its natural level. The equation also implies that if the government's main priority is to lower inflation the policy response would feed unemployment. This relationship is only valid in the short-run however because people adjust their inflation expectations in each period. This is why in most studies there is a restriction imposed on the above equation such that the sum of the weights on past inflation should equal one, i.e. $\sum_{k=1}^{h} \xi_k = 1$. The Phillips curve in this form predicted unemployment well in the 1960's for the USA. It had a downward slope as can be observed in Figure 22(Gali, 2001; Mankiw, 2006).

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[43] From Solow (in Mankiw, 2006 p. 388).

Figure 22: Phillips Curve in the 1960's in the USA[44]
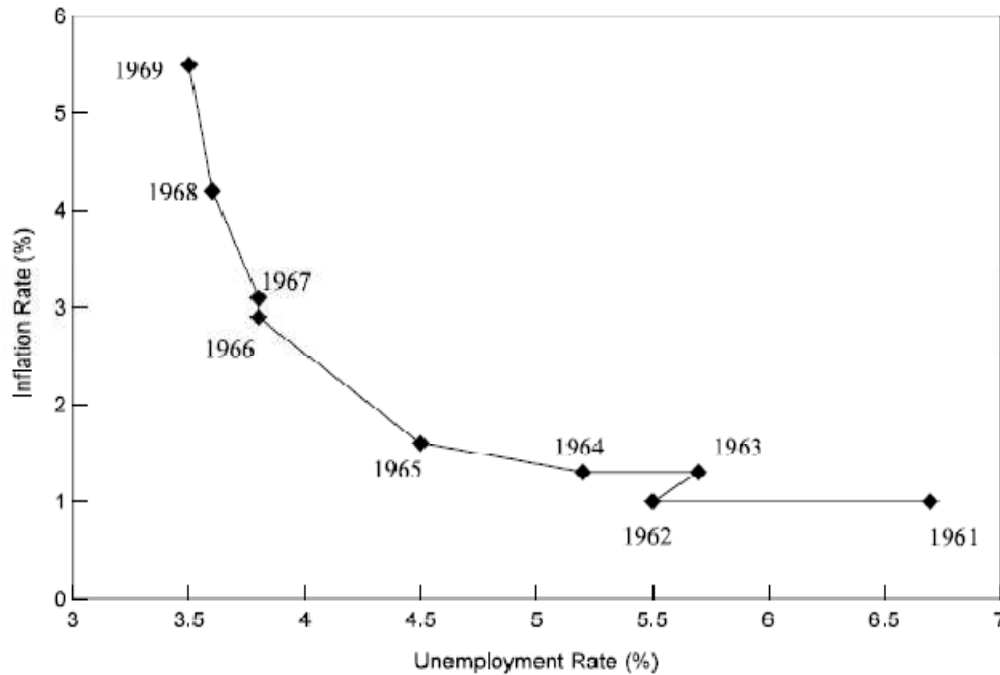
Enlarging the Phillips curve, Gali and Gertler (1999) used the marginal cost mc_t instead of the unemployment rate deviation. Their version of the old Phillips curve is then:

$$\pi = v - \beta(mc_t) + \pi^e$$

In the case of Argentina we estimated the above equation with one lag of inflation and the output gap as a measure of the marginal cost. We obtained for the period the following results:

For inflation no log

$$\pi = 0.45\pi_{t-1} - 9.34.E^{-08}(y - y*) + 0.98$$

$$(0.12) \qquad\qquad (4.98.E^{-08}) \qquad\qquad (0.6)$$

where y_t is the actual output, y_t^* is the potential output and $(y - y*)$ is the output gap and standard errors are below in brackets. In this regression, inflation is positively correlated to the past inflation and negatively correlated to the output gap. Thus, if the actual output is above the potential output, it will lower inflation. This relation is to be expected. Furthermore, in a very efficient economy in which actual GDP is higher than potential GDP, one would presume that the unemployment will also

[44] Source: taken from Cashell (2004) p. 7. Issued by the Department of Labor, Bureau of labor statistics

decrease. Here we can predict a positive relationship between inflation and unemployment.

All the variables are significant and the model seems to be doing a good job predicting the inflation influence on the output gap as can be distinguish on Figure 23. In fact, the fitted values and the actual value seem to move together. The standard error of the coefficient on the output gap is relatively large, but this may be explained by the short-term hyperinflation episodes seen in Argentina.

Figure 23: Actual versus fitted values
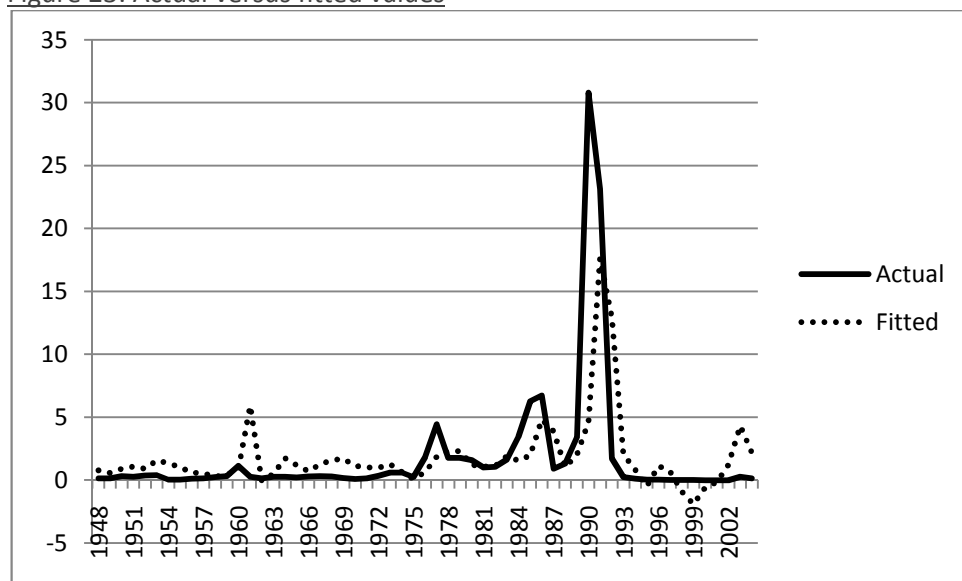
Some opponents of Keynesian theory, such as Milton Friedman and Edmund Phelps proved that the Phillips curve relationship disappeared after the 1960's. They advanced the theory that the unemployment rate tends toward a "natural rate", which is defined as "the lowest rate of unemployment consistent with stable rate of inflation".[45] They argued that in the long-run there was no trade-off and that the Phillips curve was vertical at this precise rate. Friedman stated that "there is always a temporary trade-off between inflation and unemployment; there is no permanent trade-off."[46] He also criticized the lack of microeconomic foundations for the Keynesian macroeconomic theory. Finally and more importantly there was concern over the fact that the model didn't seem to fit the data after the 1990's.

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[45] Cashell, 2004, p. 5.
[46] Friedman, 1968.

The Phillips curve seems to fit Argentine data on inflation and the output gap quite well over the period 1970-1990. Taylor (1980) and Calvo (1983) studied the long-term trade-off between unemployment and inflation and tried to find a microeconomic justification for such a relationship. In the 1980s the "new Keynesian Phillips curve" concept was developed based on the fact that prices could be sticky, i.e. prices adjust only slowly. They emphasized "staggered nominal wage and price setting by forward looking individuals and firms".[47] We will use the structural model of Gertler and Gali (1999) to examine if there is a trade-off between inflation and unemployment in Argentina (Whelan, 2005; Gali, 1999).

5. A. 2. The New Keynesian Phillips Curve (NKPC)

We follow Gertler and Gali (1999) and assume an environment of monopolistically competitive firms that are constrained by price adjustments. We use the Calvo[48] assumption that in any period t, the firms adjust their prices with probability $(1 - \theta)$ and don't change them with probability θ, which introduces price stickiness in to the model. Firms produce different items and have a different pricing history, but in all other senses are ex ante identical. Since not every firm can change their prices in each period there is a loss for them in the period when their prices are rigid. If there were no frictions firms would choose an optimal price ψ_{t+k}, but they actually choose an optimal reset price p_t^*, which is the "price selected by firms that are able to change price at t"[49], i.e. to reset their price by minimizing their loss function:

$$(1) \quad L(p_t^*) = \sum_{k=0}^{\infty} (\theta ß)^k E_t (p_t^* - \psi_{t+k})^2$$

where 0<ß<1 and $E_t (p_t^* - \psi_{t+k})^2$ is the expected loss due to price stickiness. The firm will have to keep a price p_t^* for k periods even though it could have been at the optimal ψ_{t+k}, meaning the firm will make a lower profit than the optimal one. In order to calculate its loss function, the firm sums the expectations for all present and

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[47] Gali, 1999, p. 196.
[48] Calvo, 1983.
[49] Gali, 1999, p. 199.

future periods and weights them with a discount coefficient $(\theta ß)^k$. Since ß is less than one the firm gives more weight to the present loss than the future one.

In order to minimize this loss, we differentiate $L(p_t^*)$ with respect to p_t^* and set it equal to zero. The first order condition is:

$$(2)\ L'(p_t^*) = 2\sum_{k=0}^{\infty}(\theta ß)^k\, E_t(p_t^* - \psi_{t+k}) = 0$$

Rewriting this, we obtain:

$$(3)\ \sum_{k=0}^{\infty}(\theta ß)^k\, \cdot p_t^* = \sum_{k=0}^{\infty}(\theta ß)^k\, E_t(\psi_{t+k})$$

and since $\sum_{k=0}^{\infty}(\theta ß)^k$ is a geometric sum we can write:

$$(4)\ \sum_{k=0}^{\infty}(\theta ß)^k = \frac{1}{1-\theta ß}$$

Finally we obtain the optimal reset price:

$$(5)\ p_t^* = (1-\theta ß)\sum_{k=0}^{\infty}(\theta ß)^k\, E_t(\psi_{t+k})$$

Firms keep their reset price at a weighted average of the optimal frictional price. According to microeconomic theory in a non frictional world, firms set their optimal prices equal to their marginal cost mc_t:

$$(6)\ \psi_{t+k} = mc_{t+k}$$

Substituting (6) in to (5) we obtain the optimal reset price:

$$(7)\ p_t^* = (1-ß\theta)\sum_{k=0}^{\infty}(ß\theta)^k E_t\{mc_{t+k}\}$$

Following the Calvo assumption, the price it period t, p_tp, is a function of the price of the last period and the optimal reset price:

$$(8)\ p_t = \theta p_{t-1} + (1-\theta)p_t^* <=>$$
$$(9)\ p_t^* = \frac{1}{1-\theta}\,(p_t - \theta p_{t-1})$$

Equation (7) is a stochastic difference equation since the optimal reset price is a function of the forcing variable mc_{t+k}^n. So (7) can be rewritten as a first-order stochastic difference equation:

$$(10) \quad p_t^* = ß\theta E_t p_{t+1}^* + (1 - ß\theta)mc_t$$

Combining (9) and (10) we obtain:

$$(11) \quad \frac{1}{1-\theta}(p_t - \theta p_{t-1}) = ß\theta E_t p_{t+1}^* + (1 - ß\theta)mc_t$$

And for $p_{t+1}^* = \frac{1}{1-\theta}(p_{t+1} - \theta p_t)$, we obtain:

$$(12) \quad \frac{1}{1-\theta}(p_t - \theta p_{t-1}) = \frac{ß\theta}{1-\theta}(E_t p_{t+1} - \theta p_t) + (1 - ß\theta)mc_t$$

The inflation rate is defined as the ratio of the difference in prices in period t and prices in the previous period on prices in period t:

$$(13) \quad \pi_t = \frac{p_t - p_{t-1}}{p_t}$$

Rearranging equation (12), we obtain an initial expression for the Phillips curve:

$$(14) \quad \pi_t = ß E_t \pi_{t+1} + \frac{(1-ß\theta)(1-\theta)}{\theta}(mc_t - p_t)$$

The real marginal cost is $mc_t^r = mc_t - p_t$ which means that:

$$(15) \quad \pi_t = ß E_t \pi_{t+1} + \frac{(1-ß\theta)(1-\theta)}{\theta} mc_t^r$$

After simplification the final expression of the New Keynesian Phillips Curve is:

$$\boxed{(16) \quad \boldsymbol{\pi_t = \lambda mc_t^r + ß\, E_t\{\pi_{t+1}\} + \varepsilon_{pt}}}$$

where $\lambda = \frac{(1-\theta)(1-ß\theta)}{\theta}$, ε_{pt} is a stochastic error term and $E_t\{\pi_{t+1}\}$ is the expected value of future inflation. Equation (16) indicates that inflation in one period is a function of the marginal cost and the expected inflation in the following period. Contrary to the old Phillips curve, firms are assumed to have rational expectations, i.e. they think inflation depends on future expected prices.

The marginal cost is not exogenous however. As such, we add to the previous equation a second equation for marginal cost:

$$(17) \quad \pi_t = \lambda mc_t + ß\pi_{t+1} - ß\eta_{t+1} + \varepsilon_{pt}$$

$$(18) \quad mc_t = b_1\pi_{t-1} + b_2 mc_{t-1} + \varepsilon_{mct}$$

where $E_t\{\pi_{t+1}\} = \pi_{t+1} - \eta_{t+1}$ and η_{t+1} is the expectation error. If b_1 is equal to zero, the marginal cost is exogenous which means that it is not correlated to the error term. In this case, the OLS estimator for the marginal cost coefficient is not biased.

5. A. 3. Empirical relevance of the NKPC for Argentina

We will use the generalized method of moments (GMM) in order to examine the empirical relevance of the Phillips curve. This method was formulated by Hansen in 1982 and provides a computationally convenient system of obtaining estimators of the parameters of statistical models. Let's consider the regression equation $y_t = \zeta_t\mu_t + \varepsilon_t$ for t=1,....,n, where ζ_t is a vector of the explanatory variables, μ_t a vector of unknown coefficients variables and ε_t the stochastic error term. There is a possibility that, for some k, ζ_t is correlated with the error term, in other words that $E(\zeta_{tk}\varepsilon_t) \neq 0$. If this is the case then ζ_{tk} is an endogeneous variable, i.e. it is explained within the model in which it appears. But if the vector ζ_t contains an endogenous variable, the least square (LS) estimator μ_{tk} is biased. The principle of the GMM method is to find an estimator for μ_t by replacing the theoretical relation with sample moments. In order to correct for this, instrumental variables estimation can be used, in which a vector of instrumental variables x_t is correlated with ζ_t but not with ε_t, i.e.:

$$E(x_t\varepsilon_t) = 0$$
$$<=> E\big(x_t(y_t - \zeta_t\mu_t)\big) = 0$$

When this is the case, the vectors x_t and $(y_t - \zeta_t\mu_t)$ are orthogonal. The latter equation is called the orthogonality condition.[50] It is then possible to create estimating equations for μ_t with the help of those instrumental variables that match the orthogonality condition. We obtain an "indirect least square estimator"[51] that is not biased.

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[50] www.princeton.edu/~yangfeng/intro/gmm.pdf
[51] www.princeton.edu/~yangfeng/intro/gmm.pdf p. 4.

We will assume that the marginal cost is endogenous and will verify this hypothesis later with a Wald test. We choose, as instrumental variables, information from previous periods which are not correlated to inflation forecast errors, such that:

$$(19) \quad E_t\{(\pi_t - \beta\pi_{t+1} - \lambda mc_t)z_t\} = 0$$

where z_t is a vector of instrumental variables dated at period t and earlier.

We regressed Argentine inflation on the unemployment rate and forecasted inflation. Our instruments are information from previous periods and under rational expectations the errors in the forecast of π_{t+1} and of mc_t are uncorrelated with this information. We chose three lags of inflation, wage inflation, the output gap (defined as real GDP minus the detrended log of the GDP) and marriage because they are correlated to the marginal cost but not with the error term. We obtained:

$$\pi_t = -0.02mc_t^r + 0.53 \, E_t\{\pi_{t+1}\} + 0.21$$
$$\quad\quad\;\; (0.004) \quad\quad (0.007) \quad\quad\quad (0.034)$$

The coefficients on all variables are significant. There seems to exist a negative correlation between inflation and the unemployment rate. Considering the cross correlogram of inflation and unemployment (Figure 24) we observe that the unemployment rate appears to be negatively correlated with future inflation but positively correlated with past inflation. In what follows we consider the hybrid form of the NKPC where both forward and backward inflation are included in the regression.

Figure 24: Cross correlogram of unemployment at t and leads and lags of inflation at t+k[52]
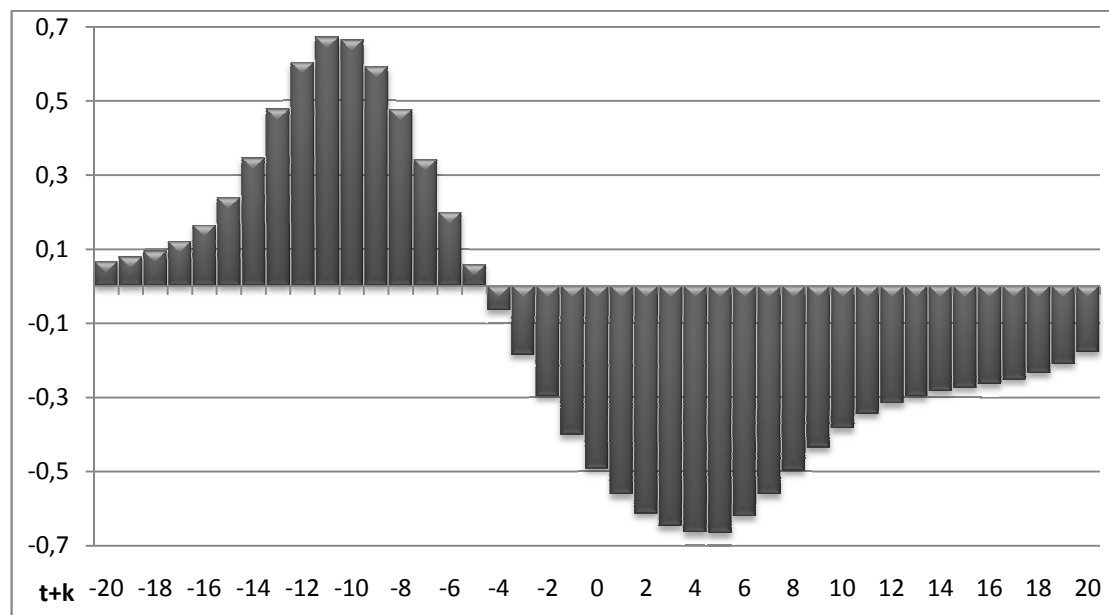
5. A. 4. The Hybrid NKPC

Gali and Gertler (YEAR) attempted to remove the remaining unexpected inflation from the above regression model by considering "hybrid versions of the new and the old"[53] Phillips Curve, in which firms are backward and forward looking when setting their prices:

$$(20) \quad \pi_t = \lambda mc_t^r + (1 - \varphi)\mathrm{E}_t\{\pi_{t+1}\} + \varphi\pi_{t-1} + \varepsilon_{pt}$$

Inflation becomes a combination of expected inflation and lagged inflation. If we regress this equation with the GMM using the same instruments as before we obtain:

$$\pi_t = 0.03mc_t^r + 0.4\,\mathrm{E}_t\{\pi_{t+1}\} + 0.74\pi_{t-1} - 0.41$$
$$(0.006) \qquad (0.016) \qquad (0.001) \qquad (0.072)$$

We obtain a positive correlation between the unemployment rate and inflation and all variables are significant. The coefficients imply that when inflation increases, unemployment does also.

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[52] The data in this graph were computed using the Hodrick-Prescott filtered series of inflation and unemployment.
[53] Gali, 1999, p. 203.

Before drawing further conclusion we consider the robustness of our model. One problem of the IV method is that the more instruments we add to the regression model the greater the risk of bias, particularly if the instruments used are weak. To examine the strength of our instruments we begin by testing if the instrumental variables and the endogenous variable are really correlated. We regressed the unemployment rate using Ordinary Least Square on the instruments as follows:

$$mc_t = \varphi\pi_{t-1} + \alpha_1\pi_{t-2} + \alpha_2\pi_{t-3} + \alpha_3 mar + \alpha_4\Delta w_t + \alpha_5(y_t - y_t^*) + \varepsilon$$

where Δw_t is wage inflation in period t, mar the marriage variable. After estimating this regression we conducted a Wald coefficient test to test the Null hypothesis of whether the instrument variables and the unemployment rate are uncorrelated, i.e.:

$$\varphi = \alpha_1 = \alpha_2 = \alpha_3 = \alpha_4 = \alpha_5 = 0$$

The F-statistic is significant as its associated p-value is 0.0001, so we can reject the Null hypothesis that the instruments are uncorrelated with the unemployment rate. This also confirms our hypothesis that the unemployment rate is really endogenous.

In addition, since there are more instruments than endogenous explanatory variables we can test for overidentifying restrictions, which is a method of indirectly testing for the exogeneity of the instrument set. To do this we employed the Hansen test, with the results indicating that we cannot reject the null hypothesis, meaning that we can accept the instrument set.

Finally we test for autocorrelation of the errors. We use the Ljung-Box test which tests if the value of the residuals in period t is correlated to values in previous periods. The Null hypothesis is that all autocorrelations are equal to zero, i.e. there is no autocorrelation. As can be seen in Table 1, the lags for the autocorrelation coefficients (AC) are all close to 0. The Ljung-Box Q-statistics are also insignificant, so we can't reject the Null hypothesis that there is no autocorrelation.

Table 1: Ljung-Box test: Autocorrelation coefficients and Q-statistics residuals from the regression of inflation on unemployment

	AC	PAC	Q-Stat	Prob
1	0.042	0.042	0.0344	0.853

2	0.051	0.050	0.0888	0.957
3	0.030	0.026	0.1086	0.991
4	0.000	-0.004	0.1086	0.999
5	0.020	0.017	0.1189	1.000
6	-0.021	-0.023	0.1310	1.000
7	-0.116	-0.117	0.5611	0.999
8	-0.006	0.004	0.5623	1.000
9	-0.099	-0.088	0.9639	1.000
10	-0.141	-0.132	1.9185	0.997
11	-0.119	-0.105	2.7325	0.994
12	-0.093	-0.071	3.3486	0.993
13	-0.022	-0.012	3.3955	0.996
14	0.005	0.004	3.3993	0.998

The results of these three tests give added confidence to the validity of the empirical model estimated. The results imply that the higher the rate of inflation in the higher will be the unemployment rate. This result is consistent with the evidence presented in the first part of the thesis where it was shown that the inflation and unemployment rates were both very high for most of the second half of the 2Oth century. Gali and Gertler (2001) also obtained a positive correlation using the wage share as their measure of marginal cost for Europe[54]. Jeffrey B. Nugent and Constantine Glezakos (1982) predicted the opposite result for Latin America countries however. They argued that *"the institutional conditions of (…) LDCs [least developed countries[55]] would be likely to lead to exactly the opposite relationship between inflation and unemployment (or growth) in LDCs than that expected for DCs [developed countries[55]]"[56]*. In the following sub-sections we examine whether the choice of variable capturing marginal cost affects the results obtained. In particular, we replace the unemployment rate with the wage share, thus following the approach of Gali and Gertler (YEAR).

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[54] See Gali (2004).
[55] Note from the author
[56] Nugent, 1982, p. 322.

## 5. B. GDP and inflation: measuring the output gap in the New Keynesian Phillips Curve

Figure 25: Cross correlogram between the output gap at t and leads and lags of inflation at t+k[57]
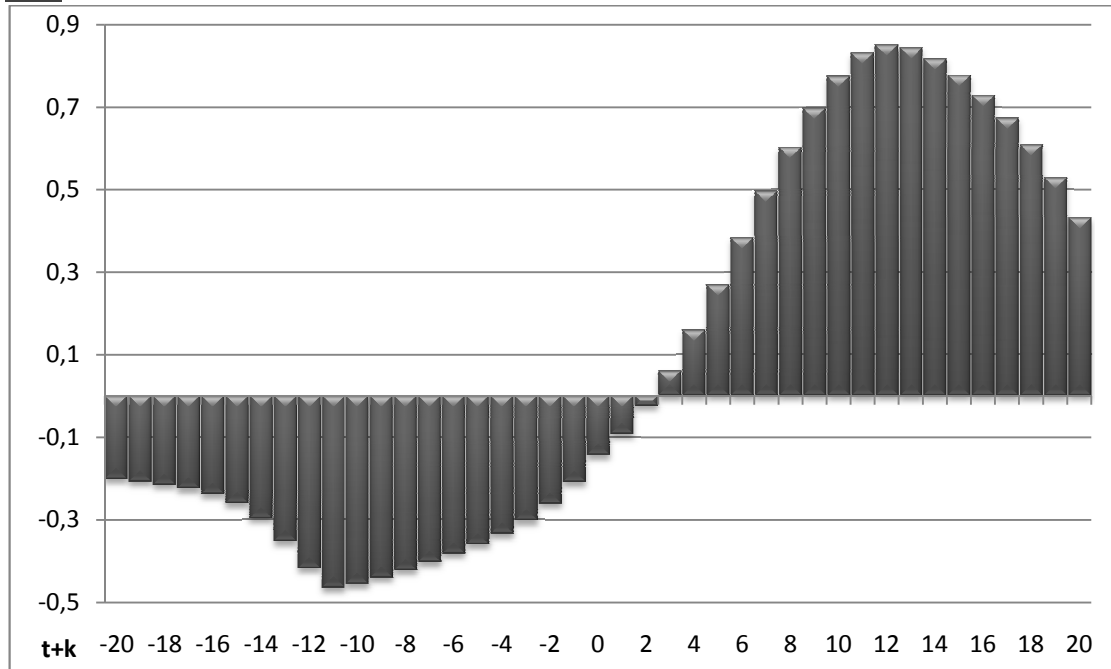
Frequently, the New Phillips curve is regressed with the output gap, which measures the real economy activity, as the marginal cost. By observing the cross-correlogram of inflation and the output gap in Figure 24 we observe a negative relationship between the output gap and the lags of inflation and a positive relationship between the output gap and leads of the inflation rate. As expected, this is the contrary to what was observed for the correlogram between the unemployment rate and leads and lags of the inflation rate. The hybrid NKPC equation with the output gap can be written as:

$$(21) \quad \pi_t = \delta\,(y_t - y_t^*) +\ (1-\varphi)E\{\pi_{t+1}\} +\ \varphi\pi_{t-1} +\ \varepsilon_{pt}$$

Using GMM, we have to change the instruments because the output gap can't be an instrument this time. So we remove it and add a lag of wage inflation, investment and

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[57] The data in this graph were computed using the Hodrick-Prescott filtered series of inflation and detrended GDP (our measure of the output gap)

real wages, which we assume to be correlated with the output gap. We obtained for the NKPC:

$$\pi_t = -5.29(y_t - y_t^*) + 0.28E\{\pi_{t+1}\} + 0.73\pi_{t-1} - 0.005$$

$$(0.000) \qquad (0.050) \qquad (0.003) \quad (0.01)$$

The regression shows a negative relationship between output gap and inflation. As before, we test the validity of the model. First we performed the Wald test to examine if our instruments are weak. To do this we regressed the output gap using OLS on the instruments:

$$(y_t - y_t^*) = \varphi\pi_{t-1} + \alpha_1\pi_{t-2} + \alpha_2\pi_{t-3} + \alpha_3 mar + \alpha_4\Delta w_t + \alpha_5\Delta w_{t-1} + \alpha_6 i + \varepsilon$$

We then test the Null hypothesis that the instruments and the output gap are uncorrelated, i.e.:

$$\varphi = \alpha_1 = \alpha_2 = \alpha_3 = \alpha_4 = \alpha_5 = \alpha_6 = 0$$

The p-value associated with the F-statistic of this Wald test is 0.04 which means that we can reject the null hypothesis that the instruments are weak.

We then proceeded to consider the Hansen test of overidentifying restrictions. The J-statistic is 0.06 and its p-value is 0.56, so there is no evidence of the endogeneity of the instruments. Finally, we test for serial correlation in the residuals using the Ljung-Box test:

Table 2: Ljung-Box test: Autocorrelation function and Q-statistic for the residuals from the regressions of inflation on output gap

	AC	PAC	Q-Stat	Prob
1	-0.140	-0.140	0.6661	0.414
2	0.004	-0.016	0.6667	0.717
3	0.020	0.019	0.6811	0.878
4	0.048	0.055	0.7697	0.942
5	-0.012	0.003	0.7755	0.979
6	-0.198	-0.204	2.3741	0.882
7	0.049	-0.010	2.4777	0.929
8	0.022	0.028	2.4991	0.962

The individual autocorrelations are all close to 0 and insignificant, while the Ljung-Box Q statistics at different lags are also insignificant, meaning that we can reject the null hypothesis that the residuals are serially correlated.

When considering the output gap as a measure of marginal cost our model does also a good job of predicting the trade-off between GDP and inflation? In the case of Argentina, there seems to be a long-run negative relationship between the two variables, which is, as expected, the contrary to the relationship between inflation and unemployment. This means that as inflation was increasing, the output gap was decreasing. Gali and Gertler (1999) also considered other variables measuring marginal costs. We will now examine if these variables are also correlated with inflation, and if so in which direction.

5. C. Inflation and labor factors: measuring the labor factors in the NKPC

In this sub-chapter, we consider the relationship between inflation and labor productivity and the wage share. The wage share is an indicator of the distribution of income between capital and labor as is measured as labor compensation divided by GDP.

5. C. 1. Inflation and wage share

The wage share is used in much of the literature as a measure of the marginal cost. As such, it is important to consider this variable, which will allow a comparison with the existing literature. Marginal cost represents the price of one additional unit of labor. Firms minimize their costs and therefore require that the marginal cost be equal to the wage divided by the marginal product of labor. Thus the wage share ws_t is:

$$mc_t = ws_t$$

As above, we use GMM to estimate the Phillips curve, replacing unemployment by the wage share. We use the same instruments as for unemployment. We obtain the following results (standard errors in brackets):

$$\pi_t = -0.007\, ws_t +\ 0.36E\{\pi_{t+1}\} +\ 0.73\pi_{t-1} - 0.009$$
$$(0.000) \qquad (0.000) \qquad\quad (0.000) \qquad (0.056)$$

All the variables are highly significant and there is a negative relationship observed between inflation and the wage share, implying that when the wage share increased inflation was declining. This is the contrary relation from unemployment and inflation but the same as inflation and output gap. Once again, we test the validity of our model in the same manner as above. Results from the Wald and Hansen test indicate that there is a correlation between the instruments and the wage share and that there is no evidence of endogeneity of the instrument set. Finally, the results in Table 3 indicate that there is no evidence of serial correlation in the residuals from the above regression model.

Table 3: Ljung-Box test: Autocorrelation function and Q-statistic for inflation and wage share

lags	AC	PAC	Q-Stat	Prob
1	-0.323	-0.323	1.4898	0.222
2	0.072	-0.036	1.5717	0.456
3	-0.001	0.012	1.5717	0.666
4	-0.022	-0.018	1.5812	0.812
5	0.011	-0.002	1.5843	0.903
6	-0.030	-0.029	1.6097	0.952
7	0.056	0.043	1.7236	0.974
8	-0.011	0.023	1.7297	0.988
9	-0.018	-0.018	1.7530	0.995

To summarize, our model appears to be valid and indicates a negative relationship between inflation and the wage share. This means that as inflation increased in Argentina, the returns to labor decreased. This trade-off goes in the same direction as the one between unemployment and inflation.

5. C. 2. Inflation and labor productivity

Finally, we examine whether there is a significant relationship between the inflation rate and labor force productivity. We use GMM to estimate the Phillips curve, replacing the wage share by labor productivity with the same instruments as for unemployment. The results we obtain are as follows:

$$\pi = 1.21. E^{-10} \frac{Y_t}{N_t} + 0.42E\{\pi_{t+1}\} + 0.74\pi_{t-1} - 1.37$$

$$(0.000) \qquad (0.002) \qquad (0.000) \qquad (0.08)$$

The coefficients are once again all significant, while the results from the tests of the validity of the instruments, the endogeneity of the instruments and the test for serial correlation in the residuals (Table 4) indicate that this model is well specified.

Table 4: Ljung-Box test: Autocorrelation function and Q-statistic for inflation and labor productivity

lags	AC	PAC	Q-Stat	Prob
1	0.050	0.050	0.0358	0.850
2	0.019	0.017	0.0418	0.979
3	0.029	0.028	0.0572	0.996
4	-0.038	-0.042	0.0874	0.999
5	0.017	0.020	0.0943	1.000
6	-0.015	-0.016	0.1007	1.000
7	0.052	0.055	0.1959	1.000
8	0.012	0.005	0.2032	1.000
9	0.008	0.008	0.2076	1.000

Our model indicates a positive relationship between labor productivity and inflation. This implies that increasing inflation in Argentina is associated with a rise in productivity. This is contrary to the relationship found between the unemployment rate and inflation. This may relate to the facts that when labour productivity is high, firms need to hire fewer workers for a given level of output, which can lead to higher unemployment.

We saw in the last two sub-chapters that there appears to be a relationship between inflation and the output gap, the unemployment rate, the wage share and

labor productivity. We also saw in the first part of the thesis that many inflation stabilization policies were attempted. In the follow section we examine whether such policies were associated with the unemployment rate and other variables measuring marginal costs.

5. D. The relationship between inflation stabilization policies and the output gap, the unemployment rate and other labor market indicators

In this section we examine whether changes in the policies to deal with inflation had an impact on the variables capturing marginal cost. Assuming that inflation stabilization policies lead to a decrease of inflation we would expect such policies to have an impact on the marginal cost variables. The policy variables are dummy variables: 1 for the year where there was one, 0 either.

5. D. 1. Stabilization policies and unemployment

In sub-chapter 3.A we found a positive relationship between the unemployment rate and inflation. The question we address now is whether or not inflation stabilization policies have also had an impact on the unemployment rate. If we consider Figure 26 such a relationship is not clear. From 1965 to 1977 changes in policies were followed by an increase in the unemployment rate, while from 1977 to 1993 the unemployment rate seems to have fallen following policy changes. Figure 27 plots the correlogram between the unemployment rate and leads and lags of the stabilization policies. Here we can observe a relationship between inflation stabilization policies and the unemployment rate, with the variables being negatively correlated until six leads and then positively correlated. In what follows we examine through regression analysis whether these correlations can be confirmed and whether the different policy anchors chosen by government have an impact on the relationship between the unemployment rate and the policy stabilization.
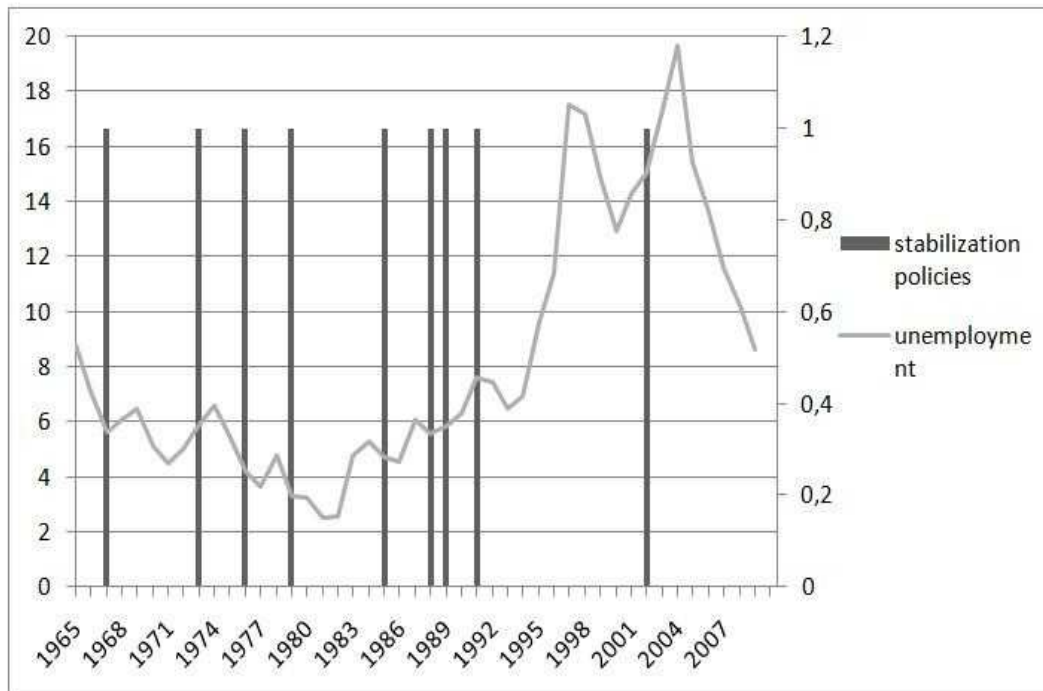
Figure 26: inflation stabilization policies and the unemployment rate

Figure 27: Cross correlogram of the unemployment rate at t and leads and lags of inflation stabilization policies at t+k[58]
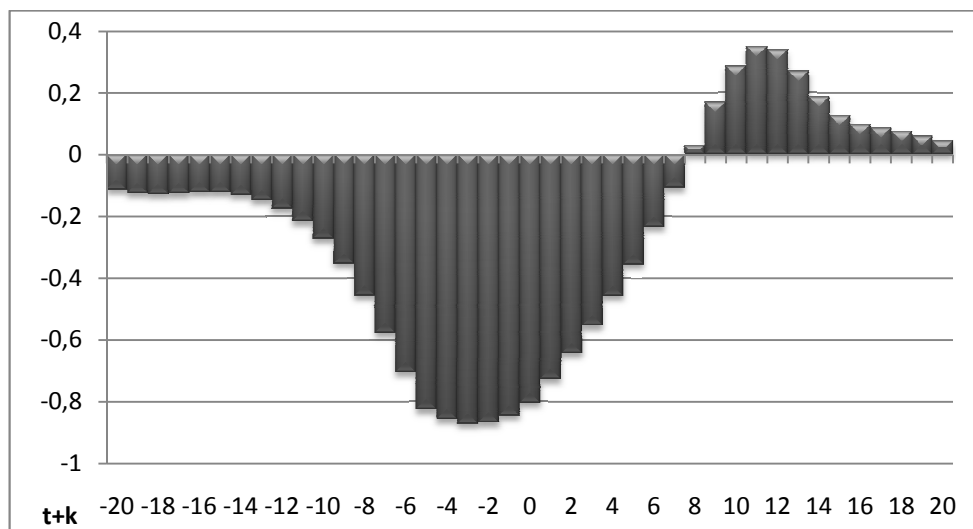
Using GMM we regressed the unemployment rate on stabilization policies:

$$unemp = \xi stab + \varepsilon$$

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[58] We used the same method as before, i.e. the H-P filtered series

where $stab$ refers to the stabilisation policies.

Regressing with OLS on the whole period from 1965 to 2009, we obtained insignificant results. But on figure 27, there seem to be different effect: from 1965 to 1977 (period 1) the unemployment rate tends to increase after the policies; from 1977 to 1993 (period 2), the unemployment rate tends to decreased after the policies; and on the rest, it is not very clear because there were too little inflation stabilization between 1993 and now. But here again there are no significant relationship. It is not expected as inflation stabilization policies should stop inflation that is related to the unemployment rate.

Furthermore we want to test if at least some parts of those policies had an impact on unemployment and we found that it is negatively correlated to the wage controls:

$$unemp = -5.95 \, wcontrol + \, 11.07$$

And to the exchange rate policies:

$$unemp = -5.16 \, xrpol + \, 11.21$$

To conclude, we can say that the inflation stabilization policies in general were not efficient in reducing unemployment. Only the exchange rate and wage controls were successful in bringing it down. This is not what we expected because if inflation had decreased from the stabilization policies, unemployment should also have decreased as they are positively correlated.

5. D. 2. Stabilization policies and the output gap

We found in sub-chapter 3.B that there is a negative relationship between the output gap and inflation. As such, we would expect that there will be a positive relationship between policies and the output gap. To examine this, we regress the stabilization policies dummy on the output gap as follows:

$$(y_t - y_t^*) = \vartheta stab + \varepsilon$$

where ϑ the coefficient on the relationship between stabilization policies and the output gap. Again, the regression was estimated using OLS. The results were as follows:

$$y_t - y_t^* = -9236683 \, stab + 1722093$$

It indicates that there is a negative relationship between the output gap and stabilization policies. This is somewhat surprising and against expectations.

5. D. 3. Stabilization policies and labor productivity

We showed above that inflation and labor productivity are positively correlated, so we may expect that policies intended to bring down inflation should also lower labor productivity. We write the relationship between policies and labor productivity as:

$$\frac{Y_t}{N_t} = \varkappa \, stab + \varepsilon$$

This model was estimated using GMM with the unemployment rate, investment and the output gap used as instruments. Estimating this model gave the following results:

$$\frac{Y_t}{N_t} = -1.07E^{+09} stab + 9.3E^{+09}$$

The results indicate a negative relationship between the stabilisation dummy and labor productivity, a result contrary to expectations.

In the last three sub-sections we have seen that inflation stabilization policies had an unexpected effect on at least two of the variables. In the case of the unemployment rate and the wage share we found no significant results. In what follows we examine whether stabilization policies had the desired effect on the rate of inflation.

5. D. 4. Stabilization policies and inflation

Figure 28: The inflation rate and inflation stabilization policies
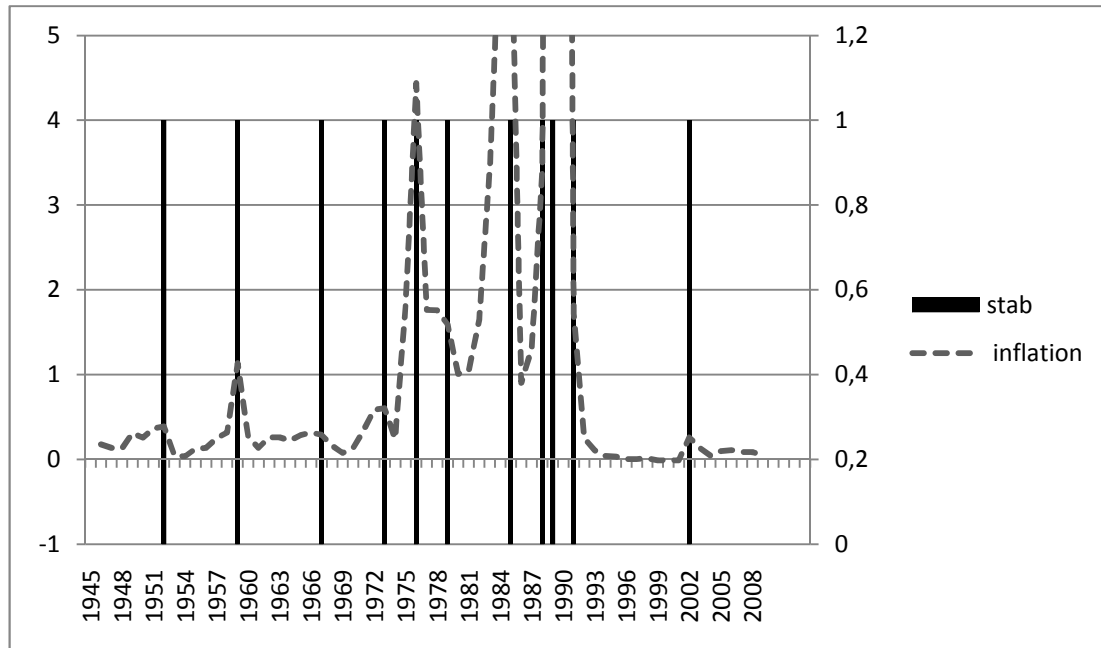
Considering Figure 28[59] we see that the policies appeared to have a negative impact on the inflation rate. To examine this in more detail we regress our measure of stabilization policies on the inflation rate:

$$\pi_t = \varsigma stab + \varepsilon$$

where ς the coefficient indicating the relationship between the inflation rate and policy. With the OLS method we obtained the following results:

$$\pi_t = 3.7 stab + 0.96$$

The variables are significant with a positive correlation between the stabilization policies and inflation observed. This is contrary to what one would have expected and helps explain why the policies appeared to have an unexpected effect on the other variables in the above section.

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[59]

5. D. 4. Interpretation of the results

To summarize we found a positive relationship between the inflation and unemployment rates. We further found a negative relationship between the inflation rate and both the output gap and the wage share, and a positive one with labor productivity. These results imply that rising consumer prices had a negative effect on the labor market through a higher unemployment rate. Our results also indicate that the authorities were not able to launch a policy that reduced both variables. Secondly, the output gap in Argentina declined as inflation increased. If the output gap is positive (negative) actual GDP is above (below) potential GDP and the country is over (under) working its resources. In general, we would like actual GDP to be as close as possible to potential output, i.e. we want the output gap as small as possible. Our results show that higher inflation had a positive influence on output since it reduced the output gap. We also find that a higher inflation rate reduces the return to labor. Finally, labor productivity was found to increase with inflation. This result also explain a part of the response of unemployment to inflation, since the higher is labor productivity, the lower the incentive of firms to hire new employees.

The results when considering the impact of stabilization policies on performance indicate that policies often had an unexpected effect on our variables of interest, and only in the case of the unemployment rate did policies have a beneficial effect, at least in the short-run.

It is interesting to note that both the backward and forward components of inflation are relevant in the Phillips curve in Argentina as both variables are statistically significant in the above analysis. In the case of Argentina however, the backward component seems more important than the forward component. This is contrary to the analysis of Gali and Gertler (2001) for Europe.

Despite the strong results for the Phillips curve we must not put too much weight on the results. The data were sometimes incomplete and this could produce errors. This is one of the reasons why we considered such a long period of time. In addition, the assumptions made in the model are more relevant for developed and not least developed countries. Finally, the models were all estimated using GMM, a method that is very sensitive to the instruments chosen.

In the next chapter we compare the results for Argentina with others in the literature for different countries.

6. Comparison with the rest of the World

It may be interesting to compare the results obtained above with those from different countries. Is the impact of inflation on the different measures of the marginal costs the same everywhere? Or is it country dependent? As mentioned above Nugent and Glezakos (1982) have made hypotheses concerning the relationship between inflation and marginal cost measures for entire Latin America. We will thus begin by examining whether our results differ from those for other Latin American countries. We will then study the difference in results for Argentina – a developing country – when compared with results for developed countries.

6. A. Latin America

In this sub-chapter, we will compare the results for the New Keynesian Phillips curve for Argentina with those for three other countries: Brazil, Chile and Mexico. Unfortunately, most of the existing studies on the Phillips curve in those countries go back only ten to fifteen years, i.e. the 1990's, which is a period shorter than that considered in the current study. Despite this it is still interesting to consider these comparisons.

6. A. 1. Brazil

The choice of Brazil was made for three reasons. First of all, Brazil and Argentina are neighbours and important trade partners, which includes a Preferential Trade Agreement (PTA) between the two countries. Secondly, both countries belong to the category "least agricultural" described by Nugent and Glezakos (1982)[60]. As such, we may expect them to follow a similar kind of behaviour. Finally, Brazil has also faced periods of high- and even hyper-inflation since the Second World War. We will base our comparison on the paper of Adolfo Sachsida (2009)[61].

Sachsida made the assumption that the unemployment and inflation rates differ across regions and so used data for several metropolitan areas. They regressed the

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[60]See Nugent (1982), p. 331.
[61] Sachsida, 2009.

New hybrid Keynesian Phillips curve as in equation (20) with the unemployment rate used as the marginal cost variable. Sachsida couldn't find any significant relationship between inflation and unemployment, even in the short term. A further study by Muinhos (2001) did find a positive relationship between the output gap and inflation. He added to the Phillips curve regression, a variable that represents the degree of openness and the Real exchange rate gap and managed to find a positive relationship for the years 1994 to 2002. This contradicts our results for Argentina.

6. A. 2. Chile

Chile also neighbours Argentina. This the main reason for comparing our results with those for Chile, though Chile also faced chronic inflation problems in the second half of the twentieth century. Moreover, Chile is the third largest of Argentina's trade partners. We will rely on the study of Céspedes, Ochoa and Soto (2005). The authors derived the same two new Phillips Curves as we did above, namely the normal and hybrid curves. In the former, where the backward component is not taken into account, they found a positive relationship between the wage share and inflation. In the case of the hybrid New Phillips curve they also found a positive relation. These results are different to the ones we found for Argentina, where the relationship between the wage share and inflation is negative. Céspedes et al (2005) also observed a negative relationship between the inflation rate and the output gap, a result consistent with that found above for Argentina.

6. A. 3. Mexico

Different to Brazil and Chile, Mexico is far away from Argentina. It has still influenced the history of Argentina however, in particular during the Tequila crisis mentioned above. Another reason for comparing Mexico and Argentina is that the former country also had trouble stabilizing its inflation rate. Finally, Mexico also belongs to the "least agricultural" country group[60]. We will rely on the article of Ramos-Francia and Torres (2008) for comparison.

Ramos-Francia and Torres (2008) regressed the normal (as opposed to the hybrid) NKPC from 1992 until 2007 using monthly data (whereas we used annual

data). The results indicate a positive relationship between inflation and the wage share. The regression of inflation on the output gap doesn't result in significant coefficients, though when considered the second and third lag of output gap they obtained a positive relationship with inflation. Regressing the hybrid NKPC as in equation (20), they also find a positive relationship between marginal costs and inflation. In their study, inflation is positively correlated to the wage share and the output gap, which are positively correlated with each other. This is in contrast with what we found for Argentina.

6. A. 4. Unity in the results for Latin America?

There seems to be no consistency in results for the relationship between inflation and marginal costs in Latin America. First, let's consider the case where the marginal cost is the wage share. For both Mexico and Chile, a positive relationship was found between inflation and the wage share, while for Argentina we find a negative relationship. This is surprising as they all belong to the same group of "least agricultural" countries and one could expect that they have the same kind of Phillips relationships. Second, in Brazil, in the case where the marginal cost is the unemployment rate, no significant relationship between inflation and the unemployment rate was found. This was predicted by Nugent and Glezakos (1982) that only found a relationship between inflation and unemployment for the "most agricultural"[62] countries, i.e. Costa Rica, El Salvador, Honduras, Nicaragua and Venezuela. For this group of countries they obtained exactly the opposite relationship between inflation and unemployment as that found for developed countries. To conclude, we can say that there is no unity on the impact of inflation on the wage share in Latin America. And the impact on unemployment is mixed.

Those results help us understand the economic situation in Argentina. The country is highly dependent on its exports. But if increasing the wage share in both Argentina and its trade partner has a different impact on prices, it will become harder to proceed to business transactions between them. And it will be hard for Latin America to become a competitive economical unity like the European Union or the

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[62] See Nugent (1982), p. 331

USA if they can't make any inflation stabilization policy without arming one of its entities. Moreover, the lack of unity in whole Latin America makes it harder for foreign investors to choose investing strategies as the behaviour are different in each country. This concerns Argentina even more because Chilli and Mexico have the same Phillips curve relationship and the former country doesn't belong to this group. We will now consider the results for developed countries and if Argentina's Phillips curve is more like them.

6. B. Developed countries

6. B. 1. USA

In spite of what one may have thought the United States of America is the largest trade partner of Argentina. Argentina has strong links to the USA and pegged its currency to the US dollar for ten years. The New Keynesian Phillips Curve is very successful in identifying the relationship between inflation and the unemployment rate for the USA. We will rely on the paper by Alain Guay and Florian Pelgrin (2004), who based their work on Gali and Gertler (1999).

Guay and Pelgrin (2004) began by estimating equation (16), that is, the purely forward looking NKPC from 1960 to 2001 for the USA. They use the wage share as their indicator of marginal cost. They used a number of techniques to estimate the relationship and while they obtained significant coefficients using GMM, results using other methods were mixed. Using GMM they found a positive relationship between inflation and their measure of marginal costs. Using the hybrid New Phillips Curve they found that both the forward and backward components were significant. They found that the forward component was dominant and the backward component less relevant. These results are different to those found for Argentina, for which we found for each measure of the marginal cost a backward looking component. This would mean that in the USA, rational expectations have more weight in the decision of the firm to set prices than in Argentina where they base their expectations on the past behaviour of inflation. Guay and Pelgrin (2004) obtain a positive relationship between the wage share and inflation which is different to our results for Argentina.

6. B. 2. Europe

Finally, we compare Argentina's inflation-marginal cost relationship with that found for Europe. This should be interesting because the old continent has a very different approach to Economics than America. Will the Phillips curve in European countries behave similarly to that for the USA because they are all developed countries or will they behave differently to both Latin America and North America? We will now present the results obtained by Gali, Gertler and Lopez-Salido (2001).

Gali et al (2001) took the wage share as the marginal cost and used data from 1970 to 1998 for the euro zone. Regressing the base line model (16) using GMM they obtained a positive relationship between marginal cost and inflation. There were problems of autocorrelation in the residuals in this model and so they turned to the Hybrid Phillips curve and again found a positive relationship between the wage share and inflation, a result similar to that found in the USA. Consistent with the results for the USA, Gali et al (2001) found that forward looking component was dominant when compared with the backward looking component.

To conclude, we can say that the results indicate that the Phillips curve for the USA and Europe behave similarly. Firstly, there is a positive relation between the wage share and inflation. Secondly, the forward component is dominant, i.e. the firms have rational expectations even if the backward component is also important. Thirdly, it is interesting to notice that the relationship between wage share and inflation is the same in Mexico, Chilli, USA and Europe but not in Argentina. Nugent and Glezakos (1982) predicted that the Phillips curve relationship in developed and least developed countries would not be the same. But they only concentrated on the unemployment rate as the marginal cost. Here again, It emphasizes the bad economic situation for Argentina. It could also explain why Argentina's inflation stabilisation policies weren't very successful: it was always going against its main trade partner's policies.

7. Conclusion

After studying the history of Argentina and the behaviour of the New Keynesian Phillips curve from 1945 to 2009 we were able to draw some conclusions on the impact of inflation on society. The history showed that inflation has been most of the time high since the Second World War in Argentina and, as they are positively related, it brought high unemployment rates. Moreover, workers received very low return from capital as wage share and inflation are negatively correlated. These dissatisfactions were often expressed in the form of demonstrations. At the beginning of the 21th century, the collapse of the convertibility period and the increase of inflation even brought political anarchy in the country for a moment. By reducing inflation the Argentine authorities could help lower unemployment, though this would negatively affect labor productivity. Lower inflation would also be a way to increase the return to labor. So why has no government been able to decrease inflation in the long-run?

The estimation for the new Phillips curve for Argentina with the rest of the World showed that when comparing with other "least agricultural"[63] Latin America countries there was no consistency in the results obtained. The Phillips curve is specific to every country, even every region. The comparison with the USA and Europe showed us that the Phillips curve relationship for Argentina works in the opposite direction to that for these two regions. So their policies to reduce inflation should go in different directions. And when the peso is pegged to the dollar, both countries are strongly linked. So if one needs to increase inflation to decrease unemployment and the other need the contrary, the smallest country, i.e. Argentina, will face even more inflation and won't be able to launch the right policy. This may be an explanation for the lack of efficient inflation stabilization policies in Argentina. In addition, the forward component of the curve seems to be dominant in developed countries while in Argentina the backward component is more important. This implies different behaviour for firms in Argentina when compared with those in North

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[63] See Nugent (1982), p. 331.

America and the Euro zone. And again, it makes it hard for the countries to be trade partners.

Why weren't the Governments able to reduce inflation? As mentioned, the Argentine relationship with the rest of the World may have handicapped them. In addition to that, the lack of long-term presidency and the frequent change of Government weren't of any help. And as the populous was struggling with high prices and high unemployment rate, the social conflicts restrained furthermore the establishment of long term policy. And finally, the Governments may have not always protected the best interest of their people all the time. In fact, the corruption level in Argentina was and still is very high.

We could have gone in to further detail in our study in order to test whether the variables chosen for the marginal costs give a good representation of the society and are accurate to test the impact of inflation on society. In order to examine if people care about unemployment a "happiness test" would have been relevant, such as the one conducted by Di Tella, Mac Culloch and Oswald (2001)[64]. To do this however, one would have had to conduct surveys in Argentina.

Last but not least, one cannot find a reason for Argentina's situation based solely on its economy. Yordon found a sociological explanation: *"the basic cause, the failure of Argentina leaders to resolve social conflicts and to achieve unity, seems to lie in certain personality traits characteristic of the Argentine culture."*[65] We can add to this point of view the opinion of Gino Germani *"Due to the peculiarities of his manner of life, (the Argentine) was an anarchic individual, a lover of personal independence and siposed to recognize authority only of those who excelled in the qualities he respected most: bravery and skill, for example"*[66].

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[64] Di Tella, 2001.
[65] See Yordon (1965), p. 87.
[66] From Germani (1962) (in Yordon (1965), p. 87).

Annex 1: Price and wage indices from 1948 to 1961 (1950=100)

Year	Agri. prices	agri. prices growth	Cost of living	cost of living growth	industrial wages	Manuf. prices	import prices	real wages	real wage growth
1948	68		64		61	68	69	95	
1949	82	20,59%	80	25,00%	84	88	85	105	10,53%
1950	100	21,95%	100	25,00%	100	100	100	100	-4,76%
1951	152	52,00%	137	37,00%	127	132	161	93	-7,00%
1952	180	18,42%	190	38,69%	156	159	210	83	-10,75%
1953	218	21,11%	197	3,68%	170	164	218	86	3,61%
1954	220	0,92%	205	4,06%	194	184	216	95	10,47%
1955	232	5,45%	230	12,20%	216	214	241	94	-1,05%
1956	328	41,38%	261	13,48%	246	248	392	94	0,00%
1957	412	25,61%	325	24,52%	329	299	434	101	7,45%
1958	550	33,50%	428	31,69%	454	401	532	106	4,95%
1959	1375	150,00%	914	113,55%	771	807	1482	84	-20,75%
1960	1555	13,09%	1163	27,24%	905	990	1660	78	-7,14%
1961	1648	5,98%	1321	13,59%	1258	1080	1610	95	21,79%
1962	2270	3774,27%	1694	28,24%	1587	1380	2140	94	-1,05%

Source: (Yordon, 1965)

Annex 2: Level and growth of the Consumer Price Index (1945 to 2009)

Head of State	year	yearly average consumer price index	growth	Head of State	YEAR	yearly average consumer price index	growth
		Base 1945=100				Base 1945=100	
	1945	100		**Alfonsin**	1984	8945573295	**626,74%**
Peron	1946	117,7068215	17,71%	**(Austral plan)**	1985	69063860668	**672,05%**
	1947	133,6719884	13,56%		1986	1,31299E+11	90,11%
	1948	151,161103	13,08%		1987	3,03759E+11	**131,35%**
	1949	198,0406386	31,01%		1988	1,3455E+12	**342,95%**
	1950	248,766328	25,61%		1989	4,27794E+13	**3079,44%**
	1951	339,9854862	36,67%	**Menem**	1990	1,03268E+15	**2313,96%**
	1952	471,4804064	38,68%		1991	2,80549E+15	**171,67%**
	1953	490,3483309	4,00%		1992	3,50406E+15	24,90%
	1954	508,8534107	3,77%		1993	3,87589E+15	10,61%
	1955	571,6255443	12,34%		1994	4,0378E+15	4,18%
Arambru	1956	648,3309144	13,42%		1995	4,17412E+15	3,38%
	1957	808,7082729	24,74%		1996	4,18062E+15	0,16%
Frondizi	1958	1064,586357	31,64%		1997	4,20272E+15	0,53%
	1959	2272,859216	**113,50%**		1998	4,24158E+15	0,92%
	1960	2878,809869	26,66%	**De la Rúa**	1999	4,1921E+15	-1,17%
	1961	3274,310595	13,74%		2000	4,15273E+15	-0,94%
	1962	4127,721335	26,06%	**Saá**	2001	4,10848E+15	-1,07%
Guido	1963	5201,015965	26,00%	**Duhalde**	2002	5,17128E+15	25,87%
Illia	1964	6353,41074	22,16%	**Kirchner Mr.**	2003	5,86647E+15	13,44%
	1965	8173,439768	28,65%		2004	6,12553E+15	4,42%
	1966	10776,48766	31,85%		2005	6,71618E+15	9,64%
Ongania	1967	13918,72279	29,16%		2006	7,448E+15	10,90%
	1968	16182,87373	16,27%	**Kirchner Ms.**	2007	8,10593E+15	8,83%
	1969	17409,28882	7,58%		2008	8,80177E+15	8,58%
	1970	19767,77939	13,55%		2009	9,22928E+15	4,86%
Laborda	1971	26625,54427	34,69%				
Lanusse	1972	42191,582	58,46%				
	1973	67656,02322	60,35%	average price growth between 1960 and 1974			28,37%
Peronism	1974	83976,77794	24,12%				
	1975	237590,7112	**182,92%**				
	1976	1292089,985	**443,83%**				
Military	1977	3568940,493	**176,21%**				
regime	1978	9843251,089	**175,80%**				
	1979	25515239,48	**159,22%**				
	1980	51240928,88	**100,82%**				
	1981	104731494,9	**104,39%**				
	1982	277358490,6	**164,83%**				
	1983	1230914369	**343,80%**				

Source: INDEC (Instituto Nacional de Estadistica y Censos)

% in **bold** is when the inflation goes above 100%

% in white is when the data that have been "corrupted" by the government

Annex 3: Monthly inflation index for drink and food from December 2007 until now

month	index	growth compared to the same month the year before	average inflation for 2009
déc-07	101,47		
janv-08	103,55		
févr-08	108,14		
mars-08	116,76		
avr-08	116,54		
mai-08	117,25		
juin-08	119,32		
juil-08	122,36		
août-08	125,05		
sept-08	126,27		
oct-08	127,90		
nov-08	126,24		
déc-08	127,59	25,74%	12,30%
janv-09	126,15	21,82%	
févr-09	124,95	15,54%	
mars-09	126,76	8,56%	
avr-09	132,20	13,43%	
mai-09	131,87	12,47%	
juin-09	132,58	11,12%	
juil-09	133,81	9,36%	
août-09	137,54	9,99%	
sept-09	139,55	10,51%	
oct-09	140,90	10,16%	

Source: www.inflacionverdadera.com (The *«calculations and statistical methodologies are based on INDEC officials, prior to the changes introduced by the current government.")*

Annex 4.a: PPP converted GDP (constant international), 1944-1950

year	GDP	GDP growth
1944	4 579	
1945	4 356	-4,86%
1946	4 665	7,09%
1947	5 089	9,10%
1948	5 252	3,19%
1949	5 047	-3,89%

Source: Angus Maddison Time series

Annex 4.b: PPP converted GDP, I$ in 2005 constant prices, 1950-2007

year	GDP	GDP growth	year	GDP	GDP growth
1950	7736,34		**1979**	12171,3	4,47%
1951	8004,03	3,46%	**1980**	12116,41	-0,45%
1952	7372,72	-7,89%	**1981**	11319,04	-6,58%
1953	7543,17	2,31%	**1982**	10867,21	-3,99%
1954	7661,55	1,57%	**1983**	11137,67	2,49%
1955	8072,9	5,37%	**1984**	11203,3	0,59%
1956	8098,13	0,31%	**1985**	10410,47	-7,08%
1957	8299,75	2,49%	**1986**	10832,22	4,05%
1958	8714,95	5,00%	**1987**	10892,32	0,55%
1959	8125,52	-6,76%	**1988**	10562,62	-3,03%
1960	8814,7	8,48%	**1989**	9833,95	-6,90%
1961	8962,03	1,67%	**1990**	9445,76	-3,95%
1962	8903,85	-0,65%	**1991**	10109,42	7,03%
1963	8480,73	-4,75%	**1992**	10905,66	7,88%
1964	8966,91	5,73%	**1993**	11471,77	5,19%
1965	9691,08	8,08%	**1994**	11912,96	3,85%
1966	9577,82	-1,17%	**1995**	11709,23	-1,71%
1967	9707,56	1,35%	**1996**	12118,01	3,49%
1968	10048,18	3,51%	**1997**	12778,25	5,45%
1969	10753,23	7,02%	**1998**	13132,14	2,77%
1970	10926,52	1,61%	**1999**	12717,35	-3,16%
1971	11139,3	1,95%	**2000**	12518,49	-1,56%
1972	11102,71	-0,33%	**2001**	12066,74	-3,61%
1973	11262,51	1,44%	**2002**	11273,66	-6,57%
1974	11757,83	4,40%	**2003**	11951,11	6,01%
1975	11479,26	-2,37%	**2004**	12647,79	5,83%
1976	11499,55	0,18%	**2005**	13603,17	7,55%
1977	12101,97	5,24%	**2006**	14495,78	6,56%
1978	11650,47	-3,73%	**2007**	15274,68	5,37%

Source: Alan Heston, Robert Summers and Bettina Aten, Penn World Table Version 6.3, Centre for International Comparisons of Production, Income and Prices at the University of Pennsylvania, August 2009.

Annex 5: Fiscal deficit (as a percentage of GDP)

year	fiscal deficit	year	fiscal deficit	year	fiscal deficit	year	fiscal deficit
1945	4,60%	1962	7,18%	1979	5,57%	1996	3,16%
1946	6,90%	1963	6,48%	1980	6,48%	1997	1,50%
1947	5,80%	1964	6,20%	1981	11,27%	1998	2,42%
1948	13,40%	1965	3,86%	1982	11,36%	1999	4,51%
1949	9,80%	1966	4,72%	1983	10,38%	2000	3,30%
1950	5,50%	1967	2,02%	1984	8,73%	2001	7,03%
1951	4,50%	1968	2,18%	1985	4,95%	2002	0,81%
1952	5,60%	1969	1,73%	1986	4,09%	2003	-1,59%
1953	8,80%	1970	1,87%	1987	7,04%	2004	-3,54%
1954	8,50%	1971	4,40%	1988	7,93%	2005	-1,01%
1955	6,90%	1972	5,90%	1989	7,81%	2006	-1,41%
1956	5,00%	1973	7,49%	1990	4,73%	2007	-0,62%
1957	5,50%	1974	7,75%	1991	1,42%	2008	-0,44%
1958	9,60%	1975	13,84%	1992	0,45%		
1959	2,90%	1976	10,26%	1993	0,01%		
1960	2,70%	1977	3,96%	1994	1,67%		
1961	4,04%	1978	5,22%	1995	2,89%		

Source: (Di Tella, et al., 1989) table 15-6, p330 for years 1945 to 1961

Report from the Ministerio de Economia y Producion, Secretaria de Hacienda, 2004 p. 12 for years 1961 to 2004

Ministerio de Economica y producion, Secretaria de hacienda, website for years 2005 and 2006

CEPAL for year 2007 and 2008. (Note: these numbers only correspond to the central government deficit. Data for the rest of the public sector is missing)

Annex 6: Annual exchange rate, number of peso units per US Dollar (end of period)

year	Peso Moneda Nacional (PMN)	year	Peso Ley (PL)	year	Peso Argentino (PA)	year	Australes (A)	year	acutal Peso (P)
1949	10	1970	4	1983	23,261	1986	1,257	1992	0,9905
1950	10	1971	5	1984	178,7	1987	3,75	1993	0,9985
1951	10	1972	5	1985	800,5	1988	13,37	1994	0,9995
1952	10	1973	5			1989	1795	1995	1
1953	10	1974	5			1990	5585	1996	0,9995
1954	10	1975	60,9			1991	9985	1997	0,9995
1955	40	1976	274,5					1998	0,9995
1956	40	1977	597,5					1999	0,9995
1957	40	1978	1003,5					2000	0,9995
1958	70	1979	1618,5					2001	0,9995
1959	80	1980	1993					2002	3,32
1960	80	1981	7248					2003	2,9
1961	80	1982	48545					2004	2,959
1962	130							2005	3,01
1963	130							2006	3,04
1964	150							2007	3,12
1965	190							2008	3,43
1966	250							2009	3,8
1967	350								
1968	350								
1969	350								

Sources: International financial Yearbooks of 1979, 1998 and 2009 (IMF)

Summary of the different currencies and their values:

-1945 to 1969: Peso Moneda Nacional (PMN)

-1970 to 1983: Peso Ley (PL)

1 PL = 100 PMN

-1983 to 1985: Peso Argentino (PA)

1 PA = 10000 PL

-1985 to 1991: Austral (A)

1 A = 1000 PA

-1992 to now: Peso (P)

1 P = 10000 A

1P = 10^{13} PMN

Annex 7: Current Account Balance (in millions of US dollars)

year	current account balance	year	current account balance
1945	368	**1978**	1856
1946	425	**1979**	-513
1947	-29	**1980**	-4774
1948	54	**1981**	-4712
1949	-138	**1982**	-2353
1950	112	**1983**	-2436
1951	311	**1984**	-2495
1952	-465	**1985**	-952
1953	344	**1986**	-2859
1954	83	**1987**	-4235
1955	-242	**1988**	-1572
1956	-131	**1989**	-1305
1957	-303	**1990**	4552
1958	-259	**1991**	-647
1959	11	**1992**	-5462
1960	-204	**1993**	-7672
1961	-585	**1994**	-10118
1962	-273	**1995**	-2768
1963	234	**1996**	-6770
1964	36	**1997**	-12138
1965	222	**1998**	-14482
1966	259	**1999**	-11943
1967	130	**2000**	-8981
1968	-53	**2001**	-3780
1969	-230	**2002**	8767
1970	-163	**2003**	8140
1971	-390	**2004**	3212
1972	-227	**2005**	5275
1973	711	**2006**	7709
1974	118	**2007**	7103
1975	-1287	**2008**	7588
1976	651	**2009**	
1977	1126		

Source: (Di Tella, et al., 1989) for years 1945 to 1950

International financial statistic yearbook from 1983, 1991 and 2009 (IMF) for years 1950 to 2009

Annex 8: Historical Summary

Year	president	inflation	Per capita GDP growth	Exchange rate system	Current account
		+ more than 20% ++ more than 100% +++ more than 1000%	- negative growth + positive growth		-deficit + surplus
1945	Gral. Juan D. Perón			Multiple fixed	+
1946			+		+
1947			+		-
1948			+		+
1949		+	-		-
1950		+	-		+
1951		+	+		+
1952		+	-		-
1953			+		+
1954			+		+
1955	Gral. Eduardo Lonardi[67]/Gral. Pedro E. Aramburu		+		-
1956			+		-
1957		+	+		-
1958	Dr Arturo Frondizi	+	+		-
1959		++	-		+
1960		+	+	Dirty float	-
1961			+	Fixed	-
1962	Dr Jose Maria Guido	+	-	Flexible	-
1963	Dr Arturo Illia	+	-		+
1964		+	+		+
1965		+	+		+
1966	Gral. Juan C. Ongania	+	-		+
1967		+	+	Fixed	+
1968			+		-
1969			+		-
1970	Gral. Roberto M. Levingston		+		-
1971	Gral. Alejandro Lanusse	+	+		-
1972		+	+		-
1973	Dr Hector Campora[67]/Mr.	+	+		+

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[67] Only stayed for a few months and was replaced in the same year-+

Year					
	Raul Lastiri[67]/Gral. Juan D. Perón				
1974	Mrs. Isabel Peron	+	+		+
1975		++	-		-
1976	Gral. Jorge R. Videla	++	-		+
1977		++	+		+
1978		++	-	Exchange rate table	+
1979		++	+		-
1980		++	-		-
1981	Gral. Roberto Viola[67]/ Gral. Leopoldo Galtieri	++	-	Flexible	-
1982	Gral. Reynaldo Bignone	++	-		-
1983	Dr Raul R. Alfonsin	++	+		-
1984		++	+		-
1985		++	-	Attempts to fixe	-
1986		+	+		-
1987		++	+		-
1988		++	-		-
1989	Dr Carlos S. Menem	+++	-		-
1990		+++	-		-
1991		++	+		+
1992		+	+	currency board	-
1993			+		-
1994			+		-
1995			-		-
1996			+		-
1997			+		-
1998			+		-
1999	Dr Fernando de la Rúa		-		-
2000			-		-
2001	Adolfo R. Saá		-	flexible	-
2002	Dr Eduardo A. Duhalde	+	-		+
2003	Dr Néstor C. Kirchner		+		+
2004					+
2005					+
2006					+
2007	Cristina Fernández de Kirchner				+
2008					+

Annex 9: Table of social variables

year	crude marriage rate (1)	real wages index (2)	unemployment rate (3)	employment rate (4)	Wage Share (5)	Labor productivity (6)
1945	8	66,3				
1946	8	64,1				
1947	8,7	78,3				
1948	8,4	92,5				
1949	8,4	93,3				
1950	8,3	86,7				
1951	8,1	82				
1952	7,6	75,7				
1953	7,8	79,6				
1954	7,7	86,9				
1955	7,5	84,5				
1956	7,4	90,6				
1957	7,5	87,3				
1958	7,4	96,8				
1959	7,3	74,2				
1960	7	74,5				
1961	6,8	82,7				
1962	6,5	81,7				
1963	6,1	81,7				
1964	6,9	90,2				
1965	6,9	98,4	8,8			
1966	6,7	98,9	7,1			
1967	6,6	96,7	5,6			
1968	6,6	91,7	6,1			
1969		96,4	6,5			
1970	7,3	100	5,1			
1971		105,2	4,5			
1972		99	5			
1973		107,2	5,9			
1974		126,4	6,6	39,2	554,84	5332536,25
1975		123,7	5,5	38,4	1556,43	5368463,06
1976		79,2	4,20	37,4	559,47	5477673,56
1977	7	75,6	3,65	37,5	25,37	5778696,39
1978		77,2	4,80	37,7	20,22	5472331,11
1979		86,1	3,30	37,4	44,01	5887692,11
1980		100	3,25	37,4	64,14	5937267,80
1981	5,6	90,29503106	2,50	36,6	75,24	6009417,01
1982		78,10559006	2,55	36,3	112,09	5854216,20

(continued)

year	crude marriage rate (1)	real wages index (2)	unemployment rate (3)	employment rate (4)	Wage Share (5)	Labor productivity (6)
1983	6	89,67391304	4,75	35,6	51,65	6196857,68
1984		111,6459627	5,30	36,1	16,24	6242121,60
1985		104,4254658	4,70	35,7	7,87	5884728,94
1986		104,1149068	4,55	36,5	4,59	6152896,60
1987		93,94409938	6,10	36,9	28,64	6224809,46
1988		90,83850932	5,55	36,6	140,70	6142306,97
1989		73,52484472	5,85	37,0	50,04	5742533,80
1990	5,8	76,94099379	6,30	36,7	1,93	5781527,20
1991		78,02795031	7,60	36,1	0,30	6461780,33
1992		79,03726708	7,45	37,0	5,86	6881205,47
1993		77,95031056	6,45	37,3	662,29	7218238,44
1994		78,49378882	6,95	37,3	10504,32	7811574,76
1995	4,6	77,63975155	9,60	36,3	52720,08	7771919,22
1996	4,2	78,10559006	11,40	35,3	173646,70	8324514,68
1997		78,33850932	17,50	34,7	6150887,57	9147213,16
1998		78,33850932	17,20	34,3	46110849,06	9681658,76
1999	4	80,66770186	14,90	35,0	12543580,80	9168020,96
2000	3,8	82,45341615	12,93	36,8	-5875015,48	8634027,94
2001	3,5	81,90993789	14,27	36,5	4949505,97	8293845,87
2002	3,2	70,49689441	15,05	36,2	4654868,43	7447329,25
2003	3,4	69,40993789	17,35	35,2	-181162,22	8336968,33
2004	3,4		19,65	34,1		
2005	3,4		15,40	36,2		
2006	3,5		13,63			
2007	3,5		11,58			
2008			10,20			
2009			8,60			

(1): number of legal marriages performed and registered per 1000 of the population
Source: demographic yearbooks, United Nations
(2): real wages index (1970=100)
Source: (Sommavilla, 1996) for years 1945 to 1980; ECLAC: Economic Commission for Latin America and the Caribbean for the rest
(3) Percentage of unemployed persons in the active population
Source: (Sommavilla, 1996) for years 1963 to 1971; INDEC, Encuesta Permanente de Hogares Continua. (Instituto Nacional de Estadistica y Censos) for the rest
(4) Percentage of employed persons in the active population
Source: INDEC, Encuesta Permanente de Hogares Continua
(5) Wage share (ws)= (real wages * employment rate)/(consumer prices * GDP)
(6)Labor productivity= GDP/employment

Annex 10: Dummy variables for inflation stabilization policies

year	stabilization policy (STAB)	exchange rate policy (XRpol)	Fiscal policy (FDpol)	Monetary policy (IRpol)	price control (Pcontrol)	wage control (Wcontrol)
1945	0	0	0	0	0	0
1946	0	0	0	0	0	0
1947	0	0	0	0	0	0
1948	0	0	0	0	0	0
1949	0	0	0	0	0	0
1950	0	0	0	0	0	0
1951	0	0	0	0	0	0
1952	1	1	1	0	1	1
1953	0	0	0	0	0	0
1954	0	0	0	0	0	0
1955	0	0	0	0	0	0
1956	0	0	0	0	0	0
1957	0	0	0	0	0	0
1958	0	0	0	0	0	0
1959	1	1	0	0	1	1
1960	0	0	0	0	0	0
1961	0	0	0	0	0	0
1962	0	0	0	0	0	0
1963	0	0	0	0	0	0
1964	0	0	0	0	0	0
1965	0	0	0	0	0	0
1966	0	0	0	0	0	0
1967	1	1	1	0	1	1
1968	0	0	0	0	0	0
1969	0	0	0	0	0	0
1970	0	0	0	0	0	0
1971	0	0	0	0	0	0
1972	0	0	0	0	0	0
1973	1	1	0	0	1	1
1974	0	0	0	0	0	0
1975	0	0	0	0	0	0
1976	1	1	1	0	0	1
1977	0	0	0	0	0	0
1978	0	0	0	0	0	0
1979	1	1	1	0	0	1
1980	0	0	0	0	0	0
1981	0	0	0	0	0	0
1982	0	0	0	0	0	0
1983	0	0	0	0	0	0

year	stabilization policy (STAB)	exchange rate policy (XRpol)	Fiscal policy (FDpol)	Monetary policy (IRpol)	price control (Pcontrol)	wage control (Wcontrol)
1984	0	0	0	0	0	0
1985	1	1	1	1	1	1
1986	0	0	0	0	0	0
1987	0	0	0	0	0	0
1988	1	0	1	1	1	1
1989	1	1	0	0	0	0
1990	0	0	0	0	0	0
1991	1	1	1	0	0	0
1992	0	0	0	0	0	0
1993	0	0	0	0	0	0
1994	0	0	0	0	0	0
1995	0	0	0	0	0	0
1996	0	0	0	0	0	0
1997	0	0	0	0	0	0
1998	0	0	0	0	0	0
1999	0	0	0	0	0	0
2000	0	0	0	0	0	0
2001	0	0	0	0	0	0
2002	1	0	0	0	0	0
2003	0	0	0	0	0	0
2004	0	0	0	0	0	0
2005	0	0	0	0	0	0
2006	0	0	0	0	0	0
2007	0	0	0	0	0	0
2008	0	0	0	0	0	0
2009	0	0	0	0	0	0

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Zusammenfassung

Seit mehr als sechzig Jahren leidet Argentinien an einer sehr hohen Inflationsrate und instabilen Regierungen. Alles Mögliche wurde schon versucht um Inflation in den Griff zu bekommen aber bis heute zeichnet sich keine langfristige Lösung für das Problem ab. Die Peronistische Zeit und Diktaturen verarmten das Land, welches seit langem eine hohe Arbeitslosigkeit ertragen muss.

Die neue Keynesianische Phillips Kurve ist ein gutes Modell, um die Beziehung zwischen Inflation und Grenzkosten zu überprüfen. Vier verschiedene Variablen wurden genutzt, um diese Grenzkosten gut umzufassen: Arbeitslosigkeit, der Output Gap, die Lohnquote und die Arbeitsproduktivität. Durch die generalisierte Momenten-Methode und verschieden Instrumenten wie der verzögerten Inflation aus Vorperiode, Heiratsquote oder Lohninflation, wurde eine positive Korrelation zwischen Inflation und Arbeitslosigkeit gefunden. Eine Erhöhung von Inflation führt zu einer Erhöhung von Arbeitslosigkeit. In dieselbe Richtung, zeigten die Resultate eine positive Beziehung von Preiswachstum und Arbeitsproduktivität aber eine negative Beziehung mit dem Output Gap und der Lohnquote. Normalerweiser, also, hätte mit einer Inflation Stabilisierungspolitik die Arbeitslosigkeit sinken sollen, so wie auch die Arbeitsproduktivität und hätte die Lohnquote und der Output Gap zunehmen sollen. Leider, laut Modell, ist das nicht der Fall. Die Regierung schaffte es nicht einmal die Inflation selber zu kontrollieren oder nur sehr kurzfristig und dann ist sie meistens noch höher gestiegen als vorher.

Wenn man die Ergebnisse mit anderen Ländern des Latein-Amerikanischen Kontinents vergleicht, findet man keine Einheit. Während die am meist entwickelten Länder eine positive Korrelation zwischen Inflationsquote mit der Lohnquote haben. Das ist genau das Gegenteil in Argentinien. Dies könnte ein Hindernis für die argentinische Politik Effizienz gewesen sein. In der Tat haben seine wichtigsten Handelspartner eine gegenteilige Phillips Beziehung und eine koordinierte Politik wäre unmöglich.

Die Ergebnisse von der Neuen Keynesianische Phillips Kurve scheinen schwach zu sein für Argentinien, wegen der Lücke an Daten und weil sie sehr von der Wahl Instrumente die gewählt wurden wie die generalisierte Momenten-Methode

abhängen. Weitere Studien und Befragungen wären notwendig, um diese Beziehung genauer zu überprüfen.

<u>Abstract</u>

For more than sixty years Argentina has suffered from very high inflation and government instability. The authorities have tried several different policies to bring inflation down but up to now there has been no long-term efficient inflation stabilization policy. Peronist periods and dictatorships impoverished the society which has for a long time experienced a very high unemployment rate.

The new Keynesian Phillips curve is a good model to examine the relationship between inflation and marginal cost. Four different variables were used to define the marginal cost: the unemployment rate, the output gap, the wage share and labor productivity. With the generalized method of moments and different instruments such as lagged inflation, the marriage rate and wage inflation, a positive correlation was found between inflation and unemployment. The first conclusion from the analysis is that an increase of inflation leads to an increase in unemployment. Additional results show a positive relationship between inflation and labor productivity and a negative relationship between inflation and the output gap and the wage rate. Normally, therefore, inflation stabilization policies should have brought down unemployment, while increasing labor productivity, the wage share and the output gap. Unfortunately, according to the model, this is not the case. The government didn't even manage to decrease inflation or at best only in the very short term, with inflation usually returning after some time, often at even higher rates.

Comparing the results with those from other Latin America countries reveals no consistency across countries, while in developed countries the inflation rate tends to be positively correlated with the wage rate, which is exactly the opposite to what was found for Argentina. This could have been an obstacle for Argentina's policy efficiency. In fact, its main trade partner have opposite Phillips relationship and a coordinated policy would be impossible.

The results of the New Keynesian Phillips Curve appear to be weak for Argentina, partly because of the lack of appropriate data and because the results are sensitive to the choice of instruments chosen for the generalized moments method.

Further studies and surveys would be needed to examine this relationship in more detail.

Curriculum Vitae

Galatée REME

Date & place of birth: July 1984, Aubergenville (France)
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Education

2002 to 2004	**Université Paris IX Dauphine** Management and applied Economics
2004	Diplome D'Etudes Universitaire Générales (DEUG) at the University **Paris IX Dauphine**
2005	One Erasmus year at the **University of Vienna** (Applied Economics)
2005	**Université Paris IX Dauphine** Bachelor of Applied economics
2005 to date	**University of Vienna** (Applied Economics)
2007-2009	**University of Vienna** (Hungarian) Language courses
2008 and 2009	Summer University at the **University Eötvös Lorand Budapest**

Work Experience

2006	**Petit Bateau**, Vienna: *saleswoman* (six months)
2004-2005	**NACEL**, Paris: *Children's escort* (2 months in summer for each year)
2002-2004	**NGO Fleur de Bitume**: Vice-President Head of humanitarian and social student association
2003	**Comfort Inn**, Bezons (France): *receptionist* (1 month) Reception of foreign groups • waitress
2001	**Cabinet of Lawyer Rousseau**, Paris: *School Internship* (1 week)

Languages and Additional Skills

French	**mother tongue**
English	**fluent** (first certificate of Cambridge)
German	**fluent** (Six years at the University of Vienna)
Hungarian	**good communication skills** (two summer universities in Budapest)
Computer skills	good command of **Microsoft Office** tools, Eviews, FoxPro and Maple