HYPERINFLATION

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Abstract

This essay provides a brief introduction to the concept of hyperinflation and the importance of both monetary and fiscal policies conducted by Central Banks and Governments in an economy. Two different albeit conventional frameworks regarding the causes of inflation and the relationship between money supply and the price level are considered. Additionally, I review historical data concerning hyperinflations in Latin America to achieve a better understanding of the object of research. This essay finally discusses the significance of the so-called monetary policy of "inflation targeting" – which looks for a low, stable, and moderate level of inflation.

I. Introduction

We understand hyperinflation as a general, persistently high, and accelerating increase in the prices of goods and services in an economy as the domestic currency depreciates. For a slightly more technical definition, economist Phillip Cagan [1] suggested that hyperinflation occurs when the monthly inflation rate exceeds 50%. The consequences of such an event are somewhat evident: as the price level of essentially all goods and services increases, agents' purchasing power significantly erodes. In this sense, inflation acts as a tax not only in eroding the purchasing power of domestic earnings and fixed-income asset values but also in terms of distributional effects – broadly speaking, inflation benefits debtors at the expense of creditors, whose lent amounts can now buy lesser goods – and regressive effects – to the extent that it affects lower and middle-income individuals more than high-income ones on the fact that the former hold a higher share of their wealth in the form of more liquid assets (i.e., cash, checks) than the latter (Erosa and Ventura [2]). Even more, as the local currency keeps losing its value and inflation becomes unpredictable, both international and domestic credit markets tend to significantly shrink (Bernholz [3]). To such an extent, the efforts devoted by Governments and Central Banks to avoid such scenarios are only natural.

The upcoming section, **Section 2**, presents two frameworks related to the (hyper)inflation topic: the "monetarist" standpoint of view, per the "quantity theory of money"; and the "rational expectations", "new classical economics" approach. Throughout the lenses of the latter, three historical cases of hyperinflations during the 1970s, 80s, and 90s in Latin America are studied in **Section 3**. In **Section 4**, the last of this essay, the nowadays "conventional" monetary policy of most advanced economies' Central Banks will be briefly discussed – i.e., "inflation targeting".

II. Theoretical Discussion

Different approaches regarding the causes of inflation have emerged across history – and will continue to do so. This essay is particularly inquisitive in studying and defining the actual relationship between the money supply and inflation (and how did it evolve through time).

i. Monetarism

The "monetarist" framework, following the "quantity theory of money", argues that there is a *strict* positive relationship between the quantity of money and the general price level

growth, or inflation. In this sense, inflation is *"always and everywhere a monetary phenomenon"* caused by an unsupported, unbacked increase in the quantity of money. Such an approach is better understood with its mathematical expression

$$M * V = P * Y$$

where M represents the quantity of money, V represents the velocity of money or the number of times each unit of currency is used within a given period, P represents the general price level of goods and services within that period, and Y represents the output of the economy in the same given period. In this aspect, in the period conducing to – and during – a (hyper)inflation, as people intend to get rid of the local currency before it keeps losing purchasing power (as they expect further inflation), the velocity of money V highly increases. To the extent that the Government's tax revenue also sees a relative decrease (considering the lag between the moment of taxes payment and the effective recollection of it – an effect known as Tanzi's law [4]), it is often the case that Central Banks incur in an ever-increasing, vicious supply of money through printing, as there's no correspondent growth in the economy's output and credit markets remain essentially closed (this is the truer for larger inflations). The result: a persistent increase in the general price level – or inflation (π).

$$\uparrow \Delta\%M + \uparrow \Delta\%V = \uparrow\uparrow \pi + \Delta\%Y$$

Such is the theoretical "orthodox" approach to this regard. However, inflation has seemed to stop being *exclusively* a monetary phenomenon lately: the somehow unprecedented rapid increase in the money supply essentially across all the world since many years ago did not come with an equally likely growth in the general price level. More notably, De Grauwe and Polan [5] show that this seems to be truer for *advance economies* – that is, the relationship between inflation and money growth for historically low-inflation countries does not hold as much as in historically high-inflation economies (see also **Section 4**).

ii. New Classical Economics

As a reaction of a now somewhat obsolete conventional wisdom – and as economic theory would have it – a different, new approach surging from the work in the "new classical economics" proposes a new framework to the inflation topic. Based on the pioneering work of Robert E. Lucas Jr. [6][7], Thomas J. Sargent [7][8][9][10] and Neil Wallace [8] – and greatly summarized for this essay's subject of study by Timothy J. Kehoe and Juan P. Nicolini [11] – this framework, together with the accumulating empirical evidence that gradually erodes the strictly positive relationship between money supply and inflation, interprets both fiscal discipline (accompanied by a careful monetary policy – *ça va sans dire*) and Central Bank and Government's credibility as *the* fundamental factors in determining the path of the inflation.

Essentially, Sargent and Wallace [8] present two ways in which fiscal and monetary policies can "coexist": fiscal domination over monetary policy, or monetary policy discipline over fiscal authorities. In the former, Government expenditure develops under its criterion, and it is only after that that the monetary authorities must finance such expenditure (by printing money, i.e., *seigniorage*, or by bond revenues). The latter form of "joint determination" (Kehoe, Nicolini and Sargent [10]), on the contrary, implies that monetary authorities independently set in advance the amount of revenue they will provide to the fiscal authorities – who are now constrained on their spending. A not less important consideration of such framework involves the credibility of the Central Bank and the Government – and, as is often the case in strong economies, the independence of the former from the latter. Under this path, it is believed that monetary authorities may permanently control inflation even with ***temporary* (high) budget deficits**, to the

extent that those deficits are interpreted by the now forward-looking, "rational expectations" agents correctly as temporary (as opposed to permanent) events – in a way they can themselves, together with a deep international credit market, finance them. For the time being, this final approach seems to convey the somewhat newly "conventional" wisdom regarding the causes of (hyper)inflation. As evidence would have it – and as it will be discussed in **Section 3** – it is often the case that hyperinflations are caused by large fiscal deficits thoroughly financed by careless monetary emissions. (High) inflation may *not exclusively* be a monetary phenomenon after all.[1]

III. Historical Evidence: The Case for Latin America

Latin America saw numerous cases of high inflations and hyperinflations during the last half of the 20th century. Together with an elevated political instability – often associated with *coups d'État* – and arguably erroneous executions of monetary and fiscal policies (also often associated with the dependency, as opposed to independence, of Central Banks), massive increases in Government expenditures, not financed by debt nor backed by increasing tax revenues – resulting in unsustainable budget deficits – induced high or hyperinflations. Other diverse facets, such as prior defaults – which shrunk and weakened credit markets both in volume and maturity, making printing money the only resource of financing for the Government – and lack of credibility of political and economic authorities contributed as well to make price instability a common currency in Latin America during the period in question.

As the "new classical economics" framework emphasizes, the way a given deficit is financed is crucial to understanding the evolution of the main macroeconomic variables – particularly, the rate of inflation. In our case studies, as mentioned, it was always the case that during the periods of high and hyperinflations the authorities had to finance this *"systematic imbalance between Government revenues and outlays"* (Buera and Nicolini **[12]**) with an ever-increasing supply of money. To this respect, **Figures 1** and **2** in the **Appendix** show the countries' *scaled* Total Deficit (as a % of GDP) and annual Inflation Rate (taken in a logarithmic scale) – from 1960 to 2017. Accordingly, there seems to be a positive correlation between the two variables in all three cases, even though some unusually extreme levels for both variables (characteristic of highly unstable, politically volatile periods) may from time to time blur the main idea (for statistical results, see **Table 1** in the **Appendix**). Generally speaking, as the level of deficit (dashed lines in **Figure 1**) increases, a correspondent (lagged) spike in the inflation rate (solid lines in **Figure 1**) tends to follow – such is the dynamic followed by the aforementioned framework: systematic chronic deficits explain persistently high levels of inflation.

i. Argentina

Argentina experienced three hyperinflations in the last half of the 20th century – 1975, 1985, and 1989. As can be seen in **Figure 1**, all such three events occur immediately after or even coincide with the three highest peaks in the level of Government deficit. In the words of Buera and Nicolini **[12]**, *"The budget constraint (...) has a direct implication: deficits imply inflation, and that is the dominant characteristic of Argentina during this period".*

Price stability was eventually achieved in 1991 when a currency board was established under Economic Minister Domingo Cavallo and President Carlos Menem. In short, the so-called "Convertibility Plan" fixed the Argentinian peso to the United States dollar at 1 (one) while simultaneously imposing a total and absolute dollar backing of the monetary base and giving independence to the Central Bank. The message was clear: *"(. . .) a new attempt to end the policy regime of fiscal dominance*

[1] In a presumably friendly pun against Friedman's *"Inflation is always and everywhere a monetary phenomenon"*, Sargent once said *"Persistent high inflation is always and everywhere a fiscal phenomenon".*

that had prevailed in Argentina for decades and to begin a new regime of monetary dominance" (Buera and Nicolini [12]).

ii. Chile

The Chilean case is somehow different from every other in Latin America. Coming off the Allende's hyperinflation in 1973 – associated with an exceptionally high level of Government deficit, as shown in **Figure 1** – economic stabilization first took place under dictator Augusto Pinochet's administration – with everything that could imply. Together with the so-called "Chicago Boys", the military administration carried out a massive liberalization, deregulation, and privatization of the economy and the markets accompanied by a substantial reduction of the Government's deficit. To the extent that inflation continued to be at high levels – *"(...) this path was incorporated in inflation expectations"* (Caputo and Saravia [13]) – price stability was only achieved with a currency board in 1978 when the exchange rate followed a predetermined rate of devaluation – the *"Tablita"*, a tool then very known across Latin America.

iii. Peru

Peru experienced high levels of inflation and hyperinflation during the last half of the 1980's decade with the heterodox stabilization attempt from President Alan García. In 1990, Alberto Fujimori is elected and, in a strategy known as "bait-and-switch", he quickly shifts his populist campaign promises towards a stabilization program – the so-called "Fujishock". Aimed at deregulating markets and reducing state intervention in terms of economic activity, together with a promise to cut inflationary monetary financing of fiscal deficits (Martinelli and Vega [14]), after a year the inflation rate was at low double-digits.

According to the framework here utilized, in the words of Martinelli and Vega [14] – and as it can be seen in **Figure 1** – *"(...) inflation before the stabilization of 1990 reflects the fiscal need for inflationary taxation in a regime of fiscal dominance of monetary policy. Indeed, fiscal statistics reflect recurrent cyclical fiscal deficits up until 1990. Stabilization in the 1990s corresponds to a period of monetary policy independence and fiscal moderation"*. The credibility of Fujimori's change of regime deeply entangles with the "credibility theory" to control inflation. As counterintuitive as it may sound, as far as people can believe that the current administration policies – the "rules of the game" (Sargent [9]) – will continue to go on regardless of the Government in office (this is the truer for the Peruvian case, where Fujimori adopted essentially all the policies his very own opponent promised during the campaign), well-directed fiscal and monetary policies may eradicate inflation.

In sum, much of the economic disgraces that tormented Latin American countries during the last half of the 20th century seem to be connected to the Government's inability to restrict expenditures to actual revenues and impose monetary dominance over fiscal. As shown in **Figures 1** and **2**, high levels of deficit implied high levels of inflation. In all the three cases here briefly reviewed – Argentina, Chile, and Peru – price stability was eventually achieved with fiscal shocks (fiscal austerity, reduced spending) or fixed exchange rates. Nonetheless, all three countries saw as well economic and financial crises in the years following the structural changes that made price stability possible. In general terms, such regimes not only produce sharp appreciations in the local currency that may imbalance the countries' accounts but also largely encourage the borrowing in foreign currency – the so-called "original sin": an eventually imminent devaluation makes this foreign-currency denominated debt increasingly expensive, diminishing the country's own foreign net worth. Financial crises involving currency crisis, debt crisis, or banking crisis – as a form of self-fulfilling mechanism – were all common events in Latin America after the 1970s, 80's, and 90's stabilizations. Even more, every momentary stability comes at the expense of high interest rates and high unemployment. As will be discussed in **Section 4**,

to the extent that monetary policy has no real long-run effect on output, essentially all Central Banks across advanced economies nowadays choose to employ "inflation targeting" as their monetary policy, looking for a low, stable, and moderate rate of inflation.

IV. Monetary Policy Rule: Inflation Targeting

Conventional monetary policy has come a long way since Milton Friedman's *"Inflation is always and everywhere a monetary phenomenon"*. In historically low-inflation countries, the strict link between money supply and price level continued to erode (De Grauwe and Polan [5]) while new monetary policies surged. **Figure 3** shows the M2 Monetary Aggregate and the Price Level for the Euro Area from 1997 to 2017, taking 1997 as a base. As seen, the money supply and the inflation rate took opposite roads.

Given that monetary policy can't support the long-run growth of a country's output (the so-called "neutrality" of money) it is often the case that the best Central Banks can do for an economy is to maintain price stability. To this day, that is arguably the main objective of most Central Banks across advanced (and not so-advanced) economies – even when some Central Banks don't explicitly admit it, price stability remains as their primary object, second to none. To this end, a somehow successful clear set of rules for monetary authorities to conduct has developed – inflation targeting. This type of monetary policy explicitly sets a stable target level for the inflation rate and uses a set of monetary tools to achieve it. While there are different variations, a standard form of inflation targeting expressed with its "loss function" – a mathematical expression that monetary authorities seek to minimize – looks like the following:

$$L_t = \frac{1}{2}[(\pi_t - \pi^*)]^2 + \lambda y_t^2]$$

where $\frac{1}{2}$ is a scaling factor, π_t is the inflation rate on period t, π^* is the targeted inflation rate, λ is the relative weight attributed to output stabilization (in the more basic form of inflation targeting $\lambda = 0$), and y_t is the output on period t. As can be noted, any deviation from the targeted level of inflation would make the Central Bank's "loss" bigger. However, because of the imperfect nature of controlling inflation – given lags and uncertainties in the monetary transmission mechanism or future shocks to the economy – it is not uncommon between macroeconomists to accept deviations from the fixed target during the short-term – for example, above-target inflation during negative supply shocks, as we've seen with the COVID-19 pandemic.

Finally, as Svensson [15] denotes, a very central point for the well-functioning of inflation targeting policies includes, unexceptionally, great transparency and accountability from the central authorities. Along these lines, and according to the framework here utilized, to the extent that the "rules of the game" are clearly, explicitly, and publicly addressed – as opposed to arbitrarily settled – it seems to be the case that inflation may be permanently controlled under non-adverse circumstances.

V. Conclusion

I have briefly addressed the concept of hyperinflation by studying both theory and evidence. From a theoretical standpoint, this work concludes that out of the two frameworks here presented – which we can call "monetarist" or "quantity theory of money" and "new classical economics" – although the former should never be overlooked, it is the latter one who remains in force in explaining hyperinflation phenomenons. Such a framework emphasizes the importance of the joint determination between monetary and fiscal policies in deciding the path of inflation. In this sense, it was shown for the historical hyperinflations here selected how persistently chronic deficits thoroughly financed through monetary emissions conducted ineluctably to high inflation and hyperinflation. Considering the destructive effects of such phenomenons, and to the extent

that monetary policy can't affect long-term output, "inflation targeting" is arguably one of the best paths a Central Bank can engage in.

References

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Appendix (Tables and Figures)

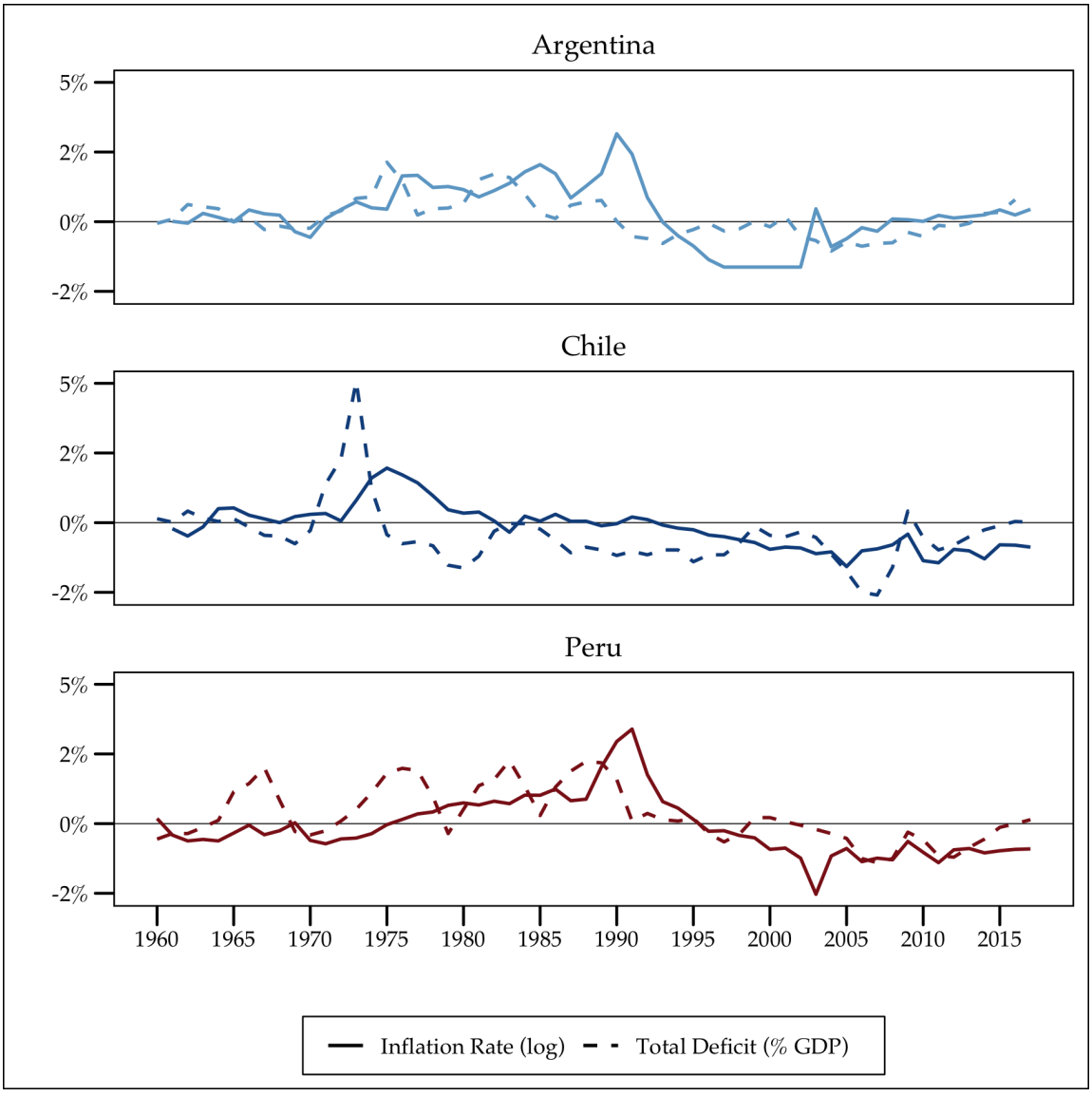

Figure 1: Total Deficit (% GDP) and annual Inflation Rate (log) for **Argentina**, **Chile** and **Peru** from 1960 to 2017 (scaled), Kehoe & Nicolini (2022).

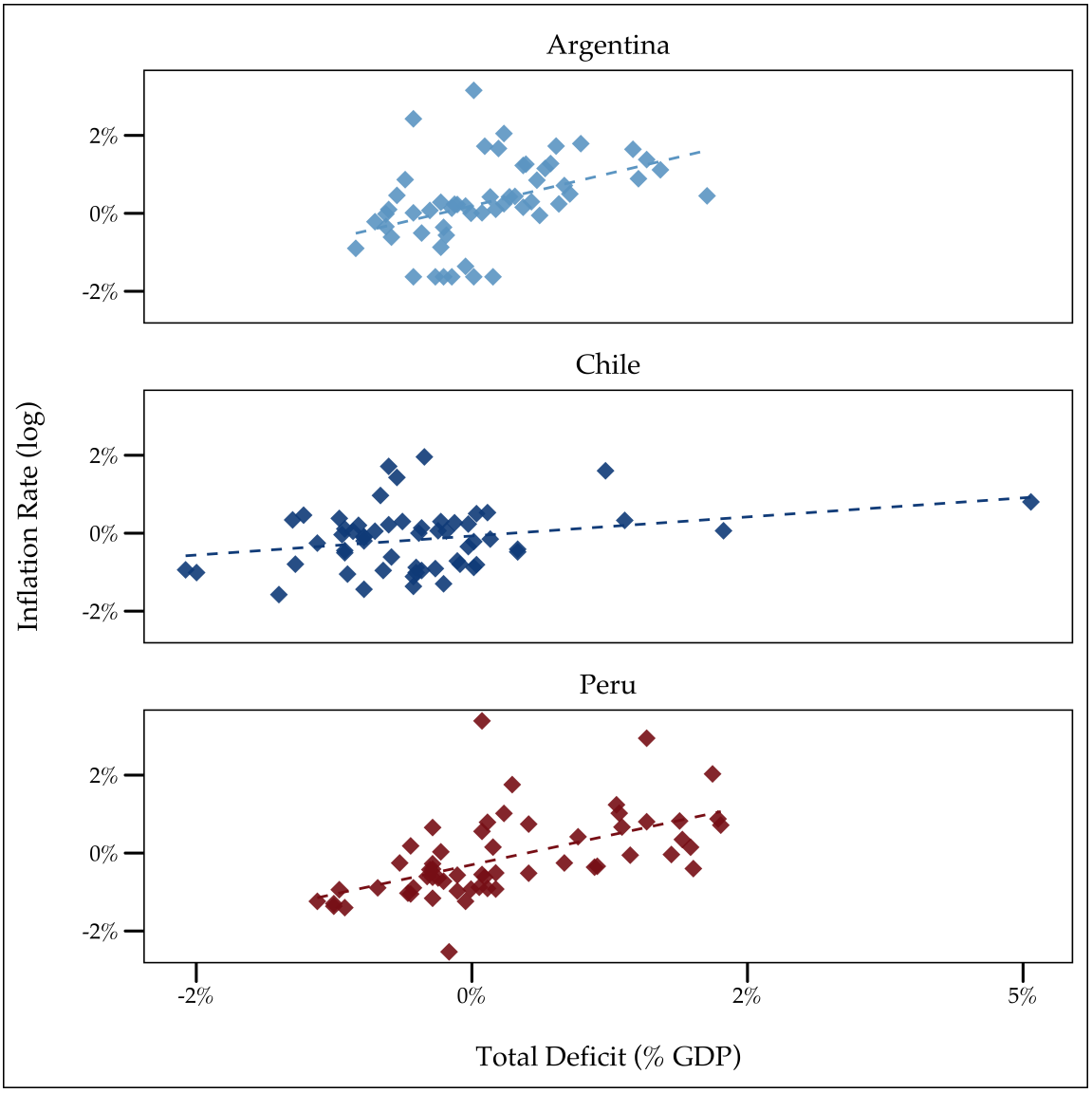

Figure 2: Total Deficit (% GDP) vs. annual Inflation Rate (log) for **Argentina**, **Chile** and **Peru** from 1960 to 2017 (scaled), Kehoe & Nicolini (2022).

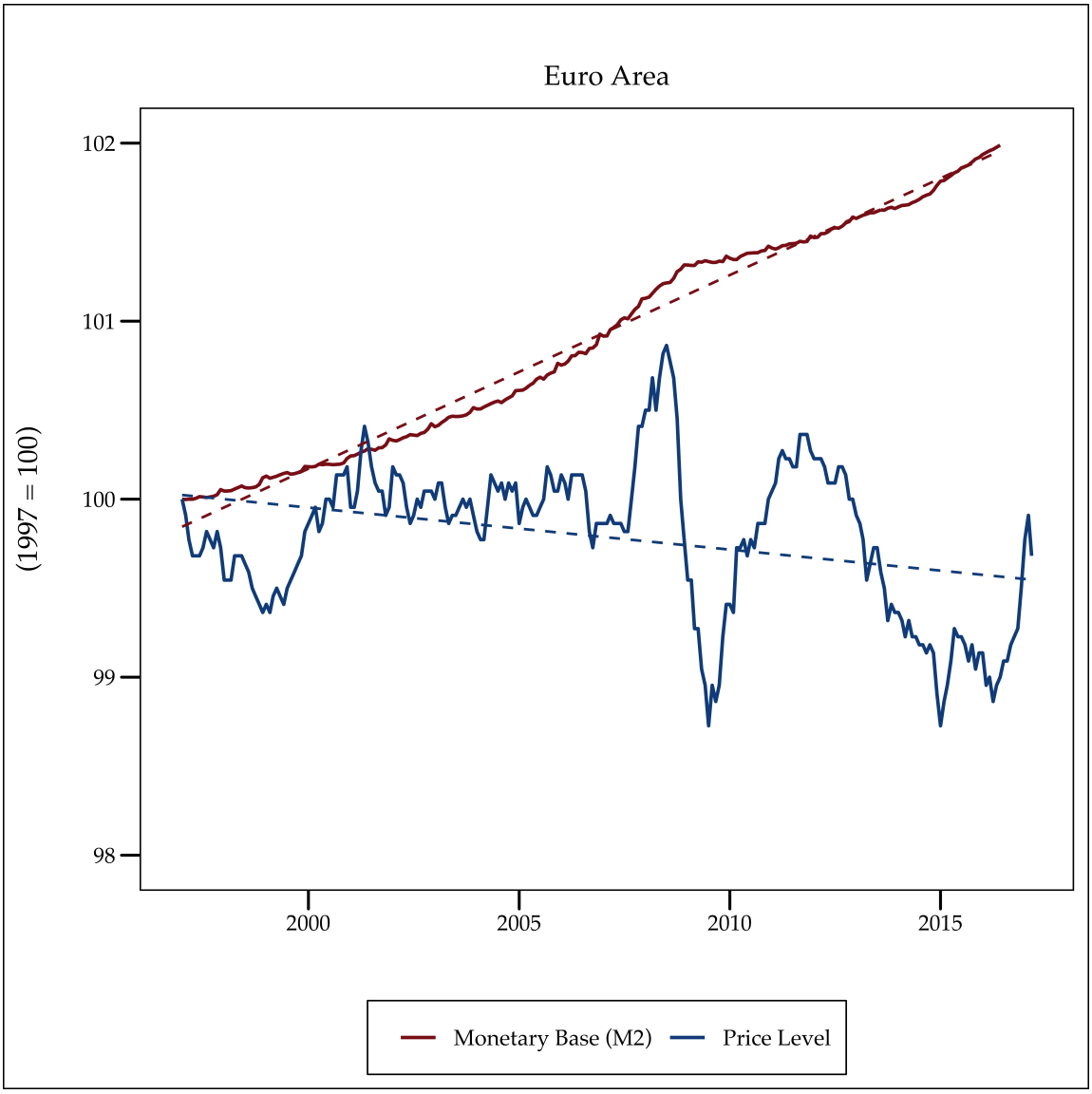

Figure 3: Monetary Base (M2) and **Price Level** (1997 = 100) for the Euro Area from 1997 to 2017, FRED.

	Dependent variable:		
	log(Inflation Rate)		
	Argentina	Chile	Peru
(Intercept)	2.160***	2.488***	1.450***
	(0.310)	(0.174)	(0.259)
Total Deficit	0.402***	0.123***	0.319***
	(0.074)	(0.039)	(0.047)
Observations	57	58	58
R^2	0.347	0.150	0.450
Adjusted R^2	0.335	0.135	0.440
Residual Std. Error	1.551 (df = 55)	1.306 (df = 56)	1.429 (df = 56)
F Statistic	29.243*** (df = 1; 55)	9.870*** (df = 1; 56)	45.762*** (df = 1; 56)
Note: **[16]**			** p < 0.1; ** p < 0.05; *** p < 0.01*

Table 1: Results of the OLS estimations of Inflation Rate for **Argentina**, **Chile** and **Peru** from 1960-2017