

Fighting Inflation in Politically Unstable Regions:

Assessing the effects of regional monetary integration



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Summary

High inflation stagnates economic performance in politically unstable countries. In this study we look into causal mechanisms affecting the commitment of governments to long-run inflationary policies. In specific, we are interested in the potential effects of regional monetary integration on the optimization strategy by national governments. By using a theoretical analytical approach we found that an increase in output due to economic integration does not alter the optimal policy from cooperative to reneging or vice versa. It does, however, amplifies the payoff of following either strategy, making the government more anchored in their original strategy choice. If monetary integration has a moderating effect on the tendency to create inflation, it is more likely to be through norm-setting rather than through a change in incentives.

Keywords: Inflationary Policies; Political Monetary Cycle; Political Economy; Monetary Integration; Time-Inconsistency.

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1. Introduction

Kurt Schuler presented a rather challenging proposition for the post-communist world in the mid-1990s. The economist claimed the central banks had caused more harm than good in developing countries. Monetary institutions would not provide enough barriers for political factors and could end up being instrumentalized and utilized to serve political agendas. Although formulated rather boldly, this specific statement points at a crucial dynamic of decent policy making under political instability: the potential for opportunistic abuse by a government in power. The institutional set-up which works for democratic nations with strong, independent, controlling agencies seems to not quite hit the mark when applied in more politically volatile environments.

Central banking institutes are fundamental players in managing financial and monetary stability. The idea of such an institute which manages the flows of and the amount of available money in a nation originally rose in order to finance war economies and manage debt. Much has changed since then, and the main objectives of central banks or other monetary agencies is promoting financial and monetary stability in the (inter-)national economic system. The mandate of central banks has changed in the general direction of being more independent from political entities. Rather than acting as a puppet institute subject to political flows and shifts in power, central banks aim to provide financial stability in the banking sector and sound monetary policy, aimed at securing long-term growth (G30, 2015: 1).

Monetary policies play a very important role in determining national inflation levels all over the world. A change in the money supply negatively affects the price of money, hence changing prices for manufactured goods and services. Low levels of inflation are widely considered as desirable in order to capture sustainable growth. It encourages investment behavior from external parties and presents a solid inflation expectations anchoring in the medium-run (G30, 2015: xii). Furthermore, the holding of money yields direct utility. Having money now allows for quick expenditures rather than converting assets to liquidity. An increase in inflation reduces the amount of real money in balances, hence providing a societal loss (Walsh, 2010: 53).

The dynamics of central banking and monetary stability have been discussed quite extensively (Rogoff, 1985; Fischer, 1995; Alesina & Gatt, 1995). The role of optimizing behavior by governments related to monetary policy instruments has also been the focus of study since the late 1970s (Kydland & Prescott, 1977; Barro & Gordon, 1983a; Barro & Gordon, 1983b). The role central banks play in developing countries, however, has been under-represented in the scientific literature.

Nearly every country around the globe has a monetary agency which governs monetary flows in the economy. Some central banking institutions have more authority than others, yet the main objective remains the same: providing and sustaining financial and monetary stability in the national economy. Such an institute, which manages the amount of the circulating means of payment, is especially prone to opportunistic behavior. Political instability gives room for the misuse of monetary policies, which is why the topic is rather relevant for the African continent. The serious considerations and plans to deepen the monetary connections between African countries instigated by the African Union offers a societal motive to investigate the link between monetary integration and inflationary performance.

Such an international monetary regime has already been implemented in West- and Central Africa in the past. Here, the participating countries use a single currency, being the CFA Franc. On an even larger scale, the Abuja treaty signed in 1991 is a similar incentive aimed at connecting African economies. The treaty gave rise to the idea of an emerging African Central Bank, with its own currency. Such an institution can be a potential way of, if enforced properly, getting countries to comply to the internationally set norms and regimes promoting long-run stability.

For this study we are interested in the role of monetary policies in politically unstable regions. More in specific, we will investigate what a deepening of monetary integration can offer politically unstable countries in terms of acquiring lower inflationary levels. To do so we look at the works of Barro & Gordon (1983a), Rogoff (1985) and Bohn (2013). The Barro-Gordon model (1983a) describes the key mechanism between trading off inflationary stability for output benefits through the creation of surprise inflation. Rogoff's (1985) work offers a solution—an independent central banker—to the tendency of national governments to create surprise inflation. Moreover, we aim to extend his work by introducing the international central bank as a substitute for the national independent banker. Bohn's (2013) work, finally, incorporates a rent-seeking government, which seeks to benefit itself in addition to picking a strategy for its monetary policy. Building upon these papers, we investigate whether the deepening of monetary integration regionally can interfere with the tendency of the government to default on promises regarding monetary commitments.

Furthermore, a potential rise of a central banking regime regulating monetary policies regionally may interact with the variable of political interference. The implications this may have for monetary stability for developing countries will also be touched upon. More specifically, the deepening of monetary integration could give potential outcome bonuses, altering the optimizing strategy by the government.

From this introduction we can ask ourselves the following question, which will be the focus of this research: *How does the deepening of monetary integration affect governments' likeliness to credibly comply with cooperative monetary policies?*

In order to answer this research question we will first look into the matters as they are now regarding monetary integration on the African continent, and what instigates monetary integration overall, which is embodied in chapter 2. Chapter 3 consists of an overview of relevant literature including the major works on the phenomenon of our interest, delving into the economic benefits of monetary integration, central banking independence and political monetary cycles. In chapter 4, three major papers are discussed to a deeper extent which are the building blocks of our argument. In chapter 5 we look whether potential economic yields linked to monetary integration change the optimizing behavior of the government as regards its commitment to keep inflation levels low. We then look into other topics of interest which rose throughout the study. These are potential topics of future research, which are presented in chapter 6. Finally, we look back at the research question and formulate an answer given the insights of the study.

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List of Equations:

Chapter 4.1

- (1) = Barro-Gordon output function in period t .
- (2) = Barro-Gordon natural rate of output function in period t .
- (3) = Societal loss in period t .

Chapter 4.2

- (4) = Rogoff's independent Central Banker's inflation setting strategy

Chapter 4.3

- (5) = Government's loss function used in Bohn (2013) with expropriating government
- (6) = Output in period t .
- (7) = Payoff when reneging in period t .
- (8) = Payoff following reneging in periods $t+n$
- (9) = Combined payoff in t and $t+n$ when reneging modified with discount factor
- (10) = Dominating strategy function

Chapter 5:

- (11) = Adjusted output function from (6)
- (12) = Adjusted loss-function from (5)

2. African Monetary Integration

Empirically speaking, the objectives stated by the central banks formally are very alike regardless of the country or region. This is puzzling, as the functioning of those institutes in developing countries deviates between the ranges of very low and very high inflation levels. As of 2017, inflation levels in Africa still average above 10% on a yearly basis with a large diversity within the sample (Worldbank, 2017). This is peculiar, as all countries have had central banks since the decolonization of the region, with mandates similar to industrialized countries' banks. The topic of financial stability and the dynamics of central banks is especially relevant given the talks on the possible construction of an African central bank. Being one of the first goals set by the African Union after its emergence, moving towards a central monetary union seems a logical step for African integration (Masson & Pattillo, 2004). The continent, however, is diverse in essence and envisioning a single monetary union for the entirety of the continent seems rather ambitious. One could argue a multiplicity of economic zones might fit the cultural and institutional diversity better than a unilateral model that aims to fit all.

In order to get a better understanding of the status quo, we will address two instances of African integration on monetary policies so far. One is a, by the French imposed, single currency area in West- and Central Africa which fixes its currency to the Euro. The other is a bottom-up, coordinated incentive by the African nations themselves. With the emergence of the African Union at its roots, the process of monetary integration seems to unfold in a slow, but steady, pace.

2.1 The CFA single-currency area

In this study, we consider the effect of a central banking union for developing countries, especially the role it could play in Africa. A multitude of former French colonies using the CFA-Franc is a prime example of a monetary union aimed at providing regional financial stability. There are two different versions of the CFA-Franc: a West-African and a Central-African version. The BCEAO, the *Banque Centrale des États de l'Afrique de l'Ouest*, issues the currency among the 8 West-African members, being Benin, Burkina Faso, Guinea-Bissau, Ivory Coast, Mali, Niger, Senegal and Togo. The BEAC, *Banque des États de l'Afrique Centrale*, issues its own currency for the 6 Central-African members, consisting of Cameroon, the Central African Republic, Chad, the Republic of the Congo, Equatorial Guinea and Gabon.

Both currencies were, in the past, linked to the French *franc*, and currently to the *Euro*. This means the areas use a fixed exchange rate regime in which the floating of the currency used in the

EU-zone affects its value towards all other countries in the world. The countries participating in the currency area performed rather well as regards inflationary levels compared to their regional counterparts looking at the 1970s onwards, and tend to approach European averages (World Bank, 2017), as one could expect from fixing exchange rates to a stronger currency.

An important critique which is linked at the way the CFA's value is composed is at the same time one of the up-sides given the main findings of the discussed papers: there is no room for devaluations in order to boost output levels (Cavanaugh, 2014). The initial idea of not having a different exchange rate among the member nations does eliminate the potential for national monetary policymaking, therefore stabilizing inflation levels. The CFA-currency area, however, hurts its own position by having it linked to the Euro, hence not being able to deviate from their exchange rate. Differences in inflation preferences cannot be overcome unless the fixed exchange rate is defaulted upon. This furthermore cripples competitiveness as a change in productivity cannot be reflected in currency prices. Products originating from this region are relatively overpriced, and therefore lose market value (Cavanaugh, 2014). Although sticking to the Euro does stabilize the CFA-franc, the West- and Central-African countries might do well adopting a floating exchange rate for their respective currencies.

2.2 Bottom-up integration process

If we look at the African Union and its considerations and plans for initiating a single currency area drafted as early as 1965 we see the need for a political platform and political agenda in order to produce a monetary union. It was with the construction of the African Union that the need for an African Central Bank and an African Monetary fund was addressed (Constitutive Act of the African Union: 14). Although at the time being unclear in having an actual implementation date, this instigated a path-dependent road of having common consent as regards monetary integration among the countries. Two tangible results of this idea are the signing of the Abuja treaty in 1991 and the emergence of the *Association of African Central Banks (AACB)*.

Further economic cooperation both on a larger scale and to deeper extent has been encouraged in the Abuja treaty, signed by the members of the African Union in 1991. In the treaty, the heads of state established the African Economic Community (Abuja Treaty, 1991: 7), promoting further economic cooperation and further integration on policy levels. In the treaty, a six-stage plan spread out over a maximum of forty years is presented how to effectively establish the economic community. Most notably, stage five and six involve the establishing of the African Common Market

involving harmonized monetary, financial and fiscal policies and resulting in a Pan-African Economic and Monetary Union (Abuja Treaty, 1991: 11).

The Association of African Central Banks is a collectively signed agreement by the central bankers of the member states of the African Union. In this agreement, the central bankers agree upon and will contribute to co-operation in the monetary, banking and financial spheres in the African region. More specifically, the union aims to “envisage [...] the advent of a single currency and a common central bank in Africa” (AACB: 4). These objectives are pursued by the organization through facilitating periodic meetings between presidents of national Central Banks, promoting the ideas of monetary cooperation in general and providing training programs and technical advice and assistance where needed in order to encourage further monetary integration (AACB: 5).

Although put rather optimistically, with the envisaged end date for the implementation of the single African currency as early as 2023, we can clearly see the tendency of the political powers in the African continent to develop a more deeply integrated community of countries. One could pessimistically argue that Treaties could, in the end just be interpreted fair wording. In the case of the integration of economic policymaking, however, we do see indicators of actual increasing African cooperation. In line with the Abuja treaty’s formulated objectives, an all-African passport for diplomats has been issued in 2016 (AllAfrica, 2016). Furthermore, plans are to distribute the region-wide passport among all citizens of member states of the African Union by 2020, allowing free traffic of people within the borders of the continent, facilitating mobility.

2.3 Political instability

When considering monetary policy implementations for this specific region, we should take the contributions of authors regarding political instability (e.g. Cukierman et al., 1989; Bohn, 2006) into account. Cukierman and colleagues find that more politically unstable countries tend to rely more heavily on seigniorage as a way of funding. Bohn (2006) points towards additional difficulties a political unstable country faces in following a long-term oriented path. If domestic forces encourage the policy maker to utilize monetary policies to suppress those forces, committing to a monetary union becomes all the harder. This is further amplified by the external pressure to conform to standards that make the country eligible for external funds (Bohn, 2006: 71). It took a French-incentivized remainder of colonial times to overcome the political incentive enticed by monetary policies on the national level. It is worth noting that, apart from the Euro-zone, none of the currency unions currently existing rose through a bottom-up incentive. The larger areas that utilize the same currency are often linked through colonial heritage (e.g. countries using the Pound sterling) or

through functional linking to a stronger currency (often to the US-dollar). This, combined with the “planned” currency communities that run into difficulties to launch properly, hints at the difficulties countries face to commit to currency area regimes. The question then is twofold: Is it in the best interest of the countries to participate in projects encouraging monetary integration, and how would this alter the tendencies to create high-inflationary policies?

3.Theory & Literature Review

In order to get a better perspective on the phenomenon of central banking in politically instable countries, we address a couple of topics that have contributed to the understanding of the phenomenon of central banking, independence and political opportunism related to monetary policies. An important study will be presented to show the upsides of monetary integration in terms of economic output levels. Theoretical studies will then be presented in order to grasp a better understanding of the underlying of logic why to have an independent central bank in the first place. Finally, some important empirical studies will be shown as to what central banking independence ignites in industrialized countries. Concluding, the most important theoretical papers for this study will then be underlined before moving on to the extensive discussion of them in the following chapters.

3.1 Monetary Unity and trade benefits

There are monetary implications linked to countries utilizing the same currency. A government cannot arbitrarily revalue the domestic currency or increase the money supply and commits to the agreed upon monetary agreements.

Andrew Rose (2000) looked further and investigated to what extent a common currency area affects international trade. His answer was a straight and simple: "Large." Being one of the key motives for the European Monetary Union to emerge, the reduction in transaction costs is the utter minimum monetary integration could bring. More optimistically, the integration of monetary policies could heavily increase intra-regional trade and circumvent non-cooperative behavior expressed by member states. This is due to the overcoming of home bias, which the rise of a common currency might circumvent. Competitive devaluations, aimed at undercutting other countries in the region, with devastating effects on a common market could be potentially be overcome (Rose, 2000: 10). The author then lists five important theoretical repercussions he summarizes to the increase in trade levels due to a common currency within European borders. The increase in overall trade will increase the total number of disputes, just by the increase in total volume. Second, the social security nets could be enlarged due to domestic forces on the labor market, as optimization of production processes would potentially lead to temporary unemployment. Third, business cycles among the countries with the same currency could potentially converge, leading to more political integration. Fourth, the single-currency area might look more appealing for outside countries to also join in. Finally, the increase in trade volume will bring

“substantial extra gains” for consumers in the participating countries of the monetary union (Rose, 1999: 10).

The author then conducts an empirical analysis in order to get to the exact relationship between monetary unity in terms of a single currency and increasing trade levels. He does so by using the gravity model, while adding variables of interest in order to isolate the effects of a single currency. His main finding is that, while keeping all other variables constant, countries that share a same currency tend to trade 3,35 times as much with each other than with countries not using this currency. Furthermore, the author finds, and this is perhaps the most academically relevant aspect, that the effect of entering a currency union is larger in a positive sense than just reducing the exchange rate volatility to zero. Monetary integration therefore has an *additional* bonus to trade rather than primarily being a removal of transaction costs (Rose, 2000: 18).

3.2 Central banking dynamics

The electing of a central banker and giving it the mandate for regulating and stabilizing price levels is how a government determines the extent to which it commits to inflation-fighting (Cukierman et. al, 1992: 353). The underlying economic phenomenon the issue of central banking could be best linked to is the willingness to commit to long-term goals over short-term gains. Crucial to this willingness to commit is the extent to which it can be done in a credible way. This hints at the time-inconsistency phenomenon in public policy making. A time-inconsistent policy is optimal at the moment of formulation, yet is sub-optimal at the time of implementation (Kydland & Prescott, 1973: 474).

Whether or not a policy is time-consistent is influenced by the way monetary objectives are pursued. Dwyer (1988) discussed the two different perspectives on how to manage financial and monetary stability. On the one hand, strict policy rules could predetermine how agencies should act in a given scenario. On the other, a degree of discretion allows policymakers to react upon shocks as they see fit, given the context provided. Traditional economic thinking would argue that discretion should always be preferred over policy rules. At every given moment, discretionary behavior can display the pre-set policy rules if it fits best, but can be deviated from if they do not seem to be appropriate given the context. More recent thinkers (Kydland & Prescott, 1973; Barro & Gordon, 1983b, Dwyer, 1988), however, make a case for dynamic consistency. If economic performance relies on expectations on future behavior, having discretionary agencies produces a significant level of uncertainty. Setting rational expectations can, therefore, given the characteristics of the economy, be preferred over arbitrage in some instances. This, however, is only helpful if it can be

done in a credible manner, as commitments which are pretty easy to default on are perceived as such by the rational public.

This is why Rogoff (1985) constructed a model by which to explain the need for an independent, yet strong, central-banking agency. He formulates the main mechanism of why society should appoint a central banking agency which does not share the same social objective function. The problem discussed here is posited by Barro & Gordon (1983a). There is a time-inconsistency problem as wage setters have an incentive to set wages too high as they expect the central bank to reduce real wages in order to boost employment. A reduction in real wages makes labor relatively cheap, boosting production and the national output. This leads to inflation levels systematically exceeding socially optimal levels. Rogoff (1985), therefore argues a central bank is needed which, instead, places “too large” a weight on inflation-rate stabilization relative to employment stabilization. But, as Rogoff argues, this emphasis on inflation should be finite, not infinite. A central banker needs some extent of flexibility with which it can respond to supply shocks. The variable which produces long-run stability (inflation) is, in general, to be preferred over the variable which produces short-term benefits (temporarily boosting employment) given normal circumstances.

3.3 What is Central Banking Independence?

The question of what defines an independent central bank is extremely relevant in order to understand the dynamics underlying monetary policy. As Cukierman and colleagues (1992: 353-354) put it, *“Economists [...] generally believe that the degree of independence of the central bank from other parts of government affects the rates of expansion of money and credit and, through them, macroeconomic variables such as inflation and the size of the budget deficit.”* The relationship underlying this statement is the following: A central bank which has little independence is prone to becoming a tool for a short-term oriented, rent-seeking governing party. Monetary policies can be used in order to decrease unemployment levels or increase the re-election perspectives of incumbent politicians at the cost of price stability. A central bank which is in fact rather independent can subdue such political pressures and can effectively formulate its own policies. However, as Cukierman et al. (1992: 353) adequately address, *“institutions cannot absolutely prevent an undesirable outcome [...], but the way that they allocate decisionmaking authority [...] makes some outcomes more probable and others less likely.”* This can be considered a proper description of the limits and potential of independent central banking. Political entities can always find ways in which to regain control over monetary policy instruments, but institutional factors can limit their window

for doing so. The smaller the window of opportunistic behavior for the national policymaker becomes, the more independence we can attribute to the central banking institution.

Moving away from statute reading methods

In order to get an indication of the strength of institutional characteristics ensuring independence, we could always look up the mandate of the central bank. Such a perspective may give an indication of the limits of such an institution, but it does, however, not necessarily reflect *actual* policy making and central banking behavior. As legal status and practical power of the central bank may differ, Haan & Kooi (2000) created a new indicator for measuring the relation between the political sphere and the central banking institution more accurately. Many studies have looked at central bank independence by using legislative regulations as a proxy (Parkin & Bade, 1978; Alesina, 1988, Grilli et al, 1991). Forder (1996) convincingly questions this statute reading approach from a methodological perspective. Linking legislation or regulation to inflation numbers falls short of being a proper tool for measuring the effects of independence on performance, as statutes do not necessarily reflect actual behavior. Legislation “shapes the options for the central bank to pursue the kind of policies that it deems necessary” (Haan & Kooj, 2000: 644), yet actual practice, even in situations where the boundaries are explicitly mentioned, may deviate from it. Furthermore, as Forder (1996: 44) also argues, economic theory is about, or should reflect, behavior, rather than what is legislated.

Furthermore, the studies that conducted research on legislation and inflation (Parkin & Bade, 1978; Grilli et al., 1991 & Alesina & Summers, 1993) however, do so in industrialized countries. They find a correlation between statutes and central banking independence, but one could question whether this is generalizable to the developing world. One could in fact make the theoretical argument that the behavior of monetary institutions in developing economies deviates further from their actual mandate. Politicians acting in a setting with increased political instability are more likely to make pragmatic use of policy instruments aimed at long-run stability. Bohn (2006) addressed the domestic pressure governments face as regards their power-position internally. The pressure of not being re-elected or forced out of office and the repercussions that may be incurred provide an extra incentive to use monetary policies to boost the likeliness of remaining in power, while disregarding legislation. Furthermore, if proper democratic institutions are lacking in the first place, incumbent politicians can use such institutions to stay in power through an ever more increasing focus on the short-term, abusing the time-inconsistency which comes with central banking in the first place (Rogoff, 1985).

Haan & Kooi (2000) therefore come up with a new indicator, being the turn-over rate of central bank governors. Although Cukierman et al. (1992) already ran statistical tests with this variable, Haan & Kooi include more developing countries in their dataset, providing different results. A high-turnover rate means that the person in the leading position of the central bank is renewed quite often. This can be seen as low central bank independence, as the high renewal rate indicates that the political sphere has a check on the institution managing monetary affairs. The authors then find, after using their new proxy to estimate central banking independence, that there is a positive relationship between central banking independence and inflation levels. This effect, however, only holds when high inflation countries are included in the sample. This indicates that the turnover of central banking governors is unrelated to actual independence in developed countries, whereas it is a strong indicator in developing countries. This strengthens the theoretical argument for a structural difference between developed and developing countries as regards legislation as being a proper indicator.

3.4.1 Political Economic perspectives

The strategic use of institutions by political actors has been discussed by a multitude of economic scholars. The degree of government expenditure is the most discussed unit of analysis. Nordhaus (1975) addressed the political business cycle, which takes government spending as an instrument for incumbent politicians to remain in power by portraying themselves as being more potent than they might actually be. Drazen (2000), in his very broad review on what has been written on the topic, showed that there is little universal consensus on the traditional models as ignited by Nordhaus (1975). This is both on an empirical level, with studies not showing pure opportunistic behavior and on a theoretical level through criticism on the underlying assumptions of seemingly irrational behavior and the reliance on monetary surprises as a driving force (Drazen, 2000: 77).

3.4.2 Political Monetary Cycle

The extent to which such political incentives play a role for incumbent policymakers as regards monetary institutions is less touched upon. Grier (1989) discussed the issue of Political Monetary Cycles (PMC) for the United States Federal Reserve. The difference between the monetary cycle and the political business cycle is slight, but not neglectable. Although the main mechanism and incentive remains the same, the institutional actor differs. Where policymakers can fully determine how high they want the levels of public expenditure and taxation to be, most central banks have a degree of

autonomy and independence. The gains for effectively using a central bank for political goals are however, very rewarding for politicians relying on the popular vote. Central banks can either increase the money supply in order to boost spending and therefore incentivize production, or devalue the national currency to boost its comparative advantage and by doing so also achieve an economic boost due to international demand. It is therefore an extremely enticing option for a vote-seeking government to interfere with monetary policies.

Several studies addressed the additional political and monetary challenges developing countries face as opposed to developed countries (Carmignani, 2003; Bohn, 2006). Both authors wonder how political instabilities interact with the same macroeconomic dilemmas relatively stable countries face. Both address the point that there are additional political incentives for less developed, unstable countries. Rather than only having to proof their competence in order to get re-elected by the population, incumbent leaders may face an exogenous threat of losing power through opposing political forces (Bohn, 2006: 71). Incumbent policy makers can increase their chance of survival by (miss-)utilizing macroeconomic policy tools. Carmignani (2003: 9) adds that the incumbent may even choose to “generate constraints that will affect the future choices of potential successors”. Countries in which an incumbent ruler has trouble keeping other factions from seeking power are therefore more subject to opportunistic, short-run oriented use of policy instruments than politically stable countries due to these extra incentives.

Apart from suppressing domestic forces, there are also funding issues that force governments to abuse monetary institutions. Bohn (2006) pointed out the rationale for governments in these unstable countries as to why seigniorage is such an appealing, and rational, option for acquiring credits in the short run. Developing countries face a self-enforcing struggle with the acquisition of capital. They run into a funding problem, as there are no bondholders within domestically due to a common mistrust of the reigning government (Bohn, 2006: 71). Furthermore, the credits such regimes then do need to accept have an international origin, which are often adjusted or expensive due to foreign perceptions on the governmental regime (Bohn, 2006: 72). Making use of seigniorage in order to finance public expenses, especially when taking into account the challenges with collecting taxes some regimes face, is therefore a rather enticing means of acquiring funds to finance government expenditure. These governments have trouble acquiring funds in the short run, yet run into the above mentioned problems related to political instability. The discount factor for the future of governments in unstable countries should therefore be higher than that of countries that have no problem acquiring funds in the short run and face less political challenges, making the former more willing to suffer future losses. This higher discount factor is key

to the analytical model which investigates the optimal fiscal policy level for such a government in a short-run reality. Concluding, the author finds that even if administrative policies are being used, the government cannot overcome the inflationary finance trap by themselves without exogenous intervention.

4. In-depth study of key contributions

In order to get to a better understanding of the key-dynamics of the phenomenon of political monetary cycles, three studies are analyzed to a broader extent. These will provide the key-fundamentals of central banking and the incentive for a national government to make strategic use of such institutions. As for the first part, the main contributions of Barro & Gordon and Rogoff will be discussed to show the general interaction between inflation levels, economic output and monetary policies. The Barro-Gordon model (1983a) will show the traditional trade-off between inflation and economic output levels. This will then be linked to monetary policies as a tool for the government to create surprise inflation and influence economic output levels. A time-consistency problem arises, which brings the discussion to Rogoff's (1985) work on this phenomenon and his solution for circumventing too high inflation levels. His work revolves around appointing an independent central banker which favors keeping inflation low over boosting economic output. The issue to what extent monetary unions suffice in fulfilling this role will then be addressed. Finally, a paper by Bohn (2013) is addressed in-depth which will then be used in the following chapter. It involves the political economy side of the rather clean Barro-Gordon (1983a) model and embodies a government which actively expropriates through monetary and fiscal policies for its own sake.

4.1 Barro-Gordon and inflation-output trade-offs

The model presented by Robert Barro and David Gordon (1983a) discusses the effect of surprise inflation in order to boost economic performance. The proxy used for measuring economic output is the actual unemployment level, as its relation to the natural rate of unemployment shows the state of the economy. This puts the phenomenon of surprise inflation in a perspective of a game with two independent agents, the policymaker and the private actors. As rational expectations under the civilian population are assumed, systematic use of inflationary policies to boost outcome is impossible. Furthermore, every player knows in advance that the government can do no better than achieving the natural rate of employment, while keeping inflation levels down. The civilians will adapt their expectations in such a way that it matches the governmental output objective (Barro & Gordon, 1983a: 591). As to why policymakers are inclined to create this surprise inflation, labor market distortions or imperfect competition could be addressed from a purely economic perspective. If not for fixing these distortions, adjusting through surprise inflation is a potential second-best option. The inclination to create surprise inflation can also rise from political pressures (Walsh, 2010: 272).

Building on natural rate models with rational expectations, the authors construct a model which shows the dynamic of inflationary policies and the governmental loss function. This model shows three features, being the decision rule for private agents, which is constructed through the available information on governmental behavior; an expectations function, which constitutes the expectations of the same private agents regarding future behavior of the policymaker and finally; a policy rule, which determines how the policymaker acts given his information set (Barro & Gordon, 1983a: 591). If these functions interact in a logically consistent way, the outcome is considered to be a rational expectations equilibrium. The decision rule for the private agents needs to be consistent with the outcome of the expectations function in order to produce a coherent decision rule. If the policymaker is capable of crafting up an optimal policy rule which incorporates the decision function (as constructed in part by the expectations function) of the private agents. Finally, the private agents need to be aware of the maximizing nature of the policymaker for the expectations to be rational as well (Barro & Gordon, 1983a: 591).

The policymaker aims to maximize the objective function which shows the preferences of society as a whole, which is a combination of the inflation level and unemployment. This objective function, however, ends up having no positive results for society in the long run. Although unemployment levels can be lowered for short periods of time, undercutting the natural rate of unemployment, it will in the end return to the original, natural, rate of unemployment. Inflation levels, however, will not be reversed and remain excessive, as shown in the model.

4.1.1 The model

The authors formulate the following model, in which they analyze the actual economic output in terms of actual unemployment as a Phillips curve. The model shows a function of the level of unemployment U_t as a function of the natural unemployment rate, U_t^n and the difference in the actual inflation level, π_t , and the expected level of inflation beforehand, π_t^e . Together, they reflect the optimizing behavior of private agents. The model looks as follows:

$$U_t = U_t^n - \alpha(\pi_t - \pi_t^e), \quad \alpha > 0 \quad (1)$$

The parameter α describes the Phillips curve slope, which is assumed to be in a linear, downward sloping fashion. It is therefore considered a constant value in the model.

Potential changes in the natural rate of employment are also accounted for in the article by Barro & Gordon (1983a). They formulate an additional model which shows the potential for change in the

natural employment level, given autonomous shocks in either direction. This is portrayed by the variable ϵ_t , which we call the shock variable. This shock variable, however, will be compensated for in the long-run due to the stabilizing nature of the second model due to the natural rate of unemployment U^n for the economy.

$$U_t^n = \lambda U_{t-1}^n + (1 - \lambda) \overline{U}^n + \epsilon_t, 0 \leq \lambda \leq 1 \quad (2)$$

Thirdly, the governmental loss function is given. Here, the authors deduce how the before mentioned equations relate to the government's or society' utility optimization problem. The optimization depends on the deviation between the actual unemployment level U_t , which once again shows the economic output, and the *desired* level of output kU_t^n . The actual inflation level, π_t , multiplied by parameter b , is then added up to the difference between output levels in order to get to the loss function.

$$Z_t = a(U_t - kU_t^n)^2 + b(\pi_t)^2; \quad a, b > 0, 0 \leq k \leq 1 \quad (3)$$

This function in total shows how, given a certain level of inflation combined with a divergence between the optimal level of unemployment and the actual level of unemployment, what the society's loss in period t is.

The Barro-Gordon (1983a) model has been used for as a tool of showing strategic interacting between the private and the public domain. Although there is a clear ultimate objective for both parties—reaching the natural rate of employment while minimizing inflation levels through monetary policies—one of the parties has an additional objective in the course of t . This time-inconsistent behavior has been looked at to circumvent and is one of the key reasons as to why an independent central banking agency is desirable.

4.1.2 Retaliation through Private Agents

Following the interaction between the private agents and the policymaker as described by Barro & Gordon (1983a), Albaseni, Chari & Christiano (2003) investigated the issue of continuing periods of high- and low inflation levels. As the private agents expect to be cheated, once they have been cheated in the past, longer periods of either high- or low inflation levels are very likely to emerge. The authors show that the equilibrium outcomes for periods after t are indeed a natural result of what the policymaker does in period t . Interaction between the private agents and the policy maker is therefore prone to creating an expectation trap. Lack of credible commitment by the central banker creates an incentive for private agents to shield themselves from expansionary monetary

policies. The private domain, either being cheated upon or expecting to be cheated upon in the near future, adjusts its expectations in such a way that the surprise inflation will not harm their interests. With the private domain already expecting inflation, there is no incentive for the central banker to stick to conservative inflationary policymaking in the short-run (in the long run, one could consider (re-)gaining trust in the future though). This reinforcing behavior from both parties, the private expecting to be cheated upon and this leading the government to have it in their best interests to do so, leads to longer periods of defective behavior and an expectation trap in monetary policymaking.

4.1.3 Governmental gains from inflationary policies

Although the model is rather technical and aimed at society's welfare function in the first place, Barro & Gordon move on to the theoretical arguments which show the potential for governmental benefits as an agency by actively pursuing inflationary policies. This is where the incentive for opportunistic use of policy instruments rises, and where we find the key dynamic underlying the topic of this thesis. Although society as a whole does not profit in the long-run from high inflationary policies, the government's utility function deviates and shows a tendency to prefer the short-run over the long run. Barro & Gordon (1983a: 603) note that in addition to having the positive economic boom through the emergence of surprise inflation, there is revenue in money creation, seigniorage, and the evaporation of outstanding public debt.

4.1.4 Concluding

As indicated by Barro & Gordon (1983), surprise inflation allows for a temporary economic boost for society in the short run, but by doing so the expectations for the future will be adjusted by the rational private agent. Furthermore, surprise inflation allows a de facto lowering of the total public debt and the economic boom incurred by inflationary policies can raise production levels, and therefore taxation levels. These inflationary policies yield an additional income for the government, besides regular taxation. The extent to which the government can live up to expectations envisioned by the private is what determines the output levels in itself, but also how much of a surprise a deviating inflation level, created by the government through monetary policies, can possibly be. This study by Barro and Gordon (1983a) accurately sums up, and entangles, the relation between output levels, rational expectations by the private agents and the way monetary policies affect both variables. The findings by the authors ignited many papers and studies by other scholars that aim to circumvent the suboptimal outcome of (longer periods of) a cheating central banker and the reacting private agents. Most notably, the problem key to this interaction and how a government could be

limited in its cheating behavior on the private's domain expectations to boost output levels, is discussed by Rogoff (1985).

4.2 Rogoff and Independent Central Banking

In the realm of monetary policy, there is a shared goal of low levels of inflation for continued periods of time. Relatively low inflation levels promote investment behavior of parties being abundant in capital. Furthermore, the alternatives, being high inflation levels or even deflation, both have their respectful downsides. High inflation levels cripple competitiveness in an international context, whereas deflation discourages private spending in general which then cripples the potential for economic output. The main challenge and Rogoff's (1985) puzzle of interest is solving the time-inconsistency problem in monetary policymaking and effectively ensuring periods of stable inflation levels.

Societies face a time-consistency problem when formulating monetary policies. A time-inconsistency policy is one where the short-run and long-run objectives collide with each other, and was posited by Kydland & Prescott (1973) related to monetary policy making. A policy maker has a clear view on what is beneficial for society in the long-run, and is genuinely interested in pursuing this long term objective. This view can be shared by the public *en large*, leading to expectations on the policy maker's behavior. At the time of implementation, however, the policy maker can be tempted to *cheat* on his previously stated objective. The actions planned in period t for period $t + i$ are considered to be time-inconsistent if in period $t + i$ it turns out to not be the optimal response for the challenges faced by the policy maker (Walsh, 2010: 270). The potential to cheat on the formulated policy is incentivized through the possibility of reaping the short-term gains in $t + i$ by defaulting on the expectations by the private agents. The policy-maker may therefore choose different policies to maximize performance levels. This is a natural result of the dynamics discussed by Barro & Gordon (1983a), with monetary policies as a tool to create surprise inflation. In the end, the policymaker primarily cares about its own re-election.

This is where the time-inconsistency is at its core, and constitutes the root of Rogoff's (1985) puzzle. The policy-maker cannot credibly commit to statements of keeping inflation low with a rational private sphere at watch, as they know they are likely to be tricked by the policy-maker utilizing his monetary capacities. In his work, Rogoff (1985: 1169) therefore expects the wage setters to rationally fear a drop in real wages due to this specific mechanism. They know the government's tendency to create surprise inflation, and wage setters will therefore aim to overprice wages to counteract the policymaker's actions up front. In doing so, inflation rates will be systematically at a too high level given its natural optimal rate, for the same levels of economic output. This hampers economic growth and creates unnecessary inflation, which also harms competitiveness levels.

Rogoff's specific objective is then to find the optimal level of commitment by a central banking agency in order to circumvent above-mentioned mechanism and achieve long-run optimal inflation levels. This level of commitment has to be credible to the private sphere to ensure mutual cooperative behavior. This can be solved through appointing a central banker which is more conservative in nature than society's preference. Where the political leader of the country cares about its re-election, Rogoff (1985) proposes a central banking agency which primarily has its key concerns with stable inflation levels. With both employment and inflation being interchangeable, Rogoff envisions a central banker whose emphasis is on fighting inflation. This helps later in the time-cycle, when the present is considered to be of more importance. At times of implementation, the central banker will therefore come to an encouraged—while having departed from a more conservative position—preference level which then approaches the society's actual desired level of inflation. This evened-out inflationary level should then be more optimal than the level achieved by a societally-oriented governmental loss-function would turn out to be. In turn, this impacts the long-run beliefs by the private agents, breaking the high-inflationary cycles. Rogoff's (1985) answer to the time-consistency problem is therefore a sound and strong delegation of monetary policymaking, away from the policymaker wanting what is best for society towards a central bank which overemphasizes inflation over output levels.

Important to note is that Rogoff does not advocate a central banker which infinitely favors inflation stability over employment as a corner solution. Given unanticipated economic shocks, there should be some room for using monetary policies in order to reignite the economy and stabilize around the market-determined levels (Rogoff, 1985: 1170).

This overemphasizing of conservative inflationary policies is then modelled by the author, resulting in the following equation, reflecting the strategy regarding monetary policies by the independent central banker:

$$I = (n - \tilde{n}')^2 + (\chi + \epsilon)(\pi - \tilde{\pi})^2, \quad \chi + \epsilon > 0 \quad (4)$$

where n is the current level of employment, whereas \tilde{n}' is the socially optimal level of employment. Variable χ shows the appreciation of inflation stability, while ϵ embodies the appreciation of employment. The sums of them serves as a multiplier for the difference between, π , the actual level of inflation and $\tilde{\pi}$, being society's desired level of inflation,

Note that the difference between the actual level of inflation, π , and society's desired level, $\tilde{\pi}$, is multiplied with a positive parameter, with ϵ being the relative weight the conservative banker

places on inflation over employment. The multiplier will be positive, as can be easily interpreted from the $\chi + \epsilon > 0$ requirement, reflecting the central banker's preference. The conservative central banker by definition emphasizes inflation control over employment, and will therefore result in a positive ϵ . Also, the deviation of the actual inflation level π from the socially desired inflation level $\tilde{\pi}$ will be multiplied with a positive multiplier.

4.2.1 Extension by Lohmann (1992)

Lohmann (1992) optimistically argued that an even better scenario of inflation-control can be reached as regards the reactivity to external shocks. The author argues that the government should, indeed, delegate the monetary policymaking towards an independent central banker, favoring stable inflation rates over economic output levels. The government should, however, be able to actively respond to significant external shocks by overriding the central banker's policies if they deem it fit. The main idea behind it is that the central banker will react more pro-active given exogenous shocks, in fear of the government taking over.

Intuitively, Lohmann's (1992) solution seems perhaps a bit counterproductive. By having a government which is able to intervene when they deem fit, the expectations of the public will be altered towards a more output-oriented policymaker, hence once again creating too high inflation levels on a structural basis, as addressed by Rogoff (1985) in his introduction. In order to convincingly and credibly commit to inflation fighting, proper delegation is required, without the political entity having an effective way to operate the levers managing the money supply. However, the paper is very illustrative of the trade-off of credible commitment versus active interference during external shocks.

Empirically speaking, one could compare the European Central Bank, being the monetary institution with high levels of independence with the Federal Reserve in the United States. The latter, being more politically oriented through the nomination of the board through the president, has indeed created higher levels of inflation during the financial crisis of 2008 onwards through increasing the money supply. The European Central Bank, of which the board partly consists of independent central bankers, has intervened in a later stage, keeping inflation levels lower. The following section will discuss to a broader extent how the integration of monetary policies on an international level can serve as a way of overcoming structural high levels of inflation.

4.2.2 Monetary Integration: Constituting an Independent Central Banker?

In order to overcome the time-consistency problem described by Barro & Gordon (1983a), the idea of a stricter central banker was posited by Rogoff (1985). As the national incentive to adjust monetary policies in an opportunistic way is hard to overcome, groups of countries can elect to deepen monetary integration altogether, circumventing national policymakers. By doing so, governments have no accessible tool to create surprise inflation. The hands of the government are tied to the policy preferences of the union as a whole. Knowing this, private agents are more likely to adjust their beliefs and think they are less likely to be cheated on. Any deviation between the expected level of inflation and the actual level of inflation will diminish, if not disappear entirely, providing stable inflation rates over the current and future periods. Overall, the credibility of the commitment of the government to stick to the envisioned inflation level increases.

4.2.2.1 Fixed Exchange Rate regime

Such a deepening of monetary integration can take multiple forms. Countries can agree upon a fixed exchange rate regime, or elect to sign a single-currency agreement. The former has been seen quite a lot in previous decades. Most notably has been the Bretton Woods regime (1944-1973), in which all currencies were linked to the U.S. Dollar (and formally, the Dollar to gold). A single-currency area takes matters a step further. Where the barrier for national governments to stop committing to supporting fixed exchange rates is relatively low (apart from international prestige and reputational issues), a single currency invokes institutional costs in terms of sunk costs. More important, the “N-1 problem”, which is crucial in a fixed exchange rate regime, is avoided by a single-currency area.

The N-1 problem is a destabilizing aspect key to many fixed exchange regimes. It involves the presence of a country in the regime which can unilaterally influence the inflation rates and interest rates regardless of the preferences of other countries (De Grauwe, 1996: 29). When two countries link their currency to one another, establishing the preferred amount of money in the system and the linked interest rate is always a challenge. National preferences can differ and provide a suboptimal outcome for the country which has the least influence on determining the actual rates. The fixed exchange rate regime therefore has N-1, the total number of participators minus one, partners that are influenced by the rate-setting country. The possibility for a discrepancy in preferences allows for speculation on the durability of the agreement by private agents. External speculation can pressure the agreed upon boundaries in addition to the internal tensions, pushing governments over the edge of defaulting over committing to the fixed exchange rate.

4.2.2.2 Single currency Area

In a single currency area, there is no superior currency influencing the interest rate of the other currencies, nor is there a single *national* authority determining the amount of money in the system. It is the more inclusive option of the two, as it shifts from bilateral agreements to a multinational framework. An integrated single currency regime is, ideally, managed by a central bank consisting of an aggregate of both national and independent central bankers. This is for instance done in the board of the European Central Bank consisting of six members of the Executive Board and the remaining seats are filled by governors of each national central bank (De Haan et al, 2015). By organizing it as such, speculation relative to a fixed exchange rate regime is decreased, as institutional costs are larger. Defaulting becomes more costly than just untying currencies from one another. More importantly, private agents cannot sell the currency of a single country in order to pressure it to default on bi- or multilateral agreements. The shared currency holds a relatively stable exchange rate as it is an aggregate of all countries' productivity levels. Speculation against member states can only occur through a lack of funding through private agents in terms of debt creation.

Apart from speculative attacks, the presence of independent central bankers, envisioning the long-term objectives of the monetary union, circumvents parts of the national incentives. Adding representatives of the union in the board of central bankers that work to embody the interests of the union as a whole, rather than national players, should be seen as an effective way to implement Rogoff's (1985) ideas to actual policymaking. By having a balance between bureaucrats and national governors, that individually only have a single vote, the national influence on monetary policies is extremely small. A distribution of interests as such should filter out national preferences for the largest part, allowing the board of central bankers to focus on longer term stability. We can, of course, not exclude the possibility of the bureaucrats being influenced by the forces emanating from the national level, but the aggregate of national central bankers in itself should also serve as a diverse group with diverging interests.

4.2.2.3 Optimum currency area

A multinational central banking agency allows for long-term stability to emerge and counteracts opportunistic use of monetary policies. The rise of such a successful monetary union, however, requires some institutional similarities among its members in order to become effective and produce sound policies. The presence of institutional characteristics which are shared among the members determine to what extent the currency area will be likely to succeed. This is presented in the theory regarding the optimum currency area, as posited in the early 1960s by Robert Mundell.

Mundell (1961) argued that as the separate members of the monetary union cannot adjust price levels by themselves, differences in the flows of goods and services will have to be overcome through inflationary means, rather than through a revaluation of the currencies. If an economic shock were to increase unemployment—and therefore, output level—in a member of the union, it can only be compensated for by the issuing of additional money in the real economy. This creates inflation for the region as a whole. The extent to which shocks can be corrected for, therefore, depends fully on the willingness of the other member states to inflate (Mundell, 1961: 659). Linked to this, Mundell argues that a crucial condition for a properly functioning single currency area is the willingness to suffer political losses required to sustain the union as a whole. Monetary discipline is therefore of utmost importance to ensure the longevity of the monetary union as a whole. In terms of regional characteristics, Frankel (1999) added an important criterion in terms of size of the area to optimal currency areas. The optimal currency area is a region that is *“neither so small and open that it would be better off pegging its currency to a neighbor, nor so large that it would be better off splitting into subregions with different currencies.”* (Frankel, 1999: 14).

An important domestic trait mentioned by Mundell (1961:661) is the degree of labor mobility among the member states. As labor is the more immobile variable of the means of production, compared to capital, it is harder to correct for unemployment discrepancies within the currency area. If country A seeks employment of cheap labor, whereas country B has a large unemployed working population, the lack of mobility might stagnate a proper flow of labor transition. Apart from these systemic characteristics as posited by Mundell, De Grauwe (2016) points out that there are domestic differences as regards the factor labor that interfere with the effectiveness of the monetary union as well. Diversity among the labor market institutions can provide heavy disturbances in how resilient and tenacious countries are to certain types of external shocks. The bargaining power of coordinated labor matters tremendously how unexpected costs or benefits are distributed among or compensated by the factors of production (De Grauwe, 2016: 20). The members of a monetary union, being a multiplicity of countries that all have their specific characteristics, will have different ways of dealing with external input. This matters for price levels, and therefore inflationary divergences over time. A more homogenous setting of labor market institutions among the potential members smoothens the constitution and the durability of a monetary union.

4.3 Expropriating governments

In order to see analyze how governments will act in terms of monetary compliance to international monetary agreements, we will look into an addition of the Barro-Gordon model. In this variant, the government's utility function is extended with an expropriation component, further influencing the optimal strategies regarding monetary policies. Bohn (2013) extends the standard model which shows the tradeoff between economic output and inflationary levels with a political economic component which shows the government's urge to expropriate. The main dynamic that is being studied is what potential motives a government might have to deviate from the agreed upon commitment to stick with a currency peg. The key dynamic discussed is at what point a government will give up "more stability-oriented monetary policies in favor of more inflationary policies" (Bohn, 2013: 568). This paper offers an insight into the rationale of countries to sticking to monetary unions, which as mentioned above, should be seen as a case of international, cooperative monetary policy crafting. More in specific, the optimal strategy for the government is presented for which it will maximize its utility through reneging on monetary policies or complying with the set standards.

4.3.1 Government's Loss function

The author uses a model which resembles the one posited by Barro & Gordon (1983a) model that investigates the government's loss function L_t . It shows the tradeoff between actual and trend levels of economic output $\bar{y} - y_t$, which are targeted to be larger than zero which is required to expropriate, and the difference in inflation levels ε_t . The expropriation, or greed, variable includes the potential for governments to extract funds out of the economy. This expropriation is done through taxation policies, τ_t , but its actual value depends on the economic output level, y_t , and the overall tendency of the government to extract funds. This tendency to extract funds is linked to a greed variable, δ , that can vary but is always larger than zero. This tendency can differ between governments of different countries as there is no single greed factor which is equal for governments around the globe. The government's loss function looks as follows:

$$L_t = \frac{1}{2}[(\varepsilon_t)^2 + \theta(\bar{y} - y_t)^2 - \delta(\tau_t y_t)], \quad \theta, \delta > 0. \quad (5)$$

The model is a simplified version of reality, in which the government can choose a combination of economic conditions which are embodied by inflation and output, and level of expropriation of the economic gains. Public goods and other fiscal expenses such as debt payments are left out of the

model in order to show the crucial consideration the government faces to self-enrich or optimize output. Basically, all the taxation by the government can be seen as self-enrichment rather than a “valid” tax which boosts economic output (e.g. roads, educational facilities etc.).

Important to note is that, similarly to the Barro-Gordon (1983a) model, with this optimizing function, the government can influence the deviation in inflation rates in order to boost economic output through surprise inflation. The government, however, has an additional incentive of utilizing such monetary policies. The expropriation—and therefore the payoff for the government—depends on the actual level of economic output and the taxation of it, the multiplication of τ_t by y_t . There is a drawback to increasing tax levels, however. The government therefore has an interest to not let the economy go bankrupt by extorting all of its output in period T . A devastated economy does not yield additional income for the periods $t + n$. Even by increasing the τ_{t+1} in order to compensate for previous losses will leave the economy even more crippled, providing very little merit for a rent-seeking government. In the author’s words, “the amount of rent-seeking is limited by the more and more disastrous effects of inflation and output losses” (Bohn, 2013: 567).

4.3.2 Output function

This loss in output is visualized by the model constructed by Huang & Wei (2006) and used by Bohn (2013). It shows the actual level of output, y_t , as a function of the expected output level, \bar{y} , the difference between actual inflation levels and expected inflation levels, $\phi(\varepsilon_t - \varepsilon_t^e)$ and taxation levels $\psi\tau_t$. The model looks as follows:

$$y_t = \bar{y} + \phi(\varepsilon_t - \varepsilon_t^e) - \psi\tau_t, \quad \phi, \psi > 0 \quad (6)$$

Note that the difference in inflation levels has a positive effect on the level of output. This “surprise” effect in inflation levels boosts employment, hence improving output in the short-run. It can only be used in a single period. Afterwards, the private agents expect the inflationary forecasts to be cheated upon by the government. The taxation set by the government hampers economic output levels, hence the negative sign. Actual output y_t differs from the target output \bar{y} due to the difference in inflation levels and the distortionary effect of taxation levels. Note that there is no room for exogenous shocks in the model, by doing so showing the isolated dynamics of the effects of expropriation on economic conditions and vice versa.

4.3.3 Policy tradeoffs

The government has two tools to adjust output levels and influence its own utility function. Fiscal policies determine in a rather straightforward way how much will be expropriated out of the economy and to what extent output levels will be crippled. Monetary policies determine the nature of the government, being either complying or reneging as regards stable, long-run monetary policies. Once reneging has initiated, private actors assume the government to renege in the future, hence always expecting surprise inflation. These two policy instruments have an additional interdependence. As the expropriation rate through fiscal policies depends on the output level, being the tax base, altering the tax base through monetary policies changes the optimal level of expropriation for the government. This interdependence is visualized in both equations (1) & (2), as the output level y_t determines the potential for taxation levels and in itself depends on the discrepancy between expected and actual inflationary levels.

This interdependence then leads to the following mechanism. Once a government chooses to renege over comply in monetary terms in period t , it will boost economic output levels in a single period. This is done by setting the inflation rate at a different rate than expected by the public, contrary to the complying strategy. Complying means that the difference between the expected level of inflation and the actual level of inflation in period t is zero, $\varepsilon_t = 0$.

When reneging, however, the actual rate of inflation differs from the expectations of the public. In the output function, we see that the total production depends partly on the difference between the actual level of inflation, ε_t and the expectations by the private agents, ε_t^e . The expectations by the private is still zero, $\varepsilon_t^e = 0$. The government can, however, renege by altering the actual level of inflation here to be different to the expectations, $\varepsilon_t \neq \varepsilon_t^e$.

Afterwards, surprising in any of the following periods is impossible due to the altered expectations of the private agents. This specific period, the government can offset the future losses it faces due to the private expecting the worst by increasing the expropriation from the increased, monetarily incentivized, tax base in period t . In other words, the government's strategy is locked into the reneging one, as the private expects the government to cheat. The optimal strategy then is to have high inflationary policies in order to get the best out of the two scenarios. As there are no benefits in switching back to the complying policy, the government maximizes by having output levels at a normal rate, rather than having a stricter inflationary policy and undercutting employment further in all following periods $t + n$.

Surprise inflation is the increase in money supply. This can be done by the printing of money, or by devaluating the national currency in order to boost competitiveness, and by doing so have an influx of capital. Both the options of printing money and devaluating the national currency are limited when in a fixed exchange rate regime. Being forced to keep a certain exchange rate level, limits, if not eliminates, the potential for a government to conjure up surprise inflation. The relevant consideration in the paper is therefore when it is in the government's best interests to renege on cooperative monetary policies, which is breaking of agreements on fixed exchange rates, rather than complying with those standards.

4.3.4 Optimal strategies

The author then continues and links the optimal strategy for a government to renege on or comply with a fixed exchange rate regime. Its optimal strategy depends on the overall gain on permanently switching towards flexible exchange rates, G^O . Equation (7) describes the period gain in period T , showing a gain by reneging ($G_T > 0$). Equation (8) shows how the reneging strategy followed in period T affects the payoff structure in such a way, that it results in a loss relative to the complying strategy in period T in the periods $T + 1, T + 2, (\dots), T + n$.

$$G_T = L_T^c - L_T^r = \frac{A}{B(B - C)} > 0 \quad (7)$$

$$G_t = L_t^c - L_t^r = -\frac{A}{B^2} < 0 \quad (8)$$

Both equations have the abbreviations A, B and C. They have the following values:

$$A = \frac{1}{2} \left(\frac{1}{2} \delta \bar{y} \right)^2 \phi^2 \left(\theta \psi + \frac{1}{2} \delta \right)^2 > 0$$

$$B = \psi(\theta \psi + \delta) > 0$$

$$C = \phi^2 \left(\frac{1}{2} \right)^2 \delta^2 > 0$$

The author then adds the political instability variable, in terms of the future discount factor, to give the equations more context. Additionally, it provides an equation which shows whether it is beneficial for the government to switch to reneging policies or costly. Given specific values on both the variables, the government will have a dominating strategy to either comply ($G^O < 0$) or

default ($G^O > 0$). The optimal choice is then given through the following equation (6), consisting of the gains in period T , G_T which are then added by the losses in the future periods $T + 1$ onwards multiplied by discount factor ρ as indicated under G_t . Whether or not the actual outcome of the gains now minus the losses later is positive or negative determines whether the government will renege on its monetary promises or comply. Larger losses than benefits to switching from complying to reneging will yield in a G^O which is negative, making complying the optimal strategy. A net gain will incentivize reneging behavior.

$$G^O = G_T + \sum_{t=T+1}^{\infty} \rho^{t-T} G_t = \frac{A[(1 - 2\rho)B + \rho C]}{B^2[B - C](1 - \rho)} \quad (9)$$

In this specific equation, the denominator will always be positive, as both B and C are positive, $B > C$ and $1 - \rho \leq 0$. Whether or not the government is willing to renege on its monetary commitment or comply therefore fully depends on whether the numerator is positive or negative. This fully depends for what values $1 - 2\rho$, being all values of ρ over $\frac{1}{2}$ resulting in a negative outcome. All values lower than $\frac{1}{2}$ yield a positive outcome, hence making the optimal strategy to renege.

4.3.5 Graphic illustration

The author then continues and illustrates how distributions in the given greed variable, δ , and discounting factor of the future, ρ , influence the optimal strategy by the government in period T . The optimal strategy by the government is addressed as ρ as a function of both the greed variable δ and the exogenously given parameters ϕ , θ , and ψ . The relation is presented as in equation 7, and visualized in figure 1:

$$G^O > 0 \Leftrightarrow \rho < \frac{1}{2} + \frac{C}{2(2B - C)} \quad (10)$$

For each value of ρ , we see a corresponding δ for which the government faces its crucial switching point from complying to reneging policies. As the political stability increases, the government seems more and more willing to stick with a complying strategy. As the greediness of the government increases, we see a tendency to switch to reneging policies. This makes sense, as the greed variable was a positive multiplier linked to the taxation of the government, hence decreasing the government's loss function. A higher greed factor would therefore imply the government having a tendency to cheat in order to expropriate more out of the economy, even if political stability increases.

As greed increases the government is willing to renege even with a more future-oriented preference. Each increase in δ is therefore matched with a corresponding ρ for which the government is willing to renege. A higher ρ requires higher levels of δ to switch to reneging, whereas higher levels of δ require higher levels of ρ to refrain from reneging. Equation (10) is visualized in figure 1, which draws the curve that shows the critical switching point between the two strategies, starting from $(\frac{1}{2}, 0)$ up to the $(1, \delta^{max})$.

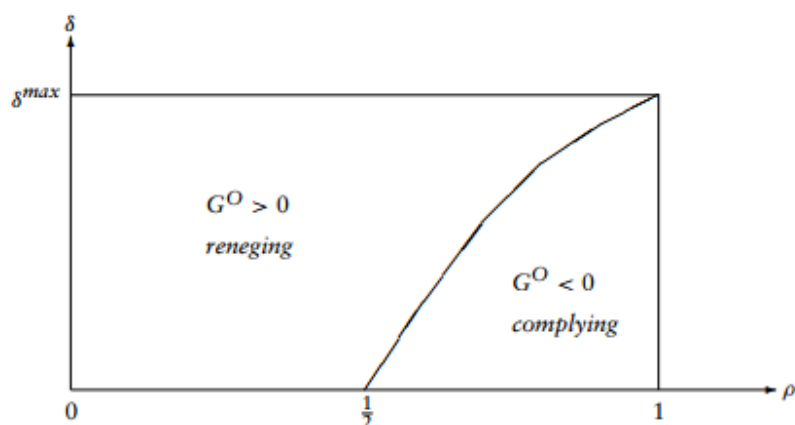


Figure 1: Optimal strategy relative to Greed and Political Instability. (Bohn, 2013: 570)

5. Output-boosting economic integration

From the study of Barro & Gordon (1983) we learned about the time-inconsistency which produces too high inflation levels on a structural basis. Rogoff (1985) provided a solution for the abovementioned problem by appointing a central banker which systematically emphasizes inflation-containment over boosting employment levels. We argued that such a solution can be found in monetary unions, that circumvent the option for national policy making on monetary affairs. The following sections will look how a monetary union would affect the optimal policy making by the government. The government's incentives to deviate from cooperative behavior in the long-run, which will be used as a proxy for the likeliness for a national government to drop out of a same-currency area will be the unit of analysis.

In this thesis we want to look further than monetary unions only involving the appointing of a conservative central banker. A monetary union involves the deepening of economic integration, often accompanied by the opening up of borders and an increase in trade and the optimization of production processes. As also indicated in the six-stage plan in the Abuja Treaty of 1991, the opening up of African borders and the free movement of goods and people is bound to have its effects on national output levels. As we've seen from the literature review addressing Rose's (2000) work on *One Money, One Market*, the entering of a monetary union vastly increases trade beyond just removing transaction costs among the participating countries. In the following sections we will therefore assume that becoming part of a monetary union will have a positive effect on the national output of the participating countries, changing the optimizing behavior as regards complying or reneging by the government.

5.1 Key models

If such a monetary union, of which at least the plans and spirits are present, were to emerge, how then could we see these underpinnings relate to the way that complying or defaulting is incentivized in period t ? In order to answer this question involving national optimizing behavior we have to go back to the roots of the government's utility function. Encouraging compliance among countries in same-currency regions—in other words, not have them drop out of the area—we look back at Bohn's (2013) formulated utility function of the government. Delving back into the previous chapter, the utility function of the government, depending on the difference inflation levels π_t , the

difference in expected and actual output levels $\bar{y} - y_t$ and the greed variable determining taxes extracted given the economic output $\delta(\tau_t y_t)$ looks as follows:

$$L_t = \frac{1}{2}[(\varepsilon_t)^2 + \theta(\bar{y} - y_t) - \delta(\tau_t y_t)], \quad \theta, \delta > 0 \quad (5)$$

With the output function depending on the difference between expected and actual inflation levels $\varepsilon_t - \varepsilon_t^e$, the trend output \bar{y} and the extent to which the government expropriates value out of the economy, shown as follows:

$$y_t = \bar{y} + \phi(\varepsilon_t - \varepsilon_t^e) - \psi\tau_t, \quad \phi, \psi > 0 \quad (6)$$

These models will be used to show how the deepening of economic and monetary integration as regards additional output levels and institutional costs affect the government's decision to either renege or comply.

5.2 Outcome boost

By itself, the key motives for economic integration—increased trade and optimization of production processes—yield a bonus for the optimizing government. The convergence of economies through an economic union, both through the harmonization of monetary policies and the removal of trade barriers, will provide net social gains. This was addressed by Rose (2000) in the “One Money, One Market” study. These new economic conditions, being more favorable than without regional integration, are assumed to boost economic output levels y_t in t and in all following periods. Departing from here, the implications for the government's utility function can be investigated further. The amount of expropriation by the government, $\delta(\tau_t y_t)$, will increase without actively changing tax rates due to the increased output levels. As pointed out in Bohn's (2013) study on compliance and renegeing from international monetary policies, we can interpret cooperative behavior as remaining in the monetary union. Renegeing, cheating on monetary policy, can only be done through a withdrawal from the union, hence forfeiting the gains made through the optimization of economies through regional integration.

We can visualize the added bonus to the output levels of the economy by inserting variable ω , which embodies the effects of integration. Assuming that integration always yields more benefits than it incurs institutional costs, ω is a multiplier being bigger than one. When a country is not part of a monetary union with the bonus from economic integration, i.e. output is simply a sum of the national produce, ω will be equal to one. Having the regional benefits increases the trend output of

the economy, \bar{y} , which will therefore be multiplied with ω in the output function, equation (2), yielding the following result:

$$y_t = \omega \bar{y} + \phi(\varepsilon_t - \varepsilon_t^e) - \psi \tau_t, \quad \phi, \psi > 0 \quad (11)$$

With ω being a factor larger than one, i.e. the country is a member-state of a monetary union, actual output in period y_t will be larger than for the same country being outside of a monetary union. As y_t is a crucial component of the government's loss function, equation (5), we see changes in the utility of the government and its optimizing strategy when ω is not equal to one. We see y_t twice in the governmental loss function. First of all, it addresses the deviation from the trend output \bar{y} . A larger actual output than trend output is favorable for the government. The second occurrence of y_t , in the expropriated revenue for the government, $\tau_t y_t$, has a positive effect on the government's utility as $\omega \bar{y} > \bar{y}$. The larger negative sign in the government's loss function implies the political actor will benefit—minimizing potential losses—from the effects accompanying regional integration.

$$L_t = \frac{1}{2}[(\varepsilon_t)^2 + \theta(\omega \bar{y} - y_t) - \delta(\tau_t y_t)] \quad \theta, \delta > 0 \quad (12)$$

5.3 Government's optimal strategy

The government has the option to renege or comply on its monetary commitment. The period gain in both the current period T and the following periods $t + n$ are shown in equations (7) and (8). Variable A changes in the sense that the \bar{y} variable is once again multiplied by ω .

$$G_T = L_T^c - L_T^r = \frac{A}{B(B - C)} > 0 \quad (7)$$

$$G_t = L_t^c - L_t^r = -\frac{A}{B^2} < 0 \quad (8)$$

As the author showed that $B - C > 0$, implying that B is larger than C (for values of A , B & C , see below), the denominator is always positive in both the G_T and G_t function. As A is of the first power in both equations, a multiplier will yield the same outcome relative to each other. The absolute values can differ as the denominator differs. To what extent this difference is relevant for the optimal strategy by the government, we have to advance to equation (6), which incorporates the discount factor of the future, ρ , into account.

As we have seen in the previous chapter, the government's strategy is determined by the sum of the positive gains in period T combined with the negative, discounted, gains in the future periods $T + 1$ onwards. It was modelled through the following equation:

$$G^O = G_T + \sum_{t=T+1}^{\infty} \rho^{t-T} G_t = \frac{A[(1 - 2\rho)B + \rho C]}{B^2[B - C](1 - \rho)} \quad (9)$$

with

$$\begin{aligned} A &= \frac{1}{2} \left(\frac{1}{2} \delta \omega \bar{y} \right)^2 \phi^2 \left(\theta \psi + \frac{1}{2} \delta \right)^2 > 0 \\ B &= \psi(\theta \psi + \delta) > 0 \\ C &= \phi^2 \left(\frac{1}{2} \right)^2 \delta^2 > 0 \end{aligned}$$

We can see that the enhanced trend output, $\omega \bar{y}$, is incorporated by the A -section of the equation. As we've seen in chapter 3.3, the denominator will always be positive, with both B and C being positive, $B > C$ and $1 - \rho \leq 0$. Whether or not the government is willing to renege on its monetary commitment or comply therefore fully depends on whether the numerator is positive or negative. As the nature of the nominator is fully determined by the value of ρ , being larger than $\frac{1}{2}$ as negative and smaller than as $\frac{1}{2}$ positive, an increase in A due to multiplier ω does not alter the optimal strategy of the government.

Although the decision of the government does not change due to the additional output provided through a deepening of economic integration, the payoff of the government, while following a certain strategy, does. The G^O will provide values which deviate further from the crucial switching point, being $G^O = 0$, than under non-integration. This means that if we look to a scenario in the future, where we loosen the ceteris paribus condition for the following periods, the decision to stick with the complying strategy becomes more resilient to shocks.

5.4 Graphical implications

Compared to the original situation for which each government could implement its own monetary policy regulations, we've seen that the optimal switching point has not been affected under monetary integration due to the additional output. The additional output of multiplier ω to trend output \bar{y} increased the payoff yielded by following either strategy, but did not make one strategy

surpass the other in the optimization function. As presented in the graph in the paper by Bohn (2013), the optimal strategy by the government is determined by equation (10), being:

$$G^O > 0 \Leftrightarrow \rho < \frac{1}{2} + \frac{C}{2(2B - C)} \quad (10)$$

The findings of the optimal strategy by the government under adapted equation (9), not being influenced in its optimal strategy make sense given the equation above. As the A-section, which was the only part of the equation being affected by changes in output levels, is not incorporated in equation (10). This function showed the optimal point of switching to a reneging monetary policy, given values of future discount factor ρ and greed variable δ . As such, we see that figure 1, which demonstrated the relation between the government's optimal strategy and ρ and δ will remain unaltered.

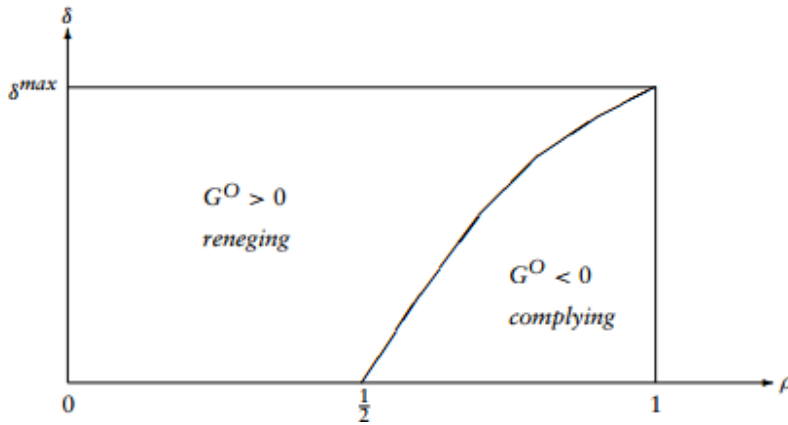


Figure 1: Optimal strategy relative to Greed and Political Instability. (Bohn, 2013: 570)

6. Recommendations for Future Research

In this section we discuss potentially interesting ways of approaching the issue of reneging on monetary policies which have risen through the writing of this thesis. The following section will discuss the potential effects of changing the future discount factor, adding a political cycle, and considering institutional costs.

6.1 Future discount factor

In this thesis we argued that an increase in output would be accompanying monetary integration. As we've modeled the increase in output as a multiplier ω of the trend output level \bar{y} we saw no effect as regards the crucial tipping point of switching from the complying strategy to the reneging strategy. The values for the optimal strategy by the government G^O were even further away from zero, making it more obvious for the government what its best strategy is and arguably stabilizing it for shocks. This also had no further graphical implications in the relation of the optimal strategy given certain values of greed, δ , and the discounting of the future, ρ .

An interesting point of departure for following studies would be whether the increase in output could lead to a change in the valuation of the future, captured by ρ , relative to the present. This would, in fact, potentially alter the optimal strategy as the nature of the G^O , being either positive or negative, is determined by the discounting factor of the future. Analyzing to what extent a potential "shadow of the future", the repetition of interactions, might interact with the utility function of the government, and push it just over the critical border of reneging towards compliance.

6.2 Political cycle

A deepening of economic integration yields a boost in output levels of national economies, affecting the likeliness of governments to default on agreed upon monetary regulations. Relaxing the conditions of the model would allow for interesting research topics. In order to make the phenomenon of monetary integration and its effects on the governments' decisions to either default or comply more applicable in the empirical domain, one could envision political pressure through election cycles. In this study, a ceteris paribus situation has been assumed for abovementioned mechanism so that when a government reneges, they do so in period t if they would plan to do so in the future. One could extend the model, changing the infinite horizon assumption to a fixed amount of periods with a chance of risking a change in power. How likely is a government to renege when the chance to get reelected in the follow period increases by doing so? In such a scenario, each

period is likely to have a binary component added to it, which indicates whether the following period, $t + 1$, is an election year. The utility associated with the increase in likeliness to remain in power in the renewed period could be added to the initial payoff of reneging in period t . Such a dynamic model would produce an interesting study in tendencies to default on cooperative international monetary policies.

6.3 Institutional costs

In order to capture a more all-encompassing view on the pros and cons of monetary integration, one could also look at the aspect of institutional costs. Apart from monetary integration as solely being a means of increasing output levels, there are costs linked to maintaining the effectiveness of the union. A supranational, governing agency needs to be funded through its member states in order to pay its expenses. This could be seen as extra taxation by the government on the economy, without the government gaining the additional returns. In future research, one could change the tax variable in such a way that a percentage of that which is expropriated is “lost” due to the institutional costs. One could also argue the costs to be of a fixed nature which are required to help the international institution survive. A more realistic scenario, therefore, would be to add a fixed cost to the government’s loss function, i , which describes the costs the government faces in period t due to staying in the monetary union.

By adding the institutional cost variable, one could create a more general and all-encompassing perspective on what it is that would drive a government to default on cooperative monetary policy making, which we defined as staying in the monetary union. After all, adding only the benefits to the model while neglecting the costs makes for an incomplete picture. Whether or not it is in the government’s best interests to stick in the monetary union compared to the autarkic situation comes down to whether the added value through staying is larger than the institutional costs. If,

$$\omega\bar{y} - \bar{y} > i,$$

the government will have additional output to expropriate which exceeds institutional costs, making the complying scenario more compelling than under autarky. If, however,

$$\omega\bar{y} - \bar{y} < i,$$

one would expect non-complying behavior to be a more compelling strategy, as monetary integration overall might yield negative results.

7. Conclusion

Although reaching effective and durable policy making in politically unstable countries is a rather difficult process, this study aims to offer a solution to rationally established, selfish behavior of national governments. We looked at surprise inflation being implemented in order to achieve short-term gains over longer-run objectives. Both Barro & Gordon (1983a) and Rogoff (1985) addressed the issue of this time-inconsistency of the policy maker, which has been discussed thoroughly in this study. In general, monetary policies offer an effective means to actively lower real wages and, by doing so, raising short-run economic output levels. This fits the agenda of the politician for whom re-election is their main priority, rather than inflation fighting.

An effective way to circumvent the incentive of national policymakers to create surprise inflation was then posited. In line with Rogoff's (1985) envisioned independent central banker, a regional, monetary union provides a way of sustainable, low levels of inflation. By taking away the monetary tools of the government, long-term stable inflation rates could be reached. The challenge lies in implementing it in politically instable regions, and having countries stick to it. As pointed out by multiple authors (Cukierman, Edwards & Tabellini, 1989; Bohn 2006), there are additional incentives a government faces in a politically unstable country which encourage the use of seigniorage in order to boost its chances to remain in power.

We then analyzed the phenomenon from a political economic perspective, and used Bohn (2013)'s paper in which the government's utility function was expanded to incorporate a rent-seeking element. A greed variable was added, showing how the government has an active stake in the actual state of the economy. The government's yields through expropriation depend on the national output levels, and hence has an additional interest in boosting the national product in a given period. This can be done through reneging on promises on monetary policy, and by doing so creating surprise inflation.

Using the model presented in this paper, we visualized the incentives for a government to deviate from the regulations set by the independent central bank, i.e. dropping out of the monetary union. In order to map these incentives that shape a national policy maker's strategy, we looked into the effects of deeper economic integration and the output boosts a monetary union could provide. A multiplier component was added to the output variable in the governments utility function, which then resulted in an adapted model.

What followed from the analysis of the newly adjusted model, was that the increase in output would not be the critical aspect forcing the government to shift strategies. The critical level of changing strategies, in which the reneging strategy would yield positive gains even when the future losses are accounted for, would not be crossed with the addition of this multiplier. Stronger even, the dominating strategy would be enforced, as the potential gains or losses for reneging would be amplified. If other variables were to change, other than the future appreciation variable—which determined the negative or positive nature of the function—the original strategy would be more resilient to change.

Even if we assume economic gains through the deepening of monetary integration, neither reneging nor complying became more enticing relative to the other. One would therefore have to look into the role of normative standards set by monetary unions, which incur reputational gains or losses that might influence the optimal decision by the government. Such an approach could still advocate why the internationalization of monetary policy could benefit long-run inflation control.

Linking back to the research question of the thesis—being how monetary integration would affect the government’s credibility to comply with cooperative monetary policies—we see that by following the models stated above, we see no reason to assume this to be true from our point of analysis. In the end, models remain a simplified version of reality, and if we assume other effects to be linked to the increase in output due to monetary integration, we could find different mechanisms at play. As mentioned in the recommendations for future research section, the appreciation of the future is vital in determining the positive or negative nature of the outcome of the government’s utility through reneging. This deserves further investigation.

The deepening of monetary integration on the African continent—be it through one or multiple central banking areas— fits in the objectives set out by the African Union regarding regional cooperation. In addition, it might give rise to more stable inflationary expectations. The key mechanism for this, however, will arguably not be a change in incentives for the government through economic gains. It is more likely that the increase in credibility for the private domain through the delegation of policy instruments to a supranational monetary organization will potentially ignite periods of relative inflationary stability.

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