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Inflation and Democracy in Former Extractive Colonies: Analysis With a New Instrumental Variable

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Abstract

This paper analyzes the link between inflation and democracy in developing countries. In order to address the endogeneity issue of democracy, I use the date of political independence as an instrument for democratic institutions. The application of the criterion of Stock and Yogo (2002, 2005) for weak instrumental variable in my sample reveals that, the independence date is a good instrument for democratic institutions. Using five years pooled data covering the period 1960-2003, and a sample of 62 developing countries former extractive colonies (including 32 African countries); I find a robust positive causal relationship between inflation and democracy. It appears that democracy increases inflation because democracy stimulates money creation and compromises trade liberalization in my sample of developing countries. Case studies based on Chile, Ghana, and Sri Lanka better illustrate the result relating to the relationship between inflation and democracy in my sample.

Keywords: Democracy, Inflation, Median voter, Stabilization Policies, Weak Instruments Test

JEL Classification: D78, E31, E63, 017

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1 Introduction

What is the link between inflation and democracy in developing countries? Do developing countries become democratic at the expense or the benefit of macroeconomic stability? The question is to know whether there is a tradeoff between economic and political reform, and if it is the case, how policy makers in developing countries manage this tradeoff. Indeed, economic reforms toward the implementation of macroeconomic stabilization policies are more likely to result in a fall in inflation. However, the cost might be a loss of political power because of potential discontent of voters. Political reform corresponds to the democratization of political regimes, of which a plausible consequence is the need to satisfy the voter's preferences in order to be maintained in power, possibly at the expense of the fall in inflation.

The study of the relationship between inflation and democracy in developing countries is important. Indeed, most developing countries depend on international aid and increasingly, the international aid agencies condition the allocation of aid on the implementation of economic and political reforms in developing countries. Additionally, in order to ensure their economic development, developing countries must control their levels of inflation because inflation hampers economic growth (Fischer, 1993; De Gregorio, 1993; Barro, 1995; Bruno and Easterly, 1995; Fischer et al., 2002). Lastly, the participation of developing countries to globalization and their chances to benefit from it depend on their capacity to control inflation.

This paper is related to the literature of political economy of inflation, and tackles particularly the question of the effect of the type of political regime on inflation, question analysed according to two different approaches in the literature. In the "state capture" approach, inflation is a result of pressures from elites who derive private benefits from money creation at the expense of the majority of citizens. The proponents of this approach see in democratization a solution to the control of inflation in developing countries, since democracy involves political and institutional constraints, which limit the elites' rent seeking behaviour. Such is the opinion shared by Bates and Krueger (1993) and Geddes (1995).

In the "populist" approach, inflation is the result of public demand for transfers financed by inflation tax, suggesting that inflation and democracy are positively correlated. The proponents of the "populist" approach see in democratization of developing countries a threat for the control of inflation. Therefore, Nelson (1993) suggests that the concentration of power in a strong chief of executive, the delegation of the management of economic policies to independent technocrats (Williamson, 1994), or the existence of a central authority (Haggard and Kaufman, 1992) could avoid high rates of inflation in developing countries.

The first objective of this paper is to check which one of the two alternative approaches of political economy of inflation is consistent with the data in the context of developing countries. The second objective of the paper is to identify the channels of transmission of the effect of democracy on inflation in developing countries. To this end, I argue that *popular demand for public goods and services financed by money creation, the uncertainty of the results of stabilization policies, and the slow materialization of these results make more difficult the control of inflation in democratic developing countries*. Indeed, in developing countries where the majority of citizens do not have access to basic public goods and services (school, health, water, etc) and where the governments have limited resources to finance their budgets, the median voter would express a high demand for public goods during the elections. Democratic governments are more likely to finance these public goods mainly by money creation in order to ensure their maintenance in office. Likewise, the uncertainty of the results of stabilization policies and the slow materialization of these results, in terms of economic growth, would reduce the preference of the median voter for stabilization policies in developing countries. In this situation, democratic governments in developing countries

would have fewer incentives to make the necessary efforts for an effective implementation of stabilization policies, since this would represent a threat for their maintenance in power.

Because of the risk of endogeneity of democratic institutions, I use the date of independence as an instrument for democratic institutions. I establish a robust positive causal relationship between inflation and democracy in a sample of 62 developing countries former extractive colonies, over the period 1960-2003. Moreover, it appears that the positive relationship between democracy and inflation in my sample of developing countries is due not only to the rise in money supply, but also to the difficulties which democracy generates for the implementation of trade liberalization policy. Indeed, democracy positively and significantly affects the growth rate of money supply, and democracy reduces trade openness in my sample of developing countries.

The positive effect of democracy on inflation that I obtain corresponds to the result predicted by the “populist” approach of political economy of inflation. My result is also in the same vein as the one found by Bates (2005) who shows that, the introduction of political competition does not improve the macroeconomic management in Africa. My result is also closer to the expectations of Alesina and Drazen (1993) who argue that polarized governments (usual characteristic of democratic political regime) are likely to record high levels of inflation because of the delay in stabilization policies implementation. Lastly, the recent results of empirical works relating to the analysis of political business cycles also confirm my result. Indeed, it has been recently established that political business cycles are of a greater width in developing countries than in developed countries (Brenda and Drazen, 2005; Shi and Svenson, 2002, 2000). In this situation, democracy which partly means the multiplication of electoral consultations is likely to challenge the macroeconomic stability in developing countries.

My results are however in contradiction with those found recently as for the effect of democracy on inflation. Indeed, Satyanath and Subramanian (2004, 2005) establish a negative relationship between democracy and inflation. Likewise, Desai et al. (2003) obtain a positive relationship between democracy and inflation conditionally on the level of income inequality, and a negative relationship between democracy and inflation, independently of the level of income inequality. How to explain the divergence between these results and mine?

The first source of difference is the sample composition. The sample of Satyanath and Subramanian (2004, 2005) is composed of 70 developed countries and developing countries including 48 ex-colonies of extraction and settlement. As for the sample of Desai et al. (2003), it is composed of more than 100 countries, including developed and developing countries. My sample is composed only of 62 developing countries ex-colonies of extraction. The second source of difference is the method of estimate. Satyanath and Subramanian (2004, 2005) use 2SLS with cross sectional data, whereas Desai et al. (2003) use the first differenced GMM estimator with annual panel data. I use 2SLS with five years pooled data. Compared to cross sectional data, pooled data present the advantage to allow me to consider the temporal dynamics of inflation and democracy, and the covariant shocks affecting simultaneously all the countries in my sample. Compared to the first differenced GMM estimator, the use of 2SLS with an instrumental variable resulting from a natural experiment may be more convincing especially when the explanatory endogenous variable is highly persistent in time, like the institutional variables are.

Beyond the sources of difference between my results and those of Satyanath and Subramanian (2004, 2005) and Desai et al. (2003), it is important to note that my paper makes two main contributions. *First*, I suggest a new instrumental variable for democratic institutions. And *second*, I identify the rise in money supply and the reduction in trade liberalization as the channels of transmission of the positive effect of democracy on inflation in my sample of developing countries.

The remainder of this paper is organized as follows. Section 2 presents my theoretical arguments and their empirically testable predictions. Section 3 is devoted to the empirical analyses. A first part of this section presents the arguments justifying the use of the date of independence as instrument for democratic institutions. The second part of section 3 contains the empirical results, while a third part is an analysis of the mechanisms through which democracy affects inflation. Section 4 presents case studies comparing the institutional performances and inflation rates in Chile, Ghana and Sri Lanka. Section 5 concludes.

2 Theoretical arguments

In democracy, the majority of citizens have the right to vote, to express its preferences for economic policies and the government is supposed to represent the preferences of the whole population (Acemoglu and Robinson, 2006). Likewise, in democracy the preferences of the median voter are most important for the various candidates to the elections because any candidate who manages to satisfy the preferences of the median voter is persuaded to be elected: this is the principle of the median voter theorem. Thus, in a democratic system made up of two political parties for which the leaders are only worried about their accession to power, one should observe a convergence of the parties' policy platforms towards the preferences of the median voter (Downs, 1957; Hotelling, 1929)¹.

I use the median voter theorem to analyse the effect of democracy on inflation in developing countries. By doing so, I make the assumption that in developing countries the median voter is poor because the majority of people are poor there². A poor median voter is characterized by an income Y^M lower than the average national income \bar{Y} , and belongs to the majority of the citizens (Acemoglu and Robinson, 2006). In this theoretical configuration, the political preferences of the poor voters are those which should prevail in a democratic system. It is assumed that there is a clear separation between the policy preferences of the poor citizens and those of the rich ones. Moreover, it is also supposed that part of the poor citizens cannot constitute with part of the rich citizens the electoral majority (Acemoglu and Robinson, 2006).

The assumption of a poor median voter in developing countries is extremely plausible and important for my theoretical predictions³. Moreover, the weak access of the majority of citizens to the fundamental public goods and services (water, health, school, etc), the slow materialization of the results of stabilization policies, and the uncertainty of these results, in terms of economic growth are structural characteristics of developing countries which condition the attitude of the median voter towards inflation. Scheve (2003, 2004) presents a

¹The median voter is the voter whose preference for economic policies shares the whole of the voters in two equal proportions i.e. 50% of the voters prefer a policy higher than that of the median voter, and 50% others have a preference lower than that of the median voter. To see the argument behind the median voter theorem, imagine individuals are voting between q^M and some policy $q' > q^M$. Because preferences are single peaked, all individuals who have ideal points less than q^M strictly prefer q^M to q' . This follows because the indirect utility functions fall monotonically as we move from individuals' ideal points. In this case, since the median voter prefers q^M to q' , this individual plus all the people with ideal points smaller than q^M constitute a majority, so q^M defeats q' in pairwise vote. This argument is easily applied to show that any q'' where $q'' < q^M$ is defeated by q^M (now all individuals with ideal points greater than q^M vote against q''). Using this type of reasoning we can see that the policy that wins in democracy must be q^M . So in democracy all the candidates have interest to propose a policy platform which is as close as possible to the policy preferred by the median voter. This illustrative example is drawn from Acemoglu and Robinson (2006).

² In their chapter 4, Acemoglu and Robinson (2006) make the same assumption of a poor median voter in a context where the majority of individuals are poor, i.e. the majority of the individuals have an income lower than the national average.

³ Sheve (2004) and Jayadeva (2006) have established a positive relationship between the level of poverty and the preference for inflation in developed countries samples.

literature on the structural characteristics of economies conditioning the attitude of citizens towards inflation.

2.1 Attitude of the median voter towards inflation in developing countries

I analyze the attitude of the median voter towards money creation and stabilization policies (fiscal and trade openness policies) to deduce her attitude towards inflation. My analysis of the attitude of the median voter towards inflation is then based on her attitude towards the tools used to lower inflation. Both a low (high) aversion of the median voter against money creation, and a weak (high) preference of the median voter for stabilization policies represent an implicit preference (aversion) of the median voter for inflation. Thus theoretically, I suppose that money creation, and stabilization policies are the transmission channels of the effect of democracy on inflation.

2.1.1 Access to fundamental public goods and services and attitude of the median voter towards money creation

The citizens in developing countries have a limited access to the fundamental public goods (water, health, school, etc). This fact is less debatable and has motivated the commitment of the international community and developing countries leaders in 2000 in favour of the Millennium Development Goals (MDGs). The MDGs aim at reducing poverty by half by 2015 essentially, via the increase in public goods' provision in developing countries. In developing countries the access to public goods is more limited for the poorest citizens to which belonged the median voter. The quantity of public goods and services consumed by the median voter in developing countries is socially suboptimal. This suboptimality can be appreciated in terms of distances covered by the children of poor families to go to school, distances covered to have access to drinking water, to have access to the centers of health, etc. The less the quantity of public goods consumed by the median voter is, the lower is the utility of the median voter, because her utility is positive and increases with the consumed quantity of public goods provided by the government.

In developing countries, during the presidential and legislative elections, the median voter would express a high demand for fundamental public goods and services (water, health, school, etc) in order to improve her well being. The governments can decide to satisfy this demand for public goods. In developing countries, however, the financing of public goods by tax or by borrowing is limited. Indeed, in developing countries because of the limited capacity of saving of the households, the governments can only borrow in limited way on domestic market. The weak solvency of developing countries' governments limits their capacity of external borrowing. The structural and technological characteristics of developing countries reduce the capacity of tax levy. The inflation tax appears so, as the source of financing by which governments in developing countries can expect to quickly increase their expenditures (Cukierman et al., 1992; Edwards and Tabellini, 1991).

While focusing on the degree of accessibility to the fundamental public goods and services of the median voter, and by making the assumption of weak independence of the Central Banks in developing countries⁴, my theoretical reasoning makes it possible to make the following deduction: If a government in a developing countries aims at being maintained in office whereas its capacities of tax levy and borrowing are limited, this government can only resort to the seignuriage to satisfy the demand for public goods and services expressed by the median voter. The governments are more incited to resort to money creation to satisfy

⁴ The assumption of weak independence of the Central Banks is quite plausible in the context of developing countries. Indeed, Cukierman et al. (1992) show that the national Central Banks in underdeveloped countries are de facto slightly independent with respect to the chief of the executive.

the demand of the median voter for public goods since this demand can be interpreted as an implicit demand⁵ of the median voter for inflation. Likewise, a high demand for public goods by the median voter in developing countries can be interpreted as the revelation of a low aversion of the median voter against money creation. This interpretation appears justifiable if it is admitted that when the median voter does not have access to the basic public goods and services, its first concern is to be able to acquire these goods independently of the cost of their modes of financing.

Whatever the interpretation that the governments in developing countries can give to the demand for public goods by the median voter, my theoretical reasoning indicates that democracy can allow the majority of citizens in developing countries to express their preferences for public goods and services. Likewise, my theoretical reasoning makes it possible to show that when the governments aim to be maintained in power, they respond to the demand of the median voter for public goods by seignuriage because of the limited character of the other sources of financing of public expenditures in developing countries. The combination of these two arguments makes it possible to put forward the low aversion of the median voter against money creation as a first cause of a possible positive relationship between inflation and democracy in developing countries.

2.2 Results of macroeconomic stabilization policies and attitude of the median voter towards macroeconomic stabilization policies

The level of inflation is one of the measurements of macroeconomic stability used in the literature. Macroeconomic stabilization can be achieved by implementing sound monetary, fiscal, and exchange policies. These policies are considered as traditional stabilization policies (World Bank, 2005). Recent works however, show that trade openness, through various channels can also contribute to macroeconomic stabilization, in the sense that trade openness can contribute to lower inflation (Romer, 1993; Campillo and Miron, 1996, 1997; Lane, 1997; Rogoff, 2003).

I am interested in the attitude of the median voter towards macroeconomic stabilization policies in developing countries. By so doing, I mention two characteristics of macroeconomic stabilization policies in developing countries: *The uncertainty and the slow materialization of the results of stabilization policies*. These two characteristics of stabilization policies are due to several factors including the structural characteristics of developing countries,⁶ and influence the attitude of the median voter towards these policies.

The non acceleration and the uncertainty of the results of stabilization policies in developing countries can be highlighted while referring at the authors of *Economic Growth in the 1990s: Learning from a Decade of Reform*, World Bank (2005). The authors of this book admit that the economic reforms implemented in developing countries and inspired by the Washington consensus have generated disappointing results in the 1990s. Indeed, these authors admit that economic growth during the 1990s in developing countries was lower than expected. In Africa, for example, in spite of the implementation of the reforms and a rather favourable international environment, economic takeoff seems to have been absent. The few rare cases of success in Africa appeared fragile. In Latin America, despite economic reforms, the 1990s were marked by slow economic growth compared to the period 1950-1980. The few cases of Latin American success were completed by financial and exchange crises.

⁵ The notion of implicit demand for inflation can also be found in Gordon (1975). Gordon used this notion to characterize the preference of certain citizens for inflation tax to finance public expenditures.

⁶ For a recent development of the causes of the uncertainty and the slow materialization of macroeconomic stabilization policies results in developing countries, see World Bank (2005) and Rodrik (2006).

I can also mention cases of specific countries to illustrate the slowness and the uncertainty of the results of economic reforms in developing countries. Indeed, Nelson (1993) argues that the reforms undertaken at the end of the 1970s and 1980s in Chile and Mexico generated a rise in investments and economic growth only several years afterwards. In Bolivia, the reforms initiated in 1985 generated positive economic growth only in 1991.

If it is admitted that the results of stabilization policies are not accelerated and are uncertain in developing countries, the question is to know how these two characteristics can influence the attitude of the median voter towards the stabilization policies.

When the results of stabilization policies are not accelerated, they are less likely to be preferred by the median voter in developing countries. Indeed, as I mention it above, the median voter in developing countries is poor. Poverty can lead the median voter to have a high preference for the present: A poor median voter is a short-sighted individual who adheres with difficulty to the policies promising him a better future. This attitude of the median voter is more plausible as the results of these policies are not accelerated and are uncertain.

In addition, the non acceleration of the results of stabilization policy reduces the initial social support that the policy reform enjoys (Nelson, 1993). In this case, the stabilization policy has little chance to be continued which reduces the probability of the median voter to enjoy the results of stabilization policies. Indeed, the results of stabilization policies are diffused to all the social groups and the poorest in particular, only if the stabilization policies are fully implemented (Nelson, 1993; Hellman, 1998).

The uncertainty of the results of stabilization policies is not either a characteristic likely to cause the adhesion of the median voter to the stabilization policies developing countries. Indeed, the uncertainty of the results of stabilization policies reduces the probability of its continuation. As I mention it however, the more uncertain the full implementation of policy reform is, the less certain is the diffusion of the results of stabilization to the poorest people among which the median belongs.

When the effects of a policy are uncertain, the first positive results of this policy are probably captured by the political and/or economic elite. The feeling of frustration resulting from the accapuration by the elite of the first results of stabilization policy can involve socio-political instability and consequently, compromise the continuation of stabilization policy. Additionally, the uncertainty of the result of stabilization policy can involve a partial reform of which the consequence is the concentration of the first positive results of the reform in the hand of a minority of elite which blocks the continuation of the reform (Hellman, 1998).

The weak preference for stabilization policies of the median voter in developing countries can dissuade the governments of these countries from an effective implementation of stabilization policies when the political regimes become democratic. In this situation, democracy is likely to involve a rise in inflation because the governments will not undertake undesirable reforms for the median; this represents a threat for their maintenance in office.

I take as a starting point the median voter theorem to analyze the relation between inflation and democracy in the context of developing countries. In addition, I mention the structural characteristics of developing economies and the situation of poverty of the median voter, for better understanding of the relation between democracy and inflation in results. The combination of these various elements enables me to make the following empirically testable proposition:

In developing countries, democracy is likely to involve a rise in inflation because of the low aversion of the median voter for money creation and her weak preference for stabilization policies. Money creation can make it possible to finance the fundamental public goods and services to which the median voter has slightly access. The uncertainty and the slow materialization of the results of stabilization policies in terms of economic growth, make

difficult the continuation of stabilization policies, and thus reduce the diffusion of the results of stabilization policies to the poorest social group to which the median voter belongs.

3 Empirical Strategies

When one studies the relationship between inflation and democracy, the problem of endogeneity is the first that she/he might face. Indeed, a high level of inflation is likely to involve political and institutional instability. Historically the seizure of power by Hitler in 1933, the changes in political regimes in Brazil in 1964, Ghana and Indonesia in 1966, Chile in 1973, and Argentina in 1975 illustrate political changes due to high inflation rates. Beyond the simultaneity, the subjective character of the measurement of democracy level can involve measurement error likely to generate biased coefficients. In addition, an omission of relevant variables can induce biased results. So, the three traditional sources of endogeneity can be present in my regressions. To solve the endogeneity problem, I resort to instrumentation, using the date of independence as instrument for democratic institutions in my sample of 62 developing countries former extractive colonies including 32 African countries⁷.

The second problem in such study is the identification of the mechanisms through which democracy affects inflation. Indeed, inflation is the outcome of the macroeconomic policies pursued by a country and democracy is a political system conditioning the choice of these policies. Based on my theoretical arguments, I test the effect of democracy on the following macroeconomic policy variables: *fiscal balance, broad money, and trade openness*, but also the effect of these macroeconomic policy variables on inflation while considering their risk of endogeneity. So these macroeconomic policy variables are considered as potential channels by which democracy affects inflation.

My empirical strategy is mainly constituted of three steps. I initially estimate the bivariate relation between inflation and democracy, then I add the transmission channels variables, finally, I control for the other determinants of inflation evoked in the literature.

3.1 Theoretical arguments on the relationship between the date of independence and the quality of democratic institutions

The date of political independence can be considered as instrumental variable for democratic institutions in order to establish a causal relationship between inflation and democracy in my sample of developing countries. Indeed, it is hard to imagine another channel by which the date of independence can affect the level of inflation in a country, than only through its effect on the quality of political institutions of this country. Moreover, I mention three theoretical arguments likely to explain the relationship between the date of independence and democratic institutions. The first argument is based on the thesis of Acemoglu et al. (2001) related to the colonization strategies. The second argument is related to the ideological beliefs of post-colonial national political leaders. The last argument is related to the externalities of the timing of independence acquisition.

3.1.1 Quality of democratic institutions and date of independence: argument based on the thesis of Acemoglu et al. (2001)

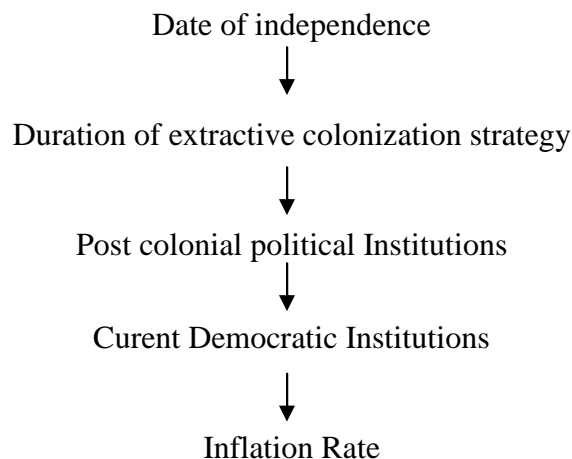
⁷ The choice of former colonies as my country sample is justified by the opportunity that this sample offers to me to have an instrumental variable resulting from natural experiment. Moreover, as I am interested in the analysis of the effect of democracy on inflation in developing countries, the choice of my sample is also justified because it is well representative of developing countries. Indeed, my sample comprises a big developing country, economically and demographically like India; emerging countries like Argentina, Brazil, and Singapore. Lastly, my country sample comprises an important number of African countries which are the poorest of developing countries. The list of these 62 countries is imposed to me by data availability.

Acemoglu et al. (2001) support that European colonialists had adopted different colonization strategies according to whether Europeans could settle in a colony. In colonies where Europeans faced high mortality rates, they could not settle and they set up extractive institutions⁸.

I argue that, the longer a country was under colonial administration, the more likely the country is to inherit bad institutions at the time of its independence. Indeed, the longer the colonial period lasts in a former extractive colony, the more persistent the strategy of extraction and the institutions of bad quality should be. Because the extractive colonization strategy, as described by Acemoglu et al. (2001), existed due to the implementation of institutions of bad quality. My assumption is correct if we admit that the extractive colonization strategy little changed in the course of time, since the climatic conditions did not change in the colonies. As Acemoglu et al. (2001) support it, however, the climatic conditions constituted an important factor for the definition of the strategies of colonization.

In addition, because of persistence of institutions a country which inherited institutions of bad quality at the time of its independence is very likely to have bad institutions today. Thus, the nature, the duration of extractive colonization strategy, and the persistence of institutions⁹ enable me to support the existence of a negative relationship between the date of independence and the quality of democratic institutions in the ex-colonies of extraction. In other words, I argue that the later an ex-colony of extraction acquires its independence, the less its democratic institutions should be of good quality.

The theoretical argument that I support, based on the thesis of Acemoglu et al. (2001) can be summarized by the following diagram:



3.1.2 Quality of democratic institutions and date of independence: argument based on countries' ideological choices

⁸ According to Acemoglu et al. (2001) the colonies from Africa, Latin America and Caribbean have tropical climate and so hostile to the survival of European colons. These colonies were extractive colonies and had inherited bad institutions from colonization. In opposite, United States, Canada, New Zealand, and Australia have climatic conditions near to the one of Europe. These colonies were colonies of settlement and so had inherited good institutions from colonization.

⁹ Acemoglu et al. (2001) mention among other factors, the lack of financial resources in the new independent countries, the lack of interests of the new local elite and the ex-colonial powers to explain the persistence of institutions in the ex-colonies.

The quality of democratic institutions depends on the institutional choices carried out by the countries and on the way in which the countries react with respect to their past mistakes. The institutional choices are sometimes justified by ideological beliefs¹⁰.

I argue that countries which soon acquired their political independence are countries which could carry out institutional choices earlier (even though these choices may not be free). These countries thus had time to observe the consequences of their choices, and to realize of the possible errors in their choices, this affects the trajectory of their countries' institutions are affected according to whether or not they correct their mistakes of institutional choices.

Through this argument, a positive or a negative relationship can be expected between the date of independence and the quality of democratic institutions, depending on the way in which the mistakes of institutional choices are managed. If the mistakes of institutional choices are reinforced in the course of time, then countries which soon acquired their independence are those which would record bad institutional scores. Conversely, if at a given time the mistakes of institutional choices are courageously corrected, this would modify positively the countries' institutional trajectory. In this case, the sooner a country acquires its political independence, the more likely the country in question would have good institutions today.

Countries can realize their mistakes of institutional choices by comparing their economic performances with those of their neighbours who carried out different institutional choices. Thus, for example, the North Korean leaders could have realized their mistakes of institutional choices by comparing their economic performances with those of their counterparts of South Korea. In West Africa, countries close to Ghana would have realized the institutional changes carried out by Ghana, and which contributed to the good economic performances of this country these last years. Indeed, it is interesting to note the current ghanean political stability and the fall (compared to the 1980s) in the number of young ghanean people in the close countries, carrying out odd jobs to ensure their survivals. This downward trend of the number of young ghanean in the close countries can be related to the improvement in the socio-economic conditions in Ghana thanks to the various institutional reforms that President Rawlings carried out.

Through these two examples, I do not contend that the leaders of the countries close to Ghana should have transposed in their own countries the same institutional changes carried out by Ghana, or that the North Korea should have copied the institutions of South Korea. I know that such transpositions are neither easy, nor necessarily effective¹¹.

The theoretical argument linking the date of independence to the quality of democratic institutions, because of the opportunity that the political independence offers to countries to carry out institutional choices is schematically summarized as follows:

¹⁰ Acemoglu et al. (2003, 2005) develop arguments on the importance of the differences in ideological beliefs likely to explain the difference in the quality of institutions among countries. In the same way, Piketty (1995) and Romer (2003) highlight the importance of the ideological beliefs for differences in countries' choices of economic policies.

¹¹ In addition, Acemoglu et al. (2003, 2005) show that for the problems of credibility of commitments between the elite and the citizens, the choice of good institutions and consequently that of institutional change can be difficult to be achieved. If the citizens are not convinced to effectively reap the share of the overall pie of institutional change that the elite promises them, the citizens will then oppose the institutional change. In the same way, the elite will not initiate institutional change if they are not convinced that the citizens will respect their commitments to give them their share of institutional change pie, even in the case of power loss.



3.1.3 Quality of democratic institutions and date of independence: argument based on the externalities of the time of acquisition of independence

I can mention arguments in favour of a positive relationship between the date of independence and the quality of institutions. These arguments are related to the positive externalities of the moment of acquisition of political independence.

Indeed, the later a country acquires its independence the more this country has opportunities to avoid the mistakes of the predecessor independent countries. Such an argument is valid by supposing for example, that the leaders of the countries having acquired later their independence could avoid undertaking policies which caused coups d'Etat in the first independent countries.

Likewise, the later a colonized country acquires its independence, the more the local civil servants of the colonial administration had time to improve their competences in management of public affairs. Such a situation can contribute indirectly to the formation of the local elite likely to ensure the management of the public affairs after the independence.

Lastly, a country which acquired its independence later could benefit from the externalities related to the international context. Thus, an independent country in the 1990s is more likely to inherit democratic institutions. The 1990s coincide with the fall of the Berlin Wall and mark the beginning of the will of the international community to spread democratic practices in the non democratic countries. On contrast, a country having acquired its independence at the time of the cold war can have institutions of bad quality without being disturbed by the Western powers as long as the country in question defends the same ideology as that of the Western powers. This is illustrated by the support brought by the United States to the dictator President Mobutu of the ex-Zaire which supported Savimbi in the fight against the communist regime of Angola during the period of the cold war.

Thus, while benefiting from the positive externalities related to the moment of independence, and because of the persistence of the quality of institutions, a country having acquired later its independence could inherit at the time of its independence good institutions which will persist. Schematically one obtains:



3.1.4 Empirical implications of the various theoretical arguments on the relationship between the quality of democratic institutions and the date of independence

The first and the third argument respectively envisage a negative and a positive relationship between the date of independence and democratic institutions. As for the second argument, it envisages a positive or a negative relationship between the date of independence and democratic institutions. Anyway, the mechanisms underlying the expected relationship between the date of independence and the quality of democratic institutions differ according to the argument used.

Indeed, according to the argument based on the thesis of Acemoglu et al. (2001), a negative relationship between the date of independence and democratic institutions should exist in the ex-colonies of extraction. Because the longer these ex-colonies lived under colonial administration, the more likely they would inherit from the colonial period an initial endowment of bad political institutions which persists in time.

As for the argument relating to the externalities of the moment of acquisition of independence, it envisages a positive relationship between the date of independence and democratic institutions. According to this argument, a country having acquired later its independence could benefit from the positive externalities of the moment of independence and inherit from the colonial period, good political institutions which persist in time.

Lastly, the argument relating to the institutional choices based on ideological beliefs envisages a positive or a negative relationship between the date of independence and democratic institutions, depending on the way in which the errors of institutional choices are managed. The mechanism underlying this argument envisages an independent relationship between the date of independence and the quality of the initial institutions inherited from the colonial period. According to this argument, the institutional choices carried out by the colonized countries and the way in which these countries are adjusted to their possible errors of choice after the independence, are the determining factors of the institutional trajectory of the colonized countries. Which of the three arguments and mechanisms will be consistent with the data? This is a question which can be answered empirically.

3.2 Specification of the empirical models and description of variables

The goal of this paper is to estimate the effect of democracy on the level of inflation in developing countries while correcting for the endogeneity of democracy. I then estimate the following equations:

$$\text{Log}(\text{infl}_{it}) = c + \alpha \text{Dem}_{it} + v_t + \varepsilon_{it} \quad (1)$$

$$\text{Dem}_{it} = c + \beta \text{Log}(\text{date}_i) + v_t + \sigma_{it} \quad (2)$$

$$\text{Dem}_{i0} = c + \delta \text{Log}(\text{date}_i) + v_t + \omega_{it} \quad (3)$$

$$\text{Dem}_{it} = c + \varphi \text{Dem}_{i0} + v_t + \mu_{it} \quad (4)$$

Equation (1) makes it possible to estimate the bivariate relationship between democracy and the rate of inflation. In this equation, $\text{Log}(\text{infl}_{it})$ is the natural logarithm of the rate of inflation in country i at time t . The data on the rate of inflation are obtained from WDI (2005) database. The annual inflation rate measures the annual change in the index of the consumer price. Dem_{it} corresponds to the index of democracy in country i at time t . This index is obtained from Polity IV database and corresponds to the Polity 2 variable, varying from -10 to +10. This index is the measurement of the level of democracy corrected for the degree of dictatorship of a political regime. The Polity 2 index measures the degree of political pluralism, the competition in the election of the chief executive, and constraints on the chief executive. A high value of this index especially when it is positive indicates a high level of democracy. V_t corresponds to the temporal fixed effects, ε_{it} to the error term, and c is the constant.

My theoretical arguments envisage a positive relationship between democracy and the rate of inflation in developing countries; I therefore expect a positive coefficient α . The choice of the functional form of equation (1) enables me to reduce the weight of outliers in the estimates i.e. observations corresponding to very high rates of inflation, but also to take into account the nonlinearity in the relationship between inflation and democracy. I choose to estimate the relationship between democracy and inflation with five years pooled data while considering temporal fixed effects. The choice of such technique of estimate has some advantages.

Indeed, thanks to the inclusion of temporal fixed effects, I can control for events such as the oil crises which involved a rise in the prices in the world. Likewise, through time, the economies succeeded to better control of inflation due to the improvement in practices of Central Banks and the increase in trade openness (Rogoff, 2003). These two factors, according to Rogoff, affected all the economies in the world. So ignoring them could involve a bias in favour of democracy since the level of democracy also improved in the course of time almost everywhere in the world. Thus, taking into account time fixed effects, makes it possible to reduce the bias due to omitted variables. The reduction in the bias of omitted variables reduces the bias in the coefficients but the establishment of a causal relationship between inflation and democracy requires the use of a technique of instrumentation that is why I also run the models of equations (2), (3) and (4).

Equation (2) is the first stage equation and makes it possible to estimate the effect of the date of independence on democratic institutions. The data on the date of independence are obtained from CIA Factbook (2005) and CD Rom Atlas Universal Larousse (2003). In case of divergence between the two sources, I consider the date of political independence which corresponds to the total absence of colonial presence in a country. Equation (2) comprises temporal fixed effects, which take into account factors which involved movements of democratization in various countries. These events are for example the fall of the Berlin Wall in 1989, or the speech at Baule of François Mitterrand in 1990, inviting all the French-speaking African countries to be democratized in order to continue benefiting from the French government aid for development. While estimating equation (2), I can identify which of the three arguments relating to the relationship between the date of independence and democracy will be revealed consistent with the data.

Equation (3) makes it possible to estimate the effect of the date of independence on the initial endowment in countries' democratic institutions. Through this equation, I try to know whether the fact of acquiring independence later is an advantage or a disadvantage for the acquisition of good democratic institutions at the time of independence. A negative δ indicates that countries having acquired later their independence would have inherited democratic institutions of lower quality. Conversely, a positive δ indicates that the later a country acquires its independence; the better its initial endowment in democratic institutions is. Equation (3) thus makes it possible to identify the mechanism underlying each argument relating to the relationship between the date of independence and the initial quality of democratic institutions. In equation (3), Dem_{i0} corresponds to the measurement of the level of democracy the year country i becomes independent.

Equation (4) makes it possible to test the assumption of the persistence of institutions. A positive φ indicates that countries having acquired good (bad) democratic institutions at the time of their independence are more likely to have good (bad) democratic institutions over the period 1960-2003. By confronting the results of equation (3) and (4) I can find an explanation to the result which I will obtain from equation (2).

The results of equation (1) without instrumentation will be presented beside those obtained after instrumentation, which makes it possible to test the robustness of my results and especially to identify the source of endogeneity in my data. Equation (3) will also be estimated with a probit model. In this case, the explained variable is a dummy variable taking the value of one if country i has a positive institutional score at independence, and zero otherwise.

I run all the models with my full sample of 62 developing countries former extractive colonies with data covering the period 1960-2003. The list of the countries as their dates of independence is in appendix¹².

3.3 Results

Table 1 presents the result of the effect of democracy on inflation. Column (2) of table 1 indicates that after instrumentation (2SLS), democracy positively and significantly affects inflation in developing countries ex-colonies of extraction. The comparison of the result of column (1) with that of column (2) of table 1 indicates that, democracy would be endogenous because of measurement errors in the quality of democratic institutions, since in OLS the coefficient associated with democracy is lower than its value in 2SLS.

The first stage result in column (3) of table 1 shows that the date of independence is a satisfactory instrumental variable for democratic institutions. Indeed, the coefficient associated with the date of independence in this equation is very significant, with a t-Student equal to 6, and the R-squared of the first stage equation is 0.19. In addition, a deep diagnosis of the quality of the instrumental variable indicates that the date of independence is not a weak instrument for democratic institutions. Indeed, according to the criterion of Stock and Yogo (2002, 2005), an instrumental variable is known as weak if the F-statistic of the first stage is lower than 10, when the model contains only one endogenous variable. In my case,

¹² In appendix, one can also find the descriptive statistics of the variables used in this paper and graph 1 which illustrates the relationship between inflation and democratic institutions in my total sample of developing countries over the period 1960-2003. It appears in graph 1, a rise in inflation since 1974 until 1994, and a beginning of fall in inflation since 1995. As for the index of democracy, it records an improvement in its value at the beginning of the 1980s. Broadly one observes a positive relationship between democracy and inflation from 1975 to 1994, and a negative relationship between the two variables from 1995 to 2003.

the F-statistic is equal to 14.1 which shows that the date of independence is a good instrument for democratic institutions in my sample of developing countries¹³.

Table 1: Results of bivariate relationship between inflation and democracy 1/

	OLS (1)	2SLS (2)	OLS (3)	OLS (4)	Probit (5)	OLS (6)
	Log (infl)	Log (infl)	Dem	Dem0	Dem0	Dem
Dem	0.013 (1.63)	0.178 (4.20)***				
log (date)			-47.918 (6.02)***	47.213 (9.12)***	21.392 (8.19)***	
dem0						0.425 (10.19)***
Constant	1.256 (6.70)***	1.419 (5.39)***	360.894 (6.07)***	-357.869 (9.18)***	-162.217 (8.20)***	-0.192 (0.29)
Number of observations	469	469	469	558	558	543
R ²	0.21	-	0.19	0.08	0.16	0.29
F-statistic	-	-	14.10***	-	-	-
Log of vraisemblance	-	-	-	-	-305.015	-

Note: ***, denote significant coefficients at the threshold of 1%. The figures in bracket are t-Student robust to the heteroskedasticity.

1/ The estimates are carried out with my sample of 62 developing countries ex-colonies of extraction. Column (3) corresponds to the first stage equation, i.e. that of the regression of the index of democracy on the date of independence. The F-statistic of the first stage is higher than 10, which shows that the date of independence is not a weak instrument for democratic institutions according to the criterion of Stock and Yogo (2002, 2005). The estimates contain temporal dummies of which coefficients are not shown. *Dem0* measures the level of democracy the year a country of my sample acquires its independence.

The first stage indicates a negative relationship between the date of independence and the quality of democratic institutions: countries having acquired later their independence are those which have bad democratic institutions over the period 1960-2003. Such a result is the one envisaged by my argument based on the thesis of Acemoglu et al. (2001), and is illustrated by graph 2 in appendix. This result does not mean necessarily that democratic institutions would have been of better quality if independence had intervened earlier in the ex-colonies of extraction. Indeed, nobody knows what would have happened.

The question is to know which mechanisms underlying the various arguments relating to the relationship between the date of independence and the quality of democratic institutions is consistent with my data. The mechanism based on the thesis of Acemoglu et al. (2001) envisages a negative relationship between the date of independence and the initial endowment in democratic institutions. As one can note in columns (4) and (5) such a prediction is not consistent with the data. Indeed, the results of these columns indicate a positive relationship between the date of independence and the initial quality of democratic institutions: countries having acquired later their independence are those which have inherited at the time of their independence relatively good democratic institutions. This result is unexpected and can be due to the quality of the measurement of the level of democracy during the independence years. Graph 3 in appendix illustrates the relationship between the date of independence and the initial endowment in democratic institutions. Column (6) of table 1 indicates the

¹³ I qualitatively obtain the same results when I use the number of years since independence, instead of the independence date as instrument for democratic institutions. The difference is that the link between democracy and the number of years since independence is positive. So the sooner a former extractive colony acquires its independence, the better its democratic institutions are. This result is not shown but is available upon request.

persistence of democratic institutions: countries which would have inherited good (bad) democratic institutions at independence are also those which would have good (bad) democratic institutions over the period 1960-2003.

The results of table 1 indicate a positive relationship between the date of independence and the initial countries' endowment in democratic institutions. The same results indicate the persistence of democratic institutions. Then, how can one understand the negative relationship between the date of independence and the quality of democratic institutions in my sample? Such a result means a negative reversal of democratic institutions in the countries, i.e. countries having inherited good democratic institutions at independence are those which have bad democratic institutions over the period 1960-2003. Such an inversion of situation is not consistent with my data, since these data indicate the persistence of democratic institutions.

None of my arguments or of the mechanisms underlying these various arguments completely explains the relationship between the date of independence and the quality of democratic institutions. The argument based on the thesis of Acemoglu et al. (2003) envisages a negative relationship between the date of independence and the quality of institutions, because of an initial endowment of bad democratic institutions that countries having acquired their independence later, would have inherited. On contrary, the data show that countries having acquired their independence later would have inherited relatively good democratic institutions at the time of their independence, as the argument based on the positive externalities of the moment of independence envisages it. However, this last argument too, does not completely explain my results, since it envisages a positive relationship between the date of independence and the quality of democratic institutions because of the persistence of institutions. This is not the case although the persistence of institutions is, indeed a phenomenon which is present in the data. The third argument relating to the relationship between the date of independence and the quality of democratic institutions envisages an independent relationship between the date of independence and the initial endowment in institutions of the countries. Such a result is not obtained because the data indicate a positive and *significant* relationship between the date of independence and the level of democracy at independence year.

The data that I have at my disposal do not allow me to explain empirically and completely, the relationship between the date of independence and democratic institutions through the various arguments and mechanisms that I mentioned earlier. However, it appears that the date of independence highly predict the quality of democratic institutions, and the application of the criterion of weak instrument reveals the good quality of the date of independence as instrumental variable for democratic institutions, which is rather reassuring for the analysis that I carry out.

I obtain a positive bivariate relationship between democracy and inflation as predicted by my theoretical arguments. I argue that it is a causal relationship since it results from a technique of instrumentation using an instrumental variable which is revealed to be good. The question is to know if the positive relationship between inflation and democracy is robust.

3.3.1 Robustness checks

The change in the functional form is the first robustness check¹⁴ that I carry out. At the place of the logarithm of the rate of inflation as explained variable, I consider the following transformation: $\pi_{it}/(1 + \pi_{it})$ suggested by Cukierman et al. (1992, 2000), π_{it} is the rate of inflation in country i at time t . This transformation according to Cukierman has the advantage of reducing the heteroskedasticity of the error while reducing the weight of outliers without involving a loss of observations.

¹⁴ The results of the robustness checks are not shown but are available upon request.

The second functional form that I consider is the level of inflation rate. In this case, no transformation is applied to the rates of inflation. In spite of these changes in functional form, the positive causal relationship between inflation and democracy remains.

I consider the deflator of GDP as a measurement of inflation rate. In this case too, the positive bivariate relationship between inflation and democracy remains unchanged. The use of the deflator of GDP as a measurement of inflation rate reduces the possibility that the positive link between inflation and democracy that I obtain, could be due to the control of consumer price which is more likely in dictatorship than in democracy.

I test the robustness of my results compared to the changes in the index of democracy. At the place of the index of democracy from Polity IV, I consider the index of constraint on the executive also obtained from Polity IV, as a measurement of democracy. In this case too, the positive effect of democracy on inflation remains. I also use the index of democracy from Freedom House (political right), as a measurement of democracy, which does not change my result about the positive relationship between democracy and inflation.

From 1960 to 2003, obviously, developing countries did not live under democratic regimes during the whole period. It is at the end of the 1980s that a number of developing countries started being democratized. My result could thus be due to the mixture of periods of dictatorship and democracy, in order to avoid this situation I run the model with data covering only the period 1980-2003. The positive relationship between inflation and democracy also remains unaffected by this change of period of analysis.

I test the robustness of my results compared to the level of inflation because it may be that for very high rates of inflation, democracy does not have any significant effect on inflation. Thus, I carry out estimates with only the observations of which the value is higher than the median value of the logarithm of the rate of inflation in my sample. With this reduced number of observations, I also obtain a positive relationship between inflation and democracy.

My sample includes countries which have institutional organizations predisposing them to record low rates of inflation. This is the case of African Franc Zone countries which for political and historical reasons, have regional Central Banks, what would have contributed to lower inflation in these countries. Thus, my result could be due to the high variability of the rate of inflation in my total sample. I thus estimate the relationship between inflation and democracy while excluding from my sample African countries of Franc Zone. In this reduced sample, I also obtain a positive relationship between inflation and democracy.

Overall, the positive relationship between inflation and democracy is robust. By which mechanisms does democracy involve such a result in developing countries former extractive colonies?

3.4 Mechanisms of transmission of the effect of democracy on inflation

3.4.1 Effects of democracy on macroeconomic policies and of macroeconomic policies on inflation

Theoretically, I argue that democracy involves a rise in inflation in developing countries because of the difficulties that it could generate for the control of money supply and/or for the implementation of macroeconomic stabilization policies. In addition, the rate of inflation in a country reflects the economic policies pursued by this country, and democracy is a political regime conditioning the choice of economic policies. So it appears judicious to test the effect of democracy on the following macroeconomic policies: *monetary, fiscal, and trade openness policies*.

The monetary policy is approximated by the logarithm of the growth rate of money supply [$\log(\text{broad money growth})$] obtained from WDI (2005), the fiscal policy is measured by the fiscal balance (revenues - expenditures), obtained from IFS and World Bank African

database (2005), and the trade openness policy is measured by the sum of exports and imports and is extracted from WDI (2005). All the proxy for macroeconomic policies (except the proxy for monetary policy) are expressed as a percentage of GDP. These three variables represent sufficiently the macroeconomic policies of a country, and their use enables me to decide between my various theoretical arguments. Indeed, through the effect of democracy on the monetary policy, I will know if democracy involves or not difficulties for the control of money supply. The effects of democracy on fiscal and trade openness policies make it possible to know if it is more difficult or not to set up stabilization policies when developing countries become democratic. I then estimate, the following equations:

$$Mon_{it} = c + \eta Dem_{it} + v_t + \omega_{it} \quad (5)$$

$$SB_{it} = c + \gamma Dem_{it} + v_t + \theta_{it} \quad (6)$$

$$Ouv_{it} = c + \lambda Dem_{it} + v_t + \phi_{it} \quad (7)$$

In equation (5), the explained variable is the growth rate of broad money. In this equation if democracy makes more difficult the control of money creation, the coefficient associated with democracy should be positive and significant. In equation (6), the explained variable is fiscal balance. The difficulties associated with setting-up sound fiscal policy when developing countries are democratized would appear through a negative coefficient on democracy in equation (6). Lastly, in equation (7), the dependent variable is trade openness. If democratized developing countries have more difficulties to implement trade liberalization, the coefficient associated with democracy should be negative and significant in equation (7).

I estimate these various equations with my full sample. I instrument democratic institutions with the date of independence in order to establish a causal relationship between democracy and the macroeconomic policy variables because of the risk of endogeneity of democratic institutions.

It is important to note that, I cannot say that the macroeconomic policy variables which I identify are good transmission channels of the effect of democracy on inflation, if these same variables do not significantly affect inflation. This justifies the interest for isolating the effect of the various macroeconomic policy variables on inflation through the following equation:

$$Log(\inf l_{it}) = c + \xi Pol\ macro_{it} + v_t + \rho_{it} \quad (8)$$

In equation (8), the independent variable can be one of the macroeconomic policy variables that I mention above. For years, the positive effects of money supply and public deficit on inflation are more or less admitted in the literature, at least theoretically, even though the empirical relations are far from being obvious. In contrast, the effect of trade openness on inflation emanates from relatively recent works, and these various works envisage and establish a negative effect of trade openness on inflation (Romer, 1993; Campillo and Miron, 1996, 1997; Lane, 1997; Rogoff, 2003).

I estimate equation (8) by instrumenting the various macroeconomic policy variables to take into account the risk of their endogeneity. Therefore, I use the instrument of Frankel and Romer (1999) for trade openness¹⁵, the one year lagged value of the log of broad money growth as instrument for monetary policy, and the one year lagged value of fiscal balance as

¹⁵ This instrument corresponds to the predicted value of trade openness due to the individual countries' geographical characteristics. Frankel and Romer (1999) use this instrumental variable to estimate the effect of trade openness on economic growth. I think that such an instrument can also be valid if it is used to establish a causal relationship between trade openness and inflation.

instrument for fiscal policy. A positive relationship between trade openness and the instrument of Frankel and Romer (1999) is expected, a positive relationship between the growth rate of broad money and its lagged value is also expected because of the inertia of monetary policy. Because of the inertial character of fiscal policy, I also expect a positive relationship between the fiscal balance and its lagged value. The use of the lagged variable as instrumental variable is valid only if the errors are not correlated. Fortunately, the absence of autocorrelation of the residuals in pooled data is less doubtful (Wooldridge, 2002, chapter 6).

The results in table 2 indicate that in 2SLS, democracy involves a significant rise in money supply; it involves a significant improvement in fiscal balance, and reduces trade openness in my sample of developing countries ex-colonies of extraction. Democracy thus has differentiated effects on macroeconomic policies¹⁶.

Table 2: Effects of democracy on macroeconomic policies 1/

	OLS (1)	2SLS (2)	OLS (3)	2SLS (4)	OLS (5)	2SLS (6)
	Mon	Mon	Fiscal	Fiscal	Open	Open
dem	0.013 (1.51)	0.058 (2.21)**	0.002 (4.07)***	0.007 (4.47)***	0.005 (2.15)**	-0.046 (4.58)***
Constant	3.030 (11.91)***	2.690 (23.51)***	-0.037 (1.54)	-0.014 (1.30)	0.526 (11.77)***	0.743 (10.78)***
Number of Observations	509	509	439	439	503	503
F-statistic	-	20.97***	-	15.48***	-	20.67***
R ²	0.06	-	0.04	-	0.05	-

Note: ***, ** denote significant coefficients respectively at the thresholds of 1% and 5%. The figures in bracket are t-Student robust to the heteroskedasticity.

1/ The estimates are carried out with the full sample of 62 developing countries former extractive colonies. The estimates contain temporal dummies of which coefficients are not shown. The F-statistics are those of the first stage for which the full results are not shown and are available upon request.

It appears that, the rise in money supply would not be the only cause of the positive effect of democracy on inflation, but also the difficulties related to the implementation of trade liberalization policy that democracy generates, would be an additional source of the positive effect of democracy on inflation in developing countries. The rise in money creation for electoral reasons that democracy could cause in developing countries, as one could fear it, seems to be confirmed in my data. Indeed, in spite of the fall in public deficit that democracy causes, democracy also involves a significant rise in money supply in my sample. This result could be interpreted as the manifestation of the syndrome of financing of extra budgetary expenditures that democracy would generate in developing countries.

Table (3) presents the results of the separate effect of each macroeconomic policy on inflation. Through this table, it appears that all the macroeconomic policies exert their expected effects on inflation in my sample. The rise in money creation positively affects inflation; the improvement in the fiscal balance reduces inflation, as does the rise in trade openness. The coefficients associated with the various macroeconomic policy variables are significant at the threshold of 1%.

The first stage equations indicate that the instruments exert their expected effects on the various macroeconomic policy variables. Indeed, through the first stage equations it appears a positive relationship between the growth rate of money supply and its lagged value.

¹⁶ Similar results are obtained while using 3SLS, to take account the correlation between the errors of the equations of the effects of democracy on the various macroeconomic policy variables.

Table 3: Effects of macroeconomic policies on inflation 1/

	2SLS (1)	OLS (2)	2SLS (3)	OLS (4)	2SLS (5)	OLS (6)
	Log (infl)	Mon	Log (infl)	Fiscal	Log (infl)	Open
mon	0.841 (7.33)***					
lagged mon		0.513 (6.87)***				
fiscal			-7.075 (2.61)***			
lagged fiscal				0.669 (8.93)***		
open					-1.617 (7.56)***	
Frankel & Romer instrument						1.497 (22.12)***
Constant	-0.524 (1.49)	1.671 (8.19)***	1.914 (14.49)***	-0.002 (1.17)	1.972 (8.76)***	0.226 (7.85)***
Number of observations	422	422	369	369	452	452
F-statistic	-	15.11***	-	13.65***	-	61.08***
R ²	0.38	0.37	0.18	0.49	0.27	0.44

Note: ***, denotes significant coefficients at the threshold of 1%. The figures in bracket are t-Student robust to the heteroskedasticity.

1/ The estimates are carried out with my whole sample of 62 developing countries former extractive colonies and contain temporal dummies of which coefficients are not shown. Lagged money is the lagged value of the logarithm of broad money growth. Lagged fiscal is the lagged value of fiscal balance as percent of GDP. The OLS estimates are the results of first stage equations.

The lagged value of fiscal balance exerts a positive effect on the current fiscal balance which illustrates the inertia of fiscal policy. Lastly, the instrument of Frankel and Romer (1999) positively and significantly affects trade openness. The analysis of F-statistic of the first stage equations indicates that none of the instrumental variable for the macroeconomic policies can be regarded as a weak instrument according to the criterion of Stock and Yogo (2002, 2005).

Therefore, I show that democracy affects macroeconomic policies, and that macroeconomic policies also affect inflation in my sample of developing countries former extractive colonies. So, one can admit that the macroeconomic policy variables that I consider can be the transmission channels of the effect of democracy on inflation. The question is to know whether the positive effect of democracy on inflation will remain once I consider the effects of these various macroeconomic policy variables.

3.4.2 Simultaneous effects of democracy and macroeconomic policies on inflation

Table 4 indicates that taking into account the effects of macroeconomic policies does not affect the positive relationship between democracy and inflation in my sample of developing countries ex-colonies of extraction. Whatever the macroeconomic policy considered the effect of democracy on inflation remains positive and significant. Thus, at this stage it seems that democracy has an independent and positive effect on inflation: democracy exerts another effect on inflation than the one due only to the various macroeconomic policy variables that I consider. Moreover, the results of table 4 show that all the macroeconomic policy variables exert a significant effect on inflation and the coefficients associated with these macroeconomic policy variables have their expected signs. In table 4, it appears that independently of the first stage equation considered, the hypothesis of weak instrumental variables is rejected.

The independent effect of democracy is subject to the same robustness checks as its direct effect on inflation. In this case, in spite of the changes in functional forms, measurement of inflation, index of democracy, level of inflation, period of analysis, and

samples, the positive and independent effect of democracy on inflation remains overall robust. These results are not shown but are available upon request.

Table 4: Simultaneous effects of democracy and macroeconomic policies on inflation 1/

	2SLS (1)	2SLS (2)	2SLS (3)
	Log (infl)	Log (infl)	Log (infl)
dem	0.084 (2.92)***	0.265 (3.93)***	0.064 (1.73)*
mon	0.741 (5.69)***		
fiscal		-19.470 (3.28)***	
open			-2.402 (5.60)***
Constant	-0.668 (1.65)*	2.142 (6.39)***	2.263 (7.56)***
Number of observations	399	349	431

First Stage Equations

	OLS (1)	OLS (2)	OLS (3)	OLS (4)	OLS (5)	OLS (6)
	Dem	Mon	Dem	Fiscal	Dem	Open
log (date)	-54.257 (6.86)***	-2.474 (1.95)*	-48.039 (5.21)***	-0.097 (2.18)**	-49.211 (5.85)***	1.406 (4.85)***
lagged money growth	0.074 (0.29)	0.502 (6.54)***				
lagged fiscal balance			24.022 (3.39)***	0.670 (8.65)***		
instrument of Frankel & Romer					3.602 (1.12)	1.471 (9.69)***
Constant	408.575 (6.23)***	19.880 (2.08)**	369.276 (5.19)***	0.74 (2.18)**	371.655 (5.86)***	-10.379 (4.75)***
R ²	0.20	0.36	0.21	0.51	0.19	0.30
Instruments quality diagnosis						
Cragg-Donald statistic 2/	16.96		9.83		13.59	
Critical values (r = 0.1)	7.03		7.03		7.03	
Critical values (r = 0.15)	4.58		4.58		4.58	

Note: ***, **, * respectively denote significant coefficients at the thresholds of 1%, 5%, and 1%. The figures in brackets are t-Student robust to the heteroskedasticity.

1/ The estimates are carried out with the total sample of 62 developing countries former extractive colonies and contain temporal dummies of which coefficients are not shown. Lagged money is the lagged value of the logarithm of broad money growth. Lagged fiscal balance is the lagged value of fiscal balance as percent of GDP.

2/ The statistic of Cragg Donald (1993) is suggested by Stock and Yogo (2002, 2005) for weak instruments test. This statistic is used when a model comprises more than one endogenous variable. If the calculated statistic is lower than the tabulated statistic of Cragg Donald, this indicates that the instruments could suffer from certain weaknesses according to the size of error (r) which the author admits.

3.5 Taking into account the other determinants of inflation

Until now I estimate the effects of democracy and macroeconomic policies on inflation without considering the effects of the other determinants of inflation. Such a situation can involve a bias in my results due to omitted variables. So I need to control for the other determinants of inflation.

Referring to the article of Cukierman et al. (1992), I control for the variables characterizing the structure of economies. These variables correspond to the GDP per capita obtained from Pen World Table 6.2, to the share of the agricultural production in the GDP obtained from WDI (2005), and to the rate of urbanization also obtained from WDI.

Table 5: Effects of democracy, macroeconomic policies, and other determinants on inflation 1/

	2SLS (1)	2SLS (2)	2SLS (3)	2SLS (4)
	Log (infl)	Log (infl)	Log(infl)	Log (infl)
dem	0.029 (0.67)	0.228 (3.49)***	0.012 (0.23)	0.135 (2.86)***
mon	0.563 (4.63)***			
fiscal		-16.916 (2.88)***		
open			-1.875 (3.90)***	
Economic structure				
lagged inflation	0.006 (0.63)	0.025 (1.64)*	0.028 (2.23)**	0.025 (1.93)*
log (gdp)	-0.551 (2.93)***	-0.522 (1.92)*	-0.281 (1.22)	-0.856 (3.78)***
agriculture	0.768 (1.28)	3.384 (2.52)**	-0.182 (0.19)	2.035 (2.22)**
urbanization	2.859 (4.90)***	2.743 (2.73)***	2.066 (2.93)**	3.682 (5.06)***
Political institutions duration				
lagged political regime stability	-0.001 (0.15)	-0.019 (2.43)**	-0.006 (1.34)	-0.008 (1.68)*
Economic situation				
lagged gdp growth rate	-0.020 (1.10)	-0.006 (0.15)	-0.015 (0.70)	-0.009 (0.36)
terms of trade	0.253 (1.81)*	0.092 (0.26)	0.037 (0.17)	0.323 (1.17)
Constant	1.847 (1.40)	3.461 (1.86)*	5.180 (3.59)***	7.050 (4.40)***
Number of observations	292	254	312	313

First stage equations

	OLS Dem (1)	OLS Mon (2)	OLS Dem (3)	OLS Fiscal (4)	OLS Dem (5)	OLS Open (6)	OLS Dem (7)
log (date)	-52.466 (4.06)***	-5.197 (2.52)**	-50.429 (3.72)***	-0.051 (0.85)	-49.667 (4.05)***	2.138 (3.98)***	-51.956 (4.15)***
lagged money	0.214 (0.75)	0.503 (5.36)***					
lagged fiscal			19.447 (2.21)**	0.573 (6.46)***			
Frankel & Romer instrument					2.313 (0.64)	1.453 (10.01)***	
Constant	392.251 (3.96)***	41.242 (2.61)**	379.678 (3.65)***	0.354 (0.78)	370.374 (3.92)***	-16.185 (3.80)***	387.962 (4.02)***
R ²	0.29	0.38	0.29	0.46	0.29	0.46	0.29
Instruments quality diagnosis							
Cragg-Donald statistic (1993) 2/		6.11		5.56		6.04	
Critical values (r = 0.1)		7.05		7.05		7.05	
Critical values (r = 0.15)		4.58		4.58		4.58	
F-statistic							13.78***

Note: ***, **, * denote significant coefficients respectively at the thresholds of 1%, 5%, and 1%. The figures in bracket are t-Student robust to the heteroskedasticity.

1/ The estimates are carried out with the total sample of 62 developing countries former extractive colonies and contain temporal dummies of which coefficients are not shown. Lagged money is the lagged value of the logarithm of broad money growth. Lagged fiscal is the lagged value of fiscal balance as percent of GDP.

2/ The statistic of Cragg Donald (1993) is suggested by Stock and Yogo (2002, 2005) for weak instruments test. This statistic is used when a model comprises more than one endogenous variable. If the calculated statistic is lower than the tabulated statistic of Cragg Donald, this indicates that the instruments could suffer from a certain weakness according to the size of error (r) which one is ready to admit.

The first stage equations contain the other exogenous explanatory variables of the model. The coefficients associated with these variables are not shown in order to save space.

Countries with high GDP per capita lay out more capacity of tax levy and resort less to the seignuriage. A high urbanization would facilitate the tax levy and could contribute to the control of inflation, but it can also cause a development of informal activities contributing thus to a rise in inflation. A significant share of the agricultural production in the GDP means a dense agricultural sector and consequently a significant share of the richness of a country escaping the tax authorities, which should contribute to the rise in inflation. I also control for the passed inflation to take into account, to a certain extent, the social preferences for inflation or the persistent aspects of the factors that determine inflation (Campillo and Miron, 1996, 1997).

I also control for the variables characterizing the duration of political institutions. It is about variable measuring the stability of political regime obtained from Polity IV. Cukierman et al. (1992) show that, the instability of political regime positively affects inflation. In order to reduce the simultaneity errors, I consider the lagged value of the political regime stability.

Lastly, I control for the variables of economic situation. Based on the Philips curve theory, I control for the lagged economic growth and expect a negative effect of economic growth on inflation. Indeed, during a period of economic growth, unemployment should drop and consequently, the need for the policy makers to resort to surprise inflation should be reduced. Likewise, it is easier to stabilize an economy during the period of economic expansion than during the period of recession, by cutting government expenditures.

As one can note in table 5, while taking into account the other determinants of inflation, the effect of democracy on inflation remains positive but no significant except in the specification with fiscal policy. The independent effect of democracy on inflation disappears once the effects of the other determinants of inflation are taken into account. However, as it appears in column 4 of table 5, while controlling for the other determinants of inflation without taking into account the effect of any of the macroeconomic policy variables, I continue to obtain a *positive and significant* effect of democracy on inflation¹⁷. This illustrates once again that the macroeconomic policy variables which I consider are good transmission channels of the effect of democracy on inflation in my sample.

In my sample of developing countries former extractive colonies, the variables of economic structure and duration of political institutions significantly affect inflation. So my results are close to those of Cukierman et al. (1992) who find significant effects on seignuriage of political instability and economic structure variables. The persistence of inflation is a phenomenon that I find in my sample of developing countries. This result is close to the one of Loungani and Swagel (2001) who also find the persistence of inflation in a group of developing countries. In opposite, it seems that the economic situation variables do not have any significant effect on inflation once the effects of democracy and those of the other determinants of inflation are taken into account. The economic situation variables, however, have their expected sign whatever the specification considered.

3.6 Additional tests of validity of the instruments

The use of the criteria of weak instrumental variables suggested by Stock and Yogo (2002, 2005) shows that the date of independence is a good instrument for democratic institutions. In this subsection, I will apply additional tests for the validity of the main results of this paper.

Firstly, in addition to the date of independence, I also use the instrument suggested by Acemoglu et al. (2001), the rate of mortality of the colons, as an additional instrument for

¹⁷ I obtain the same result when I use the log of colons mortality rates from Acemglu et al. (2001) as instrument for democratic institutions instead of the independence date. Result not shown but available upon request.

Table 6: Results of additional tests of validity of the instruments

	2SLS (1)	2SLS (2)	2SLS (3)	2SLS (4)	2SLS (5)	2SLS (6)	2SLS (7)	2LS (8)
	Log (infl)	Log (infl)	Log (infl)	Log (infl)	Log (infl)	Log (infl)	Log (infl)	Log (infl)
dem	0.027 (0.96)	0.131 (3.72)***	0.019 (0.77)	0.089 (3.16)***	0.025 (0.71)	0.079 (1.95)*	0.023 (0.77)	0.057 (1.60)
mon	0.564 (4.70)***				0.565 (4.69)***			
fiscal		-12.063 (2.84)***				-11.833 (3.15)***		
open			-1.854 (4.26)***				-1.892 (3.52)***	
log (date)	-	-	-	-	-0.201 (0.07)	-7.291 (2.35)**	0.570 (0.18)	-4.059 (1.34)
Observations	292	254	312	313	292	254	312	313

First Stage Equations

	OLS Dem (1)	OLS Mon (2)	OLS Dem (3)	OLS Fiscal (4)	OLS Dem (5)	OLS Open (6)	OLS Dem (7)	OLS Dem (8)	OLS Mon (9)	OLS Dem (10)	OLS Fiscal (11)	OLS Dem (12)	OLS Open (13)	OLS Dem (14)
log (date)	-46.423 (3.56)***	-4.658 (2.42)**	-48.669 (3.61)***	-0.053 (0.87)	-44.908 (3.76)***	2.141 (3.84)***	-46.081 (3.68)***	-	-	-	-	-	-	-
log (mortality rate)	-1.948 (4.57)***	-0.174 (2.86)***	-2.078 (4.60)***	0.002 (0.72)	-2.219 (5.24)***	-0.001 (0.07)	-1.976 (4.99)***	-1.948 (4.57)***	-0.174 (2.86)***	18.777 (2.12)**	0.002 (0.76)	7.745 (2.33)***	-0.001 (0.07)	-1.976 (4.99)***
lagged money growth	0.306 (1.04)	0.511 (5.67)***						0.306 (1.04)	0.511 (5.67)***	-	-	-	-	-
lagged fiscal balance			18.778 (2.12)**	0.574 (6.55)***						-2.078 (4.60)***	0.574 (6.55)***	-	-	-
Frankel & Romer instrument					7.745 (2.33)***	1.457 (10.09)***	-	-	-	-	-	-2.219 (5.24)***	1.457 (10.09)***	-
R ²	0.34	0.40	0.35	0.47	0.36	0.46	0.35	0.34	0.40	0.35	0.47	0.36	0.46	0.35
Instruments quality Dignosis														
p-value (from Hansen J statistic)	[0.94]		[0.04]		[0.85]		[0.20]		-		-		-	-
p-value (from F statistic test)	[0.96]		[0.13]		[0.89]		[0.33]		-		-		-	-
Anderson Canonical statistic	28.8***		36.2***		42.2***		42.4***		19.6***		24.6***		30.6***	25.9***
Cragg Donald Statistic	9.49		12.11		14.26		21.56		9.57		12.05		15.22	-
Critical Value (r = 0.10) 1/	13.43		13.43		13.43		19.93		7.05		7.05		7.05	-
Critical Value (r = 0.15) 1/	8.18		8.18		8.18		11.59		4.58		4.58		4.58	-
F-statistic 2/	-		-		-		-		-		-		-	17.79***

All the estimates relate to the total sample and contain temporal dummies as well as the other explanatory variables of the model. The coefficients associated with these various variables are not reported in order not to save space. The Hansen test is an overidentification test equivalent to the Sargan test, except that the Hansen test is robust to heteroskedasticity. If the p-values associated with the chi squared of the Hansen test is higher than 10, we can admit that the instruments are valid. The p-value of the F statistic is the p-value for the null hypothesis that the coefficient on democracy in 2SLS is the same as when instrumented using the rate of colons mortality in addition to the date of independence. 1/ Denote the critical values of the Cragg Donald statistic when the model contains two endogenous variables and three instrumental variables. The interpretation of these statistics is equivalent to that mentioned in the other tables. 2/ Stands for the value of the F statistic of the first stage resulting from the use of the rate of colons mortality as the only instrument.

democratic institutions, and I apply an overidentification test a la Hansen. If the Hansen test rejects the validity of the instruments, I can suspect that the rejection would be due to the new instrumental variable (the date of independence) which I suggest. Indeed, the instrument of Acemoglu et al. (2001) passes the tests of the American Economic Review, and this instrument is widely admitted in the literature as a valid instrumental variable for institutions. If, in contrast, the Hansen test does not reject the validity of the instruments, this is good news. Therefore, in this case, in a certain extent, we have a proof that the date of independence is a valid instrument for democratic institutions. As we can note in columns 1-4 of table 6, the p-values associated with the Hansen test are all higher than 10, except in the specification with fiscal balance. We can thus admit that the instrumental variables are jointly valid, which especially means that the date of independence can be admitted as a valid instrument for democratic institutions¹⁸.

Secondly, I apply some of the methods suggested by Acemoglu et al. (2001) in order to further test the validity of the independence date as a valid instrument for democratic institutions. The first of this method is what Acemoglu et al. (2001) called «an easy to interpret version of the overidentification test». In this case, I estimate the models while using the rate of mortality of the colons as an instrument for democratic institutions, and the date of independence as an exogenous explanatory variable. If the independence date has a direct effect on inflation, the coefficient on the date of independence should be significant. In the columns 5-8 of table 6, it appears that the coefficients on the date of independence are not significant except in the specification related to the fiscal balance. This test indicates that the effect of the independence date on inflation likely works through its effect on institutions. This constitutes an additional proof that the independence date could be regarded as a valid instrument for democratic institutions.

Another method suggested by Acemoglu et al. (2001) consists to compare the coefficients on democracy according to the instruments used for democratic institutions. In this case, I compare the coefficient on democracy when instrumented using the date of independence in addition to the rate of mortality of the colons, with the coefficients obtained when only the independence date is used as instrument. If the coefficients on democracy are different, this shows that the independence date is not a valid instrument for democratic institutions. It appears in table 6 that independently of the specification used, we can not reject the hypothesis of equality of the coefficients on democracy. Indeed, in columns 1-4 of table 6, it appears that the p-value of F statistic of equality of the coefficients on democracy after instrumentation is higher than 10, so we cannot reject the hypothesis of equality of the coefficients on democracy. Therefore, this test also indicates that the independence date could be considered as a valid instrument for democratic institutions.

Thirdly, to test the validity of the instruments, I use again the criteria of weak instruments suggested by Stock and Yogo (2002, 2005). In this case, I can reject the hypothesis of weakness of the instruments for democratic institutions, because the statistics of Cragg Donald are higher than their critical values, as one can see in table 6. Additionally, the chi squared of the statistic of Anderson is significant at 1%, independently of the specification used. These results once again confirm the validity of the instruments for democratic institutions.

To close the series of tests of validity of the instruments, I control for the regional effects, which I did not make until now¹⁹. Indeed, some of our readers can suspect that the validity of my results would be due to the fact that I do not take into account the regional characteristics. I order to attenuate these kinds of suspicions; I add dummy variables for

¹⁸ The same results are obtained even though I do not correct for the endogeneity of the macroeconomic policy variables. These results are not reported but remain available upon request.

¹⁹ None of the results of this last test is shown, but all the results are available upon request.

Africa and Latin America²⁰ as additional explanatory variables of inflation. The missing group being Asia, this means that the comparison is done between Africa and Asia on the one hand, and between the Latin America and Asia on the other hand. I jointly use the date of independence and the rate of mortality of the colons as instruments for democratic institutions. The question is then to know whether Africa and Latin America would have specific characteristics whose consideration would invalidate the results that I obtain until now. It appears that the answer to this question is *no*. Indeed, whatever the specification and the criterion used, I can not reject the hypothesis that the date of independence and the rate of mortality of the colons are valid instruments for democratic institutions. These results are not very surprising since while controlling for the passed inflation rates, I roughly control for the unobserved structural characteristics of the countries, and consequently of the regions.

In addition, the results of this last test indicates that the dummy variables for Africa and Latin America are positive, as for their significativity, it varies according to the specification used. Therefore the rate of inflation would not be inevitably higher in Latin America and Africa than in Asia, it depends on the econometric specification used. Lastly, the results obtained from the consideration of the regional characteristics indicate that the coefficient associated with democracy is always positive even though it is not significant. The positive and no significant character of the coefficient on democracy is also observed in table 6. Thus, neither the validity of my instruments, nor the positive effect of democracy on inflation is compromised by taking into account the African and Latin-American regional characteristics, and by the nature of the instruments used for democratic institutions.

Through theoretical arguments, I show that the relationship between democracy and inflation could be positive in developing countries. The data seem to confirm my assumption. I will present case studies with three specific countries to better illustrate my results.

4 Case Studies

The case studies consist in comparing the performances in terms of democracy and inflation rates in Chile, Ghana, and Sri Lanka. Africa, Latin America, and Asia which constitute the main developing regions are represented through these case studies. The choice of these three countries is based on the work of Nelson (1993) who compares the experiments of economic reforms in the 1970s and 1980s of these three countries.

In Chile, table 7 indicates that the rate of inflation reached its peak estimated at 200% during the period 1970-1974. Since that period inflation has not ceased decreasing to reach its lowest level, estimated at 3%, during the period 2000-2003. Through table 7, it appears that the spectacular falls in inflation in Chile were achieved from 1974 to 1984, period of hard dictatorship of Augusto Pinochet (1973-1990). Indeed, Pinochet arrived in power in 1973 in an environment of hyperinflation. Five years after his arrival at the head of State, Pinochet reduced by about 50 points the rate of inflation which was estimated at 150% during the period 1975-1979 compared to 200% the previous five-year period.

From 1980 to 1984, Chile continued its effort of inflation control under the hard reign of Pinochet. Compared to the period 1975-1979, the period 1980-1984 recorded a fall in the rate of inflation of 128 points. During the period 1980-1984 the statute of Pinochet passed from the one of the President of a military junta governing Chile, to the one of the President of the Republic of Chile, at the head of an authoritarian constitutional regime.

Table 7 indicates well that the control of inflation was achieved at the time of the Chilean dictatorship. Indeed, when Pinochet seized the power, the level of democracy as measured by the experts of Polity IV was equal to 1. But from 1975 to 1984, the level of democracy remained on average equal to -7 reflecting thus a transformation into a dictatorship

²⁰ By Latin America, I group together countries from Pacific, Caribbean, and mainly those from Latin America.

of the Chilean political regime. The same tendency to the authoritarian drift of the regime of Pinochet is observed no matter which index of measurement of democratic performance is considered.

The reign of Pinochet was marked by the dictatorship and the control of inflation in Chile. Table 7 shows that the control of inflation was made possible thanks to a sustained budget surplus and the increase in trade openness, whereas the money supply started its fall only nearly ten years after the arrival of Pinochet to the power. Let us note that in spite of the

Table 7: Comparisons of the performances of Chile, Ghana and Sri Lanka 1/

Countries	Periods	Money Growth	Fiscal Balance 2/	Trade Openness	Inflation	Dictatorship 3/	Democracy 4/	Constraint on executive 5/
Chile	61-64	45,44	-2	28	28	0	5	4
	65-69	41,57	-1	29	25,4	0	6	5
	70-74	187,15	-7	47	200	3	1	3
	75-79	198,88	1	45,7	150	7	-7	1
	80-84	31,46	0,3	59	22,4	7	-7	1
	85-89	34,00	0,2	60	20	4	-2	2
	90-94	22,7	1,5	57,6	17,5	0	8	7
	95-99	14,46	1	64,5	6	0	8	7
	00-03	4,88	0,1	..	3	0	9	7
Ghana	61-64	17,09	..	39,3	..	9	-9	1
	65-69	5,75	-5	38,7	9	8	-6	0
	70-74	21,44	-4	26	11,7	5	-3	3
	75-79	41,92	-9	13	66	5	-3	2
	80-84	40,46	-4	38	70	6	-4	2
	85-89	49,67	-0,1	50	26	7	-7	1
	90-94	38,15	-0,7	75,5	23	3	-3	1
	95-99	33,87	-5	100	32	1	1	4
	00-03	39,29	-8	25	25	1	5	6
Sri Lanka	61-64	9,84	0	80	2	0	7	7
	65-69	5,39	0	67	3	0	7	7
	70-74	9,89	0	52	7	0	8	7
	75-79	29,95	0	68	6	0	7	6
	80-84	22,18	-0,1	74	17	1	5	5
	85-89	11,14	0	62	8,5	1	5	5
	90-94	20,30	0	72	13	1	5	5
	95-99	17,86	0	80	9	1	5	5
	00-03	14,95	0	82	9	1	6	6

Note: 1/ All the macroeconomic variables (fiscal balance, trade openness) are expressed as a percentage of GDP. The growth rate of money corresponds to the growth rate of broad money. The data are from the same sources as those described in the body of the paper.

2/ The values of fiscal balance are very small reason for which I report the value 0 in the case of Sri Lanka. That does not mean that the budget is in all the time balanced in Sri Lanka quite to the contrary these figures are often negative.

3/ It is the values of index of Freedom House which, taken in its rough form, measures the level of dictatorship in a country.

4/ 5/ respectively denote the index of democracy and constraint on the executive from Polity IV.

end of the dictatorship of Pinochet in 1990, the Chilean authorities continued to fight inflation, which is the proof that the control of inflation initiated by Pinochet is understood by its successors as a national priority.

In Ghana, table 7 indicates that inflation reached its maximum value estimated at 70% during the period 1980-1984. From this period, inflation recorded a continuous fall until 1994. From 1995 to 1999, inflation set out again to increase. The most important fall in inflation took place in Ghana during the period 1985-1989, with the passage of the rate of inflation from its maximum value of 70% to a value of 26% during the period 1985-1989, i.e. a fall of 44 points.

The significant fall in the rate of inflation took place during the presidency of Jerry Rawlings who seized the power at the end of 1981, following his second military coup d'Etat in three years. Rawlings arrived in power in an environment of high inflation and undertook economic reforms in an austere and authoritarian way in order to stabilize the ghanean economy (Nelson, 1993; Block, 2002). Rawlings succeeded in reducing inflation in a significant way more than five years after his arrival in power, but at the expense of democracy. Indeed, as one can note from table 7, all the indicators show the fall in the level of democracy in Ghana from 1980 to 1989. The drop in inflation in Ghana was achieved thanks to the reduction in public deficit, and the rise in trade openness.

The period 1990-1994 is also characterized by a fall in inflation but in lower proportions compared to the 1980s. This proves a reduction in effort of the ghanean authorities in their inflation fight, reduction in effort which continued during the period 1995-1999, characterized by a rise in the rate of inflation of nine points compared to the period 1990-1994. It thus appears that the period 1990-1999 was the one when the efforts of the ghanean authorities in inflation fight were relatively weak, and yet Rawlings was always in power during this period. Then, how can one understand such a relaxation of the effort?

Indeed, the period 1990-1999 is marked by the beginning of democratization in Ghana as one can note in table 7, which shows an improvement in the scores of democracy in Ghana. In 1992, following the interior and external pressures, President Rawlings organized the first democratic elections in Ghana. Days before these elections, Rawlings yielded at the demand of civil servants and increased their wages of 50 to 70% whereas the wages were reduced in the 1980s in order to decrease public expenditure (Block, 2002). Rawlings was elected in 1992, and its party NDC (National Democratic Council) obtained 198 seats out of the 200 that constituted the Ghanean Parliament.

The macroeconomic stabilization effort of President Rawlings thus decreased when since the 1990s; he engaged his country in the way of democratization. Indeed, from 1990 to 1999, public deficit increased by four percentage points, whereas all the indices of the quality of democratic institutions recorded an improvement in their values during the same period, as one can note it in table 7. Ghana thus constitutes a case of developing country being democratized at the expense of macroeconomic stability. Moreover, table 7 shows that, after the departure of Rawlings from the power in 2000, public deficit and money supply did not cease increasing in Ghana.

The evolutions of the rate of inflation and democracy are less clear in Sri Lanka as pointed out by Nelson (1993). However, through table 7, one can note that the inflation rate recorded a fall of 50 points of percentage during the period 1985-1989, compared to the period 1980-1984 when inflation reached its peak. The fall in inflation is due primarily to the reduction in public deficit and money supply. Table 7, indicates that the fall in inflation in Sri Lanka was achieved without significant changes in democratic institutions, since the indices of democracy remained constant for the period 1980-1989, even though in fall compared to the previous periods.

5 Conclusions

In this paper I analyze the relationship between inflation and democracy in developing countries, an analysis based on the theorem of the median voter. *I argue that democracy is likely to involve a rise in inflation in developing countries because of the low aversion of the median voter against money creation, and her weak preference for stabilization policies.* I mention the limited access to the basic public goods and services (water, health, school, etc) of the majority of citizens to which the median voter belongs in developing countries, to deduce the low aversion against money creation of the median voter. Indeed, money creation can allow governments to finance the public goods that the median voter needs despite the limited character of the other sources of financing of public expenditures in developing countries. The non acceleration of the results of stabilization policies (fiscal, trade openness policies) as well as the uncertainty of these results in terms of economic growth, make it possible to deduce the weak preference of the median voter for stabilization policies in developing countries. Indeed, the non acceleration of the results of stabilization policies and the uncertainty of these results, make difficult the continuation of stabilization policies and thus reduce the diffusion of the results of these policies to the poorest social group to which the median voter belongs.

I use the date of independence as an instrument for democratic institutions in order to reduce endogeneity biases in the relationship between democracy and inflation in developing countries ex-colonies of extraction. By applying the criteria of Stock and Yogo (2002, 2005) for weak instrumental variables, it appears that the date of independence is a good instrument for democratic institutions in my sample of developing countries. I theoretically identify monetary, fiscal, and trade openness policies as the transmission channels of the effect of democracy on inflation. The link between democracy and money supply makes it possible to know whether it is difficult or not to control money supply when developing countries are democratized. As for the effect of democracy on fiscal and trade openness policies, it makes it possible to know whether it is difficult to implement stabilization policies in democratic developing countries.

The econometric estimates with a sample of 62 developing countries ex-colonies of extraction including 32 African countries, over the period 1960-2003, enable me to establish a positive causal relationship between democracy and inflation. The positive effect of democracy on inflation is robust to the level of inflation considered, changes in functional forms, measurement of inflation, indices of democracy, period of analysis, samples, and to the consideration of the other determinants of inflation. Case studies based on Chile, Ghana, and Sri Lanka illustrate my result relating to the relationship between democracy and inflation in developing countries.

It appears that the positive link between inflation and democracy in my sample of developing countries is not only due to the rise in money supply that democracy generates in developing countries, but also to the difficulties of these countries to implement stabilization policies when they are democratized. Indeed, in my sample, democracy involves a significant rise in money supply and democracy reduces trade openness. The later result illustrates the pro inflationary effect of democracy on the non monetary causes of inflation. In contrast, democracy involves a reduction in public deficit in the developing countries of my sample; this illustrates the anti inflationary effect of democracy on the non monetary causes of inflation.

The good news of my results is that democracy has an anti inflationary effect on fiscal policy in developing countries. The bad news is that the anti inflationary effect of democracy on fiscal policy is insufficient to counterbalance the effect of democracy on money creation and the pro inflationary effect of democracy on trade openness policy.

The policy implication of my results is *not* a questioning of the need of democratization of developing countries because nobody can deny the intrinsic values of democracy. On the other hand, my paper highlights the need to find means to control the money supply, and to facilitate the implementation of stabilization policies in developing countries when those countries are democratized; otherwise economic and political reforms are likely to be *substitutes* in developing countries. Several tracks have already been proposed for the good management of money supply in developing countries, it is advisable to reinforce these tracks especially at this moment that the majority of the developing countries start their democratic transitions. In order to facilitate the implementation of stabilization policies in developing countries, it would be desirable to reduce the uncertainty of the impact of stabilization policies on economic growth, and to accelerate the positive effects of these policies. Otherwise, the reforming candidates would have evil to be elected or to effectively implement stabilization policies. Indeed, if the results of stabilization policies are not accelerated and less uncertain, these policies are less likely to attract the adhesion of the majority of citizens in developing countries. So this paper opens question for future researches: *how to make political and economic reforms friends in developing countries?*

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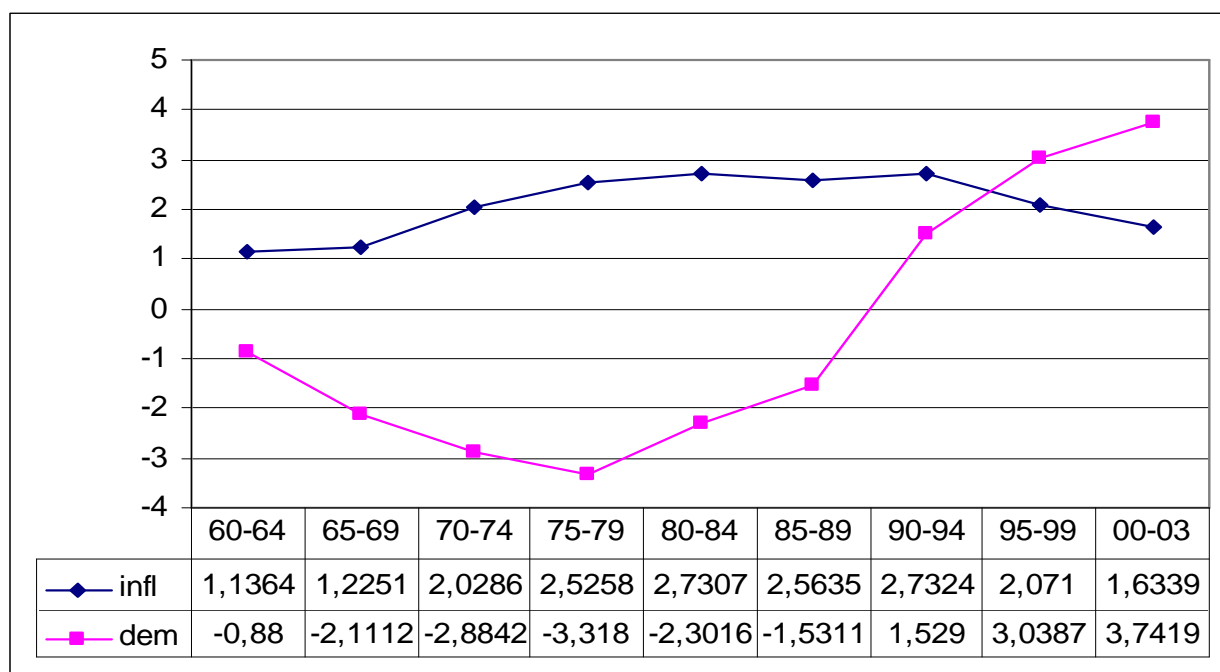
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APPENDIX

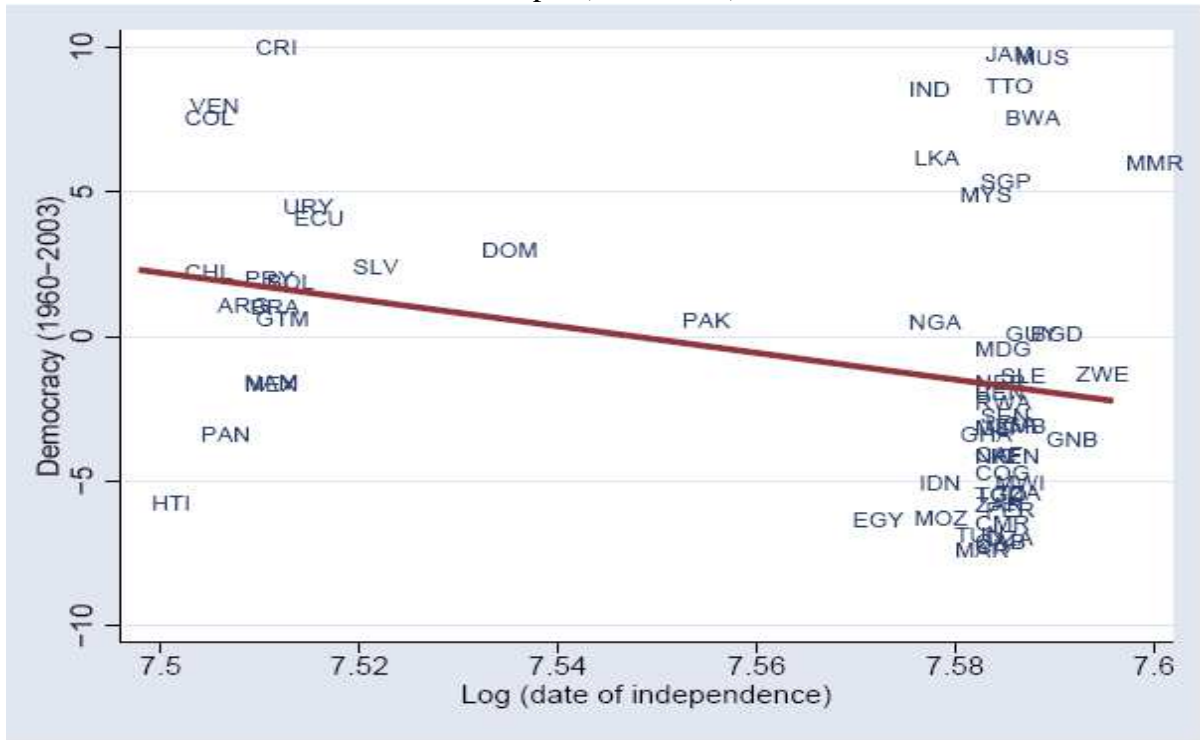
Descriptive Statistics of Variables

Variables	Observations	Mean	Standard Error	Minimum	Maximum
Log (inflation)	498	2.129	1.258	-1.122	7.614
Democracy (Polity IV)	543	-0.493	6.517	-9.8	10
Log (money growth)	541	2.918	1.091	-0.471	8.725
Fiscal balance	464	-0.027	0.060	-0.809	0.057
Openness	531	0.616	0.360	0.089	2.319
Log (independence date)	585	7,560	0.033	7.497	7,5
Log (lagged money growth)	476	2.977	1.105	-0.146	8.726
Lagged fiscal balance	407	-0.027	0.062	-0.809	0.058
Instrument of Frankel & Romer	585	0.197	0.149	0.03	0.981
Log (per capita GDP)	558	7.325	1.115	4.648	10.268
Agriculture	519	0.249	0.153	0.001	0.744
Urbanization	585	0.406	0.223	0.025	1
Lagged political Stability	481	12.792	13.424	0	77
Log (lagged inflation)	437	0.649	3.981	-0.188	64.249
Lagged growth rate	500	1.384	3.188	-11.591	15.808
Terms of trade	438	1.151	0.387	0.245	3.324

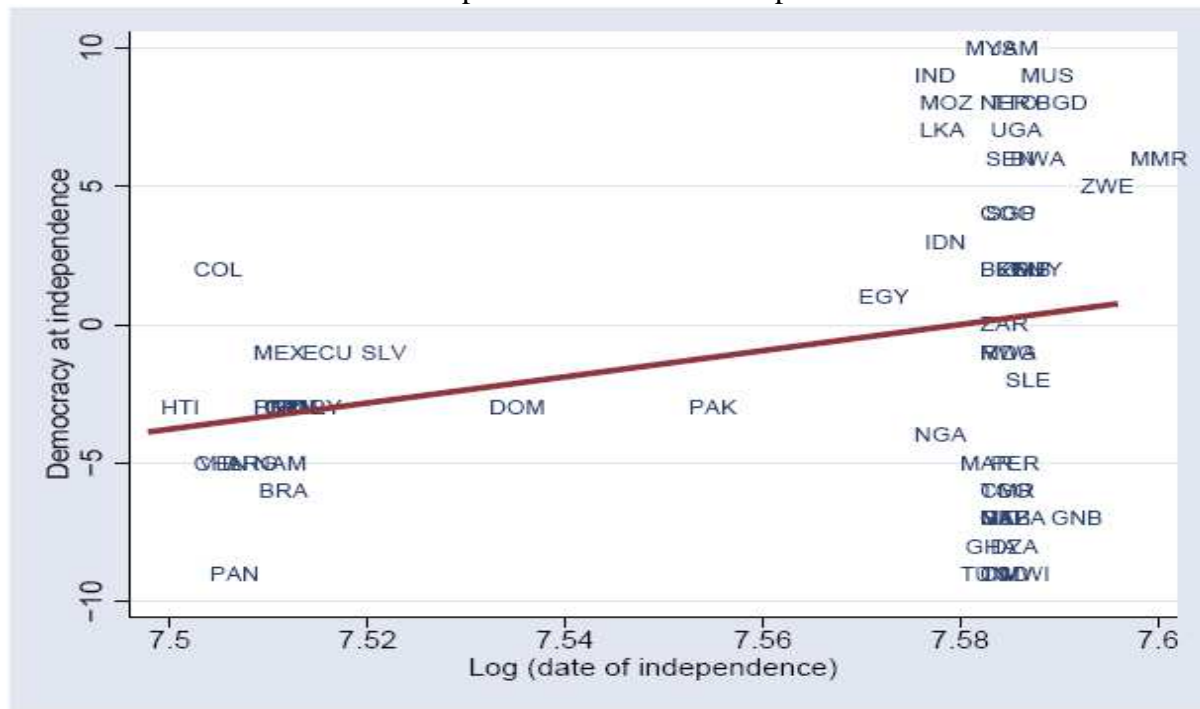
Graph 1: Evolutions of log of inflation and democratic institutions in developing countries (1960-2003)



Graph 2: Relationship between independence date and democratic institutions in the full sample (1960-2003)



Graph 3: Relationship between independence date and democratic institutions at independence in the full sample



List of the countries and their independence dates

Countries	Date of independence	Countries	Date of independence
No African Countries		African Countries	
Argentina	1816	Algeria	1962
Bangladesh	1971	Benin	1960
Bolivia	1825	Botswana	1966
Brazil	1822	Cameroon	1960
Chile	1818	Central Africa	1960
Colombia	1819	Congo Democratic	1960
Costa Rica	1823	Congo Republic	1960
Dominican Republic	1865	Chad	1960
Ecuador	1830	Cote d'Ivoire	1960
El Salvador	1841	Egypt	1936
Guatemala	1823	Gabon	1960
Guyana	1966	Ghana	1957
Haiti	1804	Guinea Bissau	1974
Honduras	1821	Kenya	1963
India	1947	Madagascar	1960
Indonesia	1949	Malawi	1964
Jamaica	1962	Mali	1960
Malaysia	1957	Mauritius	1968
Mexico	1821	Morocco	1956
Myanmar	1948	Namibia	1990
Nicaragua	1821	Niger	1960
Pakistan	1947	Nigeria	1960
Panama	1903	Rwanda	1962
Paraguay	1813	Senegal	1960
Peru	1821	Sierra Leone	1961
Singapore	1965	South Africa	1961
Sri Lanka	1948	Uganda	1962
Trinidad and Tobago	1962	Tanzania	1964
Uruguay	1828	Togo	1960
Venezuela	1811	Tunisia	1956
		Zambia	1964
		Zimbabwe	1980