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MONETARY POLICY AND ECONOMIC PERFORMANCE IN RESOURCE DEPENDENT ECONOMIES

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Send correspondence to:
Raimundo Soto
Catholic University of Chile
raimundo.soto@gmail.com

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Abstract

The aim of this paper is to explore and quantify the role of monetary policy on economic performance in resource-based economies, with a particular focus on Middle East economies. We consider two dimensions of performance: long-run economic growth and price instability (inflation). At the international level, there is mixed evidence regarding the long-run growth record of resource-abundant economies. In some countries, natural resources have turned into a curse of protracted inefficiency, low economic growth and perpetual instability. In other economies, natural resources have played an important role in fostering stability and sustained economic growth. Furthermore, resource rich economies tend to suffer from higher and more unstable levels of price inflation; nevertheless, this malaise is less pronounced in oil exporters. A crucial component in our study is to assess the role of exchange rate regimes and their interplay with monetary and fiscal policies.

JEL Classification: E1

Keywords: Monetary policy, resource-based economies, inflation

ملخص

الهدف من هذه الورقة هو استكشاف وتحديد دور السياسة النقدية في الأداء الاقتصادي في الاقتصادات القائمة على الموارد، مع التركيز بشكل خاص على اقتصادات الشرق الأوسط. نحن نعتبر بعدين من الأداء: النمو الاقتصادي على المدى الطويل وعدم استقرار الأسعار (التضخم). وعلى الصعيد الدولي، هناك أدلة متباينة بشأن سجل النمو الطويل الأجل للاقتصادات الوفيرة بالموارد. وفي بعض البلدان، تحولت الموارد الطبيعية إلى لعنة من عدم الكفاءة المطولة، وانخفاض النمو الاقتصادي، وعدم الاستقرار الدائم. وفي الاقتصادات الأخرى، أدت الموارد الطبيعية دورا هاما في تعزيز الاستقرار والنمو الاقتصادي المطرد. وعلاوة على ذلك، تميل الاقتصادات الغنية بالموارد إلى المعاناة من ارتفاع معدلات تضخم الأسعار وعدم استقرارها؛ ومع ذلك، فإن هذا الشعور بالضيق أقل وضوحا في البلدان المصدرة للنفط. ويتمثل أحد العناصر الحاسمة في دراستنا في تقييم دور نظم أسعار الصرف وتفاعلها مع السياسات النقدية والمالية.

1. Introduction

There is ample consensus that monetary policy plays a key role in fostering economic growth and avoiding the perils of macroeconomic instability and the costs of chronic inflation (Lucas, 2003). Evidence collected from cross-country studies indicates that the negative effects of inadequate monetary policies on long-run growth are sizable and long-lasting (Haslag, 1997). Prudential and transparent monetary policies in conjunction with budget-balanced fiscal policies are universally recommended as the mean to achieve a sound macroeconomic stance.

While these results have general validity, their applicability to resource-based economies is less clear. Countries endowed with significant deposits of natural resources tend to develop economic structures that render standard policy prescriptions less applicable. On one hand, exports of natural resources provide ample funds to the coffers of the government that can be used for public investment or transferred to the population to achieve higher welfare levels. Government financing is hardly a limitation when resources are abundant. On the other hand, resource-based economies tend to be quite sensitive to fluctuations in commodity prices, in particular when exports are not diversified and countries become resource dependents. The absence of an active monetary policy –due to the almost universal preference of the authorities of these economies for pegging the exchange rate (typically to the US dollar)—allows for unimpeded transmission of foreign shocks to domestic markets, further compounding the adverse effects of commodity price instability. As a result, macroeconomic policies in resource-based countries are often pro-cyclical and fail to stabilize the economy when needed. Misuse of resources and corruption are, unfortunately, also common features of resource-based countries, thus amplifying the negative effects of external and internal instability (Elbadawi and Soto, 2012).

The aim of this paper is to explore and quantify the role of monetary policy on economic performance in resource-based economies, with a particular focus on Middle East economies. We consider two dimensions of performance: long-run economic growth and price instability (inflation). At the international level, there is mixed evidence regarding the long-run growth record of resource-abundant economies. In some countries, natural resources have turned into a curse of protracted inefficiency, low economic growth and perpetual instability. In other economies, natural resources have played an important role in fostering stability and sustained economic growth. Furthermore, resource rich economies tend to suffer from higher and more unstable levels of price inflation; nevertheless, this malaise is less pronounced in oil exporters. A crucial component in our study is to assess the role of exchange rate regimes and their interplay with monetary and fiscal policies. To our knowledge, economic research has largely neglected the impact of the choice of exchange rate regimes and the conduct of monetary policy on economic performance in resource based economies.

Middle East countries comprise extreme cases of both the oil-blessing and the oil-curse and, therefore, provide a rich sample of experiences to develop our study. Paradoxically, it is precisely for these economies where we most lack empirical evidence and definite answers to the role of monetary policy on economic performance. We attempt to fill this gap by investigating the determinants of economic growth and inflation in 14 MENA economies and another 110 countries from Latin America, Europe, Africa, and Asia in the period 1970-2013. We focus on the impact of exchange rate regimes (fixed, pure and managed float) to provide cushioning against external shocks and price instability as well as providing incentives to sustainable economic growth and export diversification.

This paper is organized as follows. In section 2 we discuss the issue of resource abundance versus resource dependency. We provide evidence that resource abundance, measured by the economic rents a country collects from the production (not exports) of natural resources, is not equivalent to resource dependency, which we measure by Herfindahl indices of export

concentration. While there is some positive association between the two concepts and higher resource dependency tends to occur more in resource abundant economies, the result is largely driven by energy exporters (oil and natural gas) and there is little or no correlation whatsoever in countries exporting coal, minerals, or forestry products.

Section 3 briefly revisits the literature on the theories developed to explain the natural resource curse, i.e., the fact that resource-rich economies tend to display worse economic performances in the long run. Out of the main four explanations for the curse, we found that three depend on resource abundance and one on resource dependency. Therefore, a proper evaluation of optimal macroeconomic policies in resource-rich economies ought to differentiate between the nature of the different transmission channels.

Section 4 evaluates the applicability to resource-rich economies of standard macroeconomic prescriptions vis-à-vis the choice of monetary policy and exchange regimes. We first note that, as all in open economies, authorities in resource rich countries are subject to the discipline of the impossible trinity (a country can achieve at best only two of the following three goals: a stable currency, an open capital account, an independent monetary policy). Nonetheless, their long-term goals and restrictions can be very different to those of the median developing economy. Their relative backwardness –particularly in areas such as education, infrastructure, political participation and government accountability—would call for a different policy mix.

Section 5 provides the empirical analyses of both long-run growth and inflation. We follow the previous literature in employing the Generalized Method of Moments (GMM) to estimate dynamic panel-data models. The advantage of this method is that it deals effectively with the three econometric challenges posed by our different models. First, the regression equation is dynamic in the sense that it represents a lagged-dependent variable model. Second, the regression equation includes an unobserved country-specific effect, which cannot be accounted for by regular methods (such as the within estimator) given the dynamic nature of the model. Third, the set of explanatory variables includes some that are likely to be jointly endogenously determined with the dependent variable.

Section 6 collects the main conclusions of the study. The results are numerous: some confirm the findings in previous studies while other are quite novel. We confirm that economic growth in resource-rich countries –in particular, oil exporting economies in the MENA region—is hampered by their relative backwardness in terms of education and human capital formation, integration to the global economy and infrastructure. Furthermore, the negative impact on economic growth of these fundamental policies –as well as higher and more unstable inflation—is compounded by the lack of political participation and the lower levels of government accountability. We found also that resource rents support higher levels of economic growth, except for oil and gas exporters, but induce higher inflation. However, controlling for other fundamentals, we find evidence that oil production is not per-se detrimental to sustained growth but the lack of diversification of exports and the productive base. We also found that countries with fixed exchange regimes tend to perform systematically better than countries with any other monetary policy. However, oil exporters with floating exchange regimes perform better than those with fixed exchange rates, suggesting that GCC countries could benefit from less rigid exchange regimes.

2. Resource Abundance and Resource Dependence

We distinguish between two related and yet different concepts –"resource abundance" and "resource dependence"—and investigate their implications for long-run growth and inflation. Measuring resource abundance is not easy as, in principle, it entails quantifying the value of existing stocks and deposits of natural riches for which we have no clear methodologies and insufficient information. We therefore focus on a flow measure, namely a calculated proxy for the annual resource rents that a country produces normalized by its GDP. Resource rents are

calculated by the World Bank as production times the difference between the international price and an estimate of production costs. Of course, this measure falls short of representing properly the actual riches of an economy when they remain unexploited to a certain degree. However, in such case, such riches will not have an effect on economic activity either. Likewise, defining and measuring resource dependence is not immediately obvious. A country could be dependent on natural resources for accessing foreign exchange, for financing fiscal needs, or for stabilizing its business cycles. Again, we opt for a pragmatic solution and use as a proxy variable the ratio of natural resource based exports to total merchandise exports.[1]

Table 1 provides a snapshot of resource rents in different groups of countries as share of each country's GDP in the last forty years. It can be seen that at the world level, resource rents amount to around 3.5% of GDP in the whole period and fluctuate only moderately. Taking this world average as a reference point, we conclude that resource rents are significant –and resource curses are most likely to appear—in Latin America, Sub-Saharan Africa, and particularly in the Middle East and North Africa.

The table shows three other interesting features regarding resource rents. First, development levels appear to be inversely related to resource abundance: in every time period resource rents in developing countries are much higher than those of developed economies. This would indicate that developed economies have been able to diversify away from natural resources. However, it does not indicate whether resource rents were instrumental in diversifying these economies or if these economies were able to diversify even in the presence of such rents. Second, per capita income levels are not directly linked to resource rents as indicated by the fact that countries with middle and low income per capita enjoy very similar levels of natural resource rents. Third, while some oil-exporting countries have been able to use their resource abundance to achieve high per-capita income levels (mainly the GCC economies), most economies have been unable to develop and remain among the middle to low income groups in the world. In this sense, hydrocarbon riches have failed in becoming the engine for sustained growth and economic development.

Determining whether resource abundance turns into dependence from commodity markets requires examining export structures: for given levels of resource abundance, countries with a more diversified economy, and thereby more diversified export structure, ought to be less dependent on natural resources and less prone to the curse. Diversification of new products correlates with economic development, especially sustained, export-oriented growth. Imbs and Wacziarg (2003) study the patterns of sectors concentration across countries and time and find that income increases as economies become more diversified. At high levels of income, however, they start to specialize again. To measure exports diversification, we use UN COMTRADE data to compute Herfindahl indices of exports concentration at 2-digit ISIC level for every country in our sample and every year in the period 1980-2013. A higher Herfindahl index indicates lower levels of diversification. We then compute five year averages of these indices to avoid transient phenomena derived from commodity price fluctuations and plotted the results against the corresponding five-year averages of resource rents. The results are presented in Figure 1.

The empirical evidence would suggest the existence of a direct relationship between the level of total resource rents and the lack of export diversification. As shown in Panel A, higher levels of total resource rents tend to be highly correlated with more concentrated exports and, thereby, less diversified economies. To be more precise, no country with high levels of resource rents have a highly diversified export structure reflecting a highly diversified economy. The correlation between abundance and lack of export diversification is not the same according to

[1] Note that abundance is based on the level production while the dependence measure is based on the structure exports and, therefore, they convey very different information.

the type of natural resources, as shown in Panels B to F: for oil and gas exporters, the correlation is much stronger than for the coal, mining or forestry exporters.

Two other issues can be seen in these figures. First, there are a number of cases where resource rents are low yet export concentration may be high. This indicates that other economic forces may be at work when determining export diversification (e.g., institutions, government policies, etc.). Second, in every panel of Figure 1 there is a significant mass of observations clustered around low levels of resource rents and Herfindahl's indices, which suggests the existence of threshold levels.

We focus now on the MENA region because its country members provide contrasting cases in the relationship between resource abundance and dependence. Table 2 shows that, on average for the period 1970-2013, resource rents have been three times higher in the region then the world average. This is largely the result of the ample deposits of oil and natural gas in the region: not surprisingly, hydrocarbons dominate exports. On average, in the last four decades over one half of MENA's exports have been fuels and energy, far above the global average of 16%. The abundance of oil and natural gas has also been accompanied by very low export diversification. While Herfindahl indices for export concentration in the world are 0.265, in the MENA region it almost doubles.

The situation in MENA, nevertheless, is heterogeneous and comprises of two country groups. First, there are five economies (Israel, Jordan, Lebanon, Morocco and Tunisia) where natural resources are scarce, fuels do not have a dominant role in foreign trade (with the exception of Tunisia), and exports are diversified. Second, in the other 13 economies the opposite verifies: natural resources are very abundant –with rents ranging between 15% and 50% of GDP—and, not surprisingly, fuels and energy are the main component of exports. Hydrocarbons in some economies are, for all practical purposes, the sole source of foreign revenue (Algeria, Iran, Kuwait, Libya, Oman, Qatar, Saudi Arabia, and Yemen). Export concentration is also the norm in these economies: the correlation between fuel exports and the Herfindahl index of export concentration is 89%. Third, while there is a positive correlation between resource abundance and dependence, it is by no means an unescapable law. Consider the cases of the UAE and Algeria or Yemen, which enjoy similar levels of resource rents but display very different degrees of economic diversification.

3. Abundance, Dependence and the Natural Resource Curse

Elbadawi and Gelb (2010) provide an excellent taxonomy of the symptoms of the resource curse, especially oil dependency, which is the main focus of our research. In their view, resource rents impede economic diversification and penalize manufacturing growth by generating Dutch Disease and extreme volatility. Oil rents also promote bad governance and complicate transition to transparent and accountable democratic rule. In addition, the oil sector tends to be located at the periphery of the product space, which makes it difficult for the economy to move into new and more sophisticated lines of products and services.

Stylized descriptions of the different theories offered as explanations for the apparent resource curse on economic performance are presented in Gylfason (2011) and van der Ploeg (2011). There are, at least, four main channels of transmission linking natural resources and slow economic growth, economic instability, and/or insufficient export diversification. These explanations center on the notion that natural capital crowd out other types of man-made capital (physical, human, social or institutional). Some of these explanations, nevertheless, relate to resource abundance while others are based on resource dependency, as discussed below.

The first explanation is related to natural resource abundance, which in conjunction with institutional weaknesses (including ill-defined property rights, imperfect or missing markets, and lax legal structures) may lead to rent-seeking on the part of producers thus diverting

resources away from more socially profitable economic activities (Gelb, 1988). As emphasized by Krueger (1974), extensive rent seeking breeds corruption, distort the allocation of resources and reduce both economic efficiency and social equity. In addition, the struggle for resource rents may lead to hoarding of economic and political power in the hands of elites that, once in power, would use the rents to placate their political supporters and thus secure their hold on power, with slow growth as a result as shown in Elbadawi and Soto (2011). Finally, abundant resource rents may imbue people with a false sense of security and lead governments to lose sight of the need for good and growth-friendly economic management, including free trade, bureaucratic efficiency, and institutional quality (Sachs and Warner, 1999). Incentives to create wealth through good policies and institutions may wane because of the relatively effortless ability to extract wealth from the soil or the sea.

A second explanation of the curse arises when resource abundance reduces private and public incentives to accumulate human capital due to a high level of non-wage income or when wages are disconnected from the effort of workers. In these cases, resource abundant nations may be tempted to underestimate the long-run value of education and human capital formation. Empirical evidence shows that, across countries, school enrolment at all levels is inversely related to resource rents (Gylfason, Herbertsson, and Zoega, 1999). There is also evidence that, across countries, public expenditures on education relative to national income, expected years of schooling, and school enrolment are all inversely related to natural resource abundance (Gylfason, 2001). The abundant natural capital appears to crowd out human capital which forms the basis of sustained economic growth and diversification.

A third channel operates through saving, investment, and the accumulation of physical capital. High resource rents usually fuel consumption booms and tend to depress national saving. In turn, this leads to lower than optimal accumulation of capital, in particular in non-oil sectors (Arezki et al, 2011). Bhattacharyya and Collier (2012) also note the negative effects of oil resources on the stock of public capital. Furthermore, financial funds are frequently provided directly from the government of resource-rich countries on non-competitive basis leading often to low-return investments and to retard the development of financial institutions which ought to identify and fund the most productive projects on a social basis. Unproductive investments may seem unproblematic to governments when they are flush with oil cash.

The fourth and final channel concerns resource dependency, where the large inflow of foreign currency associated with natural resource export could induce the so-called Dutch disease (Corden and Neary, 1982). Under this theory the significant inflow of foreign currency could lead to an appreciation of the local currency thereby reducing the profitability of other exporting sectors and undermining their development. This in return could hamper economic diversification and end-up shrinking the productive basis of the economy. Even though part of the currency real appreciation reflects an equilibrium adjustment subsequent to the fact that the economy is now richer than it was before, it is frequently the case that the real overvaluation of resource dependent economies exceeds any long-term equilibrium appreciation, which often occurs due to increase in wages and the cost of capital and land. Beyond the currency appreciation, the natural resource dependence is, more often than not, accompanied by increased economic volatility. The prices of raw materials tend to fluctuate widely in world markets (vis-à-vis the price of manufactured goods), leading to fluctuations in export earnings that trigger exchange rate volatility and create uncertainty, which can be harmful to foreign and domestic investment.

4. Macroeconomic Policies in Resource-Based Economies

The abovementioned channels that link natural resources and poor economic performance (i.e., the resource curse) overlook, in our view, two crucial issues. On one hand, these channels seem to be largely independent from economic policies, in particular monetary policy and exchange

rate regime. This suggests an incomplete understanding of the resource curse problem as there is a well-researched parallel literature indicating that macroeconomic policy do have significant effects on the long-term economic performance of non-resource-based economies (Loayza and Soto, 2002). On the other hand, they also sidestep the possibility that both the level of natural resources rents and its nature (point-source versus widely-spread deposits) may induce countries to organize production and exports in a way that may increase short-term consumption but is most detrimental to long run growth and welfare by increasing the dependency and vulnerability of the economy to commodity price fluctuations. We subsequently discuss these issues.

The importance of monetary and exchange rate policies for economic performance seems to be well established. Following McCallum (2007) we look at monetary policy as the mirror image of the exchange rate regime. Accordingly, monetary policy and exchange rate policy are but two sides of the same coin, with their rules being merely the two aspects of one policy –most usefully thought of as monetary policy. In this context, a fixed exchange rate regime is similar to a monetary policy with the exchange rate as nominal anchor while a floating exchange rate regime would reflect a monetary policy with inflation as the nominal anchor. Inflation targeting is the institutional case of the latter regime whereby inflation targets, policy horizons, and instruments are explicitly disclosed and informed by the monetary authority. Likewise, currency boards, dollarization and currency unions are the institutional case of the fixed exchange regime. The absence of clear nominal anchor for monetary policy could be assimilated to an intermediate exchange rate regime.

The choice of monetary policy and exchange regime in an open economy produces a dilemma popularly called the Impossible Trinity, whereby authorities cannot achieve simultaneously (a) a very stable nominal exchange rate, (b) free movement in financial and capital flows, and (c) an independent monetary policy (Mundell, 1967). Governments can only pick two of the three. If authorities wish to maintain a stable exchange rate and high capital mobility, they relinquish monetary policy as the quantity of money (and therefore the nominal interest rate) is no longer in their control. If the authority wishes to keep control over the domestic interest rate and benefit from an open capital account, she will no longer be able to control the exchange rate. Finally, the only way to maintain control of both the interest rates and the exchange rate is to close the capital account. This poses a policy conundrum to authorities: while stable exchange rates are important for keeping inflation expectations down, capital flows are necessary for financing growth and development, and monetary policy autonomy is an essential tool for macroeconomic adjustment.

The elegance of the impossible trinity dictum, nevertheless, sidesteps the key issue that authorities aim ultimately at achieving certain development targets for which monetary and exchange rate policies are mere instruments. These targets include sustained growth, economic stability, productive diversification, and generalized improvements in welfare levels. To the extent that monetary policy allows for a stable macroeconomic environment and avoids the perils of currency appreciation and/or excess volatility, it provides the incentives for the accumulation of physical, human and social capital, it supports economic diversification by reducing currency risk, and it inhibits rent-seeking and speculative investment, among other benefits. Nonetheless, achieving these development targets depends also on political, historical, and institutional determinants. Furthermore, these determinants, as well as macroeconomics policies, can be influenced by the abundance of natural resources. Therefore, one ought to expect that optimal monetary and exchange rate policies to be dependent to some degree on the endowment of natural resources of an economy, the volatility of the international price, and the size of their associated rents.

The economic literature provides uncontroverted, massive evidence that wrong monetary policies lead to dismal economic performance (Haslag, 1997). On the contrary, a few relatively recent experiences suggest that an adequate mix of monetary policy and exchange rate regimes may have a long-lasting, positive impact on economic performance. These experiences have led some experts to suggest that the combination of inflation targeting and floating currencies is an appropriate monetary policy for emerging and developed economies alike. Evidence tend to support the notion that the commitment of monetary authorities to low inflation and non-interference in the exchange market provides adequate control of the adverse effects of the business cycle and, by lowering investment risk, it also supports long run growth (Schmidt-Hebbel, 2009).

It is fair to say, nevertheless, that enthusiasm for monetary policies based exclusively on targeting inflation within the confines of floating exchange regimes has never been generalized. Furthermore, the recent global economic downturn has given voice to those claiming that, in addition to targeting inflation, central banks ought to have additional goals such as stabilizing economic activity, the currency, and even unemployment.[2] Quantitative easing is the epitome of such type of policy. The empirical evidence collected by Sokolov et al. (2008) and Ghosh and Ostry (2009) indicates that the highest growth rates and the lowest inflation volatility in non-industrialized countries occur in countries pursuing "fear of float" policies, i.e., the intermediate case where authorities declare to have a floating exchange regime but intervene the market to avoid wide fluctuations in the currency that may lead to inflation and balance sheet effects (when it over-depreciates) or to export competitive losses (when it over-appreciates). However, these authors also find that countries pursuing a pure-float policy (*de jure* or *de facto*) have the highest inflation rates but the lowest GDP volatility. With regards to inflation, there is ample evidence that for developing and emerging market countries, pegged exchange rate regimes are associated with higher price stability (Domac et al. 2001). An important part of the benefits from lower inflation in pegged regimes comes from the credibility of a formal commitment by the Central Bank to maintain the parity; *de facto* foreign exchange intervention seems to be a sub-optimal policy in this regard.

The evidence in these and other previous papers most likely represent the experience of the median developing economy collected from samples where resource-based economies are typically underrepresented, in particular MENA countries. This is largely the result of the lack of timely statistical data on most Arab countries. In other words, our knowledge concerning the role of monetary policy in affecting long-run performance comes mainly from economies where natural resources play a rather limited role.

Consequently, optimal policy prescriptions based on such studies may not be entirely applicable to natural resource producers, in particular to oil exporters. Consider, for example, the benefits associated with the openness of the capital account. In theory, opening capital accounts lead to the development of better financial instruments, markets, and institutions which, in turn, positively influence saving rates, investment decisions, technological innovation, and hence long-run growth rates. In the median developing country, this would materialize among other things in resource mobilization and significant foreign direct investment. In countries with significant rents from exports of natural resources, usually there is little need of foreign resources and the benefits from more open capital accounts derive mostly from improvements in institutions and market design and technology transfers. Furthermore, as noted by Klein (2005), in order to fully benefit from open capital accounts

[2] Deraniyagala and Kaluwa (2011) claim that monetary policy could also be instrumental in reducing unemployment by allocating credit to job-creating sectors while Maier (2005) extends the discussion on optimal exchange rate regimes to the issue of pro-poor growth and finds that intermediate regimes show non-negative –and possible positive—effects on the lives of the poor.

countries, need to have in place an institutional fabric that is usually absent in oil exporters, particularly in the MENA region.

Likewise, consider the standard policy prescriptions on exchange systems. In theory, flexible exchange rates may, on one hand, improve performance because they provide better insulation and faster price adjustment to external shocks. On the other, exchange rate fluctuations and currency uncertainty may have a negative impact on investment and, thereby, on sustained economic growth. In this case, exchange rate stability could lead to better outcomes. But the alternative regime of fixing the currency to foreign monies requires determining the appropriate level for the exchange rate. When, for incompetence or political reasons, the exchange rate is fixed at unsustainable levels the effect on economic growth and welfare can be extremely detrimental. During periods of progressive overvaluation, there is a heavy tax on the production of exportable goods which become gradually less profitable. After the collapse of the unsustainable currency, there is often a need to sacrifice consumption heavily to restore the equilibrium. Furthermore, countries peg their currencies to that of another country under the assumption that monetary policy in the latter will be in line with the needs of the pegging economy. Whenever there is a divergence in interests, the pegging economy must decide whether to keep the peg and pay the sacrifice cost or abandon the hard peg at a reputation cost. That was the case of GCC economies in the buildup of the last global crisis where the peg to an ever-appreciating US dollar did not support the cooling efforts of the authorities to overcome the overheating of their economies as a result of booming oil prices.

Despite the evidence and the general trend towards structuring monetary policy based on a combination of floating exchange rates and a commitment towards low inflation, casual observation indicates that fixed exchange rates are the preferred nominal anchor in many resource-based economies, particularly in the GCC area where fixed exchange rates to the US dollar has been in place for the past 40 years. Such observation would indicate a positive correlation between resource rents and the likelihood of choosing fixed exchange rates as the nominal anchor of monetary policy. We test such correlation using discrete variable models (logit) where the probability of having a fixed exchange system in place is correlated with the level of resource rents, after controlling for the degree of development of the country and trade openness. As shown in the Appendix, we found evidence that higher resource rents increase the probability of having a fixed exchange rate only in oil-exporting economies but found exactly the opposite in countries exporting other natural resources.

This type of contradicting results are, of course, expected. As with all macroeconomic policies, one should not expect to find a "one-size-fits-all" monetary policy for resource-based economies, in particular for the very heterogeneous countries in the MENA region: policies that may be optimal in the GCC countries (very rich and scarcely populated) may not be equally desirable in the Maghrebi economies (less rich and vastly populated). Indeed, even when excluding oil exporters, the evidence collected among others by Ghosh (2009) points to the difficulties in finding a unique policy prescription. His empirical findings indicate that pegged and intermediate regimes are associated with low nominal volatility and higher economic growth but floating regimes imply a smoother external adjustment and lower susceptibility to financial crises. The appropriateness of an exchange regime would therefore depend on the particular needs of each country in terms of fostering growth, controlling instability, enhancing resilience to shocks or permitting smooth adjustment to foreign shocks.

In turn, these goals will depend on issues such as the degree of coordination of monetary and fiscal policies, the architecture of the financial sector, and the flexibility of domestic markets (particularly that of labor markets). Thus, it is unsurprising that the empirical significance of exchange rate policy in macroeconomic performance remains an open question.

5. Empirical Analysis

We proceed first replicate the main results of the empirical literature on the determinants of economic growth and price stabilization; we then extend these models to consider the role of exchange and monetary regimes in resource abundant and dependent economies. We estimate dynamic panel-data models of per capita GDP growth and inflation. Our sample is dictated by data availability. It contains 125 countries representing all major world regions (see Appendix A for a complete list). The regression analysis is conducted using averages of five-year periods. Each country has a minimum of two and a maximum of eight non-overlapping five-year observations spanning the years 1969–2013. Since one observation must be reserved for instrumentation, the first period in the regression corresponds to the years 1975–1979. Due to the presence of missing observations the actual number of countries and observations varies from model to model; however, each table identify the number of observations used in each estimation.

Our main econometric tool is the generalized method-of moments (GMM) estimator developed for dynamic models of panel data, which was introduced by Holtz-Eakin, Newey, and Rosen (1988), Arellano and Bond (1991), and Arellano and Bover (1995). We use the estimator proposed by Blundell and Bond (1998) which deals effectively with the following three econometric challenges posed by our different models. First, the regression equation is dynamic in the sense that it represents a lagged-dependent variable model. Second, the regression equation includes an unobserved country-specific effect, which cannot be accounted for by regular methods (such as the within estimator) given the dynamic nature of the model. Third, the set of explanatory variables includes some that are likely to be jointly endogenously determined with the dependent variable. Moreover, the GMM estimator is best suited for the case of panel data models with a large number of cross section units and a relatively short time periods. This method assumes that there is no autocorrelation in the idiosyncratic errors and requires the initial condition that the panel-level effects be uncorrelated with the first difference of the first observation of the dependent variable.

5.1 Economic growth

To study the impact of resource rents on the economic growth of developing economies, we draw from the extensive empirical literature and posit an encompassing model which seeks to link a country's economic growth rate to economic, political, and social variables. We estimate the following variation of a growth regression:

$$y_{it} - y_{it-1} = \alpha y_{it-1} + \beta' X_{it} + \mu_i + \lambda_t + \varepsilon_{it} \qquad (1)$$

where y_{it} is the log of per capita output, X_{it} is a set of variables postulated as growth determinants, λ_t is a period-specific effect, μ_i represents unobserved country-specific factors, and ε_{it} is the regression residual. The subscripts i and t refer to country and time period, respectively. The left-hand side of equation (1) is the growth rate of per capita GDP in a given period. On the right-hand side, the regression model includes the level of per capita output at the start of the period (to account for transitional convergence) and a set of explanatory variables measured during the same period. The time-specific effect, λ_t, allows us to control for international conditions that change over time and affect the growth performance of all countries in the sample. The term μ_i accounts for unobserved country specific factors that both drive growth and are potentially correlated with the explanatory variables.

5.2 Growth determinants

We focus on those economic and social variables that have received the most attention in the academic literature and in policy circles as potential determinants of economic development. Following Loayza and Soto (2002) these variables are divided into five groups: transitional

convergence, cyclical reversion, structural policies and institutions, stabilization policies, and external conditions (see the Appendix for details on definitions and sources of data).

Transitional convergence: one implication of modern theories is that the growth rate depends on the initial position of the economy. The conditional convergence hypothesis maintains that, ceteris paribus, poor countries should grow faster than rich ones because of decreasing returns to scale in production. We include the *Initial Level of Real per Capita GDP* in the set of explanatory variables.

Cyclical reversion: although we focus on long-run economic growth, in the econometric estimation we are required to work with relatively short time periods (five-year averages). At these frequencies, cyclical effects are bound to play a role. We thus include the *Output Gap* at the start of each period as a growth determinant. The output gap used in the regression is obtained as the difference between potential and actual GDP around the start of the period. The former corresponds to the secular trend of GDP obtained using a band-pass filter.

Structural policies and institutions: Evidence collected in previous research indicates that economic growth can be affected by public policies and institutions. One area of structural policies is education and human capital formation. Human capital counteracts the forces of diminishing returns in other factors of production—such as physical capital—to sustain long-run growth. Education and human capital also determine the adoption rate of technological innovations. We do not measure education policies per se but their outcomes; we use the rate of *Secondary School Attainment* of total population obtained from Barro and Lee (2010, data updated). For their income levels, resource-rich economies tend to lag behind other emerging countries, which has given foot to the notion that natural capital may crowd-out human capital formation.

A second policy area is that of integration to the world economy. We use two measures, one reflecting trade and commercial integration and another capturing financial integration. Evidence indicates that international trade openness may affect economic growth through several channels: (a) inducing higher total factor productivity as a result of specialization and the exploitation of comparative advantages, (b) producing market expansion and use of scale economies, (c) helping the diffusion of technological innovations and improved managerial practices, (d) lessening anticompetitive practices of domestic firms, and (e) reducing incentives for firms to conduct unproductive rent-seeking activities. Our measure of openness is the *Volume of Trade* (real exports plus imports) over GDP, adjusted for the size (area and population) of the country, the level of country remittances, for whether it is landlocked, and for whether it is an oil exporter. While volumes of trade are important determinants of growth, some of the abovementioned benefits may be missing in resource-rich economies due to their typically low degree of export diversification, particularly when resources are concentrated (point source) and tend to be exploited in enclaves.

Our second measure, related to financial integration, is of an institutional nature –as opposed to the observed outcomes of such financial integration– as we use the index of *Capital Account Openness* proposed and calculated by Chinn and Ito (2006, data updated). Theoretical studies suggest that the gains from capital account openness would derive from accessing foreign capital and reducing domestic distortions (Gourinchas and Jeanne, 2013). The recent empirical literature has looked into an extensive set of potential dimensions related to capital account liberalization, such as the role of financial depth and development, the quality of institutions, the sequence of reforms, and the composition of capital inflows. However, little agreement has been reached so far on the fundamental forces that make financial openness a source of economic performance (see Cherif et al., 2011). While on average oil-exporters have more open capital accounts than other emerging economies, there is still significant space to improve on these matters and further reforms could provide a boost to sustainable growth.

The third area of structural policies relates to the working of the government. We cover three broad aspects. First, governments generally determine the availability of public services and infrastructure. Whether they are treated as classic public goods or as subject to congestion, public services and infrastructure can affect growth by entering directly as inputs of the production function, by serving to improve total factor productivity, and by encouraging private investment as they help protect property rights. Measures of public services and infrastructure are scarce; the variable with the largest cross-country and time series coverage is *Telecommunications Capacity*, measured by the number of telephone lines per capita. Second, although governments play a beneficial role for the economy, they can also be a burden if they impose high taxes, use revenues to maintain ineffective public programs and a bloated bureaucracy, distort markets incentives, and interfere negatively in the economy. We account for the burden of government through the ratio of *Government Consumption* to GDP. Third, long-term growth also depends on the institutional quality of government policies and, more general, politics, including the respect for civil and political rights, bureaucratic efficiency, absence of corruption, enforcement of contractual agreements, and prevalence of law and order. We use two variables to measure institutions. First, a measure of *Political Participation* (democracy index) to account for the degree at which governments represent the preferences of society on policy goals and instruments. The second is the *Accountability of Governments* when delivering public policies, as measured by the World Bank index of checks and balances whereby a higher index is indicative of countries with better quality of the bureaucracy, lower levels of corruption, political stability and higher accountability of public officials. This is an area where resource-based economies have significant space for improvements, particularly those in the MENA region that has a dismal record on political participation and government accountability.

Stabilization policies: We include stabilization policies as determinants of economic growth for two reasons. From an econometric viewpoint, it improves the regression's fit and forecasting power increases over horizons that are relevant to economic policy (say, five to ten years). From an economic perspective, stabilization policies affect not only cyclical fluctuations, but also long-run growth. Fiscal, monetary, and financial policies that contribute to a stable macroeconomic environment and avoid financial and balance-of-payments crises are important for long run growth. By reducing uncertainty, they encourage firm investment, reduce societal disputes for the distribution of ex post rents, and allow economic agents to concentrate on productive activities (rather than trying to manage high risk). The first area in this category is related to the lack of price stability, which we measure by the average *Inflation Rate*. The second area is related to the occurrence of *Systemic Banking Crises* and serves to account for the deleterious effect of financial turmoil on economic activity, particularly over short and medium horizons. The occurrence of banking crises is measured by the fraction of years that a country undergoes a systemic banking crisis in the corresponding period (see Laeven and Valencia, 2013).

External conditions: Economic growth is shaped not only by internal factors, but also by external conditions that influence the domestic economy in both the short and long runs. We include two additional variables in the growth regression: the *Terms-of-Trade Shocks* affecting each country individually and a period-specific shift affecting all countries in the sample. Terms-of-trade shocks capture changes in both the international demand for a country's exports and the cost of production and consumption inputs. The period-specific shifts (or time dummy variables) summarize the prevalent *Global Conditions* at a given period of time and reflect worldwide recessions and booms.

5.3 Estimation results of growth models

Table 3 presents the results obtained by estimating the empirical model using around 725 observations for 125 countries. The specification tests (serial-correlation tests) support the

GMM system estimator of our model. Column (1) in the table corresponds to the base specification for the long run growth model. Column (2) displays the results for a model that includes natural resource rents (as % of GDP). Column (3) decomposes resource rents by type of commodity (oil, natural gas, coal, mining and forestry). Column (4) test presents the base specification for the oil curse hypothesis whereby we exclude resource rents and its components and concentrate only on the dummy for oil exporters. Column (5) returns to resource rents but it focuses on non-homogenous effects, by identifying oil exporters with significant oil rents using a dummy variable.

Transitional convergence. The coefficient on the initial level of per capita GDP is negative and statistically significant in all specifications. It is consistent with conditional convergence—that is, holding constant other growth determinants, poorer countries grow faster than richer ones. Given the estimated coefficients, the implied speed of convergence is roughly 4 percent per year, with a corresponding half-life of about sixteen years (this is the time it takes for half the income difference between two growing countries to disappear solely due to convergence). Our estimates are higher than those in the literature (e.g., Loayza and Soto, 2002). The estimated coefficient on the initial output gap is also negative as expected but statistically insignificant. We therefore conclude against the notion that if an economy is undergoing a recession at the start of the period, it is expected that its growth rate be higher than otherwise in the following five years, so as to close the output gap.

Structural policies and institutions. In the base regression in column (1) all variables related to structural policies present coefficients with expected signs and statistical significance. Economic growth increases with improvements in education, financial depth, trade openness, and infrastructure. It decreases when governments impose an excessive burden on the private sector. Notably, in all specifications economic growth increases as there is more political participation or when government accountability is higher: both features are largely absent in oil exporting economies. These results are broadly consistent with the vast empirical literature on endogenous growth, including Barro and Lee (2010) on the role of education and government burden; Dollar (1992) on trade openness; Canning et al. (1994) on public infrastructure; and Levine et al. (2000) on financial depth. These results are robust to changing specifications as reported in columns (2) to (5) although the statistical significance reduces somewhat in some of them.

Stabilization policies. All estimated coefficients for these variables carry the expected signs and statistical significance. Economic growth generally decreases when governments do not carry out policies conducive to macroeconomic stability, including the absence of financial and external crises. Like Fischer (1993), we find that an increase in the inflation rate leads to a reduction in economic growth. Finally, the frequency of systemic banking crises has a particularly negative effect on economic growth (Dwyer et al, 2013).

External conditions. Negative terms-of-trade shocks have the effect of slowing down the economy's growth rate. As noted by Easterly et al. (1993), for instance, good luck (in the form of favorable terms-of-trade shocks) is as important as good policies in explaining growth performance over medium-term horizons (such as decades). In a recent paper confined to conflict-affected countries in Sub-Saharan Africa, David et al (2011) find that changes in the terms of trade are the most important growth determinant in the aftermath of conflicts.

We extend the basic regression to include the level of resource rents and present the results in Column (2). It can be seen that the estimated coefficient for transitional, structural, stabilization and external variables remain unchanged while that of resource rents is positive and statistically significant: a permanent increase in resource rents from 1% of GDP to 1.5% of GDP would induce an additional 0.5 percentage points to the growth rate.

Introducing resource rents as an explanatory variable in our growth model does not allow us to discriminate between the nature of such rents. Consequently, we decompose resource rents according to where they are the result of exploiting oil, natural gas, coal, forestry and mining resources and present the results in column (3). It can be seen that oil and mining resources are significantly and positively associated with higher long-run growth while the coefficients for the other natural resources are statistically insignificant. The size of the estimated coefficients is revealing since mining resource rents have twice the effect of oil despite the latter being five times larger on average in the period 1970-2013.

This result would indicate the weakness of producing oil to sustain economic growth. The result is, nevertheless, inconsistent with the oil curse. We re-estimate our base model using a dummy for oil exporters[3] and present the results in Column (4) of Table 3. It can be seen that the estimated coefficients for the classical regressors remain quantitatively unchanged and that we obtain a very large, negative and quite significant coefficient, indicating that our sample of countries conforms to the oil curse case.

It seems, therefore, that producing oil and collecting oil rents is not the main issue but the fact that the country is a net oil exporter what makes the difference. Alternatively, those countries where oil is not a significant –and sometimes, dominant— component of exports are able to avoid or inhibit the negative consequences of the oil curse. To test this notion of non-homogenous effects between oil producers and oil exporters, we include in our growth model an interactive term identifying oil exporters of significant oil rents (*resource rents*dummy oil exporter*) while controlling for the size and origin of resource rents. Results in Column (5) indicate that the resource curse effectively is the case of oil exporters: while resource rents are positive for economic growth, the negative coefficient obtained for oil exporters indicate that this positive effect all but disappears when the country is a net oil exporter.

As discussed, an unexplored area in the natural resource literature is that of monetary policy and, in particular, exchange rate systems. We extend our econometric model to test whether the previous results are affected by exchange regimes. We use one dummy variable taking value 1 if the country has a fixed exchange rate system and, as a counterpart, a dummy variable for purely floating exchange rate systems. The intermediate exchange rate system is excluded to avoid multicolinearity. Therefore, the interpretation of estimates for this dummy variables is in relationship with the omitted regime. Our definition of fixed exchange regime follows that of Reinhart and Rogoff (2004) and views a flexible exchange system essentially as the case where the authority does not have the ability to use the exchange rate as a tool for policy purposes. A floating exchange system characterizes the case where the authorities refuse to use the exchange rate as a tool for policy purposes and allow the market to determine the value of the currency.

We report the results in Table 4, where we exclude the results for the transitional, structural, stabilization and external variables and report only the interaction terms to focus on the purpose of this study.[4] The results in column (1) indicate that, controlling for the country being an oil exporter, the exchange regime makes an important difference. As discussed, exchange regimes may have a direct impact on economic growth by affecting incentives to invest in traded and non-traded sector as well as an indirect effect derived from the impact of currency fluctuations on inflation. Therefore, our specification includes the dummy variables for fixed and floating exchange regimes as well as interaction terms of each of these regime dummies with inflation.

[3] Hydrocarbon exporters are defined according to OPEC´s classification of exporting economies and include Algeria, Angola, Australia, Brunei, Canada, China, Colombia, Congo, Ecuador, Egypt, Gabon, Indonesia, Iran, Iraq, Kuwait, Libya, Malaysia, Mexico, Nigeria, Norway, Oman, Qatar, Russia, Saudi Arabia, Sudan, Syrian Arab Republic, Trinidad and Tobago, United Arab Emirates, United Kingdom, United States, Venezuela, and Vietnam.

[4] In our estimation, we also control for the possible endogeneity of the capital account openness arising from the choice of the exchange regime.

It can be seen that while the estimated parameter for fixed exchange regimes is not statistically different from zero its counterpart for the floating exchange system is negative, sizable and quite significant. This indicates that, ceteris paribus, countries with floating exchange regimes in our sample tend to perform systematically worse than countries with fixed exchange rates or with intermediate exchange rate systems (the excluded option). The interaction terms are also informative. We obtain a positive and significant estimated coefficient for countries with fixed exchange regimes with similar magnitude but opposite sign to that of inflation. This indicates that the negative effects of inflation on economic growth are cancelled if the country has a fixed exchange regime. Likewise, the interaction term for countries with floating exchange regimes also cancel out the negative effects of price instability on economic growth. We conclude that price instability affects negatively sustained economic growth mainly in countries with intermediate monetary arrangements.

While these results are in general congruent with previous research by Rogoff et al. (2003), they may not necessarily reflect the case of resource-dependent economies, particularly oil exporters. In column 2 of Table 4 we present the results of estimating our model but extending the set of regressors to include an interactive term for a country being oil exporter and the two polar exchange regime systems. It can be seen that the general results in column 1 maintain with the new specification. Furthermore, the econometric estimates for oil exporters are statistically insignificant, thus indicating that the choice for exchange regimes in oil-based economies does not have a significantly different effect than in the rest of the countries.

The previous results present the serious shortcoming that by using a dummy variable to represent oil exporting economies it forces the effect to be of equal size for any country with disregard to the size of oil rents or the degree of export concentration. We have seen in Section 3 evidence of very different patterns in terms of these dimensions in oil exporters: a dummy variable would treat equally the relatively more diversified Emirati economy equally to highly concentrated Algeria and it would make no difference between a country enjoying sizable resource rents such as Kuwait with less endowed Egypt. Therefore, we introduce interaction terms of the form "*oil rents*export concentration index*" to better control for the combined effects of both dimensions of the resource curse. We present the results of the econometric estimation in the last column of Table 4.

First note the direct impact of resource rents on economic growth. While mineral exporters benefit from a positive effect on sustained growth, oil exporters a negative and sizable effect. Consider, for example, the case of Algeria which enjoys resource rents of around 22% of GDP and its export concentration index is 0.95. The estimated negative effect on economic growth per capita is around 1.6 percentage points. Countries with lower exports concentration levels or less sizable resource rents have, naturally, smaller negative growth effects.

Now consider the effects of exchange regimes on economic growth. The general finding of the direct effects remains unchanged, i.e. that while fixed exchange regimes may not have a statistically impact on per-capita GDP growth, floating exchange system have a negative, sizable and quite significant impact on economic development. Likewise, the general findings for the indirect effects also remain valid: we obtain a positive and significant estimated coefficient for countries with fixed exchange regimes with similar magnitude but opposite sign to that of inflation, indicating that the negative effects of inflation on economic growth cancel out in countries with fixed exchange regimes. Likewise, the interaction term for countries with floating exchange regimes also cancel out the negative effects of price instability on economic growth. We conclude that price instability affects negatively sustained economic growth mainly in countries with intermediate monetary arrangements.

The main differences are now in the interaction terms revealing the situation of oil exporting countries. It can be seen that oil exporters with floating exchange regimes have a positive and

statistically significant estimated coefficient while those with fixed exchange rates have an insignificant coefficient both is statistical and economic terms. This is a surprising result when one considers that most oil exporters in MENA –particularly the GCC countries—have stubbornly maintained fixed exchange rate regimes for long periods of time. Our result indicate that these economies would grow faster if the would allow the currency to freely float. For example, *ceteris paribus* a country like the UAE with mildly concentrated exports (0.345), resource rents of around 25% of GDP and inflation levels of 8% in the 2000s, would have had sacrificed 0.6 percentage points of economic growth every year because of its choice of exchange regime. In this type of marginal analysis, it is important to bear in mind the importance of the ceteris paribus condition: the expected benefit from moving from one regime to another also requires meeting the conditions to be successful in those new regimes.

5.4 Price instability and inflation

After the emergence of a consensus in the 1980s on the harmful effects of inflation, the last decade of the twentieth century witnessed a marked reduction in inflation rates across the world, a phenomenon popularly known as "the great moderation" (Bernanke, 2004). By the end of the 1980s, empirical evidence collected from large cross-country analyses and numerous case studies indicated that the negative effects of high and variable inflation on macroeconomic stability, economic growth, and income distribution largely outweigh the potential benefits derived from financing fiscal deficits through monetization. Similarly, short-term monetary policies aimed at higher output or lower employment were found to result in high inflation without, in the end, systematically achieving their explicit goals.

The heterogeneity in inflation rates over the last four to five decades poses theoretical as well as practical challenges. We follow Calderón and Schmidt-Hebbel (2010) in defining as our object of interest the normalized rate of inflation (computed as $\pi_t/(1+\pi_t)$) –as opposed to the customary inflation rate, π_t—for two reasons. First, it is the correct alternative cost of holding monetary balances in the context of inflation for most models of money demand (cash in advance, money in the utility function, etc.). Second, using a normalized version of inflation reduces the risk of giving excess weight to outlier episodes of high inflation and hyperinflation and, more generally, it controls for heteroskedasticity in the econometric estimations.

5.5 Inflation determinants

The literature on the determinants of inflation is quite vast and far reaching. Several surveys suggest that the determinants of inflation can be classified in groups according to the nature of the variables and their relationship to inflation (Laidler and Parkin, 1975; de Han, 2010). First, and as expected, there exists a series of institutional determinants of inflation, which we revise in detail below, linked to the degree of accountability and representativeness of the government. Second, countries that participate in the world economy are subject to external price shocks and their response depends primarily on their financial and commercial integration with the global economy. Third, monetary and exchange rate regimes are one of the main determinants of inflation rates and the pass-through of international inflation to domestic economies. Fourth, since inflation is costly to economic agents, indexations mechanisms tend to appear inducing inflation inertia, in particular in the presence of high or chronic inflation episodes. Fifth, transient phenomena, such as fiscal deficits or terms of trade shock can have transitory yet powerful effects on price instability. Fiscal policy is a key determinant of inflation inasmuch as government deficits are monetized and financed by the inflationary tax. Terms of trade shocks are passed through to domestic prices at varying degrees depending on the exchange regime and the phase of the business cycle.

The literature on the determinants of inflation makes scarce references to resource-rich economies and is virtually silent regarding countries in the MENA region (there is, however, a relatively more developed literature on the effects of inflation on other variables such as

growth, public finances or poverty). Ben Ali and Ben Mim (2011) provide some evidence on the monetary and non-monetary determinants of inflation for a sample of eight MENA countries over the period 1980-2009, taking into account the presence of oil exporters. Ghanem (2012) study the inflation performance of fixed but adjustable exchange rate regimes in MENA over the period of 1980-2007, and find that credible pegs are associated with lower inflation. Finally, there is an also incipient literature on the need and requisites for an eventual adoption of inflation targeting in MENA (see Boughazala and Cobham, 2011) and on the possible adoption of a common currency in the GCC countries (Kandil and Trabelsi, 2012).

Institutional Variables. The ability of monetary authorities to tax a large number of economic agents that cannot coordinate at a reasonable cost generates incentives to recur to money printing as a means of finance government expenditures in the short run or to alleviate public debt service even at the cost of rising inflation in the long run. High quality institutions would prevent such time-inconsistent policies to be adopted and thus lower inflation (Cukierman 1992, Aisen and Veiga 2007). We consider two measures of quality of institutions. The *Development Level* (proxied by real GDP per capita) representing a more general group of institutional arrangements. The second institutional variable is the ratio of net foreign assets of the private sector to GDP as a proxy of *Financial Development*. As noted by Calderón and Schmidt-Hebbel (2008) this variable contains information that is expected to be negatively related to inflation. First, it is a proxy of the institutional quality of a country. Second, the more developed financial markets are, the easier it is for a government to finance temporary (and sustainable) deficits through borrowing from national residents, making it less likely to incur in seigniorage-based revenue. In addition, Posen (1993, 1995) argues that the opposition to inflation from the financial sector —which reflects the financial sector's distaste for inflation and its ability to express that distaste— is a significant predictor of inflation.

Integration to global markets. We account for the role of integration to the globalized economy on domestic inflation through two different dimensions: trade openness and financial openness. Regarding *Trade Openness,* several papers have found that as the economies become more open, they tend to have less inflation (Borio and Filardo, 2007). Rogoff (1985) suggests that an explanation is that in such economies monetary policy has smaller short-term, real effects from inflationary surprises. Romer (1993) indicates that unanticipated financial expansion causes domestic exchange rate depreciation and the depreciation are larger in more open economies, the benefits of this is a decreasing function of the openness of the economy. Lane (1997) argues that the mechanism that links openness to incentives to inflate relies on imperfect competition and nominal price rigidity in the non-traded sector. On the other hand, Terra (1998) indicates that the negative association between trade openness and inflation is confined to severely indebted countries and, even then, is only evident during the 1980's debt crisis.

Regarding *Capital Account Openness,* again it might affect inflation through several channels. First, financial integration lowers the cost of foreign financing of temporary fiscal deficits, making it less likely for governments to use seigniorage and creating inflation (Aizenman 1992). Arguably, this is of lesser importance for resource-rich countries –particularly oil exporters—that have relatively easy access to foreign financing. Second, under fixed-exchange rates, capital account openness neutralizes inflationary monetary policy, while in floating exchange regimes it also exerts disciplinary effects on monetary policy by allowing counterbalancing currency substitution and currency depreciation. In turn, these consequences raise the costs associated to it and enhance credibility of the monetary authority, helping lower inflation (Tytell and Wei, 2004). Finally, to the extent that capital account openness comes after improvements in the macroeconomic policy framework (including fiscal discipline, central bank independence and sound monetary policies), it may be concurrent to achieving low inflation levels. The latter two channels are more interesting for resource rich economies.

Monetary Regimes. We test for three types of monetary arrangements which have been extensively studied in the literature (Calderón and Schmidt-Hebbel, 2010). First, we use a binary variable taking value of 1 for countries that conduct monetary policy within an *Inflation Targeting* (IT) regime and 0 otherwise. Empirical evidence suggests that adopting IT regimes tend to lower inflation and reduce its volatility (see Loayza and Soto, 2002). Arguably, part of the success of IT could be more apparent than real as its implementation in most economies coincided with the great moderation; to the extent that international inflation filters to the domestic economy, the success of IT in lowering inflation may be less than claimed. Mishkin and Schmidt-Hebbel (2007), however, find that the largest benefit of inflation reduction among IT countries is experienced by emerging market economies.

Second, we account for the effects of the *Exchange Rate Regime.* We include the three regimes (fixed, flexible and intermediate) we used in the previous section. We expect inflation to be lower in countries that adopted fixed exchange rate regimes —with the impact being even stronger in countries with hard pegs (Levy-Yeyati and Sturzenegger, 2001). Usually, countries that adopt fixed exchange rate regimes are precisely those that suffer high inflation and that eventually lower it. Second, fixed exchange rate regimes operate as a disciplinary tool for monetary authorities, limiting their ability to indefinitely expand monetary base at the risk of causing a balance of payments crisis. Third, fixed exchange rate regimes also have a signaling effect that enhances credibility of lower future inflation. This credibility would help anchor inflation expectations thus lowering actual inflation. Evidence on the negative association between inflation and pegs can be found in Husain, Mody and Rogoff (2005), among others. Floating exchange rates, the other polar case of exchange regime, are popularly associated with higher inflation rates. Recurrent fluctuations in the nominal exchange rate may induce continuous price adjustments in domestic markets and a tendency towards higher inflation

The previous discussion highlights the possibility that exchange regimes may be selected by monetary authorities precisely to control inflation. For example, several countries have recurred to fixing the exchange rate to control inflationary bouts, usually with deleterious effects on the real exchange rate and external competitiveness. Likewise, floating exchange regimes have been sometimes adopted as a last-resort tool to tame inflationary processes that have gone out of the control of monetary authorities.

Inflation Inertia and High Inflation Episodes. As mentioned, inflation is costly to economic agents and it is unsurprising that indexations mechanisms tend to appear inducing **inflation inertia**, in particular in chronic inflation economies. Furthermore, expectations based at least partly on past inflation rates play also a role in inducing inertia in inflation. We therefore employ a dynamic econometric model that includes a lag of the normalized inflation as a regressor.

In addition, Fischer et al. (2002) point out that there are several reasons to isolate extreme but infrequent episodes of high inflation: (a) hyperinflations are very costly and countries are not willing to tolerate them for long and (b) linear estimation models tend to severely overestimate the impact of inflation on macroeconomic performance compared estimations using samples of countries where this phenomenon is absent. To define episodes of ***high inflation*** and ***hyperinflation*** we follow Dornbusch and Fischer (1993) in using binary variables were hyperinflation is defined as the episode in which annual inflation exceeds 1000 percent, and high inflation refers to those episodes of annual inflation exceeding 50 percent on an annual basis.

Transient phenomena. There is a long literature on the inflationary effects of commodity prices –in particular energy prices—under the general moniker of pass-through. Small open economies tend to import international inflation and be sensitive to commodity price shocks.

And even inflation in the US economy seems to be affected by oil prices, albeit in a declining manner since the mid-1980s (Hooker, 2002).

Finally, macroeconomists have reached a consensus that government deficits are the main source of inflationary pressures whenever authorities decide to monetize and finance the deficit via the inflationary tax (Fischer et al., 2002), even if in the short run feedback effects running from inflation to the fiscal stance can be quite convoluted (Catao and Terrones, 2005).

5.7 Econometric results of inflation models

We estimate dynamic panel-data models of inflation for around 140 countries in the period 1980-2013. We use five year averages of inflation and its determinants in the estimation (around 425 observations) and control for country and time specific fixed effects as well as for the potential endogeneity of right-hand side variables using a GMM system estimator.

Table 5 presents the econometric results. Column (1) in the table corresponds to the base specification for the long-run inflation model. We summarize these results first because they form the basis of our analysis and also because they reproduce in all the extensions of this base model we use in order to assess the case of resource-rich and oil-based economies.

Inflation experience. It can be seen that the estimators of the coefficients our three variables are highly significant in statistical terms and present positive signs which are congruent with previous empirical analysis. Inflation inertia is noticeable, as reflected in the estimate of around 0.1 for the lagged dependent variable. High inflation episodes, as well as hyperinflations, are positively correlated with current inflation levels, indicating a high degree of persistence in price instability and attests to the difficulties of monetary authorities in controlling inflationary processes.

Institutional Variables. We start our analysis including three variables suggested by the empirical literature: overall development levels (proxied by real GDP per capita), financial development (proxied by net foreign assets as share of GDP) and a measure of government accountability (checks and balances). The estimated coefficients for the first two variables have the expected negative signs and are statistically significant at the 5% and 10%, respectively. The third institutional variable –government accountability—proved to be statistically insignificant, the results of it being a rather crude measure, and was subsequently deleted from the model. As shown in Appendix Table 2, institutional variables tend to be collinear and, therefore, it is not surprising to find insignificant estimates at the individual level. In subsequent estimations we only keep the overall development and financial development as control variables.

Integration to global markets. Trade openness has a positive estimated coefficient and but is statistically insignificant in our base model. These results are in line with the findings of Romer (1993) for OECD countries but contradict those results of Calderon and Schmitt-Hebbel (2008) who show a significant impact of trade openness on inflation. As recognized by these latter authors their estimated effect is sensitive to the methodology used to estimate openness and to the group of countries included in the sample. One important consideration is that our measured of trade openness filters out from the volume of trade the effects of several key variables such as the size of the economy (area and population), the level of country remittances, for whether it is landlocked, and for whether it is an oil exporter. Therefore, our measure is one of "extra-normal" openness and is not necessarily comparable to that of Calderón and Schmitt-Hebbel.

On the other hand, financial openness is highly correlated with lower inflation levels. The disciplining effect of a financial sector integrated to global markets arises from the larger cost an economy has to pay if it deviates from world standards. Higher domestic inflation signals for currency adjustment, increases country risk and financial costs, and reduces intermediation. In turn, this hampers financing of long term projects.

Monetary Regimes. The coefficients on the three monetary regimes are all statistically significant, have the expected signs and are consistent with theoretical predictions and received empirical knowledge. It is noteworthy the effect of inflation targeting: our very crude measure based on a dummy variable indicates that IT countries enjoy on average 2.5 percentage point less of annual inflation, which compares very favorably with the sample mean for normalized inflation of 10.4%.

An important consideration is the connection between inflation targeting and floating exchange regimes. While it is true that consolidated IT economies tend to have floating exchange regimes, they are by no means synonyms. First and most obvious, there are countries with floating exchange regimes that do not engage in the mechanics of inflation targeting. Second, even for IT economies, floating the currency was hardly the case during the initial stages of setting up the IT regime. These economies often start by announcing quantitative targets while maintaining some degree of control over the exchange market, mostly with the purpose of avoiding wild fluctuations of the currency that could, in turn, make difficult to achieve the target. Third, from an empirical point of view, the empirical correlation between IT and floating exchange rates is very low (0.02) so that estimates are not contaminated with collinear effects.

As expected, countries with fixed exchange regimes tend, on average, to have lower inflation levels than the excluded case of the intermediate regime: to the extent that the peg is credible, the exchange rate operates as a nominal anchor and help control inflation expectations. The economic effects are, again, quite sizable.

Countries with floating exchange systems tend to have significantly higher inflation levels than the excluded case of the intermediate regime and located half way between the intermediate case and high inflation countries.

Additional controls. We include in our regression a measure of transitory shocks to the terms of trade. This non-persistent variable helps controlling for transient phenomena that may affect inflation during adjustment phases. For example, the effect of fluctuations in the international price of energy may affect internal prices with some delay thus showing in the inflation rate even if it is a once-and-for-all adjustment. The positive estimated coefficient supports this notion. On the other hand, fiscal deficits have the expected positive effect on inflation. This variable is instrumented with lags in the estimation to avoid feedback effects and simultaneity biases. The point estimate is nevertheless small as expected for data in the form of five-year averages.

The results for these basic set of variables are not affected in any significant economic or statistical manner once we include variables to represent the case of oil-exporting economies, as can be seen in Table 5. This suggests that the model is quite robust and, in what follows, allow us to concentrate only on the testing of the main hypothesis.

We extend the basic regression to include the level of natural resource rents –resource abundance—and present the results in columns 2, 3 and 4. When adding a simple dummy variable to capture oil exporting economies (see column 2) the estimated coefficient is negative, suggesting the ability of these countries to better control inflation or the ability to finance the fiscal budget without recurring to inflationary taxes. On the contrary when using resource rents as the control variable, we obtain a positive estimate which suggest that *ceteris paribus* the higher the resource rents the more likely it is that countries have higher inflation. This apparently contradicting result suggest the need to investigate whether the nature of resource rents may have a differential effect on inflation levels. In column 4 we split resource rents by type of good and find that countries with sizable rents arising from oil and natural gas tend to have significantly higher annual inflation rates in the range of one percent. For the other natural

resource exporters –of mining, coal and forestry—we find no significant effects of rents on inflation.

Our final test on the relationship between resource abundance and inflation is to split oil and energy producers by exchange rate system. The results are presented in column 5 of Table 5. It can be seen that resource abundance is negatively associated with inflation in countries with floating exchange systems, while countries with fixed regimes do not perform significantly different than countries with intermediate systems which are the default specification of our model. One explanation for this finding could be authorities in resource-dependent economies choose flexible monetary regimes so as to cope better with the aggregate demand effects of instability of international oil prices and, therefore, are able to isolate better their economies providing less price instability.

6. Conclusions

The ample consensus that monetary policy plays a key role in fostering economic growth and avoiding macroeconomic instability is largely based on evidence for developed and emerging countries where natural resources do not play the prominent role they play in Middle East economies. Countries endowed with significant deposits of natural resources tend to develop economic structures that render policy standard prescriptions of macroeconomic management less applicable. On one hand, government financing is hardly a limitation when proceeds from natural resources are abundant. On the other hand, resource-based economies are sensitive to fluctuations in commodity prices mostly when exports are not properly diversified and countries become resource dependents.

In most resource-rich economies of the Middle East matters are more complicated due to the absence of an active monetary policy, itself the result of pegging the exchange rate to a hard-foreign currency (originally the British pound and nowadays the US dollar). Thus, the isolating properties of the exchange market is not in place, magnifying the impact of foreign shocks on domestic markets. Fiscal policies do not provide much leeway to smooth out external fluctuations as budgets tend to follow quite closely the oil-price cycle. Consequently, macroeconomic policies are often highly pro-cyclical and fail to stabilize the economy when most needed.

In this paper, we find evidence that resource rents have a significant role in macroeconomic performance in resource rich economies and, particularly, in Middle East countries. Natural resource rents have a positive and sizable effect on long-term economic growth in the case of mining and hydrocarbons (oil and natural gas), but less so in the cases of coal and forestry products. Concentration of exports on resource-based goods, on the other hand, is detrimental to economic growth as it signals the inability of the economies to develop a balanced productive base. In this regard, the negative association of resources and long-term growth –popularly known as the resource curse—is largely the fate of oil and natural gas exporters being much less relevant for mineral, coal, and forestry exporters. We also find that countries with sizable rents arising from oil and natural gas tend to have significantly higher annual inflation rates, mostly as a result of high government expenditures, calling for conservative monetary policy to counterbalance this effect for the other natural resource exporters –of mining, coal and forestry products—we find no significant effects of resource rents on long term inflation.

We also find evidence that exchange regimes make also an important difference to the long-term performance of a resource rich economy. Our general finding is that per-se intermediate and fixed exchange regimes do not have a statistically impact on the rate of growth of real per-capita GDP but floating exchange systems have a sizable detrimental effect. When considering price instability, the direct effect of the exchange regime is striking: while intermediate regimes do not have a perceptible impact on inflation, fixed exchange rates lower inflation rates systematically and floating regimes increase significantly price instability. Therefore, on the

account of direct effects, one has to conclude that fixed regimes do have an edge vis-à-vis the other exchange arrangements: to the extent that the peg is credible, the exchange rate operates as a nominal anchor, that helps control inflation expectations, reduces risks for investment and foster sustainable growth.

Nevertheless, exchange rate systems also have indirect effects. One such effect operates by ameliorating the hampering effect of price instability on economic growth. We found that the negative effects of inflation on economic growth cancel out in countries with fixed exchange regimes or with pure floats. On the contrary, the evidence suggests that in countries where monetary authorities intervene frequently in the exchange market there are negative effects of price instability on economic growth.

References

Aisen, A. and F. J. Veiga, 2006. "Does Political Instability lead to higher inflation? A Panel Data Analysis." *Journal of Money Credit and Banking* 38(5): 1379-1390.

Arellano, M. and S. Bond, 1991. "Some Tests of Specification for Panel Data: Monte Carlo Evidence and an Application to Employment Equations." *Review of Economic Studies* 58 (2): 277–97.

Arellano, M. and O. Bover, 1995. "Another Look at the Instrumental Variable Estimation of Error-Component Models." *Journal of Econometrics* 68 (1): 29-51.

Bernanke, B., 2004, "The Great Moderation," Remarks as FRB Governor at the meetings of the Eastern Economic Association, Washington, DC February 20.

Blundell, R. and S. Bond, 1998. "Initial Conditions and Moment Restrictions in Dynamic Panel Data Models." *Journal of Econometrics* 87 (1), 115-43.

Barro, R. and J. Lee, 2010. "A New Data Set of Educational Attainment in the World, 1950-2010." *Journal of Development Economics*, 104: 184-198.

Borio, C.E.V., and A. Filardo, 2007. "Globalisation and inflation: New cross-country evidence on the global determinants of domestic inflation." BIS Working Papers No 227, May.

Boughzala, M. and D. Cobham, 2011. *Inflation Targeting in MENA Countries: An Unfinished Journey*, Palgrave Macmillan.

Calderón, C. and K. Schmidt-Hebbel, 2010. "What Drives Inflation in the World?," RBA Annual Conference Volume, in: Renée Fry & Callum Jones & Christopher Kent (ed.), *Inflation in an Era of Relative Price Shocks*. Reserve Bank of Australia.

Canning, D., M. Fay, and R. Perotti, 1994. "Infrastructure and Growth." International Differences in Growth Rates: Market Globalization and Economic Areas. Central Issues in Contemporary Economic Theory and Policy series. New York: St. Martin's Press.

Catao, L. and M. Terrones, 2005. "Fiscal deficits and inflation." *Journal of Monetary Economics* 52, 529-554

Cherif, M., B. Kamar, S. Ben Naceur and M. Goaied, 2011. "Does Capital Account Liberalization Spur Economic and Financial Performance? New Investigation for MENA Countries", FEMISE Report 33-06.

Chinn, M. D. and H. Ito (2006). "What Matters for Financial Development? Capital Controls, Institutions, and Interactions," *Journal of Development Economics*, 81(1): 163-192.

Cukierman, A., 1992. *Central Bank Strategy, Credibility, and Independence: Theory and Evidence*. The MIT Press. Cambridge, Massachussets.

David, A.C.; F. Rodrigues Bastos and M. Mills, 2011. "Post-conflict Recovery: Institutions, Aid or Luck?" IMF Working Paper. WP/11/149.

De Han, J. 2010: "Inflation Differentials in the Euro Area: A Survey", in J. de Haan and H. Berger (eds.), *The European Central Bank at Ten*, Springer-Verlag, Berlin Heidelberg.

Deraniyagala, S., and Kaluwa, B., 2011, "Macroeconomic policy for employment creation: the case of Malawi", Employment working paper No. 93, Geneva: International Labour Office.

Dollar, D. 1992. "Outward-Oriented Developing Economies Really Do Grow More Rapidly: Evidence from 95 LDCs, 1976–1985." *Economic Development and Cultural Change* 40(3): 523–44.

Dornbusch, R. and S. Fischer, 1993. "Moderate Inflation," *World Bank Economic Review*, 7(1): 1-44.

Dwyer, G.; J. Devereux; S. Baier and R. Tamura, 2013. "Recessions, growth and banking crises", *Journal of International Money and Finance*, 38(November): 18–40.

Easterly, W., and S. Rebelo. 1993. "Fiscal Policy and Economic Growth:An Empirical Investigation." *Journal of Monetary Economics* 32(3):417–58.

Fischer, S. 1993. "The Role of Macroeconomic Factors in Growth." *Journal of Monetary Economics* 32(3):485–511.

Fischer, S. Sahay, and R., Végh, C., 2002. "Modern hyper–and high inflations", *Journal of Economic Literature* 40(3), 837-80.

Ghanem, D. 2012. "Fixed Exchange Rate Regimes and Inflation Performance: Evidence from MENA Countries", *Review of Middle East Economics and Finance*, 8(1): 1–30.

Gourinchas, P. O. and O. Jeanne, 2013. "Capital Flows to Developing Countries: The Allocation Puzzle", *Review of Economic Studies*, 80(4): 1484-1515.

Haslag, J., 1997. "Output, Growth, Welfare and Inflation: a Survey," *Federal Reserve Bank of Dallas Economic Review*, 2nd Quarter: 11-21.

Hooker, M. 2002. "Are Oil Shocks Inflationary? Asymmetric and Nonlinear Specifications versus Changes in Regime." *Journal of Money, Credit, and Banking*, 34: 540-561.

Imbs, J. and R. Wacziarg, 2003: "Stages of Diversification", *American Economic Review*, 93 (1): 63-86.

Kandil, M. and M. Trabelsi (2012). "Is the Announced Monetary Union in GCC Countries Feasible? A Multivariate Structural VAR Approach", *Middle East Development Journal,* 4(1): 1-8.

Klein, M. 2005. "Capital Account Liberalization, Institutional Quality and Economic Growth", NBER WORKING PAPER SERIES 11112.

Kydland, F.W. and E. Prescott (1977). "Rules rather than discretion: the inconsistency of optimal plans," *Journal of Political Economy* 85(3). 473-91.

Laeven, L. and F. Valencia. 2013. "Systemic Banking Crisis Database", *IMF Economic Review* 61, 225-270.

Laidler, D. and M. Parkin, 1975. "Inflation: A Survey", *The Economic Journal*, 85: 741-809.

Lane, P. R., 1997. "Inflation in open economies." *Journal of International Economics* 42: 327-347.

Levine, R., N. Loayza, and T. Beck. 2000. "Financial Intermediation and Growth: Causality and Causes." *Journal of Monetary Economics*, 46(1): 31–77.

Loayza, N. and R. Soto, 2002. *Economic Growth. Sources, Trends, and Cycles*, Banco Central de Chile: Santiago de Chile.

Lucas, R. E., 2003. "Macroeconomic Priorities", *American Economic Review*, 93(1): 1-14.

Mishkin, F. and K. Schmidt-Hebbel, 2007. "Does Inflation Targeting Make a Difference?" In *Monetary Policy under Inflation Targeting*, edited by F. Mishkin and K. Schmidt-Hebbel, 291-372. Santiago: Central Bank of Chile.

Phelps, E., 1973. "Inflation in the Theory of Public Finance." *Swedish Journal of Economics* 75: 67-82.

Posen, A.S., 1993. “"Why Central Bank Independence does not Cause Low Inflation: There is no Institutional Fix for Politics". In R. O'Brien (Ed.), *Finance and the International Economy* (pp. 41-66). Oxford: Oxford University Press.

Posen, A.S., 1995. “Declarations are not enough: Financial sector sources of central bank independence.” In NBER Macroeconomics Annual 1995, Volume 10, Ben S. Bernanke and Julio J. Rotemberg, eds. MIT Press.

Reinhart, C. M. and K. S. Rogoff (2004): “The Modern History of Exchange Rate Arrangements: A Reinterpretation”, *Quarterly Journal of Economics* 119(1):1-48.

Rogoff, K. S., 1985: “Can international monetary policy cooperation be counterproductive?”, *Journal of International Economics*, 18(1): 199-217.

Rogoff, K.; A. M. Husain, A. Mody, R. Brooks, and N. Oomes, 2003. “Evolution and Performance of Exchange Rate Regimes”, IMF Working Paper WP/03/243.

Romer, D., 1993. “Openness and Inflation: Theory and Evidence”, *Quarterly Journal of Economics* 108, 869-903

Schmidt-Hebbel, K. (2009): “Inflation Targeting Twenty Years on: Where, When, Why, With what Effects, What lies ahead?”, Working Paper #360, Department of Economics, Pontificia Universidad Católica de Chile.

Terra, C.T., 1998. “Openness and Inflation: A New Assessment.” *Quarterly Journal of Economics* 113(2), 641-648

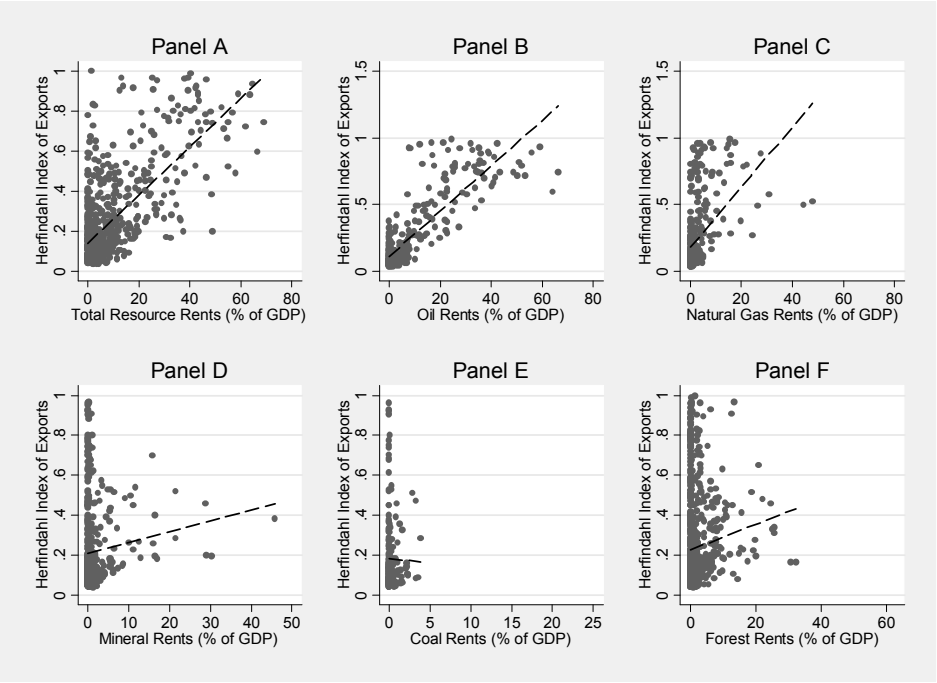
Tytell, I. and S. Wei, 2004. “Does Financial Globalization Induce Better Macroeconomic Policies?” IMF Working Paper No. 04/84.

United Nations COMTRADE database (2014).

van der Ploeg, F. 2011. “Natural Resources: Curse or Blessing?”, *Journal of Economic Literature*, 49(2): 366-420.

World Bank (2014): *World Development Indicators*, Washington, DC.

Figure 1: Resource Abundance and Resource Dependence (five-year averages, 1980-2013)



Source: own elaboration based on data from United Nations COMTRADE database.

Table 1: Total Natural Resource Rents (Decade Average, as Share of GDP, percent)

	1970s	1980s	1990s	2000s
World	3.7	4.2	2.0	4.0
By Geographical area				
East Asia and Pacific	2.7	3.1	1.1	2.8
Europe and Central Asia	1.0	1.6	1.5	2.8
Latin America and the Caribbean	6.5	9.5	4.6	8.5
Middle East and North Africa	26.4	25.1	19.8	30.7
South Asia	4.2	5.4	4.1	4.9
Sub-Saharan Africa	10.7	13.4	11.1	18.7
By Income Levels				
High income				
High income: OECD	1.9	2.1	0.7	1.3
High income: non OECD*	23.1	27.0	16.0	26.7
Middle income				
Upper middle income	8.9	8.7	6.3	9.3
Lower middle income	9.0	10.5	7.3	9.9
Low income	5.8	7.1	8.3	9.7

Note (*): includes small size, high income European economies (Andorra, Liechtenstein, Malta, Monaco, Cyprus, Latvia, Croatia), former OECD territories (Antigua and Barbuda, Aruba, Macao, Bahamas, Barbados, New Caledonia, Bermuda Northern Mariana Islands, Cayman Islands, Puerto Rico, Channel Islands, Curacao, San Marino, Singapore Faeroe Islands, Sint Maarten (Dutch part), French Polynesia, St. Kitts and Nevis, St. Martin (French part), Greenland Guam, Hong Kong, Turks and Caicos Islands, Isle of Man, Virgin Islands) and oil exporters (Bahrain, Brunei Darussalam, Oman, Qatar, Russian Federation, Saudi Arabia, Equatorial Guinea, Trinidad and Tobago, United Arab Emirates, Kuwait).
Source: own elaboration based on data from World Bank *World Development Indicators 2014.*

Table 2: Resource Abundance vs. Resource Dependence in MENA (averages for the period 1970-2013)

	Total Resource Rents (% of GDP)	Fuel and energy exports (% of Merchandise Exports)	Herfindahl Index of Export Concentration
Algeria	22.2	95.0	0.949
Bahrein	31.9	42.0	0.533
Egypt	15.0	37.9	0.186
Iran	28.8	85.3	0.715
Iraq	54.4	64.6	NA
Israel	0.4	0.3	0.152
Jordan	0.9	0.2	0.067
Kuwait	48.3	80.8	0.865
Lebanon	0.0	0.4	0.076
Libya	40.3	98.1	0.946
Morocco	2.4	2.4	0.079
Oman	45.7	85.4	0.633
Qatar	44.6	90.7	0.803
Saudi Arabia	43.1	92.2	0.777
Syria	17.2	61.6	0.349
Tunisia	7.2	23.7	0.124
UAE	26.3	54.1	0.345
Yemen	28.4	88.8	0.812
MENA Average	***25.4***	***55.8***	***0.495***
World Average	***8.7***	***16.2***	***0.265***

Source: own elaboration based on data from World Bank World Development Indicators 2014 and UN COMTRADE.

Table 3: Econometric Results: Growth in Per Capita Real GDP

Explanatory Variable	(1)	(2)	(3)	(4)	(5)
Transitional Convergence					
Initial GDP per capita	-3.899***	-3.815***	-3.922***	-3.940***	-4.002***
(in logs)	(0.357)	(0.355)	(0.371)	(0.356)	(0.352)
Cyclical reversion	*-2.796*	*-1.891*	*-1.789*	*-3.164*	*-1.497*
(Initial output gap)	*(2.911)*	*(2.917)*	*(2.917)*	*(2.902)*	*(5.708)*
Structural policies and institutions					
Education	3.231***	3.019***	3.340***	2.501***	2.900**
(secondary attainment, in logs)	(0.778)	(0.772)	(0.784)	(0.805)	(1.311)
Trade Openness	3.927***	3.844***	4.139***	3.678***	4.088***
(% of GDP, in logs)	(0.519)	(0.515)	(0.516)	(0.523)	(0.672)
Capital Account Openness	0.249**	0.269**	0.300**	*0.209*	*0.290*
(*Chinn and Ito index)*	(0.133)	(0.133)	(0.134)	*(0.134)*	*(0.202)*
Government Burden	-0.947*	*-0.849*	-1.020*	-0.941*	*-1.052*
(gov. consumption % of GDP, in logs)	(0.541)	*(0.536)*	(0.534)	(0.538)	*(1.176)*
Infrastructure	0.530**	0.577**	*0.429*	*0.438*	*0.534*
(telephones per capita, in logs)	(0.293)	(0.292)	*(0.302)*	*(0.294)*	*(0.433)*
Political Participation	0.142**	0.148**	0.153**	0.098*	0.168**
(democracy index)	(0.059)	(0.059)	(0.059)	(0.060)	(0.083)
Government Accountability	0.007**	0.007**	0.006**	0.010***	0.006*
(checks and balances index)	(0.003)	(0.003)	(0.003)	(0.003)	(0.003)
Stabilization policies					
Price Instability	*-0.048*	*-0.048*	*-0.033*	-0.067**	*-0.029*
(CPI inflation rate)	*(0.031)*	*(0.031)*	*(0.031)*	(0.032)	*(0.200)*
Systemic Banking Crisis	-2.376***	-2.389***	-2.320***	-2.441***	-2.312***
(frequency of years in crisis)	(0.469)	(0.466)	(0.465)	(0.468)	(0.526)
External Conditions					
Terms of Trade Shocks	5.320***	4.272***	4.460***	5.548***	4.697**
(growth rate of terms of trade)	(1.498)	(1.572)	(1.590)	(1.602)	(2.205)
Additional Controls					
Natural Resource Rents	-	0.057**	-	-	-
(% of GDP)		(0.022)			
Oil Resource Rents	-	-	0.065**	-	0.137***
(% of GDP)			(0.031)		(0.050)
Natural Gas Resource Rents	-	-	-0.059	-	-0.059
(% of GDP)			(0.057)		(0.074)
Coal Resource Rents	-	-	0.298*	-	0.268*
(% of GDP)			(0.177)		(0.164)
Mining Resource Rents	-	-	0.128***	-	0.125***
(% of GDP)			(0.048)		(0.48)
Forestry Resource Rents	-	-	-0.078	-	-0.089
(% of GDP)			(0.067)		(0.0127)
Oil Exporter	-	-	-	-5.058***	-
(dummy)				(1.602)	
Oil Exporter*Oil Resource Rents	-	-	-	-	-0.115*
(interaction term)					(0.064)
Constant	30.840***	29.725***	28.518***	33.046***	32.149***
	(3.006)	(3.000)	(3.041)	(3.075)	(5.966)
Sargan test	118.09***	124.69***	136.59***	109.06***	137.64***
Serial correlation test of order 1	-5.06***	-5.19***	-5.01***	-5.00***	-4.96**
Serial correlation test of order 2	-0.52	-0.64	-0.52	-0.52	-0.49

Note: Number of countries=125, number of observations=778, maximum number of instruments=60, time dummies and country dummies included. (*,**,***)= significant at 90%, 95% and 99% confidence, respectively.

Table 4: Econometric Results: Growth in Per Capita Real GDP (Standard Controls Not Reported)

Explanatory Variable	(1)	(2)	(3)
Oil Exporter	-6.513***	-6.556***	
	(1.647)	(1.702)	
Oil Rents*Export concentration index			-0.078*
			(0.045)
Mineral Rents* Export concentration index			0.264*
			(0.177)
Inflation	-0.057***	-0.057***	-0.058**
	(0.021)	(0.021)	(0.028)
Fixed Exchange Rate	-0.211	0.446	-0.228
	(0.616)	(0.693)	(0.669)
Floating Exchange Rate	-3.338***	-3.407***	-2.432***
	(0.745)	(0.812)	(0.977)
Fixed Exchange Rate*Inflation	0.057*	0.057***	0.053*
	(0.021)	(0.022)	(0.028)
Floating Exchange Rate*Inflation	0.056*	0.056***	0.057**
	(0.021)	(0.021)	(0.028)
Fixed Exchange Rate*Oil Exporter		-0.694	
		(1.835)	
Floating Exchange Rate*Oil Exporter		-1.350	
		(2.246)	
Fixed Exchange Rate*Inflation*Oil Exporter		-0.014	
		(0.106)	
Floating Exchange Rate* Inflation*Oil Exporter		0.054	
		(0.041)	
Fixed Exchange Rate*Inflation*Oil Rents *Export Concentration			0.002
			(0.001)
Floating Exchange Rate*Inflation*Oil Rents *Export Concentration			0.009**
			(0.003)
Sargan test	122.66***	81.70***	114.46***
Serial corr. test order 1	-3.59***	-2.81***	-2.25**
Serial corr. test order 2	-0.981	0.885	-1.10

Note: Number of countries = 125, number of observations = 484, maximum number of instruments = 59, time dummies and country dummies included. (*,**,***)= significant at 90%, 95% and 99% confidence, respectively.

Table 5: Econometric Results: Normalized Inflation Rate

	(1)	(2)	(3)	(4)	(5)
Inflation Experience					
High Inflation	0.624***	0.650***	0.637***	0.637***	0.678***
	(0.031)	(0.032)	(0.031)	(0.031)	(0.032)
Hyperinflation	0.829***	0.830***	0.841***	0.857***	0.801***
	(0.045)	(0.044)	(0.044)	(0.047)	(0.044)
Lagged Dep. Variable	0.077***	0.076***	0.087***	0.076***	0.058**
	(0.023)	(0.024)	(0.023)	(0.023)	(0.023)
Development Levels					
Real per capita GDP	-0.019***	-0.011*	-0.014**	-0.017***	-0.011*
	(0.006)	(0.006)	(0.006)	(0.007)	(0.006)
Financial Development	-0.013	-0.009	-0.012*	-0.012	-0.012*
	(0.013)	(0.007)	(0.007)	(0.008)	(0.007)
Institutional Variables					
Trade Openness	0.014	0.016	0.009	0.006	0.019
	(0.014)	(0.013)	(0.003)	(0.013)	(0.013)
Capital Account Openness	-0.013***	-0.013***	-0.010***	-0.007***	-0.013***
	(0.003)	(0.004)	(0.003)	(0.002)	(0.004)
Monetary Regimes					
Inflation Target	-0.025**	-0.028**	-0.026**	-0.026**	-0.030**
	(0.011)	(0.011)	(0.012)	(0.011)	(0.011)
Fixed Exchange System	-0.037***	-0.034***	-0.039***	-0.042***	-0.039***
	(0.010)	(0.010)	(0.010)	(0.010)	(0.013)
Floating Exchange System	0.039***	0.031***	0.031***	0.029***	0.046***
	(0.012)	(0.012)	(0.012)	(0.012)	(0.012)
Additional Controls					
Government Budget Balance	0.002***		0.002*	0.001	0.001*
	(0.001)		(0.001)	(0.0007)	(0.001)
Terms of Trade Shocks	0.002***	0.002***	0.001	0.002***	0.001
	(0.001)	(0.001)	(0.001)	(0.0005)	(0.001)
Oil exporter		-0.200*			-0.161
		(0.116)			(0.114)
Resource Rents			0.003***		
			(0.001)		
Oil Rent				0.003***	
				(0.001)	
Natural Gas rent				0.003***	
				(0.001)	
Mining rent				0.000	
				(0.001)	
Coal rent				-0.003	
				(0.003)	
Forestry rent				0.002	
				(0.001)	
Oil exporter * Fixed exchange					0.012
					(0.021)
Oil Exporter * Floating Exchange					-0.085***
					(0.030)
Constant	0.246***	0.190***	0.189***	0.211***	0.191***
	(0.051)	(0.051)	(0.052)	(0.057)	(0.050)
Sargan Test	32.98	29.21	31.61	32.59	29.09
Serial correlation test of order 1	-2.49***	-2.41***	-2.20**	-2.36***	-2.36***
Serial correlation test of order 2	-1.50	-0.82	-0.87	-0.84	-1.09

Note: Number of countries=138, number of observations=423, maximum number of instruments=48, time dummies and country dummies included but not reported. (*,**,***)= significant at 90%, 95% and 99% confidence, respectively.

Appendix

List of Countries

Africa	Burundi, Benin, Botswana, Cameroon, Central African Republic, Republic of Congo, Democratic Republic of Congo, Cote d'Ivoire, Gabon, The Gambia, Ghana, Kenya, Lesotho, Liberia, Malawi, Mali, Mauritania, Mauritius, Mozambique, Namibia, Niger, Rwanda, Senegal, Sierra Leone, South Africa, Sudan, Swaziland, Tanzania, Togo, Uganda, Zambia, Zimbabwe
Asia	Bangladesh, Cambodia, China, India, Indonesia, Japan, Korea, Lao, Malaysia, Mongolia, Nepal, Pakistan, Philippines, Sri Lanka, Thailand, Vietnam
Eastern Europe and Central Asia	Albania, Armenia, Bulgaria, Croatia, Czech Republic, Estonia, Hungary, Kazakhstan, Kyrgyz Republic, Latvia, Lithuania, Moldova, Poland, Romania, Russia, Slovak Republic, Slovenia, Tajikistan, Ukraine
Europe	Austria, Belgium, Cyprus, Denmark, Finland, France, Germany, Greece, Ireland, Italy, Netherlands, Norway, Portugal, Spain, Sweden, Switzerland, Turkey, United Kingdom
Latin America	Argentina, Bolivia, Brazil, Chile, Colombia, Costa Rica, Dominican Republic, Ecuador, Guatemala, Guyana, Honduras, Mexico, Nicaragua, Panama, Paraguay, Peru, El Salvador, Trinidad and Tobago, Uruguay, Venezuela.
MENA	Algeria, Bahrain, Egypt, Iran, Israel, Jordan, Kuwait, Morocco, Qatar Saudi Arabia, Syria, Tunisia, United Arab Emirates, Yemen.
North America	Canada, United States
Oceania	Australia, Fiji, New Zealand, Papua New Guinea

Definitions and Sources of Variables used in Regression Analysis

Variable	Definition and construction	Source
Real per capita GDP	Ratio of total GDP to total population. GDP is in 1985 PPP-adjusted US$. Growth rates are obtained from constant 1995 US$ per capita GDP series.	World Bank (2014).
Initial Output Gap	Difference between the log of actual GDP and (the log of) potential (trend) GDP around the start of the period. The Hodrick-Prescott filter is used to decompose the log of GDP.	Author's calculations based on data from World Bank (2014)
Secondary School Attainment	Ratio of total secondary enrollment, regardless of age, to the population of the age group that officially corresponds to that level of education.	Barro and Lee (2010) database.
Trade Openness	Residual of a regression of the log of the ratio of exports and imports (in 1995 US$) to GDP (in 1995 US$), on the logs of area and population, as well as dummies for oil-exporting and landlocked countries.	Author's calculations, based on data from World Bank (2014).
Capital Account Openness	Residual of a regression of the log of the ratio of exports and imports (in 1995 US$) to GDP (in 1995 US$), on the logs of area and population, as well as dummies for oil-exporting and landlocked countries.	Chinn and Ito database (2014).
Government Burden	Ratio of government consumption to GDP	World Bank (2014).
Main telephone lines per 1,000 workers	Telephone mainlines are telephone lines connecting a customer's equipment to the public switched telephone network. Data are presented per 1,000 population for the entire country.	World Bank (2014)
Political Participation	Democracy index, corresponding to Polity2 indices of the Polity IV project	Integrated Network for Societal Conflict Research (INSCR)
Political Risk and Checks and Balances	Number of veto players in a political system, adjusting for whether these veto players are independent of each other, as determined by the level of electoral competitiveness in a system, their respective party affiliations, and the electoral rules.	World Bank (2014)
Inflation	Measured by the consumer price index: annual percentage change in the cost to the average consumer of acquiring a fixed basket of goods and services.	World Bank (2014).
Systemic banking crises	Number of years in which a country underwent a systemic banking crisis, as a fraction of the number of years in the corresponding period.	Laeven and Valencia (2012).
Terms-of-trade shocks	Log difference of the terms of trade. Terms of trade are defined as customary.	World Bank (2000).
Natural Resource Rents	Rents are the difference between the value of production for a stock of minerals at world prices and their total costs of production.	World Bank (2014)
Period-specific shift	Time dummy variable.	Authors' construction.

Appendix Table 1: Correlation Matrix of Regressors in Growth Models

	Initial GDP per capita	Cyclical reversion	Education	Trade Openness	Financial Openness	Government Burden	Infrastructure	Government Accountability	Political Participation	Price Instability	Systemic Banking Crisis	Terms of Trade Shocks
Initial GDP per capita	**1**											
Cyclical reversion	0.0237	**1**										
Education	**0.6597**	-0.0559	**1**									
Trade Openness	**0.2123**	-0.0457	**0.2612**	**1**								
Financial Openness	**0.5742**	-0.0333	**0.4297**	**0.1946**	**1**							
Government Burden	**0.4099**	-0.0357	**0.2542**	**0.4194**	**0.2166**	**1**						
Infrastructure	**0.8683**	-0.0425	**0.8170**	**0.2460**	**0.5406**	**0.3564**	**1**					
Political Participation	**0.5534**	-0.0274	**0.5349**	**0.0948**	**0.3919**	**0.2406**	**0.6262**	**1**				
Government Accountability	**0.3723**	-0.0335	**0.4147**	0.0550	**0.2817**	**0.1590**	**0.4439**	**0.7250**	**1**			
Price Instability	**-0.0865**	-0.0320	-0.0085	-0.0314	**-0.0920**	-0.0422	**-0.0734**	-0.0415	-0.0437	**1**		
Systemic Banking Crisis	0.0478	**-0.0971**	**-0.0757**	-0.0046	0.0324	0.0240	**0.0582**	**0.0962**	**0.0647**	**0.1972**	**1**	
Terms of Trade Shocks	0.0564	**-0.1015**	**0.1077**	**0.0787**	**0.0809**	0.0136	**0.0882**	0.0242	0.0334	-0.0488	-0.0241	**1**

Note: figures in bold are statistically significant at 95% confidence. 817 observations.

Appendix Table 2: Correlation Matrix of Regressors in Inflation Models

	High Inflation	Hyperinflation	Inflation targeter	Fixed Exchange Rate	Floating Exchange Rate	Per Capita GDP (logs)	Credit to Private Sector (% GDP)	Trade Openness	Capital Account Openness
High Inflation	1.00								
Hyperinflation	-0.01	1.00							
Inflation targeter	-0.04	-0.02	1.00						
Fixed Exch. Rate	-0.10	-0.04	-0.20	1.00					
Floating Exch. Rate	0.32	0.16	-0.02	-0.30	1.00				
Per Capita GDP	-0.02	-0.04	0.26	-0.02	0.01	1.00			
Credit Private Sector	-0.09	-0.06	0.24	-0.01	-0.07	0.69	1.0000		
Trade Openness	-0.03	-0.02	0.09	0.13	-0.08	0.20	0.11	1.00	
Cap. Acc.Openness	-0.10	-0.07	0.22	0.07	-0.05	0.52	0.43	0.16	1.00

Note: figures in bold are statistically significant at 95% confidence. 4,261 annual observations.

Appendix Table 3: Panel A: Logistic Regression for Oil Exporters

Dependent Variable: Probability of Having Fixed Exchange Rate

	Coefficient	Std. Err.	z
Total Rents	0.377	0.105	3.59
Development Level	0.229	0.058	3.95
Trade Openness	0.525	0.169	3.10
Constant	-3.327	0.543	-6.12

Number of observations = 707

Panel B: Logistic Regression for Non-Oil Exporters

Dependent Variable: Probability of Having Fixed Exchange Rate

	Coefficient	Std. Err.	z
Total Rents	-0.151	0.022	-7.00
Development Level	-0.192	0.026	-7.42
Trade Openness	0.443	0.055	8.11
Constant	1.191	0.214	5.56

Number of observations = 3,920