Political Competition and the Growth Impact of Exchange Rate Regimes:

An Empirical Investigation

Abstract: Empirical studies on the growth impact of exchange rate regimes have reported mixed results on the sign and significance of this effect. The present paper introduces in this literature the claim by Acemoglu et al. (2005) that economic development is shaped by conflicts between social groups with differential political power. To this end, we examine whether the growth effect of exchange rate regimes depends on domestic political competition. We test this prediction using a panel dataset of 160 countries that covers the period 1975-2006, taking into account the endogeneity of the exchange rate regime choice. We find that fixed exchange rate regimes are directly associated with higher growth, but floating exchange rate regimes are more beneficial to growth as political competition increases.

1. Introduction

The influence of the exchange rate regime on economic growth is a central and controversial topic in open-economy macroeconomics with empirical studies providing mixed results. One strand of the literature provides evidence that floating regimes are associated with higher growth (see, for instance, Eichengreen and Leblang, 2003; Levy-Yeyati and Sturzenegger, 2003; Husain et al., 2005; Miles, 2006). According to Ghosh et al. (2003) and Reinhart and Rogoff (2004) countries with intermediate regimes grow faster, whereas Bailliu et al. (2003) find that fixed rates are associated with higher growth. Several studies report insignificant growth effects of exchange rate regimes (Ghosh et al., 1997; Edwards and Magendzo, 2006; De Grauwe and Schnabl, 2008; Klein and Shambaugh, 2010).

The aim of the present paper is to investigate whether the growth impact of exchange rate regimes is related to the domestic political environment and, in particular, to the level of political competition. Our main motivation is the extensive survey by Acemoglu et al. (2005) on the role of institutions in economic development, in which the authors claim that the process of economic development is largely shaped by conflicts between social groups with differential political power.[1] Domestic political competition becomes then an obvious determining factor of economic outcomes, as it reflects the struggle between groups on the distribution of resources and tends to force the policy choices of governments by inducing political parties to propose efficient platforms that balance the interests of various groups of voters (Horowitz, 1991; Grilli et al., 1991; Coughlin, 1992; Wittman 1995; Breton 1996; Hettich and Winer, 1999; Adams et al., 2005; Schofield and Sened, 2006). In this vein, political competition is inevitably linked to the economic impact of exchange rate regimes. For instance, under fixed exchange rates the government's inability to use expansionary policy to satisfy demands by constituents fosters growth by removing inflationary pressures; on the other hand, floating rates and monetary autonomy allow for an additional degree of freedom in policymaking under distributive pressures (Frieden and Stein, 2001).[2]

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[1] Keefer and Knack (1995), Mauro (1995), Easterly and Levine (1997), La Porta et al. (1999), Rodrik et al. (2004), Glaeser et al. (2004) have examined the role of sound institutions for economic development.

[2] See Jaramillo et al. (2001) and Lehoucq (2008) for extensive case studies on Colombia and Costa Rica, respectively, on the linkages between exchange rate policy and political competition.

Notably, empirical research has confirmed that political competition has a substantial impact on economic outcomes. Levitt and Poterba (1999) have suggested that politicians prefer to channel resources to districts where competition is high in order to win majority and provide evidence that U.S. states in which the major political parties are highly competitive, grow faster than less competitive ones. Besley et al. (2008) develop a theoretical model that shows how political competition forces parties to implement growth-promoting policies rather than special-interest policies and find that political competition in U.S. states is positively associated with economic growth. Pinto and Timmons (2005) report that political competition decreases the rate of labour and capital accumulation, but increases the rate of human capital accumulation. Regarding fiscal outcomes, Roubini and Sachs (1989) have shown that larger public deficits are associated with short-lived multi-party government coalitions, whereas Edin and Ohlsson (1991) have claimed that minority, rather than coalition, governments produce large deficits. Subsequent empirical studies by, among others, Kontopoulos and Perotti (1999), De Haan et al. (1999), Rogers and Rogers (2000), and Spolaore (2004) have confirmed that the intensity of political competition, either directly or through the government structure, affects the domestic fiscal stance. Keefer and Knack (2007) provide evidence of higher public investment in countries with non-competitive electoral systems and less political checks and balances. In an open-economy framework, Clark and Hallerberg (2000) and Clark et al. (2009) examine how the exchange rate regime interacts with domestic political institutions to constrain a government's ability in using fiscal and monetary policy instruments in order to create electoral expansions and retain political power.

Following this strand of the literature, in the present paper we attempt to assess empirically whether the growth effect of exchange rate regimes is conditional on political competition. To this end, we estimate growth specifications that include, apart from the direct effect of the exchange rate regime on growth, an interaction term between political competition and the exchange rate regime. Our work is thus related to the strand of studies that have focused in assessing the direct growth impact of exchange rate regimes, i.e. $\partial growth/\partial regime$, and, as reported in the introductory paragraph, have provided inconclusive evidence on the sign and significance of this effect. The present study takes a step further by estimating

additionally the sign and significance of $\dfrac{\partial\left(\partial growth/\partial regime\right)}{\partial\left(political\ competition\right)}$.

An important question in our context is, first, how to measure political competition and, second, how to classify exchange rate regimes. Although political competition may take a variety of forms, it typically involves electoral competition with participants competing for support via electoral process. Following this rationale, we proxy political competition using indices of executive and legislative electoral competitiveness, taken from the World Bank Database on Political Institutions. These indices characterize political competition through the competitiveness of legislative and executive elections by measuring the number of competing and winning participants in the elections. Their core is the number of parties that could and did compete in the last election, and range from 1 (no legislature) to 7 (multiple parties). Regarding the classification of exchange rate regimes, we use the *de facto* classifications of the exchange rate regimes provided by Reinhart and Rogoff (2004) and Levy-Yeyati and Sturzenegger (2005), in addition to the standard *de jure* IMF classification. These measures capture the wide range of exchange rate regime arrangements that exist among countries, as well as the actual exchange rate behaviour.

A valid concern in terms of our empirical exercise, often highlighted by related empirical literature, involves the endogeneity of the exchange rate regime. For instance, policymakers in countries with relatively weak and less stable coalition governments will be more prone to adopt a flexible exchange rate regime due to monetary policy autonomy offered. The latter is likely to be more valuable for them compared to single party-ruling governments, as policymakers have to satisfy political interests across a wide range of constituencies and over a large electorate, and thus face inherently larger pressures for redistributive policies To address the potential endogeneity of the exchange rate regime we exploit variations in the domestic political institutions following the rationale that the structure of the political system influences the incentives for policymakers in adopting an exchange rate regime (see, among others, Bernhard and Leblang, 1999; Leblang, 1999; Eichengreen and Leblang, 2003; Broz and Frieden, 2006; Fatas et al., 2007; Levy-Yeyati et al., forthcoming). Our instrument list then includes electoral rules, specifications of the political system and party orientation, the degree of government's

fractionalization and majority share. These variables are expected to be correlated with the choice of the exchange rate regime, but can be considered exogenous to unexpected shifts in growth.

Our main hypothesis, namely that the growth impact of the exchange rate regimes depends on domestic political competition, is investigated using a large panel of 160 developed and developing countries over the period 1975–2006. The main findings are that fixed exchange rate regimes are directly associated with higher growth, but floating exchange rate regimes are more beneficial to growth in countries with higher political competition. These results are robust to a number of sensitivity tests, including the sub-grouping of countries into advanced and developing economies.

The rest of the paper is structured as follows. Section 2 describes the empirical methodology and the data utilized, and addresses the endogeneity of the exchange rate regime. Section 3 presents our empirical findings and, finally, Section 4 concludes the paper.

2. Assessing the role of political competition in the growth impact of exchange rate regimes

This section provides details on the empirical setup, the data and the estimation methodology. It also discusses the endogeneity of the exchange rate regime and our instrumentation strategy.

2.1. Empirical methodology and data

Our empirical investigation aims at assessing the influence of political competition on the growth impact of the exchange rate regime. To this end, we develop a relatively standard specification of growth regression, thereby controlling for other fundamental determinants of economic performance, to which we add the exchange rate regime. We then investigate whether the interaction between the exchange rate regime and indices of political competition affects economic growth. More specifically, we estimate variants of the following equations:

$$g_{it} = a_y y_{it} + a_x x_{it} + a_{xw} x_{it} w_{it} + a_c c_{it} + \lambda_t + \varepsilon_{it}^g \tag{1}$$

$$x_{it} = b_y y_{it} + b_p p_{it} + b_c c_{it} + \mu_t + \varepsilon_{it}^x \tag{2}$$

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where subscripts i and t characterize country and year respectively, g_{it} is the growth rate of real GDP per capita, y_{it} is a vector of economic variables, x_{it} is exchange rate regime, w_{it} denotes political competition, c_{it} is a vector of exogenous control variables, p_{it} denotes political variables used as instruments for the exchange rate regime (see section 2.2 for a detailed presentation), λ_t and μ_t are fixed-time effects aiming at capturing the impact of worldwide business cycles, and ε_{it}^g and ε_{it}^x are mean zero shocks. Our hypothesis is that the influence of the exchange rate regime on growth is conditional on domestic political competition and given by the non-linear term $a_x + a_{xw}w_{it}$.

A large empirical literature has provided guidance concerning the factors that affect growth and we follow this literature in building the baseline specification (see Levine and Renelt, 1992; Sala-i-Martin et al., 2004). As is standard in the empirical literature we allow growth to depend on the log of initial real GDP per capita (starting in 1975), the gross capital formation to GDP ratio, the government consumption to GDP ratio, inflation (based on Consumer Price Index), openness and the population growth rate.[3] Our growth equation also includes a subset of exogenous control variables aiming at capturing geographical factors that are typically found to affect growth. In particular, we use regional dummy variables for Latin America and Caribbean, North America, West Europe, East Europe and Central Asia, South Asia, East Asia and Pacific, Middle East and North Africa and Sub Sahara Africa. Finally, fixed-time effects are added in order to control for common shocks across countries. A more detailed description of the variables is given in the Data Appendix.

In order to assess our prediction that the growth impact of the exchange rate regime varies with the level of political competition, in the growth specifications estimated we include an interaction term between the exchange rate regime and measures of electoral competitiveness. The latter are compiled by Beck et al. (2001) and updated regularly by the World Bank, and classify countries on a seven-point scale based on the number of parties that could and did compete in the last executive and legislative election respectively. The indices take into account both institutional rules that govern whether parties are eligible

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[3] All series are taken from the World Bank's World Development Indicators dataset.

to compete in elections and actual outcomes that determine if parties actually win seats. The scale is as follows: 1: no executive / legislature, 2: unelected executive / legislature, 3: elected, one candidate, 4: one party elected, multiple candidates, 5: only one party won seats, multiple parties are legal but did not exist, compete or win seats. 6: multiple parties compete and won seats, but one party won 75 percent or more of seats, and 7: multiple parties compete and won seats, but largest party won less than 75 percent of seats.

Since we are interested in assessing the growth impact of exchange rate regimes, we use alternatively three classifications for the exchange rate regime as dependent variables.[4] Our goal is not to assess the relative advantages of the alternate classifications, but simply to examine if our main conclusions hold with all classifications. A standard classification is provided by the International Monetary Fund (1997) and is based on the countries' official, or else *de jure*, announcements. In particular, the data (hereafter *IMF*) are reported in the IMF's *Annual Report on Exchange Arrangements and Exchange Restrictions*, and are subsequently collected and normalized by Ghosh et al. (2003) into 6 categories: 1) hard pegs, 2) single currency pegs, 3) basket pegs, 4) floats with rule-based intervention, 5) floats with discretionary intervention and 6) floating regimes. The official announcements reflect the monetary authorities' view about the appropriate exchange rate and can influence market expectations about the future exchange rate and the monetary policy stance.

However, the actual exchange rate may decline from the publicly declared rate and new *de facto* classification systems have been proposed, which are economically more appropriate indicators of monetary policy, since the monetary authorities may decide to intervene in the exchange rate market contrary to their announcements (see Rogoff et al., 2004). Both types of classifications are important and supplementary because the *de jure* classification accounts for the essence of an exchange rate regime decided by the monetary authorities, while the *de facto* classification controls for possible inconsistencies with the announced regime.[5] One such *de facto* classification is provided by Levy-Yeyati and

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[4] Tavlas et al. (2008) offer a comprehensive description of alternative classifications.

[5] In 1999, the IMF provided a new classification system that takes into account the actual exchange rates, but remains influenced by official declarations. Bubula and Otker-Robe (2002) and von Hagen and Zhou (2005) have attempted to extend this new IMF classification backwards.

Sturzenegger (2005, hereafter *LYS*) which is based on the volatility of official exchange rates and reserves and distinguishes 5 categories: 1) fixed, 2) crawling peg, 3) dirty float, 4) flexible and 5) indeterminate. Reinhart and Rogoff (2004) have put forward a classification (hereafter *RR*) that combines both types using observed data from the dual/parallel exchange rate market and detailed country chronologies. The authors study the chronologies that map the exchange rate arrangements for each country. If the exchange rate behaviour accords with the officially announced policy, then the regime is verified and classified accordingly. If the announcement fails verification, they move on a *de facto* classification based on the volatility of the market-determined exchange rates. The *RR* coarse classification consists of 6 categories: 1) peg, 2) crawling peg, 3) crawling band, 4) freely floating, 5) freely falling and 6) unclassified. Furthermore, the *RR* classification employs a rolling 5-year horizon that helps measure longer-term regimes and avoids recording temporary shifts within a regime.[6]

A closer look at the data for the sample period covered in the present study shows that pegs are the most frequent exchange rate regime for all classifications considered. The collapse of the Bretton Woods system saw mostly a shift to intermediate regimes, rather than freely floating exchange rates, rejecting the bipolar hypothesis. Almost all countries experienced at least one regime change. Most regime shifts were related to major global events, such as financial crises, and modifications of regional currency unions. Although pegs are harder to sustain and require higher macroeconomic discipline, they have been on average more durable compared to other regimes. Compared to the *de facto* classifications, the *de jure* classification overstates the number of true floats and pegs; the countries that actually allow their exchange rate to float freely and those that actually peg their exchange rate are significantly fewer than announcements would suggest.

We estimate the growth impact of the exchange rate regime treating the latter both as an exogenous and as an endogenous variable. Equation (1) is estimated using annual data over the period 1975–2006 for a panel of 160 countries either via ordinary least squares (OLS) or two-stage least-squares (2SLS)

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[6] Further *de facto* classifications were proposed by Ghosh et al. (1997), Bailliu et al. (2003), Poirson (2001) and De Grauwe and Schnabl (2005), but either the period covered or the sample of countries were shorter compared to the ones used here.

procedures. Given the large size of our sample, some outliers involving real GDP per capita growth over 20% and below -20%, are excluded from our analysis. In the case of 2SLS, equation (1) is estimated treating the exchange rate regime and the interaction term between the exchange rate regime and the indices of electoral competitiveness as endogenous variables. In turn, the first-stage equation (2), which does not include any endogenous right-hand-side variables, is based on the literature on the choice of the exchange rate regime (discussed below), which suggests that there are exogenous variables that determine the exchange rate regime but not growth, and vice versa, thus allowing us to achieve identification. Table 1 summarizes the regression specifications and the expected qualitative impact on the endogenous variables.

2.2. Addressing the endogeneity of the exchange rate regime

An extensive literature has focused on the determinants of exchange rate regime. The early studies selected potential regime determinants based mainly on the Optimum Currency Area criteria (Heller, 1978; Dreyer, 1978; International Monetary Fund, 1997; Rogoff et al., 2004). In general this literature considers that economic size, development and openness are important explanatory variables of the exchange rate regime.[7] In other words, relatively open, small and less developed economies are expected to benefit more from pegging their exchange rate. Inflation may, on the one hand, increase the incentives to peg the exchange rate, but, on the other hand, makes peg difficult to sustain.

However, the exchange rate regime choice is also influenced by the political environment. For instance, it has been argued that politicians in democracies prefer flexible exchange rate regimes because it affords them monetary policy autonomy, which is highly valuable in order to satisfy political interests

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[7] See Juhn and Mauro (2002) and von Hagen and Zhou (2007) for detailed reviews. Rogoff et al. (2004) summarize the findings of several empirical studies and claim that none of the factors examined as determinants of the exchange rate regime choice is found to be robust. They report that, with the exception of the size and inflation of an economy that are positively associated with floating exchange rate regimes in most studies, other macroeconomic, structural and institutional factors cannot explain exchange rate regimes choice. Similarly, Juhn and Mauro (2002) conclude that none of the variables identified by old and newer theories are robust determinants of exchange rate regimes. Moreover, von Hagen and Zhou (2007) underline that the empirical results of various studies seem to be sensitive to the sample composition, data construction and model specification.

from across a wide range of constituencies and over a large electorate. Also, citizens who expect to lose from structural reforms that influence exchange rate policy may exert pressure against policymakers who implement such reforms (Frieden et al., forthcoming). In addition, following a strategic behaviour an inflation-prone party may choose a fixed, rather than flexible, exchange rate regime in order to remove inflation from the electoral agenda (Milesi-Ferretti, 1995). Bernhard and Leblang (1999), Leblang (1999), Eichengreen and Leblang (2003) have suggested that the choice of the exchange rate regime may reflect the electoral system, the exogeneity of electoral timing, the structure of political institutions, the fractionalization and party orientation of the government. Levy-Yeyati et al. (forthcoming) report that pegs are more likely in countries that lack good institutional structure, but less likely if the governments are too weak to sustain them. Alesina and Wagner (2006) claim that countries with floating rates tend to be either very low or very high in the institutional quality scale. Méon and Rizzo (2002) have provided evidence that political instability, as reflected by changes in the executive power, is positively correlated with the adoption of flexible exchange rates. This finding is confirmed by von Hagen and Zhou (2007), who have pointed out that countries with higher political freedom and civil liberty prefer flexible regimes, while less democratic countries adopt fixed regimes.

In this vein, we account for the potential endogeneity of exchange rate regimes by exploiting variations in political institutions. For instance, majoritarian electoral systems and plurality rules produce single-party majority governments, whereas proportional electoral rules might lead to fragmented governments and coalitions. The latter are typically weaker and less stable, and thus more prone to pressures from electoral groups to engage in redistributive policies, compared to single ruling-party governments. Policymakers may hence find difficulties in sustaining an exchange rate peg and opt for flexible regimes in order to be able to satisfy domestic special interests (see Leblang, 1999; Eichengreen and Leblang, 2003). They also pursue policies to gain political support, which are incompatible with exchange rate pegs. Politicians may manipulate exchange rate policy to shape electoral outcomes and prefer to adopt a flexible regime in order to use policy tools to influence economy before elections (Broz and Frieden, 2006).

Furthermore, according to Fatas et al. (2007) presidential regimes are usually characterized by increased separation of power than parliamentary ones. The separation of powers is often associated with disciplined other policies, such as fiscal, and policymakers might prefer to leave exchange rate policy unconstrained and assign to it a greater role in smoothing unexpected business cycle fluctuations. Hallerberg (2002) suggests that governments with many partisan veto players prefer to adopt fixed rate regime, because the opposition has an influential role in policy making, whereas Broz (2002) concludes that autocratic governments are more prone to adopt fixed regimes in order to enhance their transparency. Thies and Arce (2009) examine the importance of federalism and number of veto players in the choice of the exchange rate regime and claim that policy makers in federal systems with many veto players face great political resistance. They are therefore less likely to engage in deep economic reforms and would rather adopt a fixed exchange rate regime as a tool to control subnational fiscal excesses.

The party orientation also influences the choice of the exchange rate regime. Centrist and rightist parties are more likely to choose fixed regimes because their partisans benefit from low inflation and higher trade and investment, whereas leftist parties would rather favour flexible regimes so that the working class does not bear the cost of adjusting the domestic economy to external conditions (Broz and Frieden, 2006). Left governments are more concerned with welfare redistribution rather than controlling inflation, and prefer monetary autonomy afforded by floating exchange rates in order to enhance growth and employment (see Bernhard and Leblang, 1999; Eichengreen and Leblang, 2003). Notably, as the government fractionalization increases and the majority share decreases, the government becomes less stable and durable and more vulnerable to pressures from interest groups. Therefore, governments characterized by high fractionalization and low majority share are associated with inability to launch or sustain a credible peg, and thus with the adoption of more flexible exchange rate regimes (see Levy-Yeyati et al., forthcoming).

Our specification of the exchange rate regime equation (2) follows these strands of the literature and includes thus as instruments several variables on political institutions taken from the World Bank, like the electoral system, the fractionalization and party orientation of the government. In particular, we

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experiment with an index of the Political System, that is classified as presidential (=0), assembly-elected parliament (=1) or parliamentary (=2), an index of the Party Orientation, that corresponds to left (=1), center (=2) or right (=3), a dummy that is equal to 1 if Proportional Representation rule is used (i.e. if one gets elected based on the percent of votes received) and 0 otherwise, a dummy that is equal to 1 if Plurality rule is not used (i.e. if the winner does not take all seats) and 0 otherwise, the Government Fractionalization, proxied by the probability that two randomly picked deputies will be of different parties, and (one minus the margin of) Majority capturing the fraction of seats held by the government. Finally, relative GDP proxied by the ratio of national GDP to U.S. GDP is also included as an instrument following the theoretical view that larger economies are reluctant to give up monetary authority and prefer exchange rate flexibility (Rogoff et al., 2004; von Hagen and Zhou, 2007).

We close this section by noting that, according to Levine and Renelt (1992), a variety of political indicators, such as civil liberties, that have been used as growth determinants are not found robustly correlated with growth. Similarly, Sala-i-Martin et al. (2004) argue that political variables, like the index of political rights and the degree of capitalism and socialism, are not robustly related to economic growth. These variables do not contribute to the goodness of fit of the regressions, nor have robust estimates across different sets of conditioning variables. We therefore anticipate that variables on political institutions will have no direct effect on real GDP per capita growth and are plausible instruments for the exchange rate regime.[8]

3. Empirical results

In this section we present the empirical evidence from the estimated specifications. We begin with some benchmark OLS growth regressions, in which we estimate the impact of the initial log GDP per capita, inflation, openness, investment and government consumption as ratio of GDP, and population growth, on the real GDP per capita growth (Table 2). Our estimates show a significant negative impact from initial

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[8] Further empirical studies that have used political variables as instruments for monetary policy regimes include Harms and Kretschmann (2007), Fatas et al. (2007) and Sokolov et al. (2008).

income, inflation, population growth and government consumption, and a significant positive impact from openness and investment, which all are consistent with the literature. Results for regional and year dummies (not reported here) are mostly significant. When the *RR* exchange rate regime is included as an exogenous variable, the exchange rate regime has a significant, negative impact on GDP per capita growth, which implies that fixed regimes are associated with higher growth. The estimations of the growth specifications that include additionally the interaction term between the exchange rate regime and (i) the legislative index of electoral competitiveness and (ii) the executive index of electoral competitiveness, are presented in columns 3 and 4 of Table 2 respectively. The coefficient of the interaction term is found to be significantly positive in both OLS regressions.

We next address the potential endogenous choice of the exchange rate regime using measures of domestic political institutions and relative GDP as instruments. The first-stage regressions for the *RR* exchange rate regime are presented in the upper panel of Table 3; we report results only for the instruments sets that turn out highly significant and clearly satisfy the exogeneity tests according to the *F*-statistic and Sargan tests. Relative GDP enters with a significantly positive coefficient, a result in line with the empirical findings reported by Rogoff et al. (2004) and von Hagen and Zhou (2007). The estimates also show significant influence of the domestic political institutions on the exchange rate regime choice. In particular, we get positive coefficients for Proportional Representation, Plurality, Government Fractionalization, and Majority. These findings are in accordance with those reported by Leblang (1999), who has shown that democratic countries, and especially those with proportional electoral system, are more likely to adopt a floating exchange rate regime than authoritarian ones.

The second-stage growth regressions, reported in the lower panel of Table 3, investigate the sign and significance of the exchange rate regime and its interaction with political competition. In all cases, the exchange rate regime enters with a negative coefficient, whereas the interaction term with a positive one for both the legislative and executive indices of electoral competitiveness. The coefficients of the other determinants of real GDP per capita growth retain their signs and significance. Thus, our results imply that fixed exchange rate regimes are associated with higher growth, but floating exchange rate regimes are

more beneficial to growth when political competition increases.

To illustrate our findings, consider two economies, Japan and China, with different degrees of political competition in year 2007, namely moderate and high respectively. In Japan, a one grade increase in exchange rate flexibility would *ceteris paribus* result in a rise of GDP per capita growth rate by roughly 0.5%. On the contrary, a one grade increase in the exchange rate flexibility in China would trigger a fall in GDP per capita growth ranging between -0.7% to -1.7% (depending on the set of instruments used). This exercise, albeit highly stylized, indicates that the beneficial effect of fixed exchange rate regime on growth can be mitigated or even outweighed by the positive impact of floating rates in countries characterized by high legislative and executive electoral competitiveness.

To assess the robustness of our results to the definition of the exchange rate regime, we experiment with the exchange rate regime classifications provided by the *IMF* and the *LYS*.[9] We first estimate the exchange rate regime equation for the alternate classifications.[10] In general, the fit of the equations is high and all variables retain their signs and significance. The estimations of the *IMF* exchange rate regime show that the impact of relative economy size is positive, whereas the estimates of political institutions reinforce our finding that government structures with many ruling parties are associated with more flexible exchange rate regimes. The estimations with the *LYS* exchange rate regime give similar results for the relative economy size and the political institutions variables. As far as the growth equation is concerned, both the OLS and the 2SLS regressions presented in Table 4 validate our previous findings. In particular, the exchange rate regime enters with a negative coefficient under both the *IMF* and the *LYS* classification, while the interaction term between the exchange rate regime and the legislative and executive index of electoral competitiveness is found positive. This reinforces our main result that the impact of the exchange rate regime on growth is conditional on the domestic political competition.

A further sensitivity test of our results follows the empirical growth literature that has used a lower data frequency, namely five-year intervals, to filter out business cycle effects. Therefore, we group the

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[9] Both series are available only up to 2004.

[10] The findings are not reported in Table 4 but are available upon request.

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data into five-year non-overlapping averages in order to remove the influence of short-term fluctuations and encompass the dynamics of long-term growth and its determinants. At the same time, the size of the panel dataset is large enough to account for the dynamics of growth. Table 5 reports the estimates from the OLS and the 2SLS growth regressions, which are in line with our previous findings. Fixed exchange rates are found to be associated with higher growth, whereas floating regimes are beneficial to growth as domestic political competition rises.

We also explore the robustness of our estimates to the inclusion of other potential growth determinants, which are related to the development of the financial system (Levine and Renelt, 1992; King and Levine, 1993). To this end, we include sequentially in our estimated specifications the following controls.[11] First, money (M2) to GDP ratio is included as a rough indicator of the state of financial development. The first three columns of Table 6 present the related findings. As can be readily seen, the monetary base is negatively associated with growth, whereas the signs of the coefficients for the rest of the variables are not affected substantially. More importantly, the coefficients corresponding to the exchange rate regime and the interaction terms between the exchange rate regime and the indices of electoral competitiveness remain significant and consistent with the previous estimates, thus reinforcing our main finding. However, given the adverse finding of the monetary base over GDP on growth, we further explore the sensitivity of our results by using alternatively domestic credit to private sector over GDP as an indicator of financial development. As argued by Levine et al. (2000), this measure of financial development is more than a simple measure of financial sector size, as it indicates higher levels of financial services and therefore greater financial intermediary development. The next three columns present the results from this specification and, although domestic credit enters with a negative coefficient, the remaining results are not affected.

Subsequently, we account for the role of external factors in the growth process (see Blattman et al., 2003; Broda, 2004). Indicatively, the rapid industrialization of several countries in our sample may have

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[11] For space reasons we report only findings from 2SLS regressions. Similar results were obtained from OLS regressions.

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resulted in a rise for the demand of primary commodities and increased export-led growth as the terms of trade improve. To capture this effect, we employ the terms of trade adjustment variable given by the difference, expressed as a ratio of GDP, between the current price value of exports, deflated by the import price index, and the value of exports at constant prices. The results from these regressions are presented in the last three columns of Table 6. The terms of trade adjustment effect is found to be significantly positive. The significance of the remaining control variables remains intact (with the exception of the initial income in one out of three specifications). The overall picture corroborates our previous results.

Our analysis has treated so far the countries under consideration as a homogeneous group regarding the growth impact of exchange rate regimes under political competition. Aghion et al. (2009) provide significant and robust evidence that the growth effects of exchange rate regime flexibility vary with the level of financial development. The authors rationalize their empirical findings with an open economy model that shows that excess volatility in the exchange rate can generate large fluctuations in firms' profits and may lower investment, with negative implications for productivity growth. This is especially likely to be the case in countries with low level of financial development and relatively more financial than real shocks. We test the robustness of our results to this assumption by splitting countries in advanced and developing countries.[12] The results are presented in columns 1 and 2 (for the legislative index of electoral competitiveness) and columns 3 and 4 (for the executive index of electoral competitiveness) of Table 7.[13] As can be readily seen, the division of countries into advanced and developing economies does not affect substantially our main findings.

As a final step, we examine the performance of exchange rate regimes for the subset of countries in which the indices of electoral competitiveness have remained unchanged through the whole sample period.[14] This allows us to focus on countries with stable political competition, a characteristic that may

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[12] The selection follows Ghosh et al. (2003) and Husain et al. (2005) and is based on the World Bank definition for upper income countries.

[13] Again, for space reasons we report only 2SLS estimates, whereas OLS regressions gave similar results.

[14] The 36 countries with unchanged legislative index of electoral competitiveness are Australia, Austria, Belgium, Brazil, Canada, Colombia, Costa Rica, Croatia, Denmark, Estonia, Finland, France, Germany, Greece, Iceland,

have affected their growth patterns over the period under consideration. Columns 5 and 6 of Table 7 present the empirical estimates for the subgroups of countries for both indices of political competition and verify our previous findings of the growth impact of exchange rate regimes, namely that fixed exchange rate regimes promote growth directly, whereas floating rates promote growth in countries with high political competition. We therefore conclude that the importance of political competition on the growth impact of exchange rate regimes is not sensitive to the choice of countries.

4. Conclusions

This paper investigated the role of political competition in assessing the growth impact of exchange rate regimes. To this end, we developed a growth regression that includes an interaction term between the exchange rate regime and indices of electoral competitiveness, and we also addressed the endogenous choice of the exchange rate system. Our evidence suggested that fixed exchange rate regimes are positively associated with growth, but floating regimes are more beneficial in countries with high political competition. Our results are robust to alternative exchange rate regime classifications, data frequency, choice of determinant variables and hold for both advanced and developing economies, as well as for countries with stable political competition over the period under consideration. These arguments highlight the importance of accounting for political conditions in the assessment of the macroeconomic impact of economic institutions, like exchange rate regimes.

Ireland, Israel, Latvia, Lithuania, Luxembourg, FYROM, Malta, Netherlands, New Zealand, Norway, Paraguay, Poland, Singapore, Slovak Republic, Slovenia, Sweden, Switzerland, Ukraine, United Kingdom, United States, and Venezuela. The 37 countries with unchanged executive index of electoral competitiveness are additionally Bhutan, Jordan, Kazakhstan, Kuwait, Morocco, Russia, Sri Lanka, and Syrian Arab Republic, less Brazil, Latvia, Lithuania, FYROM, Paraguay, Poland, and Venezuela.

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DATA APPENDIX

World Bank, World Development Indicators:

  GDP per capita growth: Annual growth rate of GDP per capita in %

  Initial GDP per capita: Logarithm of initial observation of GDP per capita in constant 2000 US$ (initial observation varies across countries)

  Relative GDP: Ratio of national GDP to U.S. GDP in constant 2000 U.S.$

  Investment to GDP ratio: Gross fixed capital formation as % of GDP

  Government consumption to GDP ratio: General government final consumption expenditure as % of GDP

  Inflation: Inflation based on consumer prices in annual %

  Openness: Trade as % of GDP

  Population growth: Population growth in annual %

  Money: Money and quasi money (M2) as % of GDP

  Credit: Domestic credit to private sector as % of GDP

  Terms of trade adjustment: the current price value of exports deflated by the import price index less the value of exports at constant prices as % of GDP

Reinhart and Rogoff (2004), Ilzetzki et al. (2008):

  RR regime: De facto coarse classification of exchange rate regimes in dual / parallel market

Ghosh et al. (2003):

  IMF regime: De jure classification based on announced exchange rate regimes

Levy-Yeyati and Sturzenegger (2005):

  LYS regime: De facto classification of official exchange rate regimes

World Bank Database of Political Institutions:

Legislative Index of Electoral Competitiveness, Executive Index of Electoral Competitiveness: No legislature=1, Unelected legislature=2, Elected, one candidate=3, One party, multiple candidates=4, Multiple parties are legal but only one party won seats (because other parties did not exist, compete, or win seats)=5, Multiple parties did win seats but the largest party received more than 75% of the seats=6, Largest party got less than 75%=7

Government System: Parliamentary=2, Assembly-elected President=1, Presidential=0

Government Party Orientation: Right=3, Center=2, Left=1

Proportional Representation (elected based on percent of votes received): yes=1, no=0

Government Fractionalization: The probability that two deputies picked at random from among the government parties will be of different parties

Plurality (elected using a winner-take-all / first-past-the-post): no=1, yes=0

Majority: One minus the fraction of seats held by the government

TABLE 1: Summary of regression specification and identification

	GDP growth			Exchange rate regime (Flexibility)
Endogenous variables				
Real GDP per capita growth	LHS	LHS	LHS	
Exchange rate regime		RHS	RHS	LHS
Exchange rate regime × political competition			RHS	
Exogenous variables				
Initial log GDP per capita	(-)	(-)	(-)	(?)
Inflation	(-)	(-)	(-)	(+ / -)
Population growth	(-)	(-)	(-)	(?)
Openness	(+)	(+)	(+)	(+ / -)
Investment (% GDP)	(+)	(+)	(+)	(?)
Government consumption (% GDP)	(-)	(-)	(-)	(?)
Relative GDP				(+)
Political institutions				(+ / -)

TABLE 2: GDP growth OLS regressions: *RR* exchange rate index

	(1)	(2)	(3)	(4)
Initial log GDP per capita	-0.903**	-0.801**	-0.742**	-0.892**
Inflation	-0.001**	-0.001**	-0.001**	-0.001**
Population growth	-0.581**	-0.761**	-0.736**	-0.716**
Openness	0.008**	0.006**	0.008**	0.007**
Investment (% GDP)	0.128**	0.115**	0.118**	0.117**
Government consumption (% GDP)	-0.109**	-0.142**	-0.139**	-0.136**
RR regime		-0.764**	-1.074**	-1.298**
RR × Legislative Index of Electoral Competitiveness			0.056**	
RR × Executive Index of Electoral Competitiveness				0.097**
Observations (countries)	3927 (159)	3588 (154)	3391 (146)	3391 (146)
R^2	0.59	0.51	0.51	0.52

*Notes: * denotes significance at the 10-percent level and ** at the 5-percent level. All regressions include regional dummies, and year and country fixed effects.*

TABLE 3: GDP growth 2SLS regressions: *RR* exchange rate index

	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)
	First-stage estimates							
System	-0.074**							
Party Orientation				-0.023				0.011
Proportional Representation	0.166**		0.250**					
Plurality		0.268**			0.192**	0.174**		0.299**
Government Fractionalization		0.291**	0.192	0.133	0.069	0.046	0.044	
Majority		0.375**	0.401**				0.136	
Relative GDP	3.410**			3.930**	4.341**	4.745**	4.178**	2.437**
	Second-stage estimates							
Initial log GDP per capita	-0.729**	-1.084**	-0.855**	-0.777**	-0.738**	-1.060**	-1.148**	-1.596**
Inflation	-0.001**	-0.002**	-0.001**	-0.002**	-0.002**	-0.001**	-0.001**	-0.001**
Population growth	-0.541**	-0.588**	-0.544**	-0.681**	-0.642**	-0.613**	-0.625**	-0.567**
Openness	0.009**	0.011**	0.008*	0.007**	0.009**	0.008**	0.008**	0.008**
Investment (% GDP)	0.121**	0.142**	0.136**	0.138**	0.138**	0.132**	0.133**	0.129**
Government consumption (% GDP)	-0.108**	-0.064**	-0.055**	-0.124**	-0.128**	-0.138**	-0.134**	-0.080**
RR regime	-7.465**	-1.656*	-3.045**	-1.613**	-2.050**	-1.794**	-1.481*	-2.466**
RR regime × Legislative Index of Electoral Competitiveness	1.034**	0.313**	0.441**	0.237**	0.312**			
RR regime × Executive Index of Electoral Competitiveness						0.273**	0.225**	0.379**
Observations (countries)	2632 (137)	2755 (139)	2559 (135)	2954 (143)	2764 (139)	2764 (139)	2995 (144)	2799 (140)
Shea partial R^2	0.02	0.09	0.10	0.07	0.13	0.05	0.03	0.02
F-test (p-value)	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Sargan test (p-value)	0.12	0.06	0.21	0.64	0.17	0.13	0.46	0.09

Notes: F-test of instruments significance; the null is that excluded instruments are relevant. Sargan test of overidentifying restrictions; the null is that the instruments are valid instruments. Shea partial R^2 refer to first stage regressions. See also Table 2.

TABLE 4: GDP growth regressions: *IMF* and *LYS* exchange rate indices

	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)
	OLS	OLS	2SLS	2SLS	2SLS	2SLS	2SLS	2SLS	2SLS
Initial log GDP per capita	-1.012**	-1.039**	-0.713*	-0.734*	-1.099*	-1.307*	-0.815**	-0.797*	-1.811**
Inflation	-0.001**	0.000**	-0.001**	-0.001**	-0.001**	-0.001**	-0.001**	-0.001**	-0.001*
Population growth	-0.551**	0.008**	-0.480**	-0.485**	-0.496**	-0.551**	-0.582**	-0.688**	-0.752**
Openness	0.010**	-0.637**	0.009**	0.010**	0.009**	0.007*	0.008*	0.008*	0.005*
Investment (% GDP)	0.131**	0.134**	0.131**	0.129**	0.126**	0.129**	0.142**	0.141**	0.148**
Government consumption (% GDP)	-0.107**	-0.107**	-0.112**	-0.109**	-0.123**	-0.131**	-0.088**	-0.145**	-0.088**
IMF regime	-0.196*		-4.410**	-4.207*	-2.120**	-2.883*			
IMF regime × Legislative Index of Electoral Competitiveness			0.617**	0.590**					
IMF regime × Executive Index of Electoral Competitiveness	0.032**				0.307**	0.409**			
LYS regime		-0.426**					-3.233**	-3.150**	-4.746**
LYS regime × Legislative Index of Electoral Competitiveness							0.450**	0.387**	
LYS regime × Executive Index of Electoral Competitiveness		0.045*							0.662**
Instruments for exchange rate regime and interaction term			Party Orient. Prop. Repr. Rel. GDP**	Prop. Repr. Plurality Rel. GDP**	Prop. Repr. Gov. Fract. Rel. GDP**	Party Orient. Prop. Repr. Rel. GDP**	Prop. Repr. Gov. Fract.* Rel. GDP**	Gov. Fract.** Plurality Rel. GDP**	Prop. Repr.** Party Orient. Rel. GDP**
Observations (countries)	3317 (148)	2916 (147)	2435 (136)	2474 (137)	2412 (135)	2435 (136)	2147 (135)	2319 (139)	2164 (136)
Shea partial R^2			0.02	0.02	0.03	0.01	0.14	0.08	0.02
F-test (p-value)			0.00	0.00	0.00	0.00	0.00	0.00	0.00
Sargan test (p-value)			0.79	0.61	0.12	0.17	0.06	0.15	0.01

Note: See Tables 2 and 3.

TABLE 5: Five-year average GDP growth regressions: *RR* exchange rate index

	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)
	OLS	OLS	2SLS	2SLS	2SLS	2SLS	2SLS	2SLS	2SLS
Initial log GDP per capita	-0.881**	-1.059**	-1.197**	-0.958**	-0.907**	-1.121**	-1.083**	-1.607*	-1.535**
Inflation	-0.003**	-0.002**	-0.002**	-0.002**	0.000	-0.002**	-0.002**	-0.002**	-0.002**
Population growth	-0.560**	-0.525**	-0.370**	-0.292**	-0.357*	-0.305*	-0.313**	-0.350**	-0.287*
Openness	0.002	0.002	0.006	0.006	0.001	0.005	0.006	0.004	0.003
Investment (% GDP)	0.125**	0.121**	0.124**	0.112**	0.085**	0.130**	0.109**	0.119**	0.122**
Government consumption (% GDP)	-0.091**	-0.091**	-0.063**	-0.082**	-0.058**	-0.084**	-0.071**	-0.064**	-0.085**
RR regime	-1.129**	-1.415**	-1.965*	-3.266*	-6.802**	-2.582**	-3.532**	-1.982*	-2.459**
RR regime × Legislative Index of Electoral Competitiveness	0.068**		0.301**	0.457**	0.803**	0.348**	0.500**		
RR regime × Executive Index of Electoral Competitiveness		0.120**						0.299**	0.327**
Instruments for exchange rate regime and interaction term			System Gov. Fract. Rel. GDP**	System Plurality* Rel. GDP**	Prop. Repr.** Gov. Fract. Rel. GDP**	Party Orient. Gov. Fract. Rel. GDP**	Gov. Fract. Plurality** Rel. GDP**	System Gov. Fract. Rel. GDP**	Gov. Fract. Party Orient. Rel. GDP**
Observations (countries)	804 (147)	804 (147)	760 (145)	710 (141)	659 (137)	750 (144)	705 (141)	760 (145)	750 (144)
Shea partial R^2			0.04	0.03	0.02	0.04	0.04	0.03	0.03
F-test (p-value)			0.00	0.00	0.00	0.00	0.00	0.00	0.00
Sargan test (p-value)			0.78	0.28	0.83	0.33	0.36	0.48	0.34

Note: See Tables 2 and 3.

TABLE 6: GDP growth 2SLS regressions: robustness tests with additional control variables

	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)
Initial log GDP per capita	-0.740**	-0.645**	-0.831	-0.548**	-0.770**	-1.317**	-0.797*	-0.633**	-0.378
Inflation	-0.001**	-0.001**	-0.001**	-0.001**	-0.002**	-0.001	-0.001**	-0.001**	-0.001**
Population growth	-0.526**	-0.519**	-0.523**	-0.557**	-0.599**	-0.563**	-0.507**	-0.625**	-0.625**
Openness	0.010**	0.009**	0.010**	0.008*	0.011**	0.006	0.010**	0.009*	0.012**
Investment (% GDP)	0.154**	0.136**	0.137**	0.138**	0.144**	0.136**	0.116**	0.141**	0.133**
Government consumption (% GDP)	-0.044**	-0.080**	-0.129**	-0.056**	-0.064**	-0.056**	-0.113**	-0.108**	-0.179**
Money (% GDP)	-0.013**	-0.012**	-0.016**						
Credit (% GDP)				-0.008**	-0.009**	-0.009**			
Terms of trade adjustment (% GDP)							0.050**	0.046**	0.040**
RR regime	-2.497**	-7.273**	-1.725*	-3.025**	-1.521**	-3.329*	-10.040*	-2.052**	-1.717**
RR regime × Legislative Index of Electoral Competitiveness	0.400**	1.006**		0.413**	0.280**		1.353*	0.270**	
RR regime × Executive Index of Electoral Competitiveness			0.270**			0.482**			0.202**
Instruments for exchange rate regime and interaction term	Propr.** Gov. Fract. Rel. GDP**	Propr.** Party Orient. Rel. GDP**	Gov. Fract. Plurality* Rel. GDP**	Gov. Fract. Propr.** Majority **	Gov. Fract.** Plurality** Majority **	Gov. Fract. Propr.** Majority**	Propr.* Plurality** Rel. GDP**	Gov. Fract. Party Or. Plurality **	Gov. Fract. Plurality Rel. GDP**
Observations (countries)	2145 (122)	2164 (123)	2334 (126)	2528 (135)	2715 (139)	2528 (135)	2337 (128)	2403 (130)	2450 (131)
Shea partial R^2	0.20	0.03	0.04	0.09	0.08	0.01	0.01	0.08	0.05
F-test (p-value)	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Sargan test (p-value)	0.76	0.42	0.38	0.09	0.04	0.04	0.67	0.85	0.81

Note: See Tables 2 and 3.

TABLE 7: GDP growth 2SLS regressions: splitting countries

	(1)	(2)	(3)	(4)	(5)	(6)
	Advanced	Developing	Advanced	Developing	Countries with unchanged	
					Legislative Electoral Competitiveness	Executive Electoral Competitiveness
Initial log GDP per capita	-2.260**	-1.561**	-2.345**	-2.369**	-1.240**	-1.173**
Inflation	-0.033**	-0.002**	-0.031**	-0.001**	-0.003**	-0.011**
Population growth	-0.134	-0.730**	-0.135	-0.795**	-0.571**	-0.448**
Openness	0.022**	0.003	0.020**	-0.003	0.018**	0.006**
Investment (% GDP)	0.019	0.144**	0.024	0.135**	0.098**	0.092**
Government consumption (% GDP)	-0.143**	-0.076**	-0.149**	-0.062**	-0.034	-0.082**
RR regime	-5.563**	-2.126**	-3.830**	-2.450**	-20.323**	-2.511**
RR regime × Legislative Index of Electoral Competitiveness	1.040**	0.352**			3.008**	
RR regime × Executive Index of Electoral Competitiveness			0.746**	0.360**		0.308**
Instruments for exchange rate regime and interaction term	System** Plurality** Rel. GDP**	System Gov. Fract. Rel. GDP**	System** Plurality** Rel. GDP**	System Gov. Fract. Rel. GDP**	Gov. Fract.** Propr. Majority	System** Gov. Fract.** Plurality**
Observations (countries)	994 (39)	1979 (103)	994 (39)	1979 (103)	912 (36)	917 (37)
Shea partial R^2	0.09	0.09	0.10	0.04	0.17	0.09
F-test (p-value)	0.00	0.00	0.00	0.00	0.00	0.00
Sargan test (p-value)	0.95	0.35	0.89	0.62	0.09	0.07

Note: See Tables 2 and 3.