Grooming Classifications: Exchange Rate Regimes and Growth in Transition Economies

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Abstract

The objective of this paper is to test the exchange rate regime – growth nexus in transition economies by looking if and how some inherent characteristics of the transition process might have affected the de-facto classifications of exchange rate regimes. 28 transition countries of Central and Eastern Europe and the Commonwealth of Independent States are investigated over 1991-2007 and three de facto classifications of exchange rate regimes are considered. As usual in the empirical literature, initially, the exchange rate regime effect on growth differs across classifications. However, further investigation suggests that the three classifications usually disagree around some inherent characteristics of the transition process, like the higher trade openness of the countries, the episodes of high inflation and the bank system reform and interest rate liberalization. Results indicate that high inflation likely determined disagreement in early transition, while trade openness and interest rate liberalization in late transition. After classifications have been cleaned of the disagreeing points, the final results, corrected for the potential selectivity bias, suggest that both pegs and intermediate regimes of all three classifications significantly outperform floats in terms of economic growth, the average effect being slightly lower for pegs.

Keywords: exchange rate regime classifications, economic growth, transition economies

JEL classification: E42, F31

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1. Introduction

Since the onset of the general floating of the exchange rates across the world after Breton Woods system broke down, the interest in the exchange rate regimes increased. One strand of literature (e.g. Rizzo, 1998; Edwards, 1999) investigates how countries choose the exchange rate regime. Another strand (Mussa, 1986; Moreno, 2000 and 2001; Domac et al. 2001; Eichengreen and Leblang, 2003; De Grauwe and Schnabl, 2004; Husain et al. 2005; Levy-Yeyati and Sturzenegger, 2005; Edwards and Levy-Yeyati, 2005; Harms and Kretschmann, 2009) analyses the macroeconomic implications of the chosen regime in operation. Among the latter are the studies investigating exchange rate regime effect on economic growth. However, their results are diverging: while ones find that a peg supports growth, others find negative or no relationship.

As a consequence, researchers started questioning the exchange rate regime classification. However, while the earlier literature questioned the IMF de-jure classification (Levy-Yeyati and Sturzenegger, 2005), the latter literature (Eichengreen and Razo-Garcia, 2011) questions the merits of the de-facto classifications. The idea behind the questioning of the de-jure classification was that there is perhaps a gap between what countries officially report and what they actually do with regard to the exchange rate regime. This gave rise to the phenomenon of "fear of floating" (Calvo and Reinhart, 2002), when a country declares a float, but heavily intervenes to prevent large swings in the exchange rate to adversely affect the economy. Hence, any analysis based on the self-reported regimes would be unreliable.

Bubula and Otker-Robe (2002), Reinhart and Rogoff (2004) and Levy-Yeyati and Sturzenegger (2005) are the most prominent papers who devoted an effort to develop a de-facto classification of the exchange rate regimes that would reflect the reality and would give the analyses reliability. Though, it showed up that there is no consensus even when the analyses are based on the de-facto classifications only (Harms and Kretschmann, 2009). Eichengreen and Razo-Garcia (2011) document the extent to which the three de-facto classifications are different, suggesting that these differences then likely drive the different effects on growth.

In addition to this, results with regard to the exchange rate regime effect on growth in the literature further differ when developing (transition) versus advanced economies are observed. Estimating the exchange rate regime effect on growth may be further complicated in transition economies, due to their inherent processes over transition, like the episodes of high inflation – which made some of those countries embark on a peg; and the episodes of currency pressures – which made them exit a peg. Moreover, the processes of capital-account liberalization, bank reform and interest rate liberalization, the opening up of the trade and foreign exchange system, reserves level and fluctuations, while affecting the speed and quality of the transition process, might have impinged on the de-facto exchange rate regime pursued in practice in these economies. Some of these issues have

not been analyzed in the literature underpinning the issue analyzed herein and hence will contribute to the current sparse of knowledge.

The objective of this research is to empirically test the exchange rate regime – growth nexus in transition economies by examining if and how the potential disagreements among de-facto classifications have been governed by the inherent characteristics of the transition process. Transition economies of Central and Eastern Europe and the Commonwealth of Independent States are analyzed over 1991-2007. The rest of the paper is organized as follows. The next section briefly reviews the literature regime-growth. Section 3 emphasizes the issue of classification of the exchange rate regime, with particular reference to the variety of de-facto classifications. Section 4 identifies some inherent characteristics of the transition process that might have affected the de facto exchange rate regime. Section 5 reviews the used model, methodology and data. Section 6 presents the results and offers a discussion. Section 7 concludes.

2. Overview of the literature

Several studies diagnose if and how exchange rate regimes affect growth. These include: Moreno, (2000, 2001); Domac et al. (2001); Gosh et al. (2002); Bailliu et al. (2003); Eichengreen and Leblang (2003); Rogoff et al. (2003); De Grauwe and Schnabl (2004); Levy-Yeyati and Sturzenegger (2003); Edwards and Levy-Yeyati (2005); Husain et al. (2005); Harms and Kretschmann (2009); Eichengreen and Razo-Garcia (2011) and others. Advocates of pegs highlight that they promote environment conductive to trade, investment and, hence, growth by reduced policy uncertainty and lowered interest-rates variability. Gylfason (2000) explains that macroeconomic stability imposed by pegging promotes foreign trade, thus "stimulating economic efficiency and growth over the long haul and restraining inflation, which is also good for growth" (p.176). Fixing the exchange rate may enable faster growth in the medium and long run by supporting greater openness to international trade. Also, the latter may spur growth by easing technology transfer, thus aiding the productivity growth, and which in turn is boosted by promoting greater openness (Moreno, 2001).

However, a flexible exchange rate may enable fast and easy accommodation and absorption of aggregate economic shocks (Bailliu et al. 2003). "When the adjustment to shocks is smoother, one would expect the growth to be higher, given that the economy is, on average, operating closer to capacity" (p.385). This could yet stimulate protectionist behavior, distorted price signals and therefore misallocation of resources in the economy (Levy-Yeyati and Sturzenegger, 2005; Nilsson and Nilsson, 2000). However, the effect of the exchange rate regime channeled through productivity growth is unclear. Aghion et al. (2005) argue that an aggregate external shock, under a peg, transmits into real activity and causes a higher share of the firms to experience credit constraints, given the under-developed financial market and thus hamper growth. In countries with a developed financial

sector, on the other hand, the positive effects of a flexible exchange rate prevail. Since financial sector development is associated with income levels, Aghion et al. (2009) offer a compelling explanation why the growth effects of exchange rate flexibility differ across income groups.

The empirical findings on the regime-growth link differ as much as the theoretical considerations. An extensive review of the empirical literature can be found in Petreski (2009). Empirical findings considerably differ even when developing are contrasted with developed economies. For instance, Levy-Yeyati and Sturzenegger (2005) and Bleaney and Francisco (2007) find that peg slows growth in developing economies, while exerts no effect in advanced economies. Gosh et al. (2002) also find a slight superiority of pegs, but show that this result is not very robust, while Rogoff et al. (2003) conclude the opposite for an isolated group of advanced economies, but not for developing ones. Dubas et al. (2005) and Huang and Malhorta (2004) conclude that regime does not matter for growth in the advanced economies, but conversely find a positive effect of peg on growth in developing economies.

There is a variety of explanations for the contradictory results of the recent literature: the different studies refer to different country samples and time intervals; they differ in their choice of control variables that are used to mitigate omitted-variable bias; they use different estimators; and the like. Concerning the classification methods of the exchange rate regime, it might be that the different approaches – the use of official de jure or observed de facto exchange rate regimes – may lead to different results. This is discussed next.

3. Exchange rate regimes: 'Deeds versus Words'

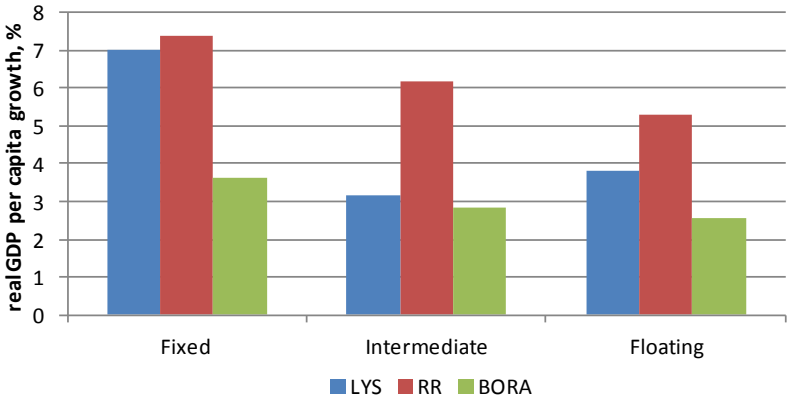
Divergent results made researchers to start questioning the exchange rate regime classification. A strand of the literature probably led by Reinhart and Rogoff (2004) and Levy-Yeyati and Sturzenegger (2005) argued that countries usually behave differently in practice, with regard to the exchange rate regime, than compared to what they report as their official regime. This gave rise to the phenomenon of "fear of floating" (Calvo and Reinhart, 2002), when a country declares a float, but in fact heavily intervenes to prevent large swings in the exchange rate to adversely affect the economy. Hence, any analysis based on the self-reported regimes seemed unreliable. These two studies opted to develop a de facto classification of the exchange rate regimes that would reflect reality.

Reinhart and Rogoff (2004) – hereafter RR – divide their observations into those in which a country has a unified exchange rate versus dual or parallel rates. For countries with only official rates, they then use statistical methods to verify the accuracy of the de jure classification and/or place the observation into an alternative category, relying mainly on data on exchange rate variability, variability relative to officially-announced bands and observed inflation. For countries with dual and

parallel rates they do likewise on the basis of the market-determined rate. They end up with 14 fine classes. Levy-Yeyati and Sturzenegger (2005) – hereafter LYS – for their part, classify exchange rate regimes on the basis of the volatility of the nominal exchange rate, the variability of its rate of change and the volatility of international reserves. High volatility of the first two and low volatility of reserves suggests float in their classification and the opposite for a peg. When all three volatilities are considerable to high, LYS classify the regime as dirty float or crawling peg. Bubula, Otker-Robe and Anderson from the IMF (Bubula and Otker-Robe, 2002) – hereafter BORA – complemented the IMF de jure classification with information from IMF country reports and related sources ("press reports, news articles, and other relevant papers") and developed a third set of de facto regime classification. They end up with 13 classes of exchange rate regimes.

While the earlier literature questioned the IMF de-jure classification, the recent literature (Eichengreen and Razo-Garcia, 2011) questions the merits of the de-facto classifications. The three prominent classifications reviewed above are based on different information: RR on the exchange rate, parallel market and observed inflation; LYS on the volatilities of the exchange rate and reserves; BORA on judgment. Indeed, for developing economies, Levy-Yeyati and Sturzenegger (2005) applying their classification found negative relation between peg and growth, while Huang and Malhorta (2004) applying the RR classification found a positive relation. However, Husain et al. (2005) found insignificant differences of how pegs and floats affect growth relying on the same RR classification. The latter is found by Bleaney and Francisco (2005) when BORA is applied. Other examples of divergent results in developing economies can be easily found in the literature. So, it showed up that there is no consensus even when the analyses are based on the de-facto classifications only (Harms and Kretschmann, 2009). Figure 1 looks at the growth performance for different exchange rate regimes and different de facto classifications for the transition economies of Central and Eastern Europe and the Commonwealth of Independent States. It only builds intuition and does not reveal causal relationships; however, it suggests that although pegs might have some precedence over intermediate and floating regimes in terms of growth, still facts are far from conclusive across the three classifications.

Figure 1 - Growth across regimes and classifications



Source: De facto classifications; World Development Indicators

Eichengreen and Razo-Garcia (2011) document the extent to which the three de-facto classifications are different, suggesting that it likely drives the different growth effects. Given all those differences, the question for transition economies is whether the differences in the de facto exchange rate regime classifications reflect some (different) characteristics of the transition process and hence result in a disagreement. We discuss this next.

4. Exchange rate regimes in transition to a market-based economy

The issue of the exchange rate regime gained importance in the economies leaving the central-planned system. Sachs (1996) argues that in most of transition economies the first years after leaving the planned system experienced large structural imbalances: repressed inflation, marked by extreme shortages in consumer and producer markets; large fiscal deficits, including an overhang of foreign debt; extreme currency inconvertibility, including a large black-market premium on the exchange rate; low levels of domestic competitiveness; and weak trade and financial linkages with market economies. So, the objective of the transition process in the monetary sphere was to free prices, stabilize the price level, liberalise trade, unify markets (in particular, the foreign exchange and money markets) and thus prices (exchange and interest rates) (Belke and Zenkic, 2007). However, the price liberalization that followed along the likely monetary financing of the large fiscal deficits sparked high inflation. Many of the transition economies – like the Visegrad and the Baltic countries - pegged their currencies to impose the credibility of the anchor currency in the domestic system, but others - for example, Bulgaria, Romania, Russia and Ukraine - adopted a float along a stringent anti-inflationary program.

In parallel, many transition economies faced the tremendous challenge of transforming their banking systems from passive residuals (i.e. the mono-banking system and administered prices) to a system with the task of increasing economic efficiency and with an active role in the macroeconomic transmission process and management (i.e. a two-tier banking system, indirect instruments of

monetary policy and so on). Bank system reform, privatization and capitalization marked the entire decade of the 1990s with heavy measures undertaken to liberalize interest rates; government were advised that undercapitalized banking sectors may exacerbate macroeconomic instability by engaging in large-scale foreign borrowing at the time of capital-market liberalization (Sachs, 1998).

Nevertheless, some studies (e.g. Dean, 2003) highlight the characteristic of transition economies being caught in tensions between rapid change and inherited rigidity. Certain of these tensions can be relieved with embarking on a flexible exchange rate – official or only de facto. For example, a tension emanating from the conflict between opening up to international trade and the privatized or restructured economy, on the one hand, and rigid relative wages and prices, on the other. The need for frequent real exchange rate adjustment under these circumstances has been more readily met by nominal exchange rate flexibility than by price and wage changes under an exchange rate peg. Rapid capital inflows and money market liberalization after transition began to bear fruit have been another source of pressure that has been more readily relieved by nominal than by real exchange rate changes; and so on. This is also probably how these countries feared to float or peg and manifested exchange rate regime behavior different than what they officially declared. The opening up to international trade, the reform of the foreign exchange and bank system, the capital flows, the high inflation, pressures on the foreign exchange market, all might have been a source of such tensions. Hence, the objective to de facto classify the exchange rate regime in operation, has been jeopardized with those factors on the high.

The preceding discussion is mirrored on Figures 2 to 5. The figures refer to the transition economies of Central and Eastern Europe and the Commonwealth of Independent States. For the purpose of the figures, we calculated the average rate of disagreement among the three de facto classifications of exchange rate regimes across countries and years. In all figures, the rate of disagreements is shown in blue diamonds and it shows a U-pattern: disagreement is higher and declining in the 1990, but then again increases around mid-2000. It is potentially related to the characteristics of inflation identified above: the high inflation, the opening up to trade, the bank and capital-account developments and the external vulnerabilities. Figure 2 suggests that periods of high-to-hyper inflation in the early 1990 may be associated with disagreement of how regime in operation will be classified in the three de facto classifications. This may be expected, as RR and BORA consider inflation developments in their classifications, but not LYS. However, inflation cannot obviously explain the rising disagreement later. Though, Figure 3 offers an explanation for this. While one may believe that the opening up to international trade and the industry restructuring that happened due to privatization over 1990s may have played some role for the exchange rate regimes classification, Figure 3 does not reveal any obvious correlation over 1990s, but some relation may be claimed over 2000s, when due to the favorable global economy, these countries achieved very high rates of trade openness. So, if trade openness causes higher disagreement across exchange rate

regimes in transition economies, then it could be the period before the 2007 economic crisis when these countries switched or started considering switches toward more flexible regimes.

Figure 2 - ERR disagreement and inflation

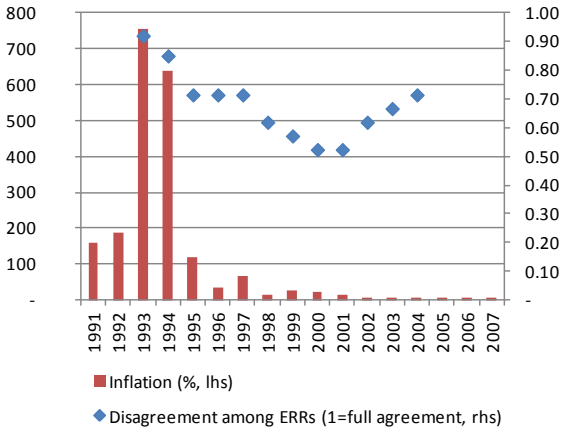


Figure 3 - ERR disagreement and trade

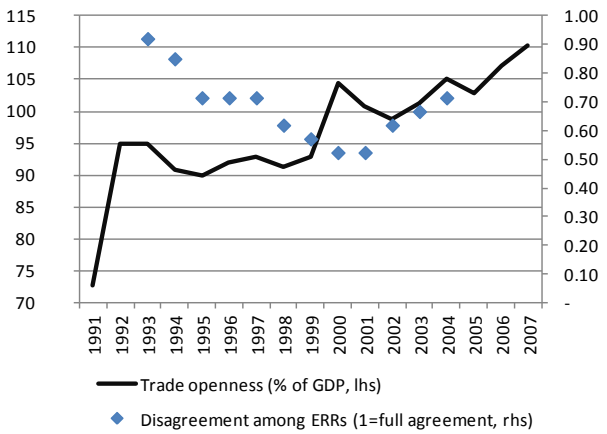


Figure 4 - ERR disagreement and financial sector

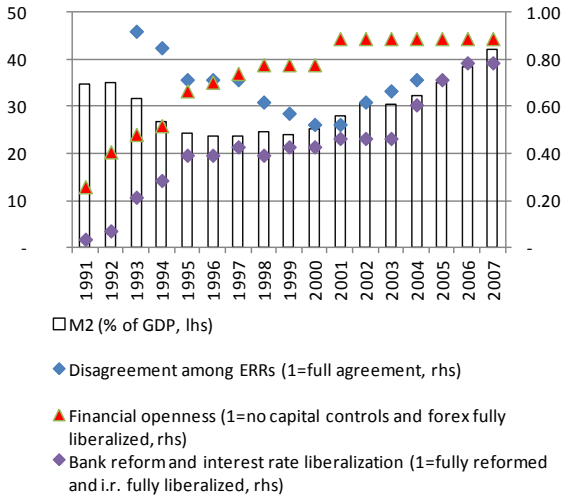
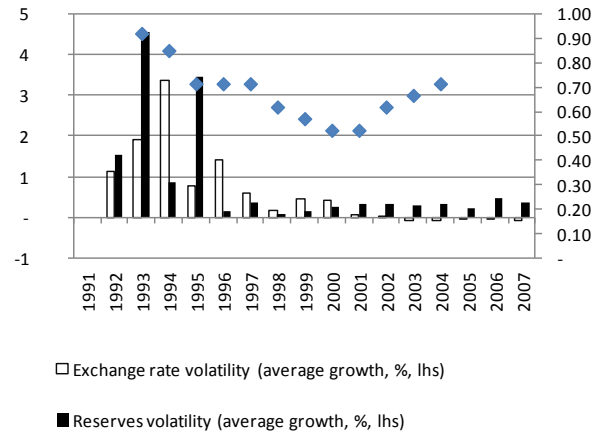


Figure 5 - ERR disagreement and forex market pressures



Source: World Development Indecators (The World Bank); Transition Indicators (EBRD); De facto exchange rate regime classifications of LYS, RR and BORA
Note: Figures are simple averages accross countries.

Figure 4 lends some further support to the idea highlighted on Figure 3. While inflation is likely determining the disagreement over 1990s, while international trade opening-up over 2000s, then money supply shows likely correlation over the entire period. However, high money supply over 1990 may be reflecting the heavy financing of the fiscal deficits with central bank lending, which was luckily pretty rapidly subdued (1993-94), while the steady rising trend of money since early 2000s may be reflecting the favorable environment conductive to capital flows across transition countries. Inter alia, high capital inflows witnessed by transition economies during the good economy before the crisis created pressures on the foreign exchange market, which may have caused the disagreement among the exchange rate classifications. However, Figure 4 is ambiguous as it suggests that financial closeness and the absence of bank reform and interest rates being non-market driven in the early transition, may be associated with higher disagreement, but that sufficiently liberalized capital

account and money market in late transition may also be associated with higher disagreement. Finally, Figure 5, expectedly, suggests that the strengthened volatilities on the foreign exchange market, as expressed by the exchange rate and reserves volatility, may have also been associated with higher disagreement among the three de facto classifications.

These stylized facts lend some support to the issues raised in the literature that many developments inflicted by the transition process might have created conflicts for the government with regard to the operation of the exchange rate regime. In turn, this likely affected the different de facto exchange rate classifications to disagree around how to classify their actual behavior with regard to the exchange rate regime. In turn, the disagreement may be causing the divergent results in the literature of how the de facto regime potentially affects growth. This context of the exchange rate regimes has not been explored in the literature and hence is the contribution that this paper tries to make.

5. Model, methodology, data

5.1. Economic model and methodology

In order to investigate the exchange rate regime effect on growth, we will design a standard growth regression, whereby GDP growth per capita is regressed on pre-determined and policy variables (Barro and Sala-i-Martin, 2004). To this standard setup, we add two exchange rate dummies, for fixed and intermediate exchange rate regime, the floating regime being the referent category:

$$gdppc_{i,t} = \alpha + \beta_1 gdp90_i + \beta_2 gc_{i,t} + \beta_3 inv_{i,t} + \beta_4 inf_{i,t} + \beta_5 ttg_{i,t} + \beta_6 popgr_{i,t} + \beta_7 lpop_{i,t} + \beta_8 trade_{i,t} + \beta_9 fixed_{i,t} + \beta_{10} inter_{i,t} + u_i + \varepsilon_{i,t} \quad (1)$$

Where: $gdppc_{i,t}$ is GDP growth per capita in country *i* in period *t*; $gdp90_i$ is the initial GDP in 1990 for each country, hence the coefficient β_1 would reflect the conditional convergence; $gc_{i,t}$ is the government consumption as a share of GDP; $inv_{i,t}$ is the gross capital formation as a share of GDP; $ttg_{i,t}$ is the growth of the terms of trade; $popgr_{i,t}$ is the growth of population; $lpop_{i,t}$ is the log of population as a measure of size; $trade_{i,t}$ is export plus import as a share of GDP; $fixed_{i,t}$ and $inter_{i,t}$ are dummy variables taking a value of 1 if the country's exchange rate regime in the respective period is classified as fixed and intermediate, respectively; u_i is a country-specific error term; $\varepsilon_{i,t}$ is the idiosyncratic error which is assumed to be well behaved. Our main interest is the parameters β_9 and β_{10}.

To have the exchange rate regime dummies appropriately defined, we need to ensure that the three classifications – LYS, RR and BORA – have the same groups of regimes. As usual in the

literature (e.g. Bleaney and Francisco, 2007), we propose a three-way classification of fixed, intermediate and floating regimes. Table 1 present the dividing lines:

Table 1 – Collapsing the currency spectrum in three categories

	LYS	RR	BORA
Fixed	Fix	No separate legal tender Pre-announced peg or currency board arrangement Pre-announced horizontal band narrower than or equal to +/-2% De facto peg	Another currency as a legal tender Currency union Currency board Economic union/Monetary coordination agreement Conventional fixed peg to a single currency
Intermediate	Dirty float Crawling peg	Pre-announced crawling peg Pre-announced crawling band narrower than or equal to +/-2% De facto crawling peg De facto crawling band narrower than or equal to +/-2% Pre-announced crawling band wider than or equal to +/-2% De facto crawling band narrower than or equal to +/-5% Moving band narrower than or equal to +/-2%	Conventional fixed peg to a basket Pegged within horizontal banks Forward-looking crawling peg Forward-looking crawling band Backward-looking crawling peg Backward-looking crawling band Other tightly managed floating
Floating	Float	Managed floating Freely floating	Managed floating with no predetermined path for the ER Independent floating

Source: Drafted by the author, based on the respective classifications.
Notes: Reinhart and Rogoff de facto classification: 1980-2007. Freely falling category reclassified following Chronologies. Bubula, Otker-Robe and Anderson de facto classification: 1980-2007. Levy-Yeyati and Sturzenegger de facto classification: 1980-2004.

As suggested by the growth literature (Barro and Sala-i-Martin, 2004) and the exchange rate regimes literature (Harms and Kretschmann, 2009), regression (1) is estimated by the usual FE or RE estimators, which assume regressors' being exogenous with respect to growth. However, while some studies find that endogeneity does not necessarily bias the results in growth regressions (Barro and Lee, 1994), still one may argue that exchange rate regime choice is not independent of output performance, nor are the other regressors fully exogenous to growth. Therefore, we show the estimates of an IV estimation also – FE or RE.[1] The choice between FE and RE in both cases is made through the standard Hausman test. In addition and for comparison purposes, we will specify OLS regression also, which disregards the country heterogeneity (i.e. ignores u_i in [1]).

[1] Closely related to the IV estimation, the annual GDP growth rates are often found to be persistent, which implies that growth regressions should include a lag of the GDP growth as an additional regressor, in which case a dynamic IV estimator would fit better. However, in all cases we documented an insignificant lagged growth, which rendered the dynamic specification inappropriate.

In the second step, we will identify the points where the three pairs of exchange rate regime classifications (Section 3) disagree. A disagreement occurs if one classification classifies observation *j* differently than the other classification. For the three pairs of classifications, we define three dummy variables which take a value of 1 where classifications X and Y disagree, and 0 otherwise. As the disagreeing dummies definition is an empirical matter, more details on this follow in the Results section. To investigate if the disagreement is determined by the inherent characteristics of the transition process, we will run the following model:

$$disagree_{i,t} = \alpha + \beta_1 m2gdp_{i,t} + \beta_2 high\_inf_{i,t} + \beta_3 high\_emp_{i,t} + \beta_4 to_{i,t} + \beta_5 fo_{i,t} + \beta_6 bank\_ref_{i,t} + u_i + \varepsilon_{i,t} \quad (2)$$

Where: $disagree_{i,t}$ is the dummy variable as defined before; $m2gdp_{i,t}$ is the broad money to GDP ratio; $high\_inf_{i,t}$ is a dummy variable that takes a value of 1 if the observation for inflation falls in the fourth quartile for the whole panel; $high\_emp_{i,t}$ is similarly defined from a variable which sums the rates of growth of the nominal exchange rate and reserves, as indicators of the developments/pressures on the foreign exchange market; $to_{i,t}$ is the trade openness, defined as export plus import to GDP; $fo_{i,t}$ is the financial openness indicator, taking a value of 1 if country *i* in period *t* has been classified as with no or little reformed trade and foreign exchange market; $bank\_ref_{i,t}$ is a dummy variable taking a value of 1 if country *i* in period *t* has been considered with little reformed bank system and money market; u_i is a country-specific error term; $\varepsilon_{i,t}$ is the idiosyncratic error which is assumed to be well behaved. The selection of variables in the regression (2) is led by the discussion and the underlying literature reviewed in Section 4. Regression (2) will be estimated with the standard panel probit model.

In the final step, the findings from regression (2) will be used to identify and remove all observations of disagreement due to the transition process. The 'cleaned' exchange rate regimes will be then used to re-estimate regression (1) in order to check if the disagreement points cause unreliable estimation of the true effect of regimes on growth. However, the 'cleaning' may be non-random and impose selectivity bias onto the obtained coefficients through an FE/RE estimator. Sample selectivity bias occurs when the data availability is influenced by a selection process related to the value of the dependent variable. This selection process can introduce correlation between the error term and the regressor, which leads to bias in the OLS estimator. In our particular case, cleaning the disagreement points of the pairs of classifications may be related to growth. We will therefore utilize the Heckman (1979) two-step procedure for potential correction of this bias. The Heckman approach is documented in any standard econometric book, e.g. Davidson and MacKinnon (1999, pp.480). Hence, we will empirically reveal if such selectivity bias exists in our case and if so, results will be corrected for.

5.2. Data

The models set in the previous section will be estimated for 28 transition economies from Central and Eastern Europe and the Commonwealth of Independent States[2]. The referent period is 1991-2007. The termination of the dataset in 2007 is determined by the availability of the data from the three de facto classifications. The data for the exchange rate regimes are obtained from the web sites of Levy-Yeyati (LYS), Carmen Reinhart (RR), and from Bubula and Otker-Robe (2002) and the IMF web site for BORA. The main source of the data for the other variables is the World Development Indicators. The indices on bank reform and interest-rate liberalization and trade and foreign exchange market reform have been taken from the Transition Indicators of the European Bank for Reconstruction and Development. The political stability indicator has been obtained from the World Governance Indicators. The financial crisis variable is taken from Laeven and Valencia (2008). Appendix 1 presents some descriptive statistics for the analyzed variables as well their definitions and sources.

6. Results and discussion

6.1. Exchange rate regimes effect on growth

Results of the model (1) are given in Table 2. Columns (1)-(4) give the estimates when the individual heterogeneity is not considered, while (5)-(8) when it is. Columns (9)-(13) present the estimates when potential regressors' endogeneity is taken into account. Counting for the individual heterogeneity brings changes only in the investment rates: they probably capture countries' differences in columns (1)-(4), so that when these are taken into account, their significance vanishes. Counting for potential endogeneity in the growth regression, in addition, only strengthens the crowding out effect implied by the significant and negative coefficient of the government consumption; and in some specifications reveals a positive effect of terms of trade change on growth; while all other coefficient largely retain their magnitude and significance. Columns (1), (5) and (9) give the estimates when the exchange rate regime dummies are not included while the subsequent columns present the estimates with the LYS, RR and BORA classifications, respectively. In terms of the standard determinants of growth, results are quite satisfactory and some of them show considerable robustness across specifications. However, when it comes to adding the exchange rate dummies in the regression, there are some notable differences.

[2] Albania, Bosnia and Herzegovina, Bulgaria, Croatia, Czech Republic, Estonia, Hungary, Latvia, Lithuania, Macedonia, Montenegro, Poland, Romania, Serbia, Slovak Republic, Slovenia, Armenia, Azerbaijan, Belarus, Georgia, Kazakhstan, Kyrgyz Republic, Moldova, Russian Federation, Tajikistan, Turkmenistan, Ukraine, Uzbekistan.

Firstly, exchange rate regimes matter for growth only when the RR classification is considered. According to it, a peg results in a better growth by about 1.7 to 3.4 percentage points as compared to a floating regime, while an intermediate regime on average performs slightly worse – it improves growth by 2.2 to 3.1 percentage points, as compared to a float. However, in the LYS and BORA specifications, regimes are unimportant for growth. Notably though, the inclusion of LYS-classification dummies in the basic specification brings some changes: inflation becomes statistically significant with the expected negative sign. On the other hand, the BORA-classification dummies do not make any changes. Therefore, the question is to what extent differences in the exchange rate regimes classifications (Section 3) drive those results.

Table 2 – Exchange rate regime effect on growth

	Individual heterogeneity not considered				**Individual heterogeneity considered**				**Potential endogeneity considered**			
	Without ERR	**LYS**	**RR**	**BORA**	**Without ERR**	**LYS**	**RR**	**BORA**	**Without ERR**	**LYS**	**RR**	**BORA**
	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	(10)	(11)	(12)
GDP in 1990	-1.381	-2.010**	-1.172	-1.419	-1.334	-1.317	-1.149	-1.409	-1.334	-1.317	-2.657	-1.409
Government consumption to GDP	-0.319***	-0.318***	-0.384***	-0.333***	-0.291*	-0.394**	-0.323**	-0.294*	-1.215***	-0.559*	-1.352*	-1.134***
Investment to GDP	0.216***	0.059	0.219***	0.229***	0.137	0.034	0.139	0.134	-0.384	-0.076	-0.472	-0.634
Inflation	0.003	-0.062*	0.002	0.007	-0.008	-0.083**	0.034	-0.009	-0.105	-0.098*	-0.463	-0.133
Terms of trade growth	0.023	0.040	-0.012	-0.021	-0.021	-0.032	-0.030	-0.020	0.161*	0.010	0.139	0.191*
Population growth	-0.682	-2.040***	-1.189*	-0.291	-0.252	-1.054*	-0.560	-0.051	0.268	-1.379	-0.879	-0.653
Population size	0.593	0.473	0.665	0.681	0.707	0.884*	0.654	0.762	-0.365	0.859	1.203	0.296
Trade to GDP	0.025*	0.040***	0.011	0.023	0.032**	0.058**	0.021	0.032**	0.114**	0.089*	0.084	0.109**
Regimes												
Fixed regime	**-**	**0.607**	**2.549***	**1.286**	**-**	**-0.135**	**1.736****	**0.691**	**-**	**-0.315**	**3.358***	**-0.204**
Intermediate regime	**-**	**1.064**	**3.099*****	**0.584**	**-**	**0.228**	**2.186*****	**0.458**	**-**	**0.316**	**2.516****	**0.982**
Fixed effects	No	No	No	No	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Hausman test Ho: FE preferred	-	-	-	-	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0022
Hansen test Ho: Instruments are valid	-	-	-	-	-	-	-	-	0.7459	0.6517	0.5372	0.8588
Observations	154	81	150	154	154	81	150	154	147	76	145	147
R^2	0.2314	0.4573	0.2668	0.2382	0.2149	0.3918	0.2515	0.2174	0.0817	0.3369	0.0905	0.0881
F-stat	0.0000	0.0000	0.0000	0.0000	0.0000	0.0021	0.0000	0.0000	0.0132	0.0019	0.0019	0.0205

Source: Author's estimates.

*Note: *,** and *** denote statistical significance at the 10, 5 and 1%, respectively. Constant not reported. For the IV estimation, lags of the potentially endogenous variables have been used to correct potential endogeneity.*

6.2. Exchange rate regimes: 'Words understood differently'

Table 3 presents the extent of disagreement between pairs of the three classifications. Matches are given in the diagonal of each contingency sub-table. In the three sub-tables, the degree of matching does not exceed 59%, which is not surprising, given classifications use different inputs in the algorithms (Section 3). Three stylized facts emerge from Table 3 (grey cells):

(1) RR is likely in favor of intermediate regimes when compared to LYS (42% of LYS pegs and 41% of LYS floats are classified as intermediates in RR);

(2) BORA is likely in favor of intermediate regimes when compared to LYS (37% of LYS pegs and 41% of LYS floats are classified as intermediates in BORA) and is more flexible than LYS (41% of LYS intermediates are classified as floats in BORA);

(3) BORA is likely a mirror of RR with regard to intermediates and floats (44% of RR floats are classified as intermediates in BORA and 73% of BORA floats are classified as intermediates in RR).

Table 3 – Disagreement between regime classifications

		RR						BORA						BORA			
		fix	**int**	**fl**	**TOT**			**fix**	**int**	**fl**	**TOT**			**fix**	**int**	**fl**	**TOT**
LYS	**fix**	**41**	35	6	82	**LYS**	**fix**	**43**	32	11	86	**RR**	**fix**	**61**	9	1	71
	int	2	**35**	4	41		**int**	5	**33**	26	64		**int**	12	**57**	87	156
	fl	4	25	**32**	61		**fl**	5	34	**45**	84		**fl**	0	24	**30**	54
	TOT	47	95	42	184		**TOT**	53	99	82	234		**TOT**	73	90	118	281
Matching		58.7%				Matching		51.7%				Matching		52.7%			

Source: Drafted by the author, based on data from the respective classifications.

In turn, we will investigate the disagreement of Table 3 by shedding light on the transition process. As argued in section 4, several processes have been occurring in transition economies, especially over 1990s. Some of them interfered with the exchange rate regime in operation, i.e. forced countries to "behave" in certain way with regard to the exchange rate regime, which may be the source of disagreement between regime classifications. To investigate this, we will create three 'disagreement' dummies so as each reflects one of the three stylized facts inferred from Table 3, as follows:

(1) LYS-RR disagreement dummy, taking a value of 1 if fixed or float in LYS and intermediate in RR, 0 otherwise;

(2) LYS-BORA disagreement dummy, taking a value of 1 if fix or float in LYS and intermediate in BORA or if intermediate in LYS and float in BORA, 0 otherwise;

(3) RR-BORA disagreement dummy, taking a value of 1 if intermediate in RR and float in BORA or if intermediate in BORA and float in RR, 0 otherwise.

Then, we use the discussion in Section 4 and the empirical probit model (2) of Section 5.1 to check if some transition characteristics may be describing regime-classification differences. Table 4 gives the results.

Table 4 – Testing the disagreement between regime classifications

	LYS-RR	**LYS-BORA**	**RR-BORA**
	(1)	(2)	(3)
M2 to GDP	0.0002	0.0009	0.002
High inflation	-0.064	0.219***	0.120*
High exchange market pressure	-0.039	-0.071	-0.017
Trade openness	0.004**	-0.003	-0.0003
Financial openness	-0.156	-0.113	-0.101
Banks reform and interest rate liberalization	-0.050	-0.035	-0.146*
Observations	198	223	264

Source: Author's estimates.
*Note: *,** and *** denote statistical significance at the 10, 5 and 1%, respectively.*

Table 4 offers interesting insights into what might determine the disagreement between pairs of regime classifications. Column (1) refers to the LYS-RR pair. It suggests that greater trade openness increases the possibility that the two classifications will result in disagreement around how to classify regimes. The disagreement likely results in some de-facto intermediate regimes being classified by either pegs or floats by LYS or vice versa by RR. This is not strange, given that LYS relies on the volatility of the exchange rate and reserves, while RR on the existence of dual exchange markets. So, the more a country is open to trade, the higher the probability that LYS will classify on the corners, probably because openness causes higher volatility of the exchange rate and/or reserves than in less open economy. This finding can be reconciled with the reality, as this disagreement likely happened in the late transition (over 2000s) when the capital inflows in those countries were on the high. Many countries in this period started rethinking their exchange rate policies and all development result in a disagreement between LYS and RR.

Column (2) refers to the LYS-BORA pair, suggesting that these two classifications do not agree around episodes of high inflation in transition economies. Recall that high inflation herein is defined as any period when inflation fell into the fourth quartile of the entire sample. This is again not strange, given that LYS do not consider inflation in their classification directly, while BORA account for it. High inflation episodes then lead BORA to classify more regimes as intermediates or floating. This disagreement, contrary to the previous one, likely refers to the early transition, when inflation was on the spike in many transition countries.

That BORA puts emphasis on inflation role for the de-facto regime in operation is justified when compared to RR in column (3). This characteristic of BORA is again emphasized here, because inflation is not considered directly even in the RR case. As in the previous case, this disagreement

between RR and BORA likely emanates from the early transition. In addition, the more the interest rate has been liberalized and bank system reformed, the more RR and BORA disagree on the regime classification. This is also intuitive, as RR did not account for any characteristic on the money market, while BORA likely accounted it for through observing country reports. However, this disagreement likely emanates from the late transition when money markets became almost perfectly liberalized hence sending signals which were differently understood by the three classifications.

These identified differences due to the early or later transition process may be driving the different results for the exchange rate regime effect on growth in transition economies, as identified in Table 2. To eliminate the points of disagreement, we will adjust the classifications by eliminating potentially conflicting points, as suggested by the findings in Table 4. Specifically, we will eliminate: i) the observations where RR disagrees with LYS and where trade openness is classified as high; ii) the observations where BORA disagrees with LYS and where inflation is classified as high; and iii) the observations where RR disagrees with BORA and where inflation is classified as high or interest rates as sufficiently or highly liberalized. After doing so, the level of matching between the pairs of regimes becomes considerably higher than before. This is shown in Table 5, which suggests that the off-diagonal elements as suggested to be the disagreement points according to the investigation in Table 4, are now indeed very low.

Table 5 – Matching and disagreement between regime classifications after transition influence accounted for

		RR						BORA						BORA			
		fix	**int**	**fl**	**TOT**			**fix**	**int**	**fl**	**TOT**			**fix**	**int**	**fl**	**TOT**
LYS	**fix**	**41**	1	0	42	**LYS**	**fix**	**40**	1	1	42	**RR**	**fix**	**42**	5	0	47
	int	2	**29**	2	33		**int**	2	**29**	2	33		**int**	3	**15**	12	30
	fl	2	0	**25**	27		**fl**	2	0	**25**	27		**fl**	0	2	**25**	27
	TOT	45	30	27	102		**TOT**	44	30	28	102		**TOT**	45	22	37	104
Matching		93.1%				Matching		92.2%				Matching		78.8%			
Source: Drafted by the author, based on data from the respective classifications.																	

This confirms that transition characteristics in the investigated economies, mainly: their trade openness, high inflation episodes and the process of reforming of the bank system and liberalization of the money market were the reasons for disagreement around the classification of the exchange rate regimes.

6.3. Clean exchange rate regimes effect on growth

To fully verify the finding of Section 6.2, Table 6 gives the results of the exchange rate regime effect on growth when the cleaned regimes are considered, i.e. after the three classifications

have been reconciled. Note that we now use the Heckman two-step selection method so as to comprehend the potential presence of the selectivity bias, i.e. the probability that classifications' cleaning has been non-random. The primary equation is the growth model we estimated in Table 2 (with 'cleaned' exchange-rate regime classifications), while the selection equation includes the explanatory variables in Table 4, i.e. the transition factors. Toward the bottom of the table, we report the inverse mills ratio, which in all three cases is statistically insignificant. This suggests that the error terms in the selection and the primary equations are not correlated, so that (transition) factors that increase the probability of disagreement between the pairs of regime classifications, tend to be unrelated to growth. In other words, we do not find support that classifications' cleaning has resulted in a non-random sample.

The standard growth determinants largely retained their magnitude and significance, hence serving as robustness check for the earlier results. However, after classifications have been cleaned for the conflicting points, discrepancies around the effect they reveal on growth now vanish. All three classifications result in significant exchange rate regimes' effect on growth.

Table 6 – Exchange rate regime effect on growth, after classifications reconciled

	LYS	**RR**	**BORA**
	(1)	(2)	(3)
GDP in 1990	-0.752	-1.073	-1.947
Government consumption to GDP	-0.714***	-0.625***	-0.575***
Investment to GDP	0.178	0.303**	0.008
Inflation	-0.260*	-0.103	-0.317*
Terms of trade growth	-0.077	0.094	0.104
Population growth	-0.942	-1.594**	-2.192**
Population size	1.310*	0.935*	0.872
Trade to GDP	0.057**	0.035	0.056****
Constant	-8.830	-1.305	12.975
Regimes			
Fixed regime	**3.568***	**3.090****	**2.136***
Intermediate regime	**2.588****	**3.753*****	**3.999***
Selection equation			
M2 to GDP	0.009	0.012	-0.008
High inflation	-0.389	-2.164***	-0.585
High exchange market pressure	-0.133	-0.224	-0.776
Trade openness	0.005*	0.003	0.006
Financial openness	-1.310***	-1.204***	-1.799**
Banks reform and interest rate liberalization	-0.451*	-1.694***	-1.301**
Constant	-0.016	0.947	1.742
Inverse mills ratio (lambda) Selection bias (p-value in parenthesis)	**2.573** (0.298)	**0.489** (0.676)	**3.864** (0.144)
Observations	168	171	71
F-stat	0.0000	0.0000	0.0003
Source: Author's estimates. *Note: *,** and *** denote statistical significance at the 10, 5 and 1%, respectively.*			

Coefficients suggest that both pegs and intermediate regimes exert positive effect on growth in transition economies when compared to floats. Pegs are associated with on average 2 to 3.6 percentage points higher growth when compared to floats. Intermediate regimes are associated with on average 2.6 to 4 percentage points higher growth when compared to floats.

Table 7 – Testing coefficients equality between pairs of classifications

	Fixed regime coefficients	**Intermediate regime coefficients**
	Ho: No statistical difference	
LYS-RR	0.4503	0.1945
LYS-BORA	0.5878	0.4804
RR-BORA	0.1058	0.4725
Source: Author's estimations.		

Table 7 further suggests that the differences between the pairs of regimes with regard to the regimes' effect on growth are not statistically significant, which gives further support to the finding that once transition factors have been accounted for, classifications can be reconciled for transition economies to give harmonized picture for exchange rate regime effect on growth.

Overall, the analysis suggests that in transition economies, the points of disagreements among the three de facto classifications of the exchange rate regimes can be explained by their different consideration of the trade openness of the economy, episodes of high inflation and the process of bank reform and interest rate liberalization. However, while high inflation episodes determined disagreement in the early transition, the international trade opening up and the liberalization of the money market only influenced disagreement in the later transition when the good global economy resulted with strong export and capital inflows in transition economies. These factors created different views on the de facto behavior of the exchange rate regime in operation. Once these conflicting points have been removed, results suggest that pegs and intermediate regimes affect economic growth positively in transition economies as compared to floats, the effect of intermediate regimes being on average slightly stronger than that of pegs.

6.4. Some robustness checks

To verify the robustness of our results obtained in Table 6, we will conduct some robustness checks, in the following lines:

- Cut the first five years of the sample, due to the argument that these early-transition years were turbulent in transition economies, both in terms of economic developments (high inflation, privatization, large output declines due to civil unrest) and political developments (military conflicts, civil unrest);

- Addition of a variable approximating institutional quality, given that some works (Barro and Sala-i-Martin, 2004) argue it should be included as a standard growth regressor. This variable is approximated by the political stability index from the World Governance Indicators. Note that the index starts from 1996. Besides institutional quality, this variable should capture the civil unrest which used to be a characteristic of the early transition period for some of the countries analyzed;
- Excluding periods of financial crisis (banking and currency crisis) that might have impinged on the exchange-rate regime in operation and are related to output declines, as constructed from Laeven and Valencia (2008). Note that adding a dummy variable for financial crisis was not possible due to the low number of periods in such condition – only 3.8% in our sample.

Results presented in Table 7 remain robust to the robustness checks. Regimes' effect has not been influenced neither by the early developments in transition economies, nor by the political/institutional stability, nor by the occurrence of banking/currency crises. Political stability variable gains some significance in the specifications and suggests that going from the first to the third quartile of the distribution of the variable would result, on average, with 1.6 to 1.9 percentage points of additional growth.

Table 7 – Three types of robustness checks

	Cutting the sample to 1996-2007			**Addition of the institutional quality**			**Excluding observations with financial crisis**		
	LYS	**RR**	**BORA**	**LYS**	**RR**	**BORA**	**LYS**	**RR**	**BORA**
	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)
GDP in 1990	-0.184	-1.063	-2.117*	-0.966	-1.584	-2.109	-0.530	-0.925	-1.946
Government consumption to GDP	-0.772***	-0.627***	-0.584***	-0.742***	-0.667***	-0.647***	-0.750***	-0.634***	-0.575***
Investment to GDP	0.146	0.303**	0.011	0.189	0.283**	0.017	0.172	0.307***	0.007
Inflation	-0.264*	-0.108	-0.200*	-0.245*	-0.004	-0.280	-0.288**	-0.164	-0.317*
Terms of trade growth	-0.074	0.094	0.099	-0.045	0.152**	0.116	-0.076	0.093	0.104
Population growth	-0.886	-1.600**	-2.258***	-0.588	-0.988	-1.506**	-0.864**	-1.653**	-2.193**
Population size	1.312	0.940	0.683	1.256*	0.539	0.895	1.382*	1.025*	0.872
Trade to GDP	0.047*	0.035	0.050*	0.049*	0.006	0.044	0.057**	0.035	0.056*
Institutional quality	-	-	-	0.704	1.628**	1.325*	-	-	-
Constant	-13.682	-1.446	17.971	-5.232	13.108	16.012	-11.784	-4.082	12.951
Regimes									
Fixed regime	**3.948***	**3.104****	**2.046**	**3.935***	**3.619****	**2.823**	**3.817***	**3.314****	**2.138***
Intermediate regime	**2.624***	**3.762*****	**3.826****	**2.463****	**3.923*****	**3.363***	**2.631****	**3.889*****	**4.002***
Selection equation									
M2 to GDP	0.003	0.012	0.003	0.008	0.0102	-0.008	0.007	0.010	-0.008
High inflation	0.159	-1.921***	-0.245	-0.389	-2.164***	-0.555	-0.397	-2.236***	-0.578
High exchange market pressure	-0.080	-0.199	-0.757	-0.133	-0.224	-0.776	-0.097	0.034	-0.773
Trade openness	-0.005	0.002	0.012	-0.005	0.003	0.006	-0.005	0.004	0.006
Financial openness	-1.361**	-1.039**	-1.345	-1.310***	-1.204***	-1.799**	-1.326***	-1.386***	-1.794**
Banks reform and interest rate liberalization	-0.329	-1.570***	-1.207**	-0.451	-1.694***	-1.301**	-0.416	-1.574***	-1.301**
Constant	0.291	1.160	0.881	-0.016	0.947	1.742	0.039	0.981	1.743
Inverse mills ratio (lambda) Selection bias (p-value in parenthesis)	**5.152** (0.162)	**0.628** (0.652)	**2.526** (0.236)	**2.718** (0.268)	**0.267** (0.812)	**4.458** (0.149)	**3.279** (0.201)	**1.040** (0.381)	**3.879** (0.145)
Observations	114	108	65	168	171	71	157	150	70
F-stat	0.0031	0.0000	0.0000	0.0000	0.0000	0.0079	0.0000	0.0000	0.0004

Source: Author's estimates.
*Note: *,** and *** denote statistical significance at the 10, 5 and 1%, respectively. Reported estimates of Heckman two-step procedure.*

7. Conclusion

The objective of this paper is to test the exchange rate regime – growth nexus in transition economies by looking at the de-facto classifications of exchange rate regimes and the inherent characteristics of the transition process. 28 transition countries of Central and Eastern Europe and the Commonwealth of Independent States are investigated over 1991-2007 and three de facto classifications of exchange rate regimes are considered: Levy-Yeyati and Sturzenegger's (2005) classification based on the volatilities of the exchange rate and reserves; Reinhart and Rogoff's (2004) classification based on information about the black foreign exchange market and inflation; and Bubula, Otker-Robe and Anderson's (Bubula and Otker-Robe, 2002) classification based on the official IMF classification and expert judgment, i.e. a variety of inputs.

First, we added the exchange rate dummies in a standard growth regression a-la Barro and Sala-i-Martin (2004). As usual in the empirical literature (e.g. Levy-Yeyati and Sturzenegger, 2005; Huang and Malhorta, 2004; Husain et al. 2005), the initial finding for the exchange rate regime effect on growth in transition economies differs across classifications. We argued that classifications may be reflecting the different characteristics of the transition process differently, including but not limited to: high inflation, the volatility of the foreign exchange market, the processes of bank reform, foreign exchange market reform, interest rate liberalization, opening up to international trade and so on. Hence, in the second step, we detected the points of disagreement between the three pairs of exchange rate regime classifications and, accordingly, created three dummy variables to check if the transition characteristics have an explanatory power over the disagreements. Results suggest that the three classifications usually disagree around the higher trade openness of the countries, the episodes of high inflation and the bank system reform and interest rate liberalization. However, high inflation episodes determined disagreement in the early transition, while trade openness and interest rate liberalization in late transition. After classifications have been cleaned of the disagreeing points, the final results, corrected for the potential selectivity bias, suggest that both pegs and intermediate regimes of all three classifications significantly outperform floats in terms of economic growth, the average effect being slightly lower for pegs.

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Appendix 1

Table A.1 – Definitions and sources

Definition	Source	Further note
GDP per capita growth	World Development Indicators	
GDP in 1990	World Development Indicators	
Government consumption to GDP	World Development Indicators	
Investment to GDP	World Development Indicators	
Inflation	World Development Indicators	
Terms of trade growth	World Development Indicators	
Population growth	World Development Indicators	
Log of Population size	World Development Indicators	
Trade to GDP	World Development Indicators	
M2 to GDP	World Development Indicators	
High inflation	Calculated based on data from the World Development Indicators	Taking a value of 1 if belonging to the fourth quartile in the distribution of the entire series
High exchange market pressure	Calculated based on data from the World Development Indicators	Sum of the rates of growth of the nominal exchange rate and reserves
Trade openness	World Development Indicators	Export plus import to GDP
Financial openness	Transition indicators – European Bank for Reconstruction and Development	Taking a value of 1 if the country in certain period has been classified as with no or little reformed trade and foreign exchange market
Banks reform and interest rate liberalization	Transition indicators – European Bank for Reconstruction and Development	Taking a value of 1 if the country in certain period has been considered with little reformed bank system and money market

Table A.2 - Descriptive statistics

	Mean	St. dev.	First quartile	Third quartile	Min	Max	Obs
GDP per capita growth	2.24	10.47	-0.72	7.42	-45.33	90.47	460
Log of GDP in 1990	8.86	0.60	8.43	9.43	7.60	9.71	425
Government consumption to GDP	17.54	4.78	13.81	20.78	5.69	30.12	444
Investment to GDP	23.96	7.94	19.40	28.09	-0.69	59.77	449
Inflation	92.18	413.14	4.03	24.98	-8.53	4,734.9	355
Terms of trade growth	2.04	7.31	-1.35	3.01	-20.96	43.86	182
Population growth	-0.04	1.13	-0.50	0.49	-6.68	3.73	476
Log of Population size	15.69	1.13	15.03	16.15	13.33	18.82	476
Trade to GDP	97.04	32.34	71.96	118.88	22.23	199.68	453
M2 to GDP	29.73	16.96	14.74	42.41	4.83	73.56	362
High inflation	0.22	0.41	0.00	0.00	0.00	1.00	476
Political stability	-0.13	0.79	-0.67	0.53	-2.24	1.2	335
Financial crisis	0.04	0.19	0	0	0	1	476
High exchange market pressure	0.27	0.44	0.00	1.00	0.00	1.00	476
Trade openness	97.04	32.34	71.96	118.88	22.23	199.68	453
Financial openness	0.27	0.45	0.00	1.00	0.00	1.00	459
Banks reform and interest rate liberalization	0.59	0.49	0.00	1.00	0.00	1.00	459