Exchange Rate Regimes and Pro-Poor Growth

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Abstract

This paper extends the ongoing discussion on optimal exchange rate regimes to the issue of pro-poor growth. To analyze empirically the poverty effects of exchange rate regimes, we estimate the distribution effects of different exchange rate arrangements on the poorest 20 and 20 to 40 percent. In addition, we test the total effect, i.e. the distribution and growth effect, to capture potential trade-offs between poverty effects through overall economic growth and distribution.

To analyze this question, we collect an irregular and unbalanced panel of time-series cross-country data on the first and second quintile share from 76 countries and use two recently proposed de facto exchange rate regime classifications, Levy-Yeyati/Sturzenegger (2002) and Reinhart/Rogoff (2003). To cover econometric issues, cross-country variation and dynamic aspects of within-country changes of the income of the poor, we apply two econometric specifications, a growth equation and a system GMM estimation. We estimate the poverty effects of different exchange rate regimes for all countries and, separately, developing and industrial countries due to considerable differences in economic structure, access to international capital markets and soundness of domestic financial systems.

Empirical findings vary considerably with respect to three aspects. First, findings for the Levy-Yeyati/Sturzenegger (2002) and Reinhart/Rogoff (2003) classification differ significantly with respect to similar exchange rate categories. Thus the classification process of exchange rate regimes affects critically the policy conclusions. Second, statistically significant exchange rate regimes in the Reinhart/Rogoff (2003) classification impact positively on the poor in developing countries, but negatively on the poor in industrial countries. Thus exchange rate regimes affect very differently the poor in developing and industrial countries in the Reinhart/Rogoff (2003) classification. Third, statistical significance of exchange rate regimes in the system GMM approach differs considerably for adjusted and unadjusted income inequality measures.

Due to these varying and only weakly robust empirical findings, a concise policy recommendation with respect to poverty-reducing exchange rate regimes is difficult. Nevertheless, positive effects of intermediate regimes of the Reinhart/Rogoff (2003) classification in developing countries should be emphasized, showing at least a tendency to not negative and possible positive effects of intermediate regimes on the poorest 40 percent in developing countries.

1. Introduction

In the 1990s developing and transitional countries were hit by devastating financial crises and speculative attacks resulting in an ongoing debate on the optimal exchange rate regime. In recent discussions, the ‘hollowing out’ hypothesis, i.e. intermediate regimes between hard pegs and free floating are unsustainable, gained prominent proponents (Fisher 2001). Critics, however, emphasized the dependence of optimal exchange rate regimes on country-specific circumstances justifying also intermediate regimes (Frankel 1999, Mussa/Masson/Swoboda /Jadresic/Mauro/Berg 2000). In addition, empirical evidence seems not to confirm the bipolar view for all developing countries (Calvo/Reinhart 2000, Husain/Mody/Rogoff 2004). Thus different exchange rate arrangements may be appropriate in countries with different structural characteristics (Isard 1995).

While the debate on optimal exchange rate regimes has often changed its focus since the early 60s, the theoretical and empirical literature is peculiarly silent on the impact of exchange rate arrangements on pro-poor growth or poverty reduction (Isard 1995). This lack of integration of poverty effects in macroeconomic modelling on exchange rate regimes is especially problematic due to the high vulnerability of the poor to external shocks and currency crises. Even without a financial crisis perspective, the question of an optimal exchange rate regime for pro-poor growth would be an important one (Lustig 2000). Thus, to analyze empirically poverty effects of different exchange rate arrangements, we estimate both the distribution and the total effect, i.e. the distribution and growth effect, of different exchange rate regimes on the poorest 20 and 20 to 40 percent in a growth equation and a system GMM estimation.

To uncover the effects of different exchange rate regimes on the income of the poor we have a short look at the literature in section 2. As the poverty issue is not very well integrated in macroeconomic models, the possible effects are given more implicitly in economic theory. In section 3 we present the data coverage and data sources used in the estimations, which encompasses a discussion of the discrepancies between the official statement of exchange rate regimes and its factual application, the de jure/de facto issue. In addition, descriptive statistics and some stylized facts of exchange rate regimes are presented. While in section 4 we discuss our concept of pro-poor growth, we explain our econometric approach in section 5 to estimate the possible impact of different exchange rate arrangements on pro-poor growth followed by an interpretation of the results. Finally, we conclude in section 6 with major findings.

2. Exchange rate regimes and pro-poor growth

2.1 Literature Review

The relationship between exchange rate regimes and pro-poor growth is only rarely discussed in the literature (Lustig 2000).[1] Thus we look at the impact of exchange rate regimes on overall economic growth, the discussion of real exchange rate misalignment and contractionary devaluation for possible different effects of exchange rate arrangements on the income of the poor.

Historically, discussions on optimal exchange rate arrangements evolved from debates on the stabilizing effect of flexible exchange rates under international capital mobility, types of structural characteristics (e.g. exposure to shocks, financial development) decisive for the choice of an appropriate exchange rate regime to issues of credibility of monetary policy and nominal anchors to cover inflation bias, optimal currency area hypothesis, endogeneity of structural characteristics and speculative attacks. Resulting from these discussions, different exchange rate regimes may be optimal for countries with different structural characteristics, types of exogenous shocks, and different macroeconomic and political environments which may change over time (Isard 1995, Frankel 1999).[2] This view is emphasized especially for developing and transitional countries caused by their heterogeneous economical situation (Mussa/Masson/Swoboda/Jadresic/Mauro/Berg 2000). While the two corner solution is recently proposed for developing countries (Krueger 1999, Fisher 2001), critics opt for adjustable pegs to balance the conflict of macroeconomic stability and economic growth (Hausknecht 2001).

In line with the debate on the optimal exchange rate system, the impact of different exchange rate arrangements on economic growth is ambiguously discussed in economic theory. Refering to the growth accounting approach, exchange rate regimes could impact on economic growth through the rate of factor accumulation (investment, labor) or total factor productivity. Fixed exchange rate arrangements may promote investment and trade by reduced price uncertainties and relative price volatility, lowered real interest rates and decreased real exchange rate volatility which in turn may increase growth.[3] In addition, fixed exchange rate regimes may foster growth by lower inflation and less vulnerability to speculative exchange rate fluctuations if the peg is credible (Levy-Yeyati/Sturzenegger 2001, Levy-Yeyati/Sturzenegger 2002a, Bailliu/Lafrance/Perrault 2002).

On the other side, fixed exchange rate regimes could also diminish the efficiency of a given stock of capital since external trade may be reduced due to higher protectionist pressure in the

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[1] On a dynamic macro-micro modelling of the impact of macroeconomic policy and variables on poverty in a CGE framework, see the IMMPA program of the Worldbank (Agénor/Fofack/Izquierdo 2003).

[2] For a detailed survey of advantages and disadvantages of nine alternative exchange rate regimes, see Edwards/Savastano (1999).

absence of exchange rate adjustments (Gosh/Gulde/Ostry/Wolf 1997).[4] Furthermore, investment can be impeded by increased real interest rates and uncertainty which may result from expectations of a regime switch due to negative external shocks or weak macroeconomic fundamentals (Montiel 2003). While the lack of adjustment and the possibility of frequent external shocks under a fixed exchange rate regime may imply increased output volatility, the impact on long-run growth is less obvious (Levy-Yeyati/Sturzenegger 2001).

Empirical evidence on the impact of different exchange rate regimes on economic growth is ambiguous.[5] In the World Economic Outlook (1997) no clear relationship between exchange rate regimes and economic growth is found for developing countries, while inflation is typically lower and less volatile in countries with pegged rates than in countries with flexible rates. Gosh/Gulde/Ostry/Wolf (1997) estimate the different impact of fixed, intermediate and flexible exchange rate regimes on growth, inflation and output volatility using de jure exchange rate regimes (official IMF classification) for 136 countries in the period 1960 - 1980. While growth varies only slightly across different exchange rate arrangements, fixed exchange rate regimes compared with flexible regimes tend to increase output volatility, but are associated with lower inflation. Levy-Yeyati/Sturzenegger (2002a) measure the impact of fixed, intermediate and flexible exchange rate regimes on growth and output volatility using de facto exchange rate regimes for 183 countries in the period 1974 – 1999. Fixed exchange rate arrangements are connected with slower growth rates and higher output volatility for non-industrial countries. However, Levy-Yeyati/Sturzenegger (2001) found an inflation-growth tradeoff for 'long' pegs in non-industrial countries, i.e. fixed exchange rate regimes with a duration of at least 5 years are associated with lower inflation in addition to slower growth. Furthermore, there is evidence for negative announcement value of short pegs with respect to economic growth, i.e. countries running a de facto peg often avoid a formal commitment to a fixed regime due to potential speculative attacks in introducing a legal peg. However, no different impact of hard pegs (currency boards or countries without separate legal tender) compared with conventional pegs on economic growth could be confirmed. On the other side, in Gosh/Gulde/Wolf (2003) currency boards are associated with higher output growth and lower inflation in developing countries. Edwards (2001) and Edwards/Magendzo (2001) find lower growth rates for dollarized countries compared with non-dollarized countries, while Edwards/Magendzo (2003), using a treatment regression analysis, could not confirm different growth rates. Accounting for different monetary policy frameworks, Bailliu/Lafrance/Perrault (2002) estimate a panel-data set of 60 countries over the period from 1973 to 1998 using a dynamic GMM estimator and find that intermediate and flexible exchange rate regimes without an anchor hinder economic growth. Finally, Husain/Mody/Rogoff (2004) test the growth and inflation impact of exchange rate regimes drawn from a new de facto exchange rate regime classification for the period 1970 to 1999. While fixed regimes are more sustainable and less inflationary in developing countries without liberal capital

[3] This reasoning assumes a positive effect of higher trade on economic growth.
[4] This line of argument would assume positive productivity effects of increased trade.

markets, pegged regimes are more crisis prone in emerging markets. In addition, flexible regimes are more sustainable in advanced economies combined with slightly higher growth rates.

Another point of departure for possible differences of exchange rate systems on poverty are the effects of real exchange rate misalignment, i.e. difference between actual and equilibrium real exchange rate (RER) [6], and nominal devaluations on real output. While the construction of an appropriate measure assessing RER misalignment is controversially discussed in the literature (Hinkle/Montiel 1999, Razin/Collins 1999) [7], persistent RER misalignment may be associated with fixed exchange rate regimes assuming nominal rigidities (Gosh/Gulde/Ostry/Wolf 1997, World Bank 2001a, Bailliu/Lafrance/Perraul 2002, Montiel 2003).[8] Alberola/López/Servén (2004) find a considerable impact of the hard peg (curreny board) on the overvaluation of the RER in Argentina.

RER misalignment is important in our context for at least three reasons. First, RER misalignment can cause inefficient allocation of resources across sectors and price distortions (Gosh/Gulde/Ostry/Wolf 1997). Second, severe or persistent RER misalignment (e.g. overvaluation) may lead to adjustment expectations resulting in capital flight and increased likelihood of currency crisis (Bailliu/Lafrance/Perrault 2002, Montiel 2003). Third, RER misalignment may be associated with lower medium to long-run growth by influencing investment and the competitiveness of the tradable sector. While these costs of RER misalignment are assumed to be positive related to the extent of financial integration (Montiel 2003), misalignment volatility may also harm economic growth (Edwards/Savastano 1999, Razin/Collins 1999). Empirical evidence seems to confirm the negative impact of average RER misalignment and its volatility on overall economic growth (Edwards 1989, Cottani/Cavallo/Khan 1990, Ghura/Grennes 1993, Razin/Collins 1999). However, this effect might be driven by important nonlinearities, i.e. while only very high overvaluations appear to be associated with slower growth, moderate to high undervaluations seem to foster growth (Razin/Collins 1999).

Nominal devaluations are associated with different kind of pegs using the exchange rate as important policy instrument. Devaluations are usually a result of inconsistent macroeconomic policies with severe overvaluation of the real exchange rate. A nominal devaluation, however,

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[5] Connected to this issue Baxter/Stockmann (1989) found that the cyclical behavior of real macroeconomic aggregates (output, consumption, etc.) does not depend systematically on exchange rate regimes.

[6] *Equilibrium real exchange rate* can be defined as the real exchange rate that would prevail if the economy is simultaneously in internal and external balance. While internal balance describes an economy operating at its potential output, external balance means that the courrent account deficit equals the expected sustainable capital inflows (Razin/Collins 1999, Montiel 2003).

[7] for an overview of empirical studies of real exchange rate misaligment in developing countries, see Edwards/Savastano (1999).

[8] RER overvaluation may be caused by fixed exchange rate regimes due to difficulties to exit the peg or the failure to accommodate secular deterioration in terms-of-trade (World Bank 2001a). Generally, however, the real exchange rate is an endogenous variable, which cannot be changed directly by policy makers. Thus the exchange rate regime is only one of several fundamental macroeconomic variables in determining indirectly the level of the real exchange rate and its misalignment. For an useful distinction in short-run and long-run RER misalignments and their relation to exchange rate regimes, see Montiel (2003).

must not necessarily translate into a real devaluation due to inflationary pressure (Edwards 1989, Ghei/Hinkle 1999). The effects of devaluations on real output and economic growth in developing countries are controversially discussed. A devaluation may lead to contraction caused by its effect on both aggregate demand and supply (Krugman/Taylor 1978, Agénor/Montiel 1999). Empirical evidence appears to confirm the contractionary devaluation hypothesis at least in the short run, even if the applied methodology is critisized (Edwards 1989, Agénor 1991, Kamin/Klau 1998, Agénor/Montiel 1999, Rogers/Kamin 2000).

2.2 Effects of exchange rate regimes and pro-poor growth

Relying on the literature review, the choice of the exchange rate regime may affect the income of the poor via its effect on macroeconomic volatility (shock absorption), its relation to real exchange rate misalignment, its proneness to currency crises, via devaluation and inflation.

Output volatility (shock absorption)

Macroeconomic volatility and high output fluctuation, resulting from exogenous shocks and instable policy regimes, may impact on poverty (Breen/Garcia-Peñalosa 1999). The income of the poor may be affected by a negative impact of macroeconomic volatility on investment and growth due to distorted price signals and expected rate of return. Increased precautionary savings caused by higher uncertainty about future income may also lead to either decreased or increased economic growth. In addition, credit market effects, i.e. higher incidence of credit rationing or increased risk premium and borrowing rates for private firms may negatively affect the income of the poor (Agénor 2002).

Identifying the predominant economic shocks and the structural features of a specific country and choosing the exchange rate regime which best insulates the economy against shocks could be seen as one reason for different impact of exchange rate arrangements on pro-poor growth. This reasoning would be based on the assumption that exchange rate regimes dampen or amplify the negative effects of exogenous shocks and adjustment processes (Ames/Brown/Devarajan/Izquierdo 2002, Bailliu/Lafrance/Perrault 2002, Edwards/Levy-Yeyati 2003).[9] Refering to a Mundell-Flemming framework, fixed exchange rate regimes are assumed to stabilize output in case of nominal shocks to domestic asset markets, while real shocks are more easily absorbed by flexible exchange rate regimes.[10] Structural features of an economy may determine the optimality of a regime with respect to external financial shocks (Montiel 2003).[11] Traditional analysis of exchange rate regimes, however, is confined to extreme

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[9] Even if the long-run equlibrium effect may be the same for fixed and flexible regimes, the short- to medium run adjustment process may differ considerably due to different exchange rate arrangements (Lustig 2000).
[10] Gosh/Gulde/Ostry/Wolf (1997) and Levy-Yeyati/Sturzenegger (2002) find that fixed exchange rate are associated with higher output volatility.
[11] Structural characteristics of economies, however, may not be exogenous to the choice of exchange rate regimes (Isard 1995).

arrangements (hard pegs or pure floats) in comparison to a broad scale of intermediated regimes used in developing countries (Montiel 2003).

RER misalignment and currency crises

Exchange rate regimes may impact on pro-poor growth via RER misalignment. First, inefficient allocation of resources between foreign and domestic goods and price distortions due to RER misalignment may lead to distributional effects. Second, reduced investment and competitiveness of the tradable sector due to RER misalignment may also result in additional effects for the poorest. The costs for the poor may be increased by the extent of financial integration in international capital markets (at least in the short run).[12] In addition, misalignment volatility may harm pro-poor growth even if the direction of these effects may be ambiguous and dependent on the amount of RER misalignment (Edwards/Savastano 1999, Razin/Collins 1999). Fourth, severe or persistent RER misalignment may be especially costly for the poor as they usually can not hedge against the adjustment risks and considerable RER misalignment may increase significantly the probability of a currency crisis (Bailliu/Lafrance/Perrault 2002, Montiel 2003).

Currency crises may be associated with certain types of exchange rate regimes. Relying on the 'hollowing-out' hypothesis, fixed but adjustable pegs and narrow-band systems are supposed to be unsustainable for countries highly integrated in global financial markets (Fisher 2001). Bubula/Ötker-Robe (2003) find that pegged exchange rate regimes are more prone to crises than floatings and intermediate exchange rate arrangements more than hard pegs or floating regimes for the period 1990 to 2001.[13] Looking at the two de facto exchange rate regime classifications used in our sample, currency crises are relatively prevalent in dirty floats in the Levy-Yeyati/Sturzenegger (2002b) classification. Even if relative frequency is much lower, currency crises are also present in all other classifications (table 4). While currency crises are not present for the category freely floating in the coarse Reinhart/Rogoff classification (2003), currency crises are relativey dominant in freely falling and associated with pegged regimes, limited flexbility and managed floating to a lower relative frequency (table 4).[14] If we replace freely falling by one of the four other regimes in a 4-way classification, currency crises of freely falling are mainly attributed to freely floating and managed floating.[15]

A currency crisis may impact negatively on the income of the poor by unemployment effects on low skilled labour in both the formal and informal sector. In addition, wealth effects and changes

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[12] While procyclical access to world capital markets of developing countries may increase macroeconomic instability, greater penetration of foreign banks may result in reduced access to loans by small and medium-size firms. In addition, financial openness may hurt the poor by credit rationing caused by increased volatility and lower growth rates due to capital flight and international risk sharing (Agénor 2003).

[13] For a detailed discussion on the feasability conditions using intermediate exchange rate regimes in developing countries in the context of capital mobility and a broad discussion on causes of currency crisis, see Montiel (2003).

[14] One reason for the prevalence of freely falling is the fact, that category freely falling is attributed to the six months immediatly following a currency crisis (Reinhart/Rogoff 2003).

[15] For reasoning and construction of the reduced 4-way RR classification, see section 3.2.

in the value of assets induced by changes in interest rates or asset prices may affect the income distribution. Furthermore, a financial crisis could lead to spending cuts in social expenditures (health, education, social security) which may adversely affect the poor.[16] Baldacci/de Mello/Inchauste (2002) find evidence for this hypothesis applying a difference-in-difference methodology in a cross-country analysis. The size of the poverty effect, however, may depend critically on the initial structure and the composition of the social spending programs since social expenditures often benefit disproportionately upper-income households in developing countries (Dollar/Kraay 2001, McCulloch/Winters/Cirera 2001, Baldacci/de Mello/Inchauste 2002, Agénor 2002, Davoodi/Tiongson/Asawanuchit 2003).[17] Finally, the poor may be additionally affected by a currency crisis in the longer-run via asymmetric effects, i.e. the decrease of the income of the poor in recessions is not offset by the positive effects of expansions (Agénor 2002).[18]

Devaluation

Fixed exchange rate arrangements may entail nominal devaluations of the official exchange rate in case of overvalued RER. However, the effects of nominal devaluations on the income of the poor are ambiguous depending also on its effect on the RER (Edwards 1989, Ghei/Hinkle 1999). On the demand side, a depreciation of the RER would benefit consumers of nontradables, while it would harm consumers of imported goods. Thus the depreciation could increase domestic food prices due to higher prices of imported food. This could lead to negative effects on the poor, if they are net consumers of food (Baldacci/de Mello/Inchauste 2002). On the supply-side, improved agricultural exports may increase the income of the rural poor, while diminished demand for labor in the nontraded sector may decrease the income of the urban poor, i.e. earnings fall for those employed in the non-trade sector with respect to the trade sector.[19] Thus RER depreciation would positively affect the poor, if they work mainly in the tradable sector, but consume nontradables (Ames/Brown/Devarajan/Izquierdo 2002, Agénor 2002). In addition, increased prices for imported intermediate input and capital goods may result in more demand for unskilled workers. Negative supply shocks are also possible, if the economy is a net importer of intermediate inputs (Agénor 2002). Empirically, RER depreciation is found to decrease real wages in the agricultural sector, while labor's share of GDP does not significantly change in the event of nominal devaluations (Edwards 1989).

[16] Curtailing government expenditures may also lead to increased poverty via cuts in real wages and layoffs of employees in the public sector (Agénor 2002).
[17] Cuts in social spending may nevertheless lead to reduced poverty if social expenditures are better targeted to the poor (Agénor 2002).
[18] Parents' decision with respect to their children attending school, asymmetric changes in expectations, credit rationing to firms due to adverse selection problems or net worth effects, borrowing constraints on household consumption behavior and "labor hoarding" of skilled labor force are proposed as explanations for the asymmetric effect of contractions and expansions on the income of the poor (Agénor 2002).

Inflation

High inflation may discourage the income of the poor via disruptive effects on economic growth (Temple 1999, Montiel 2003, Epaulard 2003). In addition, the poor may be hit disproportionately by negative effects of high and variable inflation rates on their income due to its denomination in nominal terms without access to indexation, a decline in real wages due to rigidity of nominal wages, impossibility of hedging inflation with other assets and the 'inflation tax' with effects similar to a regressive tax.[20] Empirical evidence on a negative distribution effect of inflation, however, is mixed. One reason may be that economy-wide inflation rates do not correctly reflect the effects of price changes relevant for the poor (Romer/Romer 1998, Easterly/Fisher 2001, Dollar/Kraay 2001, Anderson/White 2001, Ghura/Leite/Tsangarides 2002, Agénor 2002, Ames/Brown /Devarajan/Izquierdo 2002, Epaulard 2003).

Exchange rate regimes (together with monetary policy) may have different impact on inflation. Fixing the exchange rate to the currency of a country with anti-inflation reputation could increase credibility since announcing a future path of the exchange rate may serve as a commitment mechanism.[21] Thus inflation rate or inflation bias may be reduced due to the use of the exchange rate as nominal anchor. On the other hand, fixed exchange rate regimes face the risk of devaluation bias and loss of credibility which may result in higher inflation if the structural features of the economy are inappropriate to the choice of the fixed exchange rate regime and exiting the fixed exchange rate regime is difficult (Isard 1995, Ames/Brown /Devarajan/Izquierdo 2002, Montiel 2003). Empirical evidence supports the view that fixed exchange rate regimes are associated with lower and more stable inflation (World Economic Outlook 1997, Gosh/Gulde/Ostry/Wolf 1997, Levy-Yeyati/ Sturzenegger 2001).

To summarize, our discussion of the theoretical channels and empirical literature does not show a clear superiority or inferiority of one category of exchange rate regime with respect to pro-poor growth. Exchange rate arrangements may impact on pro-poor growth through various and possibly contradictory effects. However, there seems to be a tendency to attribute negative poverty effects to intermediate exchange rate regimes in developing countries with liberal capital markets due to an assumed higher likelihood of currency crises.

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[19] In addition, a higher cost-of-living index in the urban areas may offset the positive supply effect on small farmers in the tradable sector (Agénor 2002).

[20] In addition, a change in distribution of income and wealth may be explained by high and variable inflation, if the middle-class as holders of nominal liabilites benefits from its loss of value and the poor holds only nominal assets (Agénor 2002).

[21] On a detailed discussion of the advantages and disadvantages announcing a predetermined exchange rate path as commitment mechanism, see Montiel (2003).

3. Data sources and descriptive statistics

3.1 Data on income inequality measures

Empirical tests on the impact of exchange rate arrangements on pro-poor growth are limited by data availability. In addition, incomparability of inequality data can cause severe problems in cross-section analysis (Atkinson/Brandolini 2001). Due to different concepts used in income distribution surveys across time and space cross-section analysis of pro-poor growth using first and second quintile share of income has to be applied with caution. Data on income inequality may vary in various aspects, e.g. in income concept (income, expenditure), tax treatment, reference unit (household/family/household equivalent/person) or coverage (age/area /population). Concerning the income definition, expenditure should be preferred to income for developing countries for reasons of practical measurement, especially for rural (poor) households (Atkinson 1993, Deaton 1997). In addition, data on income distribution can be based on different sources (national household surveys, income tax records, social security/labor market agency records).[22] Thus comparability of data on first and second quintile share of income has to be handled with care. While data on quintile shares of income can not be restricted to completely comparable samples due to limited data availability, only samples should be used with observations as fully consistent as possible (Atkinson/Brandolini 2001).

Our data on the first and second quintile share of income (and the Gini coefficient) are based on four sources: the UNU/WIDER-UNDP World Income Inequality Database, Version 1.0, 12 September 2000, the Deininger and Squire (1996, 1998a) database, the Global Poverty Monitoring described in Chen/Ravallion (1997, 2000)[23] and the World Development Indicators (2002a) Table 2.8 (table 1). The observations are chosen by an successive selection procedure with restriction criteria motivated by the problems outlined above. For the UNU/WIDER database (2000), we first restrict the sample to data based on surveys covering all area, all population, all age and fulfilling the 1 OKIN quality rating.[24] Second, as we are interested in pro-poor growth, only countries with at least two spaced observations are selected. To cover medium-to-long run growth and measurement errors due to fluctuations we draw the first available observation and every following with at least three years distance to the preceding. Only in five cases have we allowed for a two year distance within a spell for pragmatic reasons.[25] In addition, the income concept and income recipients (reference unit) have to be identical for each spell.[26] As noted in the description of the data set used by Dollar/Kraay

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[22] see for further details UNU/WIDER–UNDP World Income Inequality Database, Version 1.0, 12 September 2000, User guide; see also Atkinson/Brandolini (2001).

[23] The Global Poverty Monitoring is available under www.worldbank.org/research/povmon/index.htm and continually updated.

[24] *Reliable income or expenditure data referring to the entire (national) population, not affected by apparent inconsistencies* (UNU/WIDER – UNDP World income inequality database, Version 1.0, 12 September 2000, Users guide).

[25] Bulgaria 1991 – 93, Belarus 1993 – 95, Gabon 1975 – 77, Guatemala 1987 – 89, Kenya 1992 – 94

[26] One can further strengthen the selection criteria by also requiring the same type of survey for each spell to control for differences in survey design not captured by the same income definition and reference unit. Due to data availability, however, we omitted this idea.

(2001), several 'high-quality' data from the Deininger and Squire (1996, 1998a) database are not incorporated in the UNU/WIDER database (2000). We checked the Deininger and Squire (1996, 1998a) database and three extra observations could be gained due to our restriction criteria.[27] The Global Poverty Monitoring data set is based on nationally representative surveys. All measures of household living standards are normalized by household size. The distribution and empirical Lorenz curves are household-size weighted. The income shares are estimated from primary data sources using parameterized Lorenz curves with flexible functional forms (Chen/Ravallion 1997). We have selected the sample on data of first and second quintile share of income due to the restriction criteria outlined above. In addition, actual data are drawn from the World Development Indicators 2002 Table 2.8 using the same methodology for low- and middle- income countries as used by the Global Poverty Monitoring data set.[28] This selection procedure has resulted in 371 observations in total, 231 for developing, 27 for transitional and 113 for industrial countries. Finally, data on exchange rate regimes have to be available for the selected country-year observations reducing the total sample further to 343 observations for 76 countries (212, 18 and 113 for developing, transitional and industrial countries, respectively).

In our regressions we use, first, the same income concept and reference unit for each spell, i.e. we do not construct all possible spells between the observations in each country.[29] In addition, we select in some cases two observations per country per year, exchanging the observations between the spells (table 1). Second, in adjusting the income inequality measures to form all possible spells in each country, we regress the first/second quintile share and the Gini coefficient on dummy variables for different income definitions and regional dummies.[30] The adjusted first/second quintile share and Gini coefficient are then calculated by subtracting the estimated coefficients of the alternative income dummies from the unadjusted measures to form a sample of inequality measures corresponding to the distribution of household expenditure (table 2).[31] In general, the number of observations per country varies significantly from 2 (almost all Sub-Saharan Africa and Eastern Europe countries) to 15 (India).

Mean income of the poorest is measured as the share of income earned by the poorest first and second quintile times mean income, divided by 0.2. Data on mean income are based on the

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[27] Canada 1951, 57, 61

[28] For description of estimation method, see World Development Indicators (2002a) Table 2.8 (About the data).

[29] The length of time between two observations with the same income concept within a country ranges from 2 to 14 years with a median of 4 years in our sample.

[30] We prefer to use regional dummy variables in the adjustment regressions since we have only 371 observations and eight different income definitions which are not equally distributed among regions. While category family and equivalized are only relevant for industrial countries, category income (unknown tax treatment) and net income are only present in three out of five regions in developing countries. If we omit regional dummy variables, the coefficients of these income definitions may falsely capture also regional differences in inequality. Since we only subtract the estimated coefficients of the income definitions from the unadjusted income inequality measures, regional differences in inequality are not consumed away by this adjustment procedure. To check this issue further, we also run adjustment regressions without regional dummy variables. If we compare correlations of the two adjusted first/second quintile shares and Gini coefficients with its unadjusted version, the correlation coefficients for the adjustment process with regional dummy variables are always closer to one confirming our approach.

[31] Subtracting the estimated coefficients of the alternative income dummies from the unadjusted measures means that we calculate the adjusted measures by subtracting the alternative income dummies multiplied by its coefficient from the unadjusted first/second quintile and Gini coefficients. On critic of this adjustment procedure, see Atkinson/Brandolini (2001).

PPP-adjusted real income per capita (constant 1996 US dollars using the chain index) reported in the Penn World Tables Version 6.1 (Heston/Summers/Aten 2002, Heston/Summers 1991). Though the mean income from national accounts may differ from mean level of household income (expenditure) due to measurement errors, income definition, or underestimation of income (consumption) in developing countries caused by nonparticipating rich, we use per capita GDP.[32]

3.2 Classifications of exchange rate regimes and descriptive statistics

The analysis of the impact of different exchange rate regimes on pro-poor growth needs to take into account some important issues. First, even if exchange rate regimes in developing countries might have evolved towards more flexibility since the decline of the Bretton Woods system in 1973, de facto a wide variety of managed rates is predominant in developing and transitional countries in contrast to more flexible exchange rate regimes or monetary unions in industrial countries (World Economic Outlook 1997, Agénor/Montiel 1999, Johnston et al. 1999, Mussa/Masson/Swoboda/Jadresic/Mauro/Berg 2000, Reinhart/Rogoff 2003, Husain/Mody /Rogoff 2004). Thus the empirical analysis of the optimal arrangement can be impeded by the lack of experience with flexible regimes and its 'appropriate' operational meaning in developing countries (Edwards/Savastano 1999). In addition, distinguishing the different forms of managed rates due to its different macroeconomic consequences on pro-poor growth may be important for our purposes. Second and related, quantitative restrictions on foreign exchange availability are common in developing and transitional countries leading to parallel free (il)legal exchange markets. Integrating the aspect of informal, dual or multiple exchange-rate regimes in our classification of exchange rate regimes is important due to its macroeconomic implications for both the growth and pro-poor effect as foreign exchange rationing can impact on private decision rules (e.g. private consumption, investment) (Reinhart/Rogoff 2003). Additional costs for the government (e.g. enforcement, loss of tariff revenue), loss of seignorage, distorted domestic prices, implicit tax on exports and changed transmission mechanisms of short-term macroeconomic policies caused by parallel exchange markets may affect growth and the income of the poor. Third, the assumption of perfect capital mobility is inappropriate for macroeconomic modelling in developing countries due to capital controls and immature domestic financial system (Agénor/Montiel 1999).

To cover these issues, data on exchange rate arrangements are based on two sources: Levy-Yeyati/Sturzenegger (2002b) and Reinhart/Rogoff (2003). The use of these alternative classifications is justified by the well-documented pitfalls of the old IMF classification (1975 – 1998), which only indicates the official or de jure exchange rate regime based on the public commitment of the central banks and ignores the inofficial or de facto regime and parallel

[32] One pragmatic reason is that the UNU/WIDER-UNDP Database does not indicate the mean level of household income for each household survey. For a discussion of applying this procedure in pro-poor growth regressions, see Eastwood/Lipton (2001), Dollar/Kraay (2001). For a further discussion of discrepancies between national accounts and household survey measures of living standards, see Ravallion (2001a).

exchange rates (Gosh/Gulde/Ostry/Wolf 1997, Edwards/Savastano 1999, Johnston et al. 1999, Bubula/Ötker-Robe 2002, Reinhart/Rogoff 2003, Husain/Mody/Rogoff 2004).[33] Ignoring completely the old official IMF classification, Levy-Yeyati/Sturzenegger (2002b) use the volatility of the nominal exchange rate, the volatility of its rate of change and the volatility of international reserves (indicator for the extent of foreign exchange intervention) to group annual exchange rate regimes of all 183 IMF reporting countries for the period 1974 – 2000 by cluster analysis methodology.[34] Combinations of high and low volatility of the three indicators result in a 5-way-classification (flexible, dirty float, crawling peg, fixed, inconclusives).[35]

Reinhart/Rogoff (2003) classify exchange rate regimes of 153 countries for the period 1946-2001 by incorporating monthly data on market-determined (dual, multiple or parallel) exchange rates and chronologies of the history of exchange rate arrangements and related factors, i.e. exchange controls and currency reforms.[36] Using a similar nomenclatura as the new IMF classification (January 1999), the resulting fine classification now comprises fifteen categories.[37] Due to limited availability of data in our sample, however, we use a more coarse classification which condenses the fifteen categories to six by merging the categories.[38] In their approach, Reinhart/Rogoff (2003) construct a new category freely falling by two criteria. First, the 12-month inflation rate exceeds 40 percent unless some form of pre-announced peg or narrow band have been identified. Second, the six months immediatly following a currency crisis are classified as freely falling only if the crisis has taken place by a sudden change from pegs to managed or independently floating regimes.[39] Classifying this new category, freely falling is justified by the reason that macroeconomic instability could be incorrectly attributed to pegged, intermediate or floating exchange rate regimes, i.e. exchange rate regimes would have no indepedent influence on macroeconomic outcome due to severe economic disturbances (Husain/Mody/Rogoff 2004). However, since category freely falling is not an exchange rate regime of voluntary choice and thus currency crises are not correctly attributed to the chosen de facto exchange rate arrangement, estimation results for the exchange rate categories may be misleading. To cover this issue, we also test a reduced 4-way classification replacing freely

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[33] The difference in official statement and actual management of exchange rate regimes can be caused for example by the political costs of announcing devaluations (Bubula/Ötker-Robe 2002). Reinhart and Rogoff (2003) state that the old IMF classification is almost random with respect to their reclassification.

[34] Using a calendar year as unit of account, the exchange rate regime classified is a combination of different official arrangements in case of changes during the year.

[35] **Flexible**: high volatility of the nominal exchange rate, high volatility of its rate of change, low volatility of international reserves. **Dirty float**: high volatility of the nominal exchange rate, high volatility of its rate of change, high volatility of international reserves. **Crawling peg**: high volatility of the nominal exchange rate, low volatility of its rate of change, high volatility of international reserves. **Fixed**: low volatility of the nominal exchange rate, low volatility of its rate of change, high volatility of international reserves. **Inconclusives**: low volatility of all three indicators.

[36] The chronologies are used to sort out countries with dual, multiple or parallel exchange rates. While the exchange rate regime of countries with unified exchange rates is classified by the volatility of the official exchange rate, the volatility of the market-determined (dual, multiple, parallel) exchange rate classifies the exchange rate regime if the parallel market premium is consistently 10 percent or higher.

[37] On the correspondance between the IMF de jure classification and the Reinhart/Rogoff 2003 classification, see Husain/Mody/Rogoff (2004).

[38] **Pegged**: no separate legal tender, pre announced peg, currency board or horizontal band (between +/-2 %), de facto peg. **Limited flexibility**: Pre announced crawling peg or band (between -/+ 2 %), de facto crawling peg or band (between -/+ 2 %). **Managed floating:** Pre announced crawling band (more than or equal to -/+ 2 %), de facto crawling band (between -/+ 5 %), Moving band (between -/+ 2%), Managed floating. **Freely floating**. **Freely falling**. **Category 6**: Dual market with missing data on parallel markets.

falling by one of the four categories as indicated in the chronologies (Reinhart/Rogoff 2003).[40] Critic on both the LYS and RR classifications can be based on its reliance on quantitative analysis of exchange rates and foreign exchange reserves, which may lead to false inferences about the exchange rate regime (Bubula/Ötker-Robe 2002).[41]

In table 4 we present a two-way table of the frequency of the exchange rate regimes between the LYS and RR classification, to analyze the comparability of both exchange rate regime classifications. While pegged regimes (hard pegs) and freely floating in RR coincide mainly with fixed and flexible regimes in LYS, respectively, fixed and flexible regimes in LYS are not exclusively associated with pegs and freely floating in RR, respectively, but are also frequently present in limited flexibility and managed floating.[42] In addition, freely falling is not confined to one exchange rate regime in the LYS classification, but almost equally distributed among the different arrangements. Thus the frequency table emphasizes the significant difference in classifying exchange rate arrangements between both approaches.

Finally, we have a look at descriptive statistics to reveal some important prior results. In table 5 we present the mean of the average annual growth for the unadjusted first and second quintile share for each initial exchange rate arrangement, comparing the LYS and both RR classifications. First, observations for inconclusives and category 6 (dual market with missing data on parallel market) are very limited and often misleading, thus we omit both categories in the regressions. Second, while in the LYS classification we have 22 observations with flexible exchange rate regimes in the developing countries, there is no observation for category freely floating for developing countries in the coarse RR classification. On the other hand, we have 18 observations for freely falling, a category only present in developing and transitional countries. Observations for transitional countries, however, are very limited and the mean of the average annual growth for both quintile shares is almost always highly negative compared to other regions.[43] Concerning the 4-way RR classification, freely falling is attributed mainly to managed floating and freely floating in both developing and transitional countries. Third, regarding the sign and size of the means in the LYS classification, the regime dirty float is considerably positive for all countries compared to other arrangements if we omit the highly negative observation for transitional countries (Poland 1990/93). This result is mainly driven by nine observations in developing countries. In addition, fixed regimes are negatively correlated with the mean of the growth rate of both the first and second quintile in all and developing

[39] Currency crises are defined by a monthly depreciation above twelve and one-half percent and if the preceding month's depreciation is exceeded by at least 10 percent.
[40] Reinhart/Rogoff (2003) provide also the underlying arrangement for freely falling in the chronologies, assuming that there would be no knowledge of the inflation rate. In addition, since category freely falling is only present in transitional and developing countries in our sample, estimations for industrial countries have not to be retested.
[41] For example the behavior of the exchange rate is not only affected by exchange rate policy.
[42] These results hold even if we use the 4-way classification replacing freely falling by other exchange rate arrangments (Reinhart/Rogoff 2003) (table 4).
[43] The exception managed floating (pre-announced crawling peg, moving band and managed floating) is only dependent on observations from Hungary mostly during the communist era (1972/77, 77/82, 82/87, 89/93) and thus do only marginally reflect the effect of the transitional process on the first and second quintile share. For reasons of widening inequality in transitional countries, see Grün/Klasen (2001).

countries.[44] Furthermore, the growth rates of flexible regimes (LYS) or freely floating (RR) are negatively correlated for both quintile shares in industrial countries, which also indicate negative means for all countries in the RR classification (-0.58, -0.85). Finally, we emphasize the difference between the coarse and 4-way RR classification. While category freely falling is highly positively correlated with the means for first and second quintile in developing countries, this positive effect is attributed to managed floating and freely floating in the reduced classification.[45]

In table 6 we present the means of the adjusted first and second quintile share of income for each exchange rate regime comparing the LYS and RR classifications. We now have more observations since we look at the correlation between the levels of adjusted first/second quintile share and exchange rate arrangements. Again, we omit observations for inconclusives and category 6 in our regressions due to limited availability and often misleading size. Furthermore, we now have two observations in category freely floating for developing countries in the coarse RR classification with high values (Indonesia 1999, Madagascar 1999). In general, the means in the transitional countries are high in both classifications compared with developing and industrial countries, illustrating the influence and legacy of the communist era. While there seems to be no important difference of the means in the LYS classification, freely falling is considerably lower for developing countries in the coarse RR classification, a result lessened for all countries due to the high means of freely falling in transitional countries. Looking a the 4-way RR classification, freely falling is again attributed mainly to managed floating and freely floating in both developing and transitional countries. While this change is not relevant for the means in all countries, the values for freely floating are considerable diminished for developing countries in the reduced RR classification.

To look additionally on the total effect, we finally present the means of the average annual growth of mean income of the first/second quintile and the means of the mean income of the adjusted first/second quintile for the different exchange rate arrangements (table 7 and 8).[46] In industrial and developing countries the growth rate of the mean income of first/second quintile is almost always higher than the growth rate of the first/second quintile (compare table 7 to 5). Even if dirty float remains considerably positive for all countries with respect to other regimes in the LYS classification, crawling pegs and flexibles become also important for developing countries (table 7). And again, fixed regimes exhibit the lowest growth rates for the poorest 40 percent in developing countries.[47] We find a similar result for pegged regimes in the coarse RR classification for developing countries. While the growth rates of limited flexibility and managed

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[44] The positive effect of the fixed regime for the growth rate of the first quintile becomes negative in all countries (-0.34) and the negative effect in developing countries diminishes (-0.73) if we omit an incredible high growth rate for the first quintile in Senegal 1991 – 95 (18.12 %).

[45] In all countries the small positive effect of freely falling is mainly attributed to managed floating since freely floating becomes more negative in the 4-way RR classification, i.e. the highly negative values of transitional countries are labelled as freely floating in the reduced RR classification..

[46] For the difference between distribution effect and total effect, see section 4.

floating here are not lower with respect to freely falling in developing countries, freely falling is again positively correlated with the means for growth rate of the mean income of the first and second quintile in developing countries (compare table 7 to 5). This positive effect is again attributed to freely floating and managed floating in the 4-way classification, resulting in low positive growth rates for freely floating in developing countries. Looking at table 8, the means of dirty float are considerably higher than in other regimes for developing countries in the LYS classification. In addition, freely falling is the category with the lowest means for all countries in the coarse RR classification, a result not comfirmed in developing countries. While limited flexibility remains the exchange rate regime with the highest means for developing countries in the 4-way RR classification, the values for freely floating in all countries are diminished by the highly negative values for freely floating in transitional countries in the reduced RR classification.

3.3 Data on additional macroeconomic variables

Data sources and definitions of additional macroeconomic variables are presented in table 3. As we confront missing values and outliers, the number of observations vary for each variable and restrict the size of the sample due to the econometric specification. In addition, not all additional macroeconomic variables are used in all specifications due to insignificant coefficients.

The variables overall budget surplus to GDP and government consumption to GDP are controlled for. Budget deficit is expected at least to not have negative coefficients, as better public finances should not decrease pro-poor growth. The impact of government consumption, however, is ambiguous, as benefits of public sector not necessarily support the poorest part of an economy more than other income groups.[48] In addition, government size can also negatively impact on the income of the poor due to distortions of private decisions and its proxy for bad governance (Barro/Sala-i-Martin 1995). Unfortunately, we could not test the impact of health and education expenditures to GDP on pro-poor growth due to lacking data availability for our sample.[49] Human capital may play a crucial role for the income of the poor, thus we use the average years of secondary schooling in the total population aged 25 and over as proxy for investment in education with expected positive coefficients.[50] We also include life expectancy as a proxy for investment in health with expected positive effect.

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[47] The positive effect of the fixed regime for the growth rate of the mean income of the first quintile diminishes to +1.27 in all countries and to +0.70 in developing countries if we omit the incredible high growth rate of the mean income of the first quintile for Senegal 1991 – 95 (+17.69 %).

[48]. In developing countries social expenditures often benefit more the middle class and the rich (Dollar/Kraay 2001, Davoodi/Tiongson/Asawanuchit 2003).

[49] Davoodi/Tiongson/Asawanuchit (2003) collect data on education and health expenditures for 81 countries for the period 1960 to 2000. Even if the dataset is accessible (which is not the case), it would be inconvenient for our purposes as only less than half of the countries are present in our sample.

[50] We also experimented with three other education indicators (average years of schooling in total population aged 25 and over, average years of primary schooling in total population aged 25 and over and percentage of “secondary school attained” in total population aged 25 and over). While results remained similar, secondary education turned out to be the most relevant indicator.

The rate of inflation is used to cover macroeconomic uncertainty effects and to control for inflationary financial effects on pro-poor growth. Low levels of inflation are expected to stimulate or at least not hinder pro-poor growth, while high or crisis levels of inflation should impact negatively on pro-poor growth. Furthermore, we use terms-of-trade to capture external environmental effects with expected positive impact (Barro/Sala-i-Martin 1995, Ghura/Leite/Tsangarides 2002).[51] We also controll for financial development measured by M2 to GDP ratio with expected positive coefficient. A positive impact of financial sector development on the poor may be reasoned by better access to credit and improved risk sharing (Ghura/Leite/Tsangarides 2002).

Furthermore, the initial value of the adjusted Gini coefficient is added to cover the impact of initial inequality on the growth of the mean income of the poor with expected positive coefficient. Adding the initial inequality in the growth equation can be motivated by testing the hypothesis of inequality convergence. A positive coefficient for the initial Gini coefficient would confirm the convergence of inequality (Ravallion 2000). Finally, civil liberties are used to test institutional effects on the poor. The index is measured on a scale from one to seven with one indicating the most liberal state. Thus the coefficient should be negative, if less civil liberties result in anti-poor growth and policies.

4. Pro-poor growth

Analytically, the impact of the exchange rate regime on the income of the poor can be distinguished in the growth and the distribution effect [52]:

$$\partial Y^{p20/40}_{it} / \partial Ex_{jit} = \partial \ln(Y_{it})/\partial Ex_{jit} + [\partial Y^{q20/40}_{it}/\partial \ln(Y_{it}) * \partial \ln(Y_{it})/\partial Ex_{jit} + \partial Y^{q20/40}_{it} / \partial Ex_{jit}]$$
$$= \rho_j + [(\alpha_1 - 1) * \rho_j + \gamma_j] \qquad (1)$$

with

$Y^{p20/40}_{it}$: mean income of the 20 percent/20 to 40 percent poorest defined as $\ln(Q^{20/40}_{it} * Y_{it}/0.2)$

$Y^{q20/40}_{it}$: $Y^{p20/40}_{it} - \ln(Y_{it}) = \ln(Q^{20/40}_{it} * Y_{it}/0.2) - \ln(Y_{it}) = \ln(Q^{20/40}_{it}) + \ln(Y_{it}) - \ln 0.2 - \ln (Y_{it}) = \ln(Q^{20/40}_{it} /0.2)$

$Q^{20/40}_{it}$: first/second quintile share of income

Y_{it}: real per capita income

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[51] Terms-of-trade growth reflects external shocks from world market orientation. The sign of the coefficient, however, may be indifferent as a positive terms-of-trade growth can improve the income of the poor representing for example an increase in the relative price of agricultural commodities (benefiting the rural poor) or a fall in the price for imported consumption goods (benefiting the urban poor). Otherwise, positive terms-of-trade growth can also decrease the income of the poor by adverse supply-side effects due to the shift in relative prices.

[52] There is considerable ongoing discussion on the appropriate definition and measurement of pro-poor growth. While none of the measures proposed has so far set an international accepted standard, both the growth effect and the distribution effect have been identified as most critical for reduction in absolute poverty (Kakwani/Pernia 2000,

Ex_{jit}:	dummy variable for exchange rate regimes	
	with	j = 1, ... , 4 (LYS)
		j = 1, ... , 5 (coarse RR)
		j = 1, ... , 4 (4-way RR)
ρ_j:	(equiproportionate) growth effect of exchange rate regime on mean income ($\partial \ln(Y_{it})/\partial Ex_{jit}$)	
$(\alpha_1 - 1)$:	distribution effect of mean income ($\partial Y^{q20/40}_{it}/\partial \ln(Y_{it})$)	
γ_j:	distribution effect of exchange rate regime ($\partial Y^{q20/40}_{it} / \partial Ex_{jit}$)	

The (equiproportionate) growth effect (the first term on the right hand side of the equation) measures the effect of the exchange rate regime on mean income (ρ_j) with respect to a base group.[53] The distribution effect (second term in brackets) measures the impact of the exchange rate regime on the first/second quintile share in two parts, the difference between α_1 and one times the growth effect and the direct effect γ_j of the exchange rate regime EX_{jit} on the first and second quintile share. Thus the income of the poor could be affected directly and indirectly through growth by exchange rate regimes and possible trade-offs of exchange rate regimes affecting economic growth and the first/second quintile share in opposite directions can be analyzed.

A natural benchmark for pro-poor growth would be equipropotionate growth with $\alpha_1 = 1$ and $\gamma_j = 0$, i.e. no distribution effects (equation (1): $\partial Y^{p20/40}_{it} / \partial Ex_{jit} = \rho_j$). Thus pro-poor growth could be defined by a distribution effect:

$$\rho_j + [(\alpha_1 - 1) * \rho_j + \gamma_j] > \rho_j \qquad \text{i.e.} \qquad \gamma_j > 0 \qquad \text{for } \alpha_1 = 1 \qquad (2)$$

One drawback of defining pro-poor growth only by equation (2) is the fact, that a situation with a negative growth effect ($\rho_j < 0$) would also be labelled as pro-poor if $\gamma_j > 0$. In this case the exchange rate regime would affect the growth rate negatively ($\rho_j < 0$), but this effect is diminished by an positive effect on the first/second quintile share, if $\gamma_j > -(\alpha_1 - 1) * \rho_j$ (as ρ_j is assumed to be negative the direct distribution effect of the exchange rate regimes γ_j must be greater than the distribution effect via growth if $\alpha_1 > 1$). To cover this issue, pro-poor growth could be defined by a total effect assuming $\partial Y^{p20/40}_{it} / \partial Ex_{jit} > 0$:

$$\rho_j + [(\alpha_1 - 1) * \rho_j + \gamma_j] > 0 \qquad \text{i.e.} \qquad \gamma_j > -\rho_j \qquad \text{for } \alpha_1 = 1 \qquad (3)$$

This condition would require a positive impact adding the growth and distribution effect, i.e. the positive impact of the exchange rate regime on first/second quintile share has to more than

Anderson/White 2001, Bourguignon 2001, Eastwood/Lipton 2001, Chen/Ravallion 2001, Kakwani/Son/Khandker 2003, Klasen 2003, Ravallion 2003).

[53] As we outline in the next section we estimate the difference between a fixed exchange rate regime (our base group) and all other arrangements. Thus the growth and distribution effects of, for example, a flexible exchange rate regime have to be interpreted as positive or negative difference with respect to the fixed exchange rate regime.

offset the negative effect of the exchange rate regime through growth. On the other hand, a growth situation would be also labelled pro-poor, if the positive growth effect of an exchange rate regime exceeds its negative distribution effect.

In our approach we choose equation (2) and equation (3) as our pro-poor growth conditions, to cover both the distribution effect and the total effect of exchange rate regimes on the poorest 20 and 20 to 40. We also profit from the fact that the coefficient α_1-1, while often different from zero, is almost always insignificant in our regressions. Thus, assuming no indirect distribution effect via the mean income ($\alpha_1 = 1$), pro-poor growth is defined in equation (2) by a positive distribution effect ($\gamma_j > 0$). In equation (3) pro-poor growth is achieved if the total effect of the distribution effect and growth effect is positive ($\gamma_j + \rho_j > 0$). Estimating both equations, possible trade-offs between the distribution effect and growth effect can be analyzed. If estimations for the distribution effect are positive ($\gamma_j > 0$), but the coefficients for the total effect are zero ($\gamma_j + \rho_j = 0$), we can conclude that the growth effect of exchange rate regimes on the income of the poor has to be negative ($\rho_j < 0$). If estimations for the distribution effect are negative ($\gamma_j < 0$) and the total effect is zero ($\gamma_j + \rho_j = 0$), the growth effect of the openness indicator on the income of the poor has to be positive ($\rho_j > 0$).

5. Econometric specifications and estimation

5.1 Econometric specifications

To measure the impact of exchange rate regimes on pro-poor growth we choose two different econometric methodologies, a system generalized method of moments estimation for a level and first-differenced equation and a growth equation using pooled OLS, random or fixed effects estimation.

5.1.1 System GMM estimation: level and first differenced equation

To estimate the distribution effect we formulate the following ad hoc equation in levels, i.e. we regress the mean income of the 20/20 to 40 per cent poorest on the mean income, exchange rate regime dummies, and variants of additional variables.

$$Y^{p20/40}_{it} = \alpha_0 + \alpha_1 \ln(Y_{it}) + \beta_k X_{kit} + \gamma_j Ex_{jit} + \mu_i + \varepsilon_{it} \quad (4)$$

with

$Y^{p20/40}_{it}$:	mean income of the 20 percent/20 to 40 percent poorest defined as $\ln(Q^{20/40}_{it} * Y_{it}/0.2)$
$Q^{20/40}_{it}$:	first/second quintile share of income
Y_{it}:	real per capita income

i:	cross-section units (split or not split countries)
t:	year of observation
$\mu_i + \varepsilon_{it}$:	composite error term including unobserved country effects
X_{kit}:	additional variables with k = 1, ... ,n
Ex_{jit}:	dummy variables for exchange rate regimes (base group omitted)
	with j = 1, ..., 4 (LYS)
	j = 1, ..., 5 (coarse RR)
	j = 1, ..., 4 (4-way RR)

To present more clearly the distribution effect we subtract Y_{it} from both sides: [54]

$$Y^{q20/40}_{it} = \alpha_0 + (\alpha_1\text{-}1)\ln(Y_{it}) + \beta_k X_{kit} + \gamma_j EX_{jit} + \mu_i + \varepsilon_{it} \qquad (5)$$

with

$Y^{q20/40}_{it}$ = logarithm of first/second quintile share divided by 0.2

However, to include information on within-country variation and to cover econometric issues discussed in the next section we apply a system GMM estimator, i.e. we estimate the level equation (5) and its first difference (6) as a system with the restriction of having the same coefficients α_1-1, β_k and γ_j

$$Y^{q20/40}_{i,t+z} - Y^{q20/40}_{it} = (\alpha_1\text{-}1)[\ln(Y_{i,t+z}) - \ln(Y_{it})] + \beta_k[X_{ki,t+z} - X_{kit}] + \gamma_j[EX_{ji,t+z} - EX_{jit}] + [\varepsilon_{it+z} - \varepsilon_{it}] \qquad (6)$$

with

z: distance of years between two observations of a spell with identical income definition or distance of years between observations within a country

To handle the incomparability problem of inequality data we choose two different routes. First, we split the countries requiring the same income definition within each subgroup (e.g. Côte d'Ivoire 1: 1985/88, Côte d'Ivoire 2: 1988/95) and using only the unadjusted income definition. While the number of cross-section units is now increased, the number of observations for the level equation is decreased as the first observation per cross-section unit is omitted due to the first-differenced procedure. The advantage of this procedure is that the first-differenced equations are now formed only by observations with the same income definition per country. On the other hand, the first/second quintile shares in the level equations are not directly comparable. Therefore, second, we do not split the countries and form first-differenced equations for all observations per country using the adjusted first/second quintile share of

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[54] $Y^{q20/40}_{it} = Y^{p20/40}_{it} - \ln(Y_{it}) = \ln(Q^{20/40}_{it} {*} Y_{it}/0.2) - \ln(Y_{it}) = \ln(Q^{20/40}_{it}) + \ln(Y_{it}) - \ln 0.2 - \ln(Y_{kt}) = \ln(Q^{20/40}_{it}/0.2)$

income. In this case we omit one of the two observations for the same year in one country (e.g. Côte d'Ivoire 1988/1) and an observation with only one year difference within a country (Netherlands 1983) (see table 1).[55] While in this case income definitions in the first-differenced and level equation are comparable, the adjustment procedure may influence the estimated coefficients (Atkinson, Brandolini 2001). One general drawback of the system GMM estimation in our context, however, is the fact that we are confronted with irregular panel data, i.e. z ranges form 2 to 14 in both approaches. In the system GMM estimation, however, z is assumed to be identical in the first-differenced equation.

The results of the system GMM estimation can be interpreted as a mixture of the level and first-differenced equation, i.e. pooled cross-section regression of the impact of the exchange rate regimes on the level of first/second quintile at certain country-year observations (5) and the impact of the change of the exchange rate regime on the change of the first/second quintile share (6) between the observations within a country.[56] Combining (5) and (6) in the system GMM estimation, the coefficients of the exchange rate regimes (γ_j) and the additional regressors (β_k) capture the distribution effect. Thus relying on (2) a significant $\gamma_j > 0$ or $\gamma_j < 0$ indicates a pro- or anti-poor shift on average of the first/second quintile share associated with the chosen exchange rate regime j compared to the omitted exchange rate regime. Similar, β_k different from zero indicate pro- ($\beta_k > 0$) or anti- ($\beta_k < 0$) poor growth on average.[57] Interpreting the system GMM approach as a level equation the chosen exchange rate arrangement j would shift the first/second quintile share on average by γ_j*100 percent with respect to the base group.

Finally, to estimate the total effect we regress the mean income of the poorest 20 and 20 to 40 percent on exchange rate regimes and variants of additional regressors taking as level equation in the system GMM methodology variants of the following equation: [58]

$$Y^{p20/40}_{it} = \alpha_0 + (\beta_k+\rho_k)X_{kit} + (\gamma_j+ \rho_j)Ex_{jit} + \mu_i + \varepsilon_{it} \quad (7)$$

Taking into account (3) a significant $(\gamma_j+ \rho_j) > 0$ indicate a pro-poor shift on average of the mean income of the first/second quintile share associated with the chosen exchange rate regime j compared to the omitted exchange rate regime (positive total effect), while $(\gamma_j+ \rho_j) < 0$ would indicate anti-poor shift on average. Similar, $\beta_k+\rho_k$ different from zero indicate pro- ($\beta_k+\rho_k > 0$) or anti- ($\beta_k+\rho_k < 0$) poor growth (total effect). Trade-offs between the distribution effect and growth effect are present, if estimations for the distribution effect (γ_j) and the total effect ($\gamma_j + \rho_j$) differ in sign.

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[55] We compare the values of the adjusted first and second quintile of both per country year observations (e.g. Venezuela 1987/1, 1987/2) with the values before (Venezuela 1981) and after (Venezuela 1993) the country year observations to decide whether we omit the first or second observation as ordered in table 1. If one of the adjusted observation varies considerably with respect to the other observations, we omit this observation.

[56] In the first-differenced equation the exchange rate variables have three values (1, 0 –1), which desribe the change into a regime (1), no change of a regime (0), and the change out of a regime (-1) between time t + z and t.

[57] This interpretation would apply equivalently to $\alpha_1 - 1$. As $\alpha_1 - 1$, however, is almost ever insignificant, we present only results for the system GMM estimation of equations (5) and (6) omitting $\ln(Y_{it})$.

5.1.2 Growth equation: pooled OLS, fixed effects or random effects estimation

To measure also within-country variation, to cover the problem of an irregular panel in the first-differenced equation and the incomparability issue of income inequality measures, we also use a growth equation forming the dependent variable exclusively from spells with identical definitions of inequality income measures and divide the growth rates of each spell by the distance of years to calculate (regular) annual averages. Thus we regress the annual average growth rate of the mean income of the 20 and 20 to 40 per cent poorest on the annual average growth rate of mean income and initial values for dummy variabels of exchange rate regimes and additional macroeconomic variables.

$$y^{p20/40}_{it} = \alpha_0 + \alpha_1 y_{it} + \beta_k X_{kit} + \gamma_j Ex_{jit} + u_{it} \qquad (8)$$

with

$y^{p20/40}_{it}$:	average annual rate of growth of the mean income of the 20/20 to 40 per cent poorest defined as $100/z*[\ln(Q^{20/40}_{i,t+z}*Y_{i,t+z}/0.2) - \ln(Q^{20/40}_{i,t+z\ t}*Y_{it}/0.2)]$
z:	distance of years between two observations of a spell with identical income definition
y_{it}:	average annual rate of growth of the mean income defined as $100/z*[\ln(Y_{i,t+z}) - \ln(Y_{it})]$
X_{kit}:	additional variables with k = 1, ... ,n; only initial values (at beginning of spell)
Ex_{jit}:	dummy variables for exchange rate regimes (base group omitted) with j = 1, ..., 4 (LYS); j = 1, ..., 5 (coarse RR); j = 1, ..., 4 (4-way RR); only initial values (at beginning of spell)
u_{it}	error term of unknown form

We subtract y_{it} from both sides in (8) to derive the distribution effect more clearly:

$$y^{q20/40}_{it} = \alpha_0 + (\alpha_1 - 1) y_{it} + \beta_k X_{kit} + \gamma_j EX_{jit} + \varepsilon_{it} \qquad (9)$$

with

$y^{q20/40}_{it}$: average annual rate of growth of the first and second quintile share defined as $100/z* [\ln(Q^{20/40}_{i,t+z}) - \ln(Q^{20/40}_{it})]$ [59]

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[58] In this approach we assume that α_1-1 equals zero.

[59] $y^{q20/40}_{it} = y^{p/20/40}_{it} - y_{it}$ $= 100/z*$ $([\ln(Q^{20/40}_{i,t+z}*Y_{i,t+z}/0.2) - \ln(Q^{20/40}_{it} *Y_{it}/0.2)] - [\ln(Y_{i,t+z}) - \ln(Y_{it})])$
$= 100/z*$ $([\ln(Q^{20/40}_{i,t+z}) + \ln(Y_{i,t+z}) - \ln 0.2$ $- \ln(Q^{20/40}_{it}) - \ln(Y_{it}) + \ln(0.2)$ $- \ln(Y_{i,t+z}) + \ln(Y_{it})])$
$= 100/z*$ $[\ln(Q^{20/40}_{i,t+z}) - \ln(Q^{20/40}_{it})]$

Again $\gamma_j > 0$, $\beta_k > 0$ indicate pro-poor growth (positive distribution effect) with respect to (2), i.e., first, the average annual growth rate of the first and second quintile share with exchange rate regime j is on average γ_j percentage points higher than the base group and, second, a one percentage point increase of the additional variables would increase the average annual growth rate of the first/second quintile share by β_k percentage points.[60]

Finally, we estimate also the total effect in using variants of the following equation:[61]

$$y^{p20/40}_{it} = \alpha_0 + (\beta_k+\rho_k)X_{kit} + (\gamma_j+\rho_j)EX_{jit} + u_{it} \qquad (10)$$

With respect to (3) a significant $(\gamma_j+\rho_j) > 0$ indicates that the average annual growth rate of the mean income of the first/second quintile with exchange rate regime j is on average $\gamma_j+\rho_j$ percentage points higher than the omitted exchange rate regime (positive total effect), while $(\gamma_j+\rho_j) < 0$ would indicate an anti-poor shift on average. Similar, $\beta_k+\rho_k$ different from zero indicate pro- $(\beta_k+\rho_k > 0)$ or anti- $(\beta_k+\rho_k < 0)$ poor growth (total effect). Again, trade-offs between the distribution effect and growth effect are present, if estimations for the distribution effect (γ_j) and the total effect $(\gamma_j + \rho_j)$ differ in sign.

5.2 Econometric issues

In estimating variants of equations (5), (6), and (9) several econometric issues have to be mentioned.[62] First, if we estimate the level equation (5) alone by pooled OLS, coefficients would be biased and inconsistent due to unobserved heterogeneity correlated with regressors (Dollar/Kraay 2001, Eastwood/Lipton 2001, Chen/Ravallion 1997). Fixed-effect or first-difference estimation in a panel data framework would be standard remedies to the unobserved heterogeneity issue. However, within-country variation of income distribution may be too limited compared to the greater variability of first and second quintile shares across countries (Dollar/Kraay 2001). Thus we apply a system GMM estimator using both information on the levels (cross-country variation) and first-difference (within-country variation) of income distribution data (Arellano/Bover 1995, Blundell/Bond 1998). Estimating the growth equation (9) by pooled OLS, the estimated coefficients might also be biased and inconsistent due to unobserved country-specific effects in ε_{it}. We use both a Hausmann test for fixed and random effects and a Breusch Pagan Langrange multiplier test for random effects to cover this issue. If we can not reject the null hypothesis in both tests pooled OLS is the appropriate method. Otherwise, we present results for random effects (the Breusch Pagan test is rejected, but not the Hausmann test) or fixed effects model (the Hausmann test is rejected).

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[60] This interpretation would apply equivalently to $\alpha_1 - 1$. As $\alpha_1 - 1$, however, is almost ever insignificant, we present only results for the growth equation (9) omitting y_{it}.
[61] In this approach we assume that α_1 equals one.
[62] The discussion in this section is also relevant for regressions on the total effect (equations 7 and 10).

Second, even if time-invariant country-specific effects can probably be dismissed, omitted variable bias might be an issue due to variables whose values change over time. In addition, as the econometric specification is not based on a comprehensive theoretical framework, but more found in ad hoc considerations and plausible reasoning, model uncertainty problems might arise (Ghura/Leite/Tsangarides 2002).[63] Thus excluded variables might be correlated with the regressors leading to biased estimates.

Third, measurement error in dependent and independent variables could generate biases in the estimated coefficients. While measurement error in the data on first/second quintile might be more severe due to flawed inequality data, measurement error in the dependent variable only causes biases in case of systematic correlation with regressors (Wooldridge 2000).[64] Measurement error in explanatory variables, however, might lead to inconsistent estimates. Varying definitions and accuracy in data collection, for example, cause measurement errors especially present in data on developing countries.[65]

Fourth, in estimating level and first difference equations (5), (6) or the growth equation (9) simultaneity might be an issue.[66] In case of reverse causation, estimations would be biased and inconsistent. While the choice of exchange rate regimes may depend on a broad set of variables, the (growth rate of the) first and second quintile income, however, is not proposed in the literature (Gosh/Gulde/Ostry/Wolf 1997, Levy-Yeyati/Sturzenegger 2001, 2002a). In addition, the impact of the (growth rate of) first/second quintile income on additional macroeconomic variables (X) is controversially discussed. While, on the one hand, endogeneity is denied due to pragmatic reasons (Dollar/Kraay 2001), reverse causation may be argued for because of major policy and institutional changes in developing countries and political economy reasons (Lundberg/Squire 2001). We do not instrument for EX and X in the system GMM estimations due to limited data availability and plausibility.[67] In addition, we use only initial

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[63] The problems of omitted variables and model uncertainty are connected by the exclusion of significant explaining regressors which might be correlated with the selected regressors. But while the omitted variable issue points to the inconsistent estimation of the selected parameters, the problem of model uncertainty focuses on the misspecification of the general model and the problem in explaining pro-poor growth by a single ad hoc model. On the problem of model uncertainty in cross-country growth regressions, see Temple (1999). On the issue of model uncertainty in pro-poor growth regressions with macroeconomic policy variables, see Ghura/ Leite/ Tsangarides (2002).

[64] As $y^{p20/40}$ is formed by y, i.e. the dependent variable is systematically related to an explanatory variable, a biased coefficient of y may be expected. However, remembering $y^{q20/40}$ in equation (5) this is equal to state that the growth rate of the first/second quintile must be correlated with the growth rate of mean income. As the data on first/second quintile and mean income stem from different sources, this can not be assumed in advance (Dollar/Kraay 2001). On the issue of biased estimates in case of identical data sources, see Chen/Ravallion (1997).

[65] On the measurement error problem in cross-section growth regressions and on the flawed data in the Penn World Table, see Temple (1999).

[66] On the problem of simultaneous examination of inequality and growth and their joint determinants, see Lundberg/Squire (2001).

[67] One could use lagged values of X and EX as instruments. However, as our sample is often restricted to only two observations per country, we would have to omit all these countries from the regression. The problem of endogeneity is reduced in the RR classification since longer-term regimes are indentified by a rolling five-year horizon. This approach leads to a relatively long durability of the classified exchange rate regimes (Husain/Mody/Rogoff 2004).

values for the regressors X and EX in each spell to avoid endogeneity due to explanatory variables in the growth equation.[68]

A significant impact of the (growth rate of the) mean income of the poor on the (growth rate of the) mean income might also be possible.[69] Considering equations (5), (6), and (9), reverse causation thus means impact of the (growth rate of) first/second quintile share on the (growth rate of the) mean income.[70] Using only a level equation (5), contemporaneous reverse causation will cause inconsistent OLS estimation, while lagged reverse causation would justify OLS estimation assuming serial independence. Thus considering the growth equation (9), pooled OLS estimation is unbiased and consistent if lagged reversed causation can be assumed with serial independence (Eastwood/Lipton 2001). Concerning the system GMM estimation, reverse causation is covered in using instruments for mean income. In the level equation (5), we instrument for mean income using accumulated growth in mean income over three years prior to time t (e.g. Brazil 1967 to 1970 for 1970). In the first difference equation (7), we instrument for growth in mean income using the level of mean income at the beginning of the period, and accumulated growth in the three years prior to time t (Dollar/Kraay 2001, Ghura/Leite/Tsangarides 2002).[71] A Sargan test on overidentifying restrictions is used to test for validity of extra instruments (Arrelano/Bond 1991, Bond/Blundell 1998). As the coefficient for (the growth rate of the) mean income is one in most of the cases, however, we present only results omitting (the growth rate of the) mean income.

Assuming lagged reverse causation of $y^{q20/40}$ on y in the growth equation (9), serial correlation in the error term within countries and over time remains to be discussed. In static models, autocorrelation in the error term leads to incorrect standard errors and t-ratios but not to inconsistent estimates in OLS estimation. Serial correlation in models with lagged endogenous variables, however, would result in inconsistent estimates. Given a serially correlated error term the structure of the variance-covariance matrix for equation (9) would be block diagonal with a separate block for each country. Thus off-diagonal elements would only be non-zero within these blocks (Chen/Ravallion 1997). As different surveys are used within almost each block, the error term is assumed to be serially independent. Considering the system GMM estimator, the assumption of no serial correlation of the error term ε_{it} in the level equation (5) is essential for consistency (Bond/Blundell 1998). Thus tests for first-order and second-order serial correlation of the first-differenced residuals ε_{it+z} - ε_{it} of equation (6) are reported. If disturbances ε_{it} are not serially correlated, first order serial correlation in first differenced residuals ε_{it+z} - ε_{it} have to be

[68] On this solution, see Lundberg/Squire (2001). On the empirical application of this method to deal with the endogeneity issue in cross-section growth regressions, see Barro/Sala-i-Martin (1995). But even in this solution endogeneity might remain a problem, see Temple (1999).
[69] Biased estimates might also be possible due to joint causation (Timmer 1997, Eastwood/Lipton 2001).
[70] The effect of initial income inequality on subsequent growth has been often empirically examined. The evidence, however, is mixed with negative (Perotti 1996, Alesina/Rodrik 1994), positive (Forbes 2000, Li/Zou 1998) and indifferent effect of initial income inequality on future growth (Deininger/Squire 1998b). In addition, a negative effect only for countries with mean income below $ 2000 (in constant 1985 purchasing power) was found (Barro 2000).
[71] Example: given the first difference equation Brazil 1960 – 1970 we use mean income of 1960 and the accumulated growth of mean income between 1957 and 1960 as instruments for the first difference of mean income 1960 - 1970.

significant negative (m1) and second order serial correlation in the first differenced residuals insignificant (m2) (Arrelano/Bond 1991, Bond/Blundell 1998).

5.3 Estimation strategy and results

To measure the impact of exchange rate regimes on pro-poor growth and to cover the issues mentioned above with respect to correct classifications of exchange rate regimes and econometric specifications, we test two classifications (5-way classification: Levy-Yeyati/Sturzenegger 2002b (LYS), coarse classification: Reinhart/Rogoff 2003 (RR)) in both econometric approaches using fixed (LYS) and pegged (RR) regimes (no separate legal tender, pre-announced peg, currency board or horizontal band between +/-2%) as base group. We omit inconclusives (LYS) and category 6 (RR) due to limited observations in these categories and their biasing effect in our sample (table 5 to 8). Econometric specifications are tested for all, developing and industrial countries separately.[72]

We estimate the different effects of exchange rate regimes in specifications without additional regressors, with regional dummy variables and with sets of additional macroeconomic variables. To analyze potential trade-offs between the distribution effect and the growth effect we additionally test the total effect of exchange rate regimes on the mean income of the 20 and 20 - 40 percent poorest adding macroeconomic variables. Due to our fundamentally empirical approach, we execute different robustness checks to confirm the results, i.e. we test results without outliers, with mean income and with both adjusted and unadjusted inequality income measures in the system GMM estimations.[73] Finally, we also use a reduced 4-way RR classification in which category freely falling is assigned to one of the other four categories as denoted in the chronologies (Reinhart/Rogoff 2003).

5.3.1 Exchange rate regimes and pro-poor growth: distribution effect

First, we estimate the effect of exchange rate regimes on the first and second quintile share without additional regressors. In table 9 we compare the results for the growth equation denoting the exchange rate regimes in an ascending order from more fixed (crawling peg, limited flexibility) to flexible regimes. In the LYS classification only dirty floats have a significant impact (equations 2, 10, 19, 20).[74] This effect is significantly positive for developing and all countries if we omit outliers (equations 2, 10), i.e. countries with a dirty float regime have a 2.40 percentage points higher annual average growth rate of the first quintile share with respect to

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[72] We did not test transitional countries separately due to limited data availability.

[73] We indentify outliers from graphical analysis and descriptive statistics without a strict rule. We analyze outliers for our dependent variables with respect to the whole sample of each exchange rate regime classification and within each exchange rate regime (i.e. we also omit the incredible high growth rates of Guinea 1991 - 94, Kenya 1992 - 94, and Senegal 1991 – 95 for the growth rate of the (mean of the) first quintile and Kenya 1992 - 94 for the growth rate of the (mean of the) second quintile in regressions of the growth equation). Due to a varying number of observations of the samples used in regressions for all, developing and industrial countries, the number of outliers differ for dependent and independent variables.

the base group fixed regime (equation 10).[75] The positive impact of the dirty float regime on the second quintile in industrial countries (equations 19, 20), while robust to outliers, is not significant for all countries. However, as only 2 out of 11 observations (Italy 1987, Norway 1976) for dirty float regimes are from industrial countries (table 5), the effect on industrial countries is not very well supported.

Concerning the RR classification, freely floating and freely falling are statistically significant exchange rate regimes. While category freely floating is only present in industrial countries, freely falling is only found in developing (18 observations) and transitional countries (3 observations, table 5). Significant results for all countries (table 9 equations 6, 7, 8) are therefore driven by effects in these subgroups of countries. For the first quintile share, the coefficient of freely falling is significantly positive only without outliers. We estimate a 2.88 percentage points positive difference of the annual average growth rate of the first quintile share with respect to the base group (pegged regimes) for developing countries (table 9 equation 14). On the other hand, freely floating is significantly negative for industrial countries for the first quintile share (equations 21, 22), a result contrary to the belief of a positive impact of flexible exchange rate regimes. In addition, freely floating is also highly significantly negative for the second quintile share for industrial and all countries, -0.88 and –0.66 percentage points respectively (equations 7, 8, 23, 24). Finally, all categories are negative in equation (22) omitting only two outliers.[76] If we replace freely falling in a reduced 4-way RR classification, however, no significant effect of freely floating or other exchange rate regimes could be confirmed in regressions for all and developing countries (table 9 equations 25 to 32).

In table 10 we present our estimates for the system GMM methodology.[77] We only indicate results for the RR classification due to insignificant results for the LYS classification. As mentioned above, we estimate both an adjusted and unadjusted approach to cover the income incomparability issue. Estimations for the first and second quintile shares for all countries (table 10 equations 1 to 4) indicate that coefficients change in both approaches.[78] Category freely falling now has a negative coefficient between -0.12 and -0.16 on the first quintile share and second quintile share. Interpreting the system GMM approach as a level equation, the first quintile share in countries with freely falling exchange rate regimes is on average between 15 and 16 percents lower than in countries with pegged regimes. While freely floating and limited flexibility are significantly positive with respect to pegged regimes, this result is not confirmed for the first quintile share in the unadjusted approach. Specification-tests for the system GMM

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[74] The F-test for all and developing countries (equation 2, 10), however, indicates no overall significance of the regressions.
[75] The low and insignificant coefficient of 0.12 in equation 1 is suspected to depend mainly on Poland 1990, as table 5 indicates (mean of average annual growth of first quintile share of income for transitional countries: -13.87).
[76] Initial values for spells: Norway 1979 - 84, Denmark 1992 – 95.
[77] Coefficients, heteroscedasticity adjusted asymptotic standard errors and tests on first-order and second-order serial correlation are based on the one-step estimator. While the one-step estimator is asymptotically inefficient relative to the two-step estimator, asymptotic inference based on the one-step estimator is supposed to be more reliable indicated by simulations. However, a Sargan-test would be only based on the two-step estimator (Blundell/Bond 1998, see also Bond/Hoeffler/Temple 2001).

estimator, however, require significant negative first-oder serial correlation in the differenced residuals (m1) and no evidence for second-order correlation (m2), which is only fulfilled in the adjusted approach (table 10, equations 2 and 4).

Considering developing countries, the coefficient for freely floating is now highly positive on a one percent significance level (table 10 equations 5 to 8). Conclusions based on these results, however, should be drawn cautiously, as there are only two observations (Indonesia 1999, Madagascar 1999) in the category freely floating in developing countries (table 5). In addition, limited flexibility is again significantly positive for the second quintile in the adjusted approach (table 10 equation 8). Furthermore, the coefficient of category freely falling is negative, but insignificant in developing countries. Finally, only managed floating is significantly negative in industrial countries in the adjusted approach (table 10 equation 12). Again specification-tests on first-oder serial correlation are only passed in the adjusted approach (table 10, equations 6, 8, 12). If we test the reduced 4-way RR classification, the significant coefficients for freely floating and freely falling disappear in all and developing countries, but findings for limited flexibility remain significant and change only slightly in size (table 10 equations 13 to 20).

In comparing results for the growth equation and level/first-differenced equation, four facts have to be emphasized. First, the positive effect of the dirty float regime (LYS) in the growth equation can not be confirmed in the system GMM estimation. Second, coefficients of limited flexibility (RR) are positive, but insignificant for all and developing countries in the growth equation. Third, the sign of the coefficients for category freely falling and freely floating differ in both econometric approaches for all countries (coarse RR). Finally, the coefficient of freely falling is negative, but insignificant for developing countries in the system GMM estimation (table 9 and 10).

Explanation of these different findings should be based on the estimation methodology.[79] To reveal systematic differences of the estimation methodologies, we also estimate a sample used in the growth equation in a system GMM approach. As we need two observations with growth rates per country, i.e. three observations for the first and second quintile share, to apply the system GMM estimator, we dropped all countries with only two observations. Estimated results for the system GMM estimations are a mixture of the growth equation and the first difference of the growth equation. Second, we also tested effects of the level and first differenced equations

[78] The maximum difference of 0.054 between equation 3 and 4 is equivalent to a 5.4 percent difference for the second quintile share, for example from 0.080 to 0.084.

[79] The result of the system GMM estimation is a mixture of a level and first-differenced equation, i.e. pooled cross-section regression of the impact of exchange rate regimes on the level of first/second quintile and the impact of the change of the exchange rate regime on the change of the first/second quintile share. Concerning the level equation, a negative impact of freely falling on the first/second quintile share can be expected by its lower value with respect to other categories in all countries (table 6). In the first-differenced equation the dummy varibales for exchange rate regimes have three values (1, 0, -1), which describe the change into a regime (1), no change of a regime (0), and the change out of a regime (-1) between time t and t+z. Thus a fall of first quintile between t and t+z with a change into category freely falling would indicate a negative coefficient. In the growth equation, on the contrary, we look at the impact of the exchange rate regime at time t on the growth of the first/second quintile between t and t+z . A positive effect of freely falling can then be interpreted as a higher growth of first quintile after a freely falling regime at time t. Thus the reversed signs of the freely falling coefficients may reflect a u-turn shape of a freely falling situation, i.e. a downwards and upwards movement for first quintile share between time t-z, t and t+z with freely falling category at time

of a system GMM estimation separately in OLS. Estimated coefficients for system GMM estimation are here a mixture of a level equation and the first difference of the level equation. Thus the difference between the system GMM estimations and the growth estimations stems apparently from the fact that we regress the level of the first/second quintile on exchange rate regimes, while in the growth equation we regress the growth rate on initial exchange rate regimes.

Next, we add regional dummy variables in our specifications to control for cultural, historical and economical differences of income inequality in the six regions (Cornia 2002). In general, regional dummy variables are not important in the growth equation (table 11 equations 1 to 8). Exceptions are significant negative coefficients for Latin America/Carribean and Eastern Europe/Central Asia in regressions for all countries (RR), increasing the positive impact of freely falling on the growth rate of the first quintile share (compare table 11 equation 5 with table 9 equation 6). Even if limited flexibility now affects significantly positive the growth rate of the first quintile in developing countries, regional dummy variables remain insignificant (compare table 11 equation 7 with table 9 equation 14). This result is also true, if we test the reduced 4-way RR classification (table 11 equation 11). However, exchange rate regimes remain insignificant in all other specifications in the 4-way RR classification (table 11 equations 9 to 12).

In the system GMM approach, however, estimations confirm the hypothesis of important inequality difference between regions, since most coefficients for regional dummy variables differ significantly from the base-group region, i.e. industrial countries for all countries and Sub-Saharan Africa for developing countries (table 12).[80] Adding regional dummies results in insignificant and low coefficients for freely falling and freely floating in all countries (compare table 12 equations 1 to 4 with table 10 equations 1 to 4). Thus the high values for both categories in regressions without regional dummy variables stem apparently from regional determinants different from exchange rate regimes. On the other hand, coefficients for freely floating remain highly significant and almost identical for developing countries (compare table 12 equations 5 to 8 with table 10 equations 5 to 8). Concerning limited flexibility, coefficients for the second quintile for all and developing countries remain significantly positive in the adjusted approach, but the coefficients are significantly lower (table 12 equations 4 and 8 compared with table 10 equations 4 and 8). Finally, category managed floating is now significantly positive to a 10 percent level in first and second quintile regressions for all countries (table 12 equations 1 and 3), a result not confirmed using adjusted income inequality measures. In addition, managed floating is also significantly positive in the first and second quinitle share for developing countries, a result not present in regressions without regional dummy variables (compare table 12 equations 5, 7, 8 with table 10 equations 5 to 8).[81] Again specification-tests on first-oder

t (the bottom of a possible crisis). This hypothesis, however, would indicate that category freely falling is changed at the end of a spell, which could not confirmed in our sample.

[80] Since we define developing countries without transitional countries, the dummy variable for Eastern Europe and Central Asia region is also omitted in regressions for developing countries.

[81] One exeception is the coefficient of managed floating for the first quintile share using the adjusted approach (table 12 equation 6).

serial correlation are only passed in the adjusted approach (table 12, equations 2, 4, 6, 8). If we test the reduced 4-way RR classification, significant coefficients of freely floating for developing countries disappear. On the other hand, results for category managed floating do only slightly change (table 12 equations 9 to 16). Thus, while freely falling is often replaced by managed floating in the 4-way RR classification, the reclassification does no affect the coefficients of managed floating.[82] Finally, limited flexibility is now only significantly positive for the second quintile in developing countries using the unadjusted approach (table 12 equation 7).

5.3.2 Exchange rate regimes, pro-poor growth, currency crises and capital controls: distribution effect

Restrictions on capital mobility are seen to be a critical variable in studying the association between exchange rate regimes and economic growth (Gosh/Gulde/Ostry/Wolf 1997).[83] In addition, the choice of a reasonable exchange rate arrangement may differ for countries open to international capital mobility and countries without access to international capital markets (Fisher 2001, Husain/Mody/Rogoff 2004). To test this hypothesis with respect to pro-poor growth, we additionally control for capital account liberalization in using a dummy variable for capital control based on various issues of the IMF Yearbook on Exchange Arrangement and Exchange Restrictions (table 3).[84] Batteries of regressions, however, could not reject the null hypothesis of no impact of capital restrictions on the first and second quintile shares.[85]

Certain exchange rate regimes may be more prone to currency crisis than others (Bubula/Ötker-Robe 2003).[86] But currency crises may also dependent on factors different from the type of exchange rate regimes (Husain/Mody/Rogoff 2004, Razin/Rubinstein 2004). Without controlling for currency crises we so far assigned these effects to the corresponding exchange rate arrangement. To control the shock effects of currency crises on pro-poor growth, we use a dummy variable indicating a currency crisis if an index of currency pressure, i.e. a weighted average of monthly real exchange rate changes and monthly (percent) reserve losses, exceeds the mean plus 2 times the country-specific standard deviation (Glick/Hutchinson 1999). Concerning the growth equation, the additional currency crisis variable has never significant effect on pro-poor growth in the LYS classification, except for the negative coefficient of the second quintile share in industrial countries, an effect driven by two spells (table 13 equation 1).[87] While this effect is also debatable due to the small sample size (N = 30), the positive effect of the dirty float regime is only slightly reduced from 1.32 to 1.19 (compare table 13 equation 1

[82] This result is in line with descriptive statistics since the means of adjusted first/second quintile in developing countries do not differ considerably for managed floating in both the coarse and the 4-way classification (table 6).
[83] For an overview of empirical cross-country studies on the effect of capital account liberalization on economic performance, see Edison/Klein/Ricci/Sloek (2002).
[84] In the literature, several qualitative and quantitative indicators are proposed to measure capital account liberalization. For an overview and critic on each measure, see Edison/Klein/Ricci/Sloek (2002).
[85] We test both the growth equation and system GMM equation for all, developing and industrial countries with exchange rate regimes, without outliers, with and without regional dummies for the LYS classification and the coarse and 4-way RR classification.
[86] For a detailed discussion on the feasability conditions using intermediate exchange rate regimes in developing countries in the context of capital mobility and a broad discussion on causes of currency crisis, see Montiel (2003).

with table 9 equation 20). Looking at the coarse RR classification, the coefficient of the currency crisis dummy variable is also negative for second quintile shares in industrial countries, while the high statistical significance of the negative coefficient of freely floating disappears (compare table 13 equation 2 and table 9 equation 24).[88] Currency crises have an amazingly positive impact on the growth rate of the second quintile share for developing countries (table 13 equation 4). Exchange rate regimes, however, are unimportant and the F-test on overall significance is not passed. Using the coarse classification the shock variable is insignificant in all other specifications. If we test the 4-way RR classification, currency crises affect again positively the growth rate of second quintile share in developing countries (compare table 13 equations 6 and 4). Finally, curreny crises impact now significantly positive on the growth rate of the first quintile share, while findings for limited flexibility remain similar and significant (compare table 13 equations 5 and 3). Since the coefficient of currency crisis using the 4-way RR classiciation is rather similar to the coefficient of freely falling using the coarse RR classification (+2.63, +2.79 respectively), the currency crisis variable seems to capture the effect so far attributed to freely falling.

Looking at the estimates of the system GMM estimation, currency crises impact amazingly significantly positive on the second quintile share for all and industrial countries in the RR classification (table 14 equations 1, 5 and 6).[89] Interpreting the system GMM equation as level equation, a currency crisis would increase the level of the second quintile between 2.3 and 3.2 percent in industrial countries. Controlling for currency crises, however, the limited flexibility and managed floating regimes now are significantly negative for the second quintile in industrial countries using the unadjusted approach (compare table 14 equation 5 with table 10 equation 11). In addition, managed floating becomes insignificant in the unadjusted approach for the second quintile in all countries (compare table 14 equation 1 with table 12 equation 3). While currency crises are insignificant in developing countries, categories limited flexibility and managed floating now are also insignificant for the second quintile (table 14 equations 3 and 4 compared with table 12 equations 7 and 8). Finally, if we test the reduced 4-way RR classification in the system GMM estimation, currency crises and exchange rate regimes are never significant for all and developing countries.

5.3.3 Exchange rate regimes, pro-poor growth, inflation and output volatility: distribution effect

High inflation rates may negatively affect the first and second quintile share of income (Romer/Romer 1998, Easterly/Fisher 2001, Dollar/Kraay 2001, Ghura/Leite/Tsangarides 2002). To test this hypothesis with respect to exchange rate regimes, we first add the inflation rate (logarithm of 1 plus the inflation rate) with exchange rate arrangements and regional dummy

[87] New Zealand 1986/89, Sweden 1981/87.
[88] The Wald-test, however, indicates no overall significance of the regression.
[89] The only exception is the regression for all countries using the adjusted approach (table 14, equation 2). We do not present results for regressions on the first quintile since the coefficient of currency crises is never significant.

variables in all specifications. While inflation is not relevant with respect to the LYS classification, the coefficient of the inflation rate is amazingly positive at a ten percent significance level in regressions of the growth rate of the first quintile share on exchange rate regimes, inflation and regional dummy variables in developing countries (coarse RR classification, table 15 equation 1). If we test 4-way RR classification, inflation is again positive for the growth rate of the first and second quintile in developing countries (table 15 equations 3 and 4).[90] The high coefficients for the inflation rate should not be misinterpreted, since only a one unit increase of ln(1+inflation/100) would raise the growth rate of the first quintile share for example by 9.93 percentage points (table 15 equation 3). In our sample without outliers, however, the values for ln(1+inflation/100) range only between -0.01 (-1.22 % inflation rate) and 0.89 (143.61 % inflation rate). In addition, inflation is never significant in the system GMM estimation, if we omit four outliers with extreme values (Belarus 1993: 1190 %, Belarus 1995: 709 %, Brazil 1988: 651 %, Brazil 1993: 1997 % p.a.).

We also test the direct impact of the inflation rate without exchange rate regimes. In the growth equation the coefficient of the inflation rate is amazingly positive for the growth rate of the first and second quintile in developing countries (table 15 equations 5 and 6).[91] In all other regressions, however, inflation rate is never significant for both econometric approaches and all specifications omitting outliers.[92] Thus, indirect negative effects of the exchange rate arrangements through direct effects of the inflation rate on the first and second quintile share seem unlikely. In addition, a significant effect of inflation on the first quintile share could not be confirmed in the system GMM estimations omitting values of very high inflation, even if the coefficient of inflation rate is in general negative (Dollar/Kraay 2001, Ghura/Leite/Tsangarides 2002).[93]

In addition, macroeconomic volatility may impact negatively on the first and second quintile share. We add output volatility formed as three year moving standard deviation of annual real GDP per capita growth (for example Australia 1976: standard deviation of growth rates for Australia 1974, 75, 76, table 3) with exchange rate regimes and regional dummies in our basic equations. Output fluctuation, however, is almost never significant omitting outliers.[94] We also test the direct effect of output fluctuation on the first and second quintile share omitting exchange rate arrangments. The coefficient of output volatility, however, is never significant. To

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[90] Wald-test on overall significance of the regression, however, is not passed for the growth rate of the second quintile (table 15 equation 4). We also find significant effect of inflation on the growth rate of the first quintile in all countries using the 4-way RR classification. Since Wald-test on overall significance is also not passed in this specification and other regressions indicate no significant impact of inflation for all countries, we do not present this result.

[91] Again, the Wald-test on overall significance of the regression is not passed for the growth rate of the second quintile (table 15 equation 6).

[92] These results are in contrast to empirical evidence in the literature, which find significant negative impact of high inflation on the poor (Romer/Romer 1998, Easterly/Fisher 2001). Romer/Romer (1998), however, do not adjust data on income inequality due to incomparability issues.

[93] While in Ghura/Leite/Tsangarides (2002), inflation is found to be significantly negative, results in Dollar/Kraay (2001) are similar to our estimates as the coefficients of inflation are insignificant.

[94] One exception is a small positive coefficient (+0.007) for the second quintile in industrial countries using the unadjusted approach in a system GMM estimation (coarse RR classication). However, this effect could not be confirmed in the adjusted approach and the test on first-order serial correlation indicates misspecifications.

summarize, the effect of exchange rate regimes on the first and second quintile share seem not to work indirectly through output volatility.

5.3.4 Exchange rate regimes, pro-poor growth and additional macroeconomic variables: distribution effect

Considering the empirical literature (Romer/Romer 1998, Easterly/Fisher 2001, Eastwood/Lipton 2001, Ghura/Leite/Tsangarides 2002), macroeconomic variables are found to be relevant with respect to pro-poor growth. In the growth equation we control for budget deficit to GDP, financial development (money and quasi money to GDP), secondary education (average years of secondary schooling in total population aged 25 and over), inflation and initial Gini coefficient.[95] In the system GMM estimation we substitute budget deficit by government consumption due to its proven relevance in this estimation methodology (Ghura/Leite/Tsangarides 2002). While the Gini coefficient is found to be highly significant in a similar approach (Ghura/Leite/Tsangarides 2002), regressing the first quintile share on the Gini coefficient in a level/first-difference equation seems to us tautological as a change in inequality in the first and second quintile share is only explained by a change in overall inequality, i.e. no new information on the determinants of inequality are added in this specification. Thus we omit the Gini coefficient in the system GMM estimations.[96]

Looking at the LYS classification in the growth equation, the dirty float regime is now insignificant due to positive effects of budget surplus (compare table 16 equations 1 to 3 with table 9 equations 2 and 10), but the F-test of overall significance could not be rejected.[97] Coefficients for all other exchange rate regimes remain insignificant. Controlling for additional macroeconomic variables in the RR classification, the effects of exchange rate regimes are changed considerably. While freely falling becomes insignificant in all and developing countries, now limited flexibility impacts significantly positive on the growth rate of the first quintile share (compare table 16 equations 5 and 7 with table 11 equations 5 and 7).[98] Coefficients for all other exchange rate regimes remain insignificant. Concerning the macroeconomic variables, the adjusted Gini coefficient impacts significantly positive on the growth rate of the second quintile in all and developing countries (table 16 equations 2, 4, 6, 8). Thus the hypothesis of inequality convergence would be confirmed by these results.[99] In addition, a one percentage point increase in budget surplus would raise the growth rate of the first quintile share in all and

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[95] Adding initial inequality in the growth equation can be justified by testing the hypothesis of inequality convergence even if usually the same inequality measure, i.e. Gini coefficient or first quintile share, is used on both sides of the equation (Ravallion 2000). A positive coefficient for the initial Gini coefficient would confirm the convergence of inequality.

[96] We also omit M2 to GDP ratio due to insignificant results.

[97] Tests for industrial countries fail due to limited observations (N = 19) and are not presented.

[98] The coefficient of limited flexibility remained significantly positive in regressions on the first quintile for developing countries (compare table 15 equation 7 with table 11 equation 7). In addition, tests for industrial countries fail due to limited observations (N = 28) and are not presented.

[99] One problem with these results are the high coefficients for the adjusted initial Gini coefficients, which are present only in fixed effects estimations (table 16 equations 2 and 4). However, one should be cautious interpreting these findings, since the coefficients of the constants are incredible highly negative.

developing countries between 0.22 and 0.30 percentage points (table 16 equations 1, 3, 7).[100] Finally, financial development affects significantly positive the growth rate of the first quintile in the coarse RR classification (table 16 equations 5 and 7). If we test the reduced 4-way RR classification, the significant coefficients for limited flexibility disappear (compare table 16 equations 9 and 11 with equations 5 and 7). Coefficients for all other exchange rate regimes remain insignificant. While the impact of broad money to GDP becomes insignificant, initial inequality affects now also positively the growth rate of the first quintile share (table 16 equations 9 to 12).

Adding government consumption, inflation, and secondary education to the exchange rate regimes and regional dummies in a system GMM estimation, results for the coefficients of the exchange rate regimes on the first quintile are very similar to the regressions without macroeconomic variables (compare table 17 equations 1, 2, 5, 6, 9, 10 with table 12 equations 1,2, 5, 6, and table 10 equations 9, 10). Thus managed floating is significantly positive for the first quintile in all and developing countries using the unadjusted approach. However, none of the coefficients of the macroeconomic variables are significant in these regressions. Looking at the findings for the second quintile, managed floating remains only significantly positive in developing countries using the unadjusted approach (compare table 17 equations 3, 4, 7, 8, 11, 12 with table 12 equations 3, 4, 7, 8 and table 10 equations 11 and 12). While the coefficients of limited flexibility become insignificant (compare table 17 equations 4, 8 with table 12 equations 4, 8), freely floating remain highly significantly positive in developing countries (compare table 16 equations 5 to 8 with table 12 equations 5 to 8). Finally, freely floating now affects negatively the second quintile in industrial countries using the adjusted approach (compare table 17 equation 12 with table 10 equation 12). Coefficients of the macroceonomic variables, however, are insignificant in most of the cases.[101] While the size of the significant exchange rate regimes are lower, the general effect of exchange rate regimes on pro-poor growth remain unchanged, if we test the reduced 4-way classification (compare table 17 equations 13 to 20 with table 16 equations 1 to 8). Finally, tests on first-order serial correlation are again passed only in the adjusted approach for all and developing countries, while specification tests fail completely for industrial countries.

5.3.5 Exchange rate regimes, pro-poor growth and additional macroeconomic variables: total effect

Taking into account trade-offs between the distribution effect and the growth effect of exchange rate regimes on the income of the poor, we also test for the impact of both the LYS and RR classification on the mean income of the 20 and 20-40 percent poorest, i.e. the total effect. We

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[100] One exception is the insignificant coefficient of budget surplus for the growth rate of the first quintile in the coarse RR classification for all countries (table 15 equation 5).

[101] Exceptions are the weakly positive coefficient of government consumption in all and developing countríes for the second quintile using the unadjusted approach (table 16 equations 3 and 7), and the positive effect of secondary education on the second quintile in industrial countries using the adjusted approach (table 16 equation 12).

choose to measure the total effect and derive possible trade–offs between the distribution and growth effect, because our panel is highly irregular and unbalanced and tests on the growth effect of exchange rate regimes are limited by data availability and may better be answered in samples without restrictions on income inequality data.

Controlling for budget deficit, financial development, secondary education, inflation, and initial inequality in the growth equation, we test the LYS and both the coarse and 4-way RR classification.[102] In the LYS classification, however, only crawling peg is negative at a one percent significance level for the growth rate of the mean income of the second quintile in all countries (table 18 equation 2). Thus this negative effect works only through the growth effect, as we do not find any significant distribution effect (compare table 18 equation 2 with table 16 equation 2). Considering the additional macroeconomic variables, the adjusted Gini coefficient is again significantly positive for the growth rate of the mean income of the second quintile (compare table 18 equations 2 and 4 with table 16 equations 2 and 4).[103] In addition, the significantly positive effect of budget surplus on the first quintile is reinforced by the growth effect (compare table 18 equations 1 and 3 with table 16 equations 1 and 3). A one percentage points increase in budget surplus would raise the growth rate of the mean income of the first quintile share between 0.36 and 0.39 percentage points compared to 0.22 percentage points in regressions for the distribution effect.

Concerning estimations for the coarse RR classification, none of the exchange rate regimes exhibits significant impact on the growth rate of the mean income of the poor (table 18 equations 5 to 8). Thus the significant positive distribution effect of limited flexibility on the first quintile is not supported by the growth effect, even if the coefficients for limited flexibility remain similar positive (compare table 18 equations 5 and 7 with table 16 equations 5 and 7). In addition, budget surplus affects positively the growth rate of the mean income of the first quintile in developing countries, a result primarily driven by the distribution effect (compare table 18 equation 7 with table 16 equation 7). While the size of the coefficients for M2 to GDP ratio remains broadly the same, higher financial development is now significantly positive for the growth rate of the mean income of the second quintile in all countries (compare table 18 equations 5 to 8 with table 16 equations 5 to 8). If we test the reduced 4-way RR classification, findings for exchange rate regimes and macroeconomic variables remain identical with respect to statistical significance (table 18 equations 9 to 12).

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[102] We also tested initial per capita income as convergence term in total effects regressions of the growth equation. However, we omit inital per capita income, since its coefficient was never statistically significant.

[103] In regressions for the growth rate of the mean of the second quintile, more than 85 percent of the positive effect of the initial Gini coefficient stem from a positive distribution effect on the growth rate of the second quintile, confirming the hypothesis of inequality convergence (Ravallion 2000). However, one should be cautious interpreting these findings, since the coefficients of the constants are incredible highly negative in the fixed effects estimations. In addition, the positive total effects of initial inequality are not directly comparable to Forbes (2001), since we do not apply a first-difference methodology (GMM) to estimate our growth equation, we use a different set of additional regressors, and our Gini coefficient is adjusted in a more accurate way.

In the system GMM approach we control for secondary education, government consumption, inflation, and, additionally, civil liberties, life expectancy, and terms-of-trade. Estimations for all countries do not indicate any significant impact of exchange rate regimes on the mean income of the first and second quintile (table 19 equations 1 to 4). Thus the positive distribution effect of managed floating in the unadjusted approach is apparently offset by the growth effect (compare table 19 equation 1 with table 17 equation 1). Results for developing countries, however, need a closer look. First, the highly significant positive distribution effect of category freely floating could only be confirmed for the mean income of the first quintile using the unadjusted approach (compare table 19 equations 5 to 8 with table 17 equations 5 to 8). These findings, however, are not amazing if we compare descriptive statistics for the mean of the adjusted first/second quintile and the mean of the mean income of the adjusted first/second quintile. While the mean of the first/second quintile for freely floating is highly positive with respect to other regimes (table 6), the mean of the mean income of the first/second quintiles is rather low (table 8). Second, freely falling is amazingly significantly positive for both quintiles using the unadjusted approach (compare table 19 equations 5 and 7 with table 17 equations 5 and 7). Thus category freely falling may be associated with a positive growth effect in developing countries. This result, however, could not be confirmed in the adjusted approach (table 19 equations 6 and 8). While managed floating is insignificant for the total effect, the coefficients remain positive at a lower level compared to the distribution effect (compare table 19 equations 5 to 8 with table 17 equations 5 to 8). Finally, limited flexibility is significantly positive for the mean income of the second quintile, a result primarily driven by the growth effect (compare table 19 equations 7 and 8 with table 17 equations 7 and 8). Interpreting the system GMM approach as a level equation, the mean income of the second quintile share in countries with limited flexibility (narrow crawling peg or band) is, on average, between 12.2 and 14.5 percents higher than in countries using pegged regimes. Findings for industrial countries do not change for the total effect with respect to significant exchange rate regimes. While only category freely floating is negative for the mean income of the second quintile using the adjusted approach, the size of the coefficient is almost doubled by the growth effect (compare table 19 equation 12 to table 17 equation 12). If we test the 4-way RR classification, results remain unchanged in regressions for all countries (compare table 19 equations 13 to 16 with equations 1 to 4). While the significant coefficient of category freely floating for the first quintile disappears in developing countries using the unadjusted approach (compare table 19 equation 17 with equation 5), findings for the second quintile in developing countries confirm the significantly positive impact of limited flexibility with almost unchanged size (compare table 19 equations 19 and 20 with equations 7 and 8).

Most additional macroeconomic variables impact on the income of the poor in the way expected. In all and developing countries higher life expectancy and terms-of-trade increase the income of the poor, while raised government consumption diminishes the income of the poor (table 19 equations 1 to 8, 13 to 20).[104] Thus a one percentage point rise in the ratio of

[104] The variable government consumption may be seen as a proxy for nonproductive public expenditures, political corruption or bad governance (Barro/Sala-i-Martin 1995).

government consumption to GDP would diminish the mean income of the first and second quintile around 2 percent in developing countries. In addition, improved secondary education fosters the income of the poor only in all and industrial countries (table 19 equations 1 to 4 and 9 to 12).[105] A one year rise of average years of secondary schooling would increase the mean income of the second quintile between 13 and 15 percent in all countries. While life expectancy is similar positive in industrial countries, terms-of-trade exhibit no significant effect in industrial countries (table 19 equations 9 to 12). Furthermore, the coefficient of inflation is negative in all estimations of the coarse RR classification, but only significant for the mean income of the first quintile in industrial countries (table 19 equations 9 and 10). Finally, the coefficient of civil liberties is negative in all estimations, indicating a positive impact of civil liberties on the income of the poor since civil liberties is measured on a scale from one to seven with one indicating the most favorable state. This result, however, is weakened by the fact that the coefficient of civil liberties is weakly significant only in few estimations (table 19 equations 4, 8, 10, 16, 19, 20). Results on the total effect, however, have the shortcoming that tests on first-order serial correlation are almost never passed.[106]

6. Conclusion

In this paper we estimated the poverty effect of different exchange rate arrangements on the poorest 20 and 20 to 40 percent. To answer this question we regressed the first and second quintile and the mean of the first and second quintile on two de facto exchange rate regime classifications, Levy-Yeyati/Sturzenegger (2002) and Reinhart/Rogoff (2003), in a growth equation and an adjusted and unadjusted system GMM approach. Empirical results, however, vary considerably due to exchange rate regime classifications and econometric specifications.

First, the classification process, i.e. the elements used to classify the de facto exchange rate regimes, affect the findings by attributing the exchange rate arrangements to different categories in the LYS and RR classification (table 4). Thus coefficients for similar categories have very different results in both the growth and system GMM equation, even if this effect may also be caused by the different number of observations and time periods covered in both classifications. While none of the exchange rate regimes in the LYS classification are significant using the system GMM approach, arrangements in both the coarse and 4-way RR classification are relevant. Thus the problem of classifying exchange rate regimes correctly is still an open question, influencing the conclusions drawn from the estimations.

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[105] One exception is the insignificant coefficient for secondary education in the unadjusted approach (table 18 equation 9). Another exception is the significantly positive coefficient for secondary education on the first quintile in developing countries in the unadjusted approach testing the 4-way RR classification (table 18 equation 17).

[106] Two exceptions are the estimations for the mean income of the second quintile in industrial countries (table 18 equations 11 and 12).

Second, coefficients of exchange rate regimes differ considerably for developing and industrial countries in the RR classification.[107] In industrial countries statistically significant exchange rate regimes affect negatively the poor (table 9, 10, 14, 17, 19). On the other hand, all statistically significant regimes in developing countries exhibit positive effects on the poor with respect to the base group pegged regimes (table 9, 10, 11, 12, 13, 16, 17, 19). Thus exchange rate arrangements impact very differently on pro-poor growth in developing and industrial countries in the RR classification.[108]

Considering the impact on the first and second quintile, only the poorest 20 percent are affected by exchange rate regimes in all and developing countries estimating the growth equation (table 9, 11, 13, 16). In addition, we find only significant effects for dirty float (LYS) and freely floating (RR) on the poorest 20 to 40 percent in industrial countries, if we omit any additional regressors in the growth equation (table 9).[109] Using the system GMM approach with the RR classification, again, only the second quintile in industrial countries is affected significantly by exchange rate regimes (table 10, 14, 17, 19). However, estimations do not confirm a different effect on the 20 and 20 to 40 percent poorest in all and developing countries, since estimations for both the first and second quintile share differ only modestly, and without discernable patterns (table 10, 12, 17, 19).

Fourth, empirical findings differ considerably for the growth equation and system GMM approach.[110] We assign these differences in estimation results mainly to the fact that we regress the level of the first and second quintile on exchange rate regimes in the system GMM approach, while we regress the growth rate of the first and second quintile on initial exchange rate regimes in the growth equation. Moreover, empirical findings differ often for the adjusted and unadjusted system GMM approach (table 10, 12, 14, 17, 19). Thus the statistical significance of exchange rate regimes depends critically on the solution of the incomparability problems of income inequality measures, i.e. whether we use unadjusted or adjusted first and second quintiles.

Finally, we compare results for the coarse and 4-way RR classification. If we support the view that soft pegs are unsustainable, incredible, and prone to currency crisis, we would replace category freely falling by the chosen exchange rate arrangement. In this case, significantly positive coefficients of freely floating would disappear in allmost all regressions (table 10, 12,

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[107] While descriptive statistics indicate remarkable differences for transitional countries, results of regression analysis would be misleading due to limited observations. In addition, effects of exchange rate regimes are strongly superimposed by other macroeconomic shock effects in the transition period.

[108] Results for the LYS classification, however, are not so clear since category dirty float is significantly positive in developing countries for the growth rate of the first quintile and in industrial countries for the growth rate of the second quintile in regressions without outliers (table 9, 11, 13).

[109] We also find a significantly positive effect of dirty float on the growth rate of the second quintile if we add currency crises (table 13).

[110] To compare the estimations of the growth equations with system GMM estimations, coefficients have to be divided by 100 due to multiplication by 100 in calculating the annual average rate of growth of the first and second quintile share ($y^{q20/40}_{it} = 100/z*[\ln(Q^{20/40}_{i,t+z}) - \ln(Q^{20/40}_{it})]$).

19).[111] In addition, statistical significance and size for coefficients of limited flexibility and managed floating change only slightly in most specifications (table 10, 11, 12, 13, 16, 17, 19).[112] Thus even if incredible soft pegs break down, this would not change the often positive effect of intermediate exchange rate regimes in developing countries. While the significantly positive effects of limited flexibility and managed floating are not robust to specifications, we do not find any significant negative poverty effects of intermediate arrangements. Thus we would cautiously conclude that the hollowing-out hypothesis could not be confirmed with respect to pro-poor growth in developing countries. If we sort out freely falling as separate arrangement, we would argue that the poverty effects of exchange rate regimes are not independently discernable in situations of severe macroeconomic instabilities. In this case we find amazingly significant positive coefficients of freely falling on the growth rate of the first quintile (table 9, 11, 13). On the other side, freely falling is significantly negative for all countries in the system GMM approach (table 10), a result not robust to other specifications. In addition, freely floating is now significantly positive in developing countries using the system GMM approach (table 10, 12, 17, 19). The positive results for freely floating, however, should be interpreted with caution since these effects are only driven by two observations.

Due to these varying and only weakly robust empirical results, it is difficult to derive a concise policy recommendation with respect to a poverty-reducing exchange rate regime choice. Notwithstanding these difficulties, the positive effects of limited flexibility and managed floating for the RR classification in developing countries should be emphasized. First, category limited flexibility is positively associated with average annual growth rate of the first quintile in developing countries (table 11, 13, 16).[113] These positive distribution effects, however, are not present for the total effect. On the other hand, limited flexibility is positively associated with the mean income of the second quintile in the system GMM estimation in both the unadjusted and adjusted approach (table 19). This total effect is only driven by the growth effect. Second, managed floating affects positively the first and second quintile share in the system GMM estimation using the unadjusted approach in developing countries (table 12, 17). These positive distribution effects, however, are almost never confirmed in the adjusted approach.[114] In addition, no significant total effect of managed floating could be estimated in the system GMM approach. In combination with the positive coefficient of dirty float on the growth rate of the first quintile in the LYS classification for developing countries (table 9, 11), these results show at least a tendency to not negative and possible positive effects of intermediate regimes on the poorest 40 percent in developing countries.

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[111] Regressions with additional macroeconomic variables on the distribution effect in table 17 are one exception. The significant coefficients for freely floating in the reduced 4-way RR classification (in comparison to the insignificant coefficients in table 12) stem mainly from the different sample size, since we have to omit several observations due to missing values and outliers for the inflation rate and government consumption.

[112] Exceptions are regressions on the second quintile in all and developing countries in the system GMM approach (table 12 equations 4, 7, 8, 12, 15, 16) and regressions on the first quintile in all and developing countries in the growth equation (table 16 equations 5, 7, 9, 11).

[113] This result can not be confirmed in regressions with additional macroeconomic variables using the 4-way classification (table 16).

[114] Two exceptions are regressions on the second quintile with regional dummy variables for the coarse and 4-way RR classification (table 12).

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Table 1: Coverage of the data set

Region	Country	Observations dates	Source	No. of spells
East Asia Pacific (EAP)	China	1982, 85, 88, 91	UNU	3
		1994, 97	GPM	1
	Hongkong	1971, 76, 81, 86, 91	UNU	4
	Indonesia	1976, 80, 84, 87, 90	UNU	4
		1993, 96, *99*	GPM, *WDI*	2
	Korea	1965, 70, 76, 80, 85, 88	UNU	5
	Malaysia	1970, 76, 79, 84	UNU	3
		1987, 92, 95	GPM	2
	Philippines	1957, 61, 65	UNU	2
		1965, 71, 85, 88, 91	UNU	4
		1994, 97	UNU	1
	Singapore	1978, 88	UNU	1
	Thailand	1962, 69, 75, 81, 86, 90	UNU	5
		1992, 98	UNU	1
Eastern Europe and Central Asia (ECA)	Bulgaria	1991, 93	UNU	1
	Belarus	1993, 95	GPM	1
	Hungary	1972, 77, 82, 87	UNU	3
		1989, 93	GPM	1
	Latvia	1995, 98	GPM	1
	Poland	1990, 93	UNU	1
	Romania	1989, 92	UNU	1
	Russia	1994, 98	GPM	1
Latin America and Caribbean (LAC)	Brazil	1960, 70, 76, 80, 86	UNU	4
		1988, 93, 96	GPM	2
	Chile	1968, 71	UNU	1
		1989, 92	UNU	1
	Colombia	1971, 78, 88	UNU	2
		1988, 91, 95	UNU	2
	Costa Rica	1961, 71, 77	UNU	2
		1981, 86, 89	UNU	2
		1993, 96	GPM	1
	Dominican Republic	1989, 96	GPM	1
	Ecuador	1988, 95	GPM	1
	El Salvador	1989, 95, *98*	GPM, *WDI*	2
	Guatemala	1987, 89	UNU	1
	Honduras	1989, 92, 96	GPM	2
	Jamaica	1988, 91	UNU	1
		1991, 96	UNU	1
	Mexico	1950, 57, 63, 68, 75	UNU	4
		1984, 89	UNU	1
		1989, 95, *98*	GPM, *WDI*	2
	Panama	1979, 89	UNU	1
		1991, 95	GPM	1

Table 1: continued

	Paraguay	95, *98*	GPM, *WDI*	1
	Peru	1986, 94	UNU	1
	Trinidad & Tobago	1976, 81 1988, 92	UNU GPM	1 1
	Venezuela	1962, 71, 81, 87 1987, 93, 96	UNU GPM	3 2
Middle East and North Africa (MNA)	Algeria	1988, 95	GPM	1
	Egypt	1991, 95	UNU	1
	Jordan	1980, 87, 91 1991, 97	UNU UNU	2 1
	Morocco	1984, 91 1991, 99	UNU UNU	1 1
	Tunisia	1985, 90, *95*	GPM, *WDI*	2
	Turkey	1968, 73, 87 1987, 94	UNU GPM	2 1
	Yemen	1992, *98*	GPM, *WDI*	1
South Asia (SA)	India	1951, 54, 57, 60, 63, 66, 69, 72, 77, 83, 86, 89, 92 1994, 97	UNU UNU	12 1
	Pakistan	1971, 79, 85, 88 1991, 96	UNU UNU	3 1
	Sri Lanka	1953, 63, 73, 79, 87 1990, 95	UNU UNU	4 1
Sub-Saharan Africa (SSA)	Côte d'Ivoire	1985, 88 1988, 95	UNU UNU	1 1
	Ethiopia	1981, 95	GPM	1
	Gabon	1975, 77	UNU	1
	Ghana	1987, 92 1992, 97	GPM UNU	1 1
	Guinea	1991, 94	UNU	1
	Kenya	1992, 94	UNU	1
	Lesotho	1986, 93	GPM	1
	Madagascar	1980, 93, *99*	GPM, *WDI*	2
	Mali	1989, 94	GPM	1
	Mauretania	1988, 95	UNU	1
	Mauritius	1986, 91	UNU	1
	Niger	1992, 95	UNU	1
	Nigeria	1985, 97	GPM	1
	Senegal	1991, 95	UNU	1
	Uganda	1989, 92, *96*	GPM, *WDI*	2
	Zambia	1993, 96	UNU	1

Table 1: continued

Industrial Countries (IND)	Australia	1969, 76, 79	UNU	2
		1981, 85, 89	UNU	2
		1995, 98	UNU	1
	Belgium	1979, 85, 88, 92	UNU	3
	Canada	*1951*, *57*, *61*, 65, 69, 73, 77, 81, 84, 87	*DS*/UNU	9
		1987, 91	UNU	1
	Denmark	1981, 87, 92	UNU	2
		1992, 95	UNU	1
	Finland	1978, 81, 84, 87, 91	UNU	4
		1991, 94, 97	UNU	2
	France	1979, 84	UNU	1
	Germany	1973, 78, 81, 84	UNU	3
	Greece	1974, 81, 88	UNU	2
	Ireland	1973, 80, 87	UNU	2
	Italia	1978, 81, 84, 87, 91	UNU	4
	Japan	1962, 65, 68, 71, 74, 77, 80	UNU	6
	Netherlands	1975, 79, 82	UNU	2
		1983, 87, 91	UNU	2
	Norway	1967, 73, 76, 79, 84, 91	UNU	5
	New Zealand	1973, 77, 80, 83, 86, 89	UNU	5
	Portugal	1980, 90	UNU	1
	Spain	1974, 81, 91	UNU	2
	Sweden	1967, 75, 81, 87, 92	UNU	4
	United Kingdom	1961, 64, 67, 71, 74, 77, 80, 84, 88, 91	UNU	9
	USA	1950, 53, 56, 59, 62, 65, 68, 71, 74, 77, 80, 83, 86, 89	UNU	13
	No. of countries	No. of observations		No. of spells
Total	76	343		234

UNU: UNU/WIDER-UNDP World Income Inequality Database
GPM: Global Poverty Monitoring
WDI: World Development Indicators
DS: Deininger and Squire

Note:

Pooled OLS estimation: As all observations within each line have the same income/reference unit, spells are formed only within each line (e.g. Panama 1979, 89, 91, 95 results in two spells: 1979 – 89, 91 - 95). Thus two observations for the same year in one country (e.g. Jordan 1991) indicate different income/reference unit definitions (e.g. Jordan 91: net expenditure, person/ expenditure, household per capita).

System GMM estimation:

If the countries are split by the same income definition (e.g. Côte d'Ivoire 1: 1985, 88; Côte d'Ivoire 2: 1988, 95; i.e the number of cross-section units increases), first-differenced equations are formed only within each line.

If the countries are not split by the same income definition, first-differenced equations are formed by all observations per country using the adjusted first/second quintile share. In this case we omit one of the two observations for the same year in one country (Canada 1987/1, Côte d'Ivoire 88/1, Colombia 88/1, Denmark 92/2, Finland 91/2, Ghana 92/1, Jordan 91/2, Jamaica 91/1, Mexico 89/1, Morocco 91/1, Philippines 65/1, Turkey 87/1, Venezuela 87/2) and if the time length between observations in one country is only one year (Netherlands 1983). The number behind the year indicates, whether we omit the first or second observation as ordered in the table.

Table 2: Adjustment regressions for first/second quintile income shares and Gini coefficients

	(1)	(2)	(3)
Dep. Var.	**First quintile share of income**	**Second quintile share of income**	**Gini coefficient**
Income (unknown tax treatment)	-0.0149***	-0.0127***	5.71***
	(0.0043)	(0.0049)	(1.90)
Income, net	0.0046	0.0046	-1.81
	(0.0036)	(0.0040)	(1.52)
Income, gross	-0.0071**	-0.0008	1.32
	(0.0046)	(0.0035)	(1.36)
Family	-0.0036	-0.0014	0.60
	(0.0023)	(0.0031)	(0.82)
Person	0.0119***	0.0185***	-6.62***
	(0.0026)	(0.0033)	(1.20)
Household per capita	0.0108***	0.0159***	-5.43***
	(0.0032)	(0.0041)	(1.51)
Equivalized	0.0265***	0.008***	-5.61***
	(0.0033)	(0.0029)	(0.96)
EAP	-0.0045**	-0.0248***	8.85***
	(0.0022)	(0.0029)	(0.97)
ECA	0.0196***	0.001	-1.00
	(0.005)	(0.0051)	(1.96)
LAC	-0.0272***	-0.0519***	18.86***
	(0.0024)	(0.0032)	(1.09)
MNA	-0.0117***	-0.0328***	12.00***
	(0.0036)	(0.0043)	(1.67)
SA	0.0081***	-0.0128***	4.65***
	(0.0027)	(0.0032)	(1.25)
SSA	-0.0199***	-0.0407***	16.00***
	(0.0042)	(0.0055)	(2.14)
Constant	0.0662***	0.123***	33.03***
	(0.0033)	(0.0036)	(1.34)
N	371	371	371
R-Squared	0.6647	0.6716	0.6997

Note: This table reports the results of pooled OLS Regression for the indicated inequality measures on the indicated variables. * denotes significance at the 90% level, ** at the 95% level, and *** at the 99% level (two-sided alternative). Heteroscedasticity adjusted standard errors in parentheses.

Table 3: Data Sources

Variable	Source	Comments
Share of Income: First/Second Quintile	UNU/WIDER-UNDP World Income Inequality Database, Version 1.0 (12 September 2000), Global Poverty Monitoring, World Bank Chen/Ravallion (2000), World Development Indicators (2002), Deininger/Squire (1996, 98a)	for selection procedure see section 3
Real GDP Per Capita	Penn World Tables, Version 6.1 (October 2002)	Constant 1996 US dollars using the Chain index
Exchange rate regimes	Levy-Yeyati/Sturzenegger (2002) (www.utdt.edu/~ely/papers.html)	5-way-classification
	Reinhart/Rogoff (March 3, 2003) www.puaf.umd.edu/faculty/papers/ reinhart/papers.htm	coarse classification
Gini coefficient	UNU/WIDER-UNDP World Income Inequality Database, Version 1.0 (12 September 2000), Global Poverty Monitoring, World Bank Chen/Ravallion (2000), World Development Indicators (2002), Deininger/Squire (1996, 98a)	for selection procedure see share of income quintile
Currency Crisis	Glick/Hutchison (1999)	dummy variable (1 = currency crisis) currency crisis, if index of currency pressure (weighted average of monthly real exchange rate changes and monthly (percent) reserve losses) exceeds the mean plus 2 times the country-specific standard deviation
Capital Control	IMF - Annual report on exchange arrangements and exchange restrictions (1968 – 2000)	dummy variable (1 = restricted, 0 = not restricted)
Government Consumption	Penn World Tables, Version 6.1 (October 2002)	Constant 1996 US dollars

Table 3: continued

ln(1+inflation/100)	World Development Indicators (2001) (NY.GDP.DEFL.KD.ZG)	Inflation, GDP deflator (annual %)
	(FP.CPI.TOTL.ZG)	for missing values: Inflation, consumer prices (Laspeyres) (annual %) (Belarus 1993, 95; Canada 65; Germany 1973, 78, 81, 84; Ethiopia 1981; Poland 1990; Turkey 1968)
Secondary Education	Barro and Lee (2000)	Average years of secondary schooling in total population aged 25 and over Due to limited data availability for secondary education values are linearily interpolated between the years prior and after the observation.
M2 to GDP	Word Development Indicators (2001) (FM.LBL.MOMY.GD.ZS)	Money and quasi money (M2) to GDP
Overall Budget Surplus (+)/ Deficit (-) to GDP	World Development Indicators (2001) (GB.BAL.OVRL.GD.ZS)	Overall Budget, including grants
	Easterly, Sewadeh (2002): Global Development Network Growth Database, World Bank	for missing values: Data on overall budget/deficit from IMF Government Financial Statistics (Germany 1973, 78, 81, 84; Tunisia 1990; Latvia 1995)
Life expectancy	World development indicators (2001) (SP.DYN.LE00.IN)	life expectancy at birth, total (years) Values calcutated by linear interpolation for Guatemala 1989, India 1994, Kenya 1994
	World Population Prospects: The 2002 Revision Population Database	for missing value: Jordan 1980
Terms of Trade	Easterly, Sedaweh (2002): Global Development Network Growth Database, World Bank	Terms of Trade (goods and services, 1995 = 100)

Table 3: continued

Civil Liberties	Freedom House	Measured on a scale of 1 to 7. (1 indicates the most liberal country)
Output volatility	Penn World Tables, Version 6.1 (October 2002)	Constant 1996 US dollars using the Chain index, three year moving standard deviation of annual real GDP per capita growth (e.g. Australia 1976: standard deviation of growth rates for Australia 1974, 75, 76)

Table 4: Two-way tables of frequency

Exchange rate regimes and currency crises

Levy-Yeyati/Sturzenegger (2002) 5-way classification			Reinhart/Rogoff (2003)	Coarse classification		4-way classification	
	Currency crisis			**Currency crisis**		**Currency crisis**	
	1	0		1	0	1	0
Fixed	5	50	**Pegged**	4	34	4	35
Crawling peg	3	33	**Limited flexibility**	9	76	11	76
Dirty float	7	12	**Managed floating**	4	41	8	50
Flexible	7	43	**Freely floating**	0	4	3	7
			Freely falling	9	16		
Inconclusives	0	4	**Category 6**	1	1	1	4

Exchange rate regimes Levy-Yeyati/Sturzenegger and Reinhart/Rogoff

Levy-Yeyati/ Sturzenegger (2002):	**Fixed**	**Crawling peg**	**Dirty float**	**Flexible**	**Incon-clusives**
Reinhart/Rogoff (2003) coarse classification					
Pegged	32	4	2	3	5
Limited flexibility	17	26	10	25	0
Managed floating	10	6	2	16	0
Freely floating	0	1	0	13	0
Freely falling	5	4	5	7	0
Category 6	0	0	1	1	0
Reinhart/Rogoff (2003) 4-way classification					
Pegged	33	4	2	3	5
Limited flexibility	17	27	10	26	0
Managed floating	12	7	5	21	0
Freely floating	1	3	2	14	0
Category 6	1	0	1	1	0

Note: For description of exchange rate classifications, see section 3.2.

Table 5: Exchange rate regimes and mean of average annual growth of first and second quintile share of income

Levy-Yeyati/Sturzenegger (2002), 5 – way classification				Reinhart/Rogoff 2003, coarse classification				Reinhart/Rogoff 2003, 4-way classification		
	y^{q20}	y^{q40}	N		y^{q20}	y^{q40}	N	y^{q20}	y^{q40}	N
All countries[115]				**All countries**						
Fixed	0.11	-0.14	41	Pegged	-0.34	-0.20	75	-0.34	-0.20	75
Crawling peg	0.34	-0.34	24	Lim. flexibility	0.33	-0.08	74	0.38	-0.04	75
Dirty Float	1.50	0.45	11	Man. floating	-0.45	-0.15	50	0.08	0.30	61
Flexible	0.12	0.003	43	Freely floating	-0.58	-0.85	8	-2.16	-1.37	15
				Freely falling	0.23	0.60	21			
Inconclusives	-3.52	-3.20	3	Category 6	-1.50	-0.83	2	-0.37	-0.94	4
Developing countries				**Developing countries**						
Fixed	-0.12	-0.04	31	Pegged	-0.52	-0.23	47	-0.52	-0.23	47
Crawling peg	0.42	-0.06	17	Lim. flexibility	0.96	0.29	35	1.04	0.35	36
Dirty float	1.67	0.36	9	Man. floating	-0.63	-0.17	32	0.16	0.48	43
Flexible	0.31	0.27	22	Freely floating	.	.	0	0.62	0.35	5
				Freely falling	2.04	1.72	18			
Inconclusives	-3.52	-3.20	3	Category 6	-0.51	-0.23	1	0.98	0.30	1
Transitional countries[116]				**Transitional countries**						
				Pegged	-8.53	-2.44	2	-8.53	-2.44	2
				Lim. flexibility	.	.	0			
Dirty float	-13.87	-2.78	1	Man. floating	-0.40	-0.53	4	-0.40	-0.53	4
				Freely floating	.	.	0	-15.41	-7.73	2
				Freely falling	-10.59	-6.13	3			
				Category 6	-2.50	-1.44	1	-1.72	-2.18	2
Industrial countries				**Industrial countries**						
Fixed	0.8	-0.46	10	Pegged	0.61	0.03	26			
Crawling peg	0.14	-1.01	7	Lim. flexibility	-0.23	-0.41	39			
Dirty float	0.74	0.86	2	Man. floating	-0.03	-0.01	14			
Flexible	-0.09	-0.27	21	Freely floating	-0.58	-0.85	8			
				Freely falling	.	.	0			
Inconclusives		.	0	Category 6	.	.	0			

[115] In the dirty float category we omit Poland 1990 because of its biasing effect (see transitional countries).
[116] As there is only one initial exchange rate regime for transitional countries, the values are given by the spell Poland 1990 – 93.

Table 6: Exchange rate regimes and mean of adjusted first and second quintile share of income

Levy-Yeyati/Sturzenegger 2002 5 – way classification				Reinhart/Rogoff 2003, coarse classification				Reinhart/Rogoff 2003, 4-way classification		
	Q^{20ad}	Q^{40ad}	N		Q^{20ad}	Q^{40ad}	N	Q^{20ad}	Q^{40ad}	N
All countries										
Fixed	0.053	0.094	68	Pegged	0.057	0.098	97	0.057	0.098	98
Crawling peg	0.056	0.097	41	Lim. flexibility	0.063	0.108	108	0.062	0.108	110
Dirty Float	0.054	0.093	20	Man. floating	0.056	0.096	67	0.054	0.092	81
Flexible	0.057	0.100	69	Freely floating	0.063	0.117	15	0.064	0.110	25
				Freely falling	0.048	0.082	30			
Inconclusives	0.073	0.106	5	Category 6	0.069	0.113	4	0.053	0.095	7
Developing countries										
Fixed	0.048	0.083	49	Pegged	0.052	0.085	65	0.052	0.084	66
Crawling peg	0.050	0.084	29	Lim. flexibility	0.059	0.094	57	0.058	0.093	59
Dirty float	0.052	0.090	16	Man. floating	0.049	0.084	45	0.047	0.082	59
Flexible	0.051	0.085	40	Freely floating	0.066	0.10	2	0.048	0.078	7
				Freely falling	0.039	0.072	24			
Inconclusives	0.073	0.106	5	Category 6	0.089	0.127	1	0.050	0.086	3
Transitional countries										
Fixed	0.080	0.126	1	Pegged	0.086	0.128	3	0.086	0.128	3
Crawling peg	.	.	0	Lim. flexibility	.	.	0	.	.	0
Dirty float	0.062	0.096	2	Man. floating	0.096	0.132	6	0.096	0.132	6
Flexible	0.074	0.121	2	Freely floating	.	.	0	0.091	0.130	5
				Freely falling	0.082	0.122	6			
Inconclusive	.	.	0	Category 6	0.062	0.109	3	0.055	0.102	4
Industrial countries										
Fixed	0.066	0.122	18	Pegged	0.067	0.126	29			
Crawling peg	0.073	0.130	12	Lim. flexibility	0.068	0.124	51			
Dirty float	0.058	0.112	2	Man. floating	0.061	0.115	16			
Flexible	0.064	0.121	27	Freely floating	0.063	0.119	13			
				Freely falling	.	.	0			
Inconclusives		.	0	Category 6	.	.	0			

Table 7: Exchange rate regimes and mean of average annual growth of mean income of first and second quintile share

Levy-Yeyati/Sturzenegger 2002, 5 – way classification				Reinhart/Rogoff 2003, coarse classification				Reinhart/Rogoff 2003, 4-way classification		
	y^{p20}	y^{p40}	N		y^{p20}	y^{p40}	N	y^{p20}	y^{p40}	N
All countries[117]										
Fixed	1.67	1.43	41	Pegged	1.81	1.96	75	1.81	1.96	75
Crawling peg	1.92	1.25	24	Lim. flexibility	2.96	2.55	74	2.96	2.54	75
Dirty Float	4.17	3.12	11	Man. floating	2.06	2.36	50	2.24	2.46	61
Flexible	2.31	2.19	43	Freely floating	1.71	1.45	8	-1.64	-0.85	15
				Freely falling	-0.29	0.08	21			
Inconclusives	-0.15	-0.16	3	Category 6	-5.29	-4.62	2	-3.67	-4.24	4
Developing countries										
Fixed	1.24	1.32	31	Pegged	1.49	1.78	47	1.49	1.78	47
Crawling peg	2.27	4.66	17	Lim. flexibility	4.01	3.33	35	3.98	3.29	36
Dirty float	4.28	2.96	9	Man. floating	2.25	2.72	32	2.45	2.77	43
Flexible	2.60	2.55	22	Freely floating	.	.	0	1.64	1.38	5
				Freely falling	2.45	2.13	18			
Inconclusives	-0.15	0.16	3	Category 6	1.26	1.55	1	0.34	-0.34	2
Transitional countries[118]										
				Pegged	-6.45	-0.36	2	-6.45	-.36	2
				Lim. flexibility	.	.	0	.	.	0
Dirty float	-14.28	-3.19	1	Man. floating	0.91	0.79	4	0.91	0.79	4
				Freely floating	.	.	0	-23.30	-15.61	2
				Freely falling	-16.70	-12.24	3			
				Category 6	-11.84	-10.79	1	-7.67	-8.13	2
Industrial countries										
Fixed	3.00	1.75	10	Pegged	3.05	2.47	26			
Crawling peg	1.08	-0.07	7	Lim. flexibility	2.02	1.85	39			
Dirty float	3.69	3.81	2	Man. floating	1.96	1.97	14			
Flexible	2.01	1.82	21	Freely floating	1.71	1.45	8			
				Freely falling	.	.	0			
Inconclusives	.	.	0	Category 6	.	.	0			

[117] In the dirty float category we omit Poland 1990 because of its biasing effect (see transitional countries).
[118] As there is only one initial exchange rate regime for transitional countries, the values are given by the spell Poland 1990 – 93.

Table 8: Exchange rate regimes and mean of mean income of adjusted first and second quintile share

Levy-Yeyati/Sturzenegger 2002, 5 – way classification				Reinhart/Rogoff 2003, coarse classification				Reinhart/Rogoff 2003, 4-way classification		
	P^{20ad}	P^{40ad}	N		P^{20ad}	P^{40ad}	N	P^{20ad}	P^{40ad}	N

All countries

	P^{20ad}	P^{40ad}	N		P^{20ad}	P^{40ad}	N	P^{20ad}	P^{40ad}	N
Fixed	2277	4078	68	Pegged	2093	3756	97	2084	3738	98
Crawling peg	2388	4238	41	Lim. flexibility	3204	5743	108	3157	5661	110
Dirty Float	1936	3340	20	Man. floating	1989	3480	67	1830	3211	81
Flexible	2844	5295	69	Freely floating	5317	10116	15	3924	7172	25
				Freely falling	1244	2087	30			
Inconclusives	966	1430	5	Category 6	1499	2628	4	1085	2028	7

Developing countries

	P^{20ad}	P^{40ad}	N		P^{20ad}	P^{40ad}	N	P^{20ad}	P^{40ad}	N
Fixed	964	1670	49	Pegged	894	1489	65	899	1497	66
Crawling peg	952	1653	29	Lim. flexibility	1210	1991	57	1190	1964	59
Dirty float	1567	2640	16	Man. floating	786	1369	45	853	1501	59
Flexible	926	1608	40	Freely floating	810	1153	2	889	1486	7
				Freely falling	928	1668	24			
Inconclusives	966	1430	5	Category 6	416	593	1	225	388	3

Transitional countries

	P^{20ad}	P^{40ad}	N		P^{20ad}	P^{40ad}	N	P^{20ad}	P^{40ad}	N
Fixed	2736	4319	1	Pegged	2778	4126	3	2778	4126	3
Crawling peg	.	.	0	Lim. flexibility	.	.	0	.	.	0
Dirty float	2066	3240	2	Man. floating	4071	5564	6	4071	5564	6
Flexible	2178	3628	2	Freely floating	.	.	0	2746	3892	5
				Freely falling	2511	3762	6			
Inconclusive	.	.	0	Category 6	1860	3306	3	1729	3892	4

Industrial countries

	P^{20ad}	P^{40ad}	N		P^{20ad}	P^{40ad}	N
Fixed	5826	10621	18	Pegged	4709	8798	29
Crawling peg	5859	10483	12	Lim. flexibility	5433	9937	51
Dirty float	4756	9045	2	Man. floating	4592	8635	16
Flexible	5736	10881	27	Freely floating	6011	11495	13
				Freely falling	.	.	0
Inconclusives		.	0	Category 6	.	.	0

Table 9: Exchange rate regimes and pro-poor growth distribution effect (Growth equation)

Levy-Yeyati/Sturzenegger 2002

All countries

	(1)	(2)	(3)	(4)
Dep. Var.	y^{q20}	y^{q20o}	y^{q40}	y^{q40o}
Crawling peg	0.23	0.69	-0.19	-0.61
	(1.04)	(0.95)	(0.73)	(0.68)
Dirty Float	0.12	**1.85***	0.33	-0.09
	(1.62)	(0.98)	(0.75)	(0.70)
Flexible	0.01	0.80	0.15	-0.27
	(0.99)	(0.84)	(0.58)	(0.52)
Constant	0.11	-0.34	-0.14	0.27
	(0.86)	(0.74)	(0.48)	(0.40)
F-test	0.04	1.29	0.16	0.29
R^2	0.00	0.02	0.00	0.01
N	120	117	120	118

Reinhart/Rogoff 2003, coarse classification

All countries

	(5)	(6)	(7)	(8)
	y^{q20}	y^{q20o}	y^{q40}	y^{q40o}
Limited flexibility	0.67	0.58	0.12	0.12
	(0.69)	(0.55)	(0.40)	(0.36)
Managed floating	-0.10	0.15	0.04	-0.12
	(0.82)	(0.79)	(0.43)	(0.37)
Freely floating	-0.24	0.01	**-0.66****	**-0.66****
	(0.73)	(0.69)	(0.32)	(0.29)
Freely falling	0.57	**2.37****	0.80	0.36
	(1.80)	(0.93)	(1.20)	(0.74)
Constant	-0.34	-0.59	-0.20	-0.19
	(0.49)	(0.43)	(0.28)	(0.23)
F-test	0.51	1.91	2.40*	2.36*
R^2	0.01	0.03	0.01	0.01
N	228	222	228	223

Developing countries

	(9)	(10)	(11)	(12)
Dep. Var.	y^{q20}	y^{q20o}	y^{q40}	y^{q40o}
Crawling peg	0.54	1.15	-0.02	-0.58
	(1.35)	(1.23)	(0.91)	(0.84)
Dirty float	1.79	**2.40****	0.40	-0.16
	(1.33)	(1.20)	(0.93)	(0.86)
Flexible	0.43	1.71	0.31	-0.25
	(1.43)	(1.15)	(0.88)	(0.80)
Constant	-0.12	-0.73	-0.04	0.52
	(1.09)	(0.93)	(0.62)	(0.51)
F-test	0.83	1.43	0.11	0.16
R^2	0.01	0.05	0.00	0.01
N	79	77	79	77

Developing countries

	(13)	(14)	(15)	(16)
	y^{q20}	y^{q20o}	y^{q40}	y^{q40o}
Limited flexibility	1.48	1.17	0.52	0.51
	(1.12)	(0.78)	(0.62)	(0.57)
Managed floating	-0.11	0.29	0.06	-0.20
	(1.14)	(1.07)	(0.64)	(0.54)
Freely floating	.	.	.	.
Freely falling	2.55	**2.88*****	1.95	0.96
	(1.67)	(1.03)	(1.22)	(0.72)
Constant	-0.52	-0.92	-0.23	-0.22
	(0.69)	(0.57)	(0.41)	(0.33)
F-test	1.33	2.84*	1.02	1.03
R^2	0.04	0.05	0.04	0.03
N	132	128	132	128

* denotes significance at the 90% level, ** at the 95% level, and *** at the 99% level (two-sided alternative). Pooled – OLS estimation for all equations. Heteroscedasticity adjusted standard errors in parentheses. F-test indicates the F-statistic for the test on the overall significance of the regression. y^{q20}: average annual growth rate of the first quintile share. y^{q40}: average annual growth rate of the second quintile share. y^{q20o}: average annual growth rate of the first quintile share (regressions without outliers). y^{q40o}: average annual growth rate of the second quintile share (regressions without outliers).

Table 9: continued

Levy-Yeyati/Sturzenegger 2002					Reinhart/Rogoff 2003, coarse classification				
Industrial countries					**Industrial countries**				
	(17)	(18)	(19)	(20)		(21)	(22)	(23)	(24)
Dep. Var.	y^{q20}	y^{q20o}	y^{q40}	y^{q40o}		y^{q20}	y^{q20o}	y^{q40}	y^{q40o}
Crawling peg	-0.66	0.21	-0.55	0.46	Limited flexibility	-0.84	**-1.07***	-0.44	-0.07
	(1.20)	(0.88)	(1.09)	(0.50)		(0.59)	(0.54)	(0.43)	(0.36)
Dirty float	-0.06	0.81	**1.32****	**1.32****	Managed floating	-0.64	**-1.55****	-0.05	-0.05
	(1.26)	(0.97)	(0.55)	(0.55)		(1.16)	(0.77)	(0.45)	(0.45)
Flexible	-0.89	-0.02	0.19	0.19	Freely floating	**-1.19***	**-1.19***	**-0.88*****	**-0.88*****
	(1.08)	(0.79)	(0.43)	(0.43)		(0.67)	(0.67)	(0.32)	(0.32)
					Freely falling	.	.	.	.
Constant	0.80	-0.07	-0.46	-0.46	Constant	0.61	0.61	0.03	0.03
	(1.08)	(0.71)	(0.38)	(0.38)		(0.39)	(0.39)	(0.26)	(0.26)
F-test	0.54	0.43	2.78*	2.55*	F-test	1.29	2.18*	3.35**	4.29**
R^2	0.03	0.01	0.07	0.09	R^2	0.02	0.07	0.03	0.03
N	40	39	40	39	N	87	85	87	85

* denotes significance at the 90% level, ** at the 95% level, and *** at the 99% level (two-sided alternative). Pooled – OLS estimation for all equations. Heteroscedasticity adjusted standard errors in parentheses. F-test indicates the F-statistic for the test on the overall significance of the regression. y^{q20}: average annual growth rate of the first quintile share. y^{q40}: average annual growth rate of the second quintile share. y^{q20o}: average annual growth rate of the first quintile share (regressions without outliers). y^{q40o}: average annual growth rate of the second quintile share (regressions without outliers).

Table 9: continued

Reinhart/Rogoff 2003, 4-way classification

All countries

	(25)	(26)	(27)	(28)
Dep. Var.	y^{q20}	y^{q20o}	y^{q40}	y^{q40o}
Limited flexibility	0.72	0.63	0.15	0.05
	(0.68)	(0.55)	(0.39)	(0.35)
Managed floating	0.43	0.35	0.50	0.09
	(0.86)	(0.77)	(0.52)	(0.39)
Freely floating	-1.82	0.47	-1.17	-0.30
	(1.54)	(0.71)	(0.75)	(0.31)
Constant	-0.34	-0.59	-0.20	-0.09
	(0.49)	(0.43)	(0.27)	(0.21)
F-test	1.10	0.45	1.43	0.49
R^2	0.02	0.005	0.02	0.002
N	226	221	226	220

Developing countries

	(29)	(30)	(31)	(32)
	y^{q20}	y^{q20o}	y^{q40}	y^{q40o}
Limited flexibility	1.56	1.27	0.58	0.41
	(1.10)	(0.78)	(0.61)	(0.54)
Managed floating	0.68	0.63	0.71	0.11
	(1.17)	(1.02)	(0.74)	(0.54)
Freely floating	1.13	1.54	0.58	0.41
	(1.34)	(1.28)	(0.54)	(0.45)
Constant	-0.52	-0.92	-0.23	-0.06
	(0.69)	(0.57)	(0.41)	(0.29)
F-test	0.72	1.07	0.53	0.36
R^2	0.01	0.02	0.01	0.005
N	131	128	131	127

* denotes significance at the 90% level, ** at the 95% level, and *** at the 99% level (two-sided alternative). Pooled – OLS estimation for all equations. Heteroscedasticity adjusted standard errors in parentheses. F-test indicates the F-statistic for the test on the overall significance of the regression. y^{q20}: average annual growth rate of the first quintile share. y^{q40}: average annual growth rate of the second quintile share. y^{q20o}: average annual growth rate of the first quintile share (regressions without outliers). y^{q40o}: average annual growth rate of the second quintile share (regressions without outliers).

Table 10: Exchange rate regimes and pro-poor growth distribution effect (System GMM estimation)

Reinhart/Rogoff 2003, coarse classification

	All Countries				**Developing Countries**			
	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)
Dep. Var.	Y^{q20s}	Y^{q20c}	Y^{q40s}	Y^{q40c}	Y^{q20s}	Y^{q20c}	Y^{q40s}	Y^{q40c}
Limited flexibility	0.072	**0.101***	**0.061***	**0.083***	0.083	0.103	0.058	**0.075***
	(0.054)	(0.050)	(0.036)	(0.038)	(0.068)	(0.064)	(0.041)	(0.040)
Managed floating	0.020	-0.004	0.002	-0.012	-0.003	-0.010	0.015	0.001
	(0.061)	(0.061)	(0.041)	(0.046)	(0.075)	(0.069)	(0.048)	(0.047)
Freely floating	0.048	**0.148***	**0.128****	**0.182*****	**0.281*****	**0.238*****	**0.185*****	**0.173*****
	(0.090)	(0.080)	(0.058)	(0.061)	(0.102)	(0.114)	(0.056)	(0.064)
Freely falling	**-0.152***	**-0.161***	**-0.120****	**-0.136***	-0.131	-0.142	-0.073	-0.086
	(0.088)	(0.090)	(0.060)	(0.070)	(0.091)	(0.090)	(0.060)	(0.066)
Constant	-1.28***	-1.32***	-0.67***	-0.75***	-1.38***	-1.43***	-0.79***	-0.89***
	(0.06)	(0.06)	(0.04)	(0.05)	(0.07)	(0.07)	(0.05)	(0.05)
m1	-1.60	-2.65***	-1.78*	-2.81***	-1.60	-2.56**	-1.68*	-2.59***
m2	-1.75*	-1.15	-1.95*	0.88	-1.23	-0.87	-1.91*	0.84
N	321	307	321	307	201	191	201	191
1 – RSS/TSS	0.05	0.09	0.07	0.13	0.07	0.10	0.07	0.10

Industrial Countries

	(9)	(10)	(11)	(12)
	Y^{q20s}	Y^{q20c}	Y^{q40s}	Y^{q40c}
Limited flexibility	-0.004	0.032	-0.022	-0.009
	(0.075)	(0.049)	(0.020)	(0.021)
Managed floating	0.036	-0.042	-0.039	**-0.054***
	(0.086)	(0.072)	(0.033)	(0.032)
Freely floating	-0.157	-0.033	-0.069	-0.041
	(0.102)	(0.082)	(0.049)	(0.048)
Constant	-1.11***	-1.13***	-0.45***	-0.47***
	(0.09)	(0.05)	(0.02)	(0.02)
m1	-0.77	-0.72	-1.30	-1.75*
m2	-1.19	-1.81*	-0.99	-1.35
N	111	107	111	107
1 – RSS/TSS	0.07	0.05	0.07	0.09

* denotes significance at the 90% level, ** at the 95% level, and *** at the 99% level (two-tailed test). Results for one-step estimation are obtained using DPD98 for GAUSS. Heteroscedasticity adjusted asymptotic standard errors in parentheses. M1 and m2 are tests for first-order and second-order serial correlation in the first-differenced residuals, asymptotically distributed as N(0,1) under the null of no serial correlation. 1 – RSS/TSS: 1 – residual sum of squares/total sum of squares. Y^{q20s}/Y^{q40s}: $\ln(Q^{20/40}/0.2)$ unadjusted approach. Y^{q20c}/Y^{q40c}: $\ln(Q^{20/40}/0.2)$ adjusted approach.

Table 10: continued

Reinhart/Rogoff 2003, 4-way classification

All Countries					**Developing Countries**			
	(13)	(14)	(15)	(16)	(17)	(18)	(19)	(20)
Dep. Var.	Y^{q20s}	Y^{q20c}	Y^{q40s}	Y^{q40c}	Y^{q20s}	Y^{q20c}	Y^{q40s}	Y^{q40c}
Limited flexibility	0.072	**0.092***	**0.063***	**0.078****	0.080	0.087	0.059	**0.066***
	(0.053)	(0.050)	(0.036)	(0.037)	(0.067)	(0.063)	(0.041)	(0.040)
Managed floating	-0.005	-0.029	-0.013	-0.029	-0.021	-0.033	0.003	-0.012
	(0.058)	(0.057)	(0.040)	(0.042)	(0.070)	(0.064)	(0.045)	(0.042)
Freely floating	0.017	0.074	0.063	0.081	-0.002	-0.021	0.0002	-0.024
	(0.101)	(0.096)	(0.071)	(0.075)	(0.160)	(0.139)	(0.100)	(0.098)
Constant	-1.30***	-1.32***	-0.68***	-0.75***	-1.39***	-1.43***	-0.79***	-0.89***
	(0.06)	(0.05)	(0.04)	(0.05)	(0.07)	(0.07)	(0.05)	(0.05)
m1	-1.64	-2.18**	-1.81*	-2.77***	-1.56	-2.02**	-1.76*	-2.53**
m2	-1.61*	-1.76*	-1.94*	0.97	-1.08	-1.17	-1.75*	0.15
N	319	305	319	305	199	189	199	189
1 – RSS/TSS	0.02	0.04	0.04	0.06	0.03	0.04	0.03	0.05

* denotes significance at the 90% level, ** at the 95% level, and *** at the 99% level (two-tailed test). Results for one-step estimation are obtained using DPD98 for GAUSS. Heteroscedasticity adjusted asymptotic standard errors in parentheses. M1 and m2 are tests for first-order and second-order serial correlation in the first-differenced residuals, asymptotically distributed as N(0,1) under the null of no serial correlation. 1 – RSS/TSS: 1 – residual sum of squares/total sum of squares. Y^{q20s}/Y^{q40s}: $\ln(Q^{20/40}/0.2)$ unadjusted approach. Y^{q20c}/Y^{q40c}: $\ln(Q^{20/40}/0.2)$ adjusted approach.

Table 11: Exchange rate regimes and regional dummies distribution effect (Growth equation)

Levy-Yeyati/Sturzenegger 2002					Reinhart/Rogoff 2003, coarse classification				
	(1)	(2)	(3)	(4)		(5)	(6)	(7)	(8)
Dep. Var.	**y^{q20o} all ols**	**y^{q40o} all re**	**y^{q20o} dev ols**	**y^{q40o} dev re**		**y^{q20o} all ols**	**y^{q40o} all re**	**y^{q20o} dev ols**	**y^{q40o} dev re**
Crawling peg	0.37	-0.48	0.79	-0.43	Limited flexibility	0.44	0.08	**1.29***	0.52
	(0.95)	(0.63)	(1.26)	(0.88)		(0.49)	(0.37)	(0.73)	(0.57)
Dirty float	1.62	0.16	**2.13***	-0.12	Managed floating	0.46	-0.09	0.47	-0.32
	(0.99)	(0.82)	(1.21)	(1.07)		(0.83)	(0.42)	(1.10)	(0.61)
Flexible	0.60	-0.08	1.46	-0.22	Freely floating	-0.36	-0.64		
	(0.85)	(0.55)	(1.18)	(0.82)		(0.69)	(0.85)		
					Freely falling	**3.13*****	0.53	**3.31*****	1.01
						(1.11)	(0.63)	(1.20)	(0.77)
EAP	-0.26	0.12	1.02	-0.97		-0.82	0.05	-1.37	-0.83
	(0.86)	(0.66)	(1.72)	(1.10)		(0.73)	(0.44)	(1.60)	(0.77)
ECA		-2.66				-3.29*	-1.92**		
		(2.51)				(1.93)	(0.85)		
LAC	0.65	0.93	1.87	-0.13		-1.44*	-0.18	-1.76	-1.05
	(0.92)	(0.58)	(1.84)	(1.04)		(0.84)	(0.48)	(1.47)	(0.73)
MNA	1.01	1.05	2.27	-0.03		0.82	1.00	0.36	0.18
	(0.95)	(0.93)	(1.82)	(1.34)		(0.79)	(0.69)	(1.57)	(0.96)
SA	0.03	0.30	1.06	-0.77		0.12	-0.03	-0.37	-0.93
	(0.63)	0.98)	(1.67)	(1.43)		(0.60)	(0.55)	(1.66)	(0.86)
SSA	-1.43	1.08				0.20	0.78		
	(1.61)	(0.87)				(1.50)	(0.63)		
Constant	-0.25	-0.28	-1.88	0.86		-0.22	-0.22	-0.06	0.52
	(0.78)	(0.53)	(1.68)	(0.90)		(0.42)	(0.34)	(1.62)	(0.68)
Breusch-Pagan		6.49**		6.65***			5.51**		5.68**
F- test	0.87		1.05			1.84*		2.91***	
Wald – test		6.94		2.10			12.24		7.14
R^2	0.06	0.06	0.08	0.03		0.08	0.05	0.09	0.06
N	117	118	77	77		222	223	128	128

* denotes significance at the 90% level, ** at the 95% level, and *** at the 99% level (two-sided alternative). Heteroscedasticity adjusted standard errors in parentheses. F-test/Wald-test indicate the F-statistic/Wald-statistic for the test on the overall significance of the regression. Ramsey Reset test for omitted variables is passed in all OLS estimations (equations 1, 3, 5, 7). Breusch-Pagan is a Lagrange-multiplier test for the random effects model, distributed as chi-squared under the null of no random effects. y^{q20o}: average annual growth rate of the first quintile share (regressions without outliers). y^{q40o}: average annual growth rate of the second quintile share (regressions without outliers). ols: results for pooled OLS estimation, re: results for random effects estimation. all: all countries. dev: developing countries.

Table 11: continued

Reinhart/Rogoff 2003, 4-way classification

	(9)	(10)	(11)	(12)
Dep. Var.	**y^{q20o} all ols**	**y^{q40o} all re**	**y^{q20o} dev ols**	**y^{q40o} dev re**
Limited flexibility	0.60	0.12	**1.49****	0.53
	(0.49)	(0.37)	(0.73)	(0.58)
Managed floating	0.62	-0.23	0.83	-0.08
	(0.80)	(0.41)	(1.04)	(0.58)
Freely floating	0.50	-0.31	1.93	0.19
	(0.73)	(0.67)	(1.36)	(1.22)
EAP	-0.76	0.07	-1.73	-1.56*
	(0.72)	(0.43)	(1.64)	(0.81)
ECA	-3.13	-0.88		
	(2.17)	(0.95)		
LAC	-0.91	0.25	-1.80	-1.29*
	(0.81)	(0.43)	(1.57)	(0.77)
MNA	1.09	1.06	0.16	-0.50
	(0.73)	(0.68)	(1.57)	(1.00)
SA	0.24	0.01	-0.63	-1.61*
	(0.60)	(0.54)	(1.71)	(0.90)
SSA	0.71	1.50**		
	(1.51)	(0.64)		
Constant	-0.40	-0.27	0.13	1.19
	(0.42)	(0.33)	(1.68)	(0.73)
Breusch-Pagan		6.13**		5.62**
F-test	1.45		2.40**	
Wald-test		9.45		0.56
R^2	0.04	0.04	0.05	0.05
N	221	220	128	127

* denotes significance at the 90% level, ** at the 95% level, and *** at the 99% level (two-sided alternative). Heteroscedasticity adjusted standard errors in parentheses. F-test/Wald-test indicate the F-statistic/Wald-statistic for the test on the overall significance of the regression. Ramsey Reset test for omitted variables is passed in equation 11, but not passed in equation 9. Breusch-Pagan is a Lagrange-multiplier test for the random effects model, distributed as chi-squared under the null of no random effects. y^{q20o}: average annual growth rate of the first quintile share (regressions without outliers). y^{q40o}: average annual growth rate of the second quintile share (regressions without outliers). ols: results for pooled OLS estimation, re: results for random effects estimation. all: all countries. dev: developing countries.

Table 12: Exchange rate regimes and regional dummies distribution effect (System GMM estimation)

Reinhart/Rogoff (2003), coarse classification

	All Countries				Developing Countries			
Dep. Var.	Y^{q20s}	Y^{q20c}	Y^{q40s}	Y^{q40c}	Y^{q20s}	Y^{q20c}	Y^{q40s}	Y^{q40c}
	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)
Limited flexibility	0.044	0.052	0.026	**0.030***	0.063	0.052	0.045	**0.046***
	(0.043)	(0.036)	(0.019)	(0.017)	(0.051)	(0.049)	(0.028)	(0.025)
Managed floating	**0.083***	0.041	**0.045***	0.026	**0.099***	0.069	**0.076****	**0.056***
	(0.043)	(0.039)	(0.025)	(0.023)	(0.053)	(0.048)	(0.032)	(0.029)
Free floating	-0.037	0.044	0.014	0.029	**0.280*****	**0.247*****	**0.186*****	**0.172*****
	(0.090)	(0.073)	(0.051)	(0.048)	(0.061)	(0.044)	(0.032)	(0.029)
Freely falling	0.030	-0.013	0.011	-0.005	0.043	-0.004	0.031	0.010
	(0.056)	(0.064)	(0.039)	(0.046)	(0.062)	(0.069)	(0.043)	(0.049)
Eap	-0.13	-0.07	-0.22***	-0.25***	0.08	0.38***	0.06	0.20**
	(0.08)	(0.06)	(0.05)	(0.05)	(0.09)	(0.10)	(0.07)	(0.08)
Eca	0.39***	0.40***	0.14***	0.10***				
	(0.08)	(0.05)	(0.03)	(0.03)				
Lac	-0.61***	-0.55***	-0.51***	-0.58***	-0.40***	-0.10	-0.23***	-0.13*
	(0.08)	(0.06)	(0.04)	(0.05)	(0.08)	(0.10)	(0.06)	(0.08)
Mna	-0.08	-0.20**	-0.20***	-0.32***	0.13	0.26**	0.08	0.13*
	(0.10)	(0.08)	(0.05)	(0.04)	(0.11)	(0.12)	(0.07)	(0.07)
Sa	0.19**	0.11**	-0.03	-0.12***	0.41***	0.58***	0.25***	0.33***
	(0.10)	(0.05)	(0.05)	(0.03)	(0.11)	(0.10)	(0.07)	(0.07)
Ssa	-0.21**	-0.45***	-0.28***	-0.44***				
	(0.09)	(0.10)	(0.06)	(0.06)				
Constant	-1.16***	-1.16***	-0.40***	-0.51***	-1.38***	-1.63***	-0.79***	-0.98***
	(0.07)	(0.04)	(0.02)	(0.02)	(0.07)	(0.10)	(0.06)	(0.07)
m1	-1.61	-2.20**	-1.75*	-2.68***	-1.49	-2.09**	-1.63	-2.47**
m2	-1.47	-1.05	-2.14**	-0.39	-1.01	-0.39	-2.05**	-0.26
N	321	307	321	307	201	191	201	191
1 – RSS/TSS	0.50	0.55	0.60	0.68	0.49	0.52	0.44	0.47

* denotes significance at the 90% level, ** at the 95% level, and *** at the 99% level (two-tailed test). Results for one-step estimation are obtained using DPD98 for GAUSS. Heteroscedasticity adjusted asymptotic standard errors in parentheses. M1 and m2 are tests for first-order and second-order serial correlation in the first-differenced residuals, asymptotically distributed as N(0,1) under the null of no serial correlation. 1 – RSS/TSS: 1 – residual sum of squares/total sum of squares. Y^{q20s}/Y^{q40s}: $\ln(Q^{20/40}/0.2)$ unadjusted approach. Y^{q20c}/Y^{q40c}: $\ln(Q^{20/40}/0.2)$ adjusted approach.

Table 12: continued

Reinhart/Rogoff (2003), 4-way classification

All Countries					**Developing Countries**			
Dep. Var.	Y^{q20s}	Y^{q20c}	Y^{q40s}	Y^{q40c}	Y^{q20s}	Y^{q20c}	Y^{q40s}	Y^{q40c}
	(9)	(10)	(11)	(12)	(13)	(14)	(15)	(16)
Limited flexibility	0.047 (0.043)	0.042 (0.036)	0.029 (0.020)	0.026 (0.018)	0.067 (0.052)	0.037 (0.050)	**0.050*** (0.029)	0.038 (0.026)
Managed floating	**0.075*** (0.040)	0.034 (0.038)	**0.042*** (0.024)	0.023 (0.021)	**0.090*** (0.049)	0.054 (0.046)	**0.070**** (0.031)	**0.048*** (0.026)
Freely floating	-0.006 (0.075)	0.030 (0.069)	0.014 (0.044)	0.012 (0.046)	0.122 (0.116)	0.073 (0.117)	0.074 (0.072)	0.040 (0.079)
Eap	-0.13 (0.07)	-0.08 (0.06)	-0.22*** (0.05)	-0.25*** (0.05)	0.06 (0.09)	0.37*** (0.11)	0.05 (0.07)	0.19** (0.08)
Eca	0.40*** (0.08)	0.38*** (0.05)	0.14*** (0.03)	0.09*** (0.02)				
Lac	-0.61*** (0.08)	-0.57*** (0.06)	-0.51*** (0.05)	-0.59*** (0.05)	-0.43*** (0.08)	-0.13 (0.10)	-0.25*** (0.07)	-0.15* (0.08)
Mna	-0.08 (0.10)	-0.20** (0.08)	-0.20*** (0.05)	-0.32*** (0.04)	0.11 (0.11)	0.24** (0.12)	0.06 (0.07)	0.12 (0.07)
Sa	0.20** (0.10)	0.11** (0.05)	-0.03 (0.05)	-0.12*** (0.03)	0.39*** (0.11)	0.56*** (0.10)	0.24*** (0.07)	0.32*** (0.07)
Ssa	-0.19** (0.09)	-0.44*** (0.10)	-0.27*** (0.06)	-0.44*** (0.07)				
Constant	-1.16*** (0.07)	-1.15*** (0.04)	-0.50*** (0.02)	-0.51*** (0.02)	-1.36*** (0.07)	-1.60*** (0.10)	-0.78*** (0.06)	-0.96*** (0.07)
m1	-1.63	-2.10**	-1.77*	-2.77***	-1.50	-1.94*	-1.66*	-2.60***
m2	-1.56	-1.01	-2.20**	-0.58	-1.14	-0.56	-2.10**	0.02
N	319	305	319	305	199	189	199	189
1 – RSS/TSS	0.50	0.55	0.60	0.68	0.49	0.53	0.44	0.46

* denotes significance at the 90% level, ** at the 95% level, and *** at the 99% level (two-tailed test). Results for one-step estimation are obtained using DPD98 for GAUSS. Heteroscedasticity adjusted asymptotic standard errors in parentheses. M1 and m2 are tests for first-order and second-order serial correlation in the first-differenced residuals, asymptotically distributed as N(0,1) under the null of no serial correlation. 1 – RSS/TSS: 1 – residual sum of squares/total sum of squares. Y^{q20s}/Y^{q40s}: $\ln(Q^{20/40}/0.2)$ unadjusted approach. Y^{q20c}/Y^{q40c}: $\ln(Q^{20/40}/0.2)$ adjusted approach.

Table 13: Exchange rate regimes and currency crises distribution effect (Growth Equation)

Levy-Yeyati/ Sturzenegger 2002		Reinhart/ Rogoff 2003:	coarse classification			4-way classification	
	(1)		(2)	(3)	(4)	(5)	(6)
Dep. Var.	**y^{q40o} indu ols**		**y^{q40o} indu re**	**y^{q20o} dev ols**	**y^{q40o} dev re**	**y^{q20o} dev re**	**y^{q40o} dev re**
Crawling Peg	0.33	Limited flexibility	-0.25	**2.04***	1.22	**2.15***	0.83
	(0.49)		(0.56)	(1.08)	(0.82)	(1.21)	(0.85)
Dirty Float	**1.19****	Managed floating	-0.37	1.68	0.72	1.84	0.90
	(0.54)		(0.60)	(1.47)	(0.97)	(1.26)	(0.88)
Flexible	0.55	Freely floating	-1.06			0.69	-0.05
	(0.45)		(0.94)			(2.12)	(1.47)
		Freely falling		**2.79***	1.16		
				(1.42)	(0.95)		
Currency Crisis	**-1.27***	Currency Crisis	**-1.05****	1.77	**1.65***	**2.63****	**1.67***
	(0.65)		(0.55)	(1.31)	(0.86)	(1.34)	(0.89)
Constant	-0.33	Constant	0.29	-1.50	-1.01	-1.65*	-0.61
	(0.35)		(0.50)	(0.94)	(0.68)	(1.00)	(0.71)
F-test	2.70*	F-test		2.45*			
		Wald-test	5.01		6.59	6.65	4.47
Breusch-Pagan		Breusch-Pagan	4.13**		10.28***	3.64*	9.29***
R^2	0.22	R^2	0.11	0.10	0.08	0.08	0.06
N	30	N	44	80	81	80	80

* denotes significance at the 90% level, ** at the 95% level, and *** at the 99% level (two-sided alternative). Heteroscedasticity adjusted standard errors in parentheses. F-test/Wald-test indicate the F-statistic/Wald-statistic for the test on the overall significance of the regression. Ramsey Reset test for omitted variables is passed in all OLS estimations (equations 1 and 3). Breusch-Pagan is a Lagrange multiplier test for the random effects model, distributed as chi-squared under the null of no random effects. y^{q20o}: average annual growth rate of the first quintile share (regressions without outliers). y^{q40o}: average annual growth rate of the second quintile share (regressions without outliers). ols: results for pooled OLS estimation. re: results for random effects estimation. dev: developing countries. indu: industrial countries.

Table 14: Exchange rate regimes and currency crises distribution effect (System GMM estimation)

Reinhart/Rogoff (2003), coarse classification

	All Countries		Developing Countries		Industrial Countries	
Dep. Var.	Y^{q40s}	Y^{q40c}	Y^{q40s}	Y^{q40c}	Y^{q40s}	Y^{q40c}
	(1)	(2)	(3)	(4)	(5)	(6)
Limited flexibility	0.008	0.029	0.023	0.043	**-0.063****	-0.030
	(0.026)	(0.025)	(0.032)	(0.031)	(0.030)	(0.034)
Managed floating	0.021	0.010	0.054	0.037	**-0.083****	**-0.078****
	(0.027)	(0.028)	(0.034)	(0.035)	(0.043)	(0.039)
Freely floating	0.045	**0.082*****			-0.024	0.023
	(0.029)	(0.030)			(0.025)	(0.032)
Freely falling	-0.045	-0.054	-0.028	-0.038		
	(0.044)	(0.053)	(0.062)	(0.055)		
Currency Crisis	**0.040***	0.029	0.047	0.028	**0.032****	**0.023*****
	(0.023)	(0.028)	(0.034)	(0.040)	(0.013)	(0.008)
EAP	-0.23***	-0.26***	0.03	-0.14**		
	(0.05)	(0.05)	(0.06)	(0.07)		
ECA	0.12***	0.08***				
	(0.04)	(0.02)				
LAC	-0.49***	-0.58***	-0.24***	-0.18**		
	(0.05)	(0.06)	(0.06)	(0.07)		
MNA	-0.18***	-0.31***	0.08	-0.10		
	(0.04)	(0.05)	(0.05)	(0.06)		
SA	0.002	-0.09**	0.26***	0.32***		
	(0.02)	(0.04)	(0.04)	(0.07)		
SSA	-0.25***	-0.40***				
	(0.05)	(0.06)				
Constant	-0.47***	-0.51***	-0.74***	-0.92***	-0.40***	-0.45***
	(0.03)	(0.03)	(0.04)	(0.06)	(0.02)	(0.03)
m1	-2.22**	-2.58***	-2.11**	-2.50**	-1.70*	-1.32
m2	1.51	1.97**	1.38	1.82*	-1.71*	-0.41
N	201	194	127	124	67	63
1 – RSS/TSS	0.67	0.73	0.51	0.51	0.14	0.19

* denotes significance at the 90% level, ** at the 95% level, and *** at the 99% level (two-tailed test). Results for one-step estimation are obtained using DPD98 for GAUSS. Heteroscedasticity adjusted asymptotic standard errors in parentheses. M1 and m2 are tests for first-order and second-order serial correlation in the first-differenced residuals, asymptotically distributed as N(0,1) under the null of no serial correlation. 1 – RSS/TSS: 1 – residual sum of squares/total sum of squares. Y^{q20s}/Y^{q40s}: $\ln(Q^{20/40}/0.2)$ unadjusted approach. Y^{q20c}/Y^{q40c}: $\ln(Q^{20/40}/0.2)$ adjusted approach.

Table 14: continued

Reinhart/Rogoff (2003), 4-way classification

	All Countries		Developing Countries	
Dep. Var.	Y^{q40s}	Y^{q40c}	Y^{q40s}	Y^{q40c}
	(7)	(8)	(9)	(10)
Limited flexibility	0.011	0.019	0.028	0.031
	(0.026)	(0.027)	(0.034)	(0.035)
Managed floating	0.014	-0.005	0.036	0.012
	(0.024)	(0.025)	(0.029)	(0.031)
Free floating	-0.012	-0.006	-0.028	-0.030
	(0.064)	(0.073)	(0.092)	(0.100)
Currency Crisis	0.027	0.011	0.031	0.006
	(0.021)	(0.027)	(0.031)	(0.040)
EAP	-0.23***	-0.27***	0.01	0.12*
	(0.05)	(0.05)	(0.06)	(0.07)
ECA	0.12***	0.07***		
	(0.04)	(0.02)		
LAC	-0.51***	-0.60***	-0.27***	-0.21***
	(0.05)	(0.06)	(0.06)	(0.07)
MNA	-0.19***	-0.32***	0.05	0.07
	(0.04)	(0.05)	(0.05)	(0.07)
SA	-0.004	-0.10**	0.24***	0.29***
	(0.02)	(0.04)	(0.05)	(0.07)
SSA	-0.24***	-0.39***		
	(0.05)	(0.06)		
Constant	-0.47***	-0.49***	-0.72***	-0.89***
	(0.03)	(0.03)	(0.05)	(0.06)
m1	-2.07*	-2.20**	-1.94*	-2.30**
m2	1.11	1.84*	1.31	1.87*
N	199	192	125	122
1 – RSS/TSS	0.67	0.73	0.51	0.51

* denotes significance at the 90% level, ** at the 95% level, and *** at the 99% level (two-tailed test). Results for one-step estimation are obtained using DPD98 for GAUSS. Heteroscedasticity adjusted asymptotic standard errors in parentheses. M1 and m2 are tests for first-order and second-order serial correlation in the first-differenced residuals, asymptotically distributed as N(0,1) under the null of no serial correlation. 1 – RSS/TSS: 1 – residual sum of squares/total sum of squares. Y^{q20s}/Y^{q40s}: $\ln(Q^{20/40}/0.2)$ unadjusted approach. Y^{q20c}/Y^{q40c}: $\ln(Q^{20/40}/0.2)$ adjusted approach.

Table 15: Exchange rate regimes and inflation distribution effect (Growth equation)

Reinhart/Rogoff 2003:	coarse classification		4-way classification			
	(1)	(2)	(3)	(4)	(5)	(6)
Dep. Var.	**y^{q20o} dev ols**	**y^{q40o} dev re**	**y^{q20o} dev re**	**y^{q40o} dev re**	**y^{q20o} dev re**	**y^{q40o} dev re**
Limited flexibility	1.11	0.43	1.15	0.37		
	(0.75)	(0.61)	(1.01)	(0.61)		
Managed floating	0.48	-0.61	0.24	-0.58		
	(1.12)	(0.65)	(1.04)	(0.64)		
Freely floating			-2.13	-1.65		
			(2.71)	(1.65)		
Freely falling	0.82	-0.41				
	(1.80)	(1.11)				
ln(1+inflation)	**7.31***	3.60	**9.93******	**3.91***	**7.06*****	**3.28***
	(4.00)	(2.28)	(3.42)	(2.09)	(2.68)	(1.70)
EAP	-0.73	-0.72	-1.12	-1.46*	-0.38	0.57
	(1.52)	(0.80)	(1.35)	(0.83)	(1.23)	(0.78)
ECA						
LAC	-1.49	-0.76	-2.23*	-1.24	-1.26	0.60
	(1.45)	(0.77)	(1.29)	(0.80)	(1.19)	(0.76)
MNA	0.93	0.49	0.64	-0.25	1.38	1.64*
	(1.54)	(1.00)	(1.66)	(1.02)	(1.53)	(0.97)
SA	-0.51	-1.15	-0.96	-1.89	-0.23	0.30
	(1.61)	(0.95)	(1.57)	(0.97)	(1.43)	(0.91)
SSA						
Constant	-0.99	0.16	-0.80	0.90	-0.70	-1.03
	(1.62)	(0.76)	(1.20)	(0.78)	(1.11)	(0.70)
Breusch-Pagan		8.69***	4.59**	8.86***	4.19**	6.13**
F- test	2.38**					
Wald – test		9.27	14.26*	10.10	10.04*	6.66
R^2	0.11	0.08	0.12	0.09	0.08	0.05
N	117	117	117	116	123	123

* denotes significance at the 90% level, ** at the 95% level, and *** at the 99% level (two-sided alternative). Heteroscedasticity adjusted standard errors in parentheses. F-test/Wald-test indicate the F-statistic/Wald-statistic for the test on the overall significance of the regression. Ramsey Reset test for omitted variables is passed in OLS estimation (equation 1). Breusch-Pagan is a Lagrange-multiplier test for the random effects model, distributed as chi-squared under the null of no random effects. y^{q20o}: average annual growth rate of the first quintile share (regressions without outliers). y^{q40o}: average annual growth rate of the second quintile share (regressions without outliers). ols: results for pooled OLS estimation, re: results for random effects estimation. dev: developing countries.

Table 16: Exchange rate regimes and macroeconomic variables distribution effect (Growth equation)

	Levy-Yeyati/Sturzenegger 2002				Reinhart/Rogoff 2003, coarse classification				
	(1)	(2)	(3)	(4)		(5)	(6)	(7)	(8)
Dep. Var.	**y^{q20o} all/ols**	**y^{q40o} all/fe**	**y^{q20o} dev/ols**	**y^{q40o} dev/fe**		**y^{q20o} all/ols**	**y^{q40o} all/re**	**y^{q20o} dev/ols**	**y^{q40o} dev/re**
Crawling peg	-0.38	-0.88	0.09	-0.69	Limited flexibility	**1.34***	0.81	**1.53****	0.82
	(1.15)	(1.34)	(1.31)	(1.80)		(0.80)	(0.82)	(0.79)	(0.90)
Dirty float	0.69	2.47	1.22	1.84	Managed floating	0.64	0.25	-0.69	-0.51
	(1.23)	(1.54)	(1.53)	(2.04)		(1.54)	(1.02)	(1.16)	(1.25)
Flexible	-0.03	1.60	0.64	1.59	Freely floating	0.16	0.59		
	(1.10)	(1.13)	(1.25)	(1.24)		(1.49)	(1.54)		
					Freely falling	1.35	0.71	-0.38	-0.71
						(2.50)	(1.58)	(2.44)	(1.80)
M2/GDP 0.02	-0.02	0.03	-0.02			**0.03****	0.03	**0.04***	0.03
	(0.02)	(0.06)	(0.02)	(0.08)		(0.02)	(0.02)	(0.02)	(0.03)
Budget Surplus	**0.22****	-0.18	**0.22****	0.07		0.17	0.04	**0.30****	0.12
	(0.10)	(0.16)	(0.11)	(0.32)		(0.13)	(0.09)	(0.13)	(0.11)
Secondary Education	-0.24	-1.26	-0.53	-1.01		-0.15	-0.57	-0.41	-0.89
	(0.34)	(1.27)	(1.01)	(3.00)		(0.47)	(0.43)	(0.92)	(0.73)
Adjusted Gini Coefficient	-0.002	**1.01*****	-0.02	**1.07*****		0.13	**0.16****	0.09	**0.15***
	(0.055)	(0.16)	(0.08)	(0.24)		(0.09)	(0.07)	(0.09)	(0.08)
Ln(1+inflation)	1.27	0.22	2.72	2.85		1.91	1.98	6.74	6.53
	(3.58)	(7.90)	(4.61)	(12.12)		(5.59)	(4.20)	(5.55)	(5.05)
EAP						-1.08	-1.64	-3.65***	-1.56
						(1.67)	(1.21)	(1.30)	(1.87)
ECA						-1.29	0.05		
						(2.07)	(2.74)		
LAC						-2.00	-3.07*	-3.72**	-2.72
						(2.05)	(1.69)	(1.46)	(1.86)
MNA						-0.71	-1.80	2.30*	-1.21
						(1.88)	1.54	(1.32)	(2.01)
SA						-0.20	-1.22	-2.35	-0.81
						(1.38)	(1.27)	(1.54)	(2.09)
SSA						1.29	-0.78		
						(1.83)	(1.83)		
Constant	0.66	-41.18***	0.97	-47.73***		-6.32*	-6.13**	2.38	-5.89
	(2.88)	(6.77)	(3.49)	(10.25)		(3.72)	(3.05)	(4.09)	(4.04)
Breusch-Pagan		6.54**		3.32*			10.22***		11.91***
Hausmann		52.81***		44.43***					
F-test	1.32	7.16***	1.04	5.98***		25.16***		2.71***	
Wald-test							15.00		10.79
R^2	0.10	0.07	0.12	0.06		0.13	0.16	0.21	0.18
N	72	73	52	53		94	94	63	63

* denotes significance at the 90% level, ** at the 95% level, and *** at the 99% level (two-sided alternative). Heteroscedasticity adjusted standard errors in parentheses. F-test/Wald-test indicate the F-statistic/Wald-statistic for the test on the overall significance of the regression. Ramsey Reset test for omitted variables is passed in all OLS estimations (equations 1, 3, 5, 7). Breusch-Pagan is a Lagrange multiplier test for the random effects model, distributed as chi-squared under the null of no random effects. Hausmann is a test on fixed or random effects estimation, distributed as chi-squared under the null of no difference. y^{q20o}: average annual growth rate of the first quintile share (regressions without outliers). y^{q40o}: average annual growth rate of the second quintile share (regressions without outliers). ols: results for pooled OLS estimation, re: results for random effects estimation, fe: results for fixed effects estimation. all: all countries. dev: developing countries.

Table 16: continued

Reinhart/Rogoff 2003, 4-way classification

	(9)	(10)	(11)	(12)
Dep. Var.	**y^{q20o} all/re**	**y^{q40o} all/re**	**y^{q20o} dev/re**	**y^{q40o} dev/re**
Limited flexibility	1.12	0.94	1.32	0.85
	(1.19)	(0.85)	(1.18)	(0.96)
Managed floating	0.15	0.76	-1.53	0.18
	(1.39)	(1.00)	(1.57)	(1.28)
Freely floating	-0.91	0.47	-3.91	-0.59
	(1.92)	(1.38)	(2.95)	(2.40)
M2/GDP	0.03	0.03	0.04	0.03
	(0.03)	(0.02)	(0.03)	(0.03)
Budget Surplus	0.20	0.07	**0.36****	0.16
	(0.13)	(0.09)	(0.15)	(0.12)
Adjusted Gini Coefficient	**0.25****	**0.19*****	**0.22****	**0.20****
	(0.10)	(0.07)	(0.10)	(0.08)
Ln(1+inflation)	4.18	1.48	**9.74***	4.25
	(4.54)	(3.25)	(5.31)	(4.32)
EAP	-2.06	1.57	-5.02**	-1.37
	(1.75)	(1.25)	(2.54)	(2.07)
ECA	0.12	0.37		
	(3.95)	(2.83)		
LAC	-4.51*	-2.83*	-6.65***	-2.68
	(2.40)	(1.72)	(2.54)	(2.07)
MNA	-1.63	-1.80	-3.43	-1.16
	(2.21)	(1.58)	(2.70)	(2.20)
SA	-0.29	-0.75	-2.61	0.02
	(1.83)	(1.31)	(2.77)	(2.26)
SSA	1.08	-0.73		
	(2.64)	(1.89)		
Constant	-10.41	-7.88	-6.59	-8.41
	(4.29)	(3.07)	(5.16)	(4.20)
Breusch-Pagan	4.63**	8.41***	2.98*	8.30***
Hausmann	.	.	.	.
Wald-test	14.70	16.73	16.72	10.87
R^2	0.16	0.17	0.25	0.18
N	95	95	64	64

* denotes significance at the 90% level, ** at the 95% level, and *** at the 99% level (two-sided alternative). Heteroscedasticity adjusted standard errors in parentheses. Wald-test indicate the Wald-statistic for the test on the overall significance of the regression. Breusch-Pagan is a Lagrange multiplier test for the random effects model, distributed as chi-squared under the null of no random effects. Hausmann is a test on fixed or random effects estimation, distributed as chi-squared under the null of no difference. y^{q20o}: average annual growth rate of the first quintile share (regressions without outliers). y^{q40o}: average annual growth rate of the second quintile share (regressions without outliers). re: results for random effects estimation. all: all countries. dev: developing countries.

Table 17: Exchange rate regimes and macroeconomic variables distribution effect (System GMM estimation)

Reinhart/Rogoff 2003, coarse classification

	All Countries				Developing Countries			
	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)
Dep. Var.	Y^{q20s}	Y^{q20c}	Y^{q40s}	Y^{q40c}	Y^{q20s}	Y^{q20c}	Y^{q40s}	Y^{q40c}
Limited flexibility	0.043	0.034	0.011	0.008	0.050	0.035	0.019	0.016
	(0.046)	(0.040)	(0.020)	(0.019)	(0.061)	(0.058)	(0.029)	(0.028)
Managed floating	**0.089***	0.038	0.041	0.017	**0.105***	0.072	**0.066****	0.041
	(0.046)	(0.040)	(0.026)	(0.023)	(0.056)	(0.050)	(0.032)	(0.030)
Freely floating	-0.032	0.001	-0.024	-0.023	**0.348*****	**0.247*****	**0.190*****	**0.145*****
	(0.206)	(0.009)	(0.057)	(0.051)	(0.049)	(0.051)	(0.025)	(0.031)
Freely falling	0.054	-0.010	0.006	-0.022	0.071	0.008	0.026	-0.003
	(0.068)	(0.079)	(0.042)	(0.055)	(0.069)	(0.082)	(0.042)	(0.055)
Ln(1+inflation)	-0.05	-0.02	0	0.04	-0.09	-0.03	-0.02	0.02
	(0.13)	(0.16)	(0.086)	(0.10)	(0.13)	(0.17)	(0.09)	(0.10)
Secondary Education	-0.03	0.01	0.016	0.02	0.03	0.01	0.05	0.04
	(0.03)	(0.03)	(0.017)	(0.02)	(0.05)	(0.05)	(0.03)	(0.03)
Government Consumption	-0.002	-0.003	**0.004***	0.003	0.007	0.002	**0.006****	0.004
	(0.004)	(0.003)	(0.002)	(0.002)	(0.005)	(0.005)	(0.003)	(0.003)
EAP	-0.19**	-0.07	-0.21***	-0.22***	-0.01	0.26**	-0.01	0.12*
	(0.09)	(0.07)	(0.05)	(0.06)	(0.11)	(0.12)	(0.06)	(0.07)
ECA	0.38***	0.41***	0.17***	0.11***				
	(0.09)	(0.05)	(0.04)	(0.03)				
LAC	-0.66***	-0.55***	-0.49***	-0.55***	-0.48***	-0.21*	-0.29***	-0.21***
	(0.10)	(0.08)	(0.05)	(0.05)	(0.09)	(0.12)	(0.06)	(0.07)
MNA	-0.21	-0.21*	-0.19**	-0.28***	0.01	0.13	0.02	0.07
	(0.17)	(0.12)	(0.08)	(0.07)	(0.15)	(0.15)	(0.08)	(0.08)
SA	0.12	-0.12	-0.04	-0.10**	0.30***	0.48***	0.16**	0.25**
	(0.12)	(0.08)	(0.06)	(0.05)	(0.12)	(0.12)	(0.07)	(0.07)
SSA	-0.21*	-0.34***	-0.21***	-0.35***				
	(0.12)	(0.12)	(0.06)	(0.07)				
Constant	-1.08***	-1.21***	-0.59***	-0.61***	-1.43***	-1.54***	-0.88***	-0.99***
	(0.13)	(0.07)	(0.05)	(0.04)	(0.13)	(0.14)	(0.09)	(0.09)
m1	-1.78*	-2.23**	-2.06**	-2.64***	-1.51	-1.88*	-1.84*	-2.31**
m2	-1.78*	-1.46	-1.74*	-0.81	-1.13	-0.81	-1.62	-0.47
N	277	267	277	267	165	159	165	159
1 – RSS/TSS	0.51	0.57	0.64	0.72	0.53	0.53	0.52	0.53

* denotes significance at the 90% level, ** at the 95% level, and *** at the 99% level (two-tailed test). Results for one-step estimation are obtained using DPD98 for GAUSS. Heteroscedasticity adjusted asymptotic standard errors in parentheses. M1 and m2 are tests for first-order and second-order serial correlation in the first-differenced residuals, asymptotically distributed as N(0,1) under the null of no serial correlation. 1 – RSS/TSS: 1 – residual sum of squares/total sum of squares. Y^{q20s}/Y^{q40s}: $\ln(Q^{20/40}/0.2)$ unadjusted approach (regressions without outliers). Y^{q20c}/Y^{q40c}: $\ln(Q^{20/40}/0.2)$ adjusted approach (regressions without outliers).

Table 17: continued

Reinhart/Rogoff 2003, coarse classification

Industrial Countries

	(9)	(10)	(11)	(12)
Dep. Var.	$\mathbf{Y^{q20s}}$	$\mathbf{Y^{q20c}}$	$\mathbf{Y^{q40s}}$	$\mathbf{Y^{q40c}}$
Limited flexibility	-0.004 (0.065)	0.015 (0.048)	-0.033 (0.024)	-0.026 (0.025)
Managed floating	0.006 (0.075)	-0.050 (0.072)	-0.051 (0.041)	-0.064 (0.041)
Free floating	-0.103 (0.120)	-0.066 (0.083)	-0.081 (0.054)	**-0.073*** (0.041)
Ln(1+inflation)	-0.03 (0.36)	0.15 (0.27)	0.20 (0.21)	0.27 (0.21)
Secondary Education	-0.06 (0.04)	0.02 (0.02)	0.01 (0.02)	**0.02*** (0.01)
Government Consumption	-0.004 (0.005)	0.002 (0.004)	0.001 (0.002)	0.002 (0.002)
Constant	-0.90*** (0.15)	-1.22*** (0.06)	-0.49*** (0.05)	-0.58*** (0.03)
m1	-0.46	-0.82	-0.28	-1.12
m2	-1.45	-1.82*	-1.06	-1.50
N	107	103	107	103
1 – RSS/TSS	0.14	0.08	0.08	0.17

* denotes significance at the 90% level, ** at the 95% level, and *** at the 99% level (two-tailed test). Results for one-step estimation are obtained using DPD98 for GAUSS. Heteroscedasticity adjusted asymptotic standard errors in parentheses. M1 and m2 are tests for first-order and second-order serial correlation in the first-differenced residuals, asymptotically distributed as N(0,1) under the null of no serial correlation. 1 – RSS/TSS: 1 – residual sum of squares/total sum of squares. Y^{q20s}/Y^{q40s}: $\ln(Q^{20/40}/0.2)$ unadjusted approach (regressions without outliers). Y^{q20c}/Y^{q40c}: $\ln(Q^{20/40}/0.2)$ adjusted approach (regressions without outliers).

Table 17: continued

Reinhart/Rogoff 2003, 4-way classification

	All Countries				Developing Countries			
	(13)	(14)	(15)	(16)	(17)	(18)	(19)	(20)
Dep. Var.	Y^{q20s}	Y^{q20c}	Y^{q40s}	Y^{q40c}	Y^{q20s}	Y^{q20c}	Y^{q40s}	Y^{q40c}
Limited flexibility	0.051	0.029	0.018	0.008	0.057	0.022	0.027	0.011
	(0.046)	(0.041)	(0.020)	(0.019)	(0.062)	(0.060)	(0.029)	(0.030)
Managed floating	**0.073***	0.026	0.034	0.011	**0.093***	0.055	**0.058****	0.034
	(0.043)	(0.039)	(0.024)	(0.020)	(0.051)	(0.047)	(0.029)	(0.026)
Freely floating	0.042	0.044	0.012	0.002	**0.247*****	**0.185*****	**0.125*****	**0.093*****
	(0.085)	(0.075)	(0.043)	(0.041)	(0.087)	(0.068)	(0.046)	(0.032)
Ln(1+inflation)	0.01	0.004	0.02	0.04	-0.08	-0.05	-0.03	0.003
	(0.13)	(0.14)	(0.09)	(0.08)	(0.12)	(0.15)	(0.09)	(0.08)
Secondary Education	-0.04	0.01	0.01	0.02	0.03	0.01	0.05	0.04
	(0.03)	(0.02)	(0.02)	(0.02)	(0.05)	(0.05)	(0.03)	(0.03)
Government Consumption	0.002	0.003	**0.004***	0.003	0.007	0.002	**0.006****	0.004
	(0.004)	(0.003)	(0.002)	(0.002)	(0.005)	(0.005)	(0.003)	(0.003)
EAP	-0.19**	-0.07	-0.21***	-0.22***	-0.04	0.23*	-0.03	0.10
	(0.09)	(0.07)	(0.05)	(0.06)	(0.10)	(0.12)	(0.06)	(0.07)
ECA	0.39***	0.42***	0.18***	0.11***				
	(0.09)	(0.05)	(0.04)	(0.03)				
LAC	-0.67***	-0.56***	-0.49***	-0.56***	-0.51***	-0.26**	-0.31***	-0.24***
	(0.10)	(0.08)	(0.05)	(0.05)	(0.08)	(0.11)	(0.06)	(0.07)
MNA	-0.22	-0.21*	-0.20**	-0.28***	-0.02	-0.09	-0.002	0.04
	(0.17)	(0.13)	(0.08)	(0.07)	(0.15)	(0.15)	(0.08)	(0.08)
SA	0.12	-0.12	-0.04	-0.10**	0.26**	0.44***	0.14**	0.23***
	(0.12)	(0.07)	(0.06)	(0.05)	(0.11)	(0.11)	(0.06)	(0.06)
SSA	-0.17	-0.30**	-0.19***	-0.33***				
	(0.13)	(0.12)	(0.06)	(0.07)				
Constant	-1.07***	-1.20***	-0.58***	-0.61***	-1.40***	-1.50***	-0.86***	-0.97***
	(0.13)	(0.07)	(0.06)	(0.04)	(0.13)	(0.14)	(0.09)	(0.09)
m1	-1.76*	-2.13**	-2.06**	-2.72***	-1.56	-1.83*	-2.01**	-2.48**
m2	-1.87*	-1.25	-1.94*	-0.75	-1.27	-0.77	-1.77*	-0.48
N	275	265	275	265	163	157	163	157
1 – RSS/TSS	0.51	0.56	0.64	0.72	0.54	0.53	0.53	0.54

* denotes significance at the 90% level, ** at the 95% level, and *** at the 99% level (two-tailed test). Results for one-step estimation are obtained using DPD98 for GAUSS. Heteroscedasticity adjusted asymptotic standard errors in parentheses. M1 and m2 are tests for first-order and second-order serial correlation in the first-differenced residuals, asymptotically distributed as N(0,1) under the null of no serial correlation. 1 – RSS/TSS: 1 – residual sum of squares/total sum of squares. Y^{q20s}/Y^{q40s}: $\ln(Q^{20/40}/0.2)$ unadjusted approach (regressions without outliers). Y^{q20c}/Y^{q40c}: $\ln(Q^{20/40}/0.2)$ adjusted approach (regressions without outliers).

Table 18: Exchange rate regimes and macroeconomic variables total effect (Growth equation)

Levy-Yeyati/Sturzenegger 2002					Reinhart/Rogoff 2003, coarse classification				
	(1)	(2)	(3)	(4)		(5)	(6)	(7)	(8)
Dep. Var.	**y^{p20o} all/ols**	**y^{p40o} all/fe**	**y^{p20o} dev/ols**	**y^{p40o} dev/fe**		**y^{p20o} all/ols**	**y^{p40o} all/ols**	**y^{p20o} dev/ols**	**y^{p40o} dev/ols**
Crawling peg	-1.40	**-3.74***	-1.11	-3.29	Limited flexibility	1.69	0.60	1.25	0.21
	(1.53)	(1.79)	(1.88)	(2.57)		(1.03)	(0.79)	(1.01)	(0.74)
Dirty float	1.72	1.00	1.90	-0.53	Managed floating	2.52	1.33	1.74	1.04
	(1.79)	(2.03)	(2.19)	(2.94)		(1.72)	(1.16)	(1.61)	(1.54)
Flexible	0.43	-0.34	0.73	-0.78	Freely floating	1.11	0.71		
	(1.47)	(1.50)	(1.74)	(1.84)		(1.97)	(1.28)		
					Freely falling	2.81	1.32	1.64	0.28
						(2.62)	(2.26)	(2.81)	(2.63)
M2/GDP	-0.01	0.12	-0.03	0.07		0.04	**0.05*****	0.02	0.04
	(0.04)	(0.11)	(0.06)	(0.15)		(0.03)	(0.02)	(0.04)	(0.03)
Budget Surplus	**0.36****	**0.40***	**0.39****	-0.27		0.19	-0.06	**0.32***	0.01
	(0.10)	(0.22)	(0.17)	(0.50)		(0.17)	(0.10)	(0.18)	(0.12)
Secondary Education	-0.35	-1.65	0.06	3.11		-0.02	-0.38	0.43	0.05
	(0.69)	(1.67)	(1.69)	(4.30)		(0.70)	(0.53)	(1.47)	(0.98)
Adjusted Gini Coefficient	0.14	**0.88*****	0.11	**0.96****		0.17	0.15	0.13	0.13
	(0.14)	(0.25)	(0.17)	(0.41)		(0.13)	(0.10)	(0.14)	(0.11)
Ln(1+inflation)	-4.72	11.31	-4.32	-4.48		-2.55	-1.59	-0.03	1.51
	(5.08)	(10.62)	(6.13)	(18.20)		(6.88)	(5.37)	(7.78)	(6.42)
EAP	0.11		3.05			1.81	1.96	0.75	1.89
	(3.05)		(2.27)			(2.71)	(1.93)	(2.20)	(1.99)
ECA						-7.47	-5.93***		
						(2.29)	(1.48)		
LAC	-4.27		-1.39			-3.28	-3.06	-4.24**	-3.33*
	(3.64)		(2.20)			(3.30)	(2.34)	(2.00)	(1.96)
MNA	-3.18		0.37			-2.72	-1.54	-2.55	-0.98
	(3.43)		(2.86)			(3.29)	(1.77)	(2.20)	(1.44)
SA	2.04		5.04**			1.96	0.89	1.32	1.04
	(1.88)		(2.18)			(1.93)	(1.36)	(2.59)	(1.90)
SSA	-2.51					0.91	0.20		
	(2.48)					(2.65)	(1.65)		
Constant	0.85	-35.44***	-1.13	-46.11**		-6.58	-6.20	-2.98	-4.86
	(4.71)	(9.23)	(5.85)	(15.83)		(4.73)	(3.73)	(6.08)	(4.94)
Breusch-Pagan		0.49		0.14					
Hausmann		28.58***		17.90**					
F-test	1.97**	4.52***	1.47	2.60*		62.03***	87.05***	1.84*	3.69***
R – squared	0.26	0.67	0.28	0.70		0.24	0.35	0.24	0.31
N	72	72	52	55		94	93	63	62

* denotes significance at the 90% level, ** at the 95% level, and *** at the 99% level (two-sided alternative). Heteroscedasticity adjusted standard errors in parentheses. F-test indicate the F-statistic for the test on the overall significance of the regression. Ramsey Reset test for omitted variables is only passed in equation 6, when powers of the right-hand side variables are considered (and not passed in all other OLS regressions). Breusch-Pagan is a Lagrange-multiplier test for the random effects model, distributed as chi-squared under the null of no random effects. Hausmann is a test on fixed or random effects estimation, distributed as chi-squared under the null of no difference. y^{p20o}: average annual growth rate of the mean income of the first quintile share (regressions without outliers). y^{q40o}: average annual growth rate of the mean income of the second quintile share (regressions without outliers). ols: results for pooled OLS estimation, fe: results for fixed effects estimation. all: all countries. dev: developing countries.

Table 18: continued

Reinhart/Rogoff 2003, 4-way classification

	(9)	(10)	(11)	(12)
Dep. Var.	**y^{p20o} all/ols**	**y^{p40o} all/ols**	**y^{p20o} dev/ols**	**y^{p40o} dev/ols**
Limited flexibility	1.65 (1.00)	0.62 (0.78)	1.20 (1.02)	0.20 (0.74)
Managed floating	2.56 (1.58)	1.20 (1.13)	1.59 (1.61)	0.92 (1.57)
Freely floating	0.87 (1.50)	1.19 (1.24)	-1.30 (2.57)	0.93 (2.53)
M2/GDP	0.04 (0.03)	**0.05**** (0.02)	0.02 (0.04)	0.03 (0.03)
Budget Surplus	0.19 (0.16)	-0.05 (0.09)	**0.34*** (0.18)	0.005 (0.12)
Adjusted Gini Coefficient	0.17 (0.13)	0.15 (0.10)	0.12 (0.14)	0.13 (0.12)
Ln(1+inflation)	-0.82 (4.49)	-1.33 (3.49)	2.17 (5.81)	-0.09 (5.10)
EAP	1.91 (2.68)	1.91 (1.94)	-0.17 (2.18)	1.99 (2.08)
ECA	-7.56*** (2.28)	-5.94*** (1.52)		
LAC	-3.15 (3.26)	-3.04 (2.43)	-5.07** (1.96)	-3.35 (2.07)
MNA	-2.57 (3.22)	-1.55 (1.77)	-3.43 (2.28)	-0.92 (1.62)
SA	2.15 (1.92)	-0.80 (1.35)	0.50 (2.73)	1.10 (2.09)
SSA	1.53 (2.55)	0.26 (1.64)		
Constant	-6.97 (4.79)	-5.90* (3.46)	-2.11 (6.18)	-4.77 (5.03)
F-test	63.60***	92.46***	2.08**	3.69***
R^2	0.16	0.35	0.25	0.31
N	95	93	63	62

* denotes significance at the 90% level, ** at the 95% level, and *** at the 99% level (two-sided alternative). Heteroscedasticity adjusted standard errors in parentheses. Ramsey Reset test for omitted variables is only passed in equations 10, when powers of right-hand side variables are considered (and not passed in all other OLS regressions). y^{p20o}: average annual growth rate of the mean income of the first quintile share (regressions without outliers). y^{p40o}: average annual growth rate of the mean income of the second quintile share (regressions without outliers). ols: results for pooled OLS estimation. all: all countries. dev: developing countries.

Table 19: Exchange rate regimes and macroeconomic variables total effect (System GMM estimation)

Reinhart/Rogoff 2003: coarse classification

	All Countries				Developing Countries			
	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)
Dep. Var.	Y^{p20s}	Y^{p20c}	Y^{p40s}	Y^{p40c}	Y^{p20s}	Y^{p20c}	Y^{p40s}	Y^{p40c}
Limited flexibility	0.074	0.077	0.068	0.060	0.145	0.134	0.145**	0.122*
	(0.077)	(0.077)	(0.060)	(0.059)	(0.091)	(0.094)	(0.071)	(0.074)
Managed floating	0.044	-0.021	-0.005	-0.049	0.116	0.058	0.073	0.010
	(0.103)	(0.099)	(0.086)	(0.085)	(0.116)	(0.118)	(0.103)	(0.107)
Freely floating	0.010	-0.007	-0.026	-0.006	0.203**	0.096	0.052	-0.014
	(0.101)	(0.096)	(0.073)	(0.069)	(0.094)	(0.096)	(0.079)	(0.088)
Freely falling	0.154	0.062	0.116	-0.049	0.222*	0.114	0.187*	-0.101
	(0.121)	(0.128)	(0.099)	(0.102)	(0.125)	(0.136)	(0.102)	(0.109)
Civil liberties	-0.02	-0.04	-0.03	-0.04*	-0.02	-0.03	-0.05	-0.05*
	(0.02)	(0.03)	(0.02)	(0.02)	(0.03)	(0.03)	(0.03)	(0.03)
Secondary Education	0.09*	0.14***	0.13***	0.14***	0.19	0.13	0.16	0.14
	(0.05)	(0.05)	(0.04)	(0.04)	(0.13)	(0.14)	(0.12)	(0.12)
Government Consumption	-0.014**	-0.01**	-0.012**	-0.013**	-0.018**	-0.024***	-0.018**	-0.021**
	(0.006)	(0.006)	(0.005)	(0.006)	(0.008)	(0.009)	(0.008)	(0.009)
Life Expectancy	0.05***	0.05***	0.05***	0.05***	0.04***	0.05***	0.05***	0.05***
	(0.01)	(0.01)	(0.01)	(0.01)	(0.01)	(0.01)	(0.01)	(0.01)
Ln(1+inflation)	-0.15	-0.04	-0.13	-0.03	-0.15	-0.03	-0.13	-0.04
	(0.23)	(0.28)	(0.18)	(0.21)	(0.23)	(0.29)	(0.17)	(0.21)
Terms of Trade	0.003**	0.003**	0.003**	0.003**	0.005***	0.005***	0.004***	0.005***
	(0.001)	(0.001)	(0.001)	(0.001)	(0.002)	(0.001)	(0.001)	(0.001)
EAP	-0.94***	-0.81***	-0.94***	-0.95***	0.27	0.48*	0.25	0.33
	(0.19)	(0.19)	(0.18)	(0.19)	(0.27)	(0.28)	(0.25)	(0.26)
ECA	0.33**	0.44***	0.16	0.15				
	(0.14)	(0.13)	(0.12)	(0.12)				
LAC	-1.32***	-1.19***	-1.12***	-1.16***	-0.10	0.10	0.06	0.11
	(0.14)	(0.14)	(0.11)	(0.12)	(0.32)	(0.32)	(0.31)	(0.31)
MNA	-0.61***	-0.64***	-0.64***	-0.73***	0.61**	0.59*	0.53*	0.52*
	(0.17)	(0.17)	(0.14)	(0.15)	(0.31)	(0.32)	(0.29)	(0.30)
SA	-1.07***	-1.05***	-1.24***	-1.27***	0.14	0.28	-0.04	0.03
	(0.26)	(0.25)	(0.23)	(0.23)	(0.22)	(0.22)	(0.20)	(0.21)
SSA	-1.21***	-1.31***	-1.21***	-1.31***				
	(0.36)	(0.38)	(0.36)	(0.36)				
Constant	4.44***	4.57***	5.22***	5.21***	3.44***	3.19***	4.06***	3.87***
	(0.86)	(0.88)	(0.81)	(0.84)	(0.74)	(0.77)	(0.69)	(0.73)
m1	-0.88	-0.92	-0.40	-0.75	-0.54	-0.21	-0.44	-0.53
m2	0.83	-0.70	-0.04	-0.75	0.62	-0.87	1.53	-0.44
N	215	212	215	212	127	127	127	127
1 – RSS/TSS	0.90	0.90	0.93	0.93	0.67	0.71	0.75	0.75

Notes: see next page

Table 19: continued

Reinhart/Rogoff 2003, coarse classification

Industrial Countries

	(9)	(10)	(11)	(12)
Dep. Var.	Y^{p20s}	Y^{p20c}	Y^{p40s}	Y^{p40c}
Limited flexibility	-0.062 (0.088)	0.041 (0.090)	-0.086 (0.063)	-0.076 (0.065)
Managed floating	-0.022 (0.127)	-0.108 (0.125)	-0.100 (0.082)	-0.118 (0.082)
Freely floating	-0.157 (0.111)	-0.144 (0.105)	-0.129 (0.081)	**-0.130*** (0.076)
Civil liberties	-0.01 (0.04)	**-0.04*** (0.02)	-0.01 (0.02)	-0.02 (0.02)
Secondary Education	0.04 (0.04)	**0.13***** (0.04)	**0.13***** (0.03)	**0.15***** (0.03)
Government Consumption	-0.007 (0.005)	-0.003 (0.006)	-0.005 (0.004)	-0.004 (0.004)
Life Expectancy	**0.06***** (0.02)	**0.04*** (0.02)	**0.04***** (0.01)	**0.04***** (0.01)
Ln(1+inflation)	**-1.16**** (0.46)	**-0.75**** (0.38)	-0.58 (0.38)	-0.45 (0.36)
Terms of Trade	0.003 (0.002)	0.002 (0.002)	0.002 (0.002)	0.002 (0.002)
Constant	4.59*** (1.41)	5.91*** (1.42)	5.96*** (1.01)	6.23*** (0.97)
m1	-1.19	-1.19	-1.72*	-1.74*
m2	0.16	-1.59	-1.06	-0.53
N	83	80	83	80
1 – RSS/TSS	0.38	0.49	0.63	0.65

* denotes significance at the 90% level, ** at the 95% level, and *** at the 99% level (two-tailed test). Results for one-step estimation are obtained using DPD98 for GAUSS. Heteroscedasticity adjusted asymptotic standard errors in parentheses. M1 and m2 are tests for first-order and second-order serial correlation in the first-differenced residuals, asymptotically distributed as N(0,1) under the null of no serial correlation. 1 – RSS/TSS: 1 – residual sum of squares/total sum of squares. Y^{p20s}/Y^{40s}: logarithm of mean income of first/second quintile (unadjusted approach, regressions without outliers). Y^{p20c}/Y^{p40c}: logarithm of mean income of first/second quintile (adjusted approach, regressions without outliers).

Table 19: continued

Reinhart/Rogoff 2003, 4-way classification

	All Countries				Developing Countries			
	(13)	(14)	(15)	(16)	(17)	(18)	(19)	(20)
Dep. Var.	Y^{p20s}	Y^{p20c}	Y^{p40s}	Y^{p40c}	Y^{p20s}	Y^{p20c}	Y^{p40s}	Y^{p40c}
Limited flexibility	0.072	0.069	0.066	0.058	0.136	0.112	0.139**	0.113*
	(0.076)	(0.074)	(0.059)	(0.056)	(0.089)	(0.088)	(0.069)	(0.069)
Managed floating	0.051	-0.011	0.016	-0.028	0.135	0.065	0.104	0.037
	(0.094)	(0.089)	(0.078)	(0.075)	(0.100)	(0.100)	(0.084)	(0.087)
Freely floating	0.076	0.034	0.047	0.010	0.210	0.133	0.111	0.052
	(0.114)	(0.105)	(0.083)	(0.076)	(0.171)	(0.164)	(0.125)	(0.122)
Civil liberties	-0.02	-0.04	-0.04	-0.04*	-0.03	-0.04	-0.05*	-0.05*
	(0.02)	(0.03)	(0.02)	(0.02)	(0.03)	(0.03)	(0.03)	(0.03)
Secondary Education	0.09*	0.15***	0.14***	0.15***	0.22*	0.16	0.19	0.17
	(0.05)	(0.05)	(0.03)	(0.04)	(0.12)	(0.13)	(0.11)	(0.12)
Government Consumption	-0.015***	-0.015**	-0.013**	-0.014**	-0.019**	-0.025***	-0.019**	-0.022**
	(0.006)	(0.006)	(0.005)	(0.006)	(0.008)	(0.009)	(0.008)	(0.009)
Life Expectancy	0.05***	0.04***	0.05***	0.05***	0.04***	0.04***	0.04***	0.04***
	(0.01)	(0.01)	(0.01)	(0.01)	(0.01)	(0.01)	(0.01)	(0.01)
Ln(1+inflation)	0.07	0.14	0.06	0.13	0.08	0.14	0.08	0.13
	(0.25)	(0.25)	(0.19)	(0.18)	(0.25)	(0.27)	(0.19)	(0.19)
Terms of Trade	0.002*	0.003**	0.002*	0.003**	0.004***	0.005***	0.004***	0.004***
	(0.001)	(0.001)	(0.001)	(0.001)	(0.001)	(0.001)	(0.001)	(0.001)
EAP	-0.94***	-0.80***	-0.94***	-0.94***	0.24	0.45*	0.23	0.31
	(0.18)	(0.19)	(0.18)	(0.19)	(0.26)	(0.26)	(0.24)	(0.25)
ECA	0.32**	0.43***	0.15	0.13				
	(0.14)	(0.12)	(0.11)	(0.11)				
LAC	-1.32***	-1.19***	-1.11***	-1.16***	-0.12	0.06	0.05	0.09
	(0.14)	(0.14)	(0.11)	(0.12)	(0.31)	(0.32)	(0.30)	(0.30)
MNA	-0.61***	-0.64***	-0.63***	-0.72***	0.60**	0.57*	0.53*	0.50*
	(0.16)	(0.16)	(0.14)	(0.14)	(0.30)	(0.31)	(0.28)	(0.29)
SA	-1.07***	-1.04***	-1.24***	-1.27***	0.12	0.25	-0.05	0.01
	(0.26)	(0.25)	(0.22)	(0.23)	(0.21)	(0.21)	(0.20)	(0.20)
SSA	-1.17***	-1.26***	-1.19***	-1.27***	.			
	(0.36)	(0.36)	(0.35)	(0.36)				
Constant	4.63***	4.76***	5.39***	5.36***	3.84***	3.57***	4.37***	4.16***
	(0.82)	(0.84)	(0.78)	(0.81)	(0.67)	(0.72)	(0.66)	(0.72)
m1	-0.78	-0.87	-0.41	-0.63	-0.57	-0.15	-0.55	-0.42
m2	0.78	-0.59	-0.16	-0.80	0.70	-0.79	1.48	-0.46
N	213	210	213	210	125	125	125	125
1 – RSS/TSS	0.90	0.90	0.93	0.93	0.65	0.69	0.73	0.74

* denotes significance at the 90% level, ** at the 95% level, and *** at the 99% level (two-tailed test). Results for one-step estimation are obtained using DPD98 for GAUSS. Heteroscedasticity adjusted asymptotic standard errors in parentheses. M1 and m2 are tests for first-order and second-order serial correlation in the first-differenced residuals, asymptotically distributed as N(0,1) under the null of no serial correlation. 1 – RSS/TSS: 1 – residual sum of squares/total sum of squares. Y^{p20s}/Y^{40s}: logarithm of mean income of first/second quintile (unadjusted approach, regressions without outliers). Y^{p20c}/Y^{p40c}: logarithm of mean income of first/second quintile (adjusted approach, regressions without outliers).