

Freytag, Andreas; Voll, Sebastian

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Savings and the Debt Cycle: The Ambiguous Role of Institutions

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Savings and the Debt Cycle: The Ambiguous Role of Institutions

Andreas Freytag*/Sebastian Voll**

GLOBAL FINANCIAL
MARKETS

University Jena
Carl-Zeiss-Str. 3
D-07743 Jena

University Halle
Universitätsplatz 5
D-06099 Halle

Tel.: +49 3641 942261
+49 345 5523180

E-Mail: info@gfinm.de
www.gfinm.de

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Abstract

Savings are an import prerequisite of investment and long term growth in a country and the ability of a country to enter a ‘beneficial debt cycle’. The paper analyzes how savings respond to the institutional quality in developing and transition economies. For a panel of about 60 countries over a time span of 25 years, we show that institutions play an ambiguous role. Whereas international market integration exhibits no significant influence, good governance and property rights lead to higher aggregate savings. In contrast, we find that a smaller government is associated with lower savings to income ratios. These findings are robust with respect to a number of changes in explanatory variables, estimation and treatment of instruments.

Journal of Economic Literature Classification numbers: F32, O16, O43

Keywords: developing and emerging economies, governance, institutions, savings

I. Introduction¹

The present analysis starts with the observation that to finance its investment, a country must save substantial parts of its income in the long run. However, in the short and medium run, foreign borrowing can be used to finance the capital stock if domestic savings are insufficient, a fact well researched by the literature on the Feldstein-Horioka ‘puzzle’ (see Apergis and Tsoumas, 2009, for a broad survey). By this, investment and future growth can be raised systematically.

The literature on savings and their drivers concentrates on macroeconomic variables, whereas microeconomic (or rather institutional) drivers of savings and investment have yet only been rarely used to explain savings in a cross-country comparison. Based on the empirical literature on the macro-and micro-determinants on savings, on the idea

¹ We thank the participants of the Martin Paldam Workshop in Aarhus from 28th to 29th September 2012 for valuable comments and precise critique.

of the debt cycle and on the economic theory of institutions we take a look at institutional drivers of aggregate national and private savings in developing and emerging countries.

The remainder of the paper is organized as follows. In section 2, we briefly discuss the previous empirical literature on aggregate savings formation with some theoretical considerations. Section 3 develops these theoretical considerations somewhat further with respect to the institutional drivers of savings. Section 4 is devoted to a short description of the dataset and the considered estimation methods. In section 5, we test these considerations empirically using a comprehensive set of developing and transition countries over almost three decades. Conclusions round off the paper.

II. Literature Overview

II.1 Microeconomic Advances and Macro-Prospect

The drivers of private savings on the micro level, especially for private households or single individuals, are well researched since Milton Friedman's seminal work (1957). Friedman states that life-time and actual income growth shape savings for consumption smoothing over the life, whereas Modigliani and Brumberg (1954) focus on consumption needs of households over the individuals life cycle. Zeldes (1989) and Deaton (1991) argue instead, that large parts of savings are related to the inability of households to borrow today against future income, that is credit constraints play an important role especially if income is uncertain and individuals are impatient at the same time. Following this path, Carroll (1997) further hints at the role of already accumulated wealth as a buffer-stock reserve against income shocks in which wealth has a non-linear relationship on savings.

Where micro-theory has leaped in explaining individual savings formation, the foundation of savings formation on the aggregated macro level in a cross-country comparison is less developed. As national savings are one prerequisite for capital formation and economic growth and necessary to repay debt taken in a 'beneficial debt cycle', the role of national and private savings has gained attention first in the debt crisis of the devel-

oping countries in the 1980s. This has culminated in an extensive empirical research project of The World Bank which has been finished by the year 1998 and lead to consensus on the empirical findings for the time period from 1965 to 1994 (see Loayza et al. 2000). Overall, the macroeconomic determinants have been well researched but there has been only minor interest in the role of the institutional environment in savings formation beside capital market related institutions. To give a short overview, table 1 presents the expected influences of savings determinants as presented by consumption theory and shows empirical findings from different macro-panel studies so far, which we will discuss briefly in the following part.

II.2 Macro-Panel Evidence

The dependence of consumption and thus saving on their past levels can be supported with two arguments. First, consumption and saving change only sluggishly and are determined to a big part by habit formation. Habits are shaped over a longer time period and do not react very quickly (Alessi and Lusardi 1997), therefore the past savings ratio is a relevant explanatory for actual savings. Second, as a result of intertemporal optimization of rational individuals, consumption will only be changed after new information or shocks. Therefore, consumption can be modeled as an AR(1) process (see Hall, 1978), which in turn makes inclusion of lagged savings into a savings model necessary.

The influence of income and productivity growth for aggregate savings is somewhat ambiguous: According to Modigliani's life-cycle theory (Modigliani 1966, pp.167), higher income growth can lead to higher aggregate savings but also to higher consumption today, if income growth in the future is correctly anticipated (Tobin 1967). Intuitively, one could explain that savings rise with income the level of income too, as at very low levels of per capita income the basic consumption needs do not leave spare money for savings. However, beyond such a threshold, neither consumption theory nor macro-empirical evidence provide a clear guidance for the role of per capita income in aggregate savings formation.

Demographic factors are likely to influence Gross National as well as aggregate private savings, as predicted by the life-cycle model: If the old age dependency-ratio is rising, dissaving out of accumulated wealth is likely. The conventional view on the role of the

youth-dependency ratio expects a negative sign: Children are not productive workers and consumption expenditures rise in child-rearing stages of the life-cycle (Higgins 1998). Furthermore, strong family ties can be a substitute for precautionary savings in cases where capital market development is very poor, like expected in many developing countries (Gersovitz 1991, pp.401f.)². Therefore, national savings are found to be lower in countries with higher youth dependency ratios.

Public consumption enters the private savings decisions in a direct way, since private national savings are often calculated as the residual between national and general government savings. The argument often put forward for the theoretical influence of public savings on private savings is that of 'Ricardian equivalence'. Strict equivalence means a one-to-one off-set of public deficits via private savings (Barro 1974), stating that private agents do not see debt financed public goods as net wealth. Instead, they will increase private savings, as they will have to pay the principal plus interest in future periods. Even if strict Ricardian equivalence of public debt can be denied as the overall transmission mechanism is very complex and highly dependent on full information of the citizens, the influence of public savings on private savings is expected to be negative as confirmed in the empirical literature. However, note that a very low reaction of aggregate private savings on public deficits leads nearly to a one by one reaction of Gross National Savings to government savings, giving the government some influence to boost savings in the short term and influence a country's position in the debt cycle.

Income and substitution effects of rate of return movements work in opposite directions. Therefore, exact determination of the interrelation of savings and interest rates is not possible. A rise in the real interest rate raises the cost of actual consumption relative to future consumption, leading to a substitution effect and lower saving rates. The income effect of a rise in the real interest rate works against this direction, as the targeted consumption level in the future can be achieved via lower savings. This might be the reason, why empirical studies find often insignificant or very low effects of interest rates on savings. But even if both effects cancel out each other, the wealth effect can push private savings upwards, as rising interest rates lower the present value of future labor and fixed-interest income streams (Schmidt-Hebbel et al. 1992, pp.532). The real interest is also a function of inflation. Therefore, inflation can have effects on national

2 On the other hand, actual micro-evidence challenges this view: if life-time income is dependent on the investment into education, parents try to save money in the youth of their children to finance this investment when their children become young adults (Chamon and Prasad, 2010).

savings beyond the real interest channel. As higher levels of inflation are often correlated with higher volatility, higher inflation serves as an approximation of macroeconomic stability. Thus, high inflation stands for macroeconomic uncertainty, which should shift precautionary saving upwards.

Concerning the international market integration it is especially argued that higher capital market integration leads to lower national (private) savings, as foreign borrowing constraints are lifted. Usually, the current account balance is used as an approximation for worldwide capital market integration (Schmidt-Hebbel et al. 1992, see our footnote 6 for a comment); this is in line with the theory of the debt cycle (see below). The argument can also be applied to national capital markets: If these are less developed, intermediation between lenders and borrowers is costly. In this case, consumption smoothing via lending is not possible for many citizens on an individual basis, and the precautionary savings motive drives national savings in aggregate upwards (Edwards 1995, p. 23). On the other hand, a developed domestic financial market might also provide incentives to save higher income shares by offering better risk-return profiles and especially reducing transaction costs for potential savers (Sen, Athukorala, 2003), which might influence the aggregate savings rate in the opposite direction.

[Table 1 about here]

III. Savings, Institutions and the Debt Cycle: A Theoretical Primer

This section provides an attempt to incorporate some ideas about how institutions shape savings into a standard model of savings and investment in open economies. The relation of savings to investment in an open economy can be well described using the theory of the debt cycle. Ideally, a developing country can go through a beneficial debt cycle (Kindleberger 1963, pp.458–461). During this cycle, a country first accumulates debt, thereby running a trade deficit (young debtor stage), second starts to repay the debt with a trade surplus (mature debtor stage), third uses the trade surplus to build up net foreign wealth (young creditor stage), and finally maintains this wealth, financing a trade deficit with positive capital yields (matured creditor stage).³ The debt cycle theory

³ This holds as long as the return on the investment is equal for assets and liabilities. If there is a systematic difference between returns abroad and at home, the country may have a net liability position and still show positive net capital yields. Such a situation has been found for the US and is described as dark

is based on the intertemporal approach (for early contributions, see Boehm-Bawerk 1914, and more recently Obstfeld and Rogoff 1994, see also Corden 2007) to the balance of payments dynamics. Siebert (1987), Siebert (1989) and de Long and Siebert (1989) have derived the debt cycle dynamics from an intertemporal optimization problem. With respect to the savings ratio to income, one can simply argue that it has to increase over the cycle to compensate for depreciation of the new capital stock, to reduce foreign borrowing at first and repay accumulated debt stocks later. That is the starting point for our analysis: Which institutional aspects favor higher aggregate savings to income ratios?

The debt cycle model implicitly assumes that the ability of countries to go through the cycle is given. However, there may well be constraints based on institutional failures having influence on both investment and on savings, which are the focus of our analysis. Whereas there has been large debate on the role of institutional quality for economic growth during the past 20 years⁴, the literature on savings formation has widely neglected institutions so far. Draper and Freytag (2008) argue that microeconomic drivers of savings and investment have to be taken into account. These comprise basic freedoms such as civil liberties, political rights, economic freedom and the absence of corruption.

Interestingly, the empirical picture in emerging and developing countries is quite mixed. Whereas some countries, such as South Africa in the 2000s, indeed build up debt and use the related capital inflow for investments, others such as China, accumulate huge savings and net foreign wealth to use it for future domestic absorption. Other authors (Dooley, Folkerts-Landau and Garber 2003) argue that such massive accumulation of savings can be interpreted as an upfront payment to create trust on international capital markets as lacking institutional quality or necessary collateral is not available in the early developmental stages when taking up net debt instead of net savings would be optimal from debt cycle theory. It seems quite obvious that institutions, in particular the organization of the capital market, play a role in the respective calculus. In South Africa, the financial market is well developed and can be compared to OECD countries' financial markets; the financial market in China seems to lack the regulatory

matter (Hausman and Sturzenegger 2006). The dark matter may have an influence on savings, which we do not consider here.

⁴ See Glaeser et al (2004) for a short and critical overview.

prerequisites for a well-functioning match of savers and investors (Corden 2007) as well as a credible property rights regime.

Hence looking at the general picture, the development stories of different countries may differ substantially. Institutions may play a different role in attracting capital compared to building up own saving stocks. In the first instance, one would expect that good institutions help attracting foreign investments. In the second case, good institutions support domestic wealth formation and investment via own savings. However, one may well discuss the opposite line of reasoning: Poor institutions drive out investment. They also might require saving for precautionary reasons by building up large buffer-stocks, since the individuals face an uncertain future with considerably downside risks for their expected income. The empirical analysis in the following two sections tries to identify patterns for the relation of institutions and savings across the developing world. To tackle the issue in a structured manner, we focus on three institutional complexes: First, does international market integration affect savings formation? Second, how does financial and other market regulation and reforms influence aggregate savings and third, is there a general role for good governance, property rights and the size of the state?

IV. Econometric Issues

IV.1 Dataset and hypothesis description

IV.1.1 General setting

For our estimation, we consider a wide range of developing and transition countries⁵ over the time span from 1980 to 2007. Data for the Gross Domestic Product, real growth rates or productivity are drawn from the Penn World Tables 7.0 as from August 2011 (Heston et al., 2011). Data for Gross national savings and government savings are drawn from the World Bank database and the IMF Government Finance statistics.

As dependent variable, we use Gross National Savings and Gross National Private Savings in relation to GDP. Usually, private savings are calculated within the framework of national account statistics as the residual of gross national savings minus general

⁵ A country list is given in the appendix.

government savings and we use this definition, too. Unfortunately, this is not the optimal measure for the problem at hand. Our measure of private savings especially contains savings of private companies and non-profit organizations by construction. An optimal measure would be private savings of households in relation to average household disposable income. However, neither of both variables is available for a large number of countries and/or over a long time span, which is necessary on the other hand to isolate the influence of the institutional setting which we are interested in primarily. A broad description of the other control variables including their sources and treatment can be found in the appendix. For our three areas of interest, we use several sources like described below.

IV.1.2 International market integration

Integration of the domestic economy into the world markets may be relevant for explaining savings behavior at large, because it isolates against or reduces purely domestic shocks and decreases credit constraints. An open capital account is assumed to lead to lower savings of an economy, because it enhances foreign borrowing abilities of its residents, but especially companies and the government on world capital markets. Furthermore, international trade integration makes tradable goods cheaper due to foreign competition, raising purchasing power and therefore leaving more funds to save. Additionally, impatient consumers can follow their needs because ('western style') products are available in higher quantities and better price ranges.

Therefore, we test for integration using three different institutional indices: The 'traditional' trade openness, measured as import plus export volume divided by GDP which we take from the PWT 7.0, having very high time and country coverage. The drawback of this measure is that larger countries have generally lower openness measures by this definition, as there is more potential for intra-national trade, so this variable is biased by construction. An index for the openness of the capital account and therefore integration into the world exchange and capital markets is given by Chin and Ito (2006), and actually updated to 2010. Overall, it is a more consistent measure than the usually used Current Account balance to GDP ratio⁶. It is based on an aggregate of

⁶ We do not use a measure of the current account balance like some earlier empirical studies. It can easily be shown that in this case the actual savings rate is estimated by a fraction of its own value, as the current account balance nearly equals gross national savings – our dependent – minus gross capital formation. More importantly, the usual way to interpret the current account balance as an international

binary coded dummy variables from restrictions on cross-border transactions assessed yearly by the IMF and ranges from -1.86 to 2.43 in our version. The last measure is subgroup four of the Economic Freedom index (Gwartney and Lawson, 2009), the ‘Freedom to trade’ ranging from zero to ten with ten indicating higher freedom to trade internationally. Different aspects are contained within this index: first, measures concerning merchandise trade (tariffs, export taxes, trade regulations). Second, the subgroup contains measures for the access to foreign currency (black market premia, exchange rate controls, capital controls). So it measures the regulatory costs of tariff and non-tariff trade barriers, affecting the price level of tradable goods in the country. Note that this approach differs in its interpretation from the terms of trade concept, which looks at effects of external trade relations, whereas our approach focuses on the internal influences of a specific national institutional arrangement.

IV.1.3 Domestic market regulation

Concerning market regulation, we use three indices from two sources: An index for the regulation of the domestic financial market as given by Abiad et al (2008), Subgroup one of the Economic Freedom index (Gwartney and Lawson, 2009) capturing the ‘Size of the Government’ with respect to market interventions via government enterprises, subsidies and taxes and an overall index of goods, credit and labor market regulation from subgroup five of the same source.

The reason for including regulation of credit markets is evident and founded in the credit-constraints argument from consumption theory. However, preceding large cross-country panel studies have used monetary aggregates or aggregate financial sector statistics as approximation of credit market development which is also one of our control variables, whereas studies with an evaluation of overall financial market regulation have been limited in their country coverage (see for example Bandiera et al, 2000). The tests for our baseline models have shown that monetary or credit aggregates are of limited value in explaining savings formation in our sample. Concerning overall market regulation, we would expect a negative influence as regulation, even if suboptimal, reduces uncertainty by providing a framework for market actors if income is c.p. unaffected.

borrowing constraint is not correct, as this would mean, in a cardinal interpretation inherent in every linear estimation framework, that current account surpluses are a sign of strong borrowing constraints and only current account deficits are a sign of borrowing ability. Whereas the latter should hold on average, the first aspect clearly does not.

When it comes to direct market interventions via a ‘big government’, we would expect the opposite: ‘big governments’ tend to discretionary economic policy, favouring government owned enterprise or sectors at the costs of private initiative and citizens, enlarging risks for these.

IV.1.4 Good governance and property rights

The last and perhaps most relevant aspect for us is the question if good governance variables influence the savings behavior in developing and emerging economies. Various indices exist trying to capture the manifold dimensions of good governance. We have decided to take on three sources of indices, mainly for their longer term availability over several countries, as many other measures are of limited time span or country coverage. The first is subgroup two of the Economic Freedom Index (Gwartney and Lawson, 2009), ranging from again from zero to ten. It covers the issue of Property Rights (judicial independence, military interference into justice and politics, intellectual property rights). The next index is the so called revised, combined ‘Polity2-Index’ from Marshall and Jaggers (2002) measuring the degree of democratic participation, with values approaching ten representing high democracy scores and lower values lower democracy. A last measure, the Quality of Governance Index from the International Country Risk Guide (by the PRS-Group, 2010) is itself a mixture of good governance assessments: corruption, rule of law and the quality of bureaucracy and is scaled between zero and one, with higher values indicating better governance from our viewpoint. The latter two indicators have been taken from Teorell et al. (2011).

For Good Governance and Protection of Property rights to have an influence on aggregate savings formation, they must alter one of the two driving forces for savings: expected life cycle (consumption smoothing) or risk for unexpected (precautionary saving) expenditures. At one hand, a benevolent government reduces uncertainty for the future by providing support and assistance in case of unforeseen events hitting a part of the society as a whole, like disasters but also economic crisis and poverty affecting a relevant number of its citizens. It may also provide the foundation for continuous economic growth, thereby reducing the necessity for monetary buffer-stocks against longer termed income reductions. On the other hand, good governance and stable property rights give incentives for monetary wealth accumulation, providing a supply side for savings as well as giving investment incentives representing the demand side.

IV.2 Discussion of estimation model choice

The underlying macroeconomic dataset makes the choice of a fixed effect panel data model reasonable. However, intertemporal consumption theory (Hall, 1978), the macro-empirical evidence as well as first tests for autocorrelation of residuals in a fixed effect framework hint at the inclusion of the lagged dependent variable. In a fixed effect model, inclusion of the lagged dependent variable biases the coefficient estimates downwards (Nickell, 1981). This bias only vanishes in infinite samples.

A second problem with fixed effect approaches is that variables with relatively low variation over time in comparison with their cross sectional variation (see Table 12) are highly correlated with the unobserved country specific (fixed) effect. Therefore, country dummies in a pooled OLS or the within-transformation of a fixed effect model take a large part of the cross-sectional variation away. As stated in the empirical literature covering saving rates, fixed effects might therefore only be a first hint on the influence of variables.

Furthermore, in our macro-estimation framework, endogeneity and heteroscedasticity due to country differences are present. Endogeneity of variables means that one explanatory variable is determined by the value of another one (and vice versa) in which case both variables violate the standard orthogonality assumption for the individual error terms. Consider for example the case of the variable ‘real GDP per capita’ which is influenced by the value of the ‘real interest rate’ or the actual ‘real growth rate of GDP’. These endogenous relations might bias the estimation results. The by now standard method of first differencing and using a generalized method of moments (GMM) can handle both problems of Nickell bias and endogeneity⁷. Furthermore, this approach is stated to be consistent to heteroscedasticity. However, as the GMM approach relies on using lagged values of the explanatory variables as instruments, possibly weak instruments might lead to less efficient estimates.

In contrast to comparative studies by Schrooten and Stephan (2005) and Terrones and Cardelli (2005), our preferred method is the system GMM estimator instead of only using the differenced GMM. By using the system GMM method, we can make use of

⁷ See the approach first proposed by Arellano and Bond (1991) and generalized by Arellano and Bover (1995) and Blundell and Bond (1998).

the full information contained in the level- and differenced equations. Relying on the differenced estimator alone, we would forgo the information from variables which have high cross-sectional variation but a very low variation over time. Furthermore, the system GMM estimator improves not only precision of the estimates, but reduces small sample bias in comparison to the difference GMM. The differenced and system GMM methods utilize lagged values of the relevant variables as instruments. This is one possibility to cope with endogeneity of some of the explanatory variables, as the change of the actual value of one variable can often be assumed to be independent from past changes or levels of other explanatory variables. In our estimation we assume that only the demographic variables, the oil balance, regional dummies and the institutional indices are exogenously given, whereas all other variables are treated as endogenous. Of these variables, we use the second lags as instruments in the differences and the levels equations⁸. The lagged dependent variable is of course treated as predetermined, so we use the first lag of the lagged dependent.

The next choice we face is one or two-step estimation procedure. The two-step estimator is the optimal estimator for system GMM in theory (Baltagi, 2008, p.150) as it is robust to heteroscedasticity. However, in small samples with a low number of groups the two-step system GMM standard errors are biased downwards. A possible correction for this is using the robust standard errors proposed by Windmeijer (2005). However, Bond (2002, p.150) recommends the one-step estimator for small samples, as calculating the weighting matrix for the second step relies on conventional asymptotic properties which are not met in cases with a low number of groups. This is the case for our estimation sample, with a minimum of 40 and a possible maximum of 100 developing and transition economies. Furthermore, Bond (2002, p.151) argues that efficiency gains due to heteroscedasticity consistency are often only modest in the two-step estimation. Therefore, we rely on the one-step estimation method, and use robust standard errors adapted to panel specific heteroscedasticity. For our calculations, we rely on the `xtabond2` package developed by Roodman (2006) for the Stata software program, which allows for a wide range of instrument specifications and tests.

⁸ Note that Loayza et al (2000) have decided to treat all variables as predetermined, using not second but first lags as instruments, thereby improving efficiency of their estimates considerably at cost of coping with the endogeneity problem.

To check the validity of these instruments, we perform Hansen's J-test on exogeneity of instruments⁹ and the difference-in Hansen-test for exogeneity of selected instrument subsets (see Table 11 for an overview). The Hansen-test basically checks whether the residuals of the IV-estimation are uncorrelated with the used instruments under the Null 'the instruments are exogenous' and if the exclusion of the instruments from the original regression is therefore justified. Overall, the number of instruments is increasing quartic in t , and so is the number of moment conditions. As the Hansen-test is weak with the tendency to never reject the Null if T is large¹⁰ and our dataset lies in the relevant range of group observations where this has been proven by Monte Carlo studies, we reduce the number of utilized instruments by stacking the instrument matrix of the GDP growth rate, inflation rates as well as the government savings and the domestic credit to the private sector like proposed by Roodman (2006, p. 22; 2009, pp. 148). We further reduce the instrument count in our robustness checks by splitting the sample in different time periods. However, in our robustness analysis, we try also to release these assumptions and use the complete instrument set to get higher efficiency in coefficient estimation (see

Table 8). Especially the latter results can be interpreted as a strong encouragement of our model specification.

V. Results

V.1 Estimation Procedure and Discussion

V.1.1 General Setting

To begin with, we run a simple regression on our savings variables as well as most relevant control variables (demographics, GDP, real GDP growth, inflation, the oil trade balance). To detect outliers, we calculated Cook's Distance of every observation and excluded countries, where the distance measure exceeds $4/N$ at least one time, like pro-

⁹ An alternative test would be the Sargan test. As this test is not robust to the presence of heteroscedasticity, it very often fails to reject the Null of inappropriate instruments in our case. This might also explain why this standard test is also not reported in Terrones and Cardelli (2005), for instance.

¹⁰ Zero rejection rates have been observed for even mediocre combinations of N and T , namely (126, 16), (85, 13), (70, 112) and (40, 10), see Baltagi (2008, p. 154).

posed in many textbooks. This drops five countries from our sample (Kuwait, Angola, Congo, Rwanda and Libya). Looking at the reasons for outlier behavior in these cases, we find war, civil war and disasters as explanations. To be sure to get a reliable picture of savings behavior in one country and not only a single snapshot, we dropped countries where less than 10 consecutive observations are available. Overall, this gives us a basic sample of 56 emerging and developing countries with a total of 842 observations. Note that due to reduced observations in some of the other control and institutional variables, some regressions use lower counts of observations.

We have decided not to include the real per capita GDP in our regressions: First, as Table 2 shows, it is itself as an explanatory variable insignificant, it turns other, theoretically and empirically well founded variables into insignificance and there is only weak theoretical foundation in intertemporal consumption optimization models as well as inconsistency macroeconomic evidence for the level of income. Therefore, including the GDP per capita is kept for robustness checks at the end of the chapter. We further abstain from including time dummy variables, as these enlarge the instrument matrix in our system GMM framework considerably and render Hansen-test statistics meaningless, as it then never rejects the null of instrument exogeneity.

V.1.2 Baseline Model Specifications

As we can infer from Table 2, the Fixed Effects estimation provides often comparable results in coefficients and significance like the System GMM models, but only in case of variables with higher variation over time, but not for variables with high persistence. The latter (demographics, credit to the private sector) coefficients are biased due to multicollinearity. As our institutional variables of interest have also high persistence over time, we abstain from further usage of Fixed Effects estimations. Therefore, our preferred baseline specifications are those from the models (2) for Gross National Savings and (6) for our aggregate private savings measure (Table 2). Concerning the test statistics, the AR(1) and AR(2) test point at the feasibility of using System GMM and the Hansen-test does not reject exogeneity of our chosen instrument set¹¹ as well as the difference in Hansen test does for the individual variable instruments (Table 11).

¹¹ Note that the Sargan test rejects the same Null hypothesis, because this test is not robust against the heteroscedasticity present in our sample. Therefore we do not report further this test.

Overall, our control variables for demographics and growth have expected sign and size and match previous empirical findings.

We can further see that higher domestic credit to the private sector is associated with higher gross national and private savings ratios, somewhat counter intuitively to the credit-constraints argument. However, note that in emerging economies, credit expansion in an underdeveloped credit market does not necessarily mean a lifting of borrowing constraints for private households, which might still be lacking collateral, but improving the financing situation of (private) companies. Therefore, an inflation neutral credit expansion to the private sector means also an enlargement of investment opportunities in normally underdeveloped credit markets, giving possibly rise to consumption postponement to finance prospective projects or expensive durable consumer goods in the future. An interesting point relating to money and credit expansion is inflation, because theoretically and empirically its effects on savings remain unclear. In our sample, actual inflation drives savings upwards, whereas longer-termed average inflation influences savings formation negatively, which is for itself a new and interesting result previous studies have not found so far. Whereas higher actual inflation might hint at economic uncertainty and thus raise buffer-stock savings (Carroll 1992, for example) or give economic agents surprisingly more money than planned for consumption (Deaton, 1972), higher inflation in the long run lowers purchasing power and the possibility to save. Nevertheless, significance levels for inflation rates are more convincing for the Gross National Saving rates than for private savings, therefore we should be careful with an interpretation along these lines. This brings us to a general problem in many of our following estimations, as our model performs relatively well in relation to Gross National Savings but is somewhat less consistent with aggregate private savings.

[Table 2 about here]

V.1.3 The Role of Integration into the World Economy

In chapter 4.1 we stated that we would expect international market integration to have some influence on savings formation. As can be taken from , none of these considerations can be supported by our dataset: This sheds some light on the relevance of an open current account for aggregate savings formation if we use an institutional index instead of the current account balance as indicator, as we do find neither positive nor negative effects. Also, the net foreign asset position and its growth rates do not seem to influence savings by themselves, but are rather a result of previous net national savings. The same holds for trade integration and trade regulation: if these increase saving rates, the relevant channel might be income or productivity growth without an own influence.

[Table 3 about here]

V.1.4 Domestic regulation of credit and goods markets

When it comes to the regulation of credit markets, theory states that lower regulation leads to lower savings. As indicator we use the financial reform index from Abiad et al (2008). We cannot confirm lower savings in case of Gross National savings as the coefficient is not significant at conventional levels, but for our aggregate private savings measure the effect is strongly significant with negative sign like expected in consumption theory. Interestingly, the index on overall market regulation from subgroup five of the EFW-index is not significant. It might be that lower labor regulation leads to higher precautionary savings, giving an opposite effect to the credit market regulation element also contained within this index. The most interesting result of table 3 however is the large and negative effect exhibited by our ‘small government’ measure on savings formation. Subgroup one of the EFW-index contains measures for tax levels, government subsidies and state owned enterprises which influence savings positively if present. The higher the score of a country in this category, the ‘smaller’ and more market friendly – with lower taxes, less state lead enterprises – a government is evaluated. Note that we already control for deficit financed government expenditures. Additionally, we

have included the government consumption share to GDP (from PWT 7.0) as control variable, which is itself insignificant, but the result remains unchanged¹².

One can only reason about the transmission channel of this effect, but it might well be that small governments in developing and emerging economies leave a higher disposable income or purchasing power to the private sector, increasing available income and thus saving on the micro level. On the other hand, big states with many government lead companies might spend much money into these (inefficient) areas, but (too) less into education and social security, leading people into higher old age, child education related or precautionary savings. However, as the AR(2) test for model 23 shows, presence of an AR(2) process can not be rejected in case of our private savings regression, so estimates are not reliable in this case. Furthermore, a difference in Hansen test for exogeneity of the first subgroup of the EFW-index rejects exogeneity of its instruments (see Table 11). However, in our robustness tests with the full instrument set, the difference in Hansen-test does not reject the same hypothesis for our models in Table 7 and Table 8, so an interpretation along these lines seems justified.

[Table 4 about here]

V.1.5 Good Governance, Property Rights and the Size of Government

The most interesting question from an institutional perspective is, whether property rights protection, good governance or corruption exhibit any influence on savings formation. Concerning the quality of the property rights regime we find a significant and positive relationship between our property rights indicator (subgroup two of the EFW-index) and gross national as well as private savings. So, better property rights seem to drive savings upward, which would help developing countries and transition economies in an ideal debt cycle development. Unfortunately, the transmission channel again is quite unclear: Better property rights might encourage savings for later investments into (small and large) business projects, own houses or other consumer durables. As another indicator of good governance, the Quality of Governance indicator by the PRS group out of the International Country Risk guide combines law and order, corruption and bureaucracy in one aggregate. This composition is significant with a positive value, indicating that better governance is associated with higher gross national and private

¹² Results not reported.

savings in our sample. As corruption is part of the International Country Risk Guide indicator, we cross checked the result for corruption with the World Bank Governance Indicator on control of corruption and the Transparency International Corruption Perception Index (both from Teorell et al, 2011), which are not significant. Note that these indicators have very limited time coverage and comparability over time which might influence results. But overall, corruption seems not to be one influencing element alone in savings formation, so the results of the ICRG-indicator might be driven by its property rights and judicial independence elements as confirmed by our solitary EFW-indicator “property rights”.

On the same level one could argue that good governance in form of higher democracy and civil participation rights have some influence on precautionary or life cycle savings formation. As can be drawn from Table 5, our used polity2 score does not show evidence for such considerations.

[Table 5 about here]

V.2 Robustness

V.2.1 Alternative and additional control variables

For our baseline model, we have also taken on several, in the empirical literature on aggregate savings formation, the current account balance development or the foreign asset position discussed determinants. These include the broad money to GDP, M2 or quasi money to GDP and domestic credit given through the banking sector, the real exchange rate development, net foreign aid flows, the fuel trade balance, population density and share of urban population, real interest rates (all from the world bank database), population growth rates, productivity growth, average GDP growth rates (all from Heston, Summers 2011 Penn World Tables) and the net foreign asset position¹³ (from Milesi-Ferretti and Lane 2006) in its lagged values and first differences. All of them have been very inconsistent in their coefficient sign and barely and/or seldom

¹³ Which have been part of an extensive and very inspiring research project by Christiansen et al. (2009).

significant over comparable model specifications. Therefore we did not include them further into our estimations.

Including the real GDP per capita is a general means of macroeconomic model testing. Utilizing the real GDP per capita correctly as an endogenous, explanatory variable alters significance levels and coefficients of some of our control variables, like inflation, average inflation, domestic credit to the private sector and sometimes government savings like described previously in our baseline model specification and presented in Table 6. The real GDP itself is insignificant throughout. Additionally, the test on an AR(2)-process of the residuals fails in four cases to deny non-existence of such a behavior, therefore the system GMM method should not be applied for this model specification overall. However, sign and significance of our institutional variables are unchanged for our EFW-measure of property rights regime and the overall quality of governance, so our results can be seen as robust from this side, but not for the EFW-subgroup one of the ‘size of government’.

[Table 6 about here]

Next, we have included dummy variables for geographic regions ‘Sub Saharan Africa’, taking account of the very low level of GDP per capita and thus perhaps an inability to save as income is near subsistence levels for parts of the society. The next geographical dummy is for the South and Eastern Asian region, as it is often argued the citizens there have a much higher propensity to save or lower time preference from a cultural background. Note that our SSA-dummy has its expected negative sign but is never significant, our dummy for south and eastern Asia has also expected sign but is significant only in one out of six model specifications. In contrast, all of our institutional variables remain with their expected sign and have strong significance. We therefore conclude that geographical or cultural specialties do not dominate common institutional influences on aggregate savings formation.

[Table 7 about here]

V.2.3 Alternative model specifications

The next robustness issue is the usage of the full instrument set instead of our restricted ones. We drop the stacking of the instrument matrix and use all available lags for our

control variables as instruments. This drives instrument count strongly upwards to between 490 and 511 instruments used on 47 to 49 countries and leads the Hansen-test to fail in its ability to detect non-exogenous instruments. As we already know from our previous analysis and the accompanying tests, the chosen instrument set is in general exogenous so we ignore this test statistic for now. As can be seen from Table 8, the EFW index for the quality of property rights and the index for the quality of governance from the international country risk guide remain strongly significant without a change in their signs. Also, the behavior of our control variables is in general as expected but additionally, significance levels rise strongly as could be expected from higher efficiency due to a larger instrument set. We take this as a strong encouragement of our model specification.

[Table 8 about here]

In the next robustness check we change the time periods, as given in Table 9a-c. For this, we have divided the sample into three periods: 1980 to 1989, 1990 to 1999 and 2000 to 2007. Due to limited data availability, the first period contains just eight countries, the next period 43 to 49 and the last 45 to 49 countries. The model breaks down for the first period due to the low number of countries, as eight macro-variables might be able to explain the general pattern of savings behavior in a large country pool over a longer time horizon, but hardly for a handful of countries in a small time span. Note that we also had to increase the size of our instrument matrix to extract any meaningful results at all. We used one instrument(-column) for every period and for the endogenous variables lags two to three and the predetermined variables the first and second lags. Therefore, instrument count lies between 38 and 135 instruments for eight to 49 countries and the Hansen-test goes again to unity. Overall, our EFW variable for the 'size of government' loses its significance, but keeps sign and coefficient size. The second subgroup of the EFW-index 'quality of property rights' keeps its significance level for 1980 to 1999, but is insignificant thereafter, whereas the assessment of good governance gains significance in all regressions after 1990. So we have to state that the influence of the size of the government varies over time or is strongly dependent on the sample and time period, whereas institutional aspects of property rights and good governance seem to be more stable over time and in their influence on Gross National and aggregate Private Savings ratios.

[Table 9a-c about here]

An alternative model specification for our institutional variables could be to treat these not as exogenous, but as endogenous variables, too (Table 10). Note that this might be justified for our ‘size of government’ measure, consisting of actual economic data covering tax rates, government consumption and related parts of the index. On the other hand, endogeneity of our good governance and property rights indices can hardly be assumed, as judicial rules, perceived corruption or expert assessments on the quality of property rights regimes and judicial independence are hardly influenced by the actual development of interest rates, growth or inflation. Nevertheless we have included them in our GMM instrument set with their second lags instead of the original values. As expected, our measure for ‘size of government’ is still significant with expected sign even as endogenous variable, but this does not hold for our property rights and good governance indices which do not change sign but get insignificant if treated as endogenous instead of exogenous.

[Table 10 about here]

V. Conclusion

The paper has analyzed the drivers of savings in developing and transition countries. The results are first in line with the empirical literature: old and young age dependency, past savings behavior, GDP growth and oil abundance have the expected signs and are significant. A new and interesting feature is the differential influence of average (anticipated) inflation versus actual inflation rates. We then add institutions such as freedom to trade, size of government, the quality of property rights and general governance indicators.

The quality of institutions has indeed an ambiguous effect on the saving formation in developing and transition countries. First, general measures of governance and the quality of property rights have a positive effect on savings, which is not dominated by the level of income or regional/cultural aspects. This fits into the literature on institutions and growth, supporting the hypothesis that ‘better’ institutions have a positive

impact on long term growth. Our results hint at a transmission channel of domestic savings to finance the domestic capital stock. At the one hand, this reduces dependence on (more volatile) foreign investments for emerging economies during their catch-up process. On the other hand, the idea of a beneficial outcome of a debt cycle for developing economies gets more likely if institutions are improved. Not only because it possibly stimulates growth, but especially because the aggregate saving rates will rise, which is a necessary precondition in the mid-phases of a debt cycle.

As a second result, the 'size of government' influences savings in a negative way, even if we control for public deficits or the share of government consumption. This is in line with theoretical considerations that the incentives of public spending on savings are unclear. On the one hand, a 'big government' can mean more corruption, slack and inefficient market interventions, leading to an increase in precautionary savings. On the other hand, big government can imply higher stability and less volatility of government actions, stabilizing the economic framework even if large parts of it are inefficiently organized from a market perspective.

Overall, our results seem plausible as drivers of savings are manifold. What is lacking so far is a theoretical model that relates savings to institutions in a manner allowing better forecasts and clear hypotheses. The results of this paper at least are encouraging and will hopefully lead to detailed theoretical and empirical work.

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Appendix

Dataset, description of the main variables and selection process

Gross National Savings to GDP: Are taken from the IMF World Economic Outlook 2012 database.

Government Savings (./ deficit): We use General Government Net lending to GDP from the IMF World Economic Outlook database as approximation of governmental budget deficits. We dropped 14 observations, where the deficits exceeded -25% of GDP as extreme outliers.

Private Savings: Is Gross National Savings minus Government Savings. We dropped one case, where Private Savings exceeded 150% of GDP as inconsistent or extreme outlier.

Actual Inflation: Is Consumer Price Inflation taken from the World Development Indicators. We truncated inflation values above 50% (which is the defined border for hyperinflation) and set all values above 50% to this. This has been applied to 325 of 4512 observations in the basic dataset.

3-year average inflation: Inflation average over the last three years previous to the year under consideration.

Real interest rates: Are taken from the World Bank Database and have been truncated to -10% to 50% which replaced 190 values below -10% and 34 over 50% out of 3534 observations.

Real GDP, log: Is the log of the variable 'rgdpch' taken from the PWT 7.0. It is the Real GDP, chain linked series in PPP prices with 2005 as base year.

Real GDP growth: Is the variable 'grgdpch' taken from the PWT 7.0 which is the real growth rate of the 'rgdpch' series.

Domestic Credit to the private sector to GDP (also: Broadmoney to GDP, M2 and quasi-money to GDP, Credit given by the Banking sector to GDP): Have been taken from the World Bank database. Values of zero have been replaced as missing.

Old age (youth) dependency ratio: Ratio of people over 65 (below 15) years to working age people between 15 and 65. Data is taken from the World Bank database.

Population: Population in million is taken from PWT 7.0. Countries with less than 1 Mio people are dropped, to avoid problems due to large capital account based transactions in so called 'tax heavens' like Bahamas etc.

Oil trade balance: Is the volume of oil exports to GDP minus oil imports to GDP, taken from the World Economic Outlook database 2011. In one country, imports were counted as negative entry in the dataset, which we corrected.

EFW-Indices: Are the interpolated chain-linked versions taken from Gwartney, Lawson (2009). As the institutional data is only available in 5-year steps from 1970 to 2000 and annually thereafter, we do a linear interpolation between two data points where necessary for our yearly estimations, which has been previously applied on this indicator by de Soysa and Neumayer (2005), for instance. As institutions develop slowly over time, a linear estimation comes close to the gradual development inherent in every evolution of institutional quality. Furthermore, as the indices are constructed from different sources including surveys, the normal measurement error and our error due to linear interpolation are two sides of the same coin, leading us to the conclusion that our error can be tolerated given the long time span and country coverage.

IMF Capital Account Openness: We use the Chinn and Ito (2006) index based on IMF's Annual Report on Exchange Arrangements and Exchange Restrictions (AREAER) in its 2012 version.

Trade Openness: Imports plus Exports to GDP in 2005 constant prices, it is the variable *openk* taken from the Penn World Tables 7.0.

Polity2 – Democracy: Is the revised combined polity2 score from Marshall/Jagers (2002), taken from Teorell et al. (2011)

Quality of Governance: Is the aggregate indicator from the International Country Risk Guide of the Political Risk Group which we have taken from Teorell et al. (2011).

List of countries in our baseline models:

Albania, Argentina, Bangladesh, Belarus, Benin, Bolivia, Botswana, Brazil, Burkina Faso, Burundi, Cambodia, Chile, China, Colombia, Cote d'Ivoire, Ecuador, El Salvador, Estonia, Ethiopia, Gabon, Ghana, India, Jamaica, Jordan, Kenya, Latvia, Macedonia, Malaysia, Mexico, Moldova, Mongolia, Mozambique, Namibia, Niger, Pakistan, Panama, Papua New Guinea, Paraguay, Philippines, Poland, Russian Federation, Singapore, Sri Lanka, Sudan, Swaziland, Syrian Arab Republic, Tanzania, Thailand, Togo, Tunisia, Uganda, Ukraine, Venezuela, Vietnam

Tables:

Table 1: Determinants of Aggregate Savings

Category	Variable	Expected Sign	Empirical Findings ^{a,b}
Behavioral persistence	Lagged savings	+	+ (1, 5, 6, 7)
Income and Growth	Income level, actual	+	+ (1, 3) 0 (2)
	Growth of income, actual	+/-	+ (1, 2, 3, 6, 7) 0 (5)
	Productivity growth	+/-	+ (4)
	Terms of Trade, % change	+	+ (1, 4, 5, 7) 0 (2)
Rates of Return and Macroeconomic uncertainty	Inflation rates	-	+ (1) 0 (2, 4, 5, 6)
	Real interest rates	-	- (1, 3, 4) 0 (5, 6, 7)
	Political Stability	+	0 (3)
	Political Assassinations	-	0 (3)
Domestic borrowing constraints	broad money growth /private credit growth	-	- (1) 0 (7)
Foreign Borrowing constraints	Current Account Balance	+	+ (3, 6)
Development of Financial Sector	Broad Money/GDP or M2/GDP or private Sector Credit/GDP	-	0 (1) + (3) –(6, 7)
Fiscal Policy	Public Saving	-	- (1, 3, 4, 6) + (7)
	Public Sector Surplus	-	- (2, 5)
	Public Consumption	-	- (2, 5)
Social Security System	Social Expenditures	-	- (3) 0 (6)
Demographics	Old age dependency ratio	-	- (1, 7), 0 (4)
	Young age dependency ratio	-	- (1)
	Dependency ratio	-	0 (2, 5, 6) – (3)
	Urbanization	-	- (1, 3)
Wealth and Income distribution	Income concentration	+	- (3)
	Wealth/GDP	-	0 (2, 5)

a) (1) Loayza et al. (2000), table 4, column 7; (2) Masson et al. (1998), table 2, column 4; (3) Edwards, 1996, table 2; (4) de Serres and Pelgrin (2003) table 5, column 3; (5) Haque et al. (1999), table 5 and table 6, column 6; (6) Schrotten and Stephan (2005) table 3; (7) Terrones and Cardarelli (2005), table 2.2, column 2;

b) Significant coefficients are indicated by a '+' or '-'; insignificant findings are indicated by a zero.

Tables: Main Results

Table 2: Baseline model specifications

Dependent variable: Method	(1) GNS FE	(2) GNS Sys- GMM	(3) GNS FE	(4) GNS Sys- GMM	(5) PrSav FE	(6) PrSav Sys- GMM	(7) PrSav FE	(8) PrSav Sys- GMM
Lagged Dependent Variable	0.531*** (0.0490)	0.436*** (0.104)	0.522*** (0.0527)	0.580*** (0.133)	0.457*** (0.0424)	0.388*** (0.119)	0.447*** (0.0466)	0.524*** (0.132)
Youth Dependency	-0.0987** (0.0380)	-0.161*** (0.0566)	-0.0689 (0.0428)	-0.199 (0.127)	-0.107** (0.0456)	-0.166*** (0.0610)	-0.0779 (0.0483)	-0.194 (0.139)
Old Age Dependency	0.159 (0.307)	-0.552*** (0.194)	-0.164 (0.410)	-0.371** (0.181)	-0.0256 (0.345)	-0.565** (0.220)	-0.337 (0.520)	-0.361* (0.196)
Real GDP, log			2.454 (1.736)	-2.942 (3.828)			2.399 (2.012)	-2.876 (3.997)
Real GDP growth	9.408*** (3.039)	17.55** (8.491)	8.069*** (2.997)	20.86** (8.532)	8.736*** (3.090)	13.17 (11.74)	7.471** (3.140)	15.23 (11.95)
Government Savings (./deficit)	0.216*** (0.0604)	0.193 (0.119)	0.220*** (0.0622)	0.129 (0.120)	-0.514*** (0.0637)	-0.377** (0.168)	-0.515*** (0.0646)	-0.291 (0.199)
Oil/fuel trade balance	0.339*** (0.0517)	0.255*** (0.0591)	0.339*** (0.0507)	0.308** (0.123)	0.342*** (0.0566)	0.258*** (0.0598)	0.343*** (0.0559)	0.310** (0.131)
Domestic Credit to the Private Sector, % of GDP	0.0132 (0.0169)	0.0501** (0.0251)	0.000125 (0.0168)	0.0546** (0.0277)	0.0354** (0.0171)	0.0616** (0.0293)	0.0222 (0.0188)	0.0743** (0.0323)
Inflation Rate	0.0967*** (0.0259)	0.143*** (0.0496)	0.100*** (0.0253)	0.125** (0.0521)	0.0581** (0.0225)	0.0725 (0.0480)	0.0623*** (0.0224)	0.0241 (0.0569)
3 year average inflation, excl. actual year	0.0619*** (0.0209)	-0.0880** (0.0393)	0.0627*** (0.0212)	-0.0816* (0.0465)	-0.0488** (0.0228)	-0.0419 (0.0462)	-0.0497** (0.0231)	-0.0185 (0.0563)
Observations	790	790	790	790	790	790	790	790
Countries	54	54	54	54	54	54	54	54
R2-within	0.489		0.492		0.472		0.474	
R2-between	0.830		0.840		0.787		0.788	
R2-overall	0.777		0.775		0.699		0.702	
min. years	9	9	9	9	9	9	9	9
max. years	25	25	25	25	25	25	25	25
av. years	14.63	14.63	14.63	14.63	14.63	14.63	14.63	14.63
AR(1)-test, probability		0.000970		0.000973		0.000269		0.000193
AR(2)-test, probability		0.867		0.940		0.874		0.656
Hansen-test statistic, prob		0.348		0.293		0.499		0.425
Sargan-test statistic, prob		0.125		0.000709		0.102		0.000172
Number of instruments		41		43		41		43

1) constant not reported 2) bold values indicated 99% and 95% significance levels. 3) ***(**)(*) indicate 99% (95%)(90%) significance values. 4) Numbers in brackets are the corresponding t-values in case of the FE estimations and z-values in case of System GMM 5) FE: Fixed Effect Model estimation, robust standard errors; Sys-GMM: System GMM estimation, panel specific heteroscedasticity adjusted standard errors

Table 3: Integration into the World Economy, System GMM estimations

Dependent variable:	(9) GNS	(10) GNS	(11) GNS	(12) GNS	(13) GNS	(14) PrSav	(15) PrSav	(16) PrSav	(17) PrSav	(18) PrSav
Lagged Dependent Variable	0.440*** (0.115)	0.423*** (0.102)	0.572*** (0.0882)	0.561*** (0.0858)	0.504*** (0.110)	0.406*** (0.121)	0.378*** (0.120)	0.494*** (0.103)	0.496*** (0.107)	0.506*** (0.146)
Youth Dependency	-0.166*** (0.0608)	-0.141*** (0.0518)	-0.135*** (0.0470)	-0.133*** (0.0434)	-0.144*** (0.0519)	-0.169*** (0.0630)	-0.146*** (0.0550)	-0.160*** (0.0605)	-0.141*** (0.0489)	-0.154*** (0.0551)
Old Age Dependency	-0.575*** (0.211)	-0.499*** (0.182)	-0.471*** (0.146)	-0.469*** (0.145)	-0.494*** (0.174)	-0.576** (0.228)	-0.512** (0.203)	-0.538*** (0.184)	-0.486*** (0.175)	-0.501*** (0.185)
Real GDP growth	18.06** (8.379)	14.45* (8.058)	4.852 (8.135)	19.05** (7.898)	18.17** (9.117)	13.42 (12.30)	9.665 (11.08)	-4.491 (12.47)	11.39 (12.89)	10.63 (14.77)
Government Savings (./deficit)	0.213* (0.124)	0.210* (0.117)	0.328*** (0.109)	0.206 (0.135)	0.259** (0.124)	-0.326* (0.169)	-0.366** (0.165)	-0.0734 (0.144)	-0.229 (0.170)	-0.206 (0.232)
Oil/fuel trade balance	0.251*** (0.0601)	0.270*** (0.0547)	0.152*** (0.0469)	0.214*** (0.0484)	0.226*** (0.0582)	0.246*** (0.0594)	0.271*** (0.0580)	0.139** (0.0565)	0.218*** (0.0553)	0.207*** (0.0757)
Domestic Credit to the Private Sector, % of GDP	0.0435 (0.0267)	0.0504** (0.0245)	0.00939 (0.0267)	0.0270 (0.0224)	0.0419 (0.0316)	0.0516* (0.0298)	0.0619** (0.0281)	0.0139 (0.0329)	0.0413 (0.0302)	0.0473 (0.0414)
Inflation Rate	0.126** (0.0512)	0.137*** (0.0486)	0.206*** (0.0589)	0.0903 (0.0571)	0.114** (0.0519)	0.0513 (0.0492)	0.0704 (0.0471)	0.166** (0.0666)	-0.0120 (0.0660)	0.0260 (0.0487)
3 year average inflation, excl. actual year	-0.0701 (0.0461)	-0.0844** (0.0385)	-0.139*** (0.0441)	-0.0907* (0.0493)	-0.0863* (0.0465)	-0.0270 (0.0520)	-0.0408 (0.0461)	-0.127*** (0.0444)	-0.0353 (0.0551)	-0.0290 (0.0580)
IMF: Capital Account Openness	0.108 (0.326)					0.0393 (0.361)				
Trade Openness (Im+Ex)/GDP		0.0173* (0.01000)					0.0160 (0.0116)			
EFW: Economic Freedom to Trade			0.488 (0.442)					0.464 (0.534)		
Net Foreign Asset development				-0.000687 (0.00992)					-0.00214 (0.0132)	
Net Foreign Asset, level					-0.00674 (0.0256)					-0.0194 (0.0232)
Observations	781	790	644	735	789	781	790	644	735	789
Countries	54	54	47	54	54	54	54	47	54	54
min. years	9	9	4	8	9	9	9	4	8	9
av. years	14.46	14.63	13.70	13.61	14.61	14.46	14.63	13.70	13.61	14.61
AR(1)-test, probability	0.000535	0.000800	0.00411	0.000146	0.000226	0.000122	0.000300	0.000735	1.84e-05	5.59e-05
AR(2)-test, probability	0.803	0.953	0.216	0.745	0.962	0.971	0.774	0.187	0.756	0.551
Hansen-test statistic, prob	0.544	0.370	0.274	0.305	0.375	0.618	0.442	0.442	0.221	0.381
Number of instruments	42	42	42	43	43	42	42	42	43	43

Table 4: Savings Formation, Government Intervention and National Market Regulation

Dependent variable:	(19) GNS	(20) GNS	(21) GNS	(22) PrSav	(23) PrSav	(24) PrSav
Lagged Dependent Variable	0.606*** (0.133)	0.594*** (0.0805)	0.580*** (0.0832)	0.503*** (0.130)	0.499*** (0.112)	0.500*** (0.113)
Youth Dependency	-0.0740 (0.0578)	-0.145*** (0.0462)	-0.135*** (0.0452)	-0.114* (0.0689)	-0.162*** (0.0614)	-0.146** (0.0571)
Old Age Dependency	-0.172 (0.168)	-0.473*** (0.147)	-0.452*** (0.142)	-0.237 (0.213)	-0.531*** (0.200)	-0.493*** (0.188)
Real GDP growth	24.37** (11.99)	10.50 (7.096)	8.723 (7.207)	12.92 (16.38)	5.818 (11.77)	3.582 (11.62)
Government Savings (./deficit)	0.0354 (0.129)	0.282*** (0.0990)	0.257** (0.109)	-0.257 (0.223)	-0.114 (0.158)	-0.159 (0.178)
Oil/fuel trade balance	0.220** (0.0950)	0.170*** (0.0547)	0.186*** (0.0491)	0.164 (0.119)	0.172*** (0.0616)	0.189*** (0.0571)
Domestic Credit to the Private Sector, % of GDP	0.0415** (0.0195)	0.0138 (0.0257)	0.0122 (0.0268)	0.0431 (0.0284)	0.0290 (0.0324)	0.0256 (0.0314)
Inflation Rate	0.0929 (0.0609)	0.198*** (0.0551)	0.197*** (0.0570)	0.0705 (0.0616)	0.104 (0.0678)	0.114 (0.0711)
3 year average inflation, excl. actual year	-0.107** (0.0516)	-0.133*** (0.0447)	-0.118*** (0.0419)	-0.122** (0.0487)	-0.0611 (0.0557)	-0.0732 (0.0534)
Financial Reform Index	-2.061 (1.476)			-3.983*** (1.465)		
EFW: Size of Government		-0.565** (0.254)			-0.739** (0.334)	
EFW: Overall markets regulation			0.499 (0.479)			0.529 (0.622)
Observations	475	671	673	475	671	673
Countries	37	47	47	37	47	47
min. years	7	4	4	7	4	4
max. years	23	25	25	23	25	25
av. years	12.84	14.28	14.32	12.84	14.28	14.32
AR(1)-test, probability	0.00769	0.00330	0.00312	0.00108	0.000628	0.000445
AR(2)-test, probability	0.807	0.119	0.131	0.553	0.0451	0.0696
Hansen-test statistic, prob	0.242	0.375	0.327	0.534	0.336	0.356
Sargan-test statistic, prob	0.590	0.0283	0.0275	0.340	0.0104	0.00962
Number of instruments	42	42	42	42	42	42

1) constant not reported 2) bold values indicated 99% and 95% significance levels. 3) ***(**)(*) indicate 99% (95%)(90%) significance values. 4) Numbers in brackets are the corresponding z-values 5) Sys-GMM: System GMM estimation, panel specific heteroscedasticity adjusted standard errors

Table 5: Good Governance, Property Rights Quality and Democratic Participation

Dependent variable:	(25) GNS	(26) GNS	(27) GNS	(28) PrSav	(29) PrSav	(30) PrSav
Lagged Dependent Variable	0.587*** (0.0831)	0.441*** (0.102)	0.429*** (0.107)	0.513*** (0.100)	0.390*** (0.120)	0.337*** (0.112)
Youth Dependency	-0.124*** (0.0398)	-0.159*** (0.0583)	-0.165*** (0.0504)	-0.130** (0.0523)	-0.164*** (0.0630)	-0.173*** (0.0586)
Old Age Dependency	-0.450*** (0.124)	-0.540*** (0.191)	-0.617*** (0.175)	-0.479*** (0.167)	-0.551** (0.218)	-0.662*** (0.208)
Real GDP growth	13.64* (7.226)	17.82** (8.599)	22.11** (8.755)	8.567 (11.92)	13.72 (11.76)	23.65** (10.45)
Government Savings (./deficit)	0.238** (0.0980)	0.185 (0.120)	0.208* (0.123)	-0.164 (0.162)	-0.385** (0.168)	-0.399** (0.158)
Oil/fuel trade balance	0.205*** (0.0517)	0.253*** (0.0580)	0.257*** (0.0635)	0.207*** (0.0596)	0.257*** (0.0619)	0.276*** (0.0687)
Domestic Credit to the Private Sector, % of GDP	0.00654 (0.0296)	0.0526** (0.0259)	0.0150 (0.0319)	0.0208 (0.0347)	0.0662** (0.0307)	0.0304 (0.0346)
Inflation Rate	0.183*** (0.0525)	0.142*** (0.0498)	0.160*** (0.0530)	0.0986 (0.0688)	0.0708 (0.0482)	0.0672 (0.0488)
3 year average inflation, excl. actual year	-0.133*** (0.0386)	-0.0874** (0.0394)	-0.129** (0.0543)	-0.0852* (0.0478)	-0.0400 (0.0463)	-0.0670 (0.0616)
EFW: Property Rights Quality	0.875** (0.343)			0.916** (0.432)		
Polity Score: Democracy		-0.0339 (0.0918)			-0.0400 (0.105)	
Country Risk: Quality of Governance			11.28*** (3.744)			12.36*** (4.461)
Observations	670	790	715	670	790	715
Countries	47	54	49	47	54	49
min. years	4	9	7	4	9	7
max. years	25	25	24	25	25	24
av. years	14.26	14.63	14.59	14.26	14.63	14.59
AR(1)-test, probability	0.00202	0.000898	0.00196	0.000139	0.000281	0.000450
AR(2)-test, probability	0.0821	0.858	0.747	0.0423	0.888	0.748
Hansen-test statistic, prob	0.367	0.346	0.667	0.296	0.528	0.807
Sargan-test statistic, prob	0.00581	0.109	0.382	0.00135	0.0765	0.155
Number of instruments	42	42	42	42	42	42

1) constant not reported 2) bold values indicated 99% and 95% significance levels. 3) ***(**)(*) indicate 99% (95%)(90%) significance values. 4) Numbers in brackets are the corresponding z-values 5) Sys-GMM: System GMM estimation, panel specific heteroscedasticity adjusted standard errors

Tables: Robustness Checks

Table 6: Inclusion of Real GDP per capita as control variable

Dependent variable Model:	(31) GNS Sys-GMM	(32) GNS Sys-GMM	(33) GNS Sys-GMM	(34) PrSav Sys-GMM	(35) PrSav Sys-GMM	(36) PrSav Sys-GMM
Lagged Dependent	0.712*** (0.0837)	0.651*** (0.0788)	0.546*** (0.109)	0.660*** (0.0983)	0.615*** (0.0892)	0.440*** (0.105)
Youth Dependency	-0.144 (0.106)	-0.186** (0.0802)	-0.222*** (0.0669)	-0.176 (0.139)	-0.189** (0.0911)	-0.225** (0.0896)
Old Age Dependency	-0.316** (0.129)	-0.393*** (0.126)	-0.518*** (0.149)	-0.336** (0.161)	-0.404** (0.157)	-0.548*** (0.175)
Real GDP, log	-1.409 (3.114)	-2.500 (2.269)	-2.745 (1.829)	-2.060 (3.769)	-2.513 (2.252)	-2.802 (2.205)
Real GDP growth	11.92 (7.805)	17.94** (7.724)	25.04*** (9.064)	3.736 (13.19)	11.79 (11.84)	27.99*** (10.23)
Government Savings (./deficit)	0.229*** (0.0855)	0.148* (0.0866)	0.147 (0.120)	0.000973 (0.153)	-0.151 (0.143)	-0.352** (0.171)
Oil/fuel trade balance	0.186* (0.0979)	0.274*** (0.0988)	0.312*** (0.0863)	0.179 (0.120)	0.254** (0.101)	0.338*** (0.0971)
Domestic Credit to the Private Sector, % of GDP	0.0125 (0.0257)	-0.000819 (0.0327)	0.00296 (0.0310)	0.0206 (0.0329)	0.00515 (0.0382)	0.0264 (0.0372)
Inflation Rate	0.195*** (0.0515)	0.190*** (0.0531)	0.168*** (0.0553)	0.0771 (0.0651)	0.0889 (0.0677)	0.0437 (0.0503)
3 year average inflation, excl. actual year	-0.145*** (0.0531)	-0.131*** (0.0396)	-0.144** (0.0575)	-0.0518 (0.0704)	-0.0757 (0.0479)	-0.0638 (0.0661)
EFW: Size of Government	-0.352 (0.296)			-0.478 (0.337)		
EFW: Property Rights Quality		1.286** (0.558)			1.285** (0.572)	
Country Risk: Quality of Governance			14.47*** (4.523)			15.52*** (5.427)
Observations	671	670	671	670	715	715
Countries	47	47	47	47	49	49
min. years	4	4	4	4	7	7
max. years	25	25	25	25	24	24
av. Years	14.28	14.26	14.28	14.26	14.59	14.59
AR(1)-test, probability	0.00294	0.00346	0.000298	0.000284	0.00139	0.000206
AR(2)-test, probability	0.142	0.0829	0.102	0.0517	0.801	0.850
Hansen-test statistic, prob	0.358	0.401	0.394	0.262	0.563	0.578
Sargan-test statistic, prob	0.000526	0.000317	0.000932	0.000120	0.0731	0.00720
Number of instruments	41	41	41	41	40	40

1) constant not reported 2) bold values indicated 99% and 95% significance levels. 3) ***(**)(*) indicate 99% (95%)(90%) significance values. 4) Numbers in brackets are z-values in case of System GMM 5) Sys-GMM: System GMM estimation, panel specific heteroscedasticity adjusted standard errors

Table 7: Using Regional Dummies as additional Explanatories

Dependent variable	(37) GNS	(38) GNS	(39) PrSav	(40) PrSav	(41) GNS	(42) PrSav	(43) GNS	(44) GNS	(45) PrSav	(46) PrSav	(47) GNS	(48) PrSav
Lagged Dependent	0.593*** (0.0811)	0.580*** (0.0838)	0.505*** (0.109)	0.511*** (0.0986)	0.428*** (0.110)	0.341*** (0.111)	0.583*** (0.0831)	0.577*** (0.0858)	0.483*** (0.114)	0.498*** (0.100)	0.421*** (0.109)	0.324*** (0.115)
Youth Dependency	-0.141*** (0.0427)	-0.114*** (0.0374)	-0.158*** (0.0599)	-0.123** (0.0495)	-0.174*** (0.0523)	-0.185*** (0.0639)	-0.144*** (0.0464)	-0.121*** (0.0400)	-0.160*** (0.0615)	-0.127** (0.0521)	-0.165*** (0.0496)	-0.173*** (0.0574)
Old Age Dependency	-0.470*** (0.146)	-0.441*** (0.123)	-0.525*** (0.201)	-0.475*** (0.169)	-0.624*** (0.177)	-0.672*** (0.214)	-0.436*** (0.153)	-0.414*** (0.129)	-0.478** (0.208)	-0.435** (0.174)	-0.594*** (0.182)	-0.632*** (0.215)
Real GDP growth	10.35 (7.370)	13.97* (7.258)	4.912 (12.13)	8.578 (11.86)	22.37** (8.732)	23.74** (10.37)	10.04 (7.037)	13.28* (7.176)	5.345 (11.77)	8.369 (11.87)	21.84** (8.747)	23.40** (10.49)
Government Savings (./deficit)	0.289*** (0.1000)	0.243** (0.0985)	-0.0930 (0.169)	-0.158 (0.165)	0.193 (0.124)	-0.410*** (0.157)	0.297*** (0.101)	0.246** (0.0986)	-0.109 (0.157)	-0.169 (0.160)	0.219* (0.124)	-0.396** (0.156)
Oil/fuel trade balance	0.167*** (0.0552)	0.208*** (0.0528)	0.164** (0.0660)	0.205*** (0.0602)	0.261*** (0.0618)	0.278*** (0.0669)	0.172*** (0.0561)	0.210*** (0.0541)	0.176*** (0.0646)	0.215*** (0.0626)	0.259*** (0.0653)	0.279*** (0.0719)
Domestic Credit to the Private Sector, % of GDP	0.0122 (0.0275)	0.00619 (0.0314)	0.0252 (0.0363)	0.0182 (0.0384)	0.0192 (0.0318)	0.0340 (0.0355)	0.0140 (0.0245)	0.00397 (0.0285)	0.0295 (0.0311)	0.0178 (0.0330)	0.0118 (0.0297)	0.0265 (0.0320)
Inflation Rate	0.197*** (0.0549)	0.178*** (0.0526)	0.103 (0.0663)	0.0962 (0.0674)	0.161*** (0.0543)	0.0692 (0.0481)	0.193*** (0.0547)	0.179*** (0.0522)	0.0992 (0.0672)	0.0958 (0.0685)	0.159*** (0.0531)	0.0672 (0.0490)
3 year average inflation, excl. actual year	-0.134*** (0.0465)	-0.135*** (0.0396)	-0.0634 (0.0592)	-0.0882* (0.0501)	-0.125** (0.0550)	-0.0614 (0.0640)	-0.129*** (0.0443)	-0.132*** (0.0381)	-0.0589 (0.0557)	-0.0854* (0.0477)	-0.130** (0.0530)	-0.0707 (0.0605)
sub saharan africa	-0.305 (1.075)	-0.592 (1.038)	-0.357 (1.606)	-0.487 (1.455)	0.616 (1.463)	0.792 (1.854)						
south and eastern asia							1.644* (0.960)	1.615 (0.984)	2.346** (1.106)	2.107* (1.077)	1.284 (1.255)	1.713 (1.354)
EFW: Size of Government	-0.591** (0.261)		-0.771** (0.321)				-0.656*** (0.250)		-0.869** (0.338)			
EFW: Property Rights Quality		0.923*** (0.356)		0.959** (0.426)				0.993*** (0.316)		1.072*** (0.412)		
Country Risk: Quality of Governance					11.09*** (3.687)	12.09*** (4.260)					12.03*** (3.317)	13.36*** (4.051)
Observations	671	670	671	670	715	715	671	670	671	670	715	715
Countries	47	47	47	47	49	49	47	47	47	47	49	49
min. years	4	4	4	4	7	7	4	4	4	4	7	7

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max. years	25	25	25	25	24	24	25	25	25	25	24	24
av. Years	14.28	14.26	14.28	14.26	14.59	14.59	14.28	14.26	14.28	14.26	14.59	14.59
AR(1)-test, probability	0.00343	0.00229	0.000581	0.000150	0.00189	0.000407	0.00381	0.00222	0.000915	0.000180	0.00226	0.000613
AR(2)-test, probability	0.119	0.0787	0.0490	0.0416	0.735	0.749	0.120	0.0814	0.0435	0.0405	0.744	0.723
Hansen-test statistic, prob	0.373	0.384	0.343	0.318	0.651	0.829	0.350	0.358	0.344	0.317	0.684	0.824
Sargan-test statistic, prob	0.0286	0.00505	0.0130	0.00142	0.400	0.159	0.0281	0.00573	0.0117	0.00130	0.382	0.161
Number of instruments	40	40	40	40	39	39	40	40	40	40	39	39

1) constant not reported 2) bold values indicated 99% and 95% significance levels. 3) ***(**)(*) indicate 99% (95%)(90%) significance values. 4) Numbers in brackets are the corresponding z-values in case of System GMM 5) Sys-GMM: System GMM estimation, panel specific heteroscedasticity adjusted standard errors

Table 8: Usage of the full instrument set

Dependent variable	(49) GNS	(50) GNS	(51) PrSav	(52) PrSav	(53) GNS	(54) PrSav
Lagged Dependent	0.797*** (0.0353)	0.786*** (0.0357)	0.789*** (0.0432)	0.775*** (0.0405)	0.780*** (0.0386)	0.762*** (0.0453)
Youth Dependency	-0.0548*** (0.0197)	-0.0539*** (0.0187)	-0.0608*** (0.0211)	-0.0578*** (0.0189)	-0.0633*** (0.0206)	-0.0668*** (0.0195)
Old Age Dependency	-0.205*** (0.0742)	-0.215*** (0.0664)	-0.217*** (0.0764)	-0.237*** (0.0647)	-0.235*** (0.0786)	-0.248*** (0.0759)
Real GDP growth	14.28*** (4.060)	15.25*** (4.119)	9.116** (4.341)	10.61** (4.348)	9.859*** (3.758)	8.878** (3.572)
Government Savings (./deficit)	0.195*** (0.0689)	0.176** (0.0700)	-0.151 (0.101)	-0.199** (0.0959)	0.170** (0.0675)	-0.241** (0.107)
Oil/fuel trade balance	0.119*** (0.0280)	0.131*** (0.0291)	0.113*** (0.0389)	0.134*** (0.0373)	0.125*** (0.0300)	0.137*** (0.0390)
Domestic Credit to the Private Sector, % of GDP	0.0138 (0.00993)	0.00773 (0.0117)	0.0200 (0.0130)	0.0126 (0.0154)	0.00444 (0.0123)	0.00904 (0.0166)
Inflation Rate	0.138*** (0.0319)	0.141*** (0.0312)	0.0790*** (0.0285)	0.0858*** (0.0266)	0.132*** (0.0350)	0.0664** (0.0285)
3 year average inflation, excl. actual year	-0.128*** (0.0256)	-0.117*** (0.0250)	-0.0817*** (0.0204)	-0.0764*** (0.0184)	-0.111*** (0.0218)	-0.0744*** (0.0176)
EFW: Size of Government	-0.300* (0.160)		-0.375* (0.208)			
EFW: Property Rights Quality		0.379** (0.177)		0.553*** (0.202)		
Country Risk: Quality of Governance					4.288** (1.682)	6.006*** (1.832)
Observations	671	670	671	670	715	715
Countries	47	47	47	47	49	49
min. years	4	4	4	4	7	7
max. years	25	25	25	25	24	24
av. Years	14.28	14.26	14.28	14.26	14.59	14.59
AR(1)-test, probability	0.000576	0.000690	3.19e-05	3.57e-05	0.000755	5.11e-05
AR(2)-test, probability	0.0610	0.0536	0.0708	0.0652	0.871	0.523
Hansen-test statistic, prob	1	1	1	1	1	1
Sargan-test statistic, prob	3.53e-06	2.47e-06	0.000422	0.000430	0.000672	0.00210
Number of instruments	490	487	490	487	511	511

1) constant not reported 2) bold values indicated 99% and 95% significance levels. 3) ***(**)(*) indicate 99% (95%)(90%) significance values. 4) Numbers in brackets are the corresponding z-values in case of System GMM 5) Sys-GMM: System GMM estimation, panel specific heteroscedasticity adjusted standard errors

Table 9a: : Different Time Periods: 1980-1989

Dependent variable Model:	(42) GNS	(43) GNS	(44) PrSav	(45) PrSav	(46) GNS	(47) PrSav
	1980-1989	1980-1989	1980-1989	1980-1989	1980-1989	1980-1989
Lagged Dependent	0.985*** (0.133)	0.941*** (0.102)	1.103*** (0.253)	1.079*** (0.182)	0.920*** (0.117)	1.103*** (0.220)
Youth Dependency	-0.0447 (0.0433)	-0.0408 (0.0361)	-0.0182 (0.0817)	0.00635 (0.0892)	-0.0979** (0.0384)	-0.116* (0.0620)
Old Age Dependency	-0.0336 (0.483)	0.427 (0.577)	-0.607 (0.524)	0.589 (1.200)	-1.258 (1.832)	-1.645 (2.268)
Real GDP growth	-7.697 (6.273)	-8.929* (5.018)	-8.298 (8.232)	-13.27** (6.245)	-4.251 (6.524)	-3.810 (10.02)
Government Savings (./deficit)	0.223** (0.0923)	0.167 (0.123)	0.167** (0.0803)	-0.0191 (0.0828)	0.311** (0.156)	0.104 (0.0881)
Oil/fuel trade balance	-0.236 (0.188)	-0.272*** (0.0794)	0.232 (0.670)	0.159 (0.450)	-0.267 (0.343)	-0.327 (0.594)
Domestic Credit to the Private Sector, % of GDP	-0.0298 (0.0192)	-0.0863** (0.0342)	-0.0187 (0.0289)	-0.141** (0.0699)	0.0126 (0.0875)	-0.0226 (0.0944)
Inflation Rate	-0.144*** (0.0548)	-0.159*** (0.0566)	-0.240* (0.133)	-0.270** (0.114)	-0.115* (0.0654)	-0.233* (0.126)
3 year average inflation, excl. actual year	0.0844 (0.0677)	0.0555 (0.0487)	0.201 (0.182)	0.171 (0.130)	0.0281 (0.0381)	0.158 (0.140)
EFW: Size of Government	-0.389 (0.248)		-0.653 (0.540)			
EFW: Property Rights Quali- ty		0.865** (0.360)		1.695** (0.729)		
Country Risk: Quality of Governance					-1.018 (6.279)	1.110 (6.272)
Observations	38	35	38	35	37	37
Countries	7	7	7	7	9	9
min. years	1	1	1	1	1	1
max. years	7	7	7	7	6	6
av. Years	5.429	5	5.429	5	4.111	4.111
AR(1)-test, probability	0.226	0.224	0.224	0.205	0.286	0.211
AR(2)-test, probability	0.478	0.477	0.479	0.580	0.168	0.132
Hansen-test statistic, prob	1	1	1	1	1	1
Sargan-test statistic, prob	0.389	0.445	0.0477	0.166	0.0477	0.0155
Number of instruments	38	35	38	35	37	37

1) constant not reported 2) bold values indicated 99% and 95% significance levels. 3) ***(**)(*) indicate 99% (95%)(90%) significance values. 4) Numbers in brackets are the corresponding z-values 5) System GMM estimation, panel specific heteroscedasticity adjusted standard errors

Table 9b: Different Time Periods: 1990-1999

Dependent variable	(48) GNS	(49) GNS	(50) PrSav	(51) PrSav	(52) GNS	(53) PrSav
Model:	1990-1999	1990-1999	1990-1999	1990-1999	1990-1999	1990-1999
Lagged Dependent	0.941*** (0.102)		1.079*** (0.182)			
Youth Dependency	-0.0408 (0.0361)	-0.0182 (0.0817)	0.00635 (0.0892)	-0.0979** (0.0384)	-0.116* (0.0620)	-0.0698** (0.0314)
Old Age Dependency	0.427 (0.577)	-0.607 (0.524)	0.589 (1.200)	-1.258 (1.832)	-1.645 (2.268)	-0.124 (0.116)
Real GDP growth	-8.929* (5.018)	-8.298 (8.232)	-13.27** (6.245)	-4.251 (6.524)	-3.810 (10.02)	10.66 (6.517)
Government Savings (./deficit)	0.167 (0.123)	0.167** (0.0803)	-0.0191 (0.0828)	0.311** (0.156)	0.104 (0.0881)	0.226* (0.122)
Oil/fuel trade balance	-0.272*** (0.0794)	0.232 (0.670)	0.159 (0.450)	-0.267 (0.343)	-0.327 (0.594)	0.184*** (0.0530)
Domestic Credit to the Private Sector, % of GDP	-0.0863** (0.0342)	-0.0187 (0.0289)	-0.141** (0.0699)	0.0126 (0.0875)	-0.0226 (0.0944)	0.0344* (0.0191)
Inflation Rate	-0.159*** (0.0566)	-0.240* (0.133)	-0.270** (0.114)	-0.115* (0.0654)	-0.233* (0.126)	0.154*** (0.0325)
3 year average inflation, excl. actual year	0.0555 (0.0487)	0.201 (0.182)	0.171 (0.130)	0.0281 (0.0381)	0.158 (0.140)	-0.118*** (0.0292)
EFW: Size of Government		-0.653 (0.540)				-0.409* (0.232)
EFW: Property Rights Quality	0.865** (0.360)		1.695** (0.729)			
Country Risk: Quality of Governance				-1.018 (6.279)	1.110 (6.272)	
Observations	35	38	35	37	37	272
Countries	7	7	7	9	9	42
min. years	1	1	1	1	1	1
max. years	7	7	7	6	6	9
av. Years	5	5.429	5	4.111	4.111	6.476
AR(1)-test, probability	0.224	0.224	0.205	0.286	0.211	0.00603
AR(2)-test, probability	0.477	0.479	0.580	0.168	0.132	0.0887
Hansen-test statistic, prob	1	1	1	1	1	1
Sargan-test statistic, prob	0.445	0.0477	0.166	0.0477	0.0155	0.000779
Number of instruments	35	38	35	37	37	135

1) constant not reported 2) bold values indicated 99% and 95% significance levels. 3) ***(**)(*) indicate 99% (95%)(90%) significance values. 4) Numbers in brackets are the corresponding z-values 5) System GMM estimation, panel specific heteroscedasticity adjusted standard errors

Table 9c: Different Time Periods: 2000-2007

Dependent variable	(54)	(55)	(56)	(57)	(58)	(59)
	GNS	GNS	PrSav	PrSav	GNS	PrSav
Model:	2000-2007	2000-2007	2000-2007	2000-2007	2000-2007	2000-2007
Lagged Dependent	0.941*** (0.102)		1.079*** (0.182)			
Youth Dependency	-0.0408 (0.0361)	-0.0182 (0.0817)	0.00635 (0.0892)	-0.0979** (0.0384)	-0.116* (0.0620)	-0.0698** (0.0314)
Old Age Dependency	0.427 (0.577)	-0.607 (0.524)	0.589 (1.200)	-1.258 (1.832)	-1.645 (2.268)	-0.124 (0.116)
Real GDP growth	-8.929* (5.018)	-8.298 (8.232)	-13.27** (6.245)	-4.251 (6.524)	-3.810 (10.02)	10.66 (6.517)
Government Savings (./deficit)	0.167 (0.123)	0.167** (0.0803)	-0.0191 (0.0828)	0.311** (0.156)	0.104 (0.0881)	0.226* (0.122)
Oil/fuel trade balance	-0.272*** (0.0794)	0.232 (0.670)	0.159 (0.450)	-0.267 (0.343)	-0.327 (0.594)	0.184*** (0.0530)
Domestic Credit to the Private Sector, % of GDP	-0.0863** (0.0342)	-0.0187 (0.0289)	-0.141** (0.0699)	0.0126 (0.0875)	-0.0226 (0.0944)	0.0344* (0.0191)
Inflation Rate	-0.159*** (0.0566)	-0.240* (0.133)	-0.270** (0.114)	-0.115* (0.0654)	-0.233* (0.126)	0.154*** (0.0325)
3 year average inflation, excl. actual year	0.0555 (0.0487)	0.201 (0.182)	0.171 (0.130)	0.0281 (0.0381)	0.158 (0.140)	-0.118*** (0.0292)
EFW: Size of Government		-0.653 (0.540)				-0.409* (0.232)
EFW: Property Rights Quality	0.865** (0.360)		1.695** (0.729)			
Country Risk: Quality of Governance				-1.018 (6.279)	1.110 (6.272)	
Observations	35	38	35	37	37	272
Countries	7	7	7	9	9	42
min. years	1	1	1	1	1	1
max. years	7	7	7	6	6	9
av. Years	5	5.429	5	4.111	4.111	6.476
AR(1)-test, probability	0.224	0.224	0.205	0.286	0.211	0.00603
AR(2)-test, probability	0.477	0.479	0.580	0.168	0.132	0.0887
Hansen-test statistic, prob	1	1	1	1	1	1
Sargan-test statistic, prob	0.445	0.0477	0.166	0.0477	0.0155	0.000779
Number of instruments	35	38	35	37	37	135

1) constant not reported 2) bold values indicated 99% and 95% significance levels. 3) ***(**)(*) indicate 99% (95%)(90%) significance values. 4) Numbers in brackets are the corresponding z-values 5) System GMM estimation, panel specific heteroscedasticity adjusted standard errors

Table 10: Treating Institutions as endogenous variables

Dependent variable	(73) GNS	(74) GNS	(75) PrSav	(76) PrSav	(77) GNS	(78) PrSav
Lagged Dependent	0.705*** (0.0524)	0.587*** (0.0589)	0.601*** (0.0690)	0.477*** (0.0733)	0.441*** (0.0777)	0.361*** (0.0897)
Youth Dependency	-0.0856*** (0.0314)	-0.100** (0.0413)	-0.119** (0.0463)	-0.110** (0.0493)	-0.149*** (0.0479)	-0.157*** (0.0568)
Old Age Dependency	-0.282*** (0.102)	-0.357*** (0.120)	-0.382** (0.150)	-0.419*** (0.148)	-0.546*** (0.168)	-0.588*** (0.210)
Real GDP growth	8.414* (4.974)	16.19*** (5.633)	3.470 (5.642)	16.35** (7.565)	20.72*** (5.889)	23.48*** (7.961)
Government Savings (./deficit)	0.186* (0.0975)	0.202** (0.0915)	-0.217* (0.111)	-0.390*** (0.139)	0.179 (0.114)	-0.515*** (0.139)
Oil/fuel trade balance	0.168*** (0.0378)	0.216*** (0.0513)	0.178*** (0.0477)	0.262*** (0.0604)	0.252*** (0.0635)	0.282*** (0.0695)
Domestic Credit to the Private Sector, % of GDP	0.0258 (0.0169)	0.0392 (0.0261)	0.0382* (0.0224)	0.0631* (0.0323)	0.0437 (0.0277)	0.0581* (0.0315)
Inflation Rate	0.163*** (0.0436)	0.143*** (0.0376)	0.0815* (0.0485)	0.0753* (0.0424)	0.142*** (0.0339)	0.0604* (0.0364)
3 year average inflation, excl. actual year	-0.171*** (0.0372)	-0.139*** (0.0343)	-0.117*** (0.0419)	-0.102*** (0.0375)	-0.0984** (0.0412)	-0.0491 (0.0505)
EFW: Size of Government	-0.758** (0.343)		-1.168*** (0.418)			
EFW: Property Rights Quality		0.101 (0.428)		0.333 (0.485)		
Country Risk: Quality of Governance					3.225 (3.507)	4.765 (4.166)
Observations	671	670	671	670	715	715
Countries	47	47	47	47	49	49
min. years	4	4	4	4	7	7
max. years	25	25	25	25	24	24
av. Years	14.28	14.26	14.28	14.26	14.59	14.59
AR(1)-test, probability	0.00183	0.00206	0.000208	0.000218	0.000512	0.000256
AR(2)-test, probability	0.122	0.0621	0.104	0.0323	0.810	0.838
Hansen-test statistic, prob	1.000	1.000	1.000	1.000	0.999	1.000
Sargan-test statistic, prob	0.000559	0.00384	8.05e-05	6.26e-08	0.141	0.00242
Number of instruments	87	87	87	87	80	80

1) constant not reported 2) bold values indicated 99% and 95% significance levels. 3) ***(**)(*) indicate 99% (95%)(90%) significance values. 4) Numbers in brackets are the corresponding z-values in case of System GMM 5) Sys-GMM: System GMM estimation, panel specific heteroscedasticity adjusted standard errors

Table 11: Difference-in-Hansen tests for exogeneity of instrument subsets

H0: Instrument subset is Exogenous				
Table No.	Model No.	Explanatory	Instrument Subset (selection)	Probability, that > Chi2
2	2	Gross National Savings	GMM instrument set for Levels	0.627
			GMM for LDV Gross National Savings (Lag 1)	0.262
			GMM for Real GDP Growth, Government Savings (Lag 2)	0.301
			GMM: Inflation Rate (Lag 2)	0.936
			GMM: 3-year average inflation (Lag 2)	0.712
			GMM: Domestic credit to the private sector to GDP (Lag 2)	0.412
			Exogenous variables: Old age/Youth Dependency, Oil trade balance	0.128
	4		GMM: Real Gross Domestic Product (Lag 2)	0.203
	6	Private Savings	GMM instrument set for Levels	0.653
			GMM for LDV: Private Savings (Lag 1)	0.454
			GMM for Real GDP Growth, Government Savings (Lag 2)	0.239
			GMM: Inflation Rate (Lag 2)	0.403
			GMM: 3-year average inflation (Lag 2)	0.195
			GMM: Domestic credit to the private sector to GDP (Lag 2)	0.787
			Exogenous variables: Old age/Youth Dependency, Oil trade balance	0.827
	8		GMM: Real Gross Domestic Product (Lag 2)	0.263
3	9	Gross National Savings	Exogenous variable: IMF: Capital Account Openness	0.946
	10		Exogenous variable: Trade Openness (Im+Ex)/GDP	0.319
	11		Exogenous variable: Economic Freedom to Trade	0.401
	12		GMM: Net Foreign Asset Position: Development (Lag 1)	0.02
	13	Private Savings	GMM: Net Foreign Asset Position: Level (Lag 1)	0.987
	14		Exogenous variable: IMF: Capital Account Openness	0.656
	15		Exogenous variable: Trade Openness (Im+Ex)/GDP	0.496
	16		Exogenous variable: Economic Freedom to Trade	0.688
	17		GMM: Net Foreign Asset Position: Development (Lag 1)	0.302
	18		GMM: Net Foreign Asset Position: Level (Lag 1)	0.77
4	19	Gross National Savings	Exogenous variable: Financial Reform Index	0.013
	20		Exogenous variable: EFW Size of Government	0.082
	21		Exogenous variable: EFW Overall Markets Regulation	0.017
	22	Private Savings	Exogenous variable: Financial Reform Index	0.102
	23		Exogenous variable: EFW Size of Government	0.027
	24		Exogenous variable: EFW Overall Markets Regulation	0.255
5	25	Gross National Savings	Exogenous variable: EFW Property Rights Quality	0.525
	26		Exogenous variable: Polity Score Democracy	0.574
	27		Exogenous variable: Country Risk Quality of Governance	0.606
	28	Private Savings	Exogenous variable: EFW Property Rights Quality	0.675
	29		Exogenous variable: Polity Score Democracy	0.013
	30		Exogenous variable: Country Risk Quality of Governance	0.182
7	37	Gross National Savings	Exogenous variable: EFW Size of Government	0.435
	39	Private Savings	Exogenous variable: EFW Size of Government	0.203

* note: test statistics for our control variables are only presented once. Additional test statistics are available upon request.

Table 12: Descriptive statistics

Variable							Variable						
		Mean	Std. Dev.	Min	Max	Observations			Mean	Std. Dev.	Min	Max	Observations
Gross National Savings Rate	overall	21.26	10.51	-6.56	52.44	N 904	IMF: Capital Account Openness	overall	-0.25	1.370	-1.85	2.455	N 881
	between		8.998	4.185	45.64	n 56		between		1.218	-1.85	2.455	n 56
	within		4.783	-0.95	42.52	T 16.14		within		0.695	-2.86	1.915	T 15.73
Private Savings Rate	overall	23.48	9.226	-8.48	52.71	N 904	Trade Openness (Im+Ex)/GDP	overall	81.61	61.66	14.53	441.2	N 904
	between		7.651	9.255	42.61	n 56		between		62.19	21.39	349.0	n 56
	within		4.763	-0.45	52.82	T 16.14		within		15.17	27.59	173.7	T 16.14
Government Savings (./deficit)	overall	-2.21	4.428	-22.5	18.7	N 904	EFW: Size of Government	overall	6.538	1.370	2.620	10	N 732
	between		2.975	-7.77	9.844	n 56		between		1.221	4.209	9.214	n 48
	within		3.150	-21.3	13.90	T 16.14		within		0.687	4.117	8.973	T 15.25
Real GDP, log	overall	7.914	1.097	5.772	10.78	N 904	EFW: Property Rights Quality	overall	4.834	1.506	1.433	8.633	N 730
	between		1.083	5.966	10.42	n 56		between		1.371	2.776	8.353	n 48
	within		0.179	6.939	9.010	T 16.14		within		0.634	0.592	6.662	T 15.20
Oil/fuel trade balance	overall	-0.91	7.611	-19.2	49.25	N 904	EFW: Economic Freedom to Trade	overall	6.363	1.508	1.841	9.778	N 702
	between		7.790	-10.1	37.92	n 56		between		1.268	3.139	9.627	n 48
	within		2.550	-14.0	12.13	T 16.14		within		0.711	3.361	8.853	T 14.62
Youth Dependency	overall	63.54	21.76	17.40	106.4	N 904	EFW: Domestic Market Regulation	overall	5.607	1.221	1.490	8.788	N 734
	between		22.40	21.62	100.1	n 56		between		1.179	1.946	8.447	n 48
	within		5.929	43.55	84.97	T 16.14		within		0.477	4.244	7.935	T 15.29
Old Age Dependency	overall	8.574	4.395	4.166	25.16	N 904	Polity Score: Democracy	overall	2.475	6.063	-9	10	N 867
	between		4.999	4.246	23.94	n 56		between		5.566	-9	9.461	n 54
	within		0.503	6.225	10.53	T 16.14		within		2.689	-9.67	12.62	T 16.05
Real GDP growth	overall	0.026	0.054	-0.23	0.376	N 904	Country Risk: Quality of Governance	overall	0.489	0.146	0.055	0.916	N 768
	between		0.024	-0.01	0.087	n 56		between		0.120	0.252	0.852	n 49
	within		0.049	-0.21	0.355	T 16.14		within		0.083	0.192	0.734	T 15.67
Inflation Rate	overall	10.74	11.65	-23.4	50	N 866	Financial Reform Index	overall	0.561	0.267	0	1	N 562
	between		7.920	1.540	34.07	n 54		between		0.212	0.140	0.970	n 39
	within		8.579	-18.7	48.97	T 16.03		within		0.146	0.161	0.963	T 14.41
3 year average inflation, excl. actual year	overall	11.97	12.35	-11.3	50	N 852	Net foreign asset position	overall	-42.6	59.73	-418	272.9	N 903
	between		9.581	1.630	42.42	n 54		between		56.21	-182.	202.3	n 56
	within		8.186	-13.0	45.82	T 15.77		within		26.74	-278.	60.44	T 16.12
Domestic Credit to the Private Sector, % of GDP	overall	40.27	34.41	-72.9	177.5	N 889							
	between		32.76	-34.7	139.5	n 56							
	within		11.42	-13.8	91.83	T 15.87							

Table 13: Correlation Matrix

	Gross National Savings Rate	Private Savings Rate	Government Savings (./deficit)	Real GDP, log	Oil/fuel trade balance	Youth Dependency	Old Age Dependency	Real GDP growth	Inflation Rate	3 year average inflation, excl. actual year	Domestic Credit to the Private Sector, % of GDP	IMF: Capital Account Openness	Trade Openness (Im+Ex)/GDP	EFW: Size of Government	EFW: Property Rights Quality	EFW: Economic Freedom to Trade	EFW: Domestic Market Regulation	Polity Score: Democracy	Country Risk: Quality of Governance	Financial Reform Index	Net foreign asset position
Gross National Savings Rate	1																				
Private Savings Rate	0.885	1																			
Government Savings (./deficit)	0.436	-0.03	1																		
Real GDP, log	0.400	0.233	0.411	1																	
Oil/fuel trade balance	0.200	0.127	0.185	0.223	1																
Youth Dependency	-0.49	-0.43	-0.22	-0.73	-0.16	1															
Old Age Dependency	0.107	0.080	0.076	0.545	0.019	-0.73	1														
Real GDP growth	0.349	0.280	0.207	0.121	0.012	-0.34	0.301	1													
Inflation Rate	-0.14	-0.13	-0.05	-0.11	0.300	0.159	-0.05	-0.10	1												
3 year average inflation, excl. actual year	-0.23	-0.23	-0.04	-0.08	0.302	0.140	-0.03	-0.13	0.700	1											
Domestic Credit to the Private Sector, % of GDP	0.564	0.592	0.067	0.333	-0.19	-0.34	-0.00	0.102	-0.36	-0.39	1										
IMF: Capital Account Openness	0.106	-0.03	0.302	0.498	-0.05	-0.20	0.233	0.034	-0.26	-0.26	0.077	1									
Trade Openness (Im+Ex)/GDP	0.501	0.279	0.539	0.521	-0.12	-0.32	0.106	0.079	-0.20	-0.23	0.354	0.442	1								
EFW: Size of Government	-0.06	-0.19	0.247	0.188	-0.08	0.023	-0.07	-0.16	-0.15	-0.17	-0.12	0.397	0.221	1							
EFW: Property Rights Quality	0.442	0.354	0.264	0.410	-0.24	-0.40	0.249	0.229	-0.26	-0.24	0.481	0.271	0.555	-0.17	1						
EFW: Economic Freedom to Trade	0.385	0.224	0.394	0.676	-0.07	-0.46	0.294	0.132	-0.24	-0.23	0.388	0.628	0.652	0.246	0.510	1					
EFW: Domestic Market Regulation	0.270	0.148	0.296	0.511	-0.24	-0.30	0.177	0.118	-0.33	-0.36	0.292	0.529	0.594	0.292	0.48	0.579	1				
Polity Score: Democracy	-0.21	-0.18	-0.10	0.380	0.086	-0.32	0.313	-0.05	0.024	0.054	-0.11	0.226	-0.09	0.357	-0.15	0.208	0.197	1			
Country Risk: Quality of Governance	0.429	0.353	0.241	0.458	-0.08	-0.33	0.189	0.124	-0.21	-0.18	0.413	0.308	0.483	-0.09	0.755	0.589	0.432	-0.04	1		
Financial Reform Index	0.028	-0.12	0.298	0.605	0.056	-0.32	0.355	0.025	-0.25	-0.22	0.026	0.664	0.417	0.304	0.229	0.694	0.491	0.379	0.282	1	
Net foreign asset position	0.511	0.359	0.403	0.396	0.200	-0.38	0.148	0.188	-0.03	-0.00	0.096	0.153	0.413	0.070	0.239	0.191	0.135	-0.04	0.249	0.043	1

* Andreas Freytag is Professor for Economic Policy at the University of Jena and University of Stellenbosch and Member of the graduate program 'Global Financial Markets'.

** Sebastian Voll is lecturer and Ph.D. candidate at the University of Jena and student at the graduate program 'Global Financial Markets'.

Corresponding address is a.freytag@wiwi.uni-jena.de