Macroeconomic Factors in Corporate and Household Saving. Evidence from Central and Eastern Europe

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Macroeconomic Factors in Corporate and Household Saving. Evidence from Central and Eastern Europe*

Merike Kukk and Karsten Staehr

Abstract

This paper uses panel data estimations on annual data from 10 Central and Eastern European countries to assess the effect of different macroeconomic variables on the dynamics of corporate and household saving. The analyses reveal that changes in the macroeconomic environment are important for the saving rates in both sectors, but with marked differences across the sectors. The differences are most pronounced for the output gap, the real interest rate, the inflation rate and the current account balance. Some variables such as the unemployment rate and changes in the real exchange rate are unimportant in both sectors. The differences across the sectors underscore the importance of analysing corporate and household saving separately.

JEL Codes: E21, E32, E44

Keywords: sectoral saving rates, Central and Eastern Europe, macroeconomic variables

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Non-technical summary

This paper seeks to ascertain the importance of various macroeconomic factors for corporate and household saving rates in 10 EU countries from Central and Eastern Europe. The development of corporate and household saving is important in the short and long terms for economic welfare including financial stability, business cycle developments and economic growth. Such an analysis is particularly pertinent for the CEE countries, which have had at the same time both relatively low and fluctuating saving rates and also a very volatile macroeconomic environment with large fluctuations in growth rates, unemployment and inflation rates. The global financial crisis led to large changes in variables such as interest rates, the current account balance and the fiscal balance, and underscored the vulnerability of many CEE countries to macroeconomic shocks.

Most studies investigating saving at the macroeconomic level focus on *total* private saving. Only a few studies distinguish between corporate and household saving, although the theoretical models of saving behaviour are very different for corporations and households as their objectives are different. Very few studies have examined macroeconomic factors in private saving in Central and Eastern Europe and none have considered the effects on saving in the corporate and household sectors separately. This paper contributes to the literature by estimating equations for the corporate sector and the household sector separately for a panel of 10 CEE countries.

The estimations are carried out on a panel with annual data for the time sample 1995–2012. The analyses are carried out using the Arellano-Bond GMM estimation, the LSDV estimation and the bias-corrected LSDV estimation, but the results are in almost all cases qualitatively similar across the three estimation methods. The sectoral saving rate is regressed on its lagged value, dummies and a number of key macroeconomic variables. The focus is on the effects of macroeconomic variables that typically exhibit substantial variability over time. The effects of time-invariant or slow-moving variables reflecting demographics, governance and institutions are not explicitly considered, but the country fixed effects control for time-invariant differences in the levels of the saving rates and the lagged dependent variable captures possible persistence.

The estimations show the persistence of the sectoral saving rates to be quite modest, but the point estimate is slightly higher for the corporate saving rate, at around 0.4–0.5, than for the household saving rate, where it is around 0.3–0.4. However, the coefficients are estimated with relatively large standard errors so the difference between the coefficients for the corporate and household sectors is not statistically significant.

The corporate saving rate is positively related to the output gap while the household saving rate does not depend on the business cycle. An output gap of 1 percent is associated with an increase in the corporate saving rate of 0.2 percentage point. The finding that the unemployment rate, which is an indicator of income uncertainty, is not associated with corporate saving is arguably not surprising, but it is noteworthy that it does not affect household saving.

We do not find any linkage between the real interest rate and the corporate saving rate, while there is a positive relationship between the interest rate and the household saving rate. An increase in the real interest rate of 1 percentage point corresponds to an increase in the household saving rate of 0.14 percentage point. No relationship between the real effective exchange rate denoting competitiveness and sectoral saving rates was detected.

The signs of the estimated coefficients of the inflation rate differ for the corporate and household sectors; higher inflation coincides with a higher household saving rate but a lower corporate saving rate. However, in some specifications the negative relationship between inflation and corporate saving is imprecisely estimated but the differences between the two sectors are still notable. An increase in the inflation rate of 1 percentage point is associated with an increase in the household saving rate of 0.13 percentage point. The different relationships between inflation and saving in the corporate and household sectors may be due to different underlying mechanisms. High inflation as a proxy for uncertainty should increase the saving rate but high inflation may make saving less attractive.

The sensitivity of the saving rate to changes in the government budget balance is around 0.2 for both sectors. The effects are relatively small, suggesting that an increase in the public saving rate is far from being associated with a proportional decline in the private saving rate in the CEE countries. In other words, the government's fiscal decisions can affect the national saving rate.

The estimations for the current account balance suggest that substitution between foreign and domestic saving is present in both the corporate and household sectors. Nevertheless, the substitution is substantially stronger for the corporate sector than for the household sector as the estimated coefficients are respectively 0.29 and 0.11. Corporate saving in the CEE countries appears to be more dependent on the availability of foreign capital inflows than household saving does.

This paper is the first to compare the effects of macroconomic variables on saving across the corporate and household sectors. The analyses show that the dynamics of the saving rates and their association with various macroeconomic variables differ substantially across the corporate and household sectors. Such differences, evidently, cannot be identified when the total pri-

vate saving rate is studied rather than the corporate and the household saving rates separately. This underscores the importance of distinguishing between corporate and household saving when analysing the determinants of private saving.

Contents

"A simple fact that is hard to learn is that the time to save money is when you have some."

Joe Moore

1. Introduction

This paper assesses the importance of different macroeconomic variables for corporate and household saving in 10 EU countries from Central and Eastern Europe (CEE). The dynamics of corporate and household saving play a key role for financial stability and business cycle developments, and it is therefore important to assess the role of various macroeconomic factors in corporate and household saving.

Such an analysis is particularly pertinent for the CEE countries, which on the one hand have had relatively low and fluctuating saving rates and on the other hand a very volatile macroeconomic environment with large fluctuations in growth rates, unemployment and inflation rates. The global financial crisis led to large changes in variables such as interest rates, the current account balance and the fiscal balance and underscored the vulnerability of many CEE countries to macroeconomic shocks.

Private saving stems from the (non-financial) corporate sector, the household sector and the financial sector. This paper seeks to ascertain the importance of key macroeconomic factors on corporate and household saving rates in the CEE countries.[1] Changes in saving in the corporate and household sectors are of considerable importance for financial stability, macroeconomic performance and social welfare. Financial stability reports and other means of financial and economic surveillance often consider credit risks in the corporate and household sectors separately (ECB (2012)). White (2008) posits that separate surveillance of financial developments in the corporate and household sectors is of importance for macro-financial stability.

Most studies investigating saving at the macroeconomic level focus on *total* private saving. Only a few studies distinguish between corporate and household saving, although the theoretical models of saving behaviour are very different for corporations and households, as their objectives are different (see Section 2). Poterba (1987) hypotheses that households "pierce the corporate veil", meaning that the saving decisions of corporations are in fact made by the households that are the ultimate owners of the corporations. Aron and Muellbauer (2000) find, however, only limited support for this hy-

[1] Saving in the financial sector is typically modest and very fluctuating and is therefore not modelled.

pothesis and conclude instead that the determinants of saving in different sectors are quite different.

Very few macroeconomic studies of private saving in Central and Eastern Europe have been published. The first studies were largely descriptive and focused on the marked decline in private and national saving during the early stages of transition. Denizer and Wolf (2000) find in an econometric study that parts of the decline can be explained by the elimination of involuntary saving, but they also find that the saving rate reacts to liberalisation of the economy. This result is ascribed to income smoothing, following the argument that liberalisation is associated with future income growth.

Schrooten and Stephan (2001) explore the gross *national* saving rate (private and public) using fixed effects estimations on data for 1994–1998. Schrooten and Stephan (2005) focus on the *private* saving rate and compare the determinants of the western EU countries and the CEE countries. The sample covers the period 1992–2000 and the fixed effect estimations include the lagged dependent variable. They find that the persistence of the saving rate is higher in the western EU countries than in the CEE countries, but that the determinants of the saving rate are otherwise rather similar in the two country groups.

European Commission (2011) seeks to explain the long-run private saving rate in a sample of EU countries from Central and Eastern Europe covering the period 1995–2008. The long-run cointegrating relationship between the private saving rate and explanatory variables appears to vary a great deal depending on the estimation method used. Freitag and Voll (2013) consider the importance of institutions for the saving rate in developing and transitional countries and include numerous macroeconomic variables as control variables. Chowdhury (2004) considers the impact of terms of trade shocks on private savings in 21 transition economies during the early transition phase. Different measures of the terms of trade attain statistical significance, but the economic significance of the variables is typically modest.

This brief literature review reveals that there are only few published studies that consider the macroeconomic factors in private saving in the CEE countries and there are, to the best of our knowledge, no studies that distinguish between corporate and household saving. This paper contributes to the literature by estimating equations for the corporate sector and the household sector separately for a panel of 10 CEE countries.

The estimations are carried out on a panel with annual data for the time sample 1995–2012. The panels are estimated using the Arellano-Bond GMM methodology, supplemented by a large number of robustness checks using fixed effects and bias-corrected LSDV. The focus is on the effects of macro-

economic variables that typically exhibit substantial variability over time. The effects of time-invariant or slow-moving variables reflecting demographics, governance and institutions are not explicitly considered, but the country fixed effects control for time-invariant differences in the levels of the saving rates and the lagged dependent variable captures possible persistence.

The rest of the paper is organised as follows: Section 2 discusses macroeconomic factors that may affect corporate and household saving. Section 3 presents the data used in the empirical analyses and Section 4 reports the results of panel data estimations explaining the saving rate of the household sector and the corporate sector. Finally, Section 5 summarises the paper.

2. Macroeconomic factors in sectoral saving

This section provides a brief discussion of the theoretical and empirical literature which considers macroeconomic factors that may affect saving at the sectoral level in the short term.[2]

Saving entails the reallocation of resources over time. Household saving is the difference between the disposable income and the consumption of the sector. The baseline consumption model is a model of consumption smoothing that ensures that consumption will attain a stable profile over time depending on factors like interest rates, time and risk preferences. In practice, consumption smoothing will be restrained by uncertainty about future income, borrowing constraints and incomplete financial markets (Attanasio and Weber (2010)). The real interest rate, time and risk preferences determine the opportunity cost of reallocating consumption over time. The standard consumption model implies that household saving depends on current income and income expectations, taxation, unemployment risk and the business cycle position (Carroll and Toche (2009)).

Corporate gross saving equals undistributed net-of-tax profit. There is no generally agreed model for corporate saving behaviour. A model developed by Aron and Muellbauer (2000) based on Poterba (1987) suggests that corporate saving depends on profit, corporate income taxation, decisions on profit distribution, investment opportunities and costs. The profit depends on, inter alia, a number of macroeconomic variables, including productivity, labour costs, real interest rates, the real exchange rate and GDP growth. Corporate taxation is a direct result of government policy, although most tax systems

[2] The review does not cover studies of saving which consider the determinants of the long-term level of saving. An extensive literature explores the importance of governance, institutional, demographic and cultural factors for the long-term trend of the private saving rate; see e.g. Freytag and Voll (2013) and Horioka and Terada-Hagiwara (2012).

afford corporations some discretion about the timing of tax payments. Finally, the distribution of profits depends on dividend policy, which is found to be quite stable at the firm level and the aggregate level (Denis and Osobov (2008), Fama and Babiak (1968)).

GDP growth and the *output gap* are measures of the business cycle stance. The impact of the output gap on the saving rate of households is ambiguous. In models of consumption smoothing, temporary income growth or a positive output gap is expected to be saved; but if economic growth induces households to anticipate higher income in the future, they may lower their saving rate to increase current consumption to a higher level (Browning and Lusardi (1996)). For corporations, the relationship between the business cycle and the saving rate is straightforward as investments are expected to be particularly profitable during a boom, suggesting a higher saving rate when the output gap is positive (Pike and Neale (2006)).

The *unemployment rate* may be a proxy of the income uncertainty of the individual or the household. If income uncertainty increases, households are expected to save more to accumulate buffer stocks (Carroll and Toche (2009)). Increased income uncertainty for corporations may lead to higher payment of dividends to stockholders seeking to smooth their income shocks. It follows that the same macroeconomic variable might have opposing effects on the household and corporate saving rates.

From a theoretical viewpoint, the net effect of changes in *the interest rate* on household saving is ambiguous as the income, substitution and wealth effects may not coincide (Browning and Lusardi (1996)). For the corporate sector it is equally difficult to assess the direction of the relationship between the interest rate and the saving rate. On the one hand, corporations save mainly to finance investment and a higher interest rate means higher debt servicing costs, leading to a positive linkage between corporate saving and the interest rate. On the other hand, a higher interest rate may increase shareholder demands for dividends as the opportunity cost of keeping the money in the company is higher (European Commission (2011)). It is typically found in empirical studies that the interest rate has a positive impact on the *total* private saving rate but the estimated coefficient is often small; see Balassa (1990) for an overview.

The impact of higher *inflation* on the saving rate is not theoretically clear (Masson et al. (1998)). On the one hand, there is a hypothesis derived from standard New Keynesian models that expectations of high inflation stimulate consumption, hence lowering saving (Bachmann et al. (2012)). On the other hand, inflation is related to the economic decisions of policymakers and high inflation may therefore indicate macroeconomic uncertainty. Most studies investigating the effect of inflation on total private saving find that the latter

effect dominates and see the inflation rate as a proxy for uncertainty; see Freytag and Voll (2013), Ferrucci and Miralles (2007) and Schrooten and Stephan (2005) among others. For corporations, Aron and Muellbauer (2000) point out that inflation reduces the real value of corporate debt, which may lead to additional borrowing, suggesting a negative relationship between inflation and the corporate saving rate.

The *terms of trade* may be another determinant of the saving rate. An improvement in the terms of trade is expected to have a positive effect on the saving rate, known as the Harberger-Laursen-Metzler effect (Harberger (1950), Laursen and Metzler (1950)). However, the subsequent literature distinguishes between temporary and permanent changes in the terms of trade; see Masson et al. (1998) and Chowdhury (2004) for overviews. According to theory, a short-term improvement in the terms of trade increases private saving while a long-term change has ambiguous effects.

The *government budget balance* might affect the saving rate of the corporate and household sectors through changes in taxes and spending. The Ricardian equivalence hypothesis suggests that an increase in the government deficit, as a result of lower taxes or higher government spending, will increase private saving, implying a negative relationship between the financial position of the government and private saving (Barro (1974)). This negative relation may also occur if governments increase their borrowing to compensate for shortfalls in aggregate demand in situations where the private sector has high saving rates (European Commission (2011)).

The *current account balance* has been used as a proxy for foreign borrowing in many studies; see e.g. Schrooten and Stephen (2005). As foreign funds may be a substitute for local saving, the relationship between the current account balance and the saving rate is expected to be negative. It is however not clear which way the causality goes. If access to foreign borrowing is not constrained, foreign borrowing may be the result of national saving decisions, but it may also be the case that foreign borrowing is constrained (Schmidt-Hebbel et al. (1992)).

The discussion in this section suggests that there may be linkages between a large number of macroeconomic variables and the saving rates of the corporate and household sectors. The extent to which these linkages are present in the sample of EU countries from Central and Eastern Europe is an empirical question. A number of other macroeconomic factors may also be of importance for sectoral saving such as the per capita income level and the accumulated stock of assets or liabilities.[3] These variables however are often slow-

[3] Per capita income is positively related to the private saving rate in the studies of Schrooten and Stephan (2005), Loayza et al. (2000) and Masson et al. (1998).

moving and may therefore be accounted for by inclusion of the lagged dependent variable.

3. Data

Table 1 lists the variables used in the empirical analyses along with short descriptions, some summary statistics and the data sources. Data for the saving of the corporate and household sectors are part of the sectoral national accounts. The collection, aggregation and adjustment of data entail some trade-offs. One complication is the switch to the new national account system, ESA2010. As a result, the data series using the old methodology, ESA95, are not updated beyond 2012, while ESA2010 data at the sectoral level are not available for several countries for large parts of the sample period. The ESA95 data series for 1995–2012 are therefore used in this paper. Saving data start only in 2002 for Bulgaria due to data availability and data until 2002 have been excluded for Romania due to excessive variability in the data.

Table 1: Variable definitions, summary statistics and sources

Variable	Description	Average	S.D.	Source
SAV_CO	Gross saving rate for corporate sector, % of GDP	12.946	3.740	Eurostat: *nasa_nf_tr*, *nama_gdp_c*
SAV_HH	Gross saving rate for household sector, % of GDP	3.561	4.874	Eurostat: *nasa_nf_tr*, *nama_gdp_c*
YGAP	Output gap, % deviation from potential output	0.412	4.250	Ameco: *AVGDGP*
UR	Total unemployment rate, % of civilian workforce	10.352	4.194	Ameco: *ZUTN*
GP	HICP inflation, % per year	5.217	3.811	Eurostat: *prc_hicp_aind*
ISR	Real short-term interest rate, deflated by GDP deflator	1.566	4.332	Ameco: *ISRV*
GREER	Growth in real effective exchange rate, % per year[a]	3.114	8.588	Eurostat: *ert_eff_ic_a*
BB	General government budget balance, % of GDP	−3.395	3.084	Eurostat: *gov_dd_edpt1*
CA	Current account balance, % of GDP	−5.502	5.098	Eurostat: *bop_q_gdp*

[a] The real effective exchange rate is computed using the consumer price deflator of the country and 37 trading partners.

Notes: The descriptive statistics are computed across all 10 countries and over the time sample for which data are available. The data were downloaded in January 2015.

The sectoral saving rates, SAV_CO and SAV_HH, are expressed in percent of economy-wide GDP. The output gap YGAP depicts the percentage deviation of GDP from potential GDP. The variable UR is the unemployment

rate among the working-age population using the Labour Force Survey methodology. The rate of consumer price inflation, the annual growth in the HICP index, is labelled GP. The variable ISR depicts a real short-term interbank interest rate published in Ameco. The variable GREER is the annual growth rate in the real effective exchange rate computed using the consumer price in the country and 37 trading partners. The budget balance in percent of GDP is labelled BB, and the current account balance in percent of GDP is CA.

Figure 1 shows the saving rates for the corporate sector, SAV_CO, and for the household sector, SAV_HH, for each of the 10 sample countries. The corporate saving rate is higher than the household saving rate in all the countries except Poland, where the corporate and household sectors save at comparable rates. The average corporate saving rate in 1995–2012 was 12.9 percent of GDP in the full sample, while the corresponding household saving rate was 3.6 percent of GDP. Household saving is more volatile than corporate saving; the standard deviation for the household saving rate is 4.9 percentage points while it is 3.7 percentage points for the corporate saving rate.

The dynamics of the corporate and household saving rates vary substantially in most countries. During the sample years, the corporate saving rate exhibits an upward trend, particularly in Estonia, Latvia and Lithuania, while the household saving rate is showing a declining trend. Moreover, in many cases the short-term fluctuations follow different patterns for the corporate and household sectors. The noticeable differences in the dynamics of the sectoral saving rates in the sample countries raise the question of the extent to which these dynamics can be explained by macroeconomic factors.

The results of different unit root tests for unbalanced panels are provided in Table A.1 in the Appendix. The tests are the Levin-Lin-Chu test which assumes a common unit root process and implements a pooled ADF-test (Levin et al. (2002)); the Im-Pesharan-Shin test, which assumes individual unit root processes and combines *t*-values from country-specific ADF-tests (Im et al. (2003)); and the Fischer-type test, which combines *p*-values from country-specific ADF-tests (Choi (2001)). The lag length is determined automatically using SIC. The tests show that all the variables in Table 1 are panel stationary.

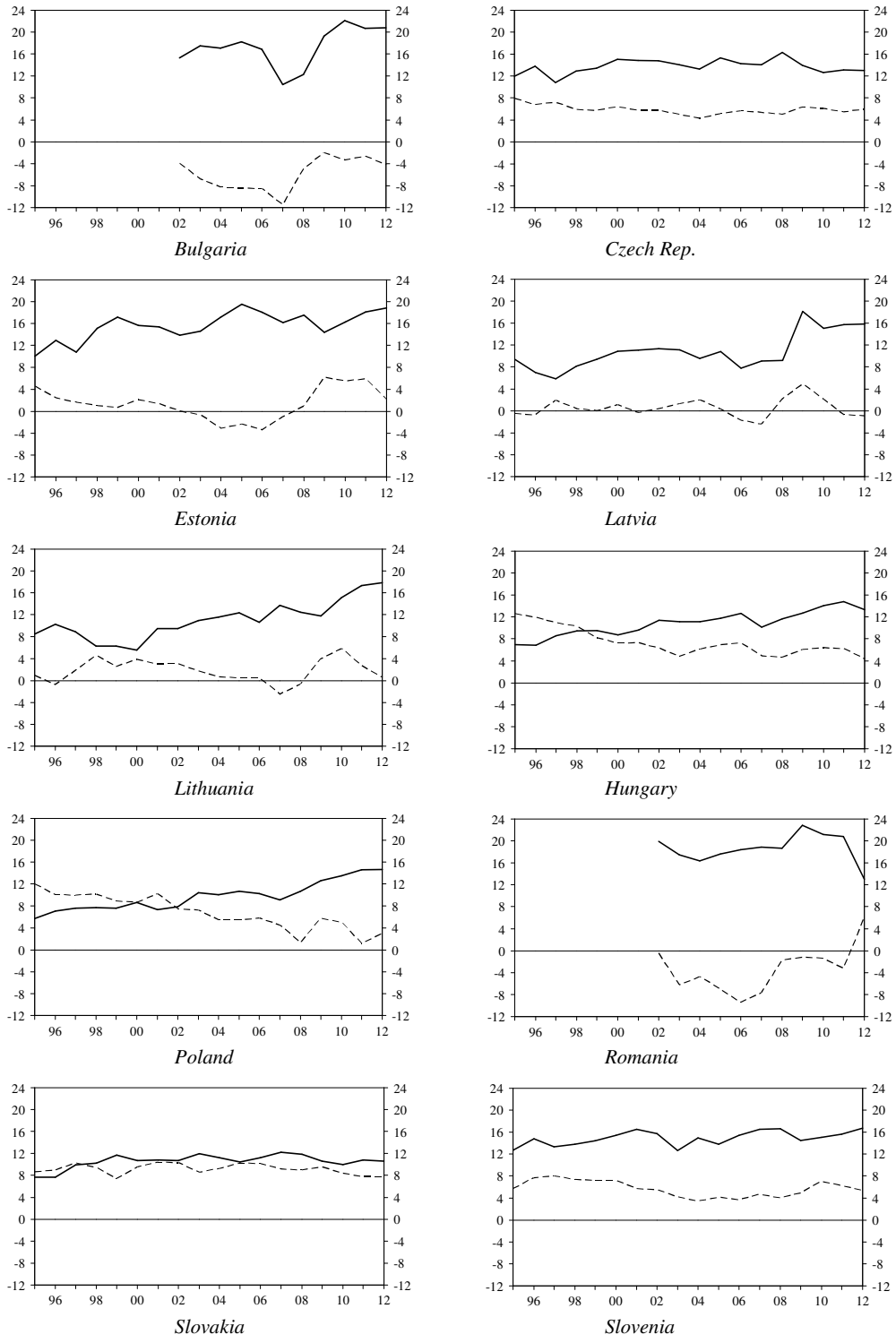

Figure 1: The corporate and household saving rates, percent of GDP

Notes: The corporate saving rate is solid, while the household saving rate is dashed.

Source: See Table 1.

4. Model and estimation methodology

This section presents the results of estimations in which the saving rate of either the corporate sector or the household sector is regressed on its one year lagged value, country dummies and the explanatory macroeconomic variables, or subsets of them, that were discussed in Section 3. The model for saving in the corporate sector can be expressed as follows:

$$\begin{aligned} \text{SAV\_CO}_{it} = {} & \alpha_i + \rho \text{SAV\_CO}_{it-1} + \beta_1 \text{YGAP}_{it} + \beta_2 \text{UR}_{it} + \beta_3 \text{GP}_{it} \\ & + \beta_4 \text{ISR}_{it} + \beta_5 \text{GREER}_{it} + \beta_6 \text{BB}_{it} + \beta_7 \text{CA}_{it} + \varepsilon_{it} \end{aligned} \tag{1}$$

The subscript i indicates the country and t the time. The notation of the variables is given in Table 1. The country dummies are given by α_i, the coefficient ρ depicts the persistence of the corporate saving rate and the β-coefficients capture the effect of different macroeconomic variables on the saving rate. A similar model is estimated for the household sector with SAV_CO replaced by SAV_HH.

The specification in eq. (1) is similar to models in Loayza et al. (2000), Chowdhury (2004), Schrooten and Stephan (2005) and Freytag and Voll (2013) among others. It is noteworthy that the explanatory variables are all included without a lag, implying that the estimated coefficients capture the interaction or relationship between the dependent variables and the saving rate within the year. Dynamic effects are modelled through the lagged dependent variable.

The inclusion of country dummy variables implies that the marginal effects are identified using the time dimension of the panel. This specification is chosen because macroeconomic variables typically show substantial variability over time, while demographic, institutional, and cultural variables typically are invariant or change very slowly over time, with the implication that the country dummies and the lagged dependent variable will pick up most of the effects of these variables.

The choice of estimation methodology is complicated by a number of factors. First, the inclusion of the lagged dependent variable means that models estimated with fixed effects least squares may suffer from the Nickell bias, which leads to a downward bias of the estimated coefficient of the lagged dependent variable and moderate biases of the other estimated coefficients (Nickell (1981)). Second, the saving behaviour of corporations and households may affect the macroeconomic situation and this raises the possibility of reverse causality, making it complex to identify cause and effect.

Following Chowdhury (2004), Schrooten and Stephan (2005), Freytag and Voll (2013) and other, the models are estimated using the Arellano-Bond

GMM estimation methodology (Arellano and Bond (1991)). The differenced model is estimated using GMM where the expanding instruments are the lagged levels of the explanatory variables. The implementation of the method is complicated by the fact that the panel contains very few cross sections and a modest number of time periods. Given the small number of observations there is a need to conserve degrees of freedom and the differenced model is therefore computed using orthogonal deviations. In all the specifications the GMM instruments are the two-period lagged level of the dependent variable and one-period lagged levels of all other variables. Monte Carlo simulations show that a restricted GMM estimator that uses a subset of the available lagged values as instruments does not affect the efficiency of the estimations (Judson and Owen (1999)).

The AB GMM estimator and other GMM estimators developed for dynamic panels may provide biased coefficient estimates in panels with a small number of cross-sections. The AB GMM estimations are therefore supplemented with standard fixed effect estimations and bias-corrected LSDV estimations. Bun and Kiviet (2001) and Judson and Owen (1999) show that bias-corrected LSDV estimators are less biased in dynamic panels with a small number of cross sections than GMM estimators. However, the bias-corrected LSDV estimators do not address the endogeneity problem and are therefore used for robustness testing.

5. Estimation results

5.1. Corporate saving

Table 2 gives the results of a number of Arellano-Bond GMM estimations where the corporate saving rate is regressed on the macroeconomic variables, cf. eq. (1). Column (2.1) shows the results of the baseline estimation with country but not time fixed effects. The coefficient of the lagged dependent variable is 0.50 and is precisely estimated, suggesting substantial persistence in the corporate saving rate.

The coefficient of the output gap, YGAP, is also positive, implying an increasing corporate saving rate during upturns in the economy. An output gap of 1 percent is associated with an increase in the corporate saving rate of 0.2 percentage point. Noticeably, the unemployment rate, UR, appears to be unimportant for corporate saving.

Table 2: Arellano-Bond GMM estimations of the corporate saving rate (SAV_CO)

	(2.1)	**(2.2)**	**(2.3)**	**(2.4)**	**(2.5)**
SAV_CO(−1)	0.498***	0.425***	0.454***	0.539***	0.575***
	(0.093)	(0.088)	(0.096)	(0.146)	(0.060)
YGAP	0.203***	0.221***	0.211***	0.228**	0.198***
	(0.063)	(0.044)	(0.066)	(0.055)	(0.065)
UR	−0.075	−0.041	−0.056	..	−0.045
	(0.101)	(0.090)	(0.124)		(0.086)
ISR	−0.047	−0.027	−0.049	..	−0.056**
	(0.035)	(0.050)	(0.048)		(0.023)
GP	−0.071	−0.022	−0.053	−0.081**	−0.085**
	(0.046)	(0.047)	(0.050)	(0.041)	(0.041)
GREER	−0.028	−0.031*	−0.032	..	−0.026
	(0.019)	(0.017)	(0.027)		(0.025)
BB	−0.187***	−0.206***	−0.195***	−0.105	−0.224***
	(0.077)	(0.091)	(0.093)	(0.076)	(0.086)
CA	0.285***	0.270***	0.282***	0.309***	0.274***
	(0.040)	(0.041)	(0.040)	(0.044)	(0.053)
AR(1)	−2.244	−2.432	−4.078	−2.100	−2.259
	[0.025]	[0.015]	[0.038]	[0.036]	[0.024]
AR(2)	−0.219	−0.168	−0.161	−0.200	−0.237
	[0.827]	[0.866]	[0.872]	[0.842]	[0.813]
Sargan	98.056	121.126	100.554	69.487	77.998
	[0.765]	[0.107]	[0.550]	[0.495]	[0.447]
Country FE	Yes	Yes	Yes	Yes	Yes
Time FE	No	Yes	No	No	No
Period	1995−2012	1995−2012	1995−2012	1995−2012	1995−2007
Countries	10	10	9	10	10
No. of obs.	134	134	119	136	95

Notes: Arellano-Bond GMM estimation with orthogonal deviations where all explanatory variables are treated as endogenous. In all model specifications the GMM instruments are the two-period lagged level of the dependent variable and the one-period lagged level of the other variables. The time dummies are treated as exogenous variables in Column (2.2). Standard errors are robust to heteroskedastic and serially correlated disturbances and are reported in round brackets below the coefficient estimates. Superscripts ***, ** and * indicate that the coefficient is statistically different from 0 at the 1%, 5% and 10% level respectively. *p*-values are reported in square brackets below the test statistics of the autocorrelation and Sargan tests.

The real short-term interest rate, ISR, does not appear to affect the corporate saving rate. The estimated coefficient is negative, but it is neither economically nor statistically significant. The inflation rate, GP, appears to be negatively associated with the corporate saving rate, but the effect is imprecisely estimated. Changes in the real effective exchange rate, GREER, do not appear to be of importance for the corporate saving rate.

The coefficient of the budget balance, BB, is negative and precisely estimated. An improvement of the government budget balance by 1 percentage point is associated with a reduction in corporate saving by 0.19 percentage point.

The coefficient of the current account balance, CA, is positive and statistically significant at the 1 percent level. The implication is that foreign financing and domestic corporate saving are partial substitutes. An increase in the current account deficit of 1 percentage point coincides with a reduction in the corporate saving rate of 0.29 percentage point.

Column (2.2) repeats the estimation in Column (2.1) but includes time fixed effects to assess whether controlling for common shocks affects the results. The only notable difference is that the estimated coefficient of the inflation rate, GP, is now smaller in numerical terms and statistically insignificant. The inflation rates exhibit substantial synchronisation across the sample countries and the effect of the inflation rate is therefore picked up by time dummies.

To assess the sensitivity of the results to outliers, the estimations have been implemented by excluding countries with somewhat unusual macroeconomic developments during the sample period. Column (2.3) shows the results when Poland is excluded from the sample. Poland was little affected by the global financial crisis, but its exclusion from the sample has no substantial impact on the results. Exclusion of other countries similarly did not change the results substantially (not reported).

The baseline model in Column (2.1) comprises a number of possibly correlated explanatory variables and a relatively small number of observations. We have therefore implemented a sequential general-to-specific strategy, where the variable with the lowest numerical *t*-value is removed in each iteration. The variables that are statistically significant in the baseline model retain their statistical significance and approximate coefficient estimates except for the budget balance variable, BB, which is now only statistically significant at the 15 percent level. It appears that the budget balance is a less robust predictor of the saving rate than the output gap and the current account balance. Moreover, in this specification the negative relationship between the corporate saving rate and inflation is statistically significant.

Column (2.5) repeats the estimations for the pre-crisis period 1997–2007. The results are surprisingly robust to this substantial reduction in the sample size; indeed, the size and the statistical significance of the coefficient of the inflation rate Column (2.4) are retained in this specification. The upshot is that the outbreak of the global financial crisis in 2008 does not appear to have

altered fundamentally the relationship between key macroeconomic variables and the corporate saving rate.

All explanatory variables are instrumented in the estimations shown in Table 2. The large number of instruments combined with the small sample size may however bias the results towards the fixed effect results. As a robustness test we therefore instrument the output gap, the inflation rate, the budget balance and the current account balance one-by-one along with the lagged dependent variable, while all other variables are treated as exogenous. The estimated coefficients are qualitatively similar to those shown in Table 2 (not reported; results available upon request). As an additional robustness test we first extend the instrument set by adding the three-year lagged level of the dependent variable to the instruments and then "collapsing" the instrument set. The results are also qualitatively unchanged in this case (not reported). The upshot is that the estimation results are robust to different specifications of the instruments.

In order to explore the importance of the estimation method in a sample with a small cross-sectional dimension, the results of fixed effects estimations and bias-corrected LSDV estimations are presented in Table A.2 in the Appendix.[4] The bias-corrected LSDV estimates are obtained in two steps. In the first step, an approximation of the bias of the LSDV estimators is computed, and this is used in the second step to correct the LSDV estimators. In order to calculate the approximation of the bias, a consistent estimator such as those suggested by Anderson and Hsiao (1982), Arellano and Bond (1991) or Blundell and Bond (1998) must be estimated in the first step. We have used two alternative methods in the first-step estimations, i.e. the Arellano-Bond estimator in Column (A2.3) and the Blundell-Bond estimator in Column (A2.4). A parametric bootstrap procedure is used to calculate the standard errors.

The results of the fixed effect and the bias-corrected LSDV specifications are qualitatively very similar to the results obtained using AB GMM in Table 2. The main differences are that the estimated coefficient of the lagged corporate saving rate varies somewhat across the specifications. The estimated coefficients of all variables are comparable to those obtained in the AB GMM estimations.

The overall picture is that the corporate saving rate exhibits substantial persistence and is affected by the output gap and the current account balance. The correlation with the inflation rate and the budget balance is uncertain in

[4] We use the bias-corrected LSDV estimator for unbalanced panels as developed by Bruno (2005a). Monte Carlo simulations by Bruno (2005b) confirm the good performance of the bias-corrected LSDV estimator.

some model specifications. The unemployment rate, the interest rate and changes in the real effective exchange rate appear to be unimportant for the corporate saving rate.

5.2. Household saving

Table 4 reports the results when the household saving rate, SAV_HH, is regressed on the same set of variables used in Table 2 using the Arellano-Bond GMM method. Column (3.1) provides the baseline results of the estimations using the full estimation sample 1997-2012. There is some persistence in the saving rate but at 0.36 the point estimate is somewhat smaller than the one estimated for the corporate saving rate.

Surprisingly, the estimated coefficients of the variables depicting the stance of the business cycle, i.e. the output gap and the unemployment rate, are small and not statistically significant.[5] It appears that the business cycle does not affect the aggregate saving rate of households, even if an increase in the saving rate in the 2008–2009 recession can be observed in most CEE countries.

The coefficient of the real interest rate is positive and precisely estimated, but arguably not very large; an increase in the real interest rate of 1 percentage point corresponds to an increase in the household saving rate of 0.14 percentage point. Studies for developed countries have found positive, negative or statistically insignificant relationships between the interest rate and the household saving rate; see Hüfner and Koske (2010) and the references therein. European Commission (2011) finds a negative relationship between the real interest rate and the private saving rate for the EU15 countries in Western Europe, but a positive one for the new EU countries in Eastern Europe, a result consistent with the finding in this paper.

The coefficient of the inflation rate is statistically significant and positive, confirming the results of other studies on the total private saving rate; see for instance Hüfner and Koske (2010) and Freytag and Voll (2013). The coefficient of GREER is statistically insignificant in all model specifications; changes in competitiveness do not appear related to the household saving rate.

The budget balance is negatively related to the household saving rate; Callen and Thimann (1997) report a similar result in their study of the saving

[5] We also included GDP growth instead of the output gap estimations to see whether the choice of the business cycle variable would be of importance, but the relationship with the household saving rate remained insignificant (not reported).

rate of households in developed countries. The coefficient estimate implies that an increase in the government budget balance by one percentage point is associated with a decline in the household saving rate of 0.19 percentage point.

Table 3: Arellano-Bond GMM estimations of the household saving rate (SAV_HH)

	(3.1)	**(3.2)**	**(3.3)**	**(3.4)**	**(3.5)**
SAV_HH(−1)	0.362***	0.434***	0.347***	0.359***	0.648***
	(0.042)	(0.050)	(0.060)	(0.067)	(0.043)
YGAP	0.015	0.093*	−0.009	..	0.121***
	(0.068)	(0.065)	(0.064)		(0.042)
UR	−0.001	0.091	−0.082	..	0.025
	(0.089)	(0.080)	(0.092)		(0.061)
ISR	0.143***	0.109***	0.120***	0.143***	0.110***
	(0.030)	(0.023)	(0.016)	(0.030)	(0.037)
GP	0.131***	0.104	0.102**	0.134***	0.048
	(0.048)	(0.064)	(0.045)	(0.047)	(0.037)
GREER	−0.001	−0.009	0.001	..	0.012
	(0.013)	(0.015)	(0.018)		(0.020)
BB	−0.190***	−0.108*	−0.181**	−0.204***	−0.178***
	(0.065)	(0.059)	(0.076)	(0.074)	(0.066)
CA	0.112***	0.089**	0.131***	0.102***	0.177***
	(0.019)	(0.027)	(0.028)	(0.029)	(0.020)
AR(1)	−2.430	−2.192	−2.310	−2.150	−2.236
	[0.015]	[0.028]	[0.021]	[0.032]	[0.025]
AR(2)	−1.006	−0.777	−0.825	−0.981	−1.090
	[0.314]	[0.437]	[0.410]	[0.327]	[0.276]
Sargan	114.961	120.551	114.287	81.278	85.573
	[0.329]	[0.114]	[0.210]	[0.168]	[0.236]
Country FE	Yes	Yes	Yes	Yes	Yes
Time FE	No	Yes	No	No	No
Period	1995−2012	1995−2012	1995−2012	1995−2012	1995−2007
Countries	10	10	9	10	10
No. of obs.	134	134	119	134	95

Notes: Arellano-Bond GMM estimation with orthogonal deviations where all explanatory variables are treated as endogenous. In all model specifications the instruments are the two-period lagged level of the dependent variable and one-period lagged levels of the other variables. The time dummies are treated as exogenous variables in Column (2.2). Standard errors are robust to heteroskedastic and serially correlated disturbances and are reported in round brackets below the coefficient estimates. Superscripts ***, ** and * indicate that the coefficient is statistically different from 0 at the 1%, 5% and 10% level respectively. *p*-values are reported in square brackets below the test statistics of the autocorrelation and Sargan tests.

The current account balance is positively associated with the household saving rate. Schmidt-Hebbel et al. (1992) also find that foreign saving affects

household saving negatively. If the current account deficit increases by one percentage point, the household saving rate decreases by 0.11 percentage point.

Column (3.2) shows the results when time dummies are included. The estimated coefficients of the statistically significant independent explanatory variables decline somewhat in numerical terms, but the qualitative results remain overall unchanged. Column (3.3) provides the estimation results when Poland is excluded from the sample, but all results from the baseline model are retained. Excluding other countries one-by-one similarly does not affect the results substantially. Likewise, all results are retained when statistically insignificant variables are removed using a general-to-specific procedure; see Column (3.4).

Finally, Column (3.5) shows the results when the model is estimated on the pre-crisis sample 1997–2007. Most results for the pre-crisis sample are in line with those for the full sample but there are some differences. The coefficient of the lagged dependent variable is larger than in the estimation on the full time sample, suggesting that the household saving rate was more persistent before than after the crisis. Other differences are that the coefficient of the output gap is statistically significant, while the coefficient of the inflation rate is not statistically significant in the pre-crisis sample.

It follows that whereas the saving behaviour of companies appears to have been little affected by the global financial crisis, the saving behaviour of households appears to have changed to some extent. EBRD (2011) finds that households in the CEE countries were severely affected by the crisis, leading to sharp changes in consumption and saving behaviour. In order to validate the hypothesis of a structural break in the saving behaviour for households, more observations would be needed from the post-crisis period.

In order to limit the number of instruments used in the estimations, we run AB GMM estimations in which the interest rate, the inflation rate, the budget balance and the current account balance are instrumented one-by-one together with the lagged household saving rate. We also implement estimations in which the third lag of the level of the dependent variable is added as an instrument and the instrument set is collapsed. In all the specifications the estimated coefficients are comparable to the estimations in Table 3, confirming the robustness of the results (not shown).

As further robustness tests, fixed effects and bias-corrected LSDV estimations are presented in Table A.3 in the Appendix. Column (A3.1) presents estimations with country fixed effects and Column (A3.2) presents estimations with country and time fixed effects. Column (A3.3) shows the results for the bias-corrected LSDV estimation when the Arellano-Bond estimator is

used in the first step, and Column (A3.4) shows the results with the Blundell-Bond estimator. The results are qualitatively very similar to the results in Table 3, suggesting that the small sample bias is not a concern.

5.3. Comparison and discussion

Several interesting results emerge from the estimations of sectoral saving rates, in particular when the results for the corporate sector and the household sector are compared. In addition to a direct comparison of the results in Tables 2 and 3, we also seek to test statistically whether the coefficients estimated are similar across the corporate and household sectors.

Table 4 presents Wald tests of the hypothesis that the estimated coefficients of the explanatory variables in the two sectors are identical. Column (4.1) repeats for convenience the results of the Arellano-Bond GMM baseline estimations for the corporate sector from Column (2.1) in Table 2. Column (4.2) reproduces the baseline AB GMM results for the household sector from Column (3.1) in Table 3. Column (4.3) shows the results of Wald tests of the coefficients in the two sectors being identical.[6]

The persistence of the sectoral saving rates is quite modest, but the point estimate is slightly higher for the corporate saving rate (around 0.4–0.5) than for the household saving rate (around 0.3–0.4). However, the coefficients are estimated with relatively large standard errors so the difference between the coefficients for the corporate and household sectors is not statistically significant; see Column (4.3) in Table 4.

The persistence of the corporate saving rate may be related to the inertia of dividend payment policies as noted by e.g. Denis and Osobov (2008) and Fama and Babiak (1968). Stable dividend payment also makes retained earnings relatively stable. The slightly lower persistence for the household sector is consistent with the theory of consumption smoothing for households as households save and dis-save to smooth their consumption in the presence of varying earnings (Attanasio and Weber (2010)).

[6] The datasets of the household and corporate sectors are stacked and this allows the coefficients of the explanatory variables in the two sectors to be estimated concurrently and Wald tests of equality to be computed.

Table 4: Arellano-Bond GMM estimations of the corporate and household saving rates

	(4.1)	**(4.2)**	**(4.3)**
	SAV_CO	**SAV_HH**	**χ^2-test**
SAV_CO(−1) / SAV_HH(−1)	0.498***	0.362***	1.79
	(0.093)	(0.042)	[0.181]
YGAP	0.203***	0.015	4.10
	(0.063)	(0.068)	[0.043]
UR	−0.075	−0.001	0.30
	(0.101)	(0.089)	[0.583]
ISR	−0.047	0.143***	16.53
	(0.035)	(0.030)	[0.000]
GP	−0.071	0.131***	9.27
	(0.046)	(0.048)	[0.002]
GREER	−0.028	−0.001	1.35
	(0.019)	(0.013)	[0.245]
BB	−0.187***	−0.190***	0.06
	(0.077)	(0.065)	[0.975]
CA	0.285***	0.112***	15.65
	(0.040)	(0.019)	[0.000]
Method	AB GMM		
Country FE	Yes		
Time FE	No		
Period	1995–2012		
Countries	10		
No. of obs.	268		

Notes: Standard errors are reported in round brackets below the coefficient estimates. The standard errors are robust to disturbances that are heteroskedastic and serially correlated in the AB GMM estimations. The null hypothesis of the Wald test is that the estimated coefficients for the corporate saving rate and the household saving rate are equal; *p*-value is reported in square brackets below the test statistics. Superscripts ***, ** and * indicate that the coefficient is statistically different from 0 at the 1%, 5% and 10% level respectively.

The estimated persistence is comparable to that found in studies of *total* private saving. Schrooten and Stephan (2005) estimate the persistence of the total private saving rate to be 0.4 for the CEE countries and Chowdhury (2004) finds the persistence to be 0.5. Freytag and Voll (2013) estimate the coefficient to be 0.4 for developing and transition countries while Loayza et al. (2000) estimate it to be 0.5 for the non-transition emerging economies. Several studies indicate that the persistence of private saving is higher for developed countries than for developing countries.

The estimations reveal that the corporate saving rate is positively related to the output gap while the household saving rate does not depend on the business cycle. Freytag and Voll (2013), Ferrucci and Miralles (2007), Masson et al. (1998) and Attanasio et al. (2000) find a positive relationship be-

tween GDP growth and *total* private saving. Our results suggest that the relationship stems from a positive association between the business cycle and corporate saving rather than from household saving.

The finding that the unemployment rate is not associated with corporate saving is arguably not surprising, but it is noteworthy that it does not affect household saving. Carroll et al. (2012) find that higher unemployment leads to increased household saving in the USA, while Callen and Thimann (1997) find that unemployment is detrimental to household saving in OECD countries in 1975–1995.

We do not find any linkage between the real interest rate and the corporate saving rate, while there is a positive relationship between the interest rate and the household saving rate. A positive linkage between the real interest rate and *private* saving is reported in several studies; see e.g. Loayza et al. (2000), Masson et al. (1998) and European Commission (2011). Our results suggest that the positive relationship is driven by household saving and not by corporate saving.[7]

The signs of the estimated coefficients of the inflation rate differ for the corporate and household sectors; higher inflation coincides with a higher household saving rate but a lower corporate saving rate. However, in some specifications the negative relationship between inflation and corporate saving is imprecisely estimated but the differences between the two sectors are still notable. As discussed in Section 2, the relationship between inflation and the saving rate is unclear in theory, as high inflation as a proxy for uncertainty should increase the saving rate but high inflation may make saving less attractive.

Empirical studies investigating the effect of inflation on *total* private saving have reached diverging conclusions. Schrooten and Stephan (2005) do not find any significant relationship between the inflation rate and the private saving rate, while Pelgrin and de Serres (2002) estimate the relationship between inflation and the total private saving rate for OECD countries in the 1990s to be negative, though imprecisely estimated. A positive relationship was obtained in European Commission (2011), Freytag and Voll (2013), Ferrucci and Miralles (2007) and Hondroyannis (2006) for total private saving. Our results suggest that the positive linkage is mainly driven by the household saving rate.

The different relationships between inflation and saving in the corporate and household sectors may be due to different underlying mechanisms. The

[7] In some model specifications the relationship between the corporate saving rate and the real interest rate is negative (Column 2.5 in Table 2) but in most cases it is not statistically significant.

explanation for the potentially negative relationship between inflation and the corporate saving rate may be that corporations are net borrowers, implying that inflationary gains outweigh the uncertainty. The positive linkage between inflation and the household saving rate could be driven by increased uncertainty as argued in other studies. Chowdhury (2004) posits indeed that the inflation level is a proxy of macroeconomic uncertainty. Bachmann et al. (2012) use micro data and find that expectations of large price changes impact the readiness to spend negatively.

The sensitivity of the saving rate to changes in the government budget balance is around 0.2 for both sectors. The effects are relatively small, suggesting that an increase in the public saving rate is far from being associated with a proportional decline in the private saving rate in the CEE countries. In other words, the government's fiscal decisions can affect the national saving rate.

The estimated coefficients of the budget balance are comparable to the findings in other studies. For developed countries, the effect of government saving on the total private saving rate, i.e. the sum of the corporate and household saving rates, has been estimated to be around 0.5; see de Mello et al. (2004), Pelgrin and de Serres (2002), Corbo and Schmidt-Hebbel (1991), and Masson et al. (1998). Ferrucci and Miralles (2007) estimate the coefficient of emerging market economies to be 0.3 and Chowdhury (2004) estimates the impact of the budget balance on the private saving rate for Eastern European countries to be 0.21.

The estimations for the current account balance suggest that substitution between foreign and domestic saving is present in both the corporate and the household sectors. Nevertheless, the substitution is substantially stronger for the corporate sector than for the household sector as the estimated coefficients are respectively 0.29 and 0.11 and the difference between the point estimates is statistically significant; see also Column (4.3) in Table 4. Corporate saving in the CEE countries appears to be more dependent on the availability of foreign capital inflows than household saving does.

The estimations for the current account balance are comparable to the results of Schrooten and Stephan (2005), who estimate the coefficient of the total private saving rate to be 0.47 for a sample of CEE countries for the period 1992–2000.[8] The findings suggest that although the current account imbalances in CEE countries were larger in the 2000s than in the 1990s, the substitution of private savings by foreign sources did not change substantially.

[8] Masson et al. (1998) also estimate the effect to be at around 0.5 for industrial and developing countries in 1982–1993.

No relationship between the real effective exchange rate and sectoral saving rates was detected in any model specifications. Ogaki et al. (1996) find that changes in the real exchange rate have a limited impact on private savings, while Bosworth et al. (1999) and Chowdhury (2004) find that the private saving rate is positively associated with the terms of trade. These results cannot be obtained on the present sample.

In conclusion, the dynamics of the saving rates and their association with various macroeconomic variables appear to differ substantially across the corporate and household sectors. The differences are most pronounced for the output gap, the real interest rate, the inflation rate and the current account balance. Some variables such as the unemployment rate and real exchange rate changes are unimportant in both sectors.

6. Final comments

This paper seeks to ascertain the importance of various macroeconomic factors for corporate and household saving rates in 10 EU countries from Central and Eastern Europe. The development of corporate and household saving is important for economic welfare in the short and long terms, including financial stability, business cycle developments and economic growth. Very few studies have examined macroeconomic factors in private saving in Central and Eastern Europe and none have considered the effects on saving in the corporate and the household sectors separately.

The paper uses annual panel data from 1995 to 2012. The sectoral saving rate is regressed on its lagged value, dummies and a number of key macroeconomic variables. The analyses are carried out using Arellano-Bond GMM estimation, LSDV estimation and bias-corrected LSDV estimation, but the results are in almost all cases qualitatively similar across the three estimation methods.

The persistence of the sectoral saving rates is relatively modest, although marginally larger for the corporate sector than for the household sector. Changes in the macroeconomic environment are important for the saving rates in both sectors, but with marked differences across the sectors. The cyclical position, represented by the output gap, is linked positively with the corporate saving rate but not with the household saving rate. The real interest rate is positively related to the household saving rate but not to the corporate saving rate. The inflation rate is positively associated with the household saving rate, while there is a negative but imprecisely estimated relationship with the corporate saving rate. The current account balance is strongly related to the corporate saving rate and less strongly to the household saving rate, sug-

gesting that foreign and domestic saving are partial substitutes. The government budget balance reduces the saving rates of the household sector and corporate sector to the same extent. Finally, other factors such as the unemployment rate and real exchange rate changes appear unimportant for sectoral saving.

The overall conclusion is that changes in the macroeconomic environment are strongly associated with private saving rates, but there are marked differences between the corporate and household sectors. Such differences, evidently, cannot be identified when the total private saving rate is studied rather than the corporate and the household saving rates separately. This underscores the importance of distinguishing between corporate and household saving in improving understanding of the determinants of private saving.

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Appendix

Table A.1: Unit root tests

	(A1.1)	**(A1.2)**	**(A1.3)**
	Levin-Lin-Chu test	**Im-Pesaran-Shu test**	**Fisher-type ADF test**
	Statistic (t^*)	Statistic (W)	Statistic (χ^2)
SAV_CO	−2.916***	−1.625*	34.724**
SAV_HH	−5.307***	−4.094***	57.047***
YGAP	−3.526***	−2.249***	36.417**
UR	−3.021***	−2.925***	40.870***
GP	−7.052***	−4.478***	53.761***
ISR	−5.895***	−4.661***	57.830***
GREER	−10.210***	−9.052***	122.979***
BB	−5.650***	−5.032***	64.018***
CA	−2.529***	−2.823***	40.869***

Notes: Unit root tests with panel means included and lag length selection based on SIC. The Levin-Lin-Chu test assumes common autoregressive parameters and implements pooled ADF test, the Im-Pesaran-Shu test assumes panel-specific autoregressive parameters and combines t-values of country-specific augmented Dickey Fuller unit root tests. The Fisher-type ADF test combines the *p*-values of country-specific augmented Dickey Fuller unit root tests. The lag length is determined by SIC. In all tests the null hypothesis is that all panels contain unit roots while the alternative hypothesis is that some panels are stationary. Superscripts *** and ** indicate that the null hypothesis is rejected at the 1% and 5% level respectively.

Table A.2: Additional estimations of the corporate saving rate (SAV_CO)

	(A2.1)	**(A2.2)**	**(A2.3)**	**(A2.4)**
SAV_CO(−1)	0.438***	0.397***	0.496***	0.590***
	(0.098)	(0.099)	(0.068)	(0.067)
YGAP	0.214***	0.213***	0.209***	0.221**
	(0.070)	(0.054)	(0.064)	(0.082)
UR	−0.047	−0.032	−0.040	−0.032
	(0.099)	(0.091)	(0.068)	(0.088)
ISR	−0.070	−0.030	−0.060	−0.036
	(0.044)	(0.062)	(0.039)	(0.049)
GP	−0.072	−0.021	−0.065	−0.056
	(0.049)	(0.051)	(0.042)	(0.052)
GREER	−0.036	−0.032	−0.033	−0.032
	(0.020)	(0.019)	(0.021)	(0.026)
BB	−0.219*	−0.221*	−0.218***	−0.222***
	(0.103)	(0.112)	(0.062)	(0.076)
CA	0.276***	0.256***	0.266***	0.262***
	(0.041)	(0.050)	(0.044)	(0.055)
Method	FE	FE	Bias-corrected (AB)	Bias-corrected (BB)
R^2	0.654	0.694	..	..
Country FE	Yes	Yes	Yes	Yes
Time FE	No	Yes	No	No
Period	1995−2012	1995−2012	1995−2012	1995−2012
Countries	10	10	10	10
No. of obs.	144	144	144	144

Notes: Standard errors are reported in round brackets below the coefficient estimates. The standard errors are robust to disturbances that are heteroskedastic and serially correlated in the FE estimations, while they are bootstrapped with 1000 replications in the bias-corrected estimations. Superscripts ***, ** and * indicate that the coefficient is statistically different from 0 at the 1%, 5% and 10% level respectively.

Table A.3: Additional estimations of the household saving rate (SAV_HH)

	(A3.1)	**(A3.2)**	**(A3.3)**	**(A3.4)**
SAV_HH(−1)	0.375***	0.451***	0.435***	0.495***
	(0.047)	(0.052)	(0.072)	(0.072)
YGAP	0.039	0.119*	0.042	0.036
	(0.080)	(0.061)	(0.064)	(0.076)
UR	0.015	0.116	−0.001	−0.033
	(0.094)	(0.093)	(0.069)	(0.084)
ISR	0.142***	0.107***	0.140***	0.133***
	(0.029)	(0.025)	(0.036)	(0.042)
GP	0.127**	0.102	0.115***	0.098**
	(0.051)	(0.070)	(0.043)	(0.049)
GREER	0.000	−0.009	0.002	0.001
	(0.014)	(0.017)	(0.020)	(0.024)
BB	−0.191**	−0.108*	−0.191**	−0.193**
	(0.077)	(0.072)	(0.060)	(0.071)
CA	0.120***	0.089**	0.119***	0.131***
	(0.025)	(0.037)	(0.042)	(0.049)
Method	FE	FE	Bias-corrected (AB)	Bias-corrected (BB)
R^2	0.594	0.668	..	..
Country FE	Yes	Yes	Yes	Yes
Time FE	No	Yes	No	No
Period	1995−2012	1995−2012	1995−2012	1995−2012
Countries	10	10	10	10
No. of obs.	144	144	144	144

Notes: Standard errors are reported in round brackets below the coefficient estimates. The standard errors are robust to disturbances that are heteroskedastic and serially correlated in the FE estimations, while they are bootstrapped with 1000 replications in the bias-corrected estimations. Superscripts ***, ** and * indicate that the coefficient is statistically different from 0 at the 1%, 5% and 10% level respectively.

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