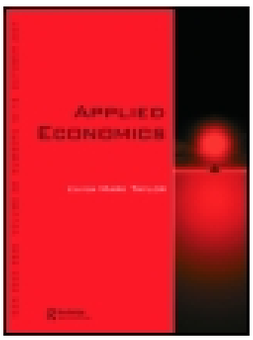

Applied Economics

ISSN: 0003-6846 (Print) 1466-4283 (Online) Journal homepage: http://www.tandfonline.com/loi/raec20

Is business saving really none of our business?

Ricardo Bebczuk & Eduardo Cavallo

To cite this article: Ricardo Bebczuk & Eduardo Cavallo (2015): Is business saving really none of our business?, Applied Economics, DOI: 10.1080/00036846.2015.1117050

To link to this article: http://dx.doi.org/10.1080/00036846.2015.1117050

Published online: 30 Nov 2015.

APPLIED ECONOMICS, 2015
http://dx.doi.org/10.1080/00036846.2015.1117050

Routledge
Taylor & Francis Group

Is business saving really none of our business?

Ricardo Bebczuk[a] and Eduardo Cavallo[b*]

[a]Departamento of Economía, Facultad de Ciencias Económicas, Universidad Nacional de La Plata, La Plata, Argentina; [b]Research Department, Inter-American Development Bank, Washington DC, USA

ABSTRACT

This paper revisits the role of business saving in the economy by critically scrutinizing the existing macroeconomic and corporate finance literatures. We assemble and exploit a broad international, unbalanced panel of 47 countries over 1995–2013 on saving and investment by institutional sector to shed new light on the relevance of business saving for private saving and investment around the world. We show that businesses contribute on average more than 50% of national saving around the world. Using this unique dataset, we find evidence of partial piercing of the corporate veil: a $1 increase in business saving gives rise to a decrease of approximately $0.40 in household saving–thereby raising private saving by as much as $0.60. We also find that a $1 increase in business saving increases private investment by as much as $0.20 in countries where limited financing is a binding constraint on firms' investment. The evidence suggests that business saving and external financing are *complementary* sources of financing for investment.

KEYWORDS

Business saving; corporate veil; domestic saving; corporate finance

JEL CLASSIFICATION

E21; G32

I. Introduction

The Chinese saving rate in the late 2000s reached an impressive record of 54% of GDP, half of which was generated by the corporate sector. Back in Latin America, 74% of the private saving rate in Chile in 2011 had the same origin. According to IMF (2006), businesses accounted for 70% of private saving in G7 countries in the early 2000s, up from 50% in the early 1990s.

In the light of these figures, it is no wonder that business saving (defined as cash flows – net revenues plus depreciation minus dividends) plays a primary role on corporate investment.[1] In fact, these retained earnings appear to be by far the main source of business financing. Fan, Titman, and Twite (2012) compile data on more than 36,000 listed firms in 39 countries in 1991–2006; they conclude that the median debt-to-assets ratio in developing countries is just 26%, implying that three-quarters of total assets is financed with equity, most of it internally generated. For six big Latin American countries in 2009, Bebczuk and Galindo (2010) find this ratio to be also 26%. For developed economies, the number is still lower (20%), suggesting that the heavy reliance on internal funds cannot be traced to differences in institutional, economic or financial development, and also affects big, listed firms, not to mention the small. If anything, it stands out as an international stylized fact.

Data on financing flows of firms reinforce this conclusion. Ayyagari, Demirguc-Kunt and Maksimovic (2008) present data from the Enterprise Surveys administered by the World Bank on some 40,000 firms in 67 countries. They report that internal funds cover 59.2% of financing needs in low-income countries, 59.3% in middle-income countries and 58.2% in high-income economies. For Latin America, this percentage is 60.5%. Much in line with the previous leverage

CONTACT Eduardo Cavallo cavalloe@iadb.org

*This is a revised version of IDB Working Paper No. 523. The views expressed here are strictly those of the authors and do not necessarily represent the views of the Inter-American Development Bank (IDB), the board of this institution or the countries it represents, or any other institution. We thank Cynthia Marchioni, Mathieu Pedemonte, Germán Reyes, and Matías Marzani for superb research assistance. Máximo Sangiácomo provided most helpful suggestions on the econometric estimations. All remaining errors are our responsibility.

[1]Just to be clear, business saving forms part of private saving along with household saving. National saving is the sum of private saving (business plus household) and public saving. Business saving is sometimes referred to as corporate saving, retained earnings, undistributed cash flows, internal funds, or own funds. Businesses do not consume, of course, but they pay out dividends to shareholders. Dividends represent an outflow of cash, in much the same way as household consumption does. The remaining cash flow is retained within the firm for later use in the form of physical or financial investment. As clearly stated in the national accounts around the world, there is one definition for business saving.

data, this pattern looks unrelated to country group characteristics. This holds irrespectively of firm size. Beck (2007) also uses the Enterprise Surveys for 71 developing countries to show that internal funding covers 66% of investment in small firms (less than 20 workers), 60% in medium firms (20–99 workers) and 58% in big firms (over 100 workers). As small firms tend to be informal for the most part, these self-financing ratios hint that informality is not the sole factor giving rise to a link between business investment and saving.

These figures notwithstanding, the saving of businesses remains a largely neglected topic in the macroeconomic literature. As far as saving studies are concerned, the bulk of the empirical work leaves aside business saving. For instance, Loayza, Schmidt-Hebbel, and Servén (2000), one of the more influential studies on private saving in the last 15 years, plainly omits the discussion of business saving. More recently, the same goes for Mody, Ohnsorge, and Sandri (2012) and Aizenman and Noy (2013). In the Latin American context, two recent reports on saving in the region, yet looking at the interplay between private and public saving, do not cover business saving separately (see IDB 2013). The only recent exception, in that business saving is explicitly examined, is Grigoli, Herman, and Schmidt-Hebbel (2014).

This paper seeks to fill this gap by tackling three central questions: (1) Why should business saving be front and centre in the analysis of national saving?; (2) How has business saving behaved around the world in the last two decades?; and (3) What is the empirical link of business saving with overall private saving, on one hand, and with business investment, on the other?

In order to answer these questions, we will review the existing international literature on the subject and assemble and exploit a novel saving and investment dataset by institutional sector (households, businesses, and the government) for 47 developed and developing countries over 1995–2013.

The paper will be organized as follows. In Section II, we go over the literature linking business saving with private and national saving and investment. In Section III, we provide some details on data sources and describe the main trends of saving and investment at the institutional sector level. Section IV presents the empirical models explaining business saving and its relationship to national saving and investment. Section V provides the conclusions and policy implications.

II. Literature review

This section aims to shed light to the theoretical and empirical links between business saving and overall private saving, on the one hand, and business investment, on the other hand. This is done by critically scrutinizing the existing macroeconomic and corporate finance literatures about these topics. As shown next, the conclusions from this analysis defy conventional wisdom in more than one regard.

Business, household and private saving: the corporate veil hypothesis

As pointed out in the Introduction, the body of economic research on business saving is remarkably scarce, even more so when compared with the profuse literature on private and national saving. Two implicit assumptions and one practical fact seem to lie behind this disdain for the topic.

Building on the basic circular flow model, the first assumption is that households save but do not invest, while firms invest but do not save. This assumption can be quickly ruled out after noticing, as observed in the Introduction, that businesses contribute with no less than 50% of private and national saving. The second assumption is that, even if not negligible, business saving is irrelevant to determine private saving because households pierce the corporate veil, an issue to be discussed momentarily and then resumed in Section IV. For now, it suffices to say that most of the evidence runs counter to this assumption, meaning that changes in business saving do have an impact on private and national saving.

Finally, the practical fact has to do with the limited availability of business saving statistics, in turn associated to the lack of comprehensive balance sheet data on the business sector, especially in developing economies. While long time series on private and public saving are available for most countries, a much more restricted group has managed to produce and maintain business sector public

information on a representative set of firms.[2] The information collected for the present paper intends to overcome this gap.

The seminal scholarly paper drawing direct attention towards business saving is Poterba (1987).[3] After taking note that corporations contributed with 50% of private saving in the 1960s as well as in the 1980s, Poterba goes on to posit the corporate veil hypothesis, according to which households take full account of the saving made by businesses on their behalf – that is, households pierce the corporate veil.

The argument relies on the fact that households are the ultimate owners of firms, and thus they adjust their saving plans in the face of changes in business saving. Under the permanent income theory, consumption decisions are based on the present value of labour income and dividend revenues. If firms change their current saving by, say, increasing current dividends, households would not modify their initial desired consumption and saving because, for a given present value of profits, higher present dividends would be compensated by lower future dividends, leaving permanent income unchanged. Consequently, the additional dividends will be fully saved, implying a complete offset between the diminished business saving and the raised personal saving. In other words, private saving does not change because the private sector's intertemporal budget constraint does not change either, and therefore the split between household and business saving is immaterial for any policy purpose.

However, Poterba (1987) acknowledged the various empirical shortcomings that can invalidate the full piercing of the corporate veil. Most prominently, empirical outcomes can depart from the theory in the presence of asymmetric information and bounded rationality. Asymmetric information in financial markets can lead to household financial constraints, under which these units will be prone to spend all or part of the extra current disposable income made available by the augmented dividends. In turn, bounded rationality may turn people unconcerned about the future and adopt myopic consumption strategies solely based on current disposable income (see Bebczuk 2000).[4] The resulting empirical prediction is that an increase (reduction) in business saving will give rise to an increase (reduction) in private saving. If such neutrality is broken, movements in business saving may prove to be a powerful instrument in changing national saving.[5]

A handful of papers have investigated the empirical nexus between household and business saving, concluding for the most part that the corporate veil holds, but only partially. Poterba (1987) finds for the USA over 1950–1986 that a $1 change in business saving translates into about $0.30 change in the same direction in private saving. Pitelis (1987) empirical results for the UK cast doubt on the perfect substitution hypothesis between personal saving and corporate retained earnings. IMF (2006) documents the relentless increase of business saving in the G7 since 1970, both as a ratio of GDP (from about 8% in 1970 to 12% in 2004) and a ratio of total private saving (from 44% to 73% between those years). Although a graphical analysis suggests a compensating effect between household and business saving, this paper does not pursue any econometric estimation. IMF (2009) observes a similar behaviour in Asian emerging countries, and in this case a panel regression delivers an offset coefficient of 0.8, even though the result for a broader set of emerging economies proves non-significant. Bebczuk (2000) looks at the seven largest countries in Latin America during 1990–1996, and obtains a coefficient of 0.61. In their household saving regression, Grigoli, Herman, and Schmidt-Hebbel (2014) find a corporate saving coefficient of −0.58, significantly lower than the −1 predicted by the pure corporate veil.

[2]A few decades ago, only developed countries had national accounts by institutional sector. Over the last two decades a growing number of emerging countries has followed.

[3]As a matter of fact, Poterba (1987) cites a pioneer paper by Edward Denison (1958) that uncovers a higher stability of gross private saving vis-à-vis household and business saving, a phenomenon that Denison interprets as evidence of offsetting between the latter.

[4]By turning any predictions about the future imprecise and unreliable, excessive economic volatility is also likely to cause shortsightedness. Uncertainty also affects consumption via a higher propensity to consume out of cash dividends vis-à-vis capital gains, as the latter tend to have a larger temporary component than dividends, whose changes are usually of a more permanent nature (see Campbell, Lo, and MacKinlay 1997). This problem is exacerbated when secondary capital markets are illiquid and/or inefficient, or stock holdings cannot be used as collateral in borrowing from the banking system, because in those cases capital gains become poor substitutes for cash dividends.

[5]The reader may easily find several points in common between the corporate veil and the Ricardian equivalence hypotheses. While the former deals with the offset between household and business saving, the latter does it with private and public saving.

This estimate implies that an additional dollar of corporate saving translates into an increase of 0.42 cents in private saving.[6]

In this paper, we revisit these estimates using a new dataset of 47 developed and developing countries over 1995–2013. Like most of the previous studies, we also find evidence of partial piercing of the corporate veil, albeit with different magnitudes. The bottom line is that, by and large, the available empirical evidence runs counter to the assumption of full neutrality of business saving in the economy.

Business saving and investment

The second empirical issue being tackled in this paper is whether business saving boosts or hinder business investment.[7] To some extent, contradictory answers have been offered to this question from the macroeconomics and corporate finance fields.[8] Within the realm of finance, the seminal Modigliani and Miller's (1958) analysis suggests that business saving (i.e. internal funding) is irrelevant, as all, inside and outside, financing sources are perfect substitutes. However, this is only true under strong and highly unrealistic assumptions, including the absence of taxes, intermediation costs and asymmetric information. In particular, the prevalence of adverse selection and moral hazard breaks the equivalence between internal and external finance.

Myers and Majluf (1984) puts forward the pecking order theory, claiming that, based on their relative cost, businesses first exhaust their availability of internal funds, then they tap the debt market (starting with secured debt) and finally, as a last resort, they issue stock. A direct corollary from this model is that a higher volume of internal cash flows would lead to more investment. This was first tested by Fazzari et al. (1988), followed by a large number of applications for different countries and periods, which lent overall support to this hypothesis (see Hubbard 1998 for a survey). All in all, corporate finance highlights several advantages of internal over external funds, namely: (1) Internal funds are uncontaminated by intermediation and information costs disturbing external finance markets (see Bebczuk 2003); (2) Since all risks are borne by the entrepreneur, the distorted incentives linked to limited liability are contained. In particular, beyond some threshold, a high debt ignites a conflict of interest between creditors and borrowers, whereby the latter might lean towards riskier projects (asset substitution) or just pass up good investment opportunities (the debt overhang syndrome, see Myers 1977); and (3) Compared to outside debt (but not outside equity), internal funding does not create a fixed obligation for the firm, reducing default risk in the face of adverse shocks.

Despite the pivotal role of self-financing in actual data and in the finance literature, there exists no empirical macroeconomic work directly assessing the connection between business investment and saving. If anything, ever since McKinnon (1973), macroeconomics has largely endorsed the position that internal funding is a suboptimal response to underdeveloped financial markets. In that regard, a prolific body of work was set off in the early 1990s on the positive nexus between financial intermediation, investment and growth (see Levine 2004 for a survey). The notion that intermediated saving is growth-enhancing (relative to the non-intermediated business saving) is rooted in the inaccurate assumption that all private saving is made by households. If that were true, the absence of a financial system would involve millions and millions of small and decentralized loans from surplus households to firms and other households in search of funding. This bilateral and atomized lending activity would surely be inefficient – due to diseconomies of scale – and entail sizable undiversified risks and low productivity – because of the inability of the typical household to select good borrowers and then control them until repayment. In some other cases, lacking good outside opportunities to invest

[6]An exception is Jongwanich (2010). He finds evidence for Thailand that a 1% increase in corporate savings brings about a 1.29% decline in household savings in the short-run and a 1.39% reduction in the long run.

[7]A closely related, but still distinct, research strand has focused on corporate liquidity. Decisions on cash holding must not be confused with business saving decisions: business saving (net revenue plus depreciation) can be allocated to fixed assets or current assets, and cash appears as part of the second category – in fact, firms can accumulate cash with or without saving. An example of this mix-up between cash hoarding and business saving is IMF (2006), which titles the piece 'Awash with Cash: Why is Business Saving so High?'.

[8]A much more detailed account of the different views on business saving, investment and growth can be found in a previous version of this paper. See Bebczuk and Cavallo (2014).

in, or a bank to delegate this task to, households would reinvest their saving in low-productivity activities of their own.[9] As banks and markets agglutinate saving and have a comparative advantage in minimizing informational and transaction costs, the amount and quality of investment are both bound to be larger.

But things look utterly different if we accept that firms save. Faced with an external finance premium, a rational entrepreneur would retain part of the cash flows generated to cover investment needs. Recalling that internal funds are free from intermediation costs and informational frictions, it is optimal for firms to exhaust internal finance before resorting to external finance. In other words, the financial system is undeniably helpful at allocating household saving, but firms are undeniably better than banks at allocating their own saving.

Let us think the problem in a slightly more formal way. Suppose that r_i is the opportunity cost of internal funds (say, the deposit interest rate), r_e is the required return by outside investors, or cost of external funds (say, the loan interest rate), and $f'(k)$ is the marginal productivity of capital, where k is the capital stock and f''(k)<0. Assuming financial frictions (i.e. $r_i < r_e$) and that $f'(k)$ is high enough, profit maximizing firms will minimize their overall cost of capital by exhausting their internal funding, and then will tap external markets up to the point in which $f'(k) = r_e$. If the intensity of the financial friction somehow lessens (e.g. as a result of a more creditor-friendly legal and economic environment), r_e would go down and thus investment will go up. But as long as r_i is strictly below r_e, firms will keep on relying on their own resources to the extent possible and only then would try to obtain external financing.[10] After a relaxation of financial frictions, the level of internal funding would remain the same, but the access to external resources would likely increase.[11] As this sketch of a model illustrates, business saving is the optimal choice for the firm in a world where Modigliani and Miller's (1958) neutrality is broken. In such a case business saving is not just a poor substitute to outside financing, but the first, optimal choice.

An implication of these arguments is that business saving should be positively correlated with business investment. This is because firms always use, when available, internal funds to invest. The correlation is likely to be stronger when firms face a constrained access to external financing, as financial constraints limit the ability of firms to invest above and beyond their internal resources.

There are, however, arguments suggesting that the sign of the correlation between business saving and investment may be different. If firms do not have good investment opportunities, and they already save more than what they invest, then incremental business saving may not dent business investment. Moreover, recall that business saving and investment are linked through the following accounting identity:

$$\text{Investment change in other assets} = \text{saving} + \text{external financing.}$$

This implies that the correlation between investment (or gross capital formation) and saving depends on the availability of external financing, and also on the alternative uses of funds. Although a detailed analysis of the uses of funds (including cash hoarding, for example) by firms is beyond the scope of this paper, it must be kept in mind that these alternative uses of funds (i.e. other than gross capital formation) may weaken the correlation between business saving and investment in the data. For example, even in the extreme case that the firm is altogether excluded from financial markets, the correlation between investment and saving may be well below 1 if saving is to some extent applied to hoard cash (or invest in other liquid assets).

The bottom line is that the strength of the correlation between business saving and investment is, therefore, an empirical question, and we next employ the newly assembled dataset on sectorial saving and investment to produce an answer.

[9]McKinnon (1973) presents the example of a poor rice farmer who, having no access to banking services, decides to store seed for next year in his barn, but the seed goes bad.

[10]If no imperfections of any sort plagued financial markets (i.e. $r_i = r_e$), then that would be the Modigliani–Miller world, where the distribution between household and business saving is irrelevant, as would be the very existence of a financial system.

[11]Ameliorating financial frictions would increase the ratio of external to internal funding, but only because of improved conditions for the intermediation of household saving.

III. Data

This section is devoted to the presentation and exploratory analysis of our database on gross saving and investment by institutional sector. As mentioned in the Introduction, one of the reasons why business saving is under-investigated is the relative scarcity of data when compared to national and even private sector figures. Our paper aims to fill this gap by assembling a broad international, unbalanced dataset of 47 countries with annual data spanning the 1995–2013 period. First part of this section explains some saving measurement issues, and the second part describes major data trends.

Saving by institutional sector: measurement issues

Our analysis centres on the behaviour of gross saving rates by institutional sector. This section briefly explains how these figures are constructed and the practical statistical challenges lying behind them.[12] In addition, we comment on our data sources and cleansing procedures.

Our main variable of interest is gross business saving. The business sector includes corporations as well as unincorporated enterprises. Corporations are enterprises having a legal identity separate from that of its owners. Corporations include financial (such as banks, insurance companies and other financial intermediaries) and non-financial entities. Unlike corporations, unincorporated enterprises (run by household members managing family firms) are not required to publish a complete set of accounts. Due to this lack of data, national accounts generally combine information on households and unincorporated firms. By the same token – namely, the need to have accounting records – informal firms are typically excluded from national accounts statistics.

Therefore, in national accounts, business sector statistics pertain to corporations only. The main data source is the tax returns these firms file at least once a year. From this data, gross business saving is calculated in the following way: the first item in the sequence, taken from the production account, is gross value added, which equals total sector's output minus intermediate consumption:

$$\text{Gross value added (GVA)} = \text{output} - \text{intermediate consumption}. \quad (1)$$

The generation of income account shows how the value added is distributed between the factors of production (i.e. labour and capital). The total cost of labour is labelled as compensation of employees, and includes both net wages and salaries as well as employees' and employers' social contributions. The remuneration of the capital factor – i.e. the gross operation surplus (GOS) – is calculated as gross value added minus compensation of employees[13]:

$$\text{Gross operating durplus (GOS)} = \text{GVA} - \text{employee compensation}. \quad (2)$$

At the third stage, the distribution of income account displays how the GOS is allocated between interest and dividends (or property income) and income taxes. The remaining resources represent gross business saving.

$$\text{Gross business saving} = \text{GOS} - \text{interest payments} - \text{dividents} - \text{income tax}. \quad (3)$$

The excess of gross capital formation over gross business saving (or self-financing) is referred to as net borrowing (or net lending, whenever gross business saving exceeds gross capital formation), and includes the change in the stock of financial assets held by the firms.[14]

$$\text{Net lending or net borrowing} = \text{gross business saving} - \text{gross capital formation}. \quad (4)$$

To convert gross into net firm saving, the consumption of fixed capital (or depreciation) needs to be subtracted from gross saving. The consumption of fixed capital is defined as the decline in the

[12]This section heavily borrows from Lequiller and Blades (2006), who explain in great detail the construction of national accounts according to common international practices.

[13]The measurement of after-tax profits according to company accounting rules is partly different from the national accounts counterpart (Gross Operating Surplus minus Interest and Income Tax). The main differences are that: (i) company amortization is based on a straight-line depreciation over the original purchase price, while national accounts depreciation applies a depreciation coefficient to the current value of each capital asset; (ii) company accounts include exceptional losses and profits, not considered in the national accounts; and (iii) only profits made on national territory are recorded in the national accounts, where company books include profits made by overseas subsidiaries.

[14]The Capital Account describes the process by which Gross Capital Formation (including Fixed Capital Formation and Changes in Inventories) is financed.

current value of fixed assets as a result of physical deterioration or normal obsolescence. Gross, as opposed to net, firm saving is our variable of interest for two reasons: first, net saving is relevant for an economic growth analysis but not from an overall sources-and-uses of funds perspective as the one underlying our paper; second, for most countries, net saving figures are just unavailable.

Regarding the household sector saving, the lack of accounting information and the questionable reliability of national household surveys has led national accountants to employ indirect sources of data and to make some simplifying assumptions at the time of constructing disposable income and consumption statistics. In this light, this sector typically merges households, unincorporated businesses and non-profit institutions serving households (NPISHs). The latter is a small sector, without much incidence on aggregate figures, and, considering that is financed by and serves households, can be assimilated to this sector. As for unincorporated businesses, given that they have no legal obligation to prepare accounting records, it is normally difficult to disentangle labour from capital income.[15] In such cases, a Mixed Income account is reported that estimates the overall income of those unincorporated businesses based on the average income of self-employed household members. In terms of data sources, household consumption is computed from retail sales figures compiled by national institutes of statistics, after deducting the portion of sales going to firms as intermediate consumption or investment. Household income is drawn from national labour statistics, in turn based on business and government payroll data. Business accounts provide information on dividend income, and the balance of payments on net income from foreign sources (including interest, dividends and remittances). Social contributions, benefits and transfers as well as tax payments, all needed to compute household disposable income, are taken from government accounts. Financial corporations' data may be also used to record interest payments and income as well as contributions and pensions managed by pension funds and life insurance companies. In sum, household saving is computed as a residual – the difference between disposable income and final consumption expenditure. Therefore, the quality of this saving measure depends on the quality of the two abovementioned variables.

The calculation of gross government saving (total revenues minus total expenditures plus gross capital formation) is considerably less problematic. This is because government finances accounts are more transparent and publicly scrutinized than their private sector counterparts.[16]

Homogenized and comprehensive international data on saving and investment by institutional sector are available from three public sources: United Nations National Accounts, OECD National Accounts and IMF's World Economic Outlook.[17] The United Nations, through its Statistics Division, is the international standard-setting organization in the area of national accounting. This agency contributes to the international coordination, development and implementation of the System of National Accounts (SNA). The vast majority of countries and regional and multilateral organizations worldwide adhere to UN guidelines. Therefore, we chose the UN dataset as the primary source.

A detailed inspection of the sectorial saving data from the three sources reveals that there are some discrepancies even when the series overlap for a given country. This is notwithstanding that in principle the data is harmonized with the 2008 System of National Accounts (SNA) and it comes from the same primary sources. This suggests that there may be differences in the way the data is aggregated and/or further harmonized across datasets. Given that the origin of the discrepancies is not explained in any of the three sources, we implemented a crude procedure to cleanse our dataset. We eliminate all observations where the difference between the value reported for a given observation

[15]This segregation is only possible in full only for quasi-corporations, which are unincorporated but keep full business accounts, and are thus included as part of the corporations sector.

[16]State-owned enterprises that provide commercial services to the private sector are generally considered part of the corporations sector. According to UN principles, public corporations charging market prices or prices that cover over 50% of costs are excluded from the government sector.

[17]In the case of WEO, the data are disaggregated between private and public savings. There is no distinction within private saving between household and firm saving.

Table 1. Country coverage.

Number of countries by income country group					
Year/income group	High-income OECD	High-income non-OECD	Upper-middle income	Lower-middle income	Total
1995	24	1	9	2	36
1996	24	2	10	3	39
1997	24	2	12	3	41
1998	24	2	13	4	43
1999	24	2	13	4	43
2000	24	2	13	5	44
2001	24	2	13	6	45
2002	24	2	14	6	46
2003	24	2	15	6	47
2004	24	2	15	6	47
2005	24	2	15	6	47
2006	24	2	15	6	47
2007	24	2	15	6	47
2008	24	2	15	6	47
2009	24	2	15	6	47
2010	24	2	14	6	46
2011	24	2	13	6	45
2012	23	2	12	4	41
2013	20	0	7	0	27

Table 2. Gross private saving to GDP.

Weighted by PPP GDP					
Year/income group	High-income OECD	High-income non-OECD	Upper-middle income	Lower-middle income	Total
1995	24.2	16.5	32.0	7.0	25.5
1996	23.7	16.2	29.1	14.9	24.6
1997	23.5	14.0	29.0	15.7	24.5
1998	21.1	13.5	27.9	15.4	22.0
1999	19.8	14.0	26.3	16.6	20.7
2000	19.4	14.6	26.6	17.8	20.8
2001	19.7	15.9	29.9	20.5	21.8
2002	20.8	15.8	29.1	21.7	22.9
2003	21.2	18.1	29.1	24.0	23.5
2004	21.2	19.3	29.8	25.7	23.9
2005	20.5	18.6	29.2	24.5	23.2
2006	20.3	18.0	30.4	21.1	23.5
2007	19.7	15.0	31.7	20.6	23.7
2008	19.9	15.6	32.1	22.0	24.2
2009	22.6	16.9	33.2	20.1	26.3
2010	23.3	18.7	37.0	21.8	27.8
2011	22.8	19.2	35.8	20.8	27.1
2012	22.6	17.7	19.0	18.8	21.9
2013	20.6	n.a.	16.5	n.a.	20.5

Source: Authors' own estimations based on data from United Nations National Accounts, OECD National Accounts, and IMF's World Economic Outlook.

Note: Sample (country) sizes used to compute the averages are different amongst the different groups. Please refer to Table 1 for actual sample size by year/group.

Table 3. Household to private saving (in %).

Weighted by PPP GDP					
Year/income group	High-income OECD	High-income non-OECD	Upper-middle income	Lower-middle income	Total
1995	48.0	37.3	49.6	15.7	48.3
1996	45.7	41.5	57.2	40.4	48.7
1997	44.2	11.4	55.5	44.8	47.3
1998	43.7	19.6	52.4	43.8	45.4
1999	40.7	54.3	50.2	39.6	42.5
2000	40.5	46.1	46.5	45.2	42.1
2001	40.8	42.0	45.6	41.1	42.1
2002	39.4	32.6	43.8	35.2	40.7
2003	38.2	29.7	46.0	38.7	41.0
2004	36.8	34.7	43.7	39.6	39.4
2005	34.4	30.7	45.3	39.5	38.7
2006	35.3	26.3	45.9	35.4	39.6
2007	35.5	21.4	45.8	37.6	40.1
2008	38.1	23.7	45.9	29.8	41.5
2009	39.3	44.8	48.7	35.7	43.5
2010	34.7	45.5	50.7	39.2	41.8
2011	35.2	38.8	51.2	35.8	42.4
2012	36.7	39.3	39.0	41.1	37.2
2013	37.9	n.a.	16.3	n.a.	37.4

Source: Authors' own estimations based on data from United Nations National Accounts, OECD National Accounts, and IMF's World Economic Outlook.

corresponding to the same series in any two databases was equal or above three percentage points of GDP; moreover, we removed the country from the sample when that discrepancy was detected in more than two years.[18] Therefore, we are only keeping the cross-country data that are consistent across the available data sources.

The usable sample, by year and income country group (high-income OECD, high-income non-OECD, upper-middle income and lower-middle income), is presented in Table 1. It comprises an unbalanced panel of 47 countries over 1995–2013. The list of countries and the period with available data appears in the Annex, along with the data sources.

Descriptive statistics

Table 2 shows the gross private saving rate as a percentage of GDP for the whole sample and each country group.[19] Central to our work, Tables 3 and 4 display the contribution of the household sector and the business sector, respectively, to the private saving rate. For the entire sample over 1995–2013, households explain between 37% and 49%, and hence businesses generate between 51% and 63% of private savings. This implies that the business sector is the main saving-generating

[18]UN data look in general similar, but not identical, to IMF data on government and private saving (the IMF does not present separate data for households and businesses), while OECD rates show some discrepancies when compared with the previous ones. Another overall conclusion is that differences between the three sources widen for lower income countries, possibly reflecting data quality issues. This explains why, after applying our simple data cleansing criterion, only middle- and high-income countries survived in the usable sample.

[19]Group values are PPP GDP-weighted averages. Given that these weights change year by year and that the sample is not fully balanced, comparisons across groups and time are not entirely meaningful.

Table 4. Business to private saving (in %).

Weighted by PPP GDP					
Year/income group	High-income OECD	High-income non-OECD	Upper-middle income	Lower-middle income	Total
1995	52.0	62.7	50.4	84.3	51.7
1996	54.3	58.5	42.8	59.6	51.3
1997	55.8	88.6	44.5	55.2	52.7
1998	56.3	80.4	47.6	56.2	54.6
1999	59.3	45.7	49.8	60.4	57.5
2000	59.5	53.9	53.5	54.8	57.9
2001	59.2	58.0	54.4	58.9	57.9
2002	60.6	67.4	56.2	64.8	59.3
2003	61.8	70.3	54.0	61.3	59.0
2004	63.2	65.3	56.3	60.4	60.6
2005	65.6	69.3	54.7	60.5	61.3
2006	64.7	73.7	54.1	64.6	60.4
2007	64.5	78.6	54.2	62.4	59.9
2008	61.9	76.3	54.1	70.2	58.5
2009	60.7	55.2	51.3	64.3	56.5
2010	65.3	54.5	49.3	60.8	58.2
2011	64.8	61.2	48.8	64.2	57.6
2012	63.3	60.7	61.0	58.9	62.8
2013	62.1	n.a.	83.7	n.a.	62.6

Source: Authors' own estimations based on data from United Nations National Accounts, OECD National Accounts, and IMF's World Economic Outlook.

Table 6. Business to private investment (in %).

Weighted by PPP GDP					
Year/income group	High-income OECD	High-income Non-OECD	Upper-middle income	Lower-middle income	Total
1995	66.6	56.0	81.9	82.2	72.6
1996	66.4	53.3	78.2	80.0	71.2
1997	67.8	73.6	78.8	74.4	72.2
1998	66.6	69.4	80.0	72.5	70.1
1999	66.7	77.7	80.5	72.4	70.1
2000	67.4	72.9	76.3	71.9	69.6
2001	66.3	71.4	77.0	71.3	69.3
2002	64.2	75.1	75.8	72.6	68.1
2003	63.0	76.9	74.0	77.5	67.3
2004	62.4	73.5	73.1	78.2	66.8
2005	62.3	76.7	70.7	75.6	65.8
2006	63.4	77.0	74.7	80.0	68.3
2007	65.8	75.6	75.9	81.4	70.4
2008	67.9	76.0	77.2	79.9	72.6
2009	66.1	76.7	74.5	76.6	70.9
2010	69.7	75.5	75.8	77.3	73.0
2011	70.4	75.4	73.1	76.7	71.9
2012	70.0	76.7	75.8	78.4	71.3
2013	66.4	n.a.	88.4	n.a.	66.9

Source: Authors' own estimations based on data from United Nations National Accounts, OECD National Accounts, and IMF's World Economic Outlook.

economic unit around the world and for all country groups.

Tables 5 and 6 report gross private investment as a percentage of GDP, and the proportion of business to private investment, respectively. In particular, Table 6 shows that business investment accounts for between 67% and 73% of private investment. The rest of private investment is done by households as residential construction. Since business saving should affect business but not household investment, and the latter is driven by a different set of variables, it is reasonable to focus on business investment in the empirical section. Therefore, we will use business investment instead of private investment as the dependent variable in Section IV.

Table 5. Gross private investment to GDP.

Weighted by PPP GDP					
Year/income group	High-income OECD	High-income non-OECD	Upper-middle income	Lower-middle income	Total
1995	20.0	18.1	29.5	21.8	22.8
1996	19.7	18.0	27.4	17.5	21.9
1997	19.9	19.8	26.7	14.7	21.8
1998	19.5	16.9	25.6	17.7	20.7
1999	19.5	15.5	25.2	14.8	20.5
2000	20.0	14.0	25.0	15.3	20.9
2001	19.0	15.8	26.1	15.4	20.4
2002	18.1	21.3	25.0	15.4	19.8
2003	18.0	20.7	25.8	16.6	20.2
2004	18.6	21.6	27.3	15.5	21.1
2005	19.1	22.0	26.8	17.3	21.4
2006	19.5	23.6	27.9	19.1	22.2
2007	19.5	23.9	28.6	20.9	22.5
2008	18.5	25.5	30.5	22.1	22.8
2009	15.0	20.1	31.2	16.9	20.9
2010	16.3	17.9	34.2	17.5	22.2
2011	16.8	16.8	35.4	17.8	23.1
2012	16.8	16.0	20.7	14.6	17.3
2013	16.2	n.a.	16.5	n.a.	16.2

Source: Authors' own estimations based on data from United Nations National Accounts, OECD National Accounts, and IMF's World Economic Outlook.

With a view to our econometric work in Section IV, a quick test of the corporate veil offset is the simple correlation between household and business saving. If the corporate veil holds to some degree, such correlation should a priori be negative. In our dataset, this coefficient for the whole panel is −0.22, and for the different country samples ranges between −0.18 and −0.51, as seen in Table 7. Except for the lower-middle-income group (−0.18 but significant at 10%), the remaining correlation coefficients are significant at 1%. Similarly, we argued in Section II that a positive link between business saving and business investment may

Table 7. Business saving: Correlation with household saving and business investment.

Country sample	Household saving	Business investment
Whole sample	−0.2197***	0.3655***
High-income OECD	−0.2758***	0.314***
High-income non-OECD	−0.5142***	0.7201***
Upper-middle income	−0.2203***	0.4079***
Lower-middle income	−0.1823*	0.1944*

***Significant at 1%, **Significant at 5%, *Significant at 10%.

Table 8. Business saving to business investment (in %).

Weighted by PPP GDP					
Year/income group	High-income OECD	High-income Non-OECD	Upper-middle income	Lower-middle income	Total
1995	96.7	102.1	61.7	34.5	87.9
1996	100.4	98.6	57.6	74.5	89.3
1997	98.6	87.6	57.7	93.3	88.3
1998	91.4	102.9	62.6	72.3	86.3
1999	90.5	59.9	64.6	95.5	86.6
2000	85.0	76.3	81.4	87.9	84.4
2001	92.6	78.2	86.6	116.4	91.9
2002	108.8	70.1	93.4	141.0	105.6
2003	115.2	85.8	87.6	125.7	107.5
2004	115.6	79.9	86.9	143.7	107.8
2005	113.0	75.3	86.4	131.5	105.3
2006	106.8	68.0	82.8	98.7	99.0
2007	98.8	52.6	81.9	80.2	92.7
2008	97.6	56.7	73.2	95.7	89.1
2009	139.9	51.5	80.3	107.5	117.5
2010	135.9	67.6	74.3	104.9	114.6
2011	126.8	88.6	70.4	110.5	107.2
2012	122.7	84.9	73.0	108.5	114.3
2013	116.4	n.a.	99.2	n.a.	116.1

Source: Authors' own estimations based on data from United Nations National Accounts, OECD National Accounts, and IMF's World Economic Outlook.

emerge, particularly in countries where financial frictions are likely to bind. Simple correlations displayed in Table 7 preliminarily support this hypothesis, with positive and highly significant correlations (between 0.31 and 0.72) for the whole sample and all country groups, except for lower-middle-income countries (0.19 but significant at 10%).

Finally, Table 8 calls attention towards the ratio of business saving to business investment. As shown in the table, business saving constitutes a very high proportion of business investment in all groups; moreover, the share often exceeds unity. For the overall sample in 1995–2013, this ratio takes a minimum value of 84% and a maximum of 117%. This is suggestive of a high internal funding reliance at the international level. However, the fact that the correlation is not always 1 also points to the fact that firms use internal funds also to acquire other assets (i.e. cash hoarding) or to reduce liabilities.

IV. Econometric evidence

Testing the corporate veil hypothesis

In this section, we put to the test the corporate veil hypothesis, which states that every change in the business saving is compensated by a change in the opposite direction in the household saving. Although in a frictionless setup this offset would be complete, the introduction of an array of market imperfections may attenuate such compensation. To proceed, we estimate a reduced-form private saving equation, defined as private saving (household + business) to gross domestic product. In order to deal with potential endogeneity biases, a generalized method of moments (GMM) system framework is adopted to estimate our panel data model.[20]

Specifically, we want to estimate the following equation:

$$ps_{i,t} = \alpha ps_{i,t-1} + \beta bs_{i,t} + \gamma Z_{i,t} + \mu_t + n_i + \varepsilon_{i,t}, \qquad (5)$$

where $ps_{i,t}$ is the ratio of private saving to output (i.e. the private saving rate); $bs_{i,t}$ is the business saving rate; $Z_{i,t}$ is a set of control variables; μ_t is a time-specific effect; n_i is a country-specific time-invariant effect; and $\varepsilon_{i,t}$ is the idiosyncratic error term.

The system GMM approach uses a first-difference transformation of (5) to eliminate the unobserved country-specific effect n_i, and internal lagged level instruments to replace the endogenous variables in the transformed difference equation. These lagged instruments are valid under the assumption that the independent variables are weakly exogenous. This means that they may be correlated with present and past error terms but not with future errors. The problem with this approach is that lagged variables are weak instruments in the presence of serial correlation. This is particularly problematic in the case of saving rates which typically show a great deal of persistence. In order to address this problem, system GMM additionally estimates the level equation using lagged differences as instruments for the contemporaneous level explanatory variables. The inclusion of two equations, one in differences and another one in levels, gives the 'System' GMM estimator its name. Note that all regressions include time-fixed effects μ_t to control for period-specific events that may affect several

[20]We apply the System GMM estimator developed in Arellano and Bond (1991), Arellano and Bover (1995) and Blundell and Bond (1998). This estimator allows us to address the joint endogeneity of all explanatory variables in a dynamic formulation, and explicitly controls for potential biases arising from country-specific effects.

countries at the same time.[21] Moreover, all regressions include the small sample correction proposed by Windmeijer (2005) in order to obtain robust two-step standard errors.

The main coefficient of interest is β. If households perfectly pierce the corporate veil, changes in business saving do not affect private saving as a whole, yielding a zero coefficient. Otherwise, in the face of a partial piercing, the business saving coefficient is expected to be positive but lower than one in magnitude, meaning that a $1 increase (decrease) in business saving gives way to a decrease (increase) of less than $1 in household saving.

Building on previous contributions (see e.g. Loayza, Schmidt-Hebbel, and Servén 2000), in addition to business saving, our regressions contain a number of controls usually incorporated in saving equations to account for income, fiscal, demographic and financial factors influencing such decisions.

As can be seen in Tables 9–11, we run different specifications to assess the robustness of the reported coefficients.[22] We start in Table 9, column 1, with a standard private saving equation including business saving among the regressors. Regarding our control set, we include the level and growth rate of real GDP, the degree of financial deepening (as measured by the M2/GDP ratio), the flow of private credit, the government saving rate, the urbanization rate, the old and young dependency ratios, and the rate of inflation. In columns 2 and 3, we add the current account balance to GDP and the terms of trade, respectively, to the control set. The last column in Table 9 adds the real interest rate and, as this variable is not available for some countries, sample size markedly falls from 597 to 432 observations. In all these regressions, the coefficient estimate β is statistically significant at 1%, and the point estimates varies within a narrow interval of 0.52 to 0.59. This implies that a $1 increase in business saving gives rise to only a partial offset of between $0.48 and $0.41 in household savings.

While most, but not all, of the control variables display the expected sign, they typically happen to be fragile, in the sense that they are not consistently significant across the various reported regressions. The most robust controls are the lagged private saving rate is invariably significant– hinting at a strong inertial behaviour in the series – and government and foreign saving. Along with the finding regarding business saving, all points to some – but not a complete – degree of substitution among saving by different institutional sectors (households, businesses, government and the rest of the world).

Table 9. Baseline private saving rate regressions.

	(1)	(2)	(3)	(4)
Lagged private saving	0.380***	0.324***	0.334***	0.258*
	(0.078)	(0.079)	(0.111)	(0.151)
Business saving rate	0.590***	0.527***	0.520***	0.552***
	(0.114)	(0.153)	(0.172)	(0.187)
Government saving to GDP	−0.180	−0.247*	−0.346*	−0.300*
	(0.125)	(0.130)	(0.181)	(0.154)
Per capita GDP growth	0.120	0.154	0.006	0.027
	(0.091)	(0.109)	(0.119)	(0.152)
Per capita GDP growth volatility	0.122	−0.027	−0.024	−0.053
	(0.126)	(0.126)	(0.151)	(0.164)
Log per capita GDP	2.809	1.314	0.210	−1.265
	(2.946)	(2.894)	(3.748)	(4.259)
Old dependency ratio	−0.156	−0.154	−0.107	−0.058
	(0.108)	(0.117)	(0.196)	(0.232)
Young dependency ratio	−0.016	−0.074	−0.083	−0.114
	(0.069)	(0.091)	(0.097)	(0.138)
Real interest rate (log)				9.357
				(9.289)
Urbanization ratio	−0.046	−0.039	0.013	0.049
	(0.056)	(0.064)	(0.072)	(0.090)
Private credit flow to GDP	−0.011	−0.008	−0.004	−0.007
	(0.008)	(0.010)	(0.010)	(0.009)
M2/GDP (log)	0.391	0.834	−0.614	−0.132
	(2.056)	(1.758)	(2.706)	(2.330)
Current account balance to GDP		0.153*	0.113	0.103
		(0.086)	(0.107)	(0.121)
Terms of trade (log)			−1.471	−2.407
			(3.709)	(4.759)
Constant	−18.750	−2.183	17.554	32.660
	(19.215)	(21.098)	(31.564)	(28.982)
Observations	597	596	556	432
Number of countries	47	47	47	42
AR(1)	0.00185	0.00361	0.0123	0.0370
AR(2)	0.235	0.0872	0.193	0.259
Hansen	0.159	0.112	0.186	0.920
Lags/instruments	1/44	1/47	1/50	1/53

Estimation: Two-step system GMM with Windmeijer (2005) small sample robust standard error correction and time effects.
Standard errors in parentheses corrected by Windmeijer finite-sample correction.
***Significant at 1%, **Significant at 5%, *Significant at 10%.

[21]Also, the methodology employed assumes no correlation across countries in the idiosyncratic disturbances. Time dummies make this assumption more likely to hold (see Roodman 2009).

[22]Furthermore, it is important to point out that both diagnostic statistics tests – for serial correlation and the validity of the instruments (i.e. the AR2 test and the Hansen-J test) – provide support for the chosen specification. In particular, they show that there are no traces of second-order autocorrelation and that the over-identifying restrictions are not rejected at conventional levels of confidence.

Table 10. Household saving rate regressions.

	(1)	(2)	(3)	(4)
Lagged household saving	0.628***	0.485***	0.561***	0.478***
	(0.098)	(0.096)	(0.105)	(0.131)
Business saving rate	−0.320***	−0.461***	−0.372**	−0.360**
	(0.113)	(0.146)	(0.145)	(0.165)
Government saving to GDP	−0.060	−0.261**	−0.358***	−0.155
	(0.099)	(0.103)	(0.127)	(0.149)
Per capita GDP growth	0.141	0.218**	0.077	−0.150
	(0.111)	(0.085)	(0.094)	(0.117)
Per capita GDP growth volatility	−0.003	0.014	−0.107	−0.120
	(0.151)	(0.113)	(0.157)	(0.163)
Log per capita GDP	−1.569	−0.201	0.509	−4.765*
	(1.617)	(2.224)	(2.458)	(2.799)
Old dependency ratio	−0.045	−0.114	−0.025	−0.016
	(0.088)	(0.116)	(0.163)	(0.176)
Young dependency ratio	−0.051	−0.085	−0.058	−0.190**
	(0.048)	(0.051)	(0.075)	(0.093)
Real interest rate (log)				3.176
				(9.008)
Urbanization ratio	0.025	−0.010	0.017	0.054
	(0.042)	(0.044)	(0.046)	(0.053)
Private credit flow to GDP	0.004	−0.001	−0.009	−0.003
	(0.014)	(0.012)	(0.010)	(0.007)
M2/GDP (log)	3.011**	1.395	−2.512	1.926
	(1.354)	(1.777)	(1.643)	(2.276)
Current account balance to GDP		0.223**	0.174**	0.153*
		(0.087)	(0.070)	(0.078)
Terms of trade (log)			−3.184	−0.250
			(4.575)	(4.482)
Constant	9.797	11.602	30.280	51.223**
	(12.862)	(14.880)	(33.295)	(22.490)
Observations	597	596	556	432
Number of countries	47	47	47	42
AR(1)	0.00802	0.00736	0.0109	0.00931
AR(2)	0.530	0.166	0.615	0.816
Hansen	0.0556	0.0967	0.172	0.604
Lags/instruments	1/44	1/47	1/50	1/53

Estimation: Two-step system GMM with Windmeijer (2005) small sample robust standard error correction and time effects.
Standard errors in parentheses corrected by Windmeijer finite-sample correction.
***Significant at 1%, **Significant at 5%, *Significant at 10%.

Table 11. Additional private saving rate regressions.

	(1)	(2)
	Pooled OLS	Cross-section
Lagged private saving	0.233***	
	(0.059)	
Business saving rate	0.370***	0.343**
	(0.050)	(0.159)
Government saving to GDP	−0.325***	−0.133
	(0.049)	(0.189)
Per capita GDP growth	0.024	0.821*
	(0.056)	(0.409)
Per capita GDP growth volatility	−0.074	−0.265
	(0.056)	(0.699)
Log per capita GDP	6.464***	0.244
	(1.468)	(1.585)
Old dependency ratio	−0.118	−0.241*
	(0.108)	(0.133)
Young dependency ratio	0.066	−0.118*
	(0.074)	(0.065)
Urbanization ratio	0.150*	−0.058
	(0.088)	(0.046)
Private credit flow to GDP	−0.002	−0.281
	(0.008)	(0.184)
M2/GDP (log)	1.477**	3.714***
	(0.691)	(1.064)
Current account balance to GDP	0.272***	0.526***
	(0.037)	(0.147)
Constant	−67.172***	9.743
	(14.729)	(15.871)
Observations	596	47
R^2	0.770	0.754
Number of ID	47	47

Robust standard errors in parentheses.
***Significant at 1%, **Significant at 5%, *Significant at 10%.

This is, in turn, consistent with the presence of financial constraints and/or some behavioural biases, such as myopia.

To complete our econometric analysis, Table 10 features a GMM estimation of the household saving rate (instead of the private saving rate), while keeping the same control set. This change intends to address two foreseeable criticisms to previous regressions, namely (a) Since business saving is on both the left and the right hand sides, this may be driving its positive loading, and (b) Strictly speaking, the theoretical arguments – and their empirical counterparts – explaining saving behaviour apply to households and not necessarily to business, and therefore the proper dependent variable should be household instead of private saving.[23] The results strongly reinforce earlier findings. In particular, business saving shows the expected negative sign with high statistical significance. Moreover, the quantitative short-run effect is consistent with that emerging from private saving regressions: the implicit offset coefficients derived from the private saving regressions in Table 9 (i.e. 0.41 to 0.48) are roughly similar to the coefficient estimates reported in Table 10 (i.e. 0.32–0.46).

Subsequently, Table 11 shows some OLS results, first in a panel with fixed effects (column 1) and then in a cross-section regression (column 2). For the latter, we simply collapse the annual observations in the panel to a single observation per country. Although these alternative specifications may not be free from bias, we opted to

[23]For instance, the permanent income framework and its extensions over time were devised having consumers in mind – not firms, whose study pertains to the corporate finance field.

include them to test if the baseline results hold within the more straightforward and transparent context of OLS regressions. Interestingly, the results hold, corroborating that the estimated business saving effect is robust.

Business investment and saving

We now turn our attention to the link between business saving and business investment. To do so, we will perform standard investment regressions (see for instance Servén 2003; Cavallo and Daude 2011) augmented with business saving as a novel regressor, and using business investment – instead of private investment as is customary in the literature – as the dependent variable.[24]

The baseline specification is as follows:

$$bi_{i,t} = \alpha bi_{i,t-1} + \beta bs_{i,t} + \gamma Z_{i,t} + \mu_t + n_i + \varepsilon_{i,t}, \quad (2)$$

where $bi_{i,t}$ is the ratio of business investment to output; $bs_{i,t}$ is the business saving to output; $Z_{i,t}$ is a set of control variables; μ_t is a time-specific effect; n_i is a country-specific time-invariant effect; and $\varepsilon_{i,t}$ is the idiosyncratic error term.

The core regressions include two explanatory variables: the per capita GDP growth rate and the business saving rate. A model with such regressors loosely resembles the structure of the financial constraints micro tests in the tradition of Fazzari et al. (1988), where investment activity is assumed to solely depend on two factors: expected profitability, proxied by Tobin's q, and the availability of internal cash flow. At the macro level, it is not simple to come up with a sound measure of expected profitability, but observed GDP growth is certainly taken as a signal by the business community. Servén and Solimano (1993) claim that changes in output are by far the main empirical explanation of investment changes in developing countries. This is somewhat puzzling in view of the allegedly forward-looking nature of investment activity and the less-than-persistent trajectory of GDP growth rates. Nevertheless, myopic behaviour or the lack of other reliable sources of information for forecasting future profitability determine that private investment be prone to be highly sensitive to past or contemporaneous output growth.

The second regressor is similar to the one employed in the financial constraints tests, with the difference that cash flow captures available internal funding before dividends and business saving is computed after dividend payout. A positive loading on business saving would hint that firms require internal funding to pursue their investment plans – external financing is either more expensive than their own saving, or downright non-existent.

Table 12 unveils a positive but mostly insignificant effect of business saving on business investment, with point estimates ranging between 0.075 and 0.140 (i.e. columns 1–5). This somewhat low coefficient estimate may respond to either a fluid access to credit by firms – which does not seem to be a realistic description of actual credit usage, as argued in Section II – or the existence of other uses of funds beyond capital formation. The last column of Table 12 explores the sensitivity of this coefficient estimate to overall financial development in the country, by interacting business saving with a dummy variable taking value 1 if the private credit-to-GDP ratio is above the sample median in each year. If financial development at the country level relaxes financial constraints for firms, this interaction term should be negative, indicating a diminishing role of business saving as the banking system gets deeper. This is exactly what we observe in column 6, where the estimated coefficient on the interaction term is −0.068 (although it is not statistically significant). However, importantly, once we control by the interaction term, the coefficient estimate on business saving increases in absolute value to 0.17, and it becomes statistically significant at the 10% level.

As control variables, we include (i) the lagged dependent variable, to capture inertia; (ii) the volatility of GDP growth (measured by its standard deviation in the previous three years), as a proxy for macroeconomic uncertainty; (iii) the flow of private credit to GDP (the same variable

[24]The latter is motivated by the evidence presented in Table 6, and discussed in the preceding section, showing the business investment does not account for all of private sector investment. Household investment (i.e. residential construction) plays a non-negligible role.

Table 12. Baseline private investment regressions.

	(1)	(2)	(3)	(4)	(5)	(6)
Lagged business investment	0.706***	0.607***	0.437***	0.627***	0.662***	0.636***
	(0.059)	(0.097)	(0.137)	(0.080)	(0.099)	(0.095)
Business saving rate	0.075	0.127	0.130	0.081	0.139	0.171*
	(0.088)	(0.119)	(0.092)	(0.112)	(0.086)	(0.094)
Per capita GDP growth	0.366***	0.362***	0.278***	0.378***	0.367***	0.319***
	(0.079)	(0.062)	(0.094)	(0.053)	(0.063)	(0.063)
Per capita GDP growth volatility	−0.053	−0.164	−0.206	−0.055	−0.128*	−0.127
	(0.081)	(0.145)	(0.221)	(0.107)	(0.070)	(0.079)
Government investment rate to GDP	−0.068	0.174	−0.194	0.015	0.127	0.284
	(0.228)	(0.326)	(0.513)	(0.326)	(0.331)	(0.378)
Private credit flow to GDP	0.011	0.014	0.007	0.015	0.014	0.015
	(0.010)	(0.010)	(0.014)	(0.013)	(0.014)	(0.014)
Log per capita GDP	−0.261					
	(0.909)					
(Private credit/GDP above sample median = 1) * business saving						−0.068
						(0.046)
Investment relative price level		1.351			0.655	1.937*
		(1.849)			(1.303)	(1.058)
Capital stock to GDP			−2.015*		0.369	0.516
			(1.182)		(0.560)	(0.555)
Total factor productivity (2005 = 1)				6.325	6.292	5.939
				(4.685)	(5.021)	(5.684)
Constant	5.266	2.118	14.777**	−2.115	−5.733	−7.142
	(9.433)	(2.490)	(7.158)	(4.473)	(5.909)	(7.361)
Observations	593	558	558	545	545	545
Number of countries	47	47	47	46	46	46
AR(1)	0.000133	0.000319	0.00671	0.000212	0.000448	0.000414
AR(2)	0.248	0.262	0.154	0.285	0.246	0.294
Hansen	0.387	0.216	0.0703	0.260	0.378	0.248
Lags/instruments	1/38	1/37	1/37	1/37	1/43	1/46

Estimation: Two-step system GMM with Windmeijer (2005) small sample robust standard error correction and time effects. 'Standard errors in parentheses corrected by Windmeijer finite-sample correction.
***Significant at 1%, **Significant at 5%, *Significant at 10%.

included in saving regressions), to check whether changes in credit stimulates investment[25]; (iv) government investment, so as to put the crowding-out hypothesis to the test, (v) Per capita GDP, to measure convergence (higher per capita GDP would imply higher capital stock and a lower marginal productivity of capital). Since per capita GDP may also capture other effects (such as institutional quality or political and economic stability), in the various specifications we replace GDP per capita by a measure of capital stock which is available from the Penn World Tables (PWT). In order to proxy for investment productivity, we also employ the relative investment price level (with an expected negative sign) and an index of total factor productivity (with a positive expected sign) that are also available from PWT database. Finally, all the regressions include year dummies to control for time effects. In general, with the notable exception of per capita GDP growth, none of the control variables enter the regression with statistically significant coefficient estimates.

In Table 13, we repeat the panel estimation using a panel OLS with fixed effects, in which the coefficient estimate for business saving turns out to be non-significant once more. It is only in cross-section regressions that the coefficient estimate for business saving enters with a high estimate (0.40 and 0.32 in columns 3 and 4, respectively) that is also statistically significant.

What may be the source of the weak link between business saving and investment in the data? As discussed in Section II, it can be argued that saving may become a limiting factor for investment if the latter exceeds the former. Otherwise, changes in saving may not necessarily induce changes in investment. Saving and investment are driven by different factors (i.e. past revenues and dividends in the case of business saving, and

[25]Properly measured, the credit variable should only comprise commercial credit. However, such variable is not available for our broad set of countries and years.

Table 13. Additional private investment regressions (I).

	(1)	(2)	(3)	(4)
	Fixed (year) effects		Cross-section	
Lagged business investment	0.519***	0.524***		
	(0.040)	(0.048)		
Business saving rate	−0.014	0.008	0.405***	0.317**
	(0.038)	(0.046)	(0.120)	(0.117)
Per capita GDP growth	0.275***	0.270***	1.220***	1.542***
	(0.040)	(0.040)	(0.316)	(0.337)
Per capita GDP growth volatility	−0.239***	−0.253***	0.093	−0.218
	(0.049)	(0.053)	(0.487)	(0.539)
Government investment rate to GDP	−0.389***	−0.313**	−0.119	0.196
	(0.127)	(0.135)	(0.527)	(0.459)
Private credit flow to GDP	0.019**	0.018*	−0.019	−0.138
	(0.010)	(0.009)	(0.154)	(0.161)
Log per capita GDP	4.845***		−0.424	
	(1.291)		(1.080)	
Investment relative price level		0.271		2.189
		(1.237)		(2.184)
Capital stock to GDP		−0.056		0.898*
		(0.188)		(0.500)
Total factor productivity (2005 = 1)		5.186**		−3.853
		(2.194)		(13.283)
Constant	−40.147***	3.691	10.437	5.705
	(12.182)	(2.563)	(10.751)	(14.662)
Observations	593	545	47	46
R^2	0.704	0.693	0.610	0.614
Number of countries	47	46	47	46

Robust standard errors in parentheses.
***Significant at 1%, **Significant at 5%, *Significant at 10%.

expected profitability in the case of investment); therefore, they can take quite different values for any particular economic unit. This implies in turn, that the theoretical correlation between the series is not necessarily positive, even in a world characterized by financial frictions (i.e. where the cost of external finance is always larger than the cost of internal finance). If this is true, then a business faced with a good investment opportunity will likely prefer to use its own saving as its first financing choice. But this is not the same as saying that an increase in business saving will generate an increase in business investment. A firm displaying low physical investment levels relative to their saving availability can be reasonably assumed to have scarce investment opportunities at hand, in which case an exogenous saving increase is less likely to be channelled towards physical investment and more likely to be used to accumulate financial or other assets. A genuine financial constraint arises, on the contrary, when the firm expects high future returns, and consequently invests as much as possible, to the point that its own saving becomes a binding constraint to accept all profitable projects. Since the manager continues to prefer internal to external financing, additional saving is more likely to be used to buy new (or to replace depreciated) physical capital. For these businesses, investment is likely to be more sensitive to saving than others.

To test this hypothesis, we construct a dummy variable taking value 1 if, for each particular year, business investment is greater than or equal to business saving.[26] This binary variable is then interacted with business saving. If the argument is valid, this interaction should yield a positive and significant coefficient, after including the three constitutive terms in the regressions (saving, the new dummy variable and the interaction between them).[27] The results reported in Table 14 lend support to this claim; the coefficient estimate on the interaction term is positive and significant, for a total effect of business saving of between 0.18 and 0.32. This is considerably higher than the estimates in Table 12. Moreover, the coefficient estimates for business saving are statistically significant at the 5% level.

V. Conclusions and policy implications

Our paper has investigated the relevance of business saving for private saving and investment around the world by constructing and exploiting a broad international, unbalanced panel of 47 countries over 1995–2013. To lay the foundations of such empirical work, we first reviewed the literature on the subject, contrasting the treatment of business saving in the macroeconomic field – which for the most part views business saving as a poor substitute for external finance – and the corporate finance field – according to which internal funding represents a profit maximizing choice in a world where the Modigliani and Miller neutrality does not hold.

On the statistical front, our first finding is that, contrary to the standard textbook model, businesses are the principal contributors to private and national

[26]In our database, business investment is equal or above business saving in 64% of total country-year observations. For the private and non-financial business sectors, this figure amounts to 48% and 72%, respectively.
[27]See Brambor, Clark, and Golder (2006) about the econometric justification to include all three terms.

Table 14. Additional private investment regressions (II).

	(1)	(2)	(3)	(4)	(5)
Lagged business investment	0.626***	0.533***	0.389***	0.557***	0.554***
	(0.065)	(0.071)	(0.122)	(0.067)	(0.098)
Business saving rate	0.184*	0.233**	0.193**	0.179*	0.254***
	(0.100)	(0.096)	(0.078)	(0.100)	(0.083)
Business saving rate * dummy [(inv ≥ sav) = 1]	0.048	0.047	0.121	0.061	0.070
	(0.077)	(0.057)	(0.079)	(0.059)	(0.067)
Dummy [(inv ≥ sav) = 1]	0.813	0.991	−0.093	0.720	0.758
	(1.317)	(0.923)	(1.239)	(0.895)	(1.024)
Per capita GDP growth	0.333***	0.312***	0.237***	0.330***	0.306***
	(0.100)	(0.050)	(0.079)	(0.045)	(0.057)
Per capita GDP growth volatility	−0.069	−0.149	−0.194	−0.079	−0.145*
	(0.075)	(0.110)	(0.172)	(0.092)	(0.074)
Government investment rate to GDP	−0.091	0.020	−0.119	0.016	0.075
	(0.227)	(0.258)	(0.394)	(0.260)	(0.269)
Private credit flow to GDP	0.007	0.007	0.003	0.008	0.008
	(0.009)	(0.008)	(0.009)	(0.009)	(0.009)
Log per capita GDP	−0.086				
	(1.032)				
Investment relative price level		1.749			0.850
		(1.379)			(1.236)
Capital stock to GDP			−1.739		0.151
			(1.197)		(0.741)
Total factor productivity (2005 = 1)				5.033	3.915
				(3.554)	(4.565)
Constant	2.664	1.031	12.615*	−1.776	−3.312
	(11.680)	(2.240)	(6.648)	(4.017)	(6.185)
Observations	593	558	558	545	545
Number of countries	47	47	47	46	46
AR(1)	0.000141	0.000203	0.00554	0.000135	0.000491
AR(2)	0.103	0.106	0.0583	0.128	0.0904
Hansen	0.197	0.457	0.262	0.420	0.607
Lags/instruments	1/44	1/43	1/43	1/43	1/49

Estimation: Two-step system GMM with Windmeijer (2005) small sample robust standard error correction and time effects. 'Standard errors in parentheses corrected by Windmeijer finite-sample correction. ***Significant at 1%, **Significant at 5%, *Significant at 10%.

saving. For the whole sample, the share of business to private saving has increased to 63% in 2013 from 52% in 1995. Also, upon casual inspection of the cross-country data, the higher the business saving rate, the higher the private saving and investment rates. From a theoretical standpoint, this link can be rationalized by invoking financial frictions and departures from the corporate veil hypothesis. To test these theories, we have run private saving and private investment regressions on our panel. In brief, our results indicate that a $1 increase in business saving increases private saving by approximately $0.59; and it increases private investment by approximately $0.20. Importantly, the last result holds only when firms in constrained by limited internal and external funding. We conclude that business saving is not neutral and, moreover, that it contributes positively to private saving and to business investment.

The fact that firms save everywhere is understandable because there is an advantage for firms to finance investment through retained earnings in a world where Modigliani-Miller breaks down (i.e. where there are costs to financial intermediation that can be dampened, but not entirely eliminated). Firms that are credit constrained may have no further options than to finance investment through their own saving. Therefore, ameliorating financial frictions would probably increase the ratio of external (i.e. credit) to internal (i.e. business saving) funding of these firms; however this is so because it would increase the availability of external funding for firms as a *complement* (rather than a substitute) of business saving. The policy implication is that business saving should be nurtured rather than discouraged. Our results show that higher business saving contributes to rising aggregate private saving and business investment in the economy.

How then to encourage business saving? Tax policy is a prime candidate for this task. In promoting private saving, the usual policy stand is to encourage household saving while to the extent possible

preserving fiscal neutrality by raising corporate taxes. This conception is probably rooted in the mistaken prior that it is the household sector the preponderant source of saving in the economy. In the words of James Poterba (1987), 'Although corporations are responsible for roughly half of private saving in the United States, most studies of saving focus exclusively on household behavior. Policy initiatives to increase saving have also concentrated on personal saving (…)'. This diagnosis has not changed much indeed since then. Both soft and hard evidence is astoundingly scarce, but it hints at a positive impact of a more lenient tax treatment on the earnings of formal businesses – obviously informal businesses would not benefit from such tax reform. In this regard, Vergara (2004) offers macro and micro evidence for Chile that the lowering of the tax rate on retained earnings from 50% to 10% over the 1980s was a significant factor in boosting private investment in subsequent years. In turn, PwC (2013) surveys the corporate income tax rate in 111 countries in 2012, concluding that the average statutory rate is 24.2% (within a 15%-30% range) and the actual rate paid, after some accounting adjustments, is 23.4%. Interestingly enough, 51% of the countries have lowered the statutory rate between 2006 and 2012. This latter fact may suggest that authorities may be becoming more aware of the positive effects of lower taxes on business as a catalyst of greater saving and investment rates.

A final word of caution is that these recommendations do not contradict at all the conventional advice about nurturing the financial intermediation process. Business and personal saving both play a positive role on long-term growth. It is evident that, unlike personal saving, business saving, when reinvested in the firm, remains outside the financial system, but this does not entail a problem. In fact, these resources, largely immune to transaction and informational costs, should be used to the extent possible. But at the point where they are exhausted, banks and markets should be tapped to take advantage of all remaining profitable investment opportunities.

Disclosure statement

No potential conflict of interest was reported by the authors.

References

Aizenman, J., and I. Noy. 2013. "Saving and the Long Shadow of Macroeconomic Shocks." NBER Working Paper No. 19067, May. Cambridge, MA: National Bureau of Economics Research. doi:10.3386/w19067. http://www.nber.org/papers/w19067

Arellano, M., and S. Bond. 1991. "Some Tests of Specification for Panel Data: Monte Carlo Evidence and an Application to Employment Equations." *The Review of Economic Studies* 58 (2): 277–297. doi:10.2307/2297968.

Arellano, M., and O. Bover. 1995. "Another Look at the Instrumental Variable Estimation of Error-Components Models." *Journal of Econometrics* 68 (1): 29–51. doi:10.1016/0304-4076(94)01642-D.

Ayyagari, M., A. Demirguc-Kunt, and V. Maksimovic. 2008. *Formal versus Informal Finance: Evidence from China*. Policy Research Working Paper No. 4465, January. Washington, DC: World Bank.

Bebczuk, R. 2000. "Business saving and Financing Decisions in Latin America, 1990-1996." *Economica* 46 (2): 37–72. La Plata, Argentina.

Bebczuk, R. 2003. *Asymmetric Information in Financial Markets: Introduction and Applications*. Cambridge: Cambridge University Press.

Bebczuk, R., and E. Cavallo. 2014. *Is Business Saving Really None of Our Business?* IDB Working Paper No. 523, July. Washington, DC: Inter-American Development Bank.

Bebczuk, R., and A. Galindo. 2010. "Corporate Leverage, the Cost of Capital, and the Financial Crisis in Latin America and the Caribbean." mimeo. IDB, Washington, DC.

Beck, T. 2007. "Financing Constraints of SMEs in Developing Countries: Evidence, Determinants and Solutions." mimeo. World Bank, Washington, DC.

Blundell, R., and S. Bond. 1998. "Initial Conditions and Moment Restrictions in Dynamic Panel Data Models." *Journal of Econometrics* 87 (1): 115–143. doi:10.1016/S0304-4076(98)00009-8.

Brambor, T., W. Clark, and M. Golder. 2006. "Understanding Interaction Models: Improving Empirical Analyses." *Political Analysis* 14: 63–82. doi:10.1093/pan/mpi014.

Campbell, J., A. Lo, and C. MacKinlay. 1997. *The Econometrics of Financial Markets*. Princeton, NJ: Princeton University Press.

Cavallo, E., and C. Daude. 2011. "Public Investment in Developing Countries: A Blessing or a Curse?" *Journal of Comparative Economics* 39 (1): 65–81. doi:10.1016/j.jce.2010.10.001.

Denison, E. F. 1958. "A Note on Private Saving." *Review of Economics and Statistics* 58 (3): 195–308. doi:10.2307/1927417.

Fan, J., S. Titman, and G. Twite. 2012. "An International Comparison of Capital Structure and Debt Maturity Choices." *Journal of Financial and Quantitative Analysis* 47 (1): 23–56. doi:10.1017/S0022109011000597.

Fazzari, S., G. Hubbard, B. Petersen, A. S. Blinder, and J. M. Poterba. 1988. "Financing Constraints and Corporate

Investment." *Brookings Papers on Economic Activity* 1988: 141–195. doi:10.2307/2534426.

Grigoli, F., A. Herman, and K. Schmidt-Hebbel. 2014. "World Saving." IMF Working Paper, WP/14/204, Washington, DC: IMF, November.

Hubbard, G. 1998. "Capital-Market Imperfections and Investment." *Journal of Economic Literature* 36: 193–225.

IDB. 2013. *Rethinking Reforms: How Latin America and the Caribbean can Escape Suppressed World Growth*. 2013 Latin American and Caribbean Macroeconomic Report, March. Washington, DC: Inter-American Development Bank.

IMF. 2006. *Awash with Cash: Why are Corporate Savings so High?* World Economic Outlook, Chapter 4. Washington, DC: International Monetary Fund.

IMF. 2009. *Business Savings and Rebalancing in Asia*. Regional Economic Outlook: Asia and Pacific, Chapter 3, October. Washington, DC: International Monetary Fund.

Jongwanich, J. 2010. "The Determinants of Household and Private Savings in Thailand." *Applied Economics* 42 (8): 965–976. doi:10.1080/00036840701721067.

Lequiller, F., and D. Blades. 2006. *Understanding National Accounts*. Paris: OECD.

Levine, R. 2004. *Finance and Growth: Theory and Evidence*. NBER Working Paper No. 10766, September. Cambridge, MA: NBER.

Loayza, N., K. Schmidt-Hebbel, and L. Servén. 2000. "What Drives Private Saving across the World." *Review of Economics and Statistics* 82 (2): 165–181.

McKinnon, R. 1973. *Money and Capital in Economic Development*. Washington, DC: Brookings Institution.

Modigliani, F., and M. H. Miller. 1958. "The Cost of Capital, Corporation Finance and the Theory of Investment." *The American Economic Review* 48 (3): 261–297.

Mody, A., F. Ohnsorge, and D. Sandri. 2012. *Precautionary Saving in the Great Recession*. Research Department Working Paper No. 42. Washington, DC: FMI.

Myers, S. 1977. "Determinants of Corporate Borrowing." *Journal of Financial Economics* 5: 147–175. doi:10.1016/0304-405X(77)90015-0.

Myers, S., and N. Majluf. 1984. "Corporate Financing and Investment Decisions when Firms have Information that Investors Do Not Have." *Journal of Financial Economics* 13: 187–221. doi:10.1016/0304-405X(84)90023-0.

Pitelis, C. 1987. "Corporate Retained Earnings and Personal Sector Saving: A Test of the Life-Cycle Hypothesis of Saving." *Applied Economics* 19 (7): 907–913. doi:10.1080/00036848700000037.

Poterba, J. 1987. *Tax Policy and Business Saving*. Brookings Papers on Economic Activity, No. 2, 455–503. Washington, DC: Brookings Institution Press. doi:10.2307/2534488.

PwC. 2013. "Corporate Income Tax – a Global Analysis." PriceWaterhouseCoopers, www.pwc.com/payingtaxes.

Roodman, D. 2009. "How to do xtabond2: An Introduction to Difference and System GMM in Stata." *Stata Journal* 9 (1): 86–136.

Servén, L. 2003. "Real Exchange Rate Uncertainty and Private Investment in LDCs." *Review of Economics and Statistics* 85 (1): 212–218. doi:10.1162/rest.2003.85.1.212.

Servén, L., and A. Solimano. 1993. "Private Investment and Macroeconomic Adjustment: A Survey." In *Striving for Growth After Adjustment. The Role of Capital Formation*, edited by Servén, L. and A. Solimano, 11–30. Washington, DC: World Bank.

Vergara, R. 2004. *Taxation and Private Investment: Evidence for Chile*. Working Paper No. 268. Santiago: Instituto de Economia, Pontificia Universidad Católica de Chile.

Windmeijer, F. 2005. "A Finite Sample Correction for the Variance of Linear Efficient Two-Step GMM Estimators." *Journal of Econometrics* 126 (1): 25–51. doi:10.1016/j.jeconom.2004.02.005.

Annex: Data

Table A1. Country sample.

Country	Period	Country	Period
A. High-income OECD		**C. Upper-middle income**	
Austria	1995–2013	Belarus	1995–2010
Belgium	1995–2013	Brazil	1995–2013
Czech Republic	1995–2013	Bulgaria	1998–2012
Denmark	1995–2013	Chile	1996–2013
Estonia	1995–2012	China	1995–2012
Finland	1995–2013	Colombia	1995–2012
France	1995–2013	Ecuador	1997–2013
Germany	1995–2013	Kazakhstan	1995–2009
Greece	1995–2013	Latvia	1995–2013
Hungary	1995–2013	Lithuania	1995–2012
Italy	1995–2013	Mexico	2003–2012
Japan	1995–2012	Romania	1995–2013
Korea, Rep.	1995–2013	Russian Federation	2002–2013
Netherlands	1995–2013	Serbia	1997–2011
Norway	1995–2013	South Africa	1995–2013
Poland	1995–2013	**D. Lower-middle income**	
Portugal	1995–2013	Bolivia	1995–2011
Slovak Republic	1995–2013	Egypt	1996–2012
Slovenia	1995–2013	Guatemala	2001–2012
Spain	1995–2011	Honduras	2000–2013
Sweden	1995–2013	Morocco	1998–2011
Switzerland	1995–2012	Ukraine	1995–2012
United Kingdom	1995–2013		
United States	1995–2013		
B. High-income non-OECD			
Croatia	1996-2012		
Cyprus	1995-2012		

Table A2. Data sources.

Source	Website
Saving and investment by institutional sector:	
United Nations National Accounts	http://data.un.org/Explorer.aspx?d = SNA
OECD	http://stats.oecd.org/Index.aspx?DataSetCode = SNA_TABLE14A#
IBGE (for Brazil)	http://www.ibge.gov.br/home/estatistica/economia/contasnacionais/2009/defaulttabzip.shtm
Banco de Guatemala (for Guatemala)	http://www.banguat.gob.gt/inc/main.asp?id=100281&aud=1&lang=1
Banco Central de Ecuador (for Ecuador)	http://contenido.bce.fin.ec/
Other Statistical Sources:	
IMF WEO	http://www.imf.org/external/pubs/ft/weo/2014/02/weodata/index.aspx
WB WDI	http://data.worldbank.org/data-catalog/world-development-indicators
Penn World Table	www.ggdc.net/pwt

Table A3. Summary statistics.

Variable	Obs.	Mean	Median	25th percentile	75th percentile
1. Panel					
Private saving rate	671	19.92	19.62	16.90	22.70
Business saving rate	671	13.87	13.89	11.14	16.50
Government saving to GDP	671	2.27	2.01	−0.20	4.10
Per capita GDP growth	723	2.68	2.53	0.81	4.60
Per capita GDP growth volatility	702	2.13	1.43	0.83	2.67
Log per capita GDP	723	9.85	9.97	9.31	10.47
Old dependency ratio	723	19.19	21.23	11.30	24.62
Young dependency ratio	723	31.65	26.48	22.39	33.02
Urbanization ratio	723	68.80	68.86	58.75	78.27
Private credit flow to GDP	697	2.88	2.37	−0.30	5.84
M2/GDP (log)	696	4.19	4.16	3.78	4.71
Current account balance to GDP	720	−1.34	−1.62	−5.12	2.56
Terms of trade (log)	628	4.62	4.60	4.55	4.64
Household saving rate	671	6.05	6.37	3.60	8.96
Real interest rate (log)	584	0.05	0.04	0.02	0.08
Business investment rate	667	14.87	14.04	11.63	17.12
Government investment rate to GDP	667	3.47	3.37	2.70	4.08
Investment relative price level	682	0.77	0.77	0.54	0.96
Capital stock to GDP	682	3.22	3.11	2.65	3.73
Total factor productivity (2005 = 1)	668	0.97	0.99	0.95	1.01
1. Cross-section					
Private saving rate	47	19.87	19.18	16.63	22.27
Business saving Rate	47	13.86	13.25	11.52	16.90
Government saving to GDP	47	2.36	2.17	0.30	3.80
Per capita GDP growth	47	2.71	2.05	1.41	3.86
Per capita GDP growth volatility	47	2.16	1.95	1.33	2.69
Log per capita GDP	47	9.83	9.88	9.26	10.48
Old dependency ratio	47	18.94	21.22	10.72	24.57
Young dependency ratio	47	32.20	26.18	23.41	37.90
Urbanization ratio	47	68.61	68.82	57.17	77.31
Private credit flow to GDP	47	2.82	2.50	1.31	3.76
M2/GDP (log)	47	4.18	4.11	3.75	4.79
Current account balance to GDP	47	−1.38	−1.61	−5.40	2.33
Business investment rate	47	14.92	14.70	11.95	17.09
Government investment rate to GDP	47	3.52	3.68	2.79	4.13
Investment relative price level	47	0.78	0.72	0.55	1.01
Capital stock to GDP	47	3.21	3.30	2.64	3.55
Total factor productivity (2005 = 1)	46	0.97	0.98	0.96	0.99