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A Microeconometric Approach for Latin America

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The FIH and the Paradox of Debt: A microeconometric approach for Latin America

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Abstract: Hyman Minsky's financial instability hypothesis (FIH) argues that as part of the normal functioning of capitalist economies robust financial structures tend to evolve into highly leveraged fragile financial structures. The paradox of debt challenges the very foundation of Minsky's FIH as it sustains that upward and downward phases of the business cycles need not be characterized by processes of respective leveraging and deleveraging. Using a panel of firm-level data and seemingly unrelated regressions we analyze the relationship between debt and investment for twelve Latin American countries for the years 2005 (expansion) and 2009 (contraction). We reject the Paradox of Debt in favor of the FIH, regardless of our model specification or the choice of external financing. The FIH seems to intensify in expansions with respect to recessions, and its intensification during expansions is explained by a larger fraction of firms acquiring debt and new investment projects, rather than from further leveraging for those firms already engaged in fixed investment.

Key words: Minsky, paradox of debt, Latin America
JEL codes: E02, E12, O11, 012

1 Introduction

Hyman Minsky's main contribution to the understanding of the evolution of capitalist economies is his financial instability hypothesis (FIH). The FIH argues that as part of the normal functioning of capitalist economies robust financial structures tend to evolve into highly leveraged fragile financial structures. In particular financial units, firms, may be described as taking on more risk as these tend to switch from hedge to speculative finance and some fall into a Ponzi financial scheme.

The FIH is based on two hypotheses. First, the free market mechanism does not produce sustained full employment equilibrium. Second, business cycles and crises which are internally generated result from the "financial attributes that are essential to capitalism." (Minsky, 1986, p. 173). Minsky's exposition of the FIH is framed in terms of the interplay between the supply price for investment and the demand price for capital adjusted for the borrower's and lender's risk. During the upward (downward) phase of the cycle the lender and borrower's risks decrease (increase) and as a result firms are willing to increase (decrease) their leverage to finance a greater (lower) volume

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of investment. Central to Minsky's explanation of leverage and deleverage cycles is the figure of a representative firm and its associated internal financing constraint which is not affected by the changes in the risk perception of the borrower and the lender.

Some Post Keynesian authors have challenged the characterization of the business cycle in terms of leveraging and deleveraging (i.e, Lavoie and Seccarecia, 2001) arguing that debt ratios and leverage may in fact be counter cyclical with respect to GDP. The paradox of debt literature has focused mostly on the difficulty of extending Minsky's microeconomic framework to the macro level. Also the empirical literature on the paradox of debt has centered on developed country cases.

Our paper contributes to this debate by expanding its scope of analysis to the microeconomic level and to the case of developing countries. More specifically we focus on the case of selected Latin American countries for the years (2005) and 2009 (contraction) using firm-level panel data. We test for the cyclicality of leverage in the different phases of the cycle using three different specifications of a bivarate probit model to estimate the correlation between the decision to invest and the decision to finance the investment with debt.

The rest of the paper is divided into 7 sections: Section 2 provides a brief review of the financial instability hypothesis and the paradox of debt in the more recent literature. We highlight some of the (heterogeneous) mechanisms that give rise to pro-cyclical or counter-cyclical movement in aggregate debt measures. Section 3 describes our database and details some relevant descriptive statistics. We also present some macroeconomic stylized facts which serve as a relevant background for discussing our microeconomic-based estimates. Section 4 reviews briefly some of the empirical literature on the financial instability hypothesis, and then presents our estimation strategy, consisting of different specifications of seemingly unrelated regressions which allows to determine whether the unobserved determinants of investment and debt decisions are positively or negatively correlated. A positive correlation provides evidence in favor of the financial instability hypothesis while a negative correlation gives support to the paradox of debt. Section 5 analyzes our results which reject the Paradox of Debt in favor of the FIH. These results are robust to the inclusion of lagged dependent variables to control for endogenity, and to different sources of external financing. They are sensitive, however, to measures of fiscal and external debt. Finally, section 6 concludes and suggests avenues for future research.

2 The Financial Instability Hypothesis and The Paradox of Debt: A theoretical assessment.

Minsky's main contribution to the understanding of the evolution of capitalist economies is his financial instability hypothesis (FIH). The FIH is meant to explain instability as "an internally generated result of the normal functioning of capitalist economies" (Minsky, 1972, pp. 144-145; 1978, p.92, p.111). It is based on two theorems (Minsky, 1992, 1986).

The first states that a capitalist economy has financing regimes (characterized by relations between cash payment commitments on debts and expected cash receipts) under which it is stable and financing regimes under which it is unstable. Minsky identifies three financing regimes: hedge, speculative and Ponzi. Their importance and weight in economic unit's portfolios determine to a large extent the stability or instability of an economy.

Hedge finance refers to a situation where the gross capital income of an economic unit (defined as gross profits before taxes minus interest paid on business debts) " exceeds by some margin the payment commitments due to debts in every relevant period over the horizon given by the debts now on the books and the borrowings that must be made if expected gross capital income is to be earned" (Minsky, 1980, p. 25). Speculative finance refers to a situation where cash payment commitments on debts are greater for some periods than the expected gross capital income. Ponzi finance refers to "speculative units with the special characteristics that for some if not for all near term periods cash payment commitments to pay interest are not covered by the income portion of the expected excess of receipts over current labor and material costs." Ponzi units must borrow in order to pay interest on their obligations so that the outstanding debt grows over time.

The FIH second theorem holds that prosperity is conducive to financial instability, i.e, "stability is destabilizing". As Minsky put it: "...over periods of prolonged prosperity, the economy transits from financial relations that make for a stable system to financial relations that make for an unstable system" (Minsky, 1992, p.8). The transition occurs during the upward phase of the cycle ("the path of this basic instability is upwards" (Minsky, 1980b, p.517; 1980a p.83)[1]. The transmission mechanism can be described with the following concepts used by Minsky in his explanation of the upward phase of the cycle: the supply price of investment, demand price of a capital asset, borrowers and lenders risk, an investment function dependent on internal finance, an equation in which the structure of aggregate demand determines profit which in the most simplified of all cases, profits are a function of realized investment. These relationships are detailed in the Table 1 below.

Table 1: Minsky's representative firm equation system

Equation	Description
$P_o = \frac{w}{P_{me}}(1+\mu)$	Supply price of investment
$P_d = \sum_i^n Q_i^e * K$	Demand price for capital assets
$I_i P_o = Q_i$	Internal financing constraint

Where, P_o = supply price of investment; W= nominal wage; P_{me}= average labor productivity; μ = mark-up on prices; P_d = demand price for investment; Q_i^e = expected quasi-rents; K = capital goods; I_i= investment at the firm level

Assume as Minsky does (1980a; 1980b; 1986, pp.193-194; 1975, p. 114) that during an upward phase of the cycle aggregate achieved investment is above its expected level and that as a result realized profits exceed the expected level of profits. A higher level of expected profits will translate into higher than expected internal funds, an increase in the willingness of borrowers to debt finance (reduction of lender's risk) and an increase in the demand price of capital assets due both to the expectations of higher quasi-rents and a decline in the borrowers' risk. The decline in the borrower's risk is due to an increasing confidence that future profits will exceed debt commitments (De Antoni, 2006). Also, the borrower's risk declines due to a rise in the capitalization rate provoked by the increase in liquidity that is characteristic of the upward phase of the cycle and which reduces

[1]Minsky thought that fragile financing patterns take time to emerge due to four factors: (i) the limits placed by borrower's and lenders' risk; (ii) conservatism and orthodoxy as a barrier to the assimilation of financial innovation; (iii) the "assured refinancing by organizations engaging in speculative finance" and (iv) the rise in profits and in internal funds (Minsky, 1986, pp. 211-213).

the value placed upon liquidity and increases the value placed upon non-monetary assets including capital goods (Minsky, 1975, p.102-105). Minsky's story of the upward phase of the cycle and the transition from robust to fragile financial structures also assumes a given structure of the rates of interest. For example in the case where hedge finance dominates Minsky identifies an interest rate structure favorable to profit opportunities and that induces financing of investment through short-liquid liabilities. In particular he assumes that the short-term rate of interest on 'secure instruments' is lower that than the yield from owing capital and that the short-term interest rate on money on money and liquid instruments is lower than the long-run rate of interest on longer-term liabilities used to finance capital assets.

For the upward phase of the cycle to lead to instability two conditions must be met. First, debt commitments have to increase at a faster pace than the underlying income supporting those levels of debt. Second the composition of debt has to shift towards short-term debt. As explained by Minsky (1995, p.201):

"In order to get to the financial instability hypothesis from the hedge, speculative or Ponzi financing structure of balance sheets, particular empirical generalizations have to be posited. One is that over a course of years during which a capitalist economy does well the rate of growth of private debts exceeds the rate of growth of the underlying income that supports such debts. In particular, payment due to business indebtedness outpace gross profits [...] A second assertion is that a change in the composition of debts occurs over a run of good times, in that short-term debt financing increases relative to long-term debt and equity financing. Further financial layering increases as new financial institutions [...] emerge in response to perceived profit opportunities [...]. As a result an increasing proportion of units become dependent upon "the normal functioning" of financial markets in which debt can be floated or rolled over."

Economic agents also become dependent on higher and increasing levels of liquidity. The normal functioning of financial markets imply the realization of optimistic expectations regarding profit flows (i.e., quasi-rents). Within this context the possibility of crisis can arise from factors that can disappoint these expectations. According to Minsky (1975, p. 115) these include "rising wages or production costs, feedbacks from rising interest rates to the value of older long-term debt, the high cost of refunding previous debt." We can add to this list, more stringent lending restrictions, default on payments commitments by an important institution from the financial or non-financial corporate sector, and interest rates increases (Wray, 2015, p.33). The generalized sale of assets (which have increased their degree of illiquidity following a boom) to raise cash to face debt commitments leads to declines in their price of capital assets, and in the demand prices of capital goods and in general in asset values.

The above process can also include a key role of the short-term rate of interest which Minsky saw as the result of the combination of a rising inelastic demand for finance combined with an inelastic (or even less than infinitely elastic) supply of finance in leading to a downturn and the bust. As he puts it (Minsky, 1978 p.107):

"As investment in process increases, an inelastic component of the demand curve for financing rises [...] the run up of prices and profits that characterizes a boom will result. However, the internal workings of... Central Bank action to constrain inflation will result in the supply of finance becoming less than infinitely elastic[2]

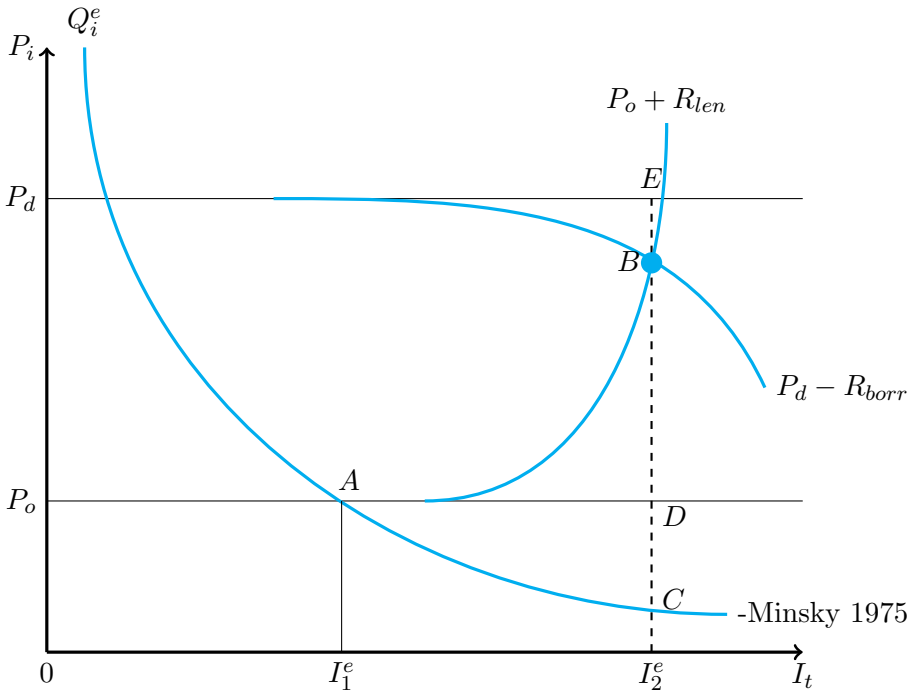
[2]Minsky (1986, p. 195) argues that this occurs for different reasons including "the limited equity base of banks, internal and foreing drains of bank reserves, and, in modern times, central bank [...] actions to restrain the money

[...] A rising inelastic demand curve for finance [...] combined with an inelastic supply curve of finance leads to a rapid increase in short-term interest rates [...] Sharp increases in short-term interest rates lead to a rise in long-term interest rates."

As he puts it above, the increase in the short-term rate of interest translates into a rise in the long-term rate of interest. Both have opposite effects on the demand price for capital assets and the supply price of investment goods. The rise in the short-term interest rate will increase the supply price of capital goods while the rise in the long-term interest rate will lower the present value of quasi-rents and thus the demand price for investment goods. This will lead to a fall in investment which lowers expected profits. This in turn deteriorates firm's confidence to fulfill their financial commitments which increases both borrower's and lenders' risk reinforcing the contraction in investment. Once again in perfect analogy with the description of the upward phase of the cycle, where the expansion of investment brings about an increase in leverage, the contraction of investment brings about a process of deleveraging.

Minsky illustrates the FIH through the generalization of the representative firm to the economy as a whole (Minsky,1975, pp. 113-130). Figure 1 reproduces Minsky's representative firm as an analytical device which allows him to determine the level of investment through the intersection of the supply price of capital goods and the demand price of investment adjusted for the lender's and borrower's risk, respectively. ($P_o + R_{len}$ and $P_D - R_{borr}$). In figure 1 this situation corresponds to the equilibrium point B compatible with the desired level of investment I_2^e. In figure 1, $I_2^e - C$ corresponds to the financing with retained earnings and $D - C$ with the financing with external funds.

Figure 1: Determination of the equilibrium level of investment for the representative firm



supply".

Following the logic described in this section, the variation of investment over a complete business cycle is explained by the interrelationships between the firms' internal financing constraint, the supply price of investment and the demand for capital curves adjusted for the borrower's and lender's risk.

For a given internal financing constraint of the representative firm an upward phase of the cycle is characterized by an increase in the level of investment as a result of the decline in the borrower's and lender's risk. By construction, the decline in the borrower's and lender's risk produces a change in the composition of finance towards greater debt-finance (higher leverage) relative to internal finance.

By a similar reasoning, the downwards phase of the cycle is characterized by a rise in both lender's and borrowers' risk and a process of deleveraging. Moreover, the intensity of the adjustment in the downward phase of the cycle is at least proportional to the "excesses" of the upward phase. This is shown in Figure 2.

Figure 2: The process of investment contraction and develeraging

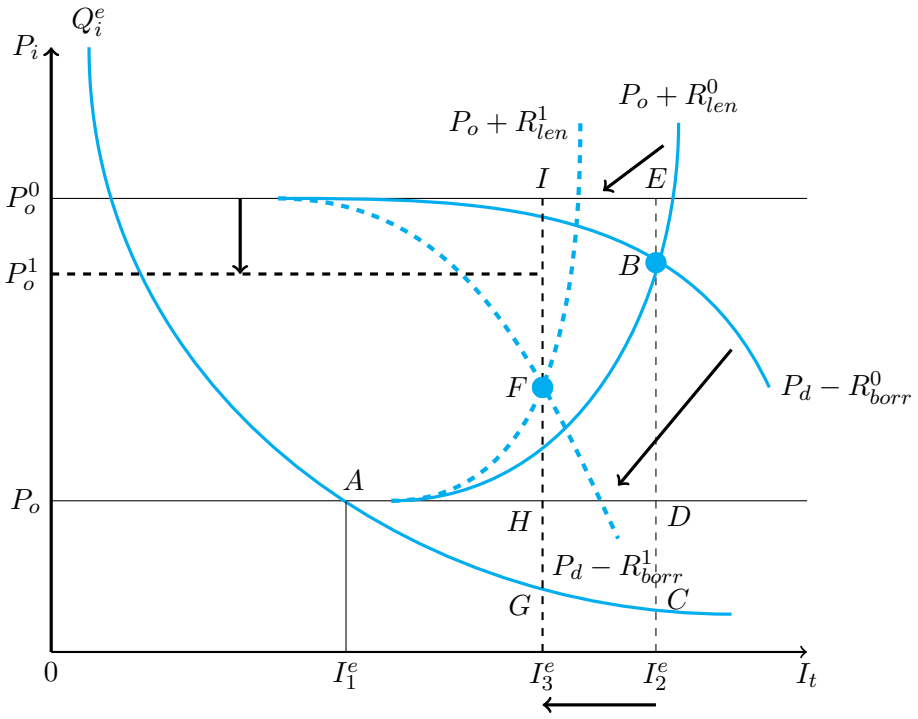


Figure 2 shows an initial situation in which the level of investment is I_2^e and where $I_2^e - C$ is the financing that is undertaken with retained earnings and C-D is the financing through debt (as in Figure 1). Due to the rise in the lender's risk from $P_D + R_{len}^0$ to $P_D + R_{len}^1$ and in the borrower's risk from $P_0 - R_{borr}^0$ to $P_0 - R_{borr}^1$, the level of desired investment contracts from I_2^e to I_3^e. For the latter level of investment financing with retained earnings is equal to $I_3^e - G$ (greater than $I_2^e - C$) and the financing with external funds (i.e., debt) is equal to $G - H$ (lower than $D - C$).

2.1 Minsky and the paradox of debt

The entire exercise builds from generalizing the representative firm analysis to the macroeconomic level. And it is precisely the unchanging financial constraint that ultimately leads to characterize business cycles as leverage-deleveraging cycles. However, at the same time, on the basis of Kalecki (1954) Minsky argued that for an economy in the aggregate, the level of profits (Π) can be expressed as a function of consumption (C), investment (I), government expenditure minus taxes ($G - T$) and the commercial balance ($X - M$). This can be expressed formally as:

$$Y = W + \Pi = C + I + (G - T) + (X - M) \tag{1}$$

Through a series of assumptions (including the separation of workers and capitalists consumption, workers spend all their wages and do not save, capitalists do not consume, a closed economy and no government), this identity can be expressed as:

$$\Pi = I \tag{2}$$

According to (2) causality operates from the components of aggregate demand (in this case aggregate investment) to aggregate profits.

As a result when the level of investment changes the level of aggregate profits must also change. In a "representative firm world" this has to induce a change in the profits of the representative firm and in its capacity to finance investment with retained earnings. Thus, when the risk perceptions of the borrower and lender change the level of investment and also the internal financing constraint of the representative firm have to change. This means that the basic condition to generate leverage and deleveraging cycles which are at the core of the FIH may not be present. Hence upward phases of the cycle may coexist with deleveraging while downward phases can coexist with leveraging.

This possibility has been underscored by several Post Keynesian authors which have contested Minsky's assertion that during expansions, debt grows at a higher rate than the underlying income to support it (Lavoie and Seccareccia, 2001; Bellofiore and Halevi, 2009; Passarella, 2012). This is known as the paradox of debt[3]. As put by Ryoo (2013a) it refers "to the phenomenon in which individual firm's attempt to reduce their indebtedness by cutting investment spending can lead to increasing indebtedness as the consequent reduction in aggregate demand and profits makes firms rely more on debt finance". This means that debt and investment move countercyclically, and thus, business cycles can exhibit the opposite leveraging patterns than those suggested by Minsky.

As recognized by Lavoie (1992) Minsky (i.e., 1975, p.114) was 'partially' aware of the paradox of debt: "...the improvement of realized profits partially frustrates the planned debt financing of investment of firms." But then Minsky goes on to say that this at the same time "reinforces the willingness of firms and bankers to debt-finance further increases in investment" so that ultimately the frustrated plans of debt finance lead to more debt finance. As a result the paradox of debt is really a non-issue for Minsky.

One proponent of the FIH argues that the paradox of debt might not hold in models where firms do not retain all of their profits, i.e, when the retention ratio is less than 1, since this implies that additional profits will be not necessarily used to pay debt commitments, but rather distributed

[3]The origin of this expression is generally attributed to Josef Steindl (1952)

as dividend's, increasing the Debt-to-Capital ratio during upswings (Charles, 2016). Another proponent points out that in models where "lending and borrowing decisions are made without any reference to margins of safety of margin's of safety" (Ryoo, 2013a), as in standard Kaleckian models, the Paradox of Debt is a necessary result. When margins of safety are incorporated properly, the Paradox of Debt ceases to hold.

The critical literature on the paradox of debt has focused mostly on the difficulty of extending Minsky's microeconomic framework - and in particular, his representative firm framework - to the macro level.[4] Also the empirical literature on the paradox of debt has centered on developed country cases. Our paper differs from this tradition in that it seeks to test the paradox of debt at the microeconomic level through individual firm surveys and is applied to developing countries and more precisely to selected Latin American countries.

3 Stylized facts, data description and variable definition

Macroeconomic aggregates

In the case of Latin America (as in other regions in the world), investment plays a key role in the explanation of the business cycle. As Table 2 shows[5], the investment cycle is highly synchronized with the GDP cycle.

Table 2: Duration and amplitude of investment cycles in relation to GDP and concordance between investment and GDP cycles

	Expansions		Contractions		Concordance
	Duration *(Quarters)*	Amplitude *(Percentages)*	Duration *(Quarters)*	Amplitude *(Percentages)*	
Argentina	0.77	1.81	1	3.36	87.88
Brazil	0.58	1.43	1.5	4.36	72.73
Chile	0.56	1.19	1.47	4.73	96.97
Ecuador	0.29	0.71	1.31	2.48	69.7
Mexico	0.84	1.58	1.13	2.09	93.94
Paraguay	0.9	1.86	0.65	3.25	—
Peru	0.76	1.78	1.23	4.74	69.7
Uruguay	0.41	1.28	0.79	1.92	78.79
Venezuela	1.11	2.95	1.65	4.07	84.84
Median	**0.8**	**1.6**	**1.2**	**3.4**	**81.8**
Average	**0.7**	**1.6**	**1.2**	**3.4**	**81.8**

Note: Data are calculated from official sources. The time series starts at the first quarter of 1990 and ends in the fourth quarter of 2014. Concordance refers to the concordance of investment and GDP cycles. Bolivia, Colombia, El Salvador and Panama do not have enough data to construct the Hardin-Pagan measure.

[4]See for example Lavoie (1992, p. 199): "With respect to theory, the case of the representative firm developed by Minsky does not necessarily extend to the macroeconomic setting." One could add that in his example of the representative firm, that in fact Minsky does not show exactly how he proceeds from the micro to the macro level. See Minsky (1975, p. 113).

[5]The methodology for analyzing the cycle is that of Harding and Pagan (2002)

An analysis of the concordance of investment and GDP cycles for the period 1990-2014 for the sample of Latin American economies used in this paper, finds that on average both series are in same phase of the business cycle roughly more than 80% of the time. Moreover, investment is usually the most volatile component of aggregate demand and also more volatile than GDP. The available empirical evidence shows that investment behaves in an asymmetrical fashion with regards to GDP during expansions and contractions: While during expansions, the investment cycle is slightly shorter and its amplitude is roughly 50% bigger than GDP; during contractions, investment contracts for a longer time than GDP, and its amplitude is more than three times larger than that registered by GDP. Succinctly put, in comparison to GDP cycles investment expansions are short lived and weak, while contractions are deeper and longer, which is consistent with evidence found previously for developed countries (Harding and Pagan, 2003).

The behavior of credit follows that of investment and GDP but its cycle phases are less intense. Table 3 shows the evolution in the rate of credit in the private sector in terms of its nominal rate of growth and also as percentage of GDP for the periods 2003-2008, 2005, 2009 and 2020-2014. The table shows that for the group of countries under consideration the annual rate of growth of credit in nominal terms reached on average 14.8% for the period 2003-2008 slowing down to 8.4% in 2009 (almost no contractions were recorded on an annual basis) and recovering to 16.6% for 2010-2024. Notwithstanding, the ratio of private credit to GDP expanded in 2009 relative to 2003-2008 (36.7% and 42.6% respectively) indicating that during the downward phase of the cycle the rate of growth of credit was greater than that of GDP.

Table 3: Private credit, Private credit to GDP and Investment Growth

	Private sector credit growth[a]				Private credit to GDP ratio				Fixed capital formation growth[b]			
	2003-2008	2005	2009	2010-2014	2003-2008	2005	2009	2010-2014	2003-2008	2005	2009	2010-2014
Argentina	15.9	23.3	10.9	27.2	...	...	...	...	21.5	7.7	-14.6	6.4
Bolivia	3.8	2.5	7.8	17.3	40.8	45.0	37.0	44.5	5.9	18.7	2.9	11.1
Colombia	13.2	14.5	3.9	10.0	31.7	29.3	40.0	48.0	13.0	9.9	-1.3	9.1
Chile	16.3	12.4	5.8	16.3	81.3	76.3	102.4	104.2	12.0	18.6	-12.1	6.9
Ecuador	14.4	21.8	7.5	13.8	...	...	...	...	6.8	16.0	-3.6	10.2
El Salvador	8.2	7.6	-2.4	3.7	...	...	...	...	2.3	-5.4	-19.2	3.5
Guatemala	13.6	12.8	2.4	12.3	26.9	25.4	25.3	28.9	2.5	-5.8	-13.1	2.9
Mexico	15.4	13.0	6.2	12.6	18.1	16.2	22.8	27.9	6.0	5.0	-9.3	3.0
Panama	11.0	9.3	6.6	12.2	86.0	87.1	81.7	82.8	17.5	8.4	-6.5	17.5
Peru	11.0	11.5	22.8	21.4	...	...	...	...	15.0	24.6	-1.6	10.2
Paraguay	12.1	9.1	12.2	13.4	17.0	15.1	30.3	42.3	9.0	17.8	-6.9	9.2
Uruguay	...	...	...	18.8	27.5	22.5	20.5	24.3	14.3	19.3	-5.8	9.7
Venezuela	43.1	57.0	16.7	36.3	15.9	13.2	23.6	23.6	18.1	2.4	-8.3	3.1
Average	**14.8**	**16.2**	**8.4**	**16.6**	**38.4**	**36.7**	**42.6**	**47.4**	**11.1**	**10.5**	**-7.6**	**7.9**
Median	**13.2**	**12.4**	**6.6**	**13.6**	**29.6**	**27.3**	**33.7**	**43.4**	**10.5**	**12.9**	**-6.7**	**9.1**

Note: *a* in local currency (nominal terms); *b* real terms.

Source: Based on official data and World Bank Development Indicators (2015)

Microeconomic patterns

The macroeconomic business cycle features have interesting counterparts at the microeconomic level in individual firm data. In this paper, we use the 2006 and 2010 World Enterprise Survey (WES). It is a global survey conducted mainly for the developing world representative of small, medium and large non-farm business; it doesn't contain, however, an expansion factor which could make the survey representative at the national level. By construction the data of the survey corresponds to the fiscal rather than the calendar year. The survey contains variables relating to the firm's production process, employment relations, technological innovation and financial issues, among other.

In order to gain an understanding of business cycle features at the micro level, we extract from the WES three sets of indicators based on Minsky's own framework: (i.) The amount of investment flows (including fixed investment and circulating capital) internally financed; (ii.) The composition of external finance[6], and (iii.) The risk perception of banks reflected in their collateral requirements. We think that the combination of macro and micro features of the business cycle can provide a more complete picture of investment dynamics and finance.

First, the data displayed in Table 4 shows that, between 2005 and 2009 most of the countries in the study registered no discernible pattern regarding changes on internal finance during the crisis. Eight out of twelve countries registered a statistically significant decline on their circulating capital. However, in the case of fixed capital investment only three countries recorded significant reductions in the proportion of investment that is internally financed, which suggest that there was neither a general process of leveraging or delevaring during the crisis.

Second, once we take in to account the composition of financing sources, the data shows a remarkable stability in the composition of finance for fixed investment and moderate changes for circulating capital. Firms in developing countries usually resort to credit from suppliers, family loans or other sources of external finance outside of bank loans. As such, there are not necessarily 1-to-1 movements increases from aggregate credit to decreases in internal funding. Credit might be substituted to other sources of external finance, and firms might simultaneously decrease outstanding debts with banks and increase their leverage with other sources of finance. Changes in the liabilities that firms hold, and in different sources of external finance, play a pivotal role in the FIH, which has usually been neglected in model-building: even if firms don't deleverage during recessions, they may substitute safer sources of finance for riskier ones. Table 5 and 6 tackle this issue showing the composition of three sources of external finance: credit from suppliers, informal financing, and non-bank financial institutions (NBFI).[7] As data on bank finance is not available for 2005, there is no basis to compare it to 2009 and as a result we do not include bank finance in Tables 5 and 6.

Table 5 shows that the changes in the financing composition of circulating capital are moderate. Financing from NBFI increased by 0.73% on average, while credit from suppliers went up by 7.4%, on average. Informal financing decreased by 2.9%. Table 6 shows that, for its part, the financing composition of fixed investment stayed surprisingly stable for most countries. Only Argentina,

[6]The authors are very grateful to Domenica Tropeano for pointing out the importance of the composition of external finance and its dynamics in Minsky's theory of the business cycle.

[7]For reasons of space, equity issues are not shown, since they constitute less than 1% of external financing for both years, and we couldn't reject the null hypothesis that for both years the means were different.

Table 4: Percentage of Investment and Circulating Capital Financed with Internal Funds.

	Fixed Investment		Circulating Capital		Ttest: E[2005]>E[2009]	
	2005	2009	2005	2009	Investment	Circulating Capital
Argentina	68,74%	60,92%	66,36%	58,31%	0.01**	0.00***
Bolivia	69,05%	62,43%	60,82%	59,71%	0.11	0.39
Chile	55,97%	55,61%	54,93%	55,74%	0.46	0.62
Colombia	46,66%	45,68%	47,38%	38,82%	0.42	0.00**
Ecuador	48,84%	50,90%	47,33%	49,91%	0.64	0.73
El Salvador	63,19%	55,50%	57,66%	47,30%	0.15	0.02*
Guatemala	71,12%	57,22%	67,13%	56,81%	0.02*	0.01**
Mexico	72,03%	62,73%	78,57%	55.98	0.07	0.00**
Panama	53,64%	79,09%	56,09%	81,83%	0.99	1.00
Paraguay	66,19%	57,92%	61,07%	62,20%	0.09	0.61
Peru	41,96%	36,23%	48,11%	41.96%	0.08	0.02*
Uruguay	73,99%	70.73%	72.25%	65,73%	0.22	0.02*
Venezuela	65,47%	52,42%	83,07%	55,83%	0.05*	0.00**
Median	65,47%	57,22%	60,82%	56,81%		

Source: WEBS. Mean comparison tests are derived under unequal variance and Welch's degree's of freedom.
*Note: * Significant at the 5 percent level. ** Significant at the 1 percent level.*

Table 5: Finance Composition: Circulating Capital

	NBFI		Suppliers		Informal		Ttest: E[2005]<E[2009]		
	2005	2009	2005	2009	2005	2009	NBFI	Suppliers	Informal
Argentina	0.42%	1.05%	20.74%	27.47%	2.37%	1.71%	0.01**	0.00**	0.85
Bolivia	0.73%	2.63%	14.37%	18.56%	7.38%	3.02%	0.02*	0.06	0.99
Chile	0.79%	1.79%	16.30%	22.72%	3.18%	1.72%	0.03*	0.00**	0.97
Colombia	0.92%	1.48%	21.59%	36.22%	4.83%	3.85%	0.12	0.00**	0.83
Ecuador	0.79%	1.80%	27.06%	27.07%	6.53%	3.46%	0.06	0.50	0.96
El Salvador	1.21%	0.18%	12.50%	28.24%	7.61%	3.89%	0.89	0.00**	0.93
Guatemala	0.47%	1.75%	16.62%	23.86%	4.39%	2.77%	0.07	0.02*	0.83
Mexico	0.43%	1.52%	11.36%	30.05%	5.79%	2.09%	0.02*	0.00**	1.00
Panama	1.05%	3.24%	10.30%	6.81%	5.00%	1.90%	0.02*	0.92	0.95
Paraguay	3.77%	3.62%	19.54%	16.32%	3.85%	1.05%	0.54	0.84	0.99
Peru	0.75%	1.22%	17.93%	25.35%	5.35%	2.52%	0.17	0.00**	0.99
Uruguay	0.25%	0.60%	14.77%	23.15%	3.25%	1.63%	0.07	0.00**	0.97
Venezuela	1.21%	0.91%	.	28.77%	.	2.05%	0.62	.	.
Median	0.79%	1.52%	16.46%	25.35%	4.92%	2.09%			

Source: WEBS. Mean comparison tests are derived under unequal variance and Welch's degree's of freedom. Note that the alternative hypothesis is that the mean in 2009 is bigger, as opposed to the previous table

Colombia and Mexico experience a major change in their financing composition, but without showing a common pattern. Thus, at least where fixed investment is concerned, financing composition

Table 6: Finance Composition: Fixed Capital

	NBFI		Suppliers		Informal		Ttest: E[2005]=E[2009]		
	2005	2009	2005	2009	2005	2009	NBFI	Suppliers	Informal
Argentina	3.18%	2.44%	4.50%	13.11%	12.27%	1.55%	0.49	0.00**	0.00***
Bolivia	0.84%	3.42%	2.84%	7.30%	3.83%	2.79%	0.11	0.04*	0.59
Chile	1.59%	2.57%	7.49%	9.67%	2.55%	1.05%	0.38	0.30	0.10
Colombia	3.98%	2.50%	6.93%	15.56%	3.35%	1.49%	0.39	0.00**	0.12
Ecuador	1.94%	3.11%	11.28%	10.95%	5.65%	5.45%	0.51	0.93	0.94
El Salvador	1.38	2.68	8.63	12.30	1.38	3.66	0.58	0.43	0.35
Guatemala	2.14%	2.90%	4.94%	10.00%	1.11%	1.45%	0.76	0.19	0.84
Mexico	0.63%	8.07%	12.97%	11.41%	1.21%	1.34%	0.00**	0.71	0.91
Panama	.	0.00%	8.38%	4.55%	2.34%	0.45%	.	0.41	0.15
Paraguay	5.77%	4.81%	10.88%	11.99%	1.70%	2.13%	0.74	0.77	0.79
Peru	0.67%	2.48%	7.74%	7.06%	1.40%	1.94%	0.08	0.75	0.61
Uruguay	1.83%	0.59%	5.23%	4.94%	2.26%	1.95%	0.28	0.89	0.80
Venezuela	2.74%	3.67%	.	21.08%	.	0.58	0.75	.	.
Median	2.06%	3.17%	8.63%	16.69%	1.38%	2.12%			

Source: WEBS. Mean comparison tests are derived under unequal variance and Welch's degree's of freedom. Note that the alternative hypothesis is that the mean's are different.

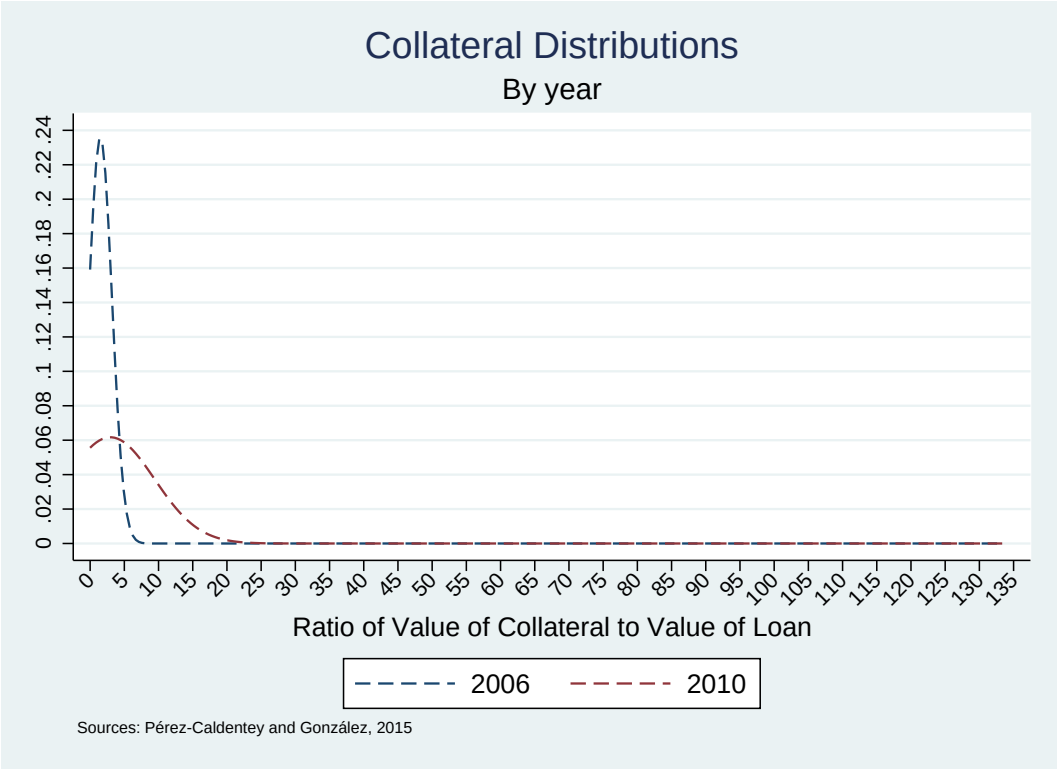
does not seem to support for Minsky's theory.[8]

Finally, as we have emphasized (Pérez-Caldentey and González, 2015), previous empirical investment work has ignored the stress put by Minsky on lender's risk. In figure 4 we reproduce the normal density function of the value of collateral measured as percentage of the firm's debt for the years 2005 and 2009. Some very interesting facts stand out: First, the distributions show a wide disperion of collaterals ranging from 0 to 130 of the value of debt. The value of collaterals above 25 times the value of the debt represent only 5% of the sample. Second, the mean value of the collaterals doubled during the crisis: while in 2005 the mean value of the collateral was 1.5 times the value of the debt, the mean value during the crisis was 2.95 times the value of the debt. This implies that all firms faced more strict financial conditions in obtaining loans, and this also has to be taken as evidence that banks adopted more stringent financial practices during the crisis. Moreover, in comparative terms the dispersion among the values of collateral requirements also increased significantly during the crisis: while the density function shows that around one quarter of the sample clusters around the mean value of the collateral, during the crisis only 6% of the observations cluster around its mean value. This is also reflected in the standard deviations of both years, which are 1.68 and 6.46, respectively, for 2005 and 2009.[9]

[8] Our results are in line with Myers (1984) pecking order theory of finance, where firms have a clear hierarchical preference for internal finance, followed by bank finance and lastly by equity issues. The theory presupposes that this hierarchical ordering is invariant to the business cycle.

[9] We do not count with an explanation for the incredible increase in the dispersion of collateral's. When we looked into the increases in dispersion for every country in the sample, no clear pattern emerges, at least associated with GDP, GDP per capita or the magnitude of the contraction during crisis years. This is definitely a interesting topic for future research.

Figure 3: Normal density function for collateral requirements



Variable Definition

Using the WES database, we build a balanced panel for the 2005-2009 period, which covers 4,596 firms for 12 Latin American countries. We complement this panel with country-level characteristics regarding financial development, obtained from the World Bank Databank. Table 7 below shows a full description of the variables used.

A few notes regarding our choice of variables are in order. The first one concerns the WES high rate of non-respondents among small and medium sized firms, especially regarding the value of investment and the value of sales. While 100% of the firms answered the question "Did this establishment make a fixed investment during the last Fiscal year?", only 34.70% of the small firms, 53.36% of the medium firms and 63.23% of the large firms answered the question regarding the value of their investment. These results leads us to prefer an estimation strategy that uses binary variables instead of continuous ones in order to avoid selection bias and also in order to increase the sample size.

The second one concerns the variables selected in our specifications. As we discussed earlier, two fundamental variables in Minsky's theory are borrower's risk and lender's risk. We construct a measure of borrower's risk with the following question: "How much of an obstacle is the access to finance?", which measures the subjective risk perceptions regarding external finance as opposed to internal finance. We do not count, however, with a reliable measure of lender's risk. While the value of collateral are available from the survey, their distribution is censored, which reduces substantially the sample size and introduces estimation problems. The maturity of loans, another candidate, is available only for one country in our sample.

Table 7: Descriptive Statistics

Variable Name	Mean	SD	Comments
Investment	61%	0.49	Dummy. 1 = Firm Invest, 0 = Firm doesn't Invest
lnInv	14.10	3.25	Logarithmic value of investment in nominal US dollars.
Debt	58%	0.49	Dummy. 1 = Firm has an outstanding Debt with a Bank 0 = Firm doesn't have a Debt.
Internal	58%	42.85	Percentage of Investment financed with Internal Funds.
Age	26.59	20.82	-
Export	23%	0.42	Dummy. 1 = Firm exports some of its products. 0 = Firm doesn't export
Foreign	0.23	0.42	Dummy. 1 = Firm is 100% Foreign Owned, 0 = Otherwise.
Overdraft	70%	0.46	Dummy. 1 = Firm counts with an Overdraft Facility 0 = Firm doesn't count with an overdraft facility.
Account	92%	0.27	Dummy 1 = Firm counts with a savings account 0 = Firm doesn't count with a savings account.
Y fc	71%	15.45	Capacity Utilization
Sales	14.28	2.28	Logarithmic Value of Sales in nominal US Dollars.
Size	-	-	Firm's size measured by number of employee's.
Small	38,5%		Between 1 and 20 employees.
Medium	38,6%		Between 21 and 200 employees.
Big	22,9%		More than 200 employees.
Borrower's Risk	1.50	1.25	Subjective Perception of Finance as an Obstacle. Values range from 0 (No obstacle) to 4 (Very Important Obstacle).
CAP	36,41%	32.72	Stock Market Capitalization of Listed Companies as a percentage of GDP.
STCK	4,04%	4.98	Volume of Stock Market Trading in a given year as percentage of GDP.
CRD	44,84%	21.09	Aggregate Private Credit as a percentage of GDP
BCAR	10,18%	1,73	Bank Capital to Asset Ratio
FP	4079832	2.73e+07	Fiscal Stance Ratio
EP	1.54e+07	5.89e+07	Export Performance Ratio

Note: All microeconomic data come from the World Bank Enterprise survey's. Country level financial data represent the average over 2000-2010 for each country, extracted from the World Bank Databank. The fiscal stance ratio is built from official sources, while the export performance ratio is built from IMF data. Both are measured in current US dollars.

Minsky's framework also suggests that retained profits are an important control variable in estimating investment and debt equations. While we do not count with any measure of the firm's profit, we have a reasonable measure of their annual sales expenditures, which might be considered as a proxy for profits. Other traditional variables found in the Post-Keynesian literature, most notably capacity utilization, are also readily available from the survey. [10] [11]

[10] Fazzari and Mott (1986) note in their seminal Post-Keynesian investment study that sales have an independent effect from profits in their investment equation. However, most of the empirical investment literature considers sales as a reasonable proxy.

[11] Interest rates, a crucial variable in every investment study, are not available in the survey. National interest

4 Estimation Strategy

Previous empirical work regarding the FIH has adopted two kinds of strategies: The first one, pioneered by Lavoie and Seccareccia (2001) is based on using aggregate Time-Series correlations, OLS regressions and Granger causality tests. They do not find either significant correlations between aggregate debt and output measures for six G-7 countries during the 1971-1995 period; nor they find evidence that output Granger causes aggregate debt for the Canadian economy during the period 1962-1998. Charles (2016) attempts to rebut the Lavoie-Seccarecia result using a longer time series for the US economy. The author notes that during the period 1950-2010, there is a secular rise in the Debt-to-GDP ratio that seems consistent with Minsky's theory. However, he does not use any econometric methods or cyclical correlations in order to prove the FIH.

A second strategy has focused on constructing individual or sectoral balance sheets in order to prove the rising composition of Ponzi financial units in detriment of hedge or speculative ones. This strategy was pioneered by Isenberg (1988, 1994) in his studies of sectoral debt previous to the Great Depression. The author finds that while there is a substantial increase in household debt, there are no signs of increased leverage in the non-financial corporate sector during the years prior to the Great Depression.

In order to test for the FIH and the Paradox of Debt, we propose to examine a panel of firms during the 2005-2009 period jointly estimating their investment and debt decisions with a bivariate probit model. Bivariate probit models are a binary version of seemingly unrelated reggresions, which are used in the empirical literature to detect whether two decision processes are negatively or positively correlated (Greene, 2012). Our equations are:

$$Y_1 = X_i\beta + \varepsilon_{1i} \tag{3}$$

$$D_i = \begin{cases} 1 \text{ if } Y_1 > 0 \\ 0 \text{ if } Y_1 \leq 0 \end{cases} \tag{4}$$

$$Y_2 = Z_i\delta + \varepsilon_{2i} \tag{5}$$

$$I_i = \begin{cases} 1 \text{ if } Y_3 > 0 \\ 0 \text{ if } Y_3 \leq 0 \end{cases} \tag{6}$$

Where Y_1, Y_2 stand for the marginal propensities to make a loan and invest, respectively. They determine, given the appropriate vector of variables, whether the firms goes into debt (D_i) and makes an investment (I_i). ε_1 and ε_2 are both white noises normally distributed, with a mean of 0 and a variance of σ_1 and σ_2, respectively.

The advantage of using this procedure is that we can compute the correlation between the error terms $(\varepsilon_{1i}, \varepsilon_{2i})$ between the two equations, that is, ρ. Given appropriate controls and some method for cleaning endogenity issues, we argue that the sign of the correlation between the unobserved

rates set by Central Banks cannot be used, since there is a well known identification problem: interest rates cause investment, but the central bank sets the interest rate with the objective of minimizing the output gap, which is a function of investment.

components of each equation sheds light on the validity of the FIH or the Paradox of Debt: if $\rho > 0$, then this is evidence in favor of the FIH; if $\rho < 0$, then this is evidence in favor of the Paradox of Debt.[12]

However, as mentioned previously, the debt decision considered is only concerned with lending from a bank, which is not always the preferred or the most common external source of finance in developing countries. We complement this regression result by running an additional seemingly unrelated regression (SUR) in continuous form, as originally formulated by Zellner (1962). This regression relates the volume of investment in logarithmic terms measured in US dollars with the percentage of investment financed with internal funds. In this case, if $\rho > 0$, then this is evidence in favor of the Paradox of Debt; if $\rho < 0$, then this is evidence in favor of the FIH.[13] This provides a more comprehensive measure of leveraging than the bank-debt decision used in the discrete model.

It's possible to interpret these two different specifications as accounting for different dimensions of the investment decision. The bivariate probit model can be interpreted as capturing investment behavior in the extensive margin, while the standard SUR model can be interpreted as capturing investment decisions in the intensive margin. As it is well known, the dynamics of aggregate investment mimic those of investment 'spikes', that is, sudden changes in the extensive margin (Caballero et. al, 1995), which means that the bivariate specification is more important to understanding the aggregate behavior between debt and investment.

Our estimation strategy can be subject to three main objections. The first one is that our data set is limited to two years may not capture the emergence of financial fragility (which emerges over a *prolonged* period of prosperity) and thus may not be adequate to test for the FIH. The second one is that the FIH does not refer to a *contemporaneous* correlation between debt and investment, but rather a lagged one. The third one is that microeconomic relations can not be tested in isolation from macroeconomic ones. As a result behavior of the business sector should not be analyzed with independence of other sectors of the economy (the external and government sectors).[14]

In order to address the first objection, we provide evidence that prolonged phases of prosperity are very hard to find in the Latin American context. The average length of expansions phases in countries such as Canada, France, the United Kingdom and the US exceeds 60 quartes, while in the case of Latin America they only last 24 quarters (Perez-Caldentay et. al, 2013). Furthermore, Table 11, contained in the appendix, shows that contractions in GDP and investment are frequent implies that in the case of Latin America periods of prosperity are short-lived. Regarding the second objection we show , in the following section, how aggregate regional leverage has behaved in upturns and downturns and asses if these patterns are consistent with our estimates.

Finally, in order to incorporate the macroeconomic perspective in our estimations we included the influence of fiscal policy and the external sector embedded in two Godley-like ratios: the fiscal stance and the export performance ratio (Godley and Cripps, 1983). The fiscal stance is defined

[12] As it's well known, multi-equational probit or logit models cannot be used to calculate directly the marginal effects of the independent variables in each equation, but they can be used to asses how the probability of being jointly in two given states of nature (such as investing and going into debt) change when the independent variables change. As such, we do not report marginal effects, but rather coefficients which are not to be interpreted jointly with our estimate of ρ.

[13] In the continuous case, the correlation term is obtained using the Breusch-Pagan heteroscedasticity Test.

[14] We are grateful to the two anonymous referees for bringing this points to our attention.

as government expenditure (G) divided by the tax-to-GDP ratio (T/GDP) and the export performance ratio is defined as exports (X) divided by the ratio of imports-to-GDP (M/GDP).

A note of caution regarding the endogeneity of our regressors is important. If some unobserved factor, such as entrepreneurial skills, idiosyncratic risk preferences of the firm's directory or owner, etc, are correlated with any of the reggresors, our estimation of the correlation between the two equations is inconsistent and biased. Multiple strategies could be developed to deal with this problem, but our preferred strategy is to use the lagged dependent variable in each equation as a control for unobserved factors. Since our panel only covers two periods, this strategy only allows to obtain confident estimates of the ρ during the crisis year, 2009. Finally, as it's customary, we employ White's (1980) sandwich estimator whenever possible in order to control for heteroscedasticity.

5 Results

Table 8 shows our empirical results for four specifications: two bivariate probit models, and two SUR models. Each one was estimated in year 2005 and 2009, with the full lists of variables which appear in Table 7. For each model, it displays the estimated ρ and the p-value associated with the null hypothesis $\rho = 0$. The full estimated models can be found in tables 9 and 10 in the appendix.

Table 8: Estimation Results

Model	ρ	p-value
Bi-Probit 2005	0.20	0.00
Bi-Probit 2009	0.10	0.02
SUR 2005	-0.13	0.00
SUR 2009	-0.09	0.01

The idea behind estimating each regression in two years is to think of the parameters as reflecting a comparative statics exercise across different business cycle phases. As we mentioned previously, the discrete version of our regression captures the correlation between the unobserved components of investment and debt, while the continuous case does so with investment and **internal** finance.[15] As it can be seen, in the upward phase of the cycle (2005) the positive correlation between external finance and investment is much more pronounced than in the downward phase (2009), for both the extensive (Probit) and intensive (SUR) margin. This results remain stable after we drop the lagged dependent variable from both regressions concerning year 2009, which is the only difference among the two estimated years. The results are also not sensible to excluding country-level or firm-level variables, with the sole exception of the fiscal and the export performance ratio. If these variables are dropped from the regression, the estimated correlation is not statistically different from zero for the extensive and intensive margin during the recession year.[16] This points to the amplifying influence of the government and external sector. This means that both sectors behaved pro cycliclally in the upward and downward phases of the cycle.

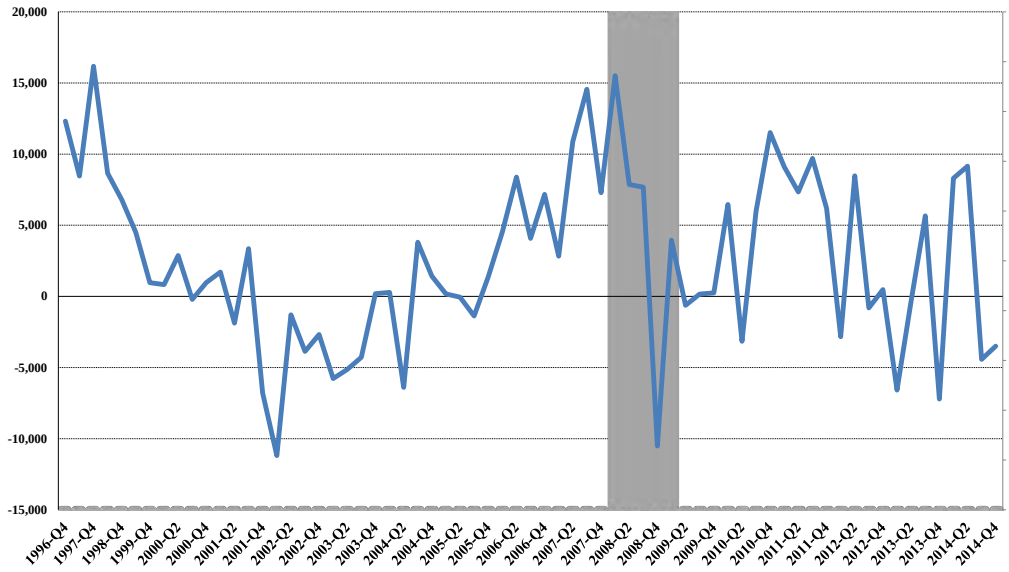
[15]Thus, a negative correlation in the continuous case means there is a positive correlation between investment and external finance.

[16]Results are available upon request.

These results lend unequivocal support for the FIH, and reject the Paradox of Debt argument. It's also interesting to note that while the intensive and extensive margin seem to be equally important during recessions, i.e, firms decide to decrease both the volume of investment and debt, and to refrain from opening new debt commitments and investment projects, this does not hold during expansions. During the upward phase of the cycle, aggregate debt and investment seem to correlate more strongly due to new debt commitments and investment projects executed together. The increase in the percentage of firms which finance investment with debt for the first time seems to dominate the increase in investment expenditure coming from firms that are already financing their investment with debt. This could be interpreted as an increase in speculative finance in relation to hedge finance, since, by definition, firms with no outstanding debts are a subset of firms with hedge financing. Certainly, this hypothesis needs to be explored in future work, but it does shed light as to what part of the firm sector at the microeconomic level increases aggregate debt and investment during expansions.

As we mentioned above, there could be a lagged relation between investment and debt, and as such, while there could have been an initial deleverage during the 2008 crisis, macroeconomic forces ensured that, with a lag, the paradox of debt occurred. Put differently, the paradox of debt (or the FIH) may not happen at business-cycle frequencies, and we may need to examine what happens over lower frequencies. In order to explore this hypothesis, we present aggregate non-financial corporate debt for the countries concerning this empirical study in Figure 4.

Figure 4: Quarterly Discrete Changes in Non-Financial Business Debt, 1997 - 2014



Note: The figure includes Argentina, Bolivia, Chile, Colombia, Ecuador, El Salvador, Guatemala, Mexico, Panama, Paraguay, Peru, Uruguay and Venezuela. Shaded area corresponds to 2008Q1 to 2009Q1. Source: BIS (2015).

This figure shows that deleveraging in the non-financial corporate sector in the fourth quarter of 2008 surpasses every other deleveraging episode, including the Asian crisis of 1999. Corporate debt recovered rapidly over 2009 and fell again during the first quarter of 2010. Overall, the rate of change of debt mimics closely the rate of change of investment shown in Table 3, which does not square well with the paradox of debt, but which is fairly consistent with the FIH.

6 Conclusion and Further Investigation

In this paper, we examine whether debt and investment decisions are positively or negatively correlated during business cycles. The first proposition is implied by the financial instability hypothesis (FIH) and is associated with the name of Hyman Minsky; the second view is implied by the paradox of debt, and is usually associated with Josef Steindl. In order to test which hypothesis holds, we carefully examine aggregate and micro stylized facts for twelve Latin American countries during the 2005 and 2009 years. Using different specifications of seemingly unrelated regressions models we find consistent evidence in favor of the FIH, rejecting the paradox of debt. The FIH seems to be more present during expansions than recessions. These results are robust to regressions which only include bank loans as external finance, as well as other (informal) sources of external finance. They also hold whether we analyze the debt and investment decision in the intensive margin or in the extensive margin.

These results can be important for future theoretical and empirical work. From a theoretical point of view, these suggest that the canonical Kaleckian model that incorporates business debt does a bad job predicting the investment-debt nexus in developing countries. From an empirical point of view, these results open up the question whether these results are robust to different estimation strategies: since Minsky's theory if inherently dynamical, panel data methods that could investigate dynamic investment equations over the business cycle could enrich our understanding of investment and debt correlations, as they have enriched our understanding of investment and financialization (see Orhangazi, 2008 for the US and Tori and Onaran, 2016 for the UK).

Another empirical possibility is to estimate directly a firm investment equation and a bank loan equation, with firm and bank matched data. Even though capitalist banking is central in Minsky's work, heterodox models have, only recently, incorporated a banking sector with its own dynamics in otherwise standard models (Ryoo, 2013b). Overall, we think that further clarification and amendment to Post-Keynesian models is needed in order to show under what conditions the FIH holds, coupled with more empirical research on developed and developing countries, are both necessary to provide robust generalizations grounded in Minsky's work.

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7 Appendix

Table 9: Bivariate probit results

Year	2006				2010			
Models	Investment		Debt		Investment		Debt	
Statistic	**Coef.**	**SD**	**Coef.**	**SD**	**Coef.**	**SD**	**Coef.**	**SD**
Investment2006	-	-	-	-	0.466***	(0.0637) -	-	
Debt2006	-	-	-	-	-	-	0.725***	(0.0657)
RP1	0.0291	(0.0860)	0.316***	(0.0867)	0.177**	(0.0847)	0.436***	(0.0911)
RP2	0.0174	(0.0770)	0.481***	(0.0787)	0.0459	(0.0782)	0.520***	(0.0837)
RP3	0.0500	(0.0912)	0.398***	(0.0903)	-0.0578	(0.0935)	0.373***	(0.102)
RP4	-0.0307	(0.112)	0.208*	(0.114)	-0.156	(0.129)	0.478***	(0.139)
Medium	0.287***	(0.0716)	0.125*	(0.0730)	0.307***	(0.0728)	0.303***	(0.0776)
Big	0.626***	(0.117)	0.127	(0.116)	0.505***	(0.113)	0.342***	(0.120)
lnSales	0.110***	(0.0241)	0.157***	(0.0243)	0.125***	(0.0241)	0.0689***	(0.0242)
Age	-0.0142***	(0.00345)	-0.00770**	(0.00353)	-0.00538	(0.00395)	0.000659	(0.00397)
Age squared	0.000116***	(3.48e-05)	3.10e-05	(3.63e-05)	3.18e-05	(3.89e-05)	1.01e-05	(3.77e-05)
Foreign owned	0.116	(0.143)	-0.377***	(0.129)	0.0162	(0.138)	-0.379***	(0.143)
Export	0.153**	(0.0756)	0.0551	(0.0721)	0.0840	(0.0747)	0.158**	(0.0807)
u	0.00670***	(0.00179)	-	-	0.00924***	(0.00187)	-	-
mean u	-0.0494	(0.0608)	-	-	-0.0242	(0.0635)	-	-
Account	-	-	0.0838	(0.148)	-	-	0.278*	(0.159)
Overdraft	-	-	0.880***	(0.0720)	-	-	0.725***	(0.0785)
CAP	0.00476	(0.00319)	0.0181***	(0.00342)	-0.00169	(0.00309)	-0.00236	(0.00337)
STCK	-0.125***	(0.0205)	-0.172***	(0.0227)	0.000305	(0.0233)	0.0699***	(0.0257)
CRD	-0.00972***	(0.00219)	0.00787***	(0.00241)	-0.00752***	(0.00186)	-0.0118***	(0.00202)
BC AR	0.142***	(0.0295)	-0.133***	(0.0307)	-0.0491**	(0.0246) -0.0632**	(0.0268)	
FP	-1.97e-07***	(3.82e-08)	-7.83e-09	(4.02e-08)	-1.12e-08***	(3.81e-09)	4.52e-09	(4.02e-09)
EP	-2.58e-08*	(1.41e-08)	7.58e-09	(1.47e-08)	2.14e-08***	(8.05e-09)	-1.18e-08	(8.52e-09)
Constant	-2.615***	(0.419)	-1.830***	(0.423)	-1.774***	(0.437)	-1.438***	(0.458)
ρ	0.206***	(0.0392)	-	-	0.0963**	(0.0414)		
Observations	2,315		2,315		2,245		2,245	

Robust standard errors in parentheses
*** p<0.01, ** p<0.05, * p<0.1

Table 10: SUR results

Year	2006				2010			
Models	Investment		Debt		Investment		Debt	
Statistic	**Coef.**	**SD**	**Coef.**	**SD**	**Coef.**	**SD**	**Coef.**	**SD**
Investment2006	-	-	-	-	0.642***	(0.0236)	-	-
Finance2006	-	-	-	-	-	-	0.249***	(0.0342)
RP1	-0.380**	(0.168)	-7.695**	(3.567)	-0.0761	(0.154)	-11.08***	(4.183)
RP2	-0.0265	(0.152)	-15.28***	(3.242)	-0.175	(0.145)	-15.05***	(3.933)
RP3	-0.521***	(0.179)	-10.78***	(3.815)	-0.0396	(0.182)	-15.09***	(4.896)
RP4	-0.749***	(0.233)	-6.992	(4.998)	0.209	(0.273)	-18.38**	(7.366)
Medium	0.555***	(0.151)	-4.292	(3.218)	0.0337	(0.156)	3.969	(4.260)
Big	1.561***	(0.223)	-13.83***	(4.731)	-0.0679	(0.220)	0.933	(5.892)
lnSales	0.465***	(0.0489)	1.644	(1.033)	0.317***	(0.0461)	-0.639	(1.209)
Age	-0.0226***	(0.00664)	0.0757	(0.141)	-0.00845	(0.00662)	0.0619	(0.178)
Age squared	0.000142**	(6.37e-05)	0.000882	(0.00136)	7.81e-05	(5.94e-05)	-0.000685	(0.00161)
Foreign owned	-0.148	(0.228)	5.425	(4.863)	0.0162	(0.138)	-0.379***	(0.143)
Export	0.0152	(0.139)	4.549	(2.864)	-0.0824	(0.127)	-1.199	(3.318)
u	0.000547	(0.00380)	-	-	0.00141	(0.00369)	-	-
mean u	-0.241**	(0.121)	-	-	-0.0603	(0.122)	-	-
Account	-	-	2.541	(8.561)	-	-	-2.673	(11.95)
Overdraft	-	-	-12.31***	(3.319)	-	-	-5.846	(4.426)
CAP	-0.169***	(0.00933)	-0.617***	(0.199)	0.00353	(0.00939)	-0.467*	(0.255)
STCK	2.706***	(0.120)	1.700	(2.542)	-0.0731	(0.0851)	2.820	(2.330)
CRD	0.0869***	(0.00494)	0.0483	(0.105)	0.0257***	(0.00455)	0.219*	(0.123)
BC AR	-0.309***	(0.0692)	2.917**	(1.476)	0.308***	(0.0469)	1.534	(1.165)
FP	2.75e-06***	(1.23e-07)	-3.42e-06	(7.20e-07)	-9.79e-08***	(9.42e-09)	-1.75e-07	(5.42e-07)
EP	8.81e-07***	(3.38e-08)	-9.90e-07	1.53e-07***	(2.17e-08)	1.54e-07		
Constant	5.703***	(0.881)	30.61	(19.04)	-3.532***	(0.849)	44.99*	(24.67)
ρ	-0.1369***	-	-	- -0.0884***	-			
Observations	1,220		1,220		773		773	
R-Squared	0.64		0.073		0.784		0.130	

Robust standard errors in parentheses
*** p<0.01, ** p<0.05, * p<0.1

Table 11: Major contractions in GDP and Investment for selected Latin American Countries. 1990 - 2014

Country	Contractions in GDP	Contractions in investment
Argentina	1995; 1998; 2002; 2009; 2012 2014	1995; 1998-2002; 2008-2009
Brazil	1991; 1995;1998: 2001; 2008-2009; 2014	1995; 1998-1999;2001; 2008-2009; 2011-2012
Chile	1990; 1998; 2008, 2009	1990;1998-1999; 2001; 2008-2009; 2013-2014
Ecuador	1999; 2008, 2009	1993; 1995-1996; 1998-1999; 2009;
El Salvador	2008; 2009	1995-1996; 1998-1999; 2011-2012
Guatemala	2008; 2009	1990-1991; 1993-1994; 1995-1996; 1999-2000; 2007-2010; 2013; 2014
Mexico	1995; 2000;2002; 2009	1994-1995; 2000-2002; 2008-2009
Panama		1992-1995;1999-2002;2008-2009
Peru	1990; 1991; 1992; 1997; 1998; 2000; 2001; 2005; 2009	1990-1992;1995;1998; 1999; 2002; 2008-2009; 2013-2014
Paraguay	2009; 2012	1992; 1995-1996; 1997-1999; 2008-2009; 2012
Uruguay	1998; 2002; 2014	1998; 2008-2009;2014
Venezuela	1993; 1994; 1995;1996; 1998; 1999: 2001;2003; 2009: 2010: 2013	1992-1995; 1997-1999; 2009; 2013-2014

Note: Data are calculated from official sources. The time series starts at the first quarter of 1990 and ends in the fourth quarter of 2014. The contractions are dated according to the Hardin-Pagan measure.