Forum for Macroeconomics and Macroeconomic Policies

IMK Macroeconomic Policy Institute

The IMK is an institute of the Hans-Böckler-Stiftung

FMM WORKING PAPER

No. 27 · June, 2018 · Hans-Böckler-Stiftung

FINANCIALISATION AND INNOVATION IN EMERGING ECONOMICS: EVIDENCE FROM BRAZIL

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ABSTRACT

This article contributes to the literature on the financial constraints of innovation in two ways. First, we examine whether financialisation has transformed the relation between finance and innovation by assessing the association between companies' financial relations, both on the liability side and the asset side of their balance sheets, and intangible assets. Second, this is the first study that examines theoretically and empirically the link between financialisation and innovation in the context of emerging markets using the population of publicly listed companies in Brazil over the period 2011-2016. We find evidence that whilst *financial liabilities* do not affect investments on intangibles, higher *financial assets* and *financial profits* discourage investments on intangibles. Other indicators of financialisation are not significant. Thus, our results support the *crowding-out hypothesis* that *financialisation* i.e. companies' increased tendency to hold financial assets and generate revenue from financial income rather than their underlying operations, discourages investments on innovation.

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Financialisation and Innovation in Emerging Economies: Evidence from Brazil

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ABSTRACT

This article contributes to the literature on the financial constraints of innovation in two ways. First, we examine whether financialisation has transformed the relation between finance and innovation by assessing the association between companies' financial relations, both on the liability side and the asset side of their balance sheets, and intangible assets. Second, this is the first study that examines theoretically and empirically the link between financialisation and innovation in the context of emerging markets using the population of publicly listed companies in Brazil over the period 2011-2016. We find evidence that whilst *financial liabilities* do not affect investments on intangibles, higher *financial assets* and *financial profits* discourage investments on intangibles. Other indicators of financialisation are not significant. Thus, our results support the *crowding-out hypothesis* that *financialisation* i.e. companies' increased tendency to hold financial assets and generate revenue from financial income rather than their underlying operations, discourages investments on innovation.

Keywords: Financialisation, Intangible assets, Innovation-driven growth, Emerging economies

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1. Introduction

Intangible assets (e.g. investments in R&D and advertising) are a major source of technological upgrading and innovation-driven growth (Lev, 2001). Specifically, intangible assets refer to technological knowledge, which when combined with financial and physical capital boost innovation (Dosi, 1988; Nelson and Winter, 1982) and leapfrogging in emerging economies (e.g. Lall, 1992; Dutrénit, 2000). Prior research points out that access to finance plays an important role in stimulating investments in technological knowledge and inducing innovation (Pellegrino and Savona, 2017; Brown, Fazzari and Petersen, 2009; Hsu, Tian and Xu, 2014; King and Levine, 1993a,b; Nanda and Kerr, 2015).

In this literature, lack of access to *external financing* often constrains a firm's cash flow. This constraint, in turn, discourages investments on intangible assets. Specifically, the literature on financial barriers to innovation stresses that research and development (R&D) faces particular financial constraints due to problems arising from asymmetric information, moral hazard, and the incompleteness and inefficiency of capital markets (Canepa and Stoneman, 2008; Hall, 2002; Hottenrott and Peters, 2011). This problem is exaggerated in Emerging Market Economies (EMEs), where financial markets are less developed (Hsu et al., 2014).

More recently, though, some authors have argued that firms' increased exposure to financial markets might hinder rather than spur the innovation processes (Mazzucato, 2013; Gleadle et al, 2014; Dosi et al. 2016). Indeed, a recent empirical literature has shown a negative, rather than a positive link, between financial development and innovation (e.g. Aristizabal-Ramirez et al., 2017). In this vein, Dosi et al (2016) write that " …we still do not know much about the specificities of the links between finance and the microeconomics of innovation" (Dosi et al, 2016: 2).

This article contributes to the literature on the links between innovation and finance in two ways. First, it extends our theoretical understanding of the constraints to innovation by building on the financialisation literature. No consensus exists in the literature with regards to the concept of financialisation. Here we define it as "the process of subordination of firm strategies to the accumulation of financial capital, mediated by financial markets and shareholder value ideology" (Montalban and Sakinç, 2013: 982). Specifically, financialisation captures the increased tendency of large companies (exposed to shareholder value pressures) to hold financial assets and generate revenue from financial income rather than their underlying operations,

including innovative activities. This, the financialisation literature has shown, has negative implications for firm investment in capital stock through offering alternative, more profitable areas of investment, changing manager preferences, and increasing payments to financial markets (Epstein 2005, Stockhammer 2004, Lazonick and O'Sullivan 2000, Orhangazi 2008, Davis 2017). More recently, a small literature has argued that firms' increased involvement with financial markets might also weigh negatively on the innovation process through shareholder value pressures, which increase financial payments at the expense of innovative activities, strengthen value extraction at the expense of value creation and shorten the horizon of managers (Lazonick, 2007, 2010; Lazonick and Mazzucato, 2013; Lazonick and Tulum, 2011; Dosi et al 2016). In this article, we make a theoretical synthesis of the two bodies of literature. Specifically, by incorporating insights from the financialisation approach we distinguish analytically three channels via which financialisation may affect innovation, and set three hypotheses, namely, crowding-out; shareholder-value, and debt trap hypotheses.

Second, building on prior empirical contributions that looked at the impact of financialisation upon real investment in emerging economies (cf. Demir, 2008; Bonizzi, 2013; and Kaltenbrunner and Karacimen, 2016; Tori and Onaran, 2017), we provide empirical evidence on the impact the abovementioned three channels of financialisation exert upon investments on intangible assets using a unique company panel-data from Brazil. In particular, this is the first paper that investigates the effect of three theoretically derived financialisation channels upon innovation: (a) the *crowding-out hypothesis* i.e. whether companies' increased tendency to hold financial assets and generate revenue from financial income, as indicators of financialisation, has a significant association with their innovative activities; (b) the *shareholder-value hypothesis* i.e. whether pressures from shareholders change the management behaviour focusing on value extraction instead of value creation; (c) the *debt-trap hypothesis*, namely whether higher company debt is associated with investments in intangible assets.

We present empirical evidence from panel-data of 94 publicly listed Brazilian manufacturing companies during the period 2011-2016. We apply the Arellano and Bond (1991) two-step difference Generalized Methods of Moments estimator. Our empirical strategy accounts for dynamic panel bias, firm fixed effects, time related

shocks, endogenous variables, autocorrelated disturbances and general forms of heteroscedasticity[4].

The results of the empirical analysis show that, in terms of the first financialisation channel, *crowding-out,* higher financial profits relative to firm's total profits discourage investment on intangibles. This implies that firms that generate more revenue from financial channels are less likely to innovate. We also find that higher financial assets relative to total assets discourage investments on intangibles, suggesting that high dependence on financial investments hinders innovation. Regarding the second financialisation channel, *shareholder-value*, our results indicate that two measures of shareholder value orientation exert a negative impact on intangibles, yet once endogeneity is controlled the effects become statistically insignificant. With respect to the third financialisation channel, *debt-trap*, our results show that, once we account for previous levels of intangibles investments and endogeneity of explanatory variables, higher firm debt exerts a positive but not statistically significant effect on intangibles.

We conclude that the *crowding-out* financialisation channel, as measured by the tendency to favor financial investments and generate more revenues from financial channels, affects innovative activities negatively, potentially hindering innovation-driven growth in emerging markets. Given that investments on intangibles [that stimulate innovation] are high risk and generate uncertain returns over the long run whereas investments on financial assets provide short term returns at lower risk (Arrow, 1962), our findings imply that the *crowding-out* financialisation channel might be the most crucial for innovation. This negative impact of financialisation on innovation might be particularly detrimental for developing countries for who high-value added, technology intensive industrial production is essential for the catching up process.

In the next section, we discuss the literature on the differential effects of access to finance and financialisation upon innovation. Section 3 elaborates the methodological approach and econometric estimation whereas section 4 presents the empirical results. Finally, section 5 provides the concluding remarks and contribution of the study.

[4] Our results are also robust to alternative model specifications.

2. Finance, Financialisation, and Innovation in Emerging Market Economies

2.1. Access to finance and innovation

Access to finance plays an important role in stimulating investments in technological knowledge and inducing innovation (Pellegrino and Savona, 2017; Brown, Fazzari and Petersen, 2009; Hsu, Tian and Xu, 2014; King and Levine, 1993a,b; Nanda and Kerr, 2015). The Modigliani-Miller (1958, 1961) theorem in corporate finance states that returns to different types of investment are independent of the way a corporation finances these investments. This implies that a corporation's capital structure (i.e. whether capital is drawn from external or internal sources) would not affect the rate of return of a project that involves investments on physical assets or investments on intangible assets.

However, the literature on economics of innovation points out that financing innovation (i.e. investments on intangible assets) using capital from sources external to the firm is constrained due to market failures (Hall, 2002). Specifically, market failure for R&D investment arises from asymmetric information, moral hazard, and the incompleteness and inefficiency of capital markets (Hall, 2002). Firstly, asymmetric information between an external lender and a borrower arise due to the difficulty in describing an innovation without giving it away (Canepa and Stoneman, 2008; Leland and Pyle, 1977; Myers and Majluf, 1984). This in turn, makes more difficult to calculate the probability of success of such projects and to estimate the returns to investments in innovation. Secondly, the separation of ownership (i.e. shareholders) and control (i.e. management) generates moral hazard when for example financing R&D requires reduction of dividends (Canepa and Stoneman, 2008). More importantly, highly innovative projects have in general low probability of success, which makes the returns to investments in such projects very uncertain (Brealey et al., 1977; Carpenter and Petersen, 2002). Thirdly, capital market incompleteness and inefficiency, such as the problems of measuring risk, impose further constrains in the financing of innovation (Arrow, 1962). Finally, investments on intangible assets, which lie behind innovative projects, cannot be used as collateral to acquire external financing (Lev, 2000; Bester, 1985). For example, more than 50 percent of the expenditure on a R&D project are mostly on wages of scientists (Hall, 2002), which do not offer a firm any collateral (Berger and Udell, 1990).

Despite the consensus in theory that external financing is a constraint of innovation, empirical evidence is mixed. On one hand, prior studies in the context of the US point out that financing of R&D does not rely on debt but rather on internal sources (Hall, 1992). Similarly, Levenson and Willard (2000) indicate that small and newly funded firms are externally constrained. In the same vein Himmelberg and Petersen (1994) stress the importance of internal financing for innovation rather than external. Prior studies in the context of emerging economies indicate that access to external financing stimulates firm innovation (Ayyagari et al., 2011). Additionally, evidence from cross-country studies points out that countries with well-developed financial markets, and therefore higher access to external finance, are more innovative (Hsu et al., 2014).

One other hand, recent research (Aristizabal-Ramirez et al., 2017) provides empirical evidence indicating that financial development reduces the probability of a firm to innovate. Bougheas (2004) argues that what might explain this contradictory evidence could be associated with differences in financial institutions pointing out that small innovative firms in Anglo-Saxon shareholder corporate governance financial systems face constrains in financing innovation whereas similar innovative firms in stakeholder corporate governance systems such as Japan, Germany, and France are able to access bank loans. Arcand, et al., (2015) argue that there might be a threshold above which financial development exerts a negative effect upon economic growth[5]. This is because the relationship between financial development and economic growth might be contingent on institutional quality (Arestis and Demetriades, 1997; Arestis et al., 2001; Demetriades and Law, 2006). Rousseau and Watchel (2011) suggest that in countries with well-developed financial sector talented employees may be driven away from manufacturing and innovative sectors, towards the financial sector where compensation is higher. The negative impact of financial depth upon economic growth is also seen in the analysis of the onset of the 2008 crisis. Aglietta and Scialom (2010) argue that financial innovations in the form of complex financial products lead to excessive risk taking and predatory behavior.

2.2. Financialisation and innovation

[5] Although our focus is on finance and innovation, we find the discussion of the relation between finance and economic growth relevant in this section due to the fact that innovation is the major force of economic growth (Rosenberg, 1994).

An explanation behind these conflicting empirical results might be related to the different mechanisms via which finance may affect innovation. Specifically, whilst external access to finance, that is financial liabilities, can support investments in innovation by helping companies to access credit for innovative projects, the holding of financial assets and/or ability to generate revenue from financial operations, might affect investments on innovation negatively by diverting companies' activities from real investments on innovation-driven growth to short term financial profit-seeking activities.

The latter phenomenon is identified in the literature as 'financialisation'. Though opinions vary with regards to its definition, manifestations, and ubiquity, financialisation has been identified as a key structural change in global capitalism (Lapavitsas 2014, Fine 2013, Christophers 2015, Sawyer 2016). Epstein (2005) conceptualises the phenomenon of financialisation by pointing out the increasing role of financial motives in firm's decision-making processes and of financial markets, financial actors and financial institutions in the operation of the national and international economies. Here we define it in line with Montalban and Sakinç (2013: 982) as "the process of subordination of firm strategies to the accumulation of financial capital, mediated by financial markets and shareholder value ideology".

With regards to Non-Financial Corporations (NFCS)[6], empirical phenomena subsumed under this definition and discussed in the literature include the increased holding and profit generation from financial assets rather than productive activities (Stockhammer 2004, Krippner 2005, e.g. Crotty 2003), their rising payments to financial markets in the form of interest, dividends, and stock buybacks (Lazonick and O'Sullivan 2000, e.g. Boyer 2000, Duménil and Lévy 2004), and switch to market rather than bank financing (Lapavitsas and Powell 2013). The sources of these changes are either located in the productive sector itself, as increased competition and monopolisation have led to a declining rate of profit and increased the attractiveness of financial investments (e.g. Boyer 2000, Duménil and Lévy 2004, Brenner 2004), or changes in institutional governance and financial market policies. These institutional changes refer particularly to the rising threat of hostile takeovers and the shift from *retain and reinvest* to creating shareholder value (e.g. Froud et al. 2000, Lazonick and O'Sullivan 2000).

[6] According to the literature, financialisation has affected a variety of different economic actors ranging from households and banks to the state and NFCs. Given their role for private innovation, we focus on the latter category in this paper.

A literature, which is by now substantial, shows that this financialisation of NFCs has negative implications for fixed investment (Stockhammer 2004, Orhangazi 2008, Tori and Onaran 2017, Van Treeck 2008).[7] According to Davis (2017) the key mechanisms invoked to explain this negative effect are three: the crowding-out hypothesis, the shareholder-value hypothesis, and the debt trap. Table 1 summarizes the key potential channels between financialisation and innovation and the indicators most frequently used in the literature.

Table 1. Channels between Financialisation and Innovation

Financialisation-Innovation Nexus	Underlying Mechanism	Indicator	Notes	Literature which uses same Indicator
Crowding-out Hypothesis	Firms make portfolio decision between investing in financial assets or innovative activities	Financial Assets/Total Assets	Reflects asset allocation	Demir 2009; Davis 2016, Soener 2015
		Net Financial Profit (before taxes)/Total Profit (before taxes)	Reflects asset allocation and the return made on it	Kripner 2005; Demir 2009; Orhanghazi 2008; Tori and Onaran 2017;
Shareholder-value Hypothesis	Pressures from shareholders change management behaviour, strengthen value extraction over value creation, increase financial payments, and cause stock buy-backs	Dividend Payments/Total Equity	Reflects payment to shareholders	Davis 2016; Lazonick, 2007
		Stock Repurchases/Total Equity	Reflects stock-buybacks	Davis 2016;
Debt Trap	Financialisation leads to higher exposure to financial markets, rising financial liabilities and financial payments	Financial liabilities	Reflects increase in total debt	Davis 2016
		Total Financial Payments (e.g. expenditures on dividends, interest, and the repurchase of equity)	Reflects payments due to all financial obligations (including debt and shareholder value pressures)	Soener 2015; Tori and Onaran 2017; Orhanghazi 2008

Source: Author's elaboration from Davis (2017).

[7] Though Davis (2017) also notes that the results depend fundamentally on the financialisation indicator used and the country under consideration.

Firstly, *the crowding out hypothesis* assumes that, given a fixed supply of financial sources (either internal or external), real and financial assets are held in proportions depending on their relative yields. This means that an increase in the return of financial assets can lead to a replacement of fixed investments if their returns lag that of the financial assets. Prior research ((Demir 2008, Demir 2009b).) shows that this effect could be assumed stronger in EMEs given their lower access to internal funds (due to lower profitability) and external funds (due to more shallow financial markets).

Secondly, *the shareholder-value hypothesis* attributes the falling of real investment to the increased emphasis paid by firm managers on shareholder value. This in turn, increases the short-termism or myopic management behaviour, raises the attention to financial performance indicators like earnings per share (Stockhammer 2004), and changes the corporate strategy from one aiming to *retain and reinvest* to that of *downsizing and distributing* (Lazonick and O'Sullivan 2000). These behavioral changes in managerial culture, in turn, lower available resources for [long-term] real investment.

Thirdly, in contrast to what has been discussed in the traditional literature on 'access to finance' (see section 2.1), the financialisation literature has shown that increased access to external funds (i.e. rising levels of indebtedness) were used to purchase financial assets rather than to increase the capital stock. This phenomenon has been coined as the *debt trap* and has been shown to lead to stagnant or even falling real investment. In particular, a growing literature demonstrates that the recent rise in indebtedness in US companies has been linked to rising financial payments as companies have borrowed to buy back their own shares (Duménil and Lévy 2011, Fiebiger 2016). Overall, the rising debt levels and shareholder value orientation increase payments to financial markets in the form of interest and dividends, which lower the resources available for capital expenditures.

A recent, though still very small literature, argues that this negative impact of financialization processes also holds for firm innovation (Mazzucato, 2013; Gleadle et al, 2014; Dosi et al. 2016). The mechanisms invoked are similar to those in the literature on the financialisation-investment nexus. A key distinction is that investment in innovation is more risky than other forms of fixed investments, and is more associated with asymmetric information, moral hazard and market incompleteness. Thus, we anticipate a stronger negative effect of financialisation

upon investments in innovation in general and in particular that the *crowding-out* financialisation channel to be the most crucial. Increased shareholder value pressures are seen to divert resources from R&D investments to financial payments (Lazonick, 2007) and change managerial preferences from those focused on *value creation* to those driven by *value extraction*. In this vein, Mazzucato (2013) and Mazzucato and Lazonick (2013) argue that in today's managerial economies we see a stronger separation between those economic actors who take the risk to innovate and those who reap the rewards and extract the value from the innovation activities. Stock markets strengthen those focused on value extraction processes through broadening the array of financial sources available (the cash function) and providing the option of corporate stock as remuneration for employees and managers (the compensation function). Moreover, though less explored in the innovation literature, increased managerial short-termism induced by stock markets is seen to weigh particularly on innovative activities, which bear higher risk (Edmans et al., 2013; Dosi et al. 2016). This problem is exacerbated if one takes into account that the returns to investments on intangible assets, which are the driving force on innovation, are only manifested in the long run. This is because of the time lag that exists from expenditure on intangible assets to innovation, and from innovation to commercialization. For example, the median lag from R&D innovation is estimated to be three years (Hall, et al., 2010). This, arguably, also increases the strength of the *crowding out effect* when highly risky innovative activities compete with liquid, high-yielding financial assets.

Very few papers, so far, have investigated empirically the relation between financialisation and innovation (exceptions are Lazonick and Sakinç 2010; Leaver and Montalban, 2010; Mazzucato and Tancioni, 2012; and Gleadle et al. 2014). For example, Mazzucato and Tancioni (2012) show that pharmaceutical companies that invest more heavily in technology experience higher stock return volatility. In this vein, Bernstein (2015), though not focusing on financialisation per se, found a decline in the number of patents filed and the innovative novelty of firms after their Nasdaq IPO. Lazonick and Sakinç (2010) have shown that American biotech firms and large pharmaceutical corporations have received large government funding and IPO capital without generating new products. They rather channeled these funds into stock market speculation and provided external R&D services.

A small, but growing interdisciplinary literature shows that NFCs from EMEs have started to adopt similar practices, relations and balance sheet characteristics to

those in developed countries. On the asset side, several authors have pointed to the increased importance of financial investments, both for hedging and speculative purposes (Demir 2008, Demir 2009a, Seo, Kim and Kim 2012, Araujo, Bruno and Pimentel 2012, Levy-Orlik 2012, Powell 2013). In particular, EME NFCs have substantially increased their holding of cash and very liquid short-term financial assets, including those on local derivatives markets (Kalinowski and Cho 2009, Correa, Vidal and Marshall 2012, Powell 2013, Karwowski 2012, Farhi and Borghi 2009). On the funding side, large EME firms have started to substitute market funding for bank borrowing, frequently offshore and mostly in foreign currency (IMF 2014, McCauley, McGuire and Shushko 2015, BIS 2015). In addition to *crowding out effects* and *shareholder value pressures*, the literature points to the crucial role of external vulnerability and macroeconomic volatility and uncertainty in shaping these financialisation patterns in emerging economies (Akkemik and Özen 2014, Demir 2009b, Kaltenbrunner and Painceira 2017).

A few authors have investigated the implications of these financialisation patterns for real investment in EMEs (Demir, 2008; Tori and Onaran 2017). Fore example, Demir (2008) shows for Mexico, Argentina and Turkey that the financial operations of publicly listed companies have had detrimental implications for capital accumulation as domestic NFCs substituted real for financial investments. Tori and Onaran (2017), on the other hand, find a strongly significant negative effect of financial payments on investment in developing and emerging economies (except China and India where the effect is not significant). The effect of financial income on investment, on the other hand, is found to be insignificant for these countries. So far, there is no empirical literature which investigates the link between different financialisation indicators and innovation in emerging economies. Our study fills this gap in the case of Brazil.

3. **Methodology**

3.1. Data

This paper uses annual balance sheet data for 94 Brazilian manufacturing firms over the 2011-2016 period. The data are from Economatica, a database that provides balance sheet data for publicly listed companies in Latin America. In total, there are 120 publicly listed manufacturing firmsin Brazil, but 26 firms are excluded from the analysis because they had fewer than 50% observations for either intangibles

investments or total assets. The sample period begins in 2011 because Brazilian publicly listed companies adopted the International Financial Reporting Standards (IFRS) in 2010[89].

3.2. Operationalising key variables

3.2.1. Innovation

We use investments on intangible assets as a proxy of innovation. This is because recent research points out that "investment in intangible capital, which includes R&D and the software component of ICT, is largely investment in innovation" (Corrado, et. al., 2012, p.4).

Prior studies on innovation have solely focused on measuring innovation via patents, investments on R&D, or via self-reported surveys on binary outputs of whether a company innovates or not (e.g. Community Innovation Survey). Although research based on these measures has generated valuable insights, there are certain caveats associated as well e.g. not all patents are turned into commercially viable innovations; not all firms invest on formal R&D, especially in EMEs; and increased bias of self-reported surveys. The advantage of measuring innovation via a company's accounts on investments in intangible assets is that it captures a broader range of activities that contributes to innovation such as R&D, ICT, advertising, design, copyrights, brand names etc.

A recent report that examines the returns on investment on science and innovation acknowledges that such investments are not limited to R&D but also include a range of 'intangible investments' (BIS, 2014). Using company and national accounts, Corrado et. al. (2005, 2009) have unraveled the importance of investments on intangibles for productivity enhancing growth. In sum, investments on intangible assets demonstrate the commitment of the company to organic growth or innovation (Corrado, et. al., 2012). Therefore, we consider it as an adequate indicator that captures the breadth and depth of a firm's investments on innovation.

Specifically, the International Financial Reporting Standards (IFRS), set out the criteria for identifying and measuring intangible assets. Companies are required to

[8] The sample includes firms engaged in the manufacturing of equipment, appliance, and components, fabricated metal products, food, furniture and related products, machinery, nonmetallic mineral products, paper, petroleum and coal products, plastics and rubber products, primary metals, printing and related activities, textile mills, transportation equipment, and miscellaneous manufacturing.

[9] IFRS are a set of accounting standards developed by the International Accounting Standards Board (IASB)

disclose this information in their financial accounts. The IFRS defines intangible assets as an identifiable[10] non-monetary asset without physical substance. They specify the intangible assets that companies should include when measuring their investments on intangibles, these are: "Identifiable intangible assets include patents, copyrights, licences, customer lists, brand names, import quotas, computer software, marketing rights and specialised know-how"[11] (Wiley IFRS, 2017, p. 201).

We model innovation as the logarithm of intangibles assets (in millions of US$), and consider alternative specifications; whereby we model intangibles as a proportion of total assets and as a proportion of capital stock.

3.2.2. Financialisation

We employ different measures to investigate the varying channels through which financialisation might affect innovation (see Table 2 below). In order to test the *Crowding-Out Hypothesis* we use two proxies: (a) Financial Assets (FA) as a percentage of Total Assets (TA), denoted (FA/TA). Higher values of this proxy indicate that companies favour financial investments as opposed to investments in innovation. (b) Financial Profits (FP) as a percentage of Total Profits (TP), denoted (FP/TP). Higher values of this variable imply that companies make more revenues from financial channels rather than from their underlying innovation or operational activities.

The *Shareholder-value Hypothesis* is measured by two proxies: (a): Dividend Payments as a percentage of Total Equity (Dividend/Equity). (b) Stock repurchases as a percentage of Total Equity (Stock repurchase/Equity). In both cases, we expect a negative effect, as higher dividend payments and expenditure for the repurchase of equity reduce resources available for investments in innovation.

Finally, we measure the external financing as firms' financial liabilities i.e. namely firms' total short-term and long-term debt in US$, as a percentage of firms'

[10] Note that in order to identify an intangible asset such asset needs to be separable, or to arise from contractual or other legal rights. This is because separable assets can be sold, transferred, licensed, etc (Wiley IFRS, 2017).

[11] Goodwill is not included in the financial accounts that measure investments on intangible assets. This is because external goodwill, acquired in a business combination (e.g. during a merger), is outside the scope of investments on intangible assets. On the other hand, internally generated goodwill is within the scope of intangible assets but is not recognised as an asset because it is not an identifiable resource (Wiley IFRS, 2017).

Total Assets. This measure is denoted (FL/TA). A positive impact of this proxy upon intangibles will confer support to the *Access to Finance* argument (see section 2.1), yet a negative sign will support the *Debt Trap Hypothesis* (see section 2.2). In line with the debt trap hypothesis, we consider a measure of Financial Payments as the sum of interest payments, dividends payments and equity repurchases, as a percentage of Total Assets (Financial Payments/TA). We expect a negative effect for this variable, as increased financial payments reduce the resources available for innovation expenditures.

Table 2 summarizes the financialisation indicators we use and their relation to the theoretical mechanisms set out in Section 2.2. All variables are measured in millions of US $.

Table 2. Measurement of Financialisation

Financialisation-Innovation Nexus	Financialisation Indicator	Measure denoted as	Our Measurement
Crowding Out Hypothesis > Financial Investments	Financial Assets/Total Assets	FA/TA	We measure a firm's financial assets as a percentage of its total assets. Financial assets are the sum of current assets, including cash and cash equivalents (such as bank deposits and cheques), short-term account receivables (such as stocks, private bonds, government bonds and T-bills) and all other short-term investments. This measurement captures investments in highly liquid assets as well as 'other assets' which are independent of goodwill and intangibles.
Crowding Out Hypothesis > Financial Returns	Net Financial profit (before taxes)/Total profit (before taxes)	FP/TP	We measure a firm's net financial profit before taxes as a percentage of its total profits before taxes. Net financial profits includes dividend income from subsidiaries, interest income and gains from other financial investments, net of all expenses associated with such operations Total profits is the sum of pre-tax net operating profit, financial profit and net equity.
Shareholder-value Hypothesis > Payments to Shareholders	Dividend Payments/Total Equity	Dividends/ Equity	Dividends paid as a percentage of firm's total equity.
Shareholder-value Hypothesis > Stock Buybacks	Stock Repurchases/Total Equity	Repurchase/ Equity	Expenditure on the repurchase of equity as a percentage of firm's total equity

Debt Trap> Financial Liabilities	Financial Liabilities /Total Assets	FL/TA	We measure a firm's financial liabilities (i.e. total debt) as a percentage of total assets. Total debt is the sum of all short term and long term debt
Debt Trap> Financial Payments	Financial Payments/Total Assets	Financial Payments/TA	We measure financial payments as the sum of firm's expenditure on dividend payments, interest payment, and payment on the repurchase of equity, over a firm's total assets

3.3. Model specification and estimation

3.3.1. Empirical models

First, we investigate the *crowding-out hypothesis.* To do this, we estimate the response of intangibles investments to firm's financial assets and financial profits, while controlling for firm size (total assets) and firm's access to external finance (financial liabilities). We estimate the following model.

$$\log(intangibles_{i,t}) = \beta_0 + \beta_1(FA/TA)_{i,t-1} + \beta_2(FP/TP)_{i,t-1} + \beta_3(FL/TA)_{i,t-1} + \beta_4 \log(TA)_{i,t-1} + d_t + \varepsilon_{i,t} \ldots . (1)$$

Where the dependent variable is the logarithm of firms' investments in intangible assets. (FA/TA) is financial assets as a percentage of total assets, (FP/TP) is financial profits as a percentage of total profits,*(FL/TA)* is financial liabilities as a proportion of total assets and (TA) is the logarithm of firms' total assets. The measurement of these variables is detailed in Table 2. We use one-year lags of all the variables because investments in intangibles may only respond to changes in companies' asset and income structure with a delay[12]. We include a vector of time dummies, d_t, to account for time-specific unobserved common shocks, such as economic recessions, changes in regulation affecting the Brazilian manufacturing sector, financial crises and other macroeconomic shocks. $\varepsilon_{i,t}$ is the error term.

To investigate the *shareholder-value orientation hypothesis*, we augment equation (1) first with a measure of dividend payments and then with a measure of equity repurchase, as detailed in Table 2. We estimate the following models:

[12] In unreported regressions, we estimate the effects of both contemporaneous and lagged values of the variables. We find that contemporaneous financialisation measures have no impact.

$$\log(intangibles_{i,t}) = \beta_0 + \beta_1(FA/TA)_{i,t-1} + \beta_2(FP/TP)_{i,t-1} + \beta_3(FL/TA)_{i,t-1} + \beta_4(Dividends/Equity)_{i,t-1} + \beta_5 \log(TA)_{i,t-1} + d_t + \varepsilon_{i,t} \ldots\ldots (2)$$

$$\log(intangibles_{i,t}) = \beta_0 + \beta_1(FA/TA)_{i,t-1} + \beta_2(FP/TP)_{i,t-1} + \beta_3(FL/TA)_{i,t-1} + \beta_4(Repurchase/Equity)_{i,t-1} + \beta_5 \log(TA)_{i,t-1} + d_t + \varepsilon_{i,t} \ldots\ldots\ldots (3)$$

Where $Repurchase/Equity$ is firms' repurchase of equity as a percentage of total equity, and $Dividends/Equity$ is firms' dividend payments as a percentage of total equity. All variables are as previously defined.

Finally, we investigate the *debt-trap hypothesis* by augmenting equation (1) with a measure of financial payments, as detailed in Table 2. We estimate:

$$\log(intangibles_{i,t}) = \beta_0 + \beta_1(FA/TA)_{i,t-1} + \beta_2(FP/TP)_{i,t-1} + \beta_3(FL/TA)_{i,t-1} + \beta_4(Financial\ payments/TA)_{i,t-1} + \beta_5 \log(TA)_{i,t-1} + d_t + \varepsilon_{i,t} \ldots (4)$$

Where $Financial\ Payments/TA$ is firms' financial payments as a percentage of total assets, as detailed in Table 2. In model (4), both FL/TA and $Financial\ Payments/TA$ are proxies for the debt trap hypothesis[13].

3.3.2. Estimation methods

To estimate (1)-(4), we employ three different methods: a Pooled Ordinary Least Squares (POLS) estimator, a Fixed Effects estimator, and a Difference GMM estimator.

The Pooled Ordinary Least Squares (POLS) model we estimate takes the following form:

$$y_{i,t} = \beta_0 + \beta X_{i,t-1} + d_t + \varepsilon_{i,t} \ldots\ldots \quad (5)$$

Where $y_{i,t}$ is the logarithm of intangibles investment, $X_{i,t-1}$ is a vector of lagged explanatory variables in each of equations (1)-(4), encompassing financialisation measures that capture the *crowding-out*, *shareholder- value orientation* and the *debt-trap hypotheses*. d_t is a vector of time dummies, and $\varepsilon_{i,t}$ is

[13] In the Appendix, check the robustness of our results to altering the model specification so that each financialisation channel is treated separately without controlling for financial assets and liabilities. The results do not change; this is not surprising given the generally low correlation between the variables, as shown in Table 4.

the error term.

This pooled model assumes away time-invariant fixed firm effects. If the fixed effects are correlated with the explanatory variables, endogeneity is introduced and OLS is no longer consistent. The coefficient estimates will be biased since the model may attribute predictive power to the explanatory variables that, in fact, belong to the firm fixed effects (Roodman, 2009). In this paper, accounting for firm specific effects is also important because the data consists only of publicly listed companies, and market listing requires that firms meet certain criteria (Demir, 2009).

In this vein, the second method we employ is a Fixed Effects model, which accounts for firm specific effects by augmenting (1)-(4) with firm dummy variables. It takes the following form:

$$y_{i,t} = \beta_0 + \beta X_{i,t-1} + d_t + \alpha_i + \varepsilon_{i,t} \ldots\ldots \qquad (6)$$

Where α_i represent firm dummies that capture time invariant firm effects, and all other variables are as previously defined. This fixed effects model, however, does not account for other sources of endogeneity that are independent of fixed effects, such as omitted variable bias or reverse causality and simultaneity between the dependent and explanatory variables. Indeed, intangibles assets, financial assets, financial profits and financial liabilities may be jointly determined. Even though we rule out contemporaneous reverse causality by using one year lags of the explanatory variables, this only makes them predetermined with respect to intangibles assets, but they are not independent of past realizations of intangibles assets: they are not strictly exogenous. In addition, the fixed effects model is unsuitable for a dynamic panel specification, which allows current realizations of intangibles assets to be influenced by past ones.[14] This is important because innovation is a cumulative and persistent process, such that past investments in intangibles would reinforce more investments.

To address these concerns, the third method we employ is the Arellano and Bond (1991) Difference Generalized Methods of Moments (GMM) estimator. This estimator allows consistent estimation of a dynamic panel model where the lagged dependent variable is included in the model. The Difference GMM estimator first transforms the regression equation in (1)-(4) into first differences, and then instruments the differenced variables with their past levels:

[14]In a dynamic specification, the fixed effects estimator is biased because the lagged dependent variable will be correlated with the current error term, introducing a new source of endogeniety. Without a large time dimension to average out the effects of this correlation, the endogeniety problem persists. Kivet (1995) finds that the bias is 20% of the coefficient even when T=30.

$$\Delta y_{i,t} = \theta \Delta y_{i,t-1} + \beta \Delta X_{i,t-1} + d_t + \Delta \varepsilon_{i,t} \ldots\ldots (7)$$

Where $\Delta y_{i,t-1}$ is the first differenced one-year lagged intangibles assets, $\Delta X_{i,t-1}$ is the vector of first differenced explanatory variables in each of equations (1)-(4), d_t is a vector of time dummies, and $\Delta \varepsilon_{i,t}$ is the differenced error term. Since all the right hand side variables in (7) are predetermined, then in the absence of second order serial correlation, the past levels of these variables should only be correlated with the errors dated $t - j, j \geq 2$, and not with current disturbances (Roodman 2009, Baum 2013). At the same time, these past levels are strongly correlated with the first differenced variables in (7), so they make good instrumental variables. The validity of this identification strategy depends crucially on the absence of second order serial correlation and on the exogeneity of the instruments. We test the former using the Arellano Bond test for second order serial correlation, and the latter using Hansen J statistic of overriding restrictions.

In our application, we use $2 \leq t \leq 4$ lagged level values of the variables as well as the level time dummies as instruments. We use the two-step GMM estimator that is robust to general forms of heteroskedasticity and autocorrelation in the error term, and Windmeijer (2005) corrected cluster-robust standard errors that limit the downward bias of robust two-step estimation in small samples. This robust estimation requires the absence of cross section correlation across the errors. To guard against contemporaneous cross-section correlation across firms (Roodman, 2009), and to account for time related common shocks, we include a full set of time dummies.

In sum, we use a two-step difference GMM estimator with Windmeijer corrected standard errors and a full set of time dummies. This estimator accounts for firm fixed effects, dynamic panel bias, endogenous explanatory variables, heteroskedastic and autocorrelated errors, and time-specific common unobserved shocks.

3.4. Descriptive analysis

Table 3 shows the descriptive statistics of the variables. The average investments in intangibles assets is $264.5 million, or 5% of total assets. The average firm size in terms of total assets is about $3 billion. On average, firm liabilities is about 38% of total assets and financial assets account for an average of 28% of total assets. Firms

make, on average, financial losses of about 57% of total profits, but the median level of financial profit is 14% of total profits. The average dividend payment is 3% of total equity and, on average, firms do not repurchase equity. Still, the highest payment for equity repurchase over the period is 33% of total equity. Financial payments are, on average, 17% of total assets. Table 4 shows the pairwise correlation coefficients between the variables. We note that there is very low correlation between the financialisation variables, so that it makes little difference if these variables are included in one model or treated separately.

Table 3. Descriptive Statistics

Variable	N	Mean	S.D.	Min	Max
Log(intangibes)	466	1.64	3.59	-8.27	8.81
FA/TA	466	0.28	0.15	0	0.81
FP/TP	466	-0.57	11.19	-140.28	50.05
Dividends/Equity	444	-0.03	0.06	-0.63	0.01
Repurchase/Equity	438	0	0.02	-0.33	0
FL/TA	465	0.38	0.59	0	7.43
Financial payments/TA	427	-0.17	0.16	-1.81	0
Log(TA)	466	6.13	2.08	0.39	10.35

Table 4: Pairwise Correlation Coefficients

	Log(intangibes)	FA/TA	FP/TP	Dividends /Equity	Repurchase /equity	FL/TA	Financial payments/TA	log(TA)
Log(intangibes)	1							
FA/TA	0.1362*	1						
FP/TP	-0.0347	-0.0024	1					
Dividends /Equity	-0.2563*	-0.2227*	-0.0121	1				
Repurchase /equity	-0.1391*	-0.0495	-0.0008	0.0752	1			
FL/TA	-0.1126*	-0.0372	-0.002	0.1356*	0.0142	1		
Financial payments/TA	-0.1397*	-0.1158*	0.1221*	0.0931	0.0989*	-0.051	1	
log(TA)	0.8377*	0.0103	0.0134	-0.1915*	-0.1000*	-0.1527*	-0.0028	1

**denotes significance at the 5% level or 10% level. All variables are as previously defined*

4. Results and Discussion

Table 5 shows results from the POLS estimates of the models in equations (1)-(4), represented in equation (5). The first column shows results from testing the *crowding-out hypothesis* (equation (1)), the second and third columns show results from testing the *shareholder-value orientation hypothesis* (equations (2) and (3)), and the last column show results from testing the *debt-trap hypothesis* (equation (4)). Overall, the

models show that higher firm size, i.e. total assets, has a positive and statistically significant impact on intangibles assets. The POLS models also indicate that all measures of financialisation, except financial payments, exert a negative and statistically significant effect on intangibles assets. This suggests that all channels of financialisation are important in limiting innovation. Given the limitations of this model, discussed in Section 3.3.2, we turn next to the results from Fixed Effects models.

Table 5: Pooled OLS estimates of the effects of financialisation on innovation

Variable	Crowding-out hypothesis	Shareholder-value orientation (1)	Shareholder-value orientation (2)	Debt-Trap Hypothesis
$(FA/TA)_{t-1}$	-0.019**	-0.030***	-0.024***	-0.026***
	[0.008]	[0.008]	[0.008]	[0.008]
$(FP/TP)_{t-1}$	-0.0001**	-0.0001**	-0.0001**	-0.0001***
	[0.000]	[0.000]	[0.000]	[0.000]
$(^{Dividends}/_{Equity})_{t-1}$		-0.078***		
		[0.016]		
$(^{Repurchase}/_{Equity})_{t-1}$			-0.186***	
			[0.049]	
$(FL/TA)_{t-1}$	-0.010***	-0.006***	-0.008***	-0.009***
	[0.002]	[0.002]	[0.002]	[0.002]
$(^{Fiancial\ Payments}/_{TA})_{t-1}$				-0.008
				[0.007]
$Log(TA)_{t-1}$	0.831***	0.787***	0.803***	0.799***
	[0.043]	[0.042]	[0.043]	[0.043]
R^2	0.55	0.60	0.58	0.58
N	466	441	433	424

$p<0.1$; ** $p<0.05$; *** $p<0.01$. Standard errors in parenthesis

Table 6 shows the Fixed Effects estimates from equations (1)-(4), represented in equation (6). Across all models, firm size continues to have a positive and significant effect on intangibles assets: a 1% increase in total assets increase intangibles assets by approximately 1.1% to 1.3%. For the *crowding-out hypothesis*, the first column of Table 6 shows that both financial assets and financial profit exert negative and significant effects on intangibles investments. In particular, a 1% increase in financial assets relative to total assets reduces intangibles investments by 3.7%, and a 10% increase in financial profits relative to total profits reduces intangibles investments by 0.05%. Turning to the *shareholder-value orientation hypothesis*, the second and third

columns of Table 6 show that dividends paid and equity repurchases reduce intangibles investments. A 1% increase in dividends paid relative to total equity reduces intangibles investments by 1.2%, and a 1% increase in equity repurchase as a proportion of total equity reduces intangibles investments by 1.3%. The last column of Table 6 show results from testing the *debt-trap hypothesis*. Here, contrary to the POLS model, financial liabilities have a positive impact on intangibles investments. In particular, a 1% increase in financial liabilities relative to total assets increases intangibles investments by 0.5%. On the other hand, financial payments have no significant effect. It is worth noting that the effects of total assets, financial assets, financial liabilities and financial profits are consistent across all models in Table 6. Overall, the Fixed Effects models suggest that both the crowding-out and shareholder value orientation channels play an important role in limiting innovation, but the effect of the debt trap channel is less robust. Next, we consider results from GMM estimates that allow for a dynamic specification and control for endogeniety of the variables.

Table 6: Fixed Effects estimates of the effects of financialisation on innovation

Variable	Crowding-out hypothesis	Shareholder value orientation (1)	Shareholder value orientation (2)	Debt Trap Hypothesis
$(FA/TA)_{t-1}$	-0.037**	-0.039**	-0.039*	-0.040*
	[0.018]	[0.018]	[0.020]	[0.020]
$(FP/TP)_{t-1}$	-0.00005***	-0.00005***	-0.00005***	-0.00005***
	[0.000]	[0.000]	[0.000]	[0.000]
$(^{Dividends}/_{Equity})_{t-1}$		-0.012*		
		[0.006]		
$(^{Repurchase}/_{Equity})_{t-1}$			-0.013*	
			[0.007]	
$(FL/TA)_{t-1}$	0.005***	0.004	0.004	0.005*
	[0.002]	[0.003]	[0.003]	[0.003]
$(^{Fiancial\ Payments}/_{TA})_{t-1}$				0.004
				[0.005]
$Log(TA)_{t-1}$	1.076***	1.208***	1.277***	1.276***
	[0.318]	[0.323]	[0.359]	[0.364]
R^2	0.22	0.25	0.25	0.26
N	466	441	433	424

p<0.1; ** p<0.05; *** p<0.01. Standard errors in parenthesis

Table 7 shows the GMM estimates from equations (1)-(4), represented in equation (7). Across all models, the coefficient of the lagged dependent variable is positive and statistically significant. This supports the view that intangibles investment is a cumulative and persistent process, so that previous levels of intangibles assets reinforce intangibles investments. Regarding the *crowding-out hypothesis*, the first column of Table 7 shows that both financial assets and financial profits continue to have a negative and significant effect on intangibles, and the magnitudes of these effects are even higher than those from the Fixed Effects model.

Table 7: GMM Estimates of the effects of financialisation on innovation

Variables	Crowding-out hypothesis	Shareholder value orientation (1)	Shareholder value orientation (2)	Debt Trap Hypothesis
$Log(intangibles)_{t-1}$	0.346***	0.280*	0.250*	0.404***
	(0.103)	[0.168]	[0.138]	[0.075]
$(FA/TA)_{t-1}$	-0.045***	-0.050*	-0.056**	-0.038**
	(0.017)	[0.028]	[0.023]	[0.017]
$(FP/TP)_{t-1}$	-0.00006***	-0.00005***	-0.00005**	-0.00005**
	(0.000)	[0.000]	[0.000]	[0.000]
$(^{Dividends}/_{Equity})_{t-1}$		-0.006		
		[0.006]		
$(^{Repurchase}/_{Equity})_{t-1}$			-0.031	
			[0.021]	
$(FL/TA)_{t-1}$	0.002	0.006	0.006	0.002
	(0.004)	[0.005]	[0.005]	[0.004]
$(^{Financial\ Payments}/_{TA})_{t-1}$				0.000
				[0.004]
$Log(TA)_{t-1}$	0.379	0.868	1.054	0.442
	(0.611)	[0.757]	[0.700]	[0.682]
N	363	344	332	319
Arellano-Bond test for AR(2)	1.52	1.63	1.61	1.54
Hansen j Statistic	55.61	67.99	66.65	65.33
Hansen p-value	0.38	0.34	0.39	0.43
Number of instruments	65.00	77.00	77.00	77.00

$p<0.1$; ** $p<0.05$; *** $p<0.01$. Standard errors in parenthesis

Here, a 1% increase in financial assets relative to total assets reduces intangibles investments by 4.5%, and a 10% increase in financial profits relative to total profits reduces intangibles investments by 0.06%. The second and third columns of Table 7 show that the effects of dividend payments and equity repurchases are still negative

but no longer significant. For the *debt-trap hypothesis*, last column of Table 7 shows that both financial liabilities and financial payments are not statistically significant. Overall, the results from the GMM model suggest that, once we account for past realizations of intangibles assets and endogeneity of the variables, only the *crowding-out channel* remains important in limiting innovation: *shareholder-value orientation* and the *debt-trap hypothesis* are not robustly associated with lower levels of innovation.

The lower panel of Table 7 shows the tests for the validity of our identification strategy in the GMM model. Across all models, the Arellano-Bond AR (2) test shows there is no evidence of second order serial correlation in the data. The Hansen's J statistics, with a p-values ranging from of 0.34 to 0.43, cannot reject the null hypothesis that our instrument sets are exogenous.

4.2. Robustness checks

In addition to comparing the consistency of our estimates across the POLS, FE and GMM estimators, we analyze the sensitivity of the GMM estimates to altering the model specification. First, the difference GMM estimator and the Hansen's exogeneity test can be biased if there are too many instruments relative to the number of observations (Roodman 2009, Baum 2013). We check the robustness of our results regarding the crowding out hypothesis to reducing the instrument count. In particular, we limit the instrumenting lags to $2 \leq t \leq 3$, as opposed to $2 \leq t \leq 4$. Second, for the crowding out hypothesis, we consider two further parameterizations of the dependent variable: the logarithm of intangibles assets as a proportion of total assets, and the logarithm of intangibles assets as a proportion of capital stock. We show that the results are robust to normalizing intangibles investments by these measures of firm size. The results from these robustness checks for the GMM are shown in Appendix A.

To confirm that only financial profits crowd out innovation, we examine the effects of firm's real profits on intangibles investments. In particular, we estimate the POLS, FE and GMM versions of equation (1), where we replace financial profits $(FP/TP)_{i,t-1}$ with a measure of real profits: firms' operating profit as a proportion of total profit $(OP/TP)_{i,t-1}$. Indeed, we find that the operating profits exert a positive impact on intangibles investments. These results confirm that different sources of firm

income are, in fact, distinct in their effects on innovation: returns on financial assets discourage innovation by encouraging firms to move away from intangibles investments in favor of financial investments, whilst returns on real investments do not have this effect. The results from this exercise are presented in Appendix B.

Finally, we check the sensitivity of the POLS, FE and GMM estimates to altering the model specifications in equations (1) – (4). Specifically, we follow Table 1 and estimate each financialisation channel separately, without retaining financial assets and liabilities as control variables in all models. The results continue to show that only the crowding-out hypothesis, measured by financial assets and financial profits, is consistently important in limiting intangibles investments. These results are shown in Appendix C.

5. Conclusions

This paper tests the hypothesis that *financialisation* i.e. companies' increased tendency to hold financial assets and generate revenue from financial income rather than their underlying operations, discourages investments on innovation. Whilst the phenomenon of financialisation has attracted the attention of political economists, only recently economists of innovation questioned whether "…financialisation transformed the relationships between finance, innovation and growth, and through which channels?" (Dosi et.al., 2016, p.14). This paper provides an answer to the above question by demonstrating that financialisation impedes innovation in the context of emerging economies. The results of the empirical analysis show that financialisation, which is measured using two proxies: (a) higher financial profits relative to total profits, and (b) financial assets relative to total assets, discourages investments on intangibles. This implies that firms that generate more revenue from financial rather than real channels are less likely to innovate, suggesting that high dependence on financial investments hinders innovation. In contrast, our results show that financial liabilities, which are measured by total firm debt, have a positive but insignificant impact on investments on intangibles.

We conclude that financialisation, defined as the tendency to favor financial investments and generate more revenues from financial channels, affects investments on innovative activities negatively, potentially hindering innovation-driven growth in emerging markets. This research extends our understanding of the constraints on innovation-driven growth in emerging economies by incorporating insights from the

financialisation literature. However, as also highlighted by Davis (2017) in her review of the literature on the financialisation-investment nexus, we still know very little about the underlying behavioral relations and mechanisms, which might cause this negative relationship. Future research will tackle this issue.

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Appendices

Appendix A: Robustness of GMM estimates to alternative model specifications

Variable	Robustness to Lower Instrument Count	Dependant Variable: Intangibles/Capital Stock	Dependant variable: Intangibles/Total Assets
$Log(intangibles)_{t-1}$	0.357**		
	(0.171)		
$Log(^{Intagibles}/_{K})_{t-1}$		0.435***	
		(0.099)	
$Log(^{intangibles}/_{TA})_{t-1}$			0.401***
			(0.122)
$Log(TA)_{t-1}$	0.709	0.143	0.282
	(0.719)	(0.598)	(0.449)
$(FL/TA)_{t-1}$	0.005	0.002	0.003
	(0.005)	(0.004)	(0.004)
$(FA/TA)_{t-1}$	-0.045**	-0.041*	-0.041**
	(0.022)	(0.021)	(0.018)
$(FP/TP)_{t-1}$	-0.0006***	-0.0006***	-0.0006***
	(0.000)	(0.000)	(0.000)
N	363	363	363
Arellano-Bond test for AR(2)	1.55	1.23	1.30
Hansen j Statistic	44.25	64.06	54.56
Hansen p-value	0.22	0.14	0.41
Number of instruments	50.00	65.00	65.00

* p<0.1; ** p<0.05; *** p<0.01. Standard errors in parenthesis

Appendix B. Estimation of the effects of Operating Profit on Intangible Investment.

Variables	POLS	FE	GMM
$Log(intangibles)_{t-1}$			0.347***
			[0.104]
$Log(TA)_{t-1}$	0.830***	1.076***	0.374
	[0.043]	[0.318]	[0.611]
$(FL/TA)_{t-1}$	-0.010***	0.005***	0.002
	[0.002]	[0.002]	[0.004]
$(FA/TA)_{t-1}$	-0.019**	-0.037**	-0.045***
	[0.008]	[0.018]	[0.017]
$(OP/TP)_{t-1}$	0.0001*	0.00005***	0.00006***
	[0.000]	[0.000]	[0.000]
R^2	0.55	0.22	
N	466	466	363
Arellano-Bond test for AR(2)			1.52
Hansen j Statistic			55.64
Hansen p-value			0.38
Number of instruments			65.00

* p<0.1; ** p<0.05; *** p<0.01

Appendix C(i): Pooled OLS estimates by Financialisation channels

Variable	COH	SVO	DTH
$Log(TA)_{t-1}$	0.825***	0.685***	0.735***
	[0.043]	[0.046]	[0.044]
$(FA/TA)_{t-1}$	-0.025***		
	[0.008]		
$(FP/TP)_{t-1}$	-0.000**		
	[0.000]		
$(^{Dividends}/_{Equity})_{t-1}$		-0.069***	
		[0.016]	
$(^{Stock\ repurchase}/_{Equity})_{t-1}$		-0.176***	
		[0.041]	
$(FL/TA)_{t-1}$			-0.010***
			[0.002]
$(^{Fiancial\ Payments}/_{TA})_{t-1}$			-0.004
			[0.007]
R^2	0.53	0.56	0.57
N	496	463	425

* p<0.1; ** p<0.05; *** p<0.01

Appendix C(ii): Fixed Effects estimates by Financialisation channels

Variable	COH	SVO	DTH
$Log(TA)_{t-1}$	0.882***	1.103***	1.193***
	[0.308]	[0.318]	[0.324]
$(FA/TA)_{t-1}$	-0.033*		
	[0.018]		
$(FP/TP)_{t-1}$	-0.000***		
	[0.000]		
$(^{Dividends}/_{Equity})_{t-1}$		-0.009	
		[0.006]	
$(^{Stock\ repurchase}/_{Equity})_{t-1}$		-0.009	
		[0.006]	
$(FL/TA)_{t-1}$			0.003
			[0.003]
$(^{Fiancial\ Payments}/_{TA})_{t-1}$			0.001
			[0.006]
_cons	-2.998*	-5.283**	-5.854***
	[1.788]	[2.106]	[2.125]
R^2	0.20	0.15	0.15
N	496	463	425

* p<0.1; ** p<0.05; *** p<0.01

Appendix C(iii): GMM estimates by Financialisation channels

Variable	Crowing-out hypothesis	Shareholder value orientation	Debt trap hypothesis
$Log(intangibles)_{t-1}$	0.255**	0.443***	0.405***
	(0.119)	(0.134)	(0.098)
$Log(TA)_{t-1}$	0.777	0.320	-0.392
	(0.637)	(0.345)	(1.055)
$(FA/TA)_{t-1}$	-0.049***		
	(0.016)		
$(FP/TP)_{t-1}$	-0.00006**		
	(0.000)		
$(^{Dividends}/_{Equity})_{t-1}$		-0.002	
		(0.004)	
$(^{Stock\ repurchase}/_{Equity})_{t-1}$		-0.017	
		(0.012)	
$(FL/TA)_{t-1}$			-0.003
			(0.005)
$(^{Fiancial\ Payments}/_{TA})_{t-1}$			0.002
			(0.006)
N	386	353	319
Arellano-Bond test for AR(2)	1.62	1.66	1.52
Hansen j Statistic	46.37	51.33	41.42
Hansen p-value	0.30	0.15	0.50
Number of instruments	53.00	53.00	53.00

* $p<0.1$; ** $p<0.05$; *** $p<0.01$. Standard errors in parenthesis

Impressum

Publisher: Hans-Böckler-Stiftung, Hans-Böckler-Straße 39, 40476 Düsseldorf, Germany
Contact: fmm@boeckler.de, www.fmm-macro.net

FMM Working Paper is an online publication series available at:
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ISSN: 2512-8655