Financialisation and the slowdown of labour productivity in Portugal: A Post-Keynesian approach

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Abstract:

This paper conducts a time series econometric analysis in order to empirically evaluate the role of financialisation in the slowdown of labour productivity in Portugal during the period from 1980 to 2017. During that time, the Portuguese economy faced a financialisation phenomenon due to the European integration process and the corresponding imposition of a strong wave of privatisation, liberalisation and deregulation of the Portuguese financial system. At the same time, Portuguese labour productivity exhibited a sustained downward trend, which seems to contradict the well-entrenched mainstream hypothesis on the finance-productivity nexus. Based on the post-Keynesian literature, we identify four channels through which the phenomenon of financialisation has impaired labour productivity, namely weak economic performance, the fall in labour's share of income, the rise of inequality in personal income, and an intensification of the degree of financialisation. The paper finds that the main triggers for the slowdown of labour productivity in Portugal are the degree of financialisation and personal income inequality over the last decades.

1. Introduction

The adhesion of Portugal to the European Economic Community in 1986 forced the adoption of a strong wave of privatisation, liberalisation and deregulation of the Portuguese financial system (Barradas et al., 2018). In our view, these measures were imposed as an excuse to promote a decrease in financial repression and an increase in financial development in order to foster a better allocation of savings to investment and support stronger economic growth (Levine, 1997; Dua and Garg, 2019). Nonetheless, economic growth and labour productivity in Portugal have denoted a strong deceleration since that time, which seems to

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contradict the well-rooted mainstream hypotheses on the finance-growth nexus and on the finance-productivity nexus.

This phenomenon, typically called financialisation, emphasises a negative role of the financial system, mainly in a strong liberalising and deregulatory environment. Indeed, post-Keynesian scholars have highlighted that the slowdown of labour productivity in more advanced economies in the last decades cannot be dissociated from the phenomenon of financialisation, which has occurred through four different channels (Tridico and Pariboni, 2018), namely weak economic performance, a fall in the labour income share, the rise of personal income inequality and the intensification of the degree of financialisation.

From an empirical point of view, several works have emerged which assess the determinants of labour productivity (Sylos Labini, 1983; Fortune, 1987; Vergeer and Kleinknecht, 2014; Guarini, 2016; Micallef, 2016; Tridico and Pariboni, 2018; Dua and Garg, 2019; Pariboni and Tridico; 2020; Carnevali et al., 2020; Yousef, 2020). However, the majority of these empirical works do not assess all four channels through which the phenomenon of financialisation has impaired labour productivity. The empirical work of Tridico and Pariboni (2018) is the only exception. They estimated an extended version of the aggregate equation of labour productivity presented by Sylos Labini (1983, 1984, 1999) and concluded that economic performance and the labour income share exert a positive effect on labour productivity in the Organisation for Economic Cooperation and Development (OECD) countries, while personal income inequality and the degree of financialisaton exert a negative effect on labour productivity in these countries.

This paper aims to conduct a time series econometric analysis in order to empirically evaluate the role of these four channels linked to the phenomenon of financialisation on the slowdown of labour productivity in Portugal during the period from 1980 to 2017. This paper contributes to the existing literature in at least four different ways. First, this paper is focused only on Portugal. Portugal is a very interesting case study due to the sustained downward trend in the evolution of labour productivity in the last decades (figure 1), which has simultaneously occurred with the phenomenon of financialisation. Labour productivity in Portugal is at one of the lowest levels among the European Union countries, surpassing labour productivity only in Greece, Poland, Romania, Latvia and Bulgaria. Second, this paper performs a time series econometric analysis in a context in which the majority of empirical works on labour productivity have conducted a panel data econometric analysis and, therefore, reach conclusions that are just an average effect of each determinant on several countries as a whole. The time series econometric analysis allows us to overcome this shortcoming by facilitating our understanding of the historical, social, economic and institutional circumstances that are responsible for the evolution of labour productivity in a specific country over time. Third, this paper uses five different variables to proxy the degree of financialisation, namely credit, money supply, financial value added, stock market capitalisation and shareholder orientation. Tridico and Pariboni (2018) used only stock market capitalisation to proxy the degree of financialisation. Our approach allows us to take into account the different dimensions related to financialisation (e.g., size, depth and efficiency) played by different financial intermediaries (e.g., banks and stock markets) or even by shareholders (Barradas, 2020). Fourth, this paper assesses not only the determinants of labour productivity in Portugal, which is the traditional strategy used by the majority of empirical works related to this matter, but also the correspondent drivers. This allows us to identify the contribution of each determinant to the

evolution of labour productivity in Portugal in the last decades (McCloskey and Ziliak, 1996; Ziliak and McCloskey, 2004).

The paper estimates an aggregate equation according to which labour productivity depends on lagged labour productivity, economic performance, the labour income share, personal income inequality and the degree of financialisation. The generalized method of moments (GMM) estimator was employed due to the inclusion of lagged labour productivity among the remaining independent variables and to overcome the potential problem of endogeneity that arises when we have problems with omitted variables and/or simultaneity among our variables.

The paper concludes that lagged labour productivity, economic performance and labour income share exert a positive impact on labour productivity in Portugal, whereas personal income inequality and the degree of financialisation exert a negative impact on labour productivity in Portugal. The paper also concludes that the degree of financialisation and personal income inequality have been the main drivers of the slowdown in labour productivity in Portugal in the last decades.

The remainder of the paper is organised as follows. In section 2, we provide a literature review on the channels through which financialisation impairs labour productivity. Section 3 presents the conceptual model and the respective hypotheses. Data and the stylised facts are described in section 4. In section 5, we explain the econometric method. The empirical results are discussed in section 6. Finally, section 7 concludes.
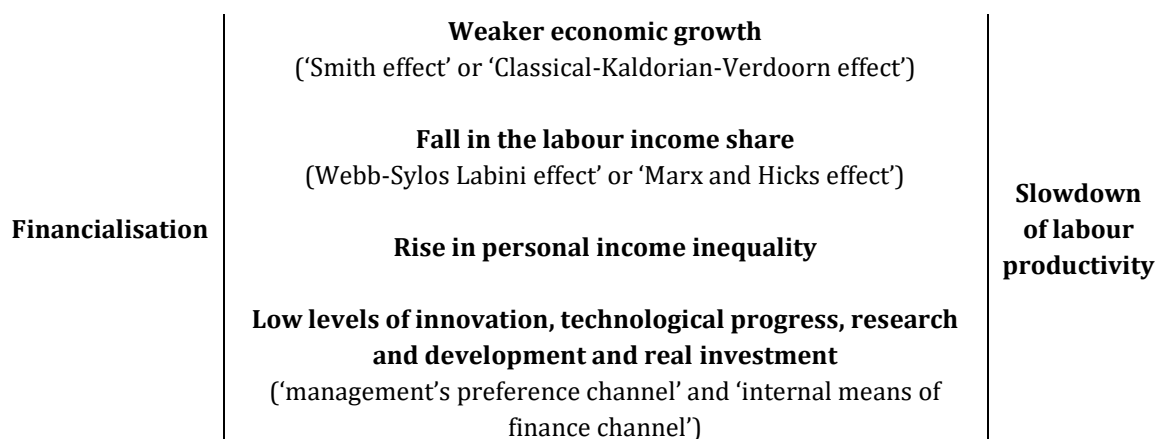

2. Literature review

It is widely recognised that the majority of the advanced economies have suffered a colossal transformation since the end of the mid-1970s, mainly due to a strong financial liberalising and deregulatory environment. Barradas (2016) highlighted that the emergence of this new paradigm was fostered on the theoretical and empirical grounds of the advantages provided by larger and deeper financial systems. Several policy measures have been widely adopted at a country level since that time, such as the elimination of administrative controls on the functioning of the financial system, the reduction of legal reserve requirements, the creation of new and more financial institutions and the corresponding privatisation of existing ones, the appearance of new financial products and/or services, and the elimination of controls on international capital flows (Ang, 2008; Sawyer, 2015; Ehigiamusoe and Lean, 2018).

Consequently, the financial system has acquired great supremacy in more advanced economies and has given rise to an excessive financial deepening with harmful effects on the real economy and on general society; this is mainly visible in the higher incidences of financial crises, the proliferation of corporate financial scandals, a greater vulnerability of banking systems, more volatility in aggregate demand, and an increased financial instability due to more recurring financial bubbles and bursts in the last decades (Rousseau and Wachtel, 2011; Barajas et al., 2013; Dabla-Norris and Srivisal, 2013; Tridico and Pariboni, 2018). This reflects a negative view on the current role of the financial system, a phenomenon that is commonly called financialisation.

Moreover, the phenomenon of financialisation has simultaneously occurred with a sustained downward trend in labour productivity in the more advanced economies since the end of the mid-1970s, which seems to suggest that they could be interrelated. This contradicts

the well-entrenched mainstream hypothesis on the finance-productivity nexus due to the role that the financial system plays in the allocation of savings to investment opportunities and in technological progress (Levine, 1997; Dua and Garg, 2019). Indeed, the post-Keynesian literature tends to highlight that the slowdown in labour productivity in more advanced economies in the last decades cannot be dissociated from the phenomenon of financialisation which has occurred through four different channels (Tridico and Pariboni, 2018), notably, weak economic performance, a fall in the labour income share, a rise in personal income inequality and an intensification of the degree of financialisation (figure 1). In what follows, we describe each of these four channels in detail as well as the connection of each to labour productivity.

Figure 1 – *The channels associated with the effects of the phenomenon of financialisation in the slowdown of labour productivity*

| Financialisation | **Weaker economic growth**
 ('Smith effect' or 'Classical-Kaldorian-Verdoorn effect')

 Fall in the labour income share
 (Webb-Sylos Labini effect' or 'Marx and Hicks effect')

 Rise in personal income inequality

 Low levels of innovation, technological progress, research and development and real investment
 ('management's preference channel' and 'internal means of finance channel') | **Slowdown of labour productivity** |

Source: based on Tridico and Pariboni (2018)

The first channel is linked with an indirect effect between the phenomenon of financialisation, economic performance and labour productivity. The post-Keynesian argument is that the phenomenon of financialisation has favoured weaker economic growth,[1]

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[1] Barradas (2020) explains in detail why there has been a negative relationship between the phenomenon of financialisation and economic growth in the last few decades, by highlighting eight different reasons. The first reason states that the phenomenon of financialisation is related to the strong growth of non-intermediation financial activities (e.g., proprietary trading, market making, provision of advisory services, insurance, derivatives, securitization, shadow banking and other non-interest income generating activities) and/or certain institutions (e.g., investment funds, money market funds, hedge funds, private equity funds, special purpose vehicles), which have a less noticeable effect on economic growth. The second reason is linked to the liquidity function of the financial system, according to which savers are increasing their financial transactions in the era of financialisation by rearranging their portfolios, which does not generate more funds for investors by penalizing higher economic growth. The third assumes that the phenomenon of financialisation has contributed to the higher instability (volatility) of aggregate demand due to the unstable and speculative nature of financial markets. The fourth states

which has contributed to sluggish labour productivity through the so-called 'Smith effect' (1776) or the 'Classical Kaldorian-Verdoorn effect' (Verdoorn, 1949; Kaldor, 1961). This effect sustains that labour productivity positively depends on economic growth due to the increasing returns to scale (Kaldor, 1957). According to Sylos Labini (1999) and Carnevali *et al.* (2020), this effect also captures the extent of the market which, in turn, influences the division of labour by allowing workers to focus on and specialise in specific tasks, thereby promoting an increase in labour productivity. Sylos Labini (1983) also emphasises that a higher economic growth promotes an acceleration of labour productivity in the short-term and in the long-term. In the short-term, a stronger economic performance will determine a more efficient use of labour, which favours an acceleration of labour productivity. In the long-term, stronger economic performance will accelerate the introduction of new plants and machines that were not profitable when the economic performance was worse but that are more efficient, which favours an acceleration of labour productivity.

The second channel is connected to an indirect effect among the phenomenon of financialisation, labour income share and labour productivity. The post-Keynesian argument is that the phenomenon of financialisation has contributed to a fall in the labour income share,[2] which has promoted a slowdown in labour productivity through the so-called 'Webb-Sylos Labini effect' (Sylos Labini, 1983, 1984, 1999) or 'the Marx and Hicks effect' (Hein and Tarassow, 2010). This effect establishes a positive relationship between labour income share and labour productivity for five different reasons. The first reason is that an increase in the labour income share represents an incentive for a more efficient organisation of the production process and for the adoption of new technological investments in order to lower production costs; this allows an increase in production even without an increase in the number of workers

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that the phenomenon of financialisation has promoted a strong growth of credit and the corresponding indebtedness of economic agents (particularly households through mortgage credit), which has increased the vulnerability of banks, the likelihood of a systemic banking crisis, the vulnerability of economies to any negative shocks, and less available funds for physical capital accumulation that would be crucial to sustain more investment, economic growth, and employment creation. The fifth emphasises that investors – in order to satisfy impatient shareholders – exhibit a higher risk-aversion behaviour in the era of financialisation, through excessive investments in tangible (and/or financial) assets than investments in knowledge-based assets, which would be more growth-enhancing. The sixth states that financial booms in the era of financialisation are not growth-enhancing because the financial system absorbs resources that are often highly paid, which decreases the available resources to real and productive sectors that would be more growth-enhancing. The seventh is associated with other problems arising from an oversized financial system in the era of financialisation (e.g., imperfect competition between financial institutions, rent extraction, implicit insurance due to bailouts, and negative externalities from auxiliary services), which is also detrimental for economic growth. The eighth is linked to the 'demand-following hypothesis' and 'supply-leading hypothesis', according to which the sustained growth of finance in the era of financialisation does not support economic growth in more developed economies. This has been confirmed by the emergence of several empirical works that have found a reversal of the traditional hypothesis of the finance-growth nexus (Rioja and Valev, 2004a, 2004b; Aghion et al., 2005; Kose et al., 2006; Prasad et al., 2007; Rousseau and Wachtel, 2011; Cecchetti and Kharroubi, 2012; Barajas et al., 2013; Dabla-Norris and Srivisal, 2013; Beck et al., 2014; Breitenlechner et al., 2015; Alexiou et al., 2018; Ehigiamusoe and Lean, 2018; Barradas, 2020).

[2] Hein (2012), Barradas and Lagoa (2017), and Barradas (2019) describe how the phenomenon of financialisation (and neoliberalism) has contributed to the fall in the labour income share in the last few decades, which has occurred through three different channels. The first channel is linked to a change in the sectorial composition of economies, namely the increasing importance of the financial sector vis-á-vis the non-financial sector and the retrenchment of the public sector. The second channel is connected to the proliferation of a corporate governance model based on 'shareholder value orientation'. The third channel is associated with the deterioration of the collective bargaining power exerted by trade unions. Kristal (2010), Dünhaupt (2013), Lin and Tomaskovic-Devey (2013), Alvarez (2015), Barradas and Lagoa (2017), Stockhammer (2017), Barradas (2019) and Kohler et al. (2019) are examples of empirical works that have found a negative relationship between the phenomenon of financialisation and the labour income share.

and the corresponding acceleration of labour productivity (Webb, 1912; Sylos Labini, 1983, 1984, 1999; Altman, 1998). This is the so-called 'organisation effect' (Carnevali et al., 2020). Second, an increase in the labour income share reduces the 'x-inefficiencies' by favouring an improvement in working conditions, the establishment of more cooperative labour relations, higher motivation and lower levels of turnover which are reflected in greater discipline and effort by the workers and an acceleration of labour productivity (Altman, 1998). This is the so-called 'wage-efficiency effect' (Tridico and Pariboni, 2018). Third, an increase in the labour income share tends to attract highly productive workers and encourage them to be more efficient, which sustains an acceleration of labour productivity (Carnevali et al., 2020). This is the so-called 'Marshall effect' (Marshall, 1890). Fourth, an increase in the labour income share drives 'natural selection' or 'creative destruction' in a context in which routine corporations and/or laggards are thrown out of the market and the most innovative ones face the opportunity to increase their own market share by contributing to the growth of labour productivity as a whole (Carnevali et al., 2020). The final reason is that an increase in the labour income share supports higher economic growth, particularly in countries that follow 'wage-led growth models' (Onaran and Obst, 2016), which contributes to an acceleration of labour productivity through the aforementioned 'Smith effect' or the 'Classical Kaldorian-Verdoorn effect'.[3]

The third channel is associated with an indirect effect among the phenomenon of financialisation, personal income inequality and labour productivity. The post-Keynesian argument is that the phenomenon of financialisation has induced a rise in personal income inequality[4] which, in turn, has contributed to a deceleration of labour productivity due to workers putting less effort into their jobs (Tridico and Pariboni, 2018) in a context of higher vulnerability of unskilled labour and/or low-skilled labour and less confidence in job stability (Vergeer and Kleinknecht, 2014) in line with more unstable (and precarious) jobs, higher flexibility, scarcer incentives and lower paid jobs (Pariboni and Tridico, 2020). These trends also discourage an investment in training and education by workers, which directly affects labour productivity (Pariboni and Tridico, 2020). In effect, the abandonment of full employment goals, the proliferation of 'shareholder value orientation', an excessive managerial focus on short-term profitability, the emergence of multinational corporations that

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[3] Altman (1998) identifies a sixth reason, according to which there is a positive relationship between the labour income share and labour productivity. He states that an increase in the labour income share forces a higher propensity to save, which supports new investments and the corresponding acceleration of labour productivity. According to Altman, this is the so-called 'savings effect'. We do not discuss this effect in further detail because it does not follow a post-Keynesian approach. Instead, it is based on a typically neoclassical (mainstream) loanable funds theory.

[4] Lagoa and Barradas (2020) clarified to what extent the phenomenon of financialisation has exerted a positive impact on personal income inequality in recent decades, namely by highlighting that financialisation tends to benefit only the richest and leaves the poorest financially excluded and/or with many difficulties in accessing financial resources (e.g., credit), which impair them (contrary to the richest) in increasing their investments in their own business or in training and education. These authors also claim that the richest tend to benefit more from (financial and/or housing) asset price booms, which also promotes a rise in personal income inequality. Baiardi and Morana (2018) also add that financial institutions tend to operate on an intensive margin, channeling their financial resources only to their current (richest) customers and neglecting the poorest and/or new customers. This has been corroborated by the emergence of several empirical works that have found a positive relationship between the phenomenon of financialisation and personal income inequality (Greenwood and Jovanovic, 1990; Banerjee and Newmann, 1993; Galor and Zeira, 1993; Baldacci et al., 2002; Roine et al., 2009; Atkinson and Morelli, 2011; Gimet and Lagoarde-Segot, 2011; Assa, 2012; Fournier and Koske, 2012; Jauch and Watzka, 2012; Jaumotte et al., 2013; Karanassou and Sala, 2013; Denk and Cournede, 2015; Furceri and Loungani, 2015; Jaumotte and Buitron, 2015; Haan and Sturm, 2017; Baiardi and Morana, 2018).

systematically threaten to relocate production to low-wage countries, the deregulation and flexibilisation of labour markets (at the level of unemployment benefits, employment protection, employment rights and minimum wage), the emergence of practices such as outsourcing, the rise of precarious labour conditions and unproductive work, and the deterioration of the general workers' bargaining power have promoted a rise in personal income inequality, a fall in the labour income share, weaker economic growth and a slowdown in labour productivity (Tridico and Pariboni, 2018).

The fourth channel is related to a direct effect between the degree of financialisation and labour productivity (Hein, 2010). This effect ascertains a negative relationship between the phenomenon of financialisation and innovation, technological progress, research and development and real investment by corporations which directly affects labour productivity. According to post-Keynesian literature, and as emphasised by Orhangazi (2008), Hein and van Treeck (2010) and Hein (2012), the phenomenon of financialisation has impaired real investment realised by corporations for two different reasons. The phenomenon of financialisation has led to an increase in financial investments by corporations, which has diverted funds from real investment. This is the so-called 'crowding out effect' or 'management's preference channel' (Hein, 2012) which is due to: shorter planning horizons (Crotty, 2005) and the corresponding 'managerial myopia' (Samuel, 2000); the increasing concern with short-term profits (so-called 'rent-seeking behaviour') instead of long-term expansion (Orhangazi, 2008); the downward trend of profits from the real sector and the increase in external funding costs that has occurred since the 1980s (Crotty, 2005; Orhangazi, 2008; Baud and Durand, 2012); higher macroeconomic uncertainty and heightened risks (Akkemik and Özen, 2014); and the learning process with other corporations (the so-called 'mimetic behaviour') and the influence of some agents (financial executives or independent consultants) on the advantages provided by the realisation of financial investments (Soener, 2015). The phenomenon of financialisation has also intensified the pressure exerted upon corporations to increase financial payments (interest, dividends and/or stock buybacks) in order to satisfy impatient shareholders, which has promoted lower retention ratios and decreased the available funds for real investment due to the 'principle of increasing risk' (Kalecki, 1937) and the corresponding difficulty of accessing external funding in an environment of imperfect capital markets (Hein, 2010). This is the so-called 'profit without investment' hypothesis (Stockhammer, 2006; Cordonnier and Van de Velde, 2015) or the 'internal means of finance channel' (Hein, 2012) which is due to higher levels of corporate indebtedness (Orhangazi, 2008), the existence of remuneration schemes based on profits (Ibid.), the higher importance of institutional investors (Ibid.) and the proliferation of a new design of corporate governance that privileges the maximisation of shareholder value (the so-called 'shareholder value orientation') rather than other corporations' stakeholders (Lazonick and O'Sullivan, 2000). Stockhammer (2004), Orhangazi (2008), van Treeck (2008), Onaran et al. (2011), Seo et al. (2012), Barradas (2017), Barradas and Lagoa (2017), Davis (2017) and Tori and Onaran (2018, 2019) are examples of empirical works that confirm a harmful effect from the phenomenon of financialisation on real investment by corporations.

Sylos Labini (1983), Fortune (1987), Vergeer and Kleinknecht (2014), Guarini (2016), Micallef (2016), Tridico and Pariboni (2018), Dua and Garg (2019), Pariboni and Tridico (2020), Carnevali et al. (2020) and Yousef (2020) are examples of several empirical works on the determinants of labour productivity. Nonetheless, they do not take into account all four of the aforementioned channels through which the phenomenon of financialisation has

contributed to the slowdown of labour productivity in more advanced economies. The study by Tridico and Pariboni (2018) is the only exception. These authors performed a panel data econometric analysis of 26 countries in the OECD (Australia, Austria, Belgium, Canada, Chile, Denmark, Finland, France, Germany, Greece, Iceland, Israel, Italy, Japan, Luxembourg, Mexico, the Netherlands, New Zealand, Norway, Portugal, Republic of Korea, Spain, Sweden, Switzerland, the United Kingdom and the United States) during the period from 1990 to 2013. They concluded that the labour productivity of these countries positively depends on economic performance and the labour income share and negatively depends on personal income inequality and the degree of financialisation. A positive relationship between economic performance and labour productivity was also found by Sylos Labini (1983) and Carnevali et al. (2020) and a positive relationship between the labour income share and labour productivity was also found by Vergeer and Kleinknecht (2014), Carnevali et al. (2020) and Yousef (2020). To the best of our knowledge, personal income inequality and the degree of financialisation have been quite neglected in the empirical evidence on the determinants of labour productivity, with the exception of the aforementioned empirical work performed by Tridico and Pariboni (2018).

Similar to the empirical work carried out by Tridico and Pariboni (2018), this paper aims to address the effects of these four channels linked to the phenomenon of financialisation on labour productivity in Portugal by conducting a time series econometric analysis covering the period from 1980 to 2017.

3. The conceptual model and hypotheses

Our conceptual model is based on an aggregate equation according to which labour productivity depends on lagged labour productivity, economic performance, labour income share, personal income inequality and the degree of financialisation. Our conceptual model is quite similar to the model proposed by Tridico and Pariboni (2018) and, therefore, also represents an extension of the aggregate equation of labour productivity presented by Sylos Labini (1983, 1984, 1999).

Nonetheless, our conceptual model is slightly different from the ones proposed by Sylos Labini (1983, 1984, 1999) and Tridico and Pariboni (2018) by containing interaction terms between the degree of financialisation and the remaining independent variables (economic performance, labour income share and personal income inequality) in order to better ascertain the indirect effects linked to the first three channels through which the phenomenon of financialisation has impaired labour productivity.

Contrary to the model presented by Sylos Labini (1983, 1984, 1999) but analogous to the model proposed by Tridico and Pariboni (2018), we do not include in our aggregate equation of labour productivity the cost of labour in relation to the price of investment goods, that is, the so-called 'Ricardo effect' (Ricardo, 1821), for three different theoretical reasons. First, the role of this effect on labour productivity is rather similar to the effect exerted by the labour income share, that is, the aforementioned 'Webb-Sylos Labini effect' (Sylos Labini, 1983, 1984, 1999) or 'the Marx and Hicks effect' (Hein and Tarassow, 2010). The former reflects the relative impact of labour costs on labour productivity and the latter translates the absolute impact of labour costs on labour productivity. But both of them will induce a technological change if an increase in labour costs occurs in order to prevent an increase in production costs which will,

in turn, stimulate an acceleration of labour productivity (Tridico and Pariboni, 2018). Second, the validity of the 'Ricardo effect' is too limited in that it requires several assumptions to be made about the available set of production methods from which producers can choose and it is restricted to an extremely special case because it does not take into account the different proportions between labour and capital (Gehrke, 2003). Third, and following a Sraffian argument, this effect varies with the distribution of income by implying that the price of labour and the price of investment goods are interdependent, which represents an objection to including it among the explanatory variables of labour productivity (Sylos Labini, 1983).

Against this backdrop, our conceptual model of labour productivity takes the following form:

$$LP_t = \beta_0 + \beta_1 LP_{t-1} + \beta_2 EP_t + \beta_3 EP_t \times DF_t + \beta_4 LIS_t + \beta_5 LIS_t \times DF_t + \beta_6 PII_t$$

$$+\beta_6 PII_t \times DF_t + \beta_8 \vec{D}F_t + \alpha_t \tag{1}$$

where t is the time period (years), LP is the growth rate in labour productivity, EP is the growth rate in economic performance, LIS is the labour income share, PII is personal income inequality, DF is the degree of financialisation[5] and α is an independent and identically distributed (white-noise) disturbance term with a null average and constant variance (homoscedastic).

We included in our conceptual model the lag of the dependent variable, which means the inclusion of lagged labour productivity among the remaining independent variables. The objective is to take into account the potential persistence degree exhibited by labour productivity and to control for state dependency (Vergeer and Kleinknecht, 2014).

According to our previously described arguments, we expect that lagged labour productivity, economic performance and labour income share exert a positive influence on labour productivity, while personal income inequality and the degree of financialisation exert a negative influence on labour productivity. The interaction terms between economic performance and the degree of financialisation, and between the labour income share and the degree of financialisation, are expected to exert a negative influence on labour productivity, namely because the phenomenon of financialisation has favoured weaker economic growth and a fall in the labour income share by promoting a slowdown in labour productivity. The interaction term between personal income inequality and the degree of financialisation is also expected to exert a negative influence on labour productivity, namely because the phenomenon of financialisation has induced a rise in personal income inequality by contributing to a deceleration of labour productivity. Our hypotheses suggests that the estimated coefficients should present the following signs:

$$\beta_1 > 0, \beta_2 > 0, \beta_3 < 0, \beta_4 > 0, \beta_5 < 0, \beta_6 < 0, \beta_7 < 0, \beta_8 < 0 \tag{2}$$

Note that we are proposing to estimate an aggregate equation for labour productivity in order to analyse the role of the phenomenon of financialisation on the deceleration of Portuguese labour productivity as a whole. This approach overlooks the potential heterogeneity of labour productivity in different corporations, sectors, industries or regions but allows us to assess whether the phenomenon of financialisation has had a real macroeconomic impact on the slowdown of labour productivity in Portugal. Thus, if we find

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[5] Please note that we will assess the degree of financialisation by using five different proxies, which implies that we will obtain different coefficients for this variable according to the proxy chosen.

a statistically significant effect of the aforementioned four channels linked to the phenomenon of financialisation on Portuguese labour productivity, we are unable to conclude if this effect occurs only in a subset of corporations, sectors, industries or regions or if it is a more generalised effect that affects all corporations, sectors, industries or regions. If we do not find a statistically significant effect of the aforementioned four channels linked to the phenomenon of financialisation on Portuguese labour productivity, we cannot exclude the possibility that this effect occurs in a subset of corporations, sectors, industries or regions, albeit not enough to cause a macroeconomic impact on Portuguese labour productivity as a whole.

4. Data and stylised facts

We collected data for Portugal on a yearly basis from 1980 to 2017, which represents a total sample with 38 observations. This corresponds to the period and the periodicity for which all proxies for our variables are available. The proxy for personal income inequality is available only after 1980 and the proxy for money supply is available only until 2017. The proxies for personal income inequality, money supply and stock market capitalisation are available only on a yearly basis. Note that our sample perfectly covers the period in which the phenomenon of financialisation became more noticeable in Portugal, which occurred since the mid-1980s in the wake of privatisation, liberalisation and deregulation of the Portuguese financial system by the imposition of European rules due to the respective integration process initiated with the adhesion of Portugal to the European Economic Community in 1986 (Barradas et al., 2018).

Due to the complex nature of financialisation, we used five different proxies to assess the degree of financialisation, namely credit (C), money supply (MS), financial value added (FVA), stock market capitalisation (SMC) and shareholder orientation (SO). As emphasised by Barradas (2020), these proxies are those normally used in other empirical works on the role of finance because they reflect different dimensions (e.g., size, depth and efficiency) played by different financial intermediaries (e.g., banks and stock markets) or even by shareholders.

Table 1 describes the proxies and sources for our variables, table 2 contains the descriptive statistics for our variables, table 3 exhibits the correlations between our variables and figure 2 illustrates the plots of our variables. Note that all correlations between our variables are less than 0.8 in absolute terms, which confirms the inexistence of multicollinearity between them (Studenmund, 2005). The only exceptions occur with the correlations between some proxies linked to the degree of financialisation. This is the reason we did not simultaneously use all of these proxies but used them separately from each other. The idea is just to assess if our results are robust according to the proxy for the degree of financialisation selected.

Table 1 – *Proxies and sources for our variables*

Variable	Proxy	Source
Labour productivity	GDP at constant prices per hour worked (growth rate %)	AMECO
Economic performance	GDP at constant prices (growth rate %)	AMECO
Labour income share	Adjusted labour income share (% of GDP)	AMECO
Personal income inequality	Top 10% income share (% of total)	World Inequality
Credit	Total credit to private non-financial sector (% of GDP)	Fred St. Louis
Money supply	Liquid liabilities (% of GDP)	Fred St. Louis
Financial value added	Gross value added of financial, insurance and real estate activities (% of total)	PORDATA
Stock market capitalisation	Stock market capitalisation of listed domestic companies (% of GDP)	World Bank
Shareholder orientation	Net financial payments of non-financial corporations (% of gross value added)	INE

Table 2 – *Descriptive statistics for all variables*

	Mean	Median	Maximum	Minimum	Standard deviation	Skewness	Kurtosis
Labour productivity	0.017	0.015	0.063	-0.029	0.018	0.281	3.819
Economic performance	0.021	0.020	0.079	-0.041	0.026	-0.004	3.189
Labour income share	0.582	0.583	0.687	0.510	0.041	0.711	3.931
Personal income inequality	0.367	0.378	0.401	0.296	0.027	-1.056	3.187
Credit	1.459	1.375	2.316	0.771	0.489	0.226	1.664
Money supply	0.867	0.851	1.015	0.703	0.090	-0.054	1.973
Financial value added	0.140	0.137	0.181	0.097	0.028	-0.018	1.816
Stock market capitalisation	0.248	0.270	0.551	0.003	0.165	0.053	2.043
Shareholder orientation	0.107	0.126	0.184	0.040	0.045	-0.183	1.657

Table 3 – *Correlations between variables*

	LP	EP	LIS	PII	C	MS	FVA	SMC	SO
LP	1.000								
EP	0.587***	1.000							
LIS	0.108	0.081	1.000						
PII	-0.256	-0.253	-0.471***	1.000					
C	-0.500***	-0.685***	-0.400**	0.442***	1.000				
MS	-0.561***	-0.665***	-0.481***	0.589***	0.923***	1.000			
FVA	-0.325**	-0.464***	-0.647***	0.731***	0.801***	0.832***	1.000		
SMC	-0.199	-0.074	-0.357**	0.793***	0.505***	0.570***	0.633***	1.000	
SO	-0.358**	-0.482***	-0.469***	0.812***	0.789***	0.834***	0.894***	0.783***	1.000

Notes: *** indicates statistical significance at the 1% level, ** indicates statistical significance at the 5% level and * indicates statistical significance at the 10% level.

Figure 2 – *Plots of the variables*
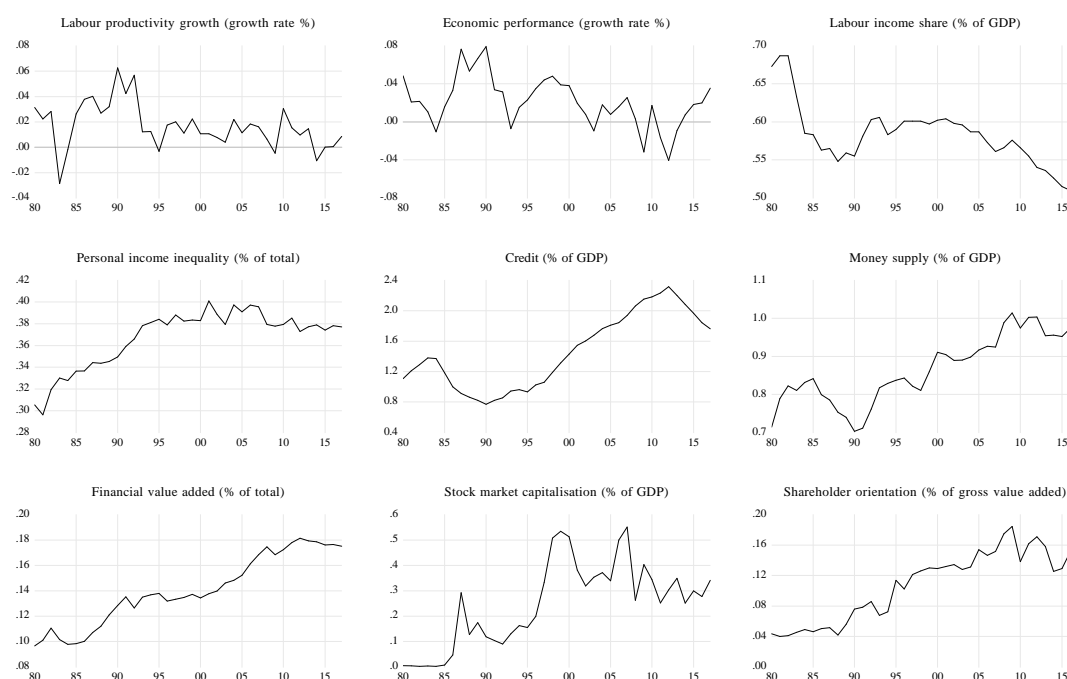
We confirm that the slowdown of labour productivity is a stylised fact in Portugal, particularly after the late 1980s. In the same vein, the deceleration in economic performance, the fall in the labour income share, the rise in personal income inequality and the intensification of the degree of financialisation are also stylised facts in Portugal in the last decades. This is the reason we observe positive correlations between economic performance and labour productivity and between labour income share and labour productivity. This is also the reason we observe negative correlations between personal income inequality and labour productivity and between the degree of financialisation and labour productivity.

5. Econometric method

We employed the GMM estimator popularised by Hansen (1982), due to not only the incorporation of lagged labour productivity among our independent variables but also the potential existence of endogeneity in our conceptual model for two different reasons. First, we needed to overcome endogeneity due to the omission of the aforementioned 'Ricardo effect' (Ricardo, 1821) and/or other important determinants of labour productivity not directly or indirectly related to the phenomenon of financialisation (Fortune, 1987; Vergeer and Kleinknecht, 2014; Guarini, 2016; Micallef, 2016; Dua and Garg, 2019; Carnevali et al., 2020; Pariboni and Tridico, 2020; Yousef, 2020). Second, we needed to overcome endogeneity due to the possible existence of simultaneity among our different variables (Vergeer and Kleinknecht, 2014; Carnevali et al., 2020).

The GMM estimator requires the definition of a set of instrumental variables, that is, the so-called instruments. The number of instruments should be greater or equal to the number of independent variables in the conceptual model, and instruments should be exogeneous in relation to the error component and simultaneously strongly correlated with the independent variables (Greene, 2003). The traditional rule of thumb is to choose several lags of the independent variables as instruments. We chose four lags of each independent variable (including the ones related to the interaction terms) to encompass our set of instruments,[6] which were validated using the J-statistic proposed by Hansen (1982). The structural stability of our models was assessed by employing the Hall and Sen (1999) O-statistic.

We used the EViews software (version 12) to produce our estimates. We employed the Newey-West option for the weighting matrix, which is a heteroskedasticity and autocorrelation consistent estimator. In addition, we relapsed on the Barlett Kernel option and on the N-step iterative procedure for weighting matrix updating. Note that, under suitable conditions, estimates produced by the GMM estimator are consistent, asymptotically normal and asymptotically efficient (Hansen, 1982).

We also present the economic effects of our statistically significant estimates (McCloskey and Ziliak, 1996; Ziliak and McCloskey, 2004) in order to assess the contribution of each of the aforementioned four channels linked to the phenomenon of financialisation to the slowdown of labour productivity in Portugal in the last decades.

6. Empirical results and discussion

Our estimates for Portuguese labour productivity are presented in table 4. We produced our estimates by using five different models. Each model used a different proxy for the variable related to the degree of financialisation. All five of these models describe relatively well the evolution of labour productivity in Portugal in the last decades, taking into account the high R-squared and adjusted R-squared values, respectively. Note that around 68% (58%) of the evolution of Portuguese labour productivity in the last decades is explained by our models. All five of these models are suitable and our set of instruments is valid, taking into account that we do not reject the null hypothesis of the *J*-statistic for any of them. Our estimates and instruments are also stable over time and we do not detect the existence of structural breaks, taking into account that we do not reject the null hypothesis of the Hall and Sen (1999) *O*-statistic for any of our five models (table A1 in the appendix).

All variables are statistically significant at the conventional significance levels and have the expected signs for all five of the models that were considered. This confirms the robustness of our results because our estimates do not change in terms of statistical significance and signs between the different models. In the same vein, our results do not change expressively if we consider lagged terms for all variables (table A2 in the appendix), which reinforces the robustness of our estimates.[7]

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[6] Please note that, due to the inclusion of lagged labour productivity among the remaining independent variables, our set of instruments pertaining to this variable encompasses its lagged values from the second one to the fifth one ($t-2$, $t-3$, $t-4$, $and\ t-5$).

[7] Please note that, due to the inclusion of lagged terms for all variables, our set of instruments pertaining to the independent variables encompasses their lagged values from the second one to the fifth one ($t-2$, $t-3$, $t-4$, $and\ t-5$).

Table 4 – *Estimates of Portuguese labour productivity*

Variable	Credit	Money supply	Financial value added	Stock market capitalisation	Shareholder orientation
β_0	0.237***	1.539***	0.455***	-0.105***	-0.280***
	(0.029)	(0.154)	(0.059)	(0.023)	(0.040)
LP_{t-1}	0.031	-0.146***	0.229***	0.268***	0.231***
	(0.029)	(0.018)	(0.011)	(0.017)	(0.020)
EP_t	0.518***	0.936***	0.444***	0.684***	0.607***
	(0.041)	(0.172)	(0.108)	(0.049)	(0.064)
$EP_t \times DF_t$	-0.190***	-0.972***	-0.381	-1.484***	-2.197***
	(0.030)	(0.203)	(0.764)	(0.178)	(0.479)
LIS_t	1.252***	4.359***	0.383**	0.522***	0.958***
	(0.099)	(0.286)	(0.146)	(0.041)	(0.077)
$LIS_t \times DF_t$	-0.630***	-4.507***	0.189	-1.412***	-6.496***
	(0.053)	(0.303)	(0.853)	(0.141)	(0.584)
PII_t	-2.566***	-10.747***	-2.011***	-0.540***	-0.746***
	(0.122)	(0.610)	(0.144)	(0.019)	(0.073)
$PII_t \times DF_t$	1.693***	12.271***	9.733***	1.193***	4.245***
	(0.083)	(0.708)	(1.040)	(0.098)	(0.545)
DF_t	-0.269***	-2.023***	-3.190***	0.409***	2.241***
	(0.017)	(0.179)	(0.357)	(0.077)	(0.291)
	38	38	38	38	38
Observations	33 after adjustments	33 after adjustments	33 after adjustments	33 after adjustments	33 after adjustments
R-squared					
Adjusted R-squared	0.709	0.731	0.643	0.700	0.634
	0.612	0.641	0.524	0.600	0.512
J-statistic	8.888	8.587	8.548	8.659	8.478
J-statistic (*p*-value)	0.998	0.998	0.998	0.998	0.999

Note: standard errors in (), *** indicates statistical significance at the 1% level, ** indicates statistical significance at the 5% level and * indicates statistical significance at the 10% level.

Lagged labour productivity is a positive determinant of labour productivity in Portugal, which confirms that this variable is indeed relatively persistent (Vergeer and Kleinknecht, 2014). Economic performance also positively impacts labour productivity in Portugal, which confirms the 'Smith effect' (1776) or the 'Classical Kaldorian-Verdoorn effect' (Verdoorn, 1949; Kaldor, 1961).[8] Note also that the interaction term between economic performance and the degree of financialisation is statistically significant at the traditional significance levels and exhibits a negative coefficient, which confirms the aforementioned indirect effect between the phenomenon of financialisation, economic performance and labour productivity in Portugal.

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[8] A similar result was found by Sylos Labini (1983) for the United States and Italy, by Guarini (2016) for 30 European countries (Austria, Belgium, Cyprus, Czech Republic, Denmark, Estonia, Finland, France, Germany, Greece, Hungary, Iceland, Ireland, Italy, Latvia, Lithuania, Luxemburg, Macedonia, Malta, Netherlands, Norway, Poland, Portugal, Romania, Slovakia, Slovenia, Spain, Sweden, Switzerland and the United Kingdom), by Tridico and Pariboni (2018) for 26 countries in the OECD (Australia, Austria, Belgium, Canada, Chile, Denmark, Finland, France, Germany, Greece, Iceland, Israel, Italy, Japan, Luxembourg, Mexico, the Netherlands, New Zealand, Norway, Portugal, the Republic of Korea, Spain, Sweden, Switzerland, the United Kingdom and the Unites States) and by Carnevali et al. (2020) for eight countries of the euro area (Austria, France, Greece, Germany, Italy, the Netherlands, Portugal and Spain).

This means that the effect of the economic performance on labour productivity depends on the degree of financialisation, in a context where the greater the degree of financialisation, the greater the negative impact of economic performance on labour productivity. The labour income share also exerts a positive influence on labour productivity in Portugal, which is in line with the predictions of the 'Webb-Sylos Labini effect' (Sylos Labini, 1983, 1984, 1999) or 'the Marx and Hicks effect' (Hein and Tarassow, 2010).[9] The interaction term between the labour income share and the degree of financialisation is also statistically significant at the traditional significance levels and also presents a negative coefficient by confirming the aforementioned indirect effect between the phenomenon of financialisation, the labour income share and labour productivity in Portugal. This indicates that the effect of the labour income share on labour productivity depends on the degree of financialisation, in a context where the greater the degree of financialisation, the greater the negative impact of the labour income share on labour productivity. Personal income inequality and the degree of financialisation also determine labour productivity in Portugal by exerting a negative effect for the majority of the models that were considered.[10] The interaction term between personal income inequality and the degree of financialisation is statistically significant at the traditional significance levels, which again supports the aforementioned indirect effect between the phenomenon of financialisation, personal income inequality and labour productivity in Portugal.

These results seem to suggest that the evolution of labour productivity in Portugal has been clearly affected by the aforementioned four channels linked to the phenomenon of financialisation. The role of each of these four channels on that evolution is exhibited in table 5, where we present the respective economic effects of each channel on each one of the five models.

The most import finding is that all four of the aforementioned channels linked to the phenomenon of financialisation have been detrimental to the evolution of labour productivity in Portugal given the corresponding negative economic effects of each one, particularly in the cases of models with the proxies of credit, money supply and financial value added. In effect, the deceleration in economic performance, the fall in labour income share, the rise of personal income inequality and the intensification of the degree of financialisation have contributed to deceleration of labour productivity in Portugal from 1980 to 2017. The intensification of the degree of financialisation and the rise of personal income inequality were the main triggers of the deceleration of labour productivity in Portugal in the last decades.

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[9] A positive relationship between the labour income share and labour productivity was also reported by Vergeer and Kleinknecht (2014) for 20 countries in the OECD (Australia, Austria, Belgium, Canada, Denmark, Finland, France, Germany, Ireland, Italy, Japan, the Netherlands, New Zealand, Norway, Portugal, Spain, Sweden, Switzerland, the United Kingdom and the United States) and by Tridico and Pariboni (2018), Carnevali et al. (2020) and Yousef (2020) for Jordan.

[10] Please note that this negative impact of personal income inequality on labour productivity in Portugal does not change if we use the top 1% income share instead of the top 10% income share. Results are available upon request. A negative impact from personal income inequality and the degree of financialisation on labour productivity was also reported by Tridico and Pariboni (2018).

Table 5 – *Economic effects on Portuguese labour productivity*

Conceptual model	Variable	Short-term coefficient	Long-term coefficient	Actual cumulative change	Economic effect
Credit	EP_t	0.518	0.535	-0.271	-0.145
	$EP_t \times DF_t$	-0.190	-0.196	0.167	-0.033
	LIS_t	1.252	1.292	-0.238	-0.307
	$LIS_t \times DF_t$	-0.630	-0.650	0.200	-0.130
	PII_t	-2.566	-2.648	0.236	-0.625
	$PII_t \times DF_t$	1.693	1.747	0.941	1.644
	DF_t	-0.269	-0.278	0.586	-0.163
Money supply	EP_t	0.936	0.817	-0.271	-0.221
	$EP_t \times DF_t$	-0.972	-0.848	0.025	-0.021
	LIS_t	4.359	3.804	-0.238	-0.905
	$LIS_t \times DF_t$	-4.507	-3.933	0.069	-0.271
	PII_t	-10.747	-9.378	0.236	-2.213
	$PII_t \times DF_t$	12.271	10.708	0.729	7.806
	DF_t	-2.023	-1.765	0.401	-0.708
Financial value added	EP_t	0.444	0.576	-0.271	-0.156
	LIS_t	0.383	0.497	-0.238	-0.118
	PII_t	-2.011	-2.608	0.236	-0.615
	$PII_t \times DF_t$	9.733	12.624	1.276	16.108
	DF_t	-3.190	-4.137	0.804	-3.326
Stock market capitalisation	EP_t	0.684	0.934	-0.271	-0.253
	$EP_t \times DF_t$	-1.484	-2.027	39.333	-79.728
	LIS_t	0.522	0.713	-0.238	-0.170
	$LIS_t \times DF_t$	-1.412	-1.929	42.750	-82.465
	PII_t	-0.540	-0.738	0.236	-0.174
	$PII_t \times DF_t$	1.193	1.630	63.500	103.505
	DF_t	0.409	0.559	55.833	31.211
Shareholder orientation	EP_t	0.607	0.789	-0.271	-0.214
	$EP_t \times DF_t$	-2.197	-2.857	1.238	-3.537
	LIS_t	0.958	1.246	-0.238	-0.297
	$LIS_t \times DF_t$	-6.496	-8.447	1.345	-11.361
	PII_t	-0.746	-0.970	0.236	-0.229
	$PII_t \times DF_t$	4.245	5.520	2.846	15.710
	DF_t	2.241	2.914	2.000	5.828

Note: The long-term coefficient is obtained through the ratio between the short-term coefficient (estimated coefficient) and one minus the coefficient of the autoregressive estimation (estimated lagged labour productivity coefficient) and gives us the impact in percentage points on labour productivity if there is an increase of the corresponding variable by 1 percentage point. The actual cumulative change corresponds to the growth rate of the correspondent variable. The economic effect is the multiplication of the long-term coefficient by the actual cumulative change and gives us the percentual impact of this variable on labour productivity during the respective period.

7. Conclusions

The aim of this paper was to conduct a time series econometric analysis in order to empirically evaluate the role of financialisation in the slowdown of labour productivity in Portugal in the period from 1980 to 2017.

From a theoretical point of view and following the post-Keynesian literature, the phenomenon of financialisation has contributed to the slowdown of labour productivity in more advanced economies in the last decades, which has occurred through four different channels (Tridico and Pariboni, 2018), notably weak economic performance, a fall in the labour income share, a rise in personal income inequality and the intensification of the degree of financialisation.

Accordingly, we estimated an aggregate equation according to which labour productivity depends on lagged labour productivity, economic performance, the labour income share, the level of personal income inequality and the degree of financialisation. We employed the GMM estimator popularised by Hansen (1982) due to the inclusion of lagged labour productivity among the independent variables and to overcome the potential problem of endogeneity that arises when there are problems with omitted variables and/or simultaneity.

Our results confirm that lagged labour productivity, economic performance and labour income share exert a positive impact on labour productivity in Portugal, whereas personal income inequality and the degree of financialisation exert a negative impact on labour productivity in Portugal. This confirms that these four channels linked to the phenomenon of financialisation have been important drivers of the slowdown of labour productivity in Portugal in a context in which the intensification of the degree of financialisation and the rise of personal income inequality have been the main triggers for that evolution.

Our results also suggest the need to engage in policies to promote the phenomenon of de-financialisation of the Portuguese economy in the coming years. This is required to support stronger economic performance, an increase in the labour income share, a decrease in personal income inequality, a reduction in the degree of financialisation and, consequently, an acceleration of Portuguese labour productivity. The policy recommendations proposed by Palley (2007), Hein (2012), Vercelli (2013) and Sawyer (2015) could represent some directions that Portuguese policymakers could follow to ensure the phenomenon of de-financialisation in the coming years.

Further research on labour productivity in Portugal should use micro data to assess the role of these four channels linked to the phenomenon of financialisation at the corporate level, the sector level, the industry level or the regional level. This approach will allow a determination of whether or not these detrimental effects of the phenomenon of financialisation on the slowdown of labour productivity has affected all corporations, sectors, industries or regions in the same manner and/or to the same degree.

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Appendix

Table A1 – *The Hall and Sen (1999) O-statistics*

Year	Credit	Money supply	Financial value added	Stock market capitalisation	Shareholder orientation
1994	7.647 (1.000)	7.760 (1.000)	7.767 (1.000)	8.305 (1.000)	8.288 (1.000)
1995	9.141 (1.000)	9.993 (1.000)	10.422 (1.000)	10.524 (1.000)	10.388 (1.000)
1996	10.407 (1.000)	9.475 (1.000)	10.717 (1.000)	9.775 (1.000)	9.810 (1.000)
1997	9.865 (1.000)	10.703 (1.000)	10.571 (1.000)	9.615 (1.000)	10.218 (1.000)
1998	9.741 (1.000)	10.449 (1.000)	10.293 (1.000)	10.762 (1.000)	11.033 (1.000)
1999	9.524 (1.000)	10.391 (1.000)	9.885 (1.000)	9.888 (1.000)	11.266 (1.000)
2000	9.197 (1.000)	10.785 (1.000)	10.553 (1.000)	9.995 (1.000)	11.182 (1.000)
2001	9.733 (1.000)	10.770 (1.000)	10.643 (1.000)	11.335 (1.000)	11.240 (1.000)
2002	10.435 (1.000)	9.771 (1.000)	11.449 (1.000)	10.720 (1.000)	11.226 (1.000)
2003	10.059 (1.000)	9.434 (1.000)	10.439 (1.000)	10.108 (1.000)	10.835 (1.000)
2004	9.759 (1.000)	10.807 (1.000)	10.227 (1.000)	10.643 (1.000)	11.135 (1.000)
2005	9.673 (1.000)	10.646 (1.000)	10.008 (1.000)	10.371 1.000	10.963 (1.000)
2006	9.923 (1.000)	9.668 (1.000)	11.184 (1.000)	10.596 (1.000)	11.287 (1.000)
2007	9.107 (1.000)	9.659 (1.000)	n.a.	10.046 (1.000)	10.198 (1.000)
2008	10.846 (1.000)	10.223 (1.000)	9.981 (1.000)	9.915 (1.000)	9.518 (1.000)
2009	7.834 (1.000)	8.089 (1.000)	n.a.	7.612 (1.000)	7.768 (1.000)

Note: *p*-values of the Hall and Sen (1999) *O*-statistics in ().

Table A2 – *Estimates of Portuguese labour productivity with lagged terms for all variables*

Variable	Credit	Money supply	Financial value added	Stock market capitalisation	Shareholder orientation
β_0	0.685***	1.807***	0.876***	0.225***	0.343***
	(0.020)	(0.132)	(0.065)	(0.032)	(0.042)
LP_{t-1}	-0.104**	-0.203***	0.035	-0.042	0.117***
	(0.044)	(0.036)	(0.036)	(0.041)	(0.024)
EP_{t-1}	0.348***	1.449***	-0.067	0.652***	0.329***
	(0.048)	(0.159)	(0.150)	(0.059)	(0.050)
$EP_{t-1} \times DF_{t-1}$	-0.272***	-1.629***	0.935	-2.076***	-2.535***
	(0.026)	(0.174)	(1.008)	(0.151)	(0.341)
LIS_{t-1}	-0.102	1.616***	-1.603***	0.097*	-0.219**
	(0.109)	(0.322)	(0.154)	(0.049)	(0.098)
$LIS_{t-1} \times DF_{t-1}$	0.143**	-1.535***	11.429***	0.386**	3.073***
	(0.054)	(0.496)	(0.895)	(0.140)	(0.811)
PII_{t-1}	-1.611***	-7.278***	0120	-0.751***	-0.565***
	(0.189)	(0.633)	(0.148)	(0.039)	(0.084)
$PII_{t-1} \times DF_{t-1}$	0.958***	8.103***	-5.822***	0.735***	0.919
	(0.135)	(0.712)	(0.916)	(0.168)	(0.973)
DF_{t-1}	-0.446***	-2.152***	-4.240***	-0.441***	-2.044***
	(0.024)	(0.153)	(0.437)	(0.122)	(0.327)
	38	38	38	38	38
Observations	33 after adjustments	33 after adjustments	33 after adjustments	33 after adjustments	33 after adjustments
R-squared	0.672	0.697	0.620	0.666	0.605
Adjusted R-squared	0.563	0.596	0.494	0.555	0.474
J-statistic	8.868	8.754	8.672	8.736	8.822
J-statistic (P-value)	0.998	0.998	0.998	0.997	0.998

Notes: Standard errors in (), *** indicates statistical significance at the 1% level, ** indicates statistical significance at the 5% level and * indicates statistical significance at the 10% le