

Why has labour productivity slowed down in the era of financialisation?
Insights from the post-Keynesians for the European Union countries

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ABSTRACT

This paper employs a panel data econometric approach in order to empirically ascertain the role of the phenomenon of financialisation in the deceleration of labour productivity in the European Union (EU) countries from 1980 to 2019. During that time, the EU countries suffered a huge structural transformation based on Reaganomics and Thatcherism and their financial systems have experienced strong liberalisation and deregulation, which have contributed to poor evolution of labour productivity and have revived fears around a new ‘secular stagnation’ in the era of financialisation. Grounded in post-Keynesian literature, the slowdown of labour productivity in the majority of developed economies in the last decades cannot be separated from the phenomenon of financialisation, which has occurred through four different channels, namely the weak economic performance, the decline in the labour income share, the increase in personal income inequality, and strengthening of the degree of financialisation. Our findings confirm that lagged labour productivity, economic performance, and labour income share have a positive impact on labour productivity in the EU countries, while personal income inequality and the degree of financialisation impact it negatively. Our findings also reveal that labour productivity in the EU countries in the last decades would have grown more if there had been a stronger economic performance, a smaller decline (or even a rise) of the labour income share, a smaller increase (or even a decrease) of personal income inequality, and a weakening of the degree of financialisation.

KEYWORDS: Labour Productivity, Financialisation, European Union, Panel Data, Least-Squares Dummy Variable Bias-Corrected Estimator

JEL CLASSIFICATION: C23, E12, E24, and E44

1. INTRODUCTION

Since the mid-1970s and 1980s, the majority of developed economies have engaged in Reaganomics and Thatcherism and their financial systems have experienced huge liberalisation and deregulation, and these factors have contributed to a poor evolution of labour productivity and have revived the fears around a new ‘secular stagnation’ in the era of financialisation (Kus, 2012; Verceli, 2013; Barradas, 2016; Tridico and Pariboni, 2018; Pariboni *et al.*, 2020).

Effectively, the post-Keynesian literature tends to emphasise that the slowdown of labour productivity in the majority of developed economies in the last decades cannot be divorced from the phenomenon of financialisation, which has impaired it through four different channels, namely weak economic performance, a decline in the labour income share, an increase in personal income inequality, and strengthening of the degree of financialisation (Tridico and Pariboni, 2018; Correia and Barradas, 2021).

Some of these four channels have already been tested in several econometric works (Sylos Labini, 1983; Vergeer and Kleinknecht, 2014; Guarini, 2016; Micallef, 2016; Tridico and Pariboni, 2018; Carnevali *et al.*, 2020; Yousef, 2020; and Correia and Barradas, 2021), although these works do not directly assess all the aforementioned four channels through which the phenomenon of financialisation has undermined labour productivity. Tridico and Pariboni (2018) and Correia and Barradas (2021) are the only exceptions. The former work focuses on the Organisation for Economic Cooperation and Development (OECD) countries but uses only one proxy to capture the degree of financialisation (stock market capitalisation) and does not take into account in its estimates the potential indirect effects between the degree of financialisation (the fourth channel) and economic performance (the first channel), the labour income share (the second channel), and personal income inequality (the third channel). The latter work uses five different proxies to measure the degree of financialisation (credit, money supply, financial value added, stock market capitalisation, and shareholder orientation) and takes into account in its estimates the potential indirect effects between the degree of financialisation (the fourth channel) and economic performance (the first channel), labour income share (the second channel), and personal income inequality (the third channel) through the use of interaction terms, but it is only focused on Portugal.

This paper employs a panel data econometric approach in order to empirically ascertain the role of these four channels in the deceleration of labour productivity in the EU countries from 1980 to 2019. This paper offers at least five different novelties to the existing literature. Firstly, this paper assesses the role of the phenomenon of financialisation in explaining the poor evolution

of labour productivity in the EU countries, for which the empirical evidence is relatively scarce. The EU countries represent a very interesting case study because the majority of them have indeed experienced a slowdown of labour productivity (Figure A1 in the Appendix), which has occurred simultaneously with a weak economic performance (Figure A2 in the Appendix), a decline in the labour income share (Figure A3 in the Appendix), an increase in personal income inequality (Figure A4 in the Appendix), and a strengthening of the degree of financialisation (Figure A5 to A8 in the Appendix). This seems to suggest that the phenomenon of financialisation has played a central role in the poor evolution of labour productivity in the EU countries. Secondly, this paper employs a panel data econometric approach, which tends to be more beneficial than cross-sectional econometric approaches and/or time series econometric approaches as it allows for the collection of more observations and larger samples with higher heterogeneity, which improves the consistency and efficiency of the produced estimates (Baltagi, 2005). Vergeer and Kleinknecht (2014), Guarini (2016), Tridico and Pariboni (2018), and Carnevali *et al.* (2020) are examples of panel data econometric works on the determinants of labour productivity, although they do not focus directly on the EU countries and/or the majority of them do not assess all the aforementioned four channels through which the phenomenon of financialisation has impaired labour productivity. Thirdly, this paper uses four different proxies to measure the degree of financialisation (credit, liquid liabilities, stock market capitalisation, and stock market value traded), which allows us to take into account different scopes (e.g. size, depth, and efficiency) related to the role played by the financial system (Beck *et al.*, 2014; Breitenlechner *et al.*, 2015) and different scopes related to the role played by banks and financial (stock) markets to sustain the phenomenon of financialisation (Barradas, 2020). A similar strategy was also followed by Correia and Barradas (2021), although their econometric work is also centred on Portuguese labour productivity. Fourthly and similarly to the econometric work performed by Correia and Barradas (2021), this paper also estimates a model with interaction terms in order to properly evaluate the potential indirect effects between the degree of financialisation (the fourth channel) and economic performance (the first channel), the labour income share (the second channel), and personal income inequality (the third channel). Fifthly and contrary to the majority of econometric works on this matter, this paper presents not only the determinants of labour productivity in the EU countries but also the respective drivers, which allows us to better identify the influence of each channel linked to the phenomenon of financialisation on the poor evolution of labour productivity in the EU countries.

We estimate an aggregate equation according to which labour productivity depends on lagged labour productivity, economic performance, labour income share, personal income inequality, and degree of financialisation. We employed the Least-Squares Dummy Variable Bias-Corrected (LSDVC) estimator created by Nickel (1981), Bun and Kiviet (2003), Bun and

Carree (2005), and Bruno (2005a, 2005b) due to the existence of an unbalanced panel, a dynamic model, and a macro panel and the need to overcome the potential endogeneity due to the omission of relevant variables and/or simultaneity among the different variables (channels).

Our findings confirm that lagged labour productivity, economic performance, and labour income share have a positive impact on labour productivity in the EU countries, whilst personal income inequality and degree of financialisation impact it negatively. Our findings also reveal that labour productivity in the EU countries in the last decades would have been grown more if there had been a stronger economic performance, a smaller decline (or even a rise) of the labour income share, a smaller increase (or even a decrease) of personal income inequality, and a weakening of the degree of financialisation.

The remainder of the paper is organised as follows. Section 2 provides the theoretical and empirical literature on the relationship between the phenomenon of financialisation and the slowdown of labour productivity. In Section 3, we present the models to estimate labour productivity and the corresponding hypotheses. Data, stylised facts on labour productivity, and the econometric methodology are described in Sections 4 and 5, respectively. In Section 6, the findings are described and discussed. Finally, Section 7 concludes, presents the main policy implications, and adds some suggestions for further research.

2. LABOUR PRODUCTIVITY IN THE ERA OF FINANCIALISATION

The majority of the developed economies have faced a radical transformation since the mid-1970s and 1980s, particularly after the collapse of the Bretton Woods system and mainly with the administrations of Richard Nixon and Ronald Reagan in the United States and Margaret Thatcher in the United Kingdom, due to the adoption of a set of reforms and structural adjustments based on supply-side economics, liberal orientations, a laissez-faire paradigm, the abandonment of Keynesian policies and full employment goals, liberalisation of trade and capital mobility, labour flexibility and weaker labour market institutions, tax competition for corporations and capital, privatisations, and retrenchments of welfare states (Kus, 2012; Verceli, 2013; Tridico and Pariboni, 2018; Pariboni *et al.*, 2020). This new paradigm also implied a strong liberalisation and deregulation of the financial system, apparently as a motto to promote a higher financial development and stimulate economic growth (Barradas, 2016).

Against this backdrop, the financial system has gained great prominence and assumed growing dominance over the real economy and the everyday life of citizens in the most developed economies since that time, leading to a substantial transformation from a ‘manufacturing-driven’ economy to a ‘finance-orientated’ economy (Tomaskovic-Devey *et al.*, 2015). This has cast

doubts on the sustainable nature of this new strong liberalising and deregulatory environment, which has been fed by the higher recurrence of financial crises, a surge of financial corporate scandals and frauds, greater fragility of banking systems, lower stability of aggregate demand, and the growth of financial instability due to the corresponding rise of 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 excessive financial deepening and its negative repercussions in the economic and social spheres are commonly referred to as the phenomenon of financialisation (Barradas, 2016; Barradas *et al.*, 2018).

Additionally, an important feature linked to the phenomenon of financialisation has been the deceleration of labour productivity and the slowdown of economic performance in the majority of the developed economies in the last decades, which has revived fears of a new ‘secular stagnation’ in the era of financialisation (Tridico and Pariboni, 2018; Pariboni *et al.*, 2020). This also seems to indicate that the sustained downward trend in both labour productivity and economic performance cannot be divorced from the phenomenon of financialisation by refuting the conventional claims on the finance–productivity nexus and on the finance–growth nexus due to the potential positive effects of the financial system on the allocation of savings to investment and to research and development, innovation, and technological progress (Levine, 1997; Dua and Garg, 2019).

Effectively, the post-Keynesian literature tends to emphasise that the phenomenon of financialisation has impaired labour productivity due to four different channels, namely the weak economic performance, the decline in the labour income share, the increase in personal income inequality, and the strengthening of the degree of financialisation (Tridico and Pariboni, 2018; Correia and Barradas, 2021). The first three channels are indirect channels through which the phenomenon of financialisation has undermined labour productivity and the fourth channel is a direct channel through which the phenomenon of financialisation has weakened labour productivity. All of them are described thoroughly in what follows.

The first channel corresponds to an indirect effect between the phenomenon of financialisation, economic performance, and labour productivity. By relying on the post-Keynesian literature, this channel states that the phenomenon of financialisation has contributed to a weak economic performance¹, which impairs labour productivity due to the so-called ‘Smith effect’ (1776) or the so-called ‘Classical Kaldorian-Verdoorn effect’ (Verdoorn, 1949; Kaldor, 1961). These two effects consider the existence of a positive relationship between economic

¹ Barradas (2020) discusses the extent to which the phenomenon of financialisation has contributed to a weak economic performance in the last decades, which has been confirmed by several econometric works (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; Pariboni *et al.*, 2020).

performance and labour productivity due to the rising returns to scale (Kaldor, 1957). Sylos Labini (1983) adds that this positive relationship between economic performance and labour productivity occurs in both the short term and the long term. With regard to the short-term, the author claims that a better economic performance tends to promote a more efficient use of labour, often by exploiting earlier innovations, which contributes to the growth of labour productivity. Regarding the long term, the author highlights that a better economic performance will promote the introduction of new and more efficient plants and machines to replace the existing ones, which also fosters the growth of labour productivity. Moreover, a better economic performance suggests an extension of the domestic market, which will induce a greater division of labour with workers focusing on and specialising in specific tasks, which determines the growth of labour productivity (Sylos Labini, 1999; Carnevali *et al.*, 2020).

The second channel occurs through an indirect effect between the phenomenon of financialisation, labour income share, and labour productivity. Drawing on the post-Keynesian literature, this channel considers that the phenomenon of financialisation has damaged the labour income share², which undermines labour productivity due to the so-called ‘Webb-Sylos Labini effect’ (Sylos Labini, 1983, 1984, 1999) or the so-called ‘Marx and Hicks effect’ (Hein and Tarassow, 2010). These effects support the existence of a positive relationship between labour income share and labour productivity due to at least six different motives. Firstly, the positive relationship between the labour income share and labour productivity is linked with the so-called ‘organisation effect’ (Carnevali *et al.*, 2020), according to which the rise of labour income share stimulates the adoption of new technologies and the reorganisation of the production process in order to limit production costs by supporting the rise of production even without an increase in the number of workers and the growth of labour productivity (Webb, 1912; Sylos Labini, 1983, 1984, 1999; Altman, 1998). Secondly, the positive relationship between the labour income share and labour productivity is related to the so-called ‘wage-efficiency effect’ (Tridico and Pariboni, 2018), according to which the rise of labour income share induces a decline of the ‘x-inefficiencies’, which causes an improvement in working conditions, the reinforcement of more cooperative labour relations, improved motivation, decreased levels of turnover, increased discipline and effort among workers, and a corresponding growth of labour productivity (Altman, 1998). Thirdly, the positive relationship between the labour income share and labour productivity is connected to the so-called ‘savings effect’ (Altman, 1999), according to which the rise of the labour income share increases the pressure to adopt new technologies and the reorganise the production process, which forces high-wage corporations to increase their propensity to save in

² Hein (2012), Barradas and Lagoa (2017a), Barradas (2019), and Kohler *et al.* (2019) clarify the extent to which the phenomenon of financialisation has damaged the labour income share in the last decades, which has been confirmed by several econometric works (Kristal, 2010; Dühaupt, 2013; Lin and Tomaskovic-Devey, 2013; Alvarez, 2015; Barradas and Lagoa, 2017a; Stockhammer, 2017; Barradas, 2019; Kohler *et al.*, 2019).

order to sustain the rise of investment, which will cause the growth of labour productivity³. Fourthly, the positive relationship between the labour income share and labour productivity is associated with the so-called ‘Marshall effect’ (Marshall, 1890), according to which a rise in the labour income share attracts highly productive workers and motivates them to be more efficient by determining the growth of labour productivity (Carnevali *et al.*, 2020). Fifthly, the positive relationship between the labour income share and labour productivity is linked with the rise of market share of the most innovative corporations and the corresponding growth of labour productivity of the whole economy when there is a rise of the labour income share because routine corporations and/or laggards are thrown out of the market in a process of ‘natural selection’ or ‘creative destruction’ (Carnevali *et al.*, 2020). Sixthly, the positive relationship between the labour income share and labour productivity is related to countries that are characterised by ‘wage-led growth models’ (Onaran and Obst, 2016), according to which the rise of labour income share is beneficial to the economic performance by supporting the growth of labour productivity in these countries through the aforementioned ‘Smith effect’ (1776) or ‘Classical Kaldorian-Verdoorn effect’ (Verdoorn, 1949; Kaldor, 1961).

The third channel relates to an indirect effect between the phenomenon of financialisation, personal income inequality, and labour productivity. Based on the post-Keynesian literature, this channel states that the phenomenon of financialisation has caused an increase in personal income inequality⁴, which weakens labour productivity because workers put less effort into their jobs (Tridico and Pariboni, 2018) due to their increased vulnerability and reduced confidence in job stability in the labour market (Vergeer and Kleinknecht, 2014) in the face of more unstable and precarious jobs, higher flexibility, scarcer incentives, and lower-paid jobs (Pariboni and Tridico, 2020). Against this backdrop, the majority of workers, but particularly unskilled or low-skilled ones, feel less encouraged to invest in training and education in order to upgrade their skills, which also impairs labour productivity (Pariboni and Tridico, 2020). Note that the increase in personal income inequality, the decline of the labour income share, the weak economic performance, and the slowdown of labour productivity have been stylised facts in the era of financialisation, particularly due to the abandonment of Keynesian policies and full employment goals, the emergence of a paradigm based on ‘shareholder value orientation’, an excessive focus on short-term profits, the proliferation of multinational corporations that reallocate their production to low-wage countries, the deregulation and flexibilisation of labour markets (at the

³ Please note that we do not discuss this effect further because it relies on the neoclassical (mainstream) loanable funds theory, which is not consistent with the post-Keynesian literature.

⁴ Lagoa and Barradas (2020) examine the extent to which the phenomenon of financialisation has caused an increase in personal income inequality in the last decades, which has been confirmed by several econometric works (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 Courneade, 2015; Furceri and Loungani, 2015; Jaumotte and Buitron, 2015; Haan and Sturm, 2017; Baiardi and Morana, 2018).

level of unemployment benefits, employment protection, employment rights, and minimum wage), the propagation of practices such as outsourcing, the increase of precarious labour conditions, and the deterioration of workers' bargaining power (Tridico and Pariboni, 2018).

The fourth channel is associated with a direct effect between the phenomenon of financialisation and labour productivity. Grounded in the post-Keynesian literature, this channel considers that the phenomenon of financialisation has been harmful to innovation, research and development, technological progress, and productive investments performed by non-financial corporations⁵, which directly reduces labour productivity (Hein, 2010). This negative relationship between the phenomenon of financialisation and innovation, research and development, technological progress, and productive investments realised by non-financial corporations could be explained by two different motives. Firstly, the phenomenon of financialisation has instigated a rise of financial investments made by non-financial corporations, which diverts funds from innovation, research and development, technological progress, and productive investments and compromises the growth of labour productivity. This 'crowding-out effect' or 'management preference channel' (Hein, 2012) has been exacerbated by the existence of shorter planning horizons and the corresponding 'managerial myopia' (Crotty, 2005; Samuel, 2000); an excessive focus on short-term profits (so-called 'rent-seeking behaviour') instead of long-term expansion (Orhangazi, 2008); the decreasing trend of profits in productive activities and the increasing trend of external funding costs since the mid-1980s (Crotty, 2005; Orhangazi, 2008; Baud and Durand, 2012); the rise of macroeconomic uncertainty and heightened risks (Akkemik and Özen, 2014); the learning process with other non-financial corporations (so-called 'mimetic behaviour'); and the strong influence of some agents (e.g. financial executives or independent consultants) concerning the advantages of higher engagement in financial activities (Soener, 2015). Secondly, the phenomenon of financialisation has instigated lower retention ratios due to the strong pressures exerted by shareholders over non-financial corporations to increase their financial payments (e.g. interest, dividends, stock buybacks), which decreases the funds available for innovation, research and development, technological progress, and productive investments and compromises the growth of labour productivity. This 'profit without investment' hypothesis or 'internal means of finance channel' (Stockhammer, 2006; Hein, 2012; Cordonnier and Van de Velde, 2015) has been exacerbated by the 'principle of increasing risk' and the corresponding difficulty of accessing external funding in the presence of imperfect capital markets (Kalecki, 1937; Hein, 2010); the higher levels of indebtedness exhibited by non-financial corporations (Orhangazi, 2008); the proliferation of remuneration schemes based on profits (Orhangazi, 2008);

⁵ This disruptive relationship between the phenomenon of financialisation and innovation, research and development, technological progress, and productive investments performed by non-financial corporations has been confirmed by several econometric works (Stockhammer, 2004; Orhangazi, 2008; van Treeck, 2008; Onaran *et al.*, 2011; Seo *et al.*, 2012; Barradas, 2017; Barradas and Lagoa, 2017b; Davis, 2017; Tori and Onaran, 2017, 2019).

the increasing significance of institutional investors (Orhangazi, 2008); and the excessive focus on the primacy of shareholder value (so-called ‘shareholder value orientation’) by underestimating other corporations’ stakeholders (Lazonick and O’Sullivan, 2000).

From an empirical point of view, we identify in the existing literature several econometric works that address the determinants of labour productivity, namely 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), and Correia and Barradas (2021). Nevertheless, the majority of these econometric works face at least one important flaw because they do not take into account the aforementioned four channels through which the phenomenon of financialisation has slowed down labour productivity in the majority of the developed countries. This increases the risk that their results could be biased and inconsistent because several relevant variables are clearly omitted (Baltagi, 2005). The econometric works performed by Tridico and Pariboni (2018) and Correia and Barradas (2021) are the only two exceptions. The former conducts a panel data econometric analysis for 26 countries of the OECD (Australia, Austria, Belgium, Canada, Chile, Denmark, Finland, France, Germany, Greece, Iceland, Israel, Italy, Japan, Luxembourg, Mexico, New Zealand, Norway, Portugal, Republic of Korea, Spain, Sweden, Switzerland, the Netherlands, the United Kingdom, and the United States) from 1990 to 2013 and the latter performs a time series econometric analysis for Portugal from 1980 to 2017. Nonetheless, the former applies only one proxy to capture the degree of financialisation (stock market capitalisation) and does not take into account in its estimates the potential indirect effects between the degree of financialisation (the fourth channel) and economic performance (the first channel), the labour income share (the second channel), and personal income inequality (the third channel). The latter uses five different proxies to measure the degree of financialisation (credit, money supply, financial value added, stock market capitalisation, and shareholder orientation) and employs interaction terms in its estimates in order to take into consideration the potential indirect effects between the degree of financialisation (the fourth channel) and economic performance (the first channel), the labour income share (the second channel), and personal income inequality (the third channel). Both of these econometric works find that economic performance and labour income share exert a positive impact on labour productivity, whilst personal income inequality and the degree of financialisation exert a negative impact on labour productivity. Sylos Labini (1983) for the United States and Italy, 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), and Carnevali *et al.* (2020) for eight euro-area countries (Austria, France, Greece, Germany, Italy, the

Netherlands, Portugal, and Spain) also conclude that economic performance impacts labour productivity positively. Vergeer and Kleinknecht (2014) for 20 OECD countries (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 Carnevali *et al.* (2020) and Yousef (2020) for Jordan also find that labour income share exerts a positive effect on labour productivity.

Similarly to the econometric works carried out by Tridico and Pariboni (2018) and Correia and Barradas (2021), this paper aims to assess the role of the phenomenon of financialisation in labour productivity by performing a panel data econometric work for all the EU countries from 1980 to 2019.

3. MODELS AND HYPOTHESES

Our model to estimate labour productivity is an extension of the model presented by Sylos Labini (1983, 1984, 1999) and by Tridico and Pariboni (2018), according to which labour productivity depends on the aforementioned four channels through which the phenomenon of financialisation has impaired the evolution of labour productivity in the majority of the developed economies in the last decades.

Against this backdrop, our model to estimate labour productivity includes five independent variables, namely lagged labour productivity, economic performance, labour income share, personal income inequality, and degree of financialisation⁶. The inclusion of lagged labour productivity among the independent variables aims to control for state dependency and to assess the degree of persistence and inertia shown by labour productivity (Vergeer and Kleinknecht, 2004).

Our model to estimate labour productivity assumes the following configuration:

$$LP_{i,t} = \beta_0 + \beta_1 LP_{i,t-1} + \beta_2 EP_{i,t} + \beta_3 LIS_{i,t} + \beta_4 PII_{i,t} + \beta_5 DF_{i,t} + \alpha_{i,t} \quad (1)$$

⁶ Please note that we do not include in our model to estimate labour productivity the cost of labour in relation to the price of investment goods – the so-called ‘Ricardo effect’ (Ricardo, 1821) – due to three different theoretical motives. Firstly and taking into account a Sraffian point of view, the ‘Ricardo effect’ changes with the distribution of income by implying that the cost of labour and the price of investment goods are interdependent, which constitutes an objection to including the ‘Ricardo effect’ among the independent variables of our model to estimate labour productivity (Sylos Labini, 1983). Secondly, the validity of the ‘Ricardo effect’ is quite limited because it is restricted to an extremely special case by requiring very specific assumptions about the available set of production methods from which producers can choose (Gehrke, 2003). Thirdly, the impact on labour productivity of the ‘Ricardo effect’ is rather analogous to the one exerted by the aforementioned ‘Webb-Sylos Labini effect’ or the ‘Marx and Hicks effect’, namely because both of them will induce the adoption of new technologies and the reorganisation of the production process in order to limit production costs, which supports the growth of labour productivity (Tridico and Pariboni, 2018). A similar empirical strategy was carried out by Tridico and Pariboni (2018) and Correia and Barradas (2021).

where i is the country, t is the time period (year), LP is labour productivity, EP is economic performance, LIS is the labour income share, PII is personal income inequality, DF is the degree of financialisation, and α is the two-way error term component to account for unobservable country-specific effects and time-specific effects.

Our hypotheses assume that lagged labour productivity, economic performance, and labour income share should positively impact labour productivity, whereas personal income inequality and degree of financialisation should negatively impact labour productivity. Our estimated coefficients should exhibit the following signs:

$$\beta_1 > 0, \beta_2 > 0, \beta_3 > 0, \beta_4 < 0, \beta_5 < 0 \quad (2)$$

We also present a second model to estimate labour productivity by including three interaction terms between the degree of financialisation and economic performance, the degree of financialisation and labour income share, and the degree of financialisation and personal income inequality. This model, similar to the one proposed by Correia and Barradas (2021), aims to better assess the aforementioned three indirect effects through which the phenomenon of financialisation has undermined the evolution of labour productivity.

Our second model to estimate labour productivity assumes the following configuration:

$$LP_{i,t} = \beta_0 + \beta_1 LP_{i,t-1} + \beta_2 EP_{i,t} + \beta_3 EP_{i,t} \times DF_{i,t} + \beta_4 LIS_{i,t} + \beta_5 LIS_{i,t} \times DF_{i,t} + \beta_6 PII_{i,t} + \beta_7 PII_{i,t} \times DF_{i,t} + \beta_8 DF_{i,t} + \alpha_{i,t} \quad (3)$$

According to our second model to estimate labour productivity, the impact of economic performance, labour income share, and personal income inequality on labour productivity depends linearly on the degree of financialisation, that is:

$$(\beta_2 EP_{i,t} + \beta_3 EP_{i,t} \times DF_{i,t})' = \beta_2 + \beta_3 DF_{i,t} \quad (4)$$

$$(\beta_4 LIS_{i,t} + \beta_5 LIS_{i,t} \times DF_{i,t})' = \beta_4 + \beta_5 DF_{i,t} \quad (5)$$

$$(\beta_6 PII_{i,t} + \beta_7 PII_{i,t} \times DF_{i,t})' = \beta_6 + \beta_7 DF_{i,t} \quad (6)$$

Here, β_2 , β_4 , and β_6 measure the impact of economic performance, labour income share, and personal income inequality on labour productivity if the degree of financialisation is zero. In that situation, economic performance and labour income share should positively impact labour productivity, whereas personal income inequality should negatively impact labour productivity. At different (positive and higher) values of the degree of financialisation, the impact of economic performance, labour income share, and personal income inequality on labour productivity tends to be lower due to the arguments described previously according to which the phenomenon of financialisation has favoured a weak economic performance, a decline in the labour income share, and an increase in personal income inequality by impairing labour productivity. Our estimated coefficients should exhibit the following signs:

$$\beta_1 > 0, \beta_2 > 0, \beta_3 < 0, \beta_4 > 0, \beta_5 < 0, \beta_6 < 0, \beta_7 < 0, \beta_8 < 0 \quad (7)$$

Our two models to estimate labour productivity represent an aggregate equation to assess the extent to which the phenomenon of financialisation has contributed to the decline of labour productivity in the EU countries in the last few decades. Our macroeconomic approach introduces at least two important flaws in our analysis. On the one hand, we cannot assess the role of the phenomenon of financialisation in the slowdown of labour productivity in different corporations, sectors, industries, and/or regions. On the other hand, we cannot assess the role of the phenomenon of financialisation in the slowdown of labour productivity in the different countries, namely because we are dealing with a panel data econometric work that produces estimates that represent an average effect of the phenomenon of financialisation on labour productivity for all the EU countries as a whole. Nonetheless, our macroeconomic approach allows us to assess the general macroeconomic effect of the phenomenon of financialisation on the decline of labour productivity in the EU countries. Against this backdrop, if the aforementioned four channels linked to the phenomenon of financialisation are proved to impact labour productivity in the EU countries, we cannot assess whether their impact affects only some corporations, sectors, industries, regions, and/or countries or affects all corporations, sectors, industries, regions, and/or countries indifferently. If the aforementioned four channels related to the phenomenon of financialisation are proved to not impact labour productivity in the EU countries, we cannot assess whether their impact affects some corporations, sectors, industries, and/or countries but not enough to generate a global impact in all corporations, sectors, industries, regions, and/or countries.

4. DATASET AND STYLISTED FACTS ON LABOUR PRODUCTIVITY

We collected annual data from 1980 to 2019 for all the EU countries, constituting a panel dataset composed of a total of 28 cross-sectional units ($N = 28$) observed over time ($T = 40$)⁷. This represents the span and the frequency for which all data are available. Note that the proxy for personal income inequality is only available on a yearly basis from 1980 to 2019.

Due to the natural complexity related to the phenomenon of financialisation, we used four different variables to measure the degree of financialisation, namely credit, liquid liabilities, stock market capitalisation, and stock market value traded. On the one hand, these four variables reflect different scopes related to the role played by the financial system, namely its size, depth, and efficiency (Beck *et al.*, 2014; Breitenlechner *et al.*, 2015). On the other hand, these four variables reflect different scopes related to the role played by banks and by financial (stock) markets to sustain the phenomenon of financialisation (Barradas, 2020). Credit and liquid liabilities are more connected to the role played by the banking system, while the stock market capitalisation and the stock market value traded are more linked to financial (stock) markets. These four proxies will be used separately from each other in order to avoid multicollinearity problems and to confirm the robustness of our results to the proxy chosen.

Nonetheless, the available data differ slightly according to each proxy for the degree of financialisation, although for each of them there is not data available for all the years for each country. Thus, and in order to maximize the number of observations and to minimize the number of missing values, four unbalanced panels were created. Table 1 describes the structure and composition of our four unbalanced panels.

Table 1. The structure and composition of our four unbalanced panels

Country	Credit	Liquid Liabilities	Stock Market Capitalisation	Stock Market Value Traded
Austria	1980-2017	1980-2017	1980-2019	1980-2019
Belgium	1980-2017	1980-2017	1980-2018	1980-2014
Bulgaria	1996-2017	1996-2017	1996-2011	1996-2013 and 2019
Croatia	1996-2017	1996-2017	1996-2019	1996-2019
Cyprus	1996-2017	1996-2017	2006-2019	1996-2019

⁷ The United Kingdom was also included in our sample because our dataset encompasses annual data from 1980 to 2019 and Brexit only occurred at the beginning of 2020.

Czechia	1994-2017	1994-2017	1994-2008	1994-2014
Denmark	1980-2017	1980-2017	1980-2004	1980-2004
Estonia	1995-2017	2004-2017	1999-2011	1998-2004
Finland	1980-2017	1980-2017	1982-2004	1982-2004
France	1980-2017	1980-2017	1980-2018	1980-2014
Germany	1992-2017	1992-2017	1992-2019	1992-2019
Greece	1980-2017	1980-2017	2001-2019	1980-2019
Hungary	1996-2017	1996-2017	2002-2019	2002-2019
Ireland	1980-2017	1980-2017	1997-2018	1995-2019
Italy	1980-2017	1980-2017	1999-2008	1980-2008
Latvia	1993-2017	1994-2017	1995-2011	1997-2004
Lithuania	1993-2017	1994-2017	1995-2011	2003-2004
Luxembourg	1980-2017	1980-2017	1980-2019	1982-2019
Malta	1992-2017	1992-2017	2000-2019	1998-2019
Netherlands	1980-2017	1980-2017	1980-2017	1980-2014
Poland	1993-2017	1993-2017	1995-2019	1993-2019
Portugal	1980-2017	1980-2017	1980-2018	1993-2014
Romania	1996-2017	1991-2017	1998-2011 and 2019	1997-2014 and 2019
Slovakia	1996-2017	2002-2017	1996-2013	1996-2013
Slovenia	1996-2017	1996-2017	1997-2019	1996-2019
Spain	1980-2017	1980-2017	1980-2019	1980-2019
Sweden	1980-2017	1980-2017	1980-2003	1980-2004
United Kingdom	1980-2017	1980-2017	1980-2008	1980-2008
Observations	860	848	690	702
Missing Values	260	272	430	418
Total	1120	1120	1120	1120

Table 2. The proxies, units and sources for each variable

Variable	Proxy	Source
Labour Productivity	GDP at constant prices per person employed (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	Domestic credit to the private sector (% of GDP)	The Global Economy
Liquid Liabilities	Liquid liabilities (% of GDP)	The Global Economy
Stock Market Capitalisation	Stock market capitalisation (% of GDP)	The Global Economy ⁸
Stock Market Value Traded	Stock market value traded (% of GDP)	The Global Economy

Table 3. The descriptive statistics of each variable in each unbalanced panel

Model	Statistic	<i>LP</i>	<i>EP</i>	<i>LIS</i>	<i>PII</i>	<i>DF</i>
Credit	Mean	0.020	0.025	0.546	0.330	0.751
	Median	0.018	0.027	0.548	0.331	0.709
	Maximum	0.208	0.252	0.764	0.450	2.533
	Minimum	-0.129	-0.164	0.347	0.232	0.067
	Standard Deviation	0.028	0.034	0.058	0.038	0.414
	Skewness	0.574	-0.713	-0.015	0.156	1.115
	Kurtosis	9.249	9.889	2.841	3.007	4.927
	Liquid Liabilities	Mean	0.019	0.025	0.548	0.329
Median		0.018	0.026	0.550	0.330	0.646
Maximum		0.208	0.252	0.764	0.450	9.387
Minimum		-0.126	-0.148	0.347	0.233	0.037
Standard Deviation		0.028	0.033	0.058	0.036	1.060
Skewness		0.555	-0.655	0.033	0.085	5.607
Kurtosis		9.551	9.617	2.965	2.984	37.929

⁸ Please note that the information pertaining to the stock market capitalisation for Estonia, Latvia and Lithuania were collected from the Fred St. Louis database due to the inexistence of that information for these three specific countries on The Global Economy database.

Stock Market Capitalisation	Mean	0.020	0.027	0.549	0.332	0.433
	Median	0.018	0.027	0.552	0.333	0.321
	Maximum	0.208	0.252	0.764	0.450	3.264
	Minimum	-0.112	-0.148	0.338	0.238	0.001
	Standard Deviation	0.027	0.034	0.060	0.036	0.395
	Skewness	0.810	-0.482	-0.138	0.081	1.990
	Kurtosis	9.623	9.623	2.934	3.066	9.445
	Stock Market Value Traded	Mean	0.019	0.026	5.488	0.330
Median		0.018	0.027	0.551	0.332	0.068
Maximum		0.208	0.252	0.764	0.450	2.653
Minimum		-0.112	-0.141	0.330	0.233	0.000
Standard Deviation		0.026	0.030	0.060	0.038	0.321
Skewness		0.835	-0.015	-0.192	0.048	2.844
Kurtosis		11.105	9.428	3.117	2.976	14.069

Table 4. The correlation matrix between all the variables in each unbalanced panel

Model	Variable	LP	EP	LIS	PII	DF
Credit	LP	1.000				
	EP	0.739***	1.000			
	LIS	-0.122***	-0.207***	1.000		
	PII	0.090***	0.121***	-0.249***	1.000	
	DF	-0.302***	-0.186***	0.064*	0.103***	1.000
Liquid Liabilities	LP	1.000				
	EP	0.734***	1.000			
	LIS	-0.141***	-0.247***	1.000		
	PII	0.068**	0.119***	-0.271***	1.000	
	DF	-0.180***	0.001	-0.089***	0.175***	1.000
Stock Market Capitalisation	LP	1.000				
	EP	0.716***	1.000			
	LIS	-0.187***	-0.280***	1.000		
	PII	0.078**	0.127***	-0.238***	1.000	
	DF	-0.159***	0.097**	-0.042	0.110***	1.000
Stock Market Value Traded	LP	1.000				
	EP	0.726***	1.000			
	LIS	-0.142***	-0.274***	1.000		
	PII	0.055	0.129***	-0.239***	1.000	
	DF	-0.105***	-0.004	0.034	0.033	1.000

Note: *** indicates statistically significance at 1% level, ** indicates statistically significance at 5% level and * indicates statistically significance at 10% level

Table 1 exhibits proxies, units, and sources for each variable, Table 2 includes the descriptive statistics of each variable in each unbalanced panel, Table 3 contains the correlation matrix between all the variables in each unbalanced panel, and Figures A1 to A8 in the Appendix show the plots of each variable.

All correlations between all the variables in each unbalanced panel are less than 0.8 in absolute terms, which disproves the hypothesis on the existence of multicollinearity among them (Studenmund, 2005). We also confirm that labour productivity has exhibited a timid growth of around 2% on average in the EU countries from 1980 and 2019 (Table 2), in a context where its slowing down has been a stylised fact in the majority of EU countries (Figure A1 in the Appendix). Similarly, the weak economic performance, the decline in the labour income share, the increase in personal income inequality, and the strengthening of the degree of financialisation have also been stylised facts in the majority of EU countries in the last decades (Figures A2 to A8 in the Appendix), which suggests that the aforementioned four channels through which the phenomenon of financialisation has made labour productivity sluggish has also occurred in the case of the EU countries.

5. ECONOMETRIC METHODOLOGY

Our econometric methodology involves the implementation of the LSDVC estimator proposed by Nickel (1981), Bun and Kiviet (2003), and Bun and Carree (2005) and extended by Bruno (2005a, 2005b) for the specific case of unbalanced panels. Stata software is used to produce our estimates by employing the ‘xtlsdvc’ routine.

This particular estimator was chosen for four different reasons, which are directly related to the characteristics of our four panels (unbalanced, dynamic, and macro panels) and the need to deal with the potential problem of endogeneity. On the one hand, our four panels described previously are indeed unbalanced due to the existence of some missing values because it was not possible to collect data for all the variables for all the years for each country, are also dynamic due to the inclusion of lagged labour productivity among the independent variables, and are also macro due to the relatively small number of cross-sectional units (countries). On the other hand, we need to take into account the hypothetical existence of endogeneity for two different reasons, namely the omission of the aforementioned ‘Ricardo effect’ (Ricardo, 1821) and/or other relevant variables not directly or indirectly linked to the phenomenon of financialisation but that are typically used in some econometric works on this subject (Fortune, 1987; Vergeer and Kleinknecht, 2014; Guarini, 2016; Micallef, 2016; Dua and Garg, 2019; Carnevali *et al.*, 2020; Pariboni and Tridico, 2020; Yousef, 2020) and the possibility of simultaneity among our variables (Vergeer and Kleinknecht, 2014; Carnevali *et al.*, 2020).

In what follows, we describe the four reasons that explain our choice to implement the LSDVC estimator. Firstly, the conventional panel data estimators (e.g. pooled ordinary least squares, least-squares dummy variables, fixed effects, and random effects) do not produce unbiased and consistent estimates in the case of dynamic panel data models, particularly because the lagged dependent variable is correlated with fixed effects in the error term component (Nickel, 1981). Secondly, the conventional panel data estimators for dynamic panel data models (e.g. Anderson and Hsiao, 1982; Arrelano and Bond, 1991; Arrelano and Bover, 1995; Blundell and Bond, 1998) also do not produce unbiased and consistent estimates in the case of macro panels with a relatively small number of cross-sectional units (Bruno, 2005a, 2005b). Thirdly, the Monte Carlo simulations show that the LSDVC estimator outperforms the aforementioned estimators in terms of efficiency and consistency in the case of macro panels (Kiviet, 1995; Judson and Owen, 1999; Bruno 2005a, 2005b). Fourthly, the Monte Carlo simulations also show that the LSDVC estimator performs reasonably well in terms of efficiency and consistency even in the presence of endogeneity (Behr, 2003).

The LSDVC works in two different steps in order to produce the corresponding estimates (Bruno, 2005a, 2005b). In the first one, the LSDVC estimator produces consistent estimates by requiring an initial matrix of starting values to be defined through the implementation of one of three consistent estimators, namely Anderson and Hsiao (1982), Arrelano and Bond (1991), and Blundell and Bond (1998). In the second one, the LSDVC estimator corrects the bias by performing several multiple replications to bootstrap the standard errors. Nevertheless, the choices in the aforementioned two steps related to the consistent estimator and the number of replications do not affect the estimates produced by the LSDVC estimators in terms of statistical significance and/or signs (Bun and Kiviet, 2001; Bruno, 2005a, 2005b).

6. RESULTS AND DISCUSSION

In this section, we present our estimates for labour productivity in the EU countries for the model without interaction terms (Table 5) and for the model with interaction terms (Table 6). For the two models, Arrelano and Bond's (1991) estimator was employed in the first stage and a number of replications equal to 250 was used in the second stage. For these two models, we included time dummies in order to take into account the specific features of each year in the evolution of labour productivity in the EU countries. Wald tests were also performed in order to assess the statistical significance of the time dummies.

In relation to the estimates for labour productivity in the EU countries for the model without interaction terms (Table 5), our findings confirm that all variables are statistically significant at the traditional significance levels and have the expected signs. This confirms the

robustness of our estimates, namely because our results do not change considerably when using the different proxies for the degree of financialisation. We find that the lagged labour productivity positively impacts the actual labour productivity in the EU countries by confirming that this variable evolves with a strong inertia, which is in line with the results found by Vergeer and Kleinknecht (2014) and Correia and Barradas (2021). This reinforces the urgent need for the adoption of several policies to reverse this downward on the evolution of labour productivity in the EU countries, otherwise the current slowdown will persist in the coming years. We also find that economic performance is a positive determinant of labour productivity in the EU countries, which is in line with the ‘Smith effect’ (1776) or the ‘Classical Kaldorian-Verdoorn effect’ (Verdoorn, 1949; Kaldor, 1961). Sylos Labini (1983), Guarini (2016), Tridico and Pariboni (2018), Carnevali *et al.* (2020), and Correia and Barradas (2021) also report a positive effect of economic performance on labour productivity. Our findings also confirm that the labour income share also determines labour productivity in the EU countries by exerting a positive effect. This result supports the ‘Webb-Sylos Labini effect’ (Sylos Labini, 1983, 1984, 1999) or the ‘Marx and Hicks effect’ (Hein and Tarassow, 2010). Vergeer and Kleinknecht (2014), Tridico and Pariboni (2018), Carnevali *et al.* (2020), Yousef (2020), and Correia and Barradas (2021) also found that labour income share exerts a positive impact on labour productivity. As also expected, personal income inequality exerts a negative effect on labour productivity in the EU countries⁹. A similar result was reported by Tridico and Pariboni (2018) and Correia and Barradas (2021). As also found by Tridico and Pariboni (2018) and Correia and Barradas (2021), our results confirm that the degree of financialisation negatively impacts the labour productivity in the EU countries. The only exception pertains to the case with the proxy of credit, according to which labour productivity depends positively on credit. This counterintuitive result could be explained by the structure of the productive system in the EU countries, where the majority of corporations (around 99%) are small and medium sized. These corporations face higher funding constraints in comparison with larger corporations and they are more dependent on credit to improve labour productivity through new investments in human capital and/or on physical capital.

Table 5. Estimates of labour productivity for the model without interaction terms (1980-2019)

Variable	Credit	Liquid Liabilities	Stock Market Capitalisation	Stock Market Value Traded
<i>LP_{t-1}</i>	0.042 (0.029) [1.45]	0.058** (0.027) [2.12]	0.023 (0.032) [0.72]	0.110*** (0.035) [3.13]

⁹ It is worth noting that the negative effect of personal income inequality on labour productivity in the EU countries would be maintained if we used the top 1% income share or the Gini coefficient instead of the top 10% income share. Results are available upon request.

	0.607*** (0.027) [22.33]	0.604*** (0.026) [23.43]	0.594*** (0.025) [23.50]	0.620*** (0.029) [20.79]
<i>EP_t</i>	0.038** (0.019) [2.05]	0.037* (0.020) [1.89]	0.024 (0.027) [0.90]	0.033 (0.024) [1.37]
<i>LIS_t</i>	-0.052* (0.032) [-1.63]	-0.056* (0.032) [-1.74]	-0.060 (0.038) [-1.59]	-0.078** (0.036) [-2.19]
<i>PII_t</i>	0.006** (0.003) [2.12]	-0.001* (0.001) [-1.64]	-0.007** (0.003) [-2.16]	-0.005* (0.003) [-1.63]
Observations	804	792	633	644
Countries	28	28	28	27
Years	40	40	40	40
Time Effects	Yes	Yes	Yes	Yes
Wald Test (P-value)	0.000***	0.000***	0.000**	0.000***

Note: Standard errors in (), z-statistics in [], *** indicates statistically significance at 1% level, ** indicates statistically significance at 5% level and * indicates statistically significance at 10% level. Coefficients, standard errors and z-statistics for the year dummies are not reported

Table 6. Estimates of labour productivity for the model with interaction terms (1980-2019)

Variable	Credit	Liquid Liabilities	Stock Market Capitalisation	Stock Market Value Traded
<i>LP_{t-1}</i>	0.029 (0.027) [1.08]	0.059** (0.027) [2.17]	0.022 (0.032) [0.71]	0.088*** (0.033) [2.64]
<i>EP_t</i>	0.834*** (0.035) [23.65]	0.601*** (0.030) [20.16]	0.591*** (0.028) [21.43]	0.674*** (0.030) [22.84]
<i>EP_t×DF_t</i>	-0.367*** (0.040) [-9.21]	0.004 (0.020) [0.20]	0.007 (0.053) [0.14]	-0.617*** (0.098) [-6.29]
<i>LIS_t</i>	0.039* (0.023) [1.65]	0.039 (0.028) [1.38]	0.036 (0.028) [1.25]	0.041* (0.025) [1.64]
<i>LIS_t×DF_t</i>	-0.041 (0.038)	-0.003 (0.035)	-0.048 (0.051)	-0.085* (0.051)

	[-1.09]	[-0.08]	[-0.95]	[-1.66]
	-0.012	-0.057	-0.058	-0.096***
<i>PII_t</i>	(0.045)	(0.040)	(0.043)	(0.037)
	[-0.28]	[-1.41]	[-1.36]	[-2.60]
	-0.043	0.001	-0.011	0.058
<i>PII_t×DF_t</i>	(0.046)	(0.021)	(0.054)	(0.064)
	[-0.94]	[0.03]	[-0.21]	[0.90]
	0.046*	-0.0003	0.023	0.047
<i>DF_t</i>	(0.028)	(0.021)	(0.039)	(0.037)
	[1.65]	[-0.01]	[0.58]	[1.28]
Observations	804	792	633	644
Countries	28	28	28	27
Years	40	40	40	40
Time Effects	Yes	Yes	Yes	Yes
Wald Test (P-value)	0.000***	0.000***	0.000***	0.000***

Note: Standard errors in (), z-statistics in [], *** indicates statistically significance at 1% level, ** indicates statistically significance at 5% level and * indicates statistically significance at 10% level. Coefficients, standard errors and z-statistics for the year dummies are not reported

With regard to the estimates for labour productivity in the EU countries for the model with interaction terms (Table 6), our findings do not change considerably in comparison with the results for the model without interaction terms. Effectively, we continue to find evidence that labour productivity is strongly persistent, positively affected by economic performance and labour income share, and negatively affected by personal income inequality. The main change occurs with the degree of financialisation, which loses its statistical significance in the majority of cases, with the exception of the case where credit is used as a proxy, which continues to exhibit a positive effect on labour productivity. Our findings confirm that the interaction term between economic performance and the degree of financialisation is statistically significant at the traditional significance levels and exhibits a negative sign, which confirms that the impact of economic performance on labour productivity in the EU countries depends linearly and negatively on the degree of financialisation. We also find that the interaction term between labour income share and the degree of financialisation is also statistically significant at the traditional significance levels and exhibits a negative coefficient, which corroborates that the impact of labour income share on labour productivity in the EU countries also depends linearly and negatively on the degree of financialisation. These results are in line with the post-Keynesian predictions on the existence of the aforementioned indirect channels between the strengthening of the degree of financialisation, the weak economic performance (and the decline of the labour income share), and the

corresponding slowdown of labour productivity in the EU countries (Tridico and Pariboni, 2018; Correia and Barradas, 2021). The statistical insignificance of the interaction term between personal income inequality and labour productivity does not confirm the indirect channel between the strengthening of the degree of financialisation, the increase of personal income inequality, and the deceleration of labour productivity in the EU countries (Tridico and Pariboni, 2018; Correia and Barradas, 2021), probably because the increase of personal income inequality in the EU countries is explained not only by the phenomenon of financialisation but also by a host of different factors.

In order to confirm the robustness of our estimates to resampling, we also employ a jackknife analysis (Quenouille, 1949, 1956; Tukey, 1958) through the re-estimation of our results for the model without interaction terms and for the model with interaction terms by excluding one country at a time and one year at a time¹⁰. For both models, the results of the jackknife analysis show that the majority of our variables maintain their statistical significance and the same impacts on labour productivity vis-à-vis the results for all the EU countries for all the years that are shown in Tables 5 and 6.

Our results confirm that the poor evolution of labour productivity in the EU countries cannot be divorced from the phenomenon of financialisation and its corresponding four channels. Tables 7 and 8 describe the economic effects of our estimates (McCloskey and Ziliak, 1996; Ziliak and McCloskey, 2004) in order to assess the role of each channel in the evolution of labour productivity in the EU countries. Just for simplicity, we present the economic effects only for the model without interaction terms.

Table 7. Economic effects of labour productivity for the model without interaction terms (1980-2019)

Model	Variable	Short-term Coefficient	Long-term Coefficient	Actual Cumulative Change ¹¹	Economic Effect
Credit	EP_t	0.607*** (0.027) [22.33]	0.633*** (0.025) [11.61]	0.025	0.016
	LIS_t	0.038** (0.019) [2.05]	0.040** (0.019) [2.06]	-0.170	-0.007
	PII_t	-0.052* (0.019) [2.05]	-0.054* (0.019) [2.06]	0.137	-0.007

¹⁰ Please note that the results of the jackknife analysis are available upon request.

¹¹ Note that the actual cumulative change for the models with the proxies of credit and liquid liabilities corresponds to the annual growth rate of the correspondent variables from 1980 and 2017 due to the existence of missing values in 2018 and 2019 (Table 1).

		(0.032) [-1.63] 0.006**	(0.034) [-1.62] 0.006**		
	<i>DF_t</i>	(0.003) [2.12]	(0.003) [2.12]	0.565	-0.004
Liquid Liabilities	<i>EP_t</i>	0.604*** (0.026) [23.43] 0.037*	0.641*** (0.028) [23.30] 0.039*	0.025	0.016
	<i>LIS_t</i>	(0.020) [1.89] -0.056*	(0.021) [1.88] -0.059*	-0.170	-0.007
	<i>PII_t</i>	(0.032) [-1.74] -0.001*	(0.034) [-1.73] -0.001*	0.137	-0.008
	<i>DF_t</i>	(0.001) [-1.64]	(0.001) [-1.64]	1.017	-0.001
Stock Market Capitalisation	<i>EP_t</i>	0.594*** (0.025) [23.50] -0.007**	0.608*** (0.024) [24.84] -0.007**	0.027	0.016
	<i>DF_t</i>	(0.003) [-2.16]	(0.003) [-2.15]	2.714	-0.019
Stock Market Value Traded	<i>EP_t</i>	0.620*** (0.029) [20.79] -0.078**	0.696*** (0.030) [23.12] -0.088**	0.026	0.018
	<i>PII_t</i>	(0.036) [-2.19] -0.005*	(0.040) [-2.19] -0.005*	0.188	-0.017
	<i>DF_t</i>	(0.003) [-1.63]	(0.003) [-1.62]	3.273	-0.016

Note: Standard errors in (), z-statistics in [], *** indicates statistical significance at 1% level, ** indicates statistical significance at 5% level and * indicates statistical significance at 10% level. The long-term coefficient is calculated through the ratio between the short-term coefficient (estimated coefficient) and one minus the coefficient of the autoregressive estimation (estimated lagged labour productivity coefficient) by employing the 'nlcom' routine from the Stata software. The actual cumulative change corresponds to the average annual growth rate of the economic performance and to the growth rate of the labour income share, personal income inequality and degree of financialisation. The economic effect is the multiplication of the long-term coefficient by the actual cumulative change

Table 8. Average of the economic effects of labour productivity for the model without interaction terms (1980-2019)

Variable	Short-term Coefficient (Average)	Long-term Coefficient (Average)	Actual Cumulative Change (Average)	Economic Effect (Average)
<i>EP_t</i>	0.606	0.645	0.026	0.017
<i>LIS_t</i>	0.038	0.040	-0.170	-0.007
<i>PII_t</i>	-0.062	-0.067	0.154	-0.011
<i>DF_t</i>	-0.002	-0.002	1.892	-0.010

We conclude that all four channels associated with the phenomenon of financialisation explain the evolution of labour productivity in the EU countries. The increase of personal income inequality, the strengthening of the degree of financialisation, and the decline of the labour income share have contributed to the sluggish labour productivity in the EU countries from 1980 to 2019 by around 1.1%, 1%, and 0.7% on average, respectively. Economic performance has been the main driver of labour productivity in the EU countries by favouring a growth of about 1.7% on average, which has not been enough to compensate for the detrimental economic effects of the increase in personal income inequality, the strengthening of the degree of financialisation, and the decline of the labour income share. During that time, labour productivity in the EU countries would have grown more if there had been a stronger economic performance, a smaller decline (or even a rise) of the labour income share, a smaller increase (or even a decrease) of personal income inequality, and a weakening of the degree of financialisation.

7. CONCLUSION

This paper employed a panel data econometric approach in order to empirically ascertain the role of the phenomenon of financialisation in the deceleration of labour productivity in the EU countries from 1980 to 2019.

Theoretically, and by relying on the post-Keynesian literature, the phenomenon of financialisation cannot be divorced from the deceleration of labour productivity in the majority of the developed economies since the mid-1970s and 1980s, namely due to four different channels: the weak economic performance, the decline in the labour income share, the increase in personal income inequality, and strengthening of the degree of financialisation (Tridico and Pariboni, 2018; Correia and Barradas, 2021).

Some of these four channels have already been tested in several econometric works (Sylos Labini, 1983; Vergeer and Kleinknecht, 2014; Guarini, 2016; Micallef, 2016; Tridico and Pariboni, 2018; Carnevali *et al.*, 2020; Yousef, 2020; and Correia and Barradas, 2021), although they do not directly assess all the aforementioned four channels through which the phenomenon of financialisation has undermined labour productivity. Tridico and Priboni (2018) and Correia and Barradas (2021) are the only two exceptions. The former work focuses on the OECD countries but uses only one proxy to capture the degree of financialisation (stock market capitalisation) and does not take into account in its estimates the potential indirect effects between the degree of financialisation (the fourth channel) and economic performance (the first channel), the labour income share (the second channel), and personal income inequality (the third channel). The latter uses five different proxies to measure the degree of financialisation (credit, money supply, financial value added, stock market capitalisation, and shareholder orientation) and takes into account in its estimates the potential indirect effects between the degree of financialisation (the fourth channel) and economic performance (the first channel), the labour income share (the second channel), and personal income inequality (the third channel), through the use of interaction terms, but it only focuses on Portugal.

Hence, we estimated an aggregate equation according to which labour productivity depends on lagged labour productivity, economic performance, labour income share, personal income inequality, and degree of financialisation. We used the LSDVC estimator created by Nickel (1981), Bun and Kiviet (2003), Bun and Carree (2005), and Bruno (2005a, 2005b) due to the existence of an unbalanced panel, a dynamic model, and a macro panel and the need to overcome the potential endogeneity due to the omission of relevant variables and/or simultaneity among the different variables (channels).

Our findings confirm that the weak evolution of labour productivity in the EU countries cannot be dissociated from the phenomenon of financialisation and its corresponding four channels. Lagged labour productivity, economic performance, and labour productivity positively impact the labour productivity in the EU countries, while personal income inequality and the degree of financialisation impact it negatively. Our findings also reveal that labour productivity in the EU countries in the last decades would have grown more if there had been a stronger economic performance, a smaller decline (or even a rise) of the labour income share, a smaller increase (or even a decrease) of personal income inequality, and a weakening of the degree of financialisation.

Our findings suggest that policy makers in the EU countries should engage in policies that could promote a stronger economic performance, a rise of the labour income share, a decrease of personal income inequality, and a weakening of the degree of financialisation in order to

support higher growth of labour productivity in the coming years and to avoid a new ‘secular stagnation’ in the era of financialisation. Following post-Keynesian insights, policy makers should put in place several measures to interrupt the continuously decreasing demand, which should involve international coordination to abandon the paradigm of Reaganomics and Thatcherism and to resume a focus on demand-side economics, full employment goals, welfare state expansion, labour market protection, expansionary budget policies, and redistributive policies (Pariboni *et al.*, 2020). Re-regulation of the financial system, a process of de-financialisation, and a Global Keynesian New Deal could be desirable to achieve all of these goals (Hein, 2012).

The use of micro data at corporate level, industry level, sector level, regional level, and/or country level could represent a suggestion for further research on labour productivity in EU countries. This will be crucial to assess whether these four channels linked to the phenomenon of financialisation have a detrimental effect on labour productivity in all corporations, sectors, regions, industries, regions, and/or countries or only in some of them. An analysis of the consequences of the slowdown of labour productivity in the EU countries could represent another suggestion for further research on this matter.

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9. APPENDIX

Figure A1. Labour productivity (growth rate %)

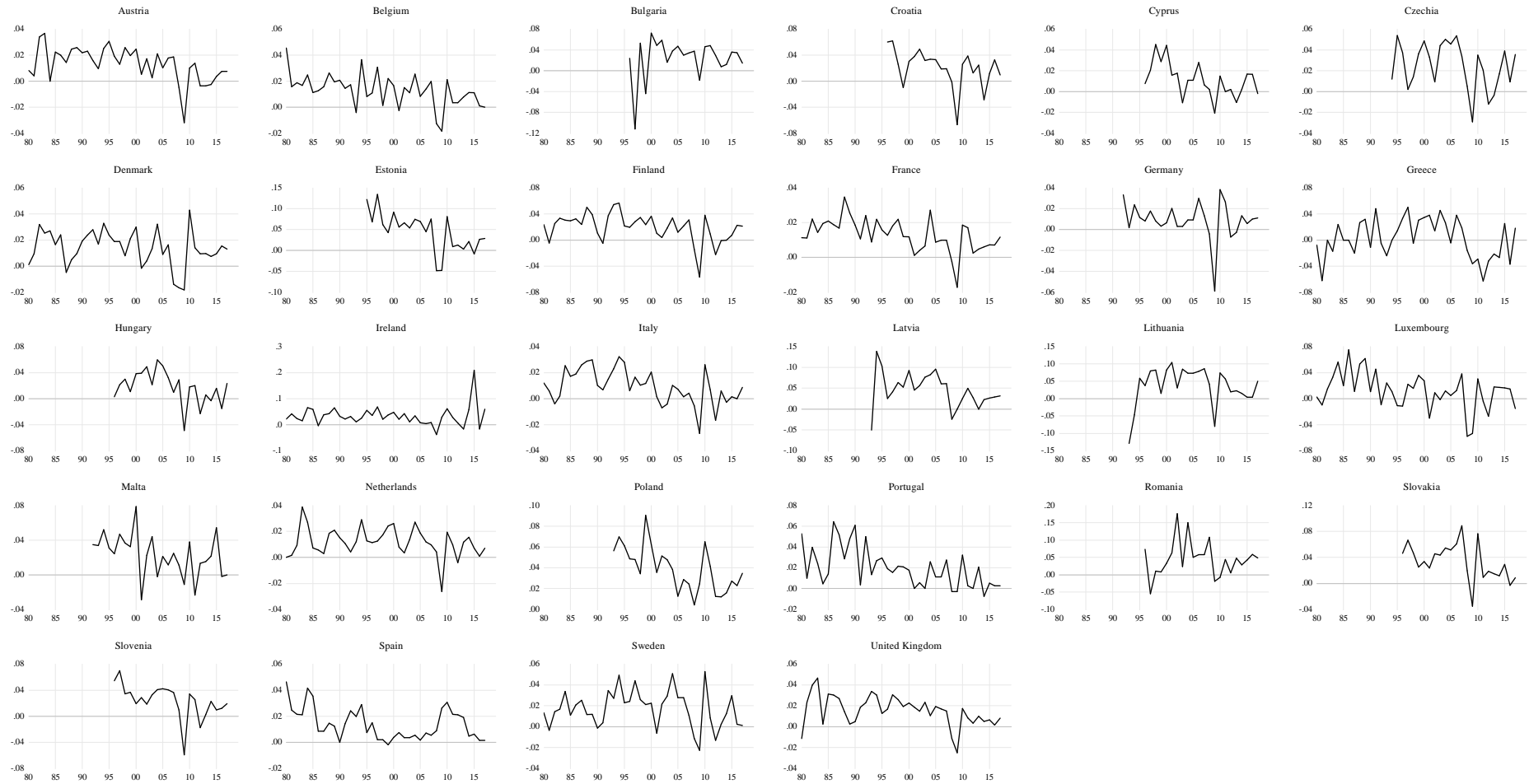


Figure A2. Economic performance (growth rate %)

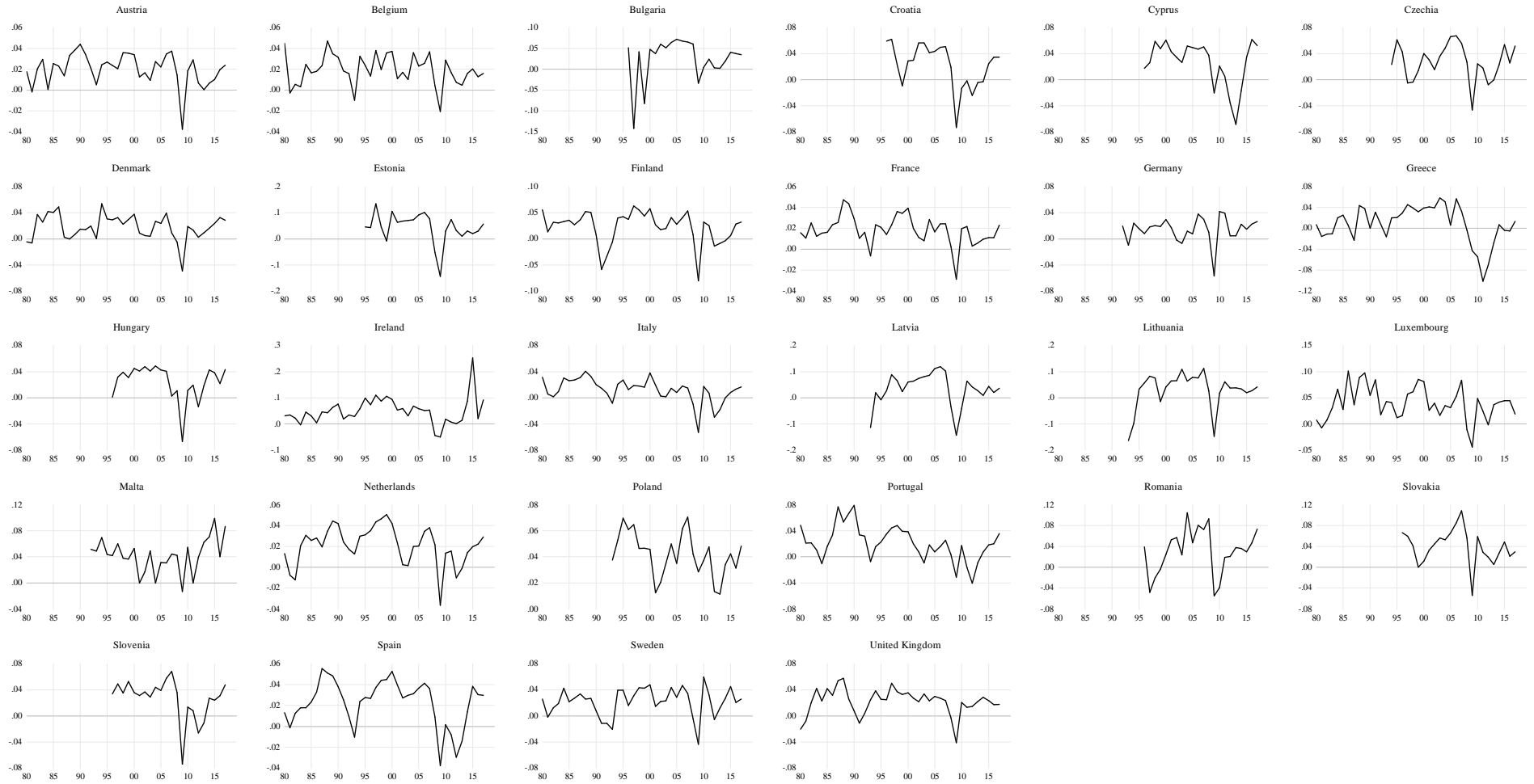


Figure A3. Labour income share (% of gross domestic product)

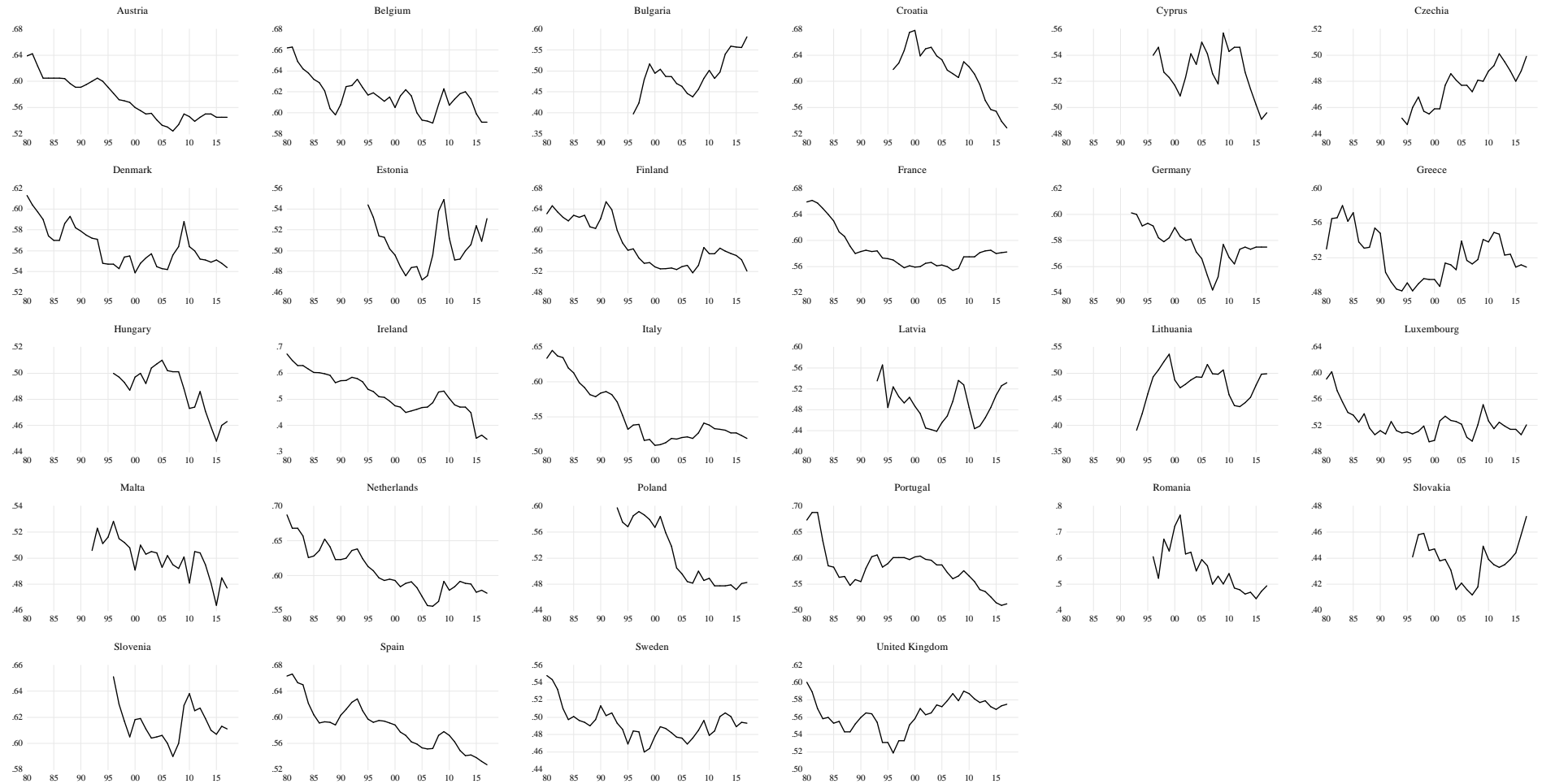


Figure A4. Personal income inequality (% of total)

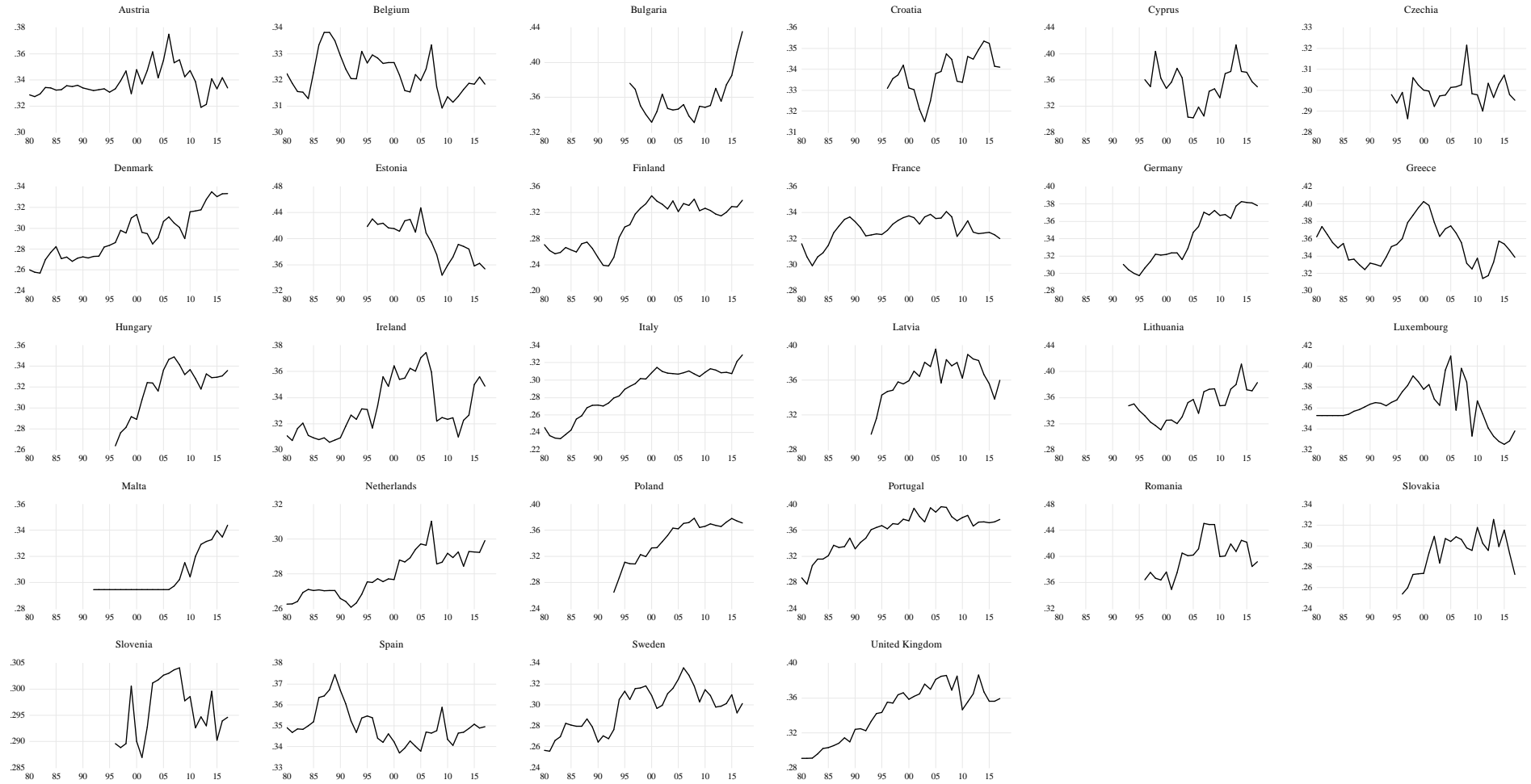


Figure A5. Credit (% of gross domestic product)

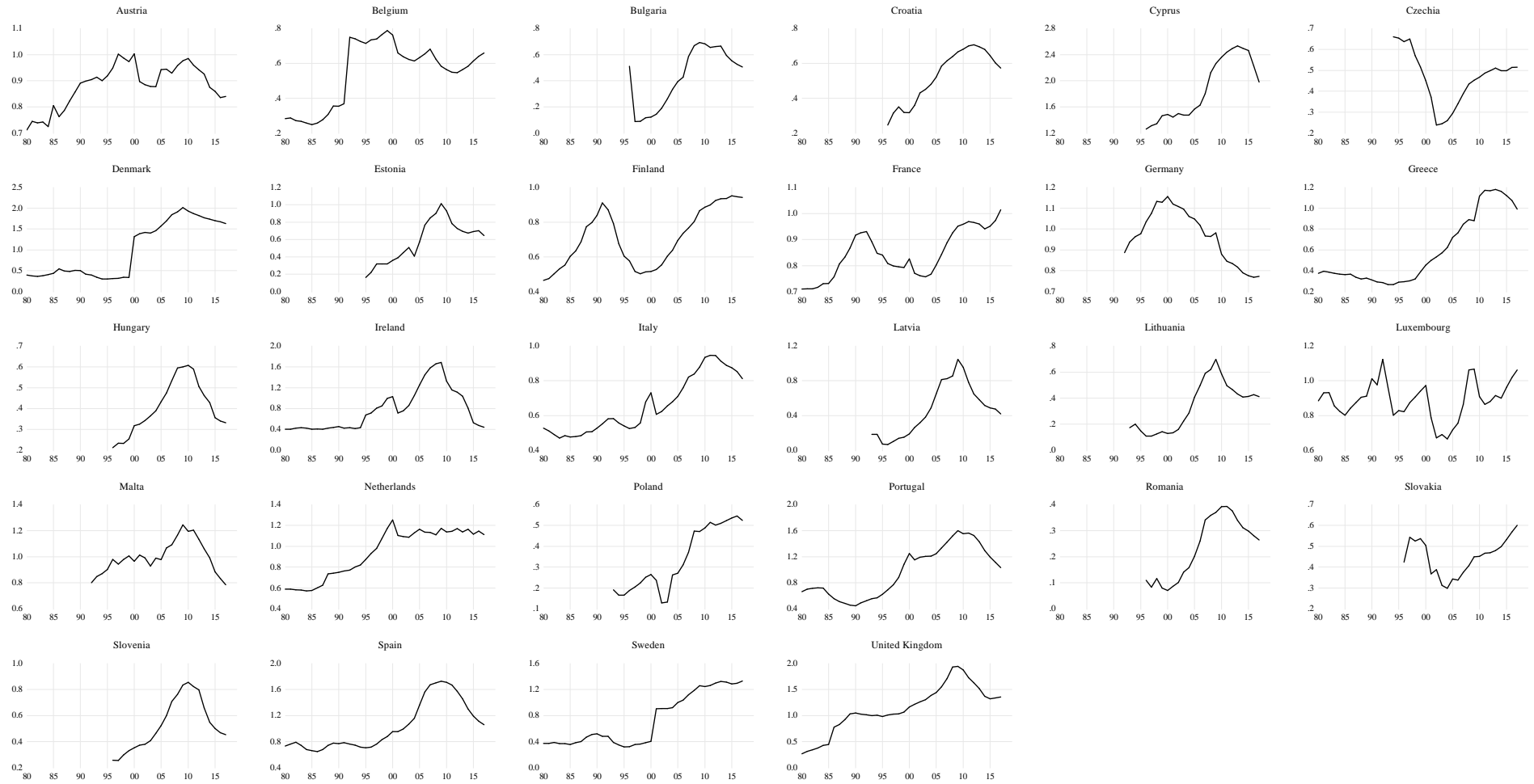


Figure A6. Liquid liabilities (% of gross domestic product)

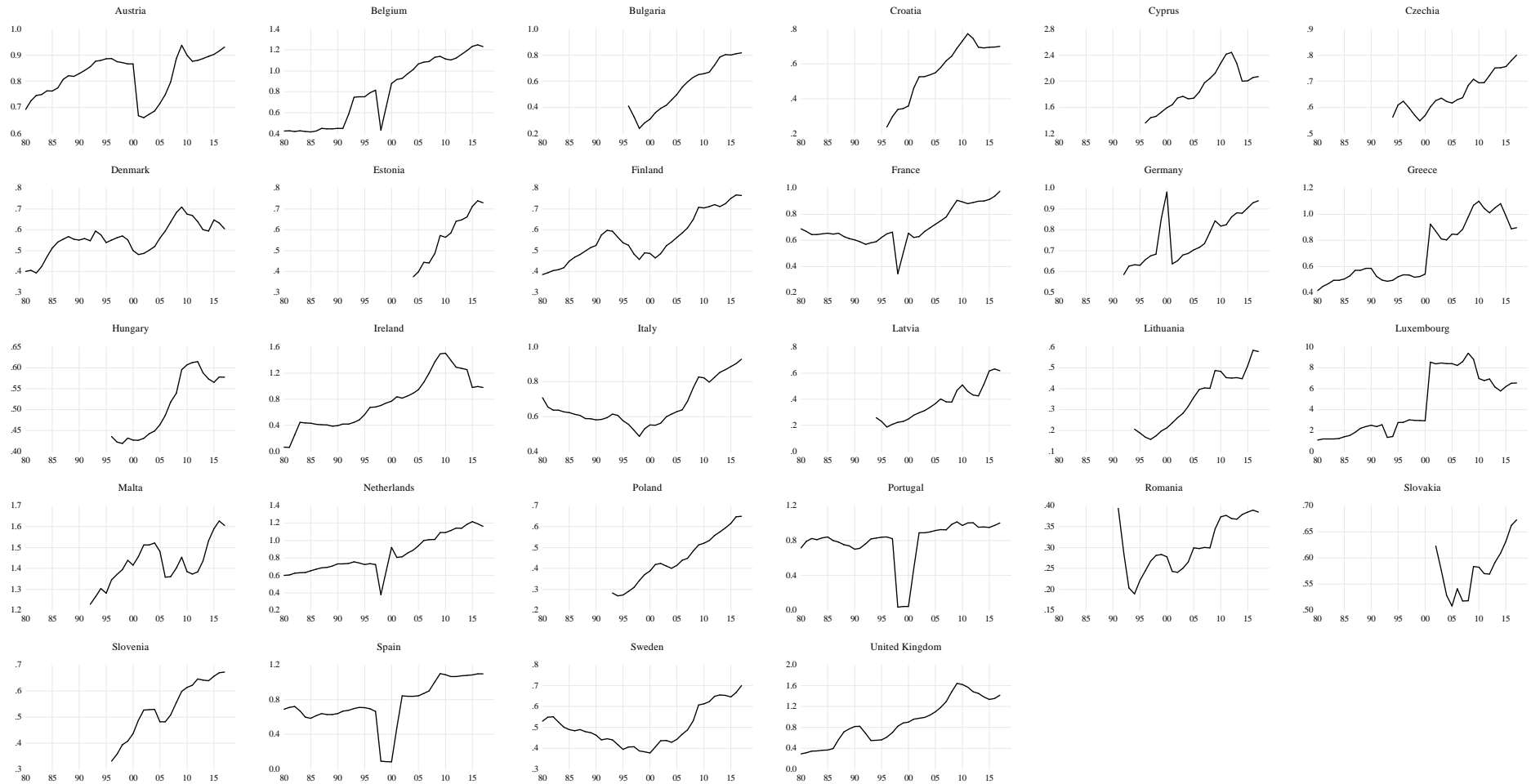


Figure A7. Stock market capitalisation (% of gross domestic product)

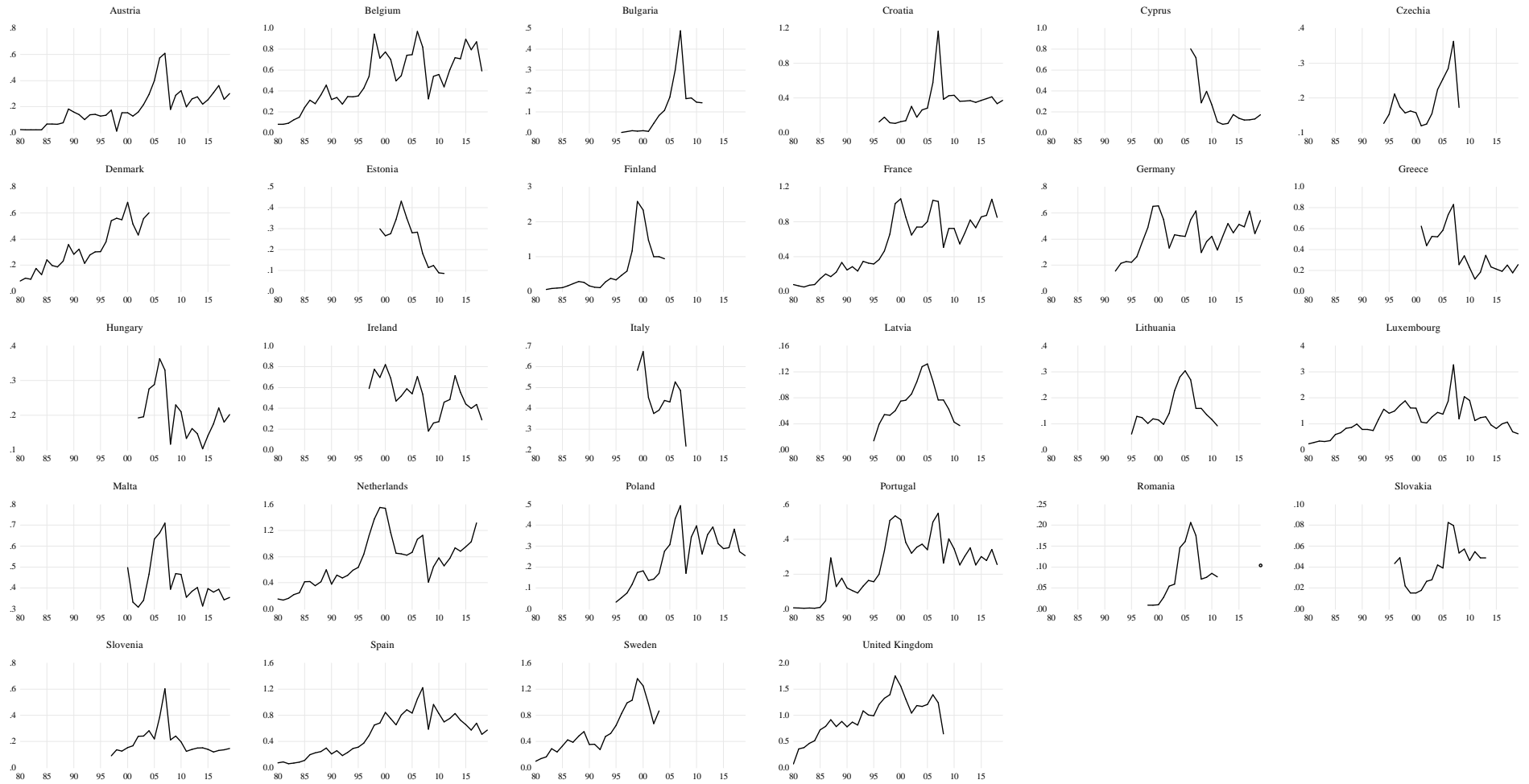


Figure A8. Stock market value traded (% of gross domestic product)

