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Article

# Household indebtedness in the European Union countries: Going beyond the mainstream interpretation

RICARDO BARRADAS and INÊS TOMÁS*

**Abstract**:

*This paper develops a panel data econometric analysis in order to determine the main macroeconomic drivers of household indebtedness in the European Union countries from 1995 to 2019. During that time, household indebtedness reached unprecedented and unsustainable levels, which played a crucial role in the emergence of the last financial and economic crisis. This is not clearly well interpreted by the mainstream economics, which advocates that household indebtedness is just an instrument to smooth consumption in a continuous process of utility maximization over life. This paper estimates a model according to which household indebtedness depends on seven macroeconomic drivers: housing prices, financial asset prices, personal income inequality, household labour income, welfare state expenditures, the working-age population, and interest rates. This paper finds that housing prices, welfare state expenditures and interest rates impact positively on household indebtedness in the European Union countries, whilst financial asset prices, personal income inequality and household labour income impact negatively on household indebtedness in the European Union countries. This paper also finds that the fall of household labour income and the rise of housing prices have been the main triggers of household indebtedness in the European Union countries since 1995.*

Barradas: Iscte – Instituto Universitário de Lisboa, Lisbon (Portugal),
email: ricardo_barradas@iscte-iul.pt
Tomás: Solvay Business Services Portugal, Lisbon (Portugal),
email: ines.mtomas@gmail.com

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The conventional economic theory, based on the life cycle and permanent income theories of consumption (Modigliani and Brumberg, 1954; Friedman, 1957; Ando and Modigliani, 1963), advocates that households maximize their utility functions over their entire life in order to smooth consumption, which implies that household indebtedness is only a neutral tool that aims to transfer lifetime income and wealth across time (Barba and Pivetti, 2008; Kim et al., 2014). Against this background, the conventional economic theory does not provide a reasonable interpretation of the unprecedented and unsustainable levels of household

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indebtedness reached in the last years and, in particular, up to the Great Recession, because the institutional and social contexts, the psychological factors, and/or the existence of habits are completely ignored (Cynamon and Fazzari, 2008; Palley, 2010).

Against this backdrop, Moore and Stockhammer (2018), by falling back on different strands of literature, find eight macroeconomic drivers of household indebtedness, namely the growth of housing prices, the increase of financial asset prices, the rise of personal income inequality, the fall of household labour income, the welfare state retrenchment, the rise of the working-age population, the decreasing trend of interest rates, and the greater availability of credit.

This paper develops a panel data econometric analysis in order to determine the main macroeconomic drivers of household indebtedness in the European Union (EU) countries from 1995 to 2019 and extends the existing literature in at least four different ways. Firstly, this paper is focused on the macroeconomic drivers of household indebtedness in the EU countries, for which the empirical evidence is notably scarce. The EU countries are an interesting case study as they present a certain institutional heterogeneity, despite being integrated in the same economic and political region. The majority of these countries has experienced an increasing trend in household indebtedness (figure 1 and figure A1 in the appendix), which played a crucial role in the emergence of the last financial and economic crisis (Mian and Sufi, 2014; Moore and Stockhammer, 2018). Moreover, the southern European countries and the Anglo-Saxon European countries have even developed "credit-financed consumption-led booms" and "debt-driven demand regimes", especially up to the Great Recession (Stockhammer and Kohler, 2019; Hein et al., 2021). Note also that household indebtedness has already overtaken the total national income in Cyprus, Denmark, Ireland, the Netherlands, Portugal and the United Kingdom, which tend to exhibit higher levels of household indebtedness even in comparison to those registered in the United States (figure A1 in the appendix and figure 2). Secondly, this paper performs a time series econometric analysis by employing the fixed effects two-stage least squares (FE2SLS) estimator in order to take into account the heterogeneity across the EU countries and to contour the potential problem of endogeneity that arises when: a relevant variable is omitted, there is a potential reverse causation (and/or simultaneity) between the variables under study, and/or there are measurement errors in the proxies chosen for our variables (Greene, 2003; Wooldridge, 2003). Note that all the aforementioned eight macroeconomic drivers will be tested throughout this paper, with the exception of the one linked to the greater availability of credit, due to data availability. Thirdly, the paper assesses the macroeconomic drivers of household indebtedness in the EU countries for a period where the evolution of household indebtedness was not linear (figure 1 and figure A1 in the appendix). We cover both a period where we observe an increasing trend of household indebtedness and a period where we observe a decreasing trend of household indebtedness in the EU countries (figure 1 and figure A1 in the appendix) in order to identify the macroeconomic drivers that are responsible of such evolution. Fourthly, and contrary to the majority of empirical studies on this issue, this paper also identifies the economic effects of household indebtedness in order to ascertain the role of each macroeconomic driver on its evolution in the EU countries.

Our empirical findings reveal that housing prices, welfare state expenditures, and interest rates impact positively on household indebtedness in the EU countries, whilst financial asset prices, personal income inequality, and household labour income impact negatively. Our

empirical findings also show that the fall of household labour income and the rise of housing prices have been the main triggers of household indebtedness in the EU countries since 1995.

The remainder of the paper is organized as follows. In section 1, we provide theoretical and empirical evidence on household indebtedness. In section 2, we describe the main institutional and historical trends of household indebtedness in the EU countries. Section 3 presents the model and hypotheses on household indebtedness. The data set and the econometric method are described in section 4 and section 5, respectively. Section 6 presents the empirical findings and the respective discussion. Finally, section 7 concludes.

## 1. Theoretical and empirical evidence on household indebtedness

Mainstream economics, mainly relying on the life cycle and permanent income theories of consumption, argues that households are rational, perfectly informed, and forward-looking economic agents that maximize their utility functions over their entire life in order to smooth consumption (Modigliani and Brumberg, 1954; Friedman, 1957; Ando and Modigliani, 1963). According to these theories, households incur debt just as an instrument of optimal intertemporal consumption smoothing in the face of temporary and predictable deviations in their income levels, which means that household indebtedness is a neutral tool that aims to transfer lifetime income and wealth across time (Barba and Pivetti, 2008; Kim et al., 2014).

Nonetheless, the growth of household indebtedness in the last years to unprecedented and unsustainable levels, particularly up to the Great Recession, seems to put into question this benign view of the conventional economic theory to explain this household behaviour, which tends to be deeply influenced by the institutional and social contexts, psychological factors, and/or the existence of habits (Cynamon and Fazzari, 2008; Palley, 2010). Effectively, it is increasingly difficult to advocate that situations of household over-indebtedness or even household default are due to the rational decisions of households. These have occurred not only in the case of housing credit, but especially in the case of other forms of credit, such as consumer credit, credit cards, and overdraft banking accounts (Stockhammer, 2009).

Against this background, we need to go beyond the mainstream interpretation in order to better ascertain the macroeconomic drivers of household indebtedness; this approach will be crucial to the implementation of several economic policies to revert the increasing trend of this debt and thus avoid the emergence of financial and economic crises in the coming future. Relying on the existing literature on this matter, Moore and Stockhammer (2018) identify eight macroeconomic drivers of household indebtedness, which can be grouped into three different categories of drivers from several strands of the literature (table 1).

As clearly described by Romão and Barradas (2022), the majority of these eight macroeconomic drivers of household indebtedness are indeed general trends observed in the majority of countries since the mid-1980s; they are clearly related to the processes of neoliberalism, globalization and financialization that have marked the evolution of the contemporary world since that time. Most of them are also visible in the EU countries (figure A2 to figure A8 in the appendix). In what follows, we explain in detail how household indebtedness is driven by each of these eight macroeconomic drivers.

Table 1 – *Macroeconomic drivers of household indebtedness*

| | | |
|---|---|---|
| **Household indebtedness** | **Asset-transaction drivers** (Post-Keynesian literature and consumption wealth effects literature) | Rising housing prices<br>Rising financial asset prices |
| | **Consumption-oriented drivers** (Behavioural economics literature, post-Keynesian literature and life-cycle model) | Rising personal income inequality<br>Falling household labour income<br>Welfare state retrenchment<br>Rise of working-age population |
| | **Monetary policy and credit supply drivers** | Low interest rates<br>Greater availability of credit |

*Source*: Based on Moore and Stockhammer (2018) and Romão and Barradas (2022).

First, the growth of housing prices feeds household indebtedness, particularly due to two different channels (Godley and Lavoie, 2007; Ryoo, 2016). On the one hand, the growth of housing prices increases household collateral, which relaxes household credit constraints and allows households to borrow more. This is the so-called "liquidity constraints effect" (Ludwig and Sløk, 2001), which is based on the financial accelerator theory (Bernanke et al., 1996). On the other hand, the growth of housing prices increases household wealth, which boosts their expenditures that would be realized by borrowing against the value of their houses. This is the so-called "realized wealth effect" (Ludwig and Sløk, 2002), according to which households can take out equity in the form of refinancing or selling the house to support their expenditures. Second, the growth of financial asset prices also boosts household indebtedness because households take on debt as leverage to purchase more financial assets (Cooper and Dynan, 2016). This behaviour is also shared by low-income and middle-class households (Barba and Pivetti, 2008; Van der Zwan, 2014; Barradas, 2016). Similar to what happens in the case of housing prices, the growth of financial asset prices also increases household collateral and household wealth, which allows households to borrow more (Ludwig and Sløk, 2002). Third, the rise of personal income inequality also contributes to the growth of household indebtedness (Frank et al., 2014), in a context where the poorer households take on debt in their aspiration for the lifestyle and consumption standards of richer households. This is the so-called "demonstration effect" or "Duesenberry effect" (Duesenberry, 1949), according to which households denote an "expenditure cascades" behaviour or a "keeping up with the Joneses" behaviour, namely with regard to Veblen's theory of conspicuous consumption and other durable goods through borrowing (Gonçalves and Barradas, 2021; Barradas, 2022). In the last few decades, this behaviour was intensified by the appearance of new goods and services (e.g., cell phones and other information and communication technology devices), perceived as tempting among low-income and middle-class households (Barba and Pivetti, 2008), which are strongly influenced by advertising, marketing and mass media (Cynamon and Fazzari, 2008). Fourth, the

fall of household labour income also motivates the growth of household indebtedness (Barba and Pivetti, 2008; Stockhammer, 2012, 2015). The argument here is that the debt functions as a substitute for wages by allowing households to maintain their standard of living even when they face a decrease in their labour income. This is associated with the so-called "ratchet effect" (Duesenberry, 1949), according to which households try to maintain their lifestyle because they are simply accustomed to it and they are not willing to show other households that their lifestyle has deteriorated. Fifth, the welfare state retrenchment triggers household indebtedness because households are obliged to take on debt in order to fulfil their basic needs and to ensure the maintenance of the quantity and/or the quality of several services (e.g., housing, health, education, pensions and transportation). This is especially relevant in a context where the public provision of these services is decreasing vis-á-vis the increasing importance of private provision mediated by finance (Finlayson, 2009; Lapavitsas, 2013), namely through the use of public-private partnerships financed by banks (Barradas et al., 2018) or through the privatization of public corporations (Barradas, 2019). Sixth, the increase in the working-age population drives a growth in household indebtedness because this corresponds to the group of the population that takes on debt, in contrast to the non-working young population group that does not take on any loans because they do not earn any income and are fully credit-constrained, and the non-working elderly population group that only spends their savings (Modigliani and Brumberg, 1954). Note also that the baby-boomer generation, which currently belongs to the working-age population, has exhibited a less risk averse and a more relaxed behaviour toward taking on debt compared to the other generations (Cynamon and Fazzari, 2008). Seventh, the low level of interest rates determines household indebtedness because the respective costs of borrowing are cheaper, which stimulates credit demand (Taylor, 2009). Eighth, the greater availability of credit drives household indebtedness by allowing households, including low-income and middle-class ones, to borrow more than previously because of the corresponding rise in the credit supply (Moore and Stockhammer, 2018). The increasing trend in the credit supply has been fed by financial innovation with regards to securitization (Hein, 2012), technological progress and the corresponding improvement in credit scoring models (Cynamon and Fazzari, 2008), greater competition among banks and other financial institutions (Boone and Girouard, 2002), and the existence of some aggressive and predatory credit policies (Stockhammer, 2009).

Several empirical studies can be identified in the literature that aim to address the drivers of household indebtedness. Chrystal and Mizen (2005), Kohn and Dynan (2007), Oikarinen (2009), Gimeno and Martinez-Carrascal (2010), Valverde and Fernandez (2010), Anundsen and Jansen (2013), Meng et al. (2013), Rubaszek and Serwa (2014), Klein (2015), Malinen (2016), Moore and Stockhammer (2018), Stockhammer and Wildauer (2018), and Romão and Barradas (2022) are some examples. However, the majority of these empirical studies faces at least one important shortcoming; namely, they do not test simultaneously all the aforementioned eight macroeconomic drivers of household indebtedness. This increases the risk that their estimates could be biased and inconsistent because several relevant variables are clearly omitted (Greene, 2003; Wooldridge, 2003). Moore and Stockhammer (2018) and Romão and Barradas (2022) are the only two exceptions, having taken into account seven of the aforementioned eight macroeconomic drivers of household indebtedness. Due to data availability, the macroeconomic driver related to the greater availability of credit was not taken into account in these two empirical studies. The former study performs a panel data econometric analysis for 13 countries of the OECD (Australia, Belgium, Canada, Finland, France, Germany, Italy, Japan, Norway, Spain, Sweden, the United Kingdom and the United States) from 1993 to 2011 and concludes that

housing prices is the most robust macroeconomic driver of household indebtedness in these countries. The latter study performs a time series econometric analysis for Portugal from 1988 to 2016 and concludes that housing prices and financial asset prices are the main macroeconomic drivers of Portuguese household indebtedness.

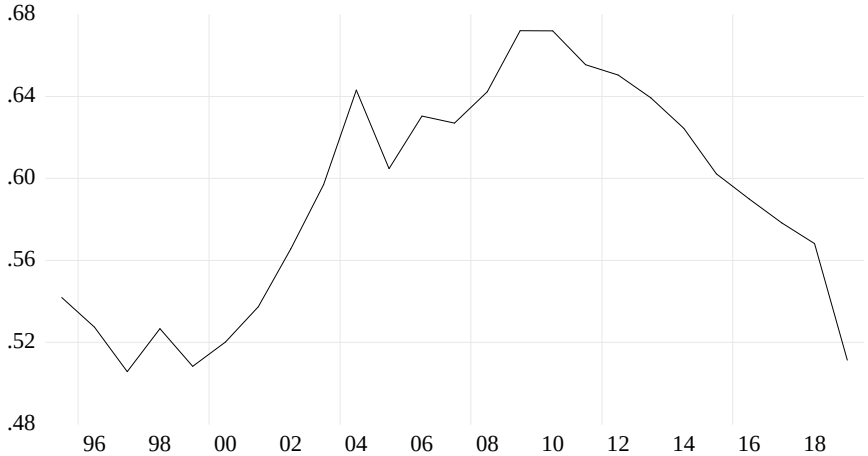
Similar to Moore and Stockhammer (2018) and Romão and Barradas (2022), this paper aims to assess the macroeconomic drivers of household indebtedness by performing a panel data econometric analysis for all the EU countries from 1995 to 2019.

## 2. Institutional and historical trends of household indebtedness in the European Union countries

The majority of the developed countries, including the EU ones, have put in place several public policies based on Reaganomics and Thatcherism since the 1970s and 1980s, which occurred simultaneously with a strong process of liberalisation, deregulation and privatisation of the financial system (Barradas, 2016). As a consequence, the financial system has exhibited a strong growth and an increasing dominance over the real economic and the everyday life of citizens since that time (Van der Zwan, 2014).

Against this backdrop, households, including low-income and middle-class ones, in the majority of the developed countries have increased their engagement with the financial system, not only as asset holders but also as debtors (Van der Zwan, 2014; Barradas, 2016). Households are now holding more financial assets (e.g., life insurance pensions, other insurance products, money market funds, deposits, bonds, stocks, and cryptocurrencies, among others) and contracting more financial liabilities (e.g., credits, credit cards, and overdraft bank charges, among others). This behaviour represents a stylised fact in the era of financialisation, which is common in the majority of the developed countries, including the EU ones (Barradas, 2022).

Figure 1 – *Household indebtedness in the EU countries (% of gross domestic product)*

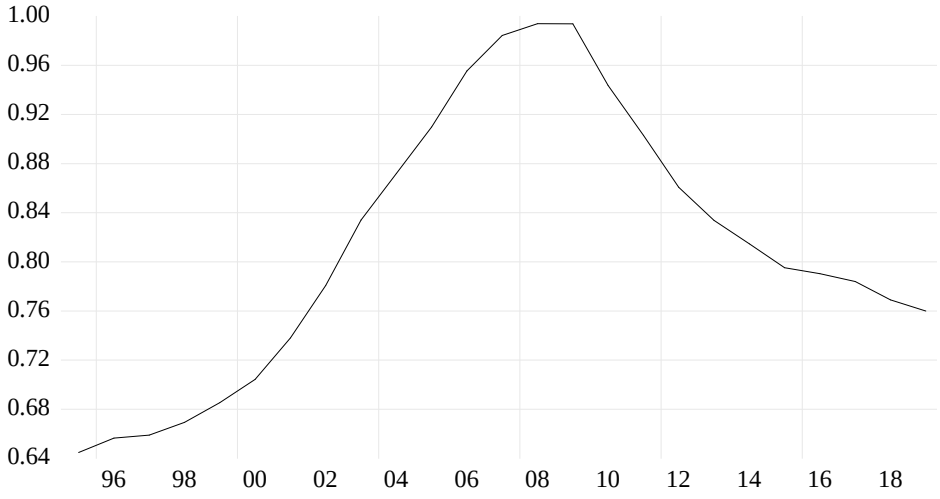



*Source*: Eurostat database.

Figure 1 shows the evolution of the total financial liabilities of households and non-profit institutions serving households in percentage of gross domestic product in the EU countries (unweighted average) since 1995, which confirms the higher engagement of households in the sphere of finance and their corresponding higher indebtedness, particularly until the Great Recession.

This pattern is quite similar to the one observed in the United States (figure 2). Nonetheless, the total financial liabilities of households and non-profit institutions serving households in percentage of gross domestic product in the EU countries (unweighted average) is slightly lower than that in the United States since 1995.

Figure 2 – *Household indebtedness in the United States (% of gross domestic product)*




*Source*: Federal Reserve Bank of St. Louis database.

Figure A1 in the appendix assesses this trend per EU country, confirming that the growth of household indebtedness occurred in the majority of them up to the Great Recession. Household indebtedness has already overtaken the total national income of the following countries: Cyprus, Denmark, Ireland, the Netherlands, Portugal and the United Kingdom. In these countries, the level of household indebtedness has been even higher than the level of household indebtedness in the United States.

As emphasized by Stockhammer and Kohler (2019) and Hein et al. (2021), some of these countries (particularly the southern and the Anglo-Saxon ones, like Greece, Italy, Ireland, Portugal, Spain and the United Kingdom) have experienced "credit-financed consumption-led booms" and growth models supported by household indebtedness, i.e., the so-called "debt-driven demand regimes", particularly up to the Great Recession.[1] In these countries, household indebtedness supported a greater economic dynamism, boosted by private consumption, property price inflation, and large current account deficits caused by credit flows from northern countries, which prevailed up to the Great Recession.[2] In the northern countries (e.g.,

[1] Hein et al. (2021) show that these countries are switching to an export-led trajectory after the Great Recession, especially the southern ones under the dominance of austerity and deflationary stagnation policies since that time.
[2] This happens because the growth of household indebtedness has been essentially driven by housing credit in these

Austria and Germany), household indebtedness has grown at comparatively low rates. These countries have experienced "export-driven growth models", strongly supported by the demand from the southern and the Anglo-Saxon countries. In eastern European countries (e.g., Czechia, Hungary, Poland, Slovakia and Slovenia), household indebtedness increased more than in the northern countries but less than in the southern and Anglo-Saxon countries. These countries have experienced a process of catching-up through foreign direct investment from the northern countries, mostly associated with the privatisation of formerly public corporations.

Since the Great Recession, we observe a strong reduction in household indebtedness in the EU countries, which is more evident in the southern and Anglo-Saxon countries (figure 1 and figure A1 in the appendix). The ongoing deleverage process since the Great Recession has allowed a decrease of external imbalances in these countries, particularly due to the strong decline in imported demand in the wake of severe austerity measures adopted in some of these countries in the context of financial assistance requested from the EU, the International Monetary Fund, and the European Central Bank (the so-called *Troika*). These countries were hit hard by the Great Recession, confirming that higher levels of household indebtedness tend to increase financial fragility, making countries more vulnerable to downside risks, such as increases in the level of interest rates and/or decreases in household labour income.

Mian and Sufi (2014) and Moore and Stockhammer (2018) claim that household indebtedness played a central role in the emergence of the Great Recession, which is explained in detail by Barradas et al. (2018). Firstly, these authors stress that the growth of household indebtedness funded by foreign debt made it difficult to finance these countries at a time of increasing risk aversion in the financial markets, immediately after the collapse of the subprime credit segment in the United States. During that time, some segments of interbank money markets in the euro area, particularly for longer maturities, dried up, which led to a liquidity shortage with direct effects on the reduction of credit and the rise of interest rates and, consequently, on the strong fall of both private consumption and private investment by accelerating (and exacerbating) the economic recession. Secondly, these authors emphasise that the growth of household indebtedness in these countries was not accompanied by significant economic growth in the previous years, which suggests that "debt-driven demand regimes" are not sustainable because they depend on a continuing rise in debt. Note that non-performing loans have risen significantly since 2008, suggesting that households exhibited some difficulties in coping with high levels of indebtedness; this also reflects a certain unsustainability of the unprecedented levels of household indebtedness reached before the Great Recession. Thirdly, these authors note that indebted households became more exposed to increases in interest rates, the slowdown of economic activity, and the corresponding rise of the unemployment rate during that time.

## 3. The model and hypotheses on household indebtedness

Our model is based on an aggregate equation according to which household indebtedness depends on the macroeconomic drivers described in the previous section: housing prices, financial asset prices, personal income inequality, household labour income, welfare state expenditures, the working-age population, and interest rates. The

countries, in a context in which the household debt in other advanced economies (e.g., the United States) also includes consumer credit, student loans, and loans for medical bills (Stockhammer and Kohler, 2019).

macroeconomic driver linked to the greater availability of credit was not incorporated in our model due to the inexistence of a reasonable proxy with which to assess it.

Our model for household indebtedness takes the following form:

$$HI_{i,t} = \beta_0 + \beta_1 HP_{i,t} + \beta_2 FAP_{i,t} + \beta_3 IN_{i,t} + \beta_4 LI_{i,t} + \beta_5 WS_{i,t} + \beta_6 WP_{i,t} + \beta_7 IR_{i,t} + \alpha_i + \varepsilon_t \quad (1)$$

where $i$ is the country, $t$ is the time period (years), $HI$ is household indebtedness, $HP$ is housing prices, $FAP$ is financial asset prices, $IN$ is personal income inequality, $LI$ is household labour income, $WS$ is welfare state expenditures, $WP$ is working-age population, $IR$ is interest rates, and $\alpha$ and $\varepsilon$ are the two-way error term components accounting for unobservable country-specific effects and time-specific effects.

As described in the previous section, housing prices, financial asset prices, personal income inequality, and working-age population are expected to impact positively on household indebtedness, whilst household labour income, welfare state expenditures, and interest rates are expected to impact negatively on household indebtedness. According to our hypotheses, the estimated coefficients of our variables should present the following signs:

$$\beta_1 > 0, \beta_2 > 0, \beta_3 > 0, \beta_4 > 0, \beta_5 > 0, \beta_6 > 0, \beta_7 < 0 \quad (2)$$

It is worth noting that our model is based on an aggregate equation to estimate the macroeconomic drivers of household indebtedness in the EU countries from 1995 to 2019. This macroeconomic approach assumes the existence of a representative household whose behaviour does not change across time and space. This approach could lead to several shortcomings in our analysis. The first one is related to the impossibility of assessing the macroeconomic drivers of household indebtedness according to household characteristics (e.g., dimension, age, qualifications, occupation, and social stratum). The second one is linked to the impossibility of assessing the macroeconomic drivers of household indebtedness per country because we are using a panel data econometric analysis that estimates an average effect of several countries. In fact, our approach allows us to understand the macroeconomic drivers of household indebtedness in these countries as a whole, by looking beyond the specificities of each household in each country. If our macroeconomic drivers are proved to exert an effect on household indebtedness, we are unable to know whether that effect occurs in only some households or countries or whether it is a more generalized effect across all households or all countries. If our macroeconomic drivers are proved to exert no effect on household indebtedness, we cannot reject them if there is an effect in some households or some countries but at an insufficient level to create a general effect in all households or all countries as a whole.

## 4. The data set

Our data set encompasses annual data for all the EU countries from 1995 to 2019. These are the period and the periodicity for which all variables are available. Our dataset represents a panel data including a total of 28 cross-sectional units ($N = 28$) observed over time from 1995 to 2019 ($T = 25$). Our data set is an unbalanced panel due to the inexistence of data for all the variables for all the years for each country. Table A1 in the appendix describes the data set, which includes a total of 511 observations and a total of 189 missing values.

In what follows, we describe definitions, units and sources for each variable. Household indebtedness corresponds to the total financial liabilities of households and non-profit institutions serving households as a percentage of the gross domestic product, available in the Eurostat database. Housing prices are quantified through the natural logarithm of the real housing price index ($2015 = 100$), from the Eurostat, OECD and Bank for International Settlements databases. Financial asset prices are proxied by the natural logarithm of the total share price indexes ($2015 = 100$) from the Federal Reserve Bank of St. Louis database and the Investing database. Personal income inequality is measured through the top 1% income share, available in the World Inequality Database. Household labour income corresponds to the adjusted labour share, i.e., the ratio of the compensation of employees per employee to the gross domestic product at current market prices per employee, available in the AMECO database. The welfare state expenditure is assessed by the general government expenditures on education, health, and housing and community amenities as a percentage of the gross domestic product, which was collected from the Eurostat database. The working-age population corresponds to the activity rate, i.e., the total active population divided by the total population aged between 15 and 64 years, extracted directly from the Eurostat database. The level of interest rates corresponds to the real short-term interest rates (using the gross domestic product deflator), available in the AMECO database.

Plots of all variables are illustrated in figure A1 to figure A8 in the appendix, the descriptive statistics are exhibited in table A2 in the appendix, and the correlation matrix is presented in table A3 in the appendix. The hypothesis on the existence of multicollinearity between our variables is strongly rejected, because all correlations are less than 0.8 in absolute terms (Studenmund, 2005). As expected, housing prices, financial asset prices, welfare state expenditures, and working-age population are positively correlated with household indebtedness in the EU countries, whilst interest rates are negatively correlated with household indebtedness in the EU countries.

Note that we assume that all of our variables are stationary in levels for three different reasons. The first reason is related to the fact that all of our variables are measured in ratios, in natural logarithms and in percentages, which intuitively become plausible the assumption about their stationarity in levels. The second reason is associated with the fact that the evolution of our variables over time seems to suggest that they are indeed stationary (figure A2 to figure A8 in the appendix). The third reason concerns the very low power of the traditional unit root tests in the presence of panels where the cross-sectional dimension $N$ is higher than the period dimension $T$ (Baltagi, 2005; Hlouskova and Wagner, 2006; Cameron and Trivedi, 2009; Greene, 2003).

## 5. The econometric method

Our econometric method involves the implementation of the FE2SLS estimator for three different reasons. Firstly, the traditional panel data estimators (e.g., pooled ordinary least squares, fixed effects, and random effects) produce biased and inconsistent estimates in the presence of endogeneity (Greene, 2003; Wooldridge, 2003). This is especially relevant in our model due to the omission of the macroeconomic driver of household indebtedness related to the greater availability of credit, due to the possible existence of a reverse causation (and/or simultaneity) between household indebtedness and some of our dependent variables and due

to the potential existence of measurement errors in the proxies chosen for our variables. Secondly, the FE2SLS estimator allows us to deal with unobservable heterogeneity across our cross-sectional units observed over time, i.e., country-specific (and also time-specific) effects (Greene, 2003). Thirdly, the FE2SLS estimator produces reliable estimates in terms of efficiency and consistency, even in the presence of endogeneity (Wooldridge, 2003).

The implementation of the FE2SLS estimator implies the need to define a set of instrumental variables (i.e., the so-called instruments), which should be at least equal to the number of dependent variables in our model. Instruments should be variables that do not appear as dependent variables in our model (but they are strongly correlated with them) and are simultaneously exogenous (orthogonal) in relation to the error term component (Greene, 2003; Wooldridge, 2003). The suitability of our model and the validity of our set of instruments are tested using the J statistic of Hansen (1982). The traditional rule of thumb is to choose as instruments the lagged variables of the dependent variables that are potentially endogenous. Accordingly, our set of instruments encompasses five lags of the variables housing prices, financial asset prices, personal income inequality, and interest rates.[3]

The EViews software (version 12) is used to obtain our estimates. Our estimates are produced not only for all the period as a whole (i.e., from 1995 to 2019) but also for two specific subperiods, where we identify a different behaviour in the evolution of household indebtedness in the EU countries (figure A1 in the appendix). The first subperiod is from 1995 to 2009 and corresponds to a period of increasing household indebtedness in the EU countries; the second subperiod is from 2010 and 2019 and corresponds to a period of decreasing household indebtedness in the EU countries due to the ongoing deleverage process since the Great Recession. The idea is to better understand the main macroeconomic drivers that are responsible for the evolution of household indebtedness in the EU countries and to identify potential asymmetries on the effects of these macroeconomic drivers on household indebtedness. The robustness of our estimates is assessed by a jack-knife analysis, by excluding one country at a time for the period as a whole and for the two subperiods.

Finally, the economic effects of our estimates are also presented (McCloskey and Ziliak, 1996; Ziliak and McCloskey, 2004) in order to ascertain the role of each macroeconomic driver in the evolution of household indebtedness in the EU countries.

## 6. Empirical findings and discussion

The results of our estimates for household indebtedness in the EU countries, produced by the FE2SLS estimator, are presented in table 2.

[3] We consider housing prices, financial asset prices, personal income inequality, and interest rates as potential endogenous variables in our model. Effectively, it is intuitively plausible to assume a reverse causation between household indebtedness and these four variables. The growth of household indebtedness could imply a rise in housing prices and in the financial asset prices due to the increase of the corresponding demand for houses and for financial assets. The growth of household indebtedness could imply a rise in personal income inequality, particularly between those households that have access to credit and those that are more credit-constrained. The growth of household indebtedness could imply a rise in interest rates due to the increase in credit risk.

Table 2 – *Estimates for household indebtedness in the EU countries*[4]

| Variable | 1995-2019 | 1995-2009 | 2010-2019 |
|---|---|---|---|
| $\beta_0$ | 2.737*<br>(1.473)<br>[1.858] | –1.795<br>(1.290)<br>[–1.392] | 1.518<br>(1.101)<br>[1.378] |
| $HP_t$ | 0.243**<br>(0.105)<br>[2.320] | 0.256***<br>(0.060)<br>[4.266] | 0.021<br>(0.119)<br>[0.178] |
| $FAP_t$ | –0.054*<br>(0.030)<br>[–1.777] | 0.154**<br>(0.069)<br>[2.227] | –0.029<br>(0.032)<br>[–0.895] |
| $IN_t$ | –2.205*<br>(1.181)<br>[–1.867] | –3.871***<br>(0.999)<br>[–3.874] | 0.559<br>(1.013)<br>[0.552] |
| $LI_t$ | –3.945**<br>(1.668)<br>[–2.365] | 1.409<br>(1.442)<br>[0.977] | –1.887*<br>(1.079)<br>[–1.748] |
| $WS_t$ | 13.991***<br>(3.141)<br>[4.455] | 2.947<br>(2.899)<br>[1.016] | 18.491***<br>(3.491)<br>[5.297] |
| $WP_t$ | –3.199<br>(2.388)<br>[–1.339] | –0.209<br>(1.421)<br>[–0.147] | –2.925<br>(2.050)<br>[–1.427] |
| $IR_t$ | 3.724***<br>(1.257)<br>[2.962] | 2.157***<br>(0.688)<br>[3.133] | 2.345*<br>(1.376)<br>[1.704] |
| Observations | 371 | 144 | 247 |
| Cross-sectional units | 28 | 20 | 28 |
| Time effects | Yes | Yes | Yes |
| R-squared | 0.862 | 0.981 | 0.932 |
| Adjusted R-squared | 0.839 | 0.975 | 0.917 |
| J statistic (P value) | 0.680 | 0.138 | 0.680 |

*Note*: Standard errors in round brackets, *t*-statistics in square brackets; *** indicates statistical significance at the 1% level, ** indicates statistical significance at the 5% level, and * indicates statistical significance at the 10% level.

With regard to the full period as a whole, our results confirm that all variables are statistically significant at the conventional significance levels, with the exception of the working-age population. This result does not support the macroeconomic driver related to the life-cycle model (Modigliani and Brumberg, 1954). This seems to indicate that the growing importance of the working-age population in the EU countries (figure A7 in the appendix) does not drive household indebtedness, probably because households are facing more precarious labour conditions (Tridico and Pariboni, 2018), which tends to increase

[4] In the model corresponding to the subperiod of 1995 to 2009, our set of instruments encompasses four lags of the variables of housing prices, financial asset prices, personal income inequality, and interest rates because, if we had used five lags for these variables, we would reject the null hypothesis of the J statistic on the suitability of our model and the validity of our instruments.

their credit constraints and prevent the corresponding indebtedness. The statistical insignificance of the working-age population was also found by Moore and Stockhammer (2018). The remaining variables are statistically significant at the traditional significance levels, but the majority of them exhibited unexpected effects on household indebtedness in the EU countries. The financial asset prices exert a negative impact on household indebtedness in the EU countries, which does not corroborate with the argument that upward movements of financial asset prices lead households to incur debt as leverage to acquire more financial assets (Cooper and Dynan, 2016). Instead, this negative relationship between financial asset prices and household indebtedness could suggest that households in the EU countries enjoy the periods of growth in financial asset prices in order to sell them and use this income to pay existing debts, which favours a decline in their indebtedness. This mechanism could be particularly relevant in situations of over-indebtedness, in order to avoid partial or total defaults by households. In the same vein, personal income inequality also impacts negatively on household indebtedness in the EU countries, which is not in line with the macroeconomic driver associated with the "expenditure cascades" behaviour or a "keeping up with the Joneses" behaviour (Frank et al. 2014).[5] As argued by Pardo and Santos (2014), the rise of personal income inequality could result in a decline in household indebtedness because the low-income and middle-class households are more credit-constrained. Welfare state expenditures also exhibit a counter-intuitive impact by exerting a positive influence on household indebtedness in the EU countries. Nevertheless, this result is not too surprising because there has not been a notable welfare state retrenchment in EU countries (figure A6 in the appendix), contrary to the predictions of Finlayson (2009) and Lapavitsas (2013). Effectively, the sustained increase in welfare state expenditures in the EU countries could be the cause of a growth in household indebtedness because the households feel more protected by the state; this situation favours a less risk averse and more relaxed behaviour toward incurring debt. This is the so-called "free-rider problem", which tends to vary in proportion to the generosity of the respective welfare state (Homburg, 2000). Comelli (2021) emphasizes that a welfare state that is generous – particularly with regard to education, active labour polices, and better protection of temporary employment – promotes higher levels of planning and stabilises financial expectations by households, which supports less risk aversion and favours higher degrees of indebtedness. A similar result was found by Romão and Barradas (2022) for the specific case of household indebtedness in Portugal. Unexpectedly, interest rates influence positively household indebtedness in EU countries. This seems to suggest that the rise in interest rates could increase household indebtedness in the EU countries, for instance in order to avoid higher costs of borrowing in the future if the increasing trend on the level of interest rates persists. This could be quite relevant due to the general recognition that the majority of central banks all over the world conduct their monetary policy with a strong inertia (Clarida et al., 1998). Note also that this result could be explained by the banks' behaviour; they tend to be more willing to lend when interest rates are increasing because they make more profit. Finally, housing prices and household labour income also determine household indebtedness in the EU countries, by exerting both a positive and a negative effect, respectively. A positive impact of housing prices on household indebtedness was also reported by Chrystal and Mizen (2005), Kohn and Dynan (2007),

[5] Please note that this negative effect of personal income inequality on household indebtedness in the EU countries does not change if we use the top 10% income share instead of the top 1% income share. Results are available upon request.

Oikarinen (2009), Gimeno and Martinez-Carrascal (2010), Valverde and Fernandez (2010), Anundsen and Jansen (2013), Meng et al. (2013), Rubaszek and Serwa (2014), Moore and Stockhammer (2018), Stockhammer and Wildauer (2018) and Romão and Barradas (2022), which confirms the theoretical hypothesis of the post-Keynesian literature related to the collateral effects (Godley and Lavoie, 2007) and of the consumption wealth effects literature linked to the wealth effects (Ryoo, 2016). A negative impact of household labour income on household indebtedness was also found by Klein (2015), which is consistent with the post-Keynesian literature that household indebtedness functions as a substitute for household labour income (Barba and Pivetti, 2008; Stockhammer, 2012 and 2015).

Regarding the two subperiods, our results do not change notably in comparison to those for the full period as a whole, albeit they present some specificities according to the respective trend on the evolution of household indebtedness in the EU countries in each subperiod. Three particular comments should be highlighted. Firstly, the working-age population continues to be statistically insignificant for the two subperiods. Secondly, the statistical significance of interest rates and their positive effect on household indebtedness occurs both in periods of increasing and decreasing trends of household indebtedness in the EU countries. Thirdly, the remaining variables seem to suggest the existence of asymmetries in their effects on household indebtedness. On the one hand, the macroeconomic drivers related to housing prices, financial asset prices, and personal income inequality are relevant only in periods when household indebtedness is increasing. In fact, these variables are statistically significant only in the first subperiod and they have the same effects on household indebtedness as in the full period as a whole. The only exception pertains to the variable of financial asset prices, which impacts positively on household indebtedness in the EU countries in periods when that indebtedness is increasing, probably as leverage to the acquisition of further financial assets (Cooper and Dynan, 2016). On the other hand, the macroeconomic drivers associated with household labour income and welfare state expenditures are pertinent only in periods when household indebtedness is decreasing. Effectively, these variables are statistically significant only in the second subperiod and they have the same effects on household indebtedness as in the full period as a whole.

All of these results are notably robust to resampling. Through a jack-knife analysis, all of these results were re-estimated by excluding one country at a time for the period as a whole and for the two subperiods. We concluded that the majority of our variables maintains their statistical significance and the same effects on household indebtedness in comparison with the results for all the EU countries that are exhibited in table 2.[6]

The results of the economic effects for household indebtedness in the EU countries are presented in table 3.

[6] Please note that the results of the jack-knife analysis are available upon request.

Table 3 – *Economic effects of the estimates for household indebtedness in the EU countries*

| Period | Variable | Coefficient | Actual cumulative change | Economic effect |
|---|---|---|---|---|
| 1995-2019 | $HP_t$ | 0.243 | 0.530 | 0.129 |
| | $FAP_t$ | –0.054 | 1.100 | –0.059 |
| | $IN_t$ | –2.205 | 0.151 | –0.333 |
| | $LI_t$ | –3.945 | –0.076 | 0.300 |
| | $WS_t$ | 13.991 | –0.001 | –0.014 |
| | $IR_t$ | 3.724 | –1.605 | –5.977 |
| 1995-2009 | $HP_t$ | 0.256 | 0.410 | 0.105 |
| | $FAP_t$ | 0.154 | 0.930 | 0.143 |
| | $IN_t$ | –3.871 | 0.104 | –0.403 |
| | $IR_t$ | 2.157 | –0.395 | –0.852 |
| 2010-2019 | $LI_t$ | –1.887 | 0.004 | –0.008 |
| | $WS_t$ | 18.491 | –0.067 | –1.239 |
| | $IR_t$ | 2.345 | –5.600 | –13.132 |

*Note*: The actual cumulative change corresponds to the growth rate of the correspondent variable during the respective period. The economic effect is the multiplication of the coefficient by the actual cumulative change.

In the period from 1995 to 2009, the main triggers to the increase in household indebtedness in the EU countries are the rise of both financial asset prices and housing prices. In fact, household indebtedness in the EU countries during that time would have been lower by about 14.3 and 10.5 per cent if there had not been an increase in both financial asset prices and housing prices, respectively. The fall in the interest rates and the rise in personal income inequality were not sufficient to avoid the growth of household indebtedness in the EU countries during that time. Effectively, the household indebtedness in the EU countries at that time would have been even higher by around 85.2 per cent if there had not been a fall in interest rates and by around 40.3 per cent if personal income inequality had not increased. From 2010 to 2019, the fall in the interest rates and the welfare state retrenchment were the main drivers in the decrease of household indebtedness in the EU countries during that time, accounting for a decline of about 1313.2 per cent and 123.9 per cent, respectively. Over the full period as a whole, we conclude that the growth in household indebtedness in the EU countries was particularly boosted by the fall in household labour income and the rise in housing prices. In fact, the fall in household labour income and the rise in housing prices sustained an increase in household indebtedness by around 30.0 and 12.9 per cent, respectively, during that time. The fall in interest rates, the increase in personal income inequality, the rise in financial asset prices, and the welfare state retrenchment were not enough to prevent the growth in household indebtedness in the EU countries during that time. In fact, it would have been even higher: by around 597.7 per cent if interest rates had not fallen, by about 33.3 per cent if personal income inequality had not increased, by around 5.9 per cent if financial asset prices had not risen, and by about 1.4 per cent if the welfare state had not retrenched.

## 7. Conclusions

This paper developed a panel data econometric analysis in order to determine the main macroeconomic drivers of household indebtedness in all the EU countries from 1995 to 2019.

Mainstream economics, based on the life cycle and permanent income theories of consumption (Modigliani and Brumberg, 1954; Friedman, 1957; Ando and Modigliani, 1963), does not offer a reliable interpretation of the unprecedented and unsustainable levels of household indebtedness reached in recent years, particularly up to the Great Recession (Cynamon and Fazzari, 2008; Palley, 2010).

Accordingly, Moore and Stockhammer (2018), by falling back on different strands of literature, find eight macroeconomic drivers of household indebtedness: the growth of housing prices, the increase in financial asset prices, the rise in personal income inequality, the fall of household labour income, the welfare state retrenchment, the rise in the working-age population, the decreasing trend in interest rates, and the greater availability of credit.

Some of these eight interpretations have already been addressed in several empirical studies (Chrystal and Mizen, 2005; Kohn and Dynan, 2007; Oikarinen, 2009; Gimeno and Martinez-Carrascal, 2010; Valverde and Fernandez, 2010; Anundsen and Jansen, 2013; Meng et al., 2013; Rubaszek and Serwa, 2014; Klein, 2015; Malinen, 2016; Moore and Stockhammer, 2018; Stockhammer and Wildauer, 2018; Romão and Barradas, 2022), but none of them have taken into account all of these interpretations simultaneously.

We estimated a model according to which household indebtedness in the EU countries depends on housing prices, financial asset prices, personal income inequality, household labour income, welfare state expenditures, the working-age population, and interest rates. As is the case in the majority of empirical studies around household indebtedness, the macroeconomic driver linked to the greater availability of credit was omitted due to data availability. Our model was estimated using the FE2SLS estimator in order to take into account the heterogeneity across the EU countries and to contour the potential problem of endogeneity that arises when a relevant variable is omitted, when there is a potential reverse causation (and/or simultaneity) between the variables under study, and/or when there are measurement errors in the proxies chosen for our variables (Greene, 2003; Wooldridge, 2003).

Our empirical findings reveal that housing prices, welfare state expenditures, and interest rates impact positively on household indebtedness in the EU countries, whilst financial asset prices, personal income inequality, and household labour income impact negatively on it. This confirms that these macroeconomic drivers are important drivers of household indebtedness in the EU countries, albeit its effects vary across time and, particularly, across the trend in the evolution of household indebtedness in the EU countries. From 1995 to 2009, the rise in both financial asset prices and housing prices were the main triggers of the increasing trend of household indebtedness in the EU countries. From 2010 to 2019, the decline in interest rates and the welfare state retrenchment were the main triggers of the decrease in household indebtedness in the EU countries. Over the full period as a whole, the fall in household labour income and the rise in housing prices were the main triggers of household indebtedness in the EU countries.

Our empirical findings provide very important insights for policymakers on the adoption of several measures to support the progressive reduction of household indebtedness in the EU countries, which involves essentially the need to restrain the rise in housing prices and

financial asset prices and to contain the fall in household labour income. Central banks should act in order to avoid the formation of bubbles in the housing market and in the stock markets, namely by preventing the maintenance of low interest rates that feed more financial speculation. A monetary policy more focused on full employment goals could be desirable, because the increasing importance of low inflation goals using inflation targeting policies has proved to be insufficient to circumvent the trade-off between curtailing financial speculation and sustaining economic growth (Palley, 2007). In this respect, a regulatory framework based on asset-based reserve requirements could be promising (Palley, 2007; Hein, 2012). Governments should act in order to revert the trend of decreasing household labour income by impairing the progressive deregulation and flexibilization of labour markets at the level of unemployment benefits, employment protection, employment rights and minimum wage (Barradas and Lagoa, 2017). The recovery of the general workers' bargaining power could be desirable, for instance by promoting more collective bargaining (e.g., among public servants) and by reinforcing the role of trade unions and/or workers' commissions on the board of directors of the majority of corporations.

Despite the decreasing trend of household indebtedness in the EU countries since the Great Recession, ongoing inflationary pressures and the corresponding rise of interest rates by central banks could have detrimental effects on financial and economic spheres in the near future. The expected reduction of credit and the rise of interest rates should delineate a fall of both private consumption and private investment by feeding an economic recession. This should also determine an increase of the non-performing loans by households and corporations with negative repercussions on the banking stability.

Further research on household indebtedness in the EU countries should address the role of these eight macroeconomic drivers across the several types of household indebtedness, not only with regards to the respective purpose (e.g., housing credit, consumer credit, credit cards and overdraft banking accounts) but also in relation to the corresponding maturity (e.g., short-term credit, medium-term credit and long-term credit). Another suggestion could be analysis at the household level, by using micro data, which would allow for addressing the role of these eight macroeconomic drivers across household characteristics (e.g., dimension, age, qualifications, occupation, and social stratum).

## Appendix

Table A1 – *Data set*

| Country | Period | Observations | Missing |
|---|---|---|---|
| Austria | 2000-2019 | 20 | 5 |
| Belgium | 1995-2019 | 25 | 0 |
| Bulgaria | 2005-2018 | 14 | 11 |
| Croatia | 2011-2018 | 8 | 17 |
| Cyprus | 2004-2018 | 15 | 10 |
| Czechia | 2008-2019 | 12 | 13 |
| Denmark | 1995-2018 | 24 | 1 |
| Estonia | 2005-2019 | 15 | 10 |
| Finland | 1996-2018 | 23 | 2 |
| France | 2003-2018 | 16 | 9 |
| Germany | 1995-2018 | 24 | 1 |
| Greece | 1997-2019 | 23 | 2 |
| Hungary | 2007-2018 | 12 | 13 |
| Ireland | 2001-2018 | 18 | 7 |
| Italy | 1995-2019 | 25 | 0 |
| Latvia | 2006-2019 | 14 | 11 |
| Lithuania | 1999-2019 | 21 | 4 |
| Luxembourg | 2007-2018 | 12 | 13 |
| Malta | 2007-2019 | 13 | 12 |
| Netherlands | 1995-2019 | 25 | 0 |
| Poland | 2005-2019 | 15 | 10 |
| Portugal | 1995-2019 | 25 | 0 |
| Romania | 2009-2010 | 11 | 14 |
| Slovakia | 2005-2019 | 15 | 10 |
| Slovenia | 2007-2019 | 13 | 12 |
| Spain | 1995-2019 | 25 | 0 |
| Sweden | 1996-2019 | 24 | 1 |
| United Kingdom | 1995-2018 | 24 | 1 |

Table A2 – *Descriptive statistics*

| | **Mean** | **Median** | **Maximum** | **Minimum** | **Standard deviation** | **Skewness** | **Kurtosis** |
|---|---|---|---|---|---|---|---|
| *HI* | 0.604 | 0.543 | 1.496 | 0.021 | 0.305 | 0.792 | 3.053 |
| *HP* | 4.590 | 4.607 | 5.145 | 3.571 | 0.252 | –1.155 | 5.552 |
| *FAP* | 4.556 | 4.556 | 9.176 | 2.731 | 0.639 | 2.702 | 18.691 |
| *IN* | 0.105 | 0.106 | 0.187 | 0.058 | 0.022 | 0.427 | 3.481 |
| *LI* | 0.532 | 0.533 | 0.638 | 0.338 | 0.050 | –0.412 | 3.310 |
| *WS* | 0.120 | 0.118 | 0.163 | 0.080 | 0.017 | 0.087 | 2.350 |
| *WP* | 0.715 | 0.719 | 0.829 | 0.577 | 0.052 | –0.322 | 2.492 |
| *IR* | 0.002 | 0.0004 | 0.253 | –0.095 | 0.027 | 2.069 | 19.441 |

Table A3 – *Correlation matrix*

| | ***HI*** | ***HP*** | ***FAP*** | ***IN*** | ***LI*** | ***WS*** | ***WP*** | ***IR*** |
|---|---|---|---|---|---|---|---|---|
| *HI* | 1.000 | | | | | | | |
| *HP* | 0.114*** | 1.000 | | | | | | |
| *FAP* | 0.008 | 0.435*** | 1.000 | | | | | |
| *IN* | –0.085* | 0.037 | 0.009 | 1.000 | | | | |
| *LI* | 0.306*** | 0.020 | –0.102** | –0.235*** | 1.000 | | | |
| *WS* | 0.385*** | –0.130*** | –0.282*** | –0.278*** | 0.415*** | 1.000 | | |
| *WP* | 0.531*** | –0.076* | –0.103** | 0.062 | 0.090** | 0.421*** | 1.000 | |
| *IR* | –0.024 | –0.376*** | –0.209*** | –0.046 | 0.105** | 0.032 | –0.182*** | 1.000 |

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

Figure A1 – *Household indebtedness (% of gross domestic product)*

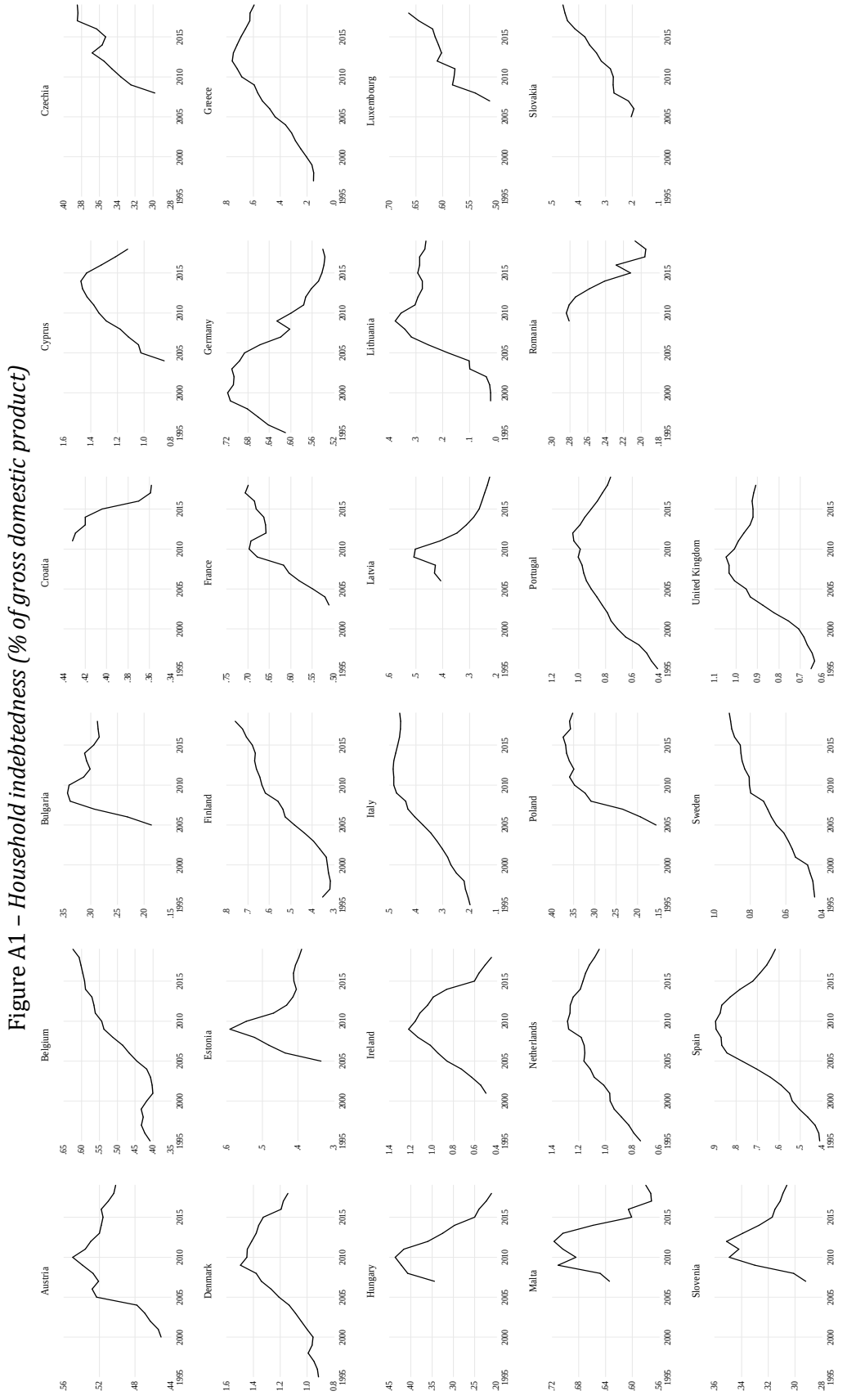


Figure A2 – *Housing prices (natural logarithm)*

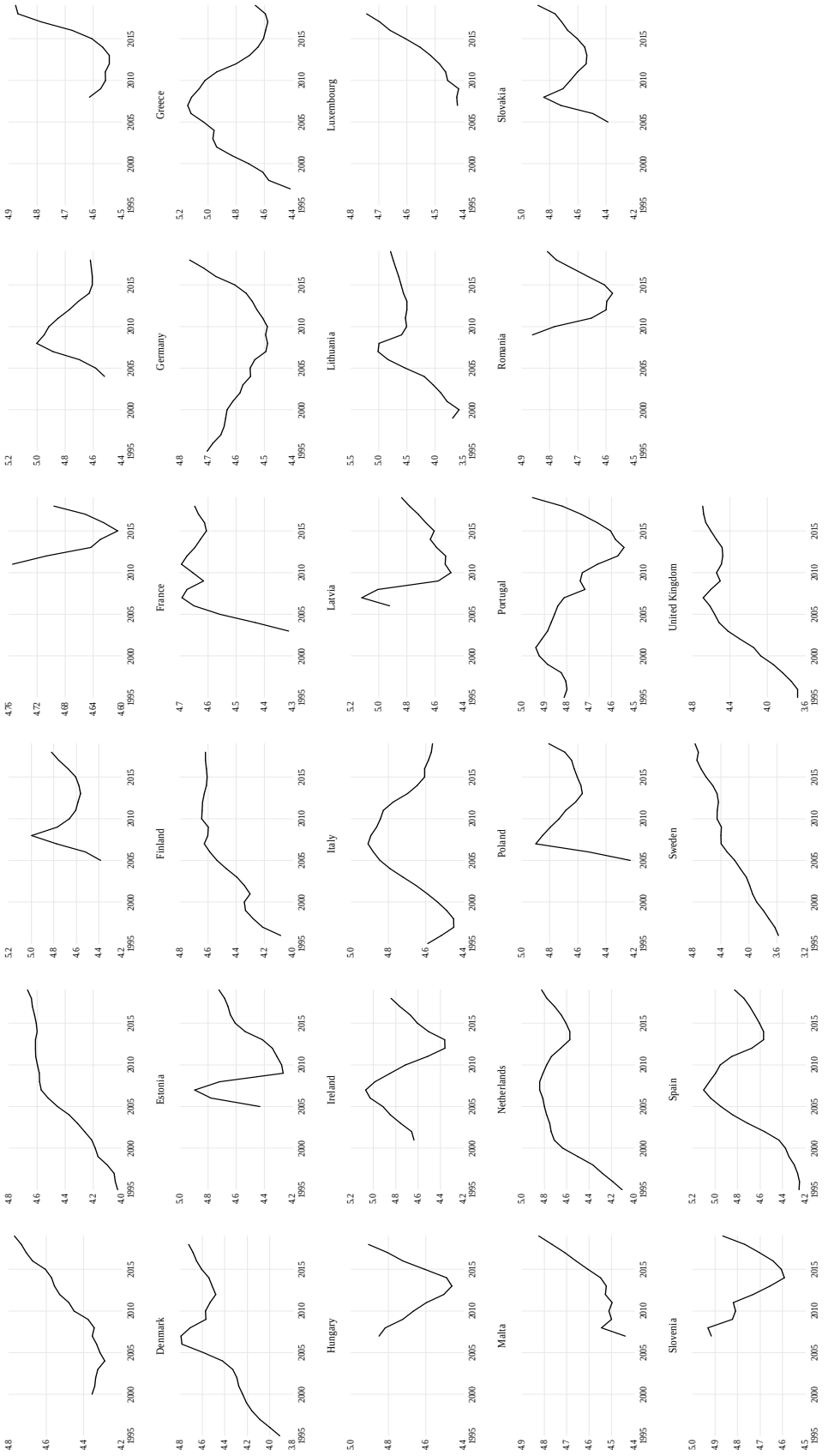


Figure A3 – *Financial asset prices (natural logarithm)*

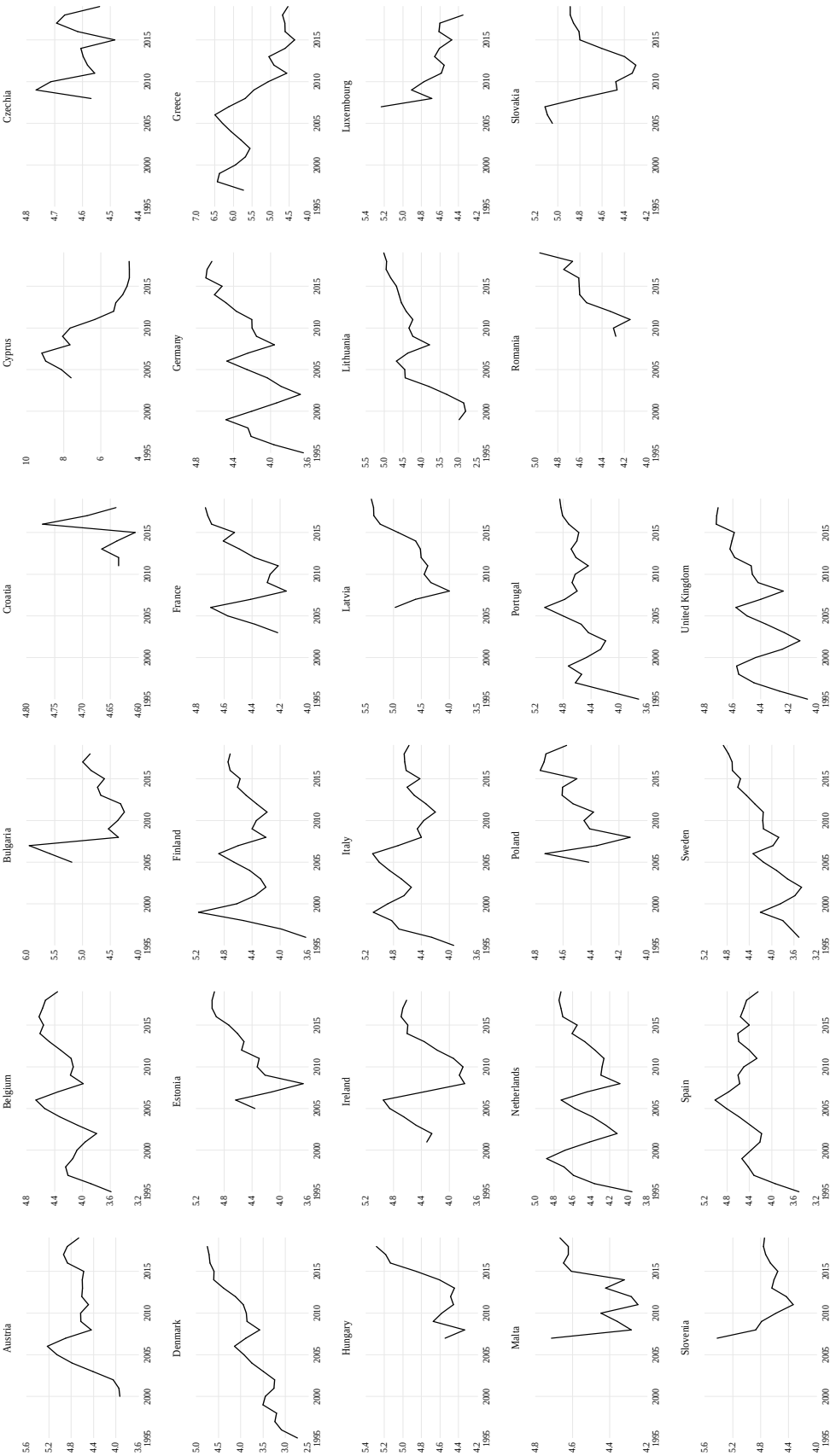


Figure A4 – *Personal income inequality (% of total)*

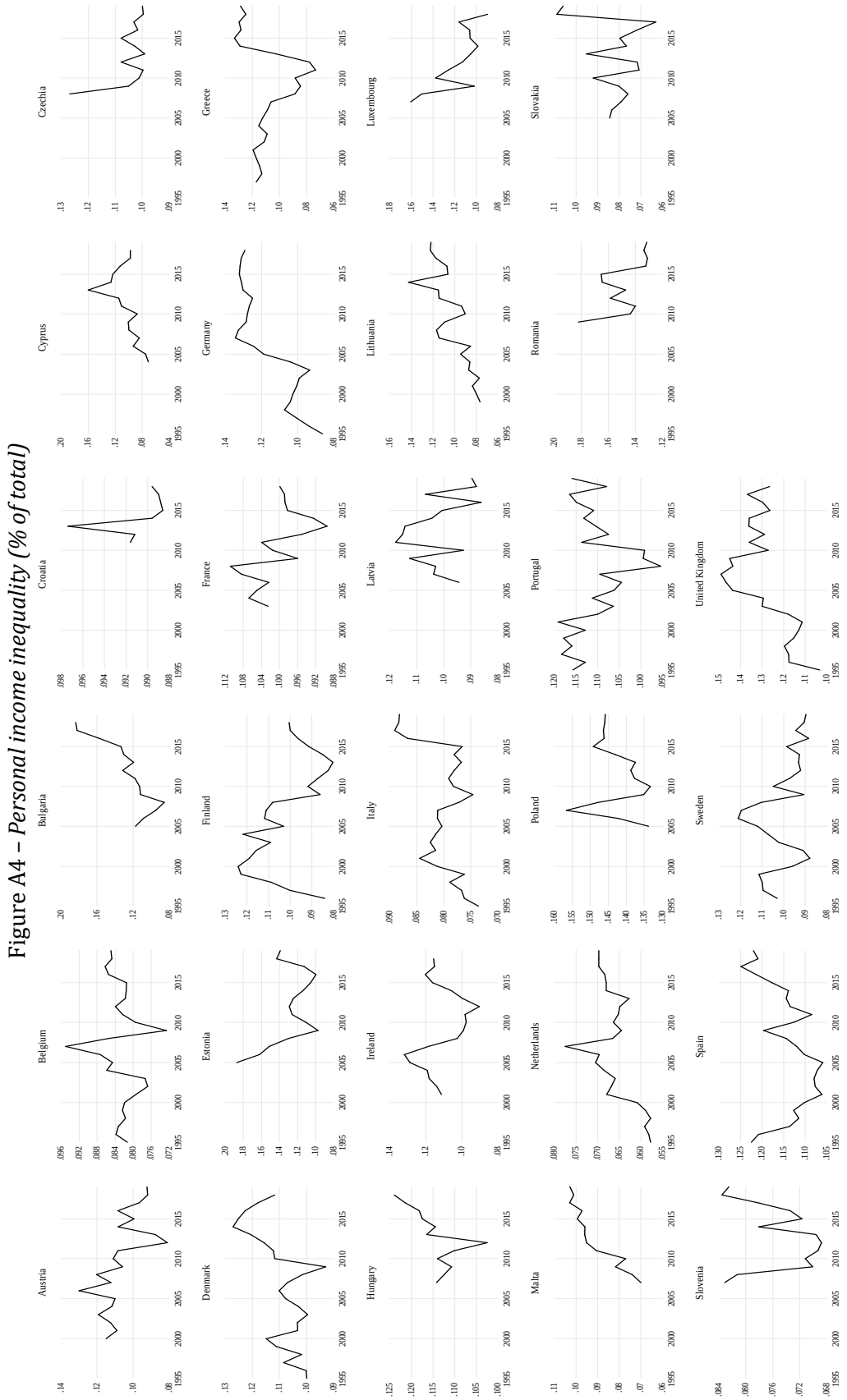


Figure A5 – *Household labour income (% of gross domestic product)*

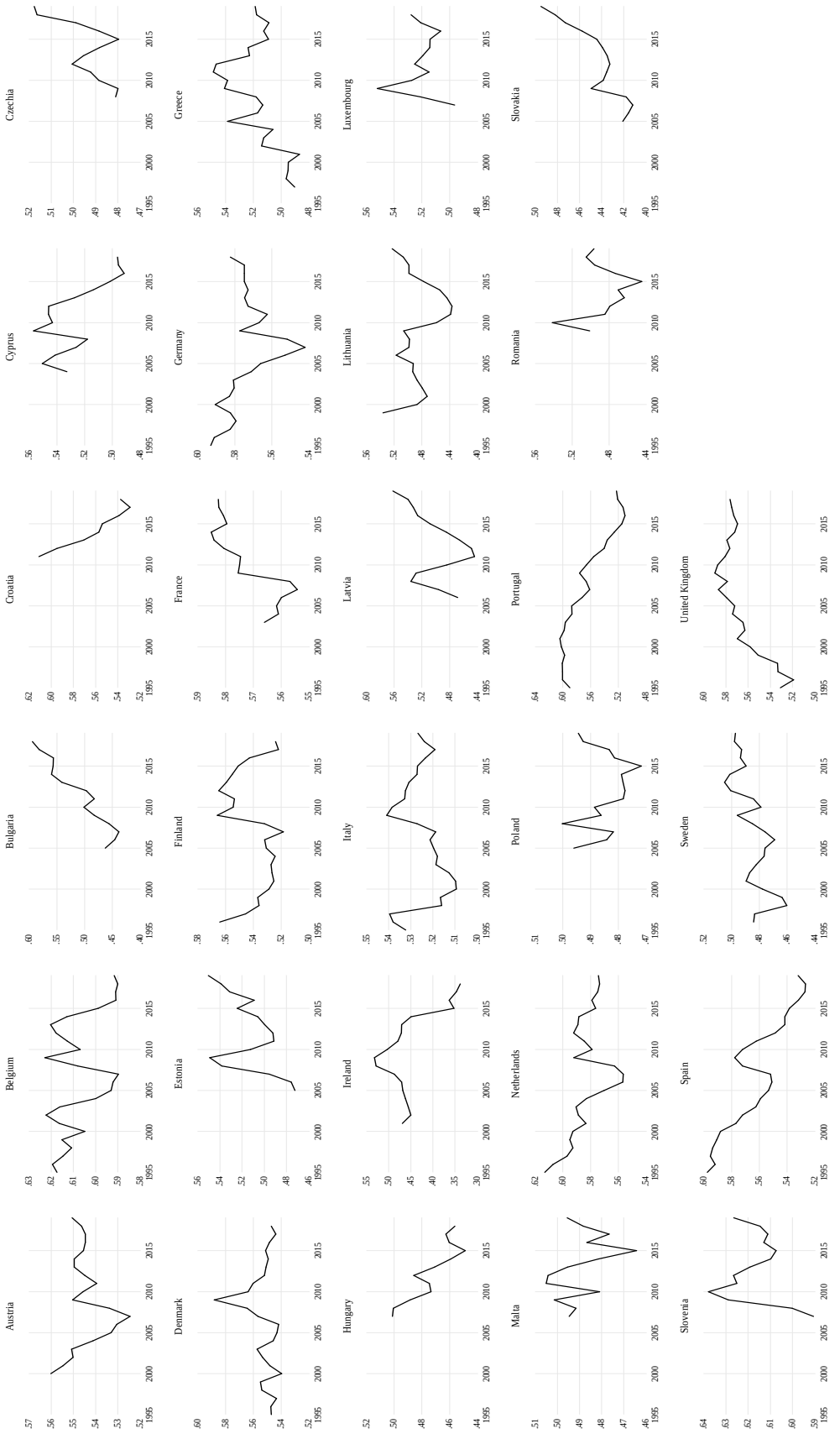


Figure A6 – *Welfare state expenditures (% of gross domestic product)*

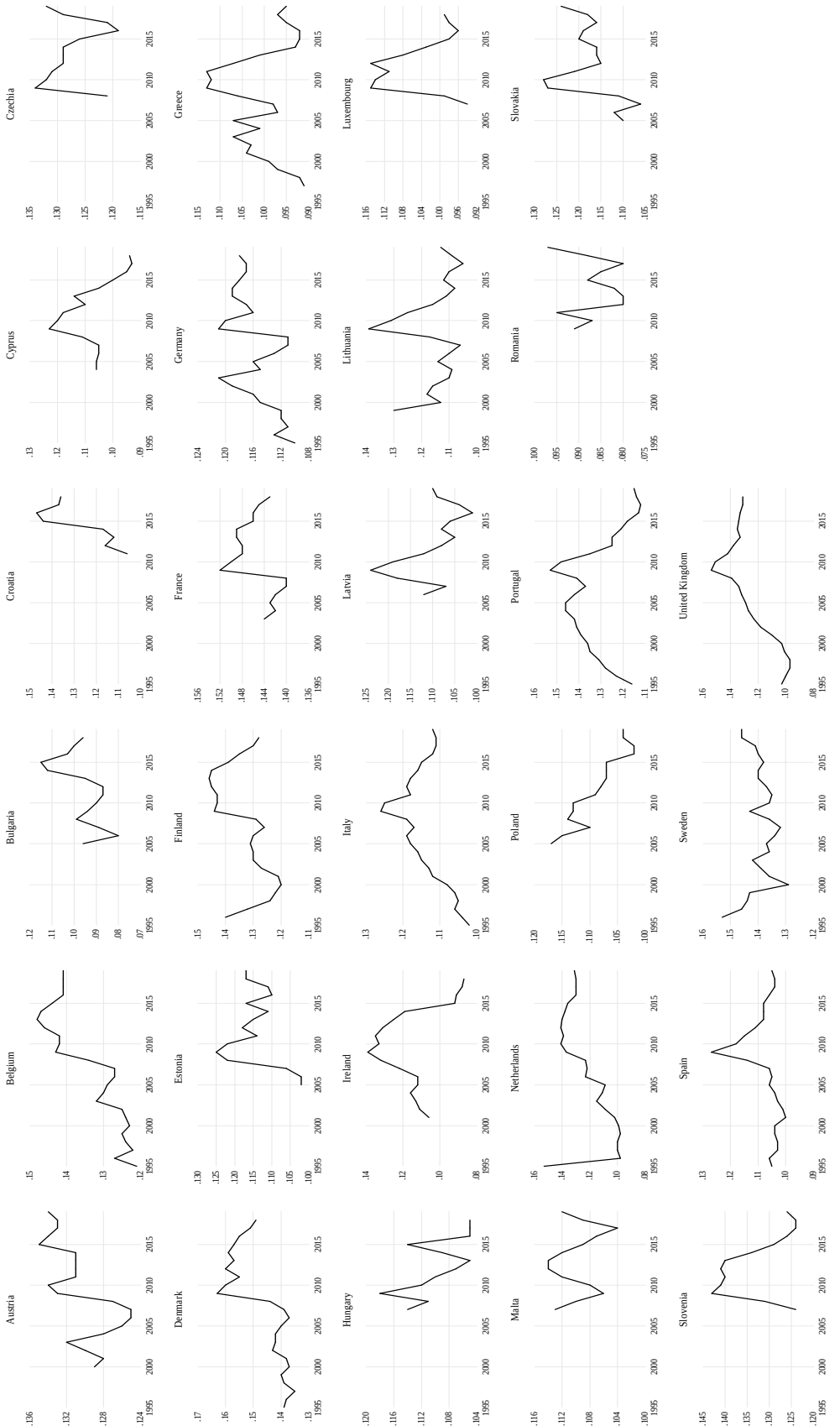


Figure A7 – *Working-age population (% of the total population between 15 and 64 years of age)*

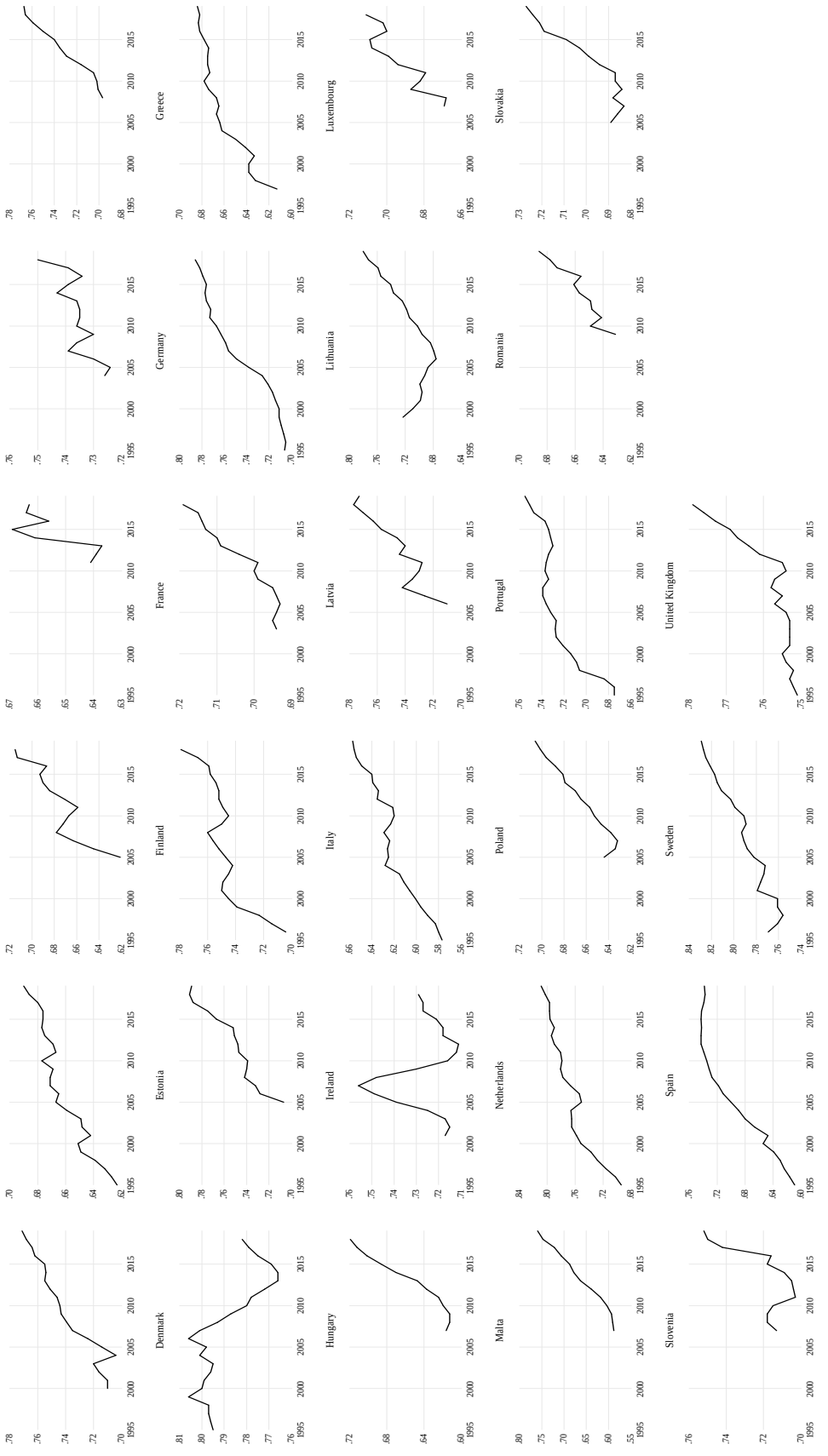
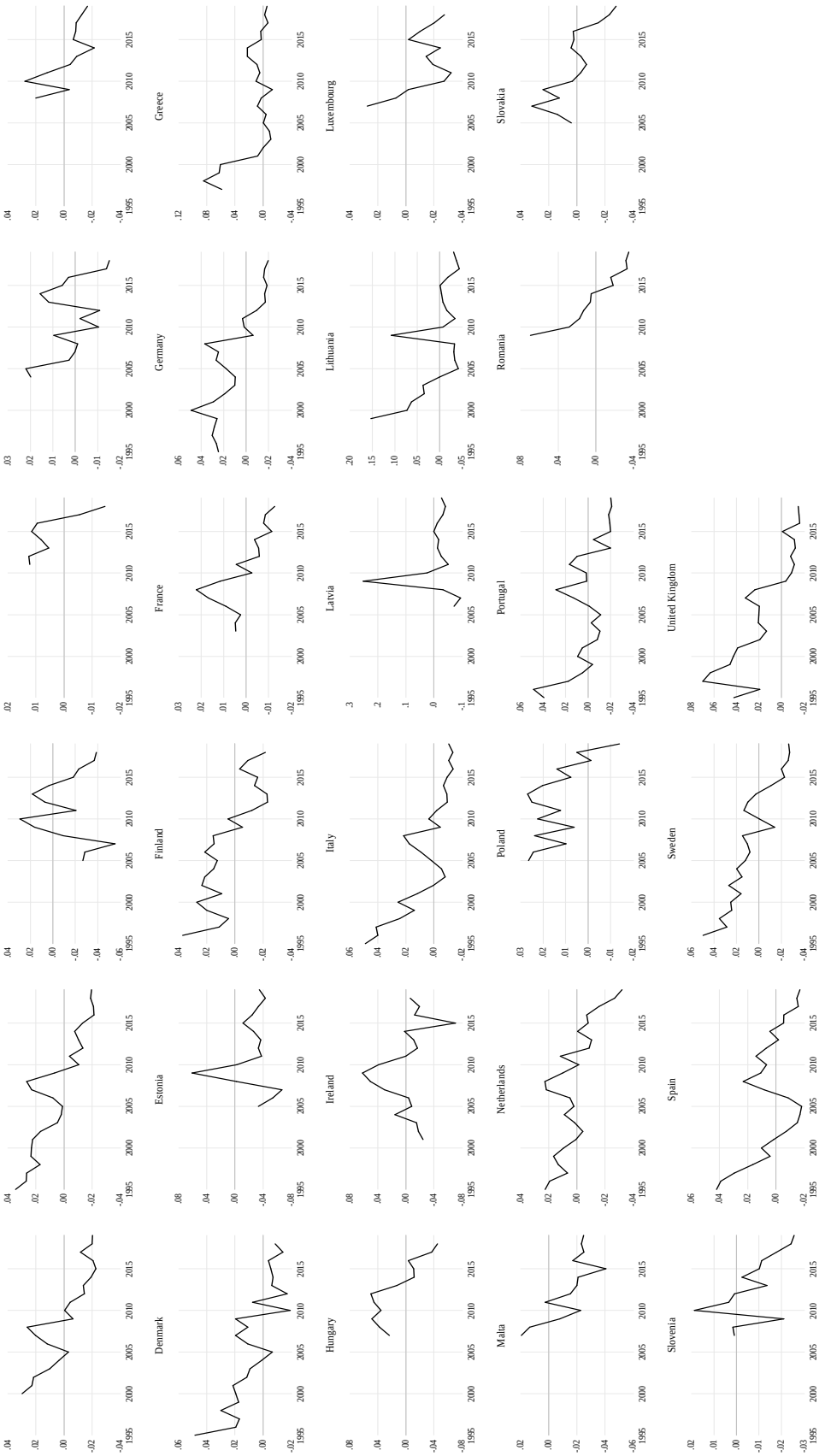


Figure A8 – *Interest rates (%)*



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