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Abstract

This paper explores the extent to which financial liberalization in the euro area had a differentiated impact on members' private consumption patterns and in turn on their current account positions as a function of who got indebted in the first place. Theoretically, it builds on an inter-temporal consumption model augmented with household heterogeneity. Low/middle income groups are impatient and credit-constrained, whilst high-income groups are patient and under no constraint. Increased access to credit in previously financially repressed countries implies a relaxation of collateral constraints specifically for low-income groups, who differently from high-income agents borrow to finance current consumption. It follows that financial liberalization is associated with deteriorating external positions there where initial levels of financial openness and inclusion are lowest and the share of the low/middle-income group largest.

Keywords

Introduction[*]

The creation of the European Monetary Union (EMU) was preceded by the elimination of capital controls in 1990. Perfect capital mobility was achieved with the introduction of the single currency in 1999 and the ensuing elimination of exchange rate risks on all euro area (EA) financial assets. This process was reinforced by new regulation allowing for the free movement of financial services in the context of the Single European Market (SEM) as well as by the deregulation of domestic credit markets evident, for example, in the rise of private to public bank ownership and in the strong pick-up of private credit to gross domestic product (GDP). In parallel, the periphery of the EA increased consumption relatively to income, thus witnessing a dramatic deterioration of the current account, whereas the core contained consumption, which allowed persistent current account surpluses to be built up (see Figure 1). This paper explores how the broad process of financial liberalization affected household consumption/saving behavior in the EA and in turn current account imbalances before and after the crisis.[1]

The empirical literature assessing the impact of financial liberalization on private consumption/saving behavior finds mixed results. McKinnnon (1973) and Shaw (1973) posit that financial liberalization increases saving opportunities in previously financially constrained countries, thus leading to a drop in consumption rates. By contrast, Bayoumi (1993), Jappelli and Pagano (1994) and Mendoza et al (2009) equate financial liberalization with a relaxation of liquidity constraints, finding that consumption would increase as a result of it. While the former literature builds on the premise that financial liberalization comes with a rise in real interest rates – with the evidence showing that this is indeed the case when emerging economies drop interest rate controls and switch to market-determined rates, the latter looks more broadly at the extent to which the process reduces the fraction of consumers that are liquidity-constrained independently of how market interest rates respond to financial reform. That is to say that the way in which financial liberalization is defined and possibly the initial level of financial development bear an important impact on expected results.

There is a relatively broad consensus in the literature that financial reform is indeed a multidimensional policy package involving a number of institutional changes at the level of both international and domestic credit markets, each of which may exercise a differentiated impact on private consumption/saving behavior (see, for example, Bandiera et al 2000). The same broad approach to financial liberalization is used in Lanau and Wieladek (2012) and Moral-Benito and Roehn (2016), which together with Ferrero (2012) and Borio and Disyatat (2011) are the only available analyses of the impact of broad financial reform on current account positions. All authors find that financial liberalization processes tend to worsen external positions because they mostly come with a relaxation of liquidity constraints. Moral-Benito and Roehn (2016) but show that bank entry barriers predict current account deterioration, whereas deregulating securities markets and privatizing banks tends to raise the external balance.

Building on the empirical literature mentioned above, we define financial liberalization in broader terms than just a change in market rates. We describe it by input variables such as the opening of the

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[1] Production is assumed exogenous such that current account movements are solely determined by consumption/saving decisions. This is in line with the theoretical approach used in this paper, which assumes a long-run relationship between the current account and macroeconomic fundamentals irrespective of short/medium-term movements in relative prices. The choice is also justified empirically. For example, Ca'Zorzi and Rubaszek (2008) show that EA current accounts are mostly driven by consumption smoothing, whilst capital accumulation plays a modest role. Along similar lines, Mian, Sufi and Verner (2017) find that, worldwide, firm debt dynamics do not generate the same boom-bust cycles that underpin household debt and are, as such, less of a threat to financial stability.

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capital account at the international level and the softening of domestic credit market regulation at the domestic level - with a focus on bank ownership - as well as by output variables such as changes in real long-term interest rates and in monetary depth, which is here captured by the evolution of private credit to GDP.[2] Input variables have the advantage of being exogenous, which is an aspect that will be relevant to the choice of the most appropriate empirical specification. Visual inspection of the relation between these four dimensions of financial liberalization and current account positions in the EA shows some unexpected results; they are indicative of a different relationship between finance and external positions across the core and the periphery.

Figure 2 plots the evolution of external positions in the EA in relation to a de jure measure of capital account openness, the so-called Chinn-Ito index, which captures all restrictions on cross-border financial transactions (Chinn and Ito 2008). The value of the index rises for higher levels of capital account openness. The data cover the period 1980-2015 and are constructed as averages per country grouping, where the periphery includes Greece, Ireland, Italy, Portugal and Spain, and the core Austria, Belgium, Finland, France, Germany, and the Netherlands. Figure 3 relates mean current accounts in the periphery and the core to an index measuring private versus public ownership of banks compiled by the Fraser Institute. Higher values of the index indicate a relatively high share of private to public banks. Figures 4 and 5 juxtapose current account positions to the evolution of real long-term interest rates and of private credit to GDP, respectively. The empirical evidence shows that, especially from the early 1990s up to the crisis, potentially open capital accounts and softer credit market regulation in the form of a rising share of private relatively to public banks were associated with lower real long-term interest rates and stronger credit expansion across all EA members, albeit more significantly so in the previously financially repressed periphery than in the core. Nevertheless, the data also reveal a differentiated in fact opposite response of domestic absorption and of the current account across the two country groupings. The (strong) financial liberalization witnessed by peripheral EA members especially since the early 1990s went hand in hand with a rise in debt-financed consumption as evident in the deterioration of the current account, whilst the (milder) liberalization in core members correlates with lower consumption and the rapid accumulation of current account surpluses. The main objective of the present paper is to shed light on this empirical puzzle.

The explanation we put to the test is that the qualitative effect of financial liberalization is a function of initial levels of financial openness and inclusion. In advanced economies, when financially repressed countries start liberalizing, the strongest channel that gets activated is the liquidity - constraints channel. The more binding the initial constraint, the stronger the consumption response. By contrast, when financially liberal advanced economies pursue further liberalization, the main effect goes through an expansion of the supply and quality of saving opportunities including improved risk/return trade-offs that encourage saving. By applying an inter-temporal approach to the current account, the hypothesis we put forward is that financial reform in previously repressed systems of the EA periphery relaxed credit/collateral constraints specifically for (impatient) low/medium-income agents, who borrow for immediate consumption. When they represent a large share of the population and the capital account is fully open, the current account worsens. By contrast, financial reform in already fairly liberal financial systems such as those of the EA core increases saving opportunities for (patient) high-income groups, who invest in relatively safe financial assets (e.g. pension funds) to maintain future consumption unaltered. When the latter are a large share of the population and the capital account is fully open, the current account improves. That is to say that financial liberalization tends to have non-linear effects and that it will lead to a deterioration of the current account when imposed on financial systems characterized by modest levels of openness and inclusion and by a large share of optimizing agents that prefer today's over tomorrow's consumption. We proxy the share of (impatient) low-income agents to the total population by income inequality because higher levels of

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[2] It should be noted that capital account openness, bank ownership and real long-term interest rates capture credit supply shocks, whilst the evolution of private credit to GDP can reflect both supply and demand factors and in fact differentiating between the two is in many respects an empirical challenge.

income inequality typically come with a higher share of the low-income group[3] as well as by the employment rate of low-skilled workers against the assumption that they are the only ones that - by being able to offer collateral in the form of labour income - have access to credit after financial liberalization.

The same approach is useful to understand the asymmetric reversal of macroeconomic imbalances after the crisis. In peripheral countries, it was mainly low/medium-income groups that borrowed to finance current consumption, as evident in the evolution of debt and financial assets to income ratios. As capital stopped flowing in, the supply of credit shrank and the cost of borrowing rose (Figures 4-5), their inter-temporal budget constraint tightened significantly, forcing them to contract consumption, which led to a significant improvement of the current account. Decreased access to credit was possibly also a function of the deterioration of the collateral considering that the crisis hit disproportionally low-income groups, with unemployment rising the most amongst the low-skilled.[4]

This paper relates to different strands of literature. Empirically, we add to the recent research investigating the link between broad financial reform and current accounts (Borio and Disyatat 2011; Lanau and Wieladek 2012; Moral-Benito and Roehn 2016). Similar to this literature, we test whether different dimensions of financial liberalization come with different effects on the current account after controlling for the standard long-run determinants of external positions (see, for example, Debelle and Faruqee 1996; Chinn and Prasad 2003; Lee et al 2008). Theoretically, we relate to the literature that studies the evolution of the current account in the framework of inter-temporal consumption models, viewing the current account as the outcome of dynamic forward-looking saving and investment decisions (see, for example, Sachs 1981; Obstfeld and Rogoff 1996; Blanchard and Giavazzi 2002; Fagan and Gaspar 2007, 2008; Campa and Gaviland 2011).

Compared to the available literature, though, we innovate along two dimensions. First, we explicitly account for the non-linear impact of financial liberalization on consumption/saving behavior in the context of the EA. Second, we depart from a representative-agent setting to appreciate the role of within-country household heterogeneity. We do so by splitting the population into low/middle- and high-income households. They are assumed to have different rates of time preference and different collateral constraints. Low/middle-income groups are impatient, but high-income groups are not. Moreover, low/middle-income consumers are subject to a budget/collateral constraint that is progressively relaxed as financial liberalization matures, while high-income consumers are virtually free of any constraint both before and after liberalization. Both are relatively common assumptions in heterogeneous-agent macroeconomic models (see, for example, Hall 1978; Campbell and Mankiw 1989; Iacoviello 2008). We posit that the liquidity-constraints view of financial liberalization is consistent with the evidence only when there is a sufficiently large share of the population with low/middle income or, to put it differently, when income inequality is relatively high. To be fair, the link between income inequality and deteriorating external positions has been already made in the literature (Kumhof et al 2012; Al-Hussami and Remesal 2012; Bofinger and Scheuermeyer 2016; Marzinotto 2017). Compared to them, we relate inequality and macroeconomic imbalances conditioning on the magnitude and, most originally, on the qualitative outcome of financial liberalization.

The rest of the paper is structured as follows. Section 1 provides suggestive evidence. Section 2 describes the paper's analytical framework. Section 3 presents the empirical analysis and results. Section 4 concludes.

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[3] Marzinotto (2017) shows that income inequality is a good proxy of the share of the population that is below the at-risk-of-poverty threshold in each EA country.

[4] A similar dynamic is modelled in Guerrieri and Lorenzoni (2017).

1. Suggestive evidence

There are suggestive pieces of evidence that support our hypothesis. Firstly, the distribution of household debt to income ratios for different income categories varies across the periphery and the core. Figure 6 shows that well. In the periphery, immediately prior to the outbreak of the debt crisis, the bottom 20 percent was the most indebted category. By contrast, in the core, debt was more evenly distributed across categories of income but slightly higher for the top 80-90 percent of the income distribution. Long-time series on the distribution of household debt by income category are unavailable, but this evidence is suggestive of the fact that in the periphery the financial liberalization process that preceded the crisis may have affected disproportionally low-income groups by relaxing their collateral constraints, which induced them to contract debt. By contrast, in the core, it did not necessarily come with distributive effects; if anything, it allowed high-income groups to access credit so as to indulge in sophisticated financial investment and risk management activities.

Secondly, there is some indirect evidence that loans taken out by households in the core were re-invested in financial assets rather than used for immediate consumption. Figure 7 compares the evolution of household debt to income ratios, the same measure used in Figure 6, with that of net financial assets to income ratios across the two country groupings. Debt to income accounts for loans relatively to annual disposable income and is a measure of the indebtedness of households in relation to their capacity to pay back. The net financial assets to income ratio is the difference between all assets (money, deposits, bonds, equities, pension funds, etc.) and liabilities (loans) to disposable income and accounts for the accumulation of the financial assets as a proportion of households' annual income. That is to say that debt is the liability used on the numerator of the net financial assets to income ratio. The two variables should move in opposite direction because more debt reduces net financial assets automatically. Would they not follow opposed trends, then the indication is that new credit is used to acquire financial assets that may at times provide positive remuneration, with the result that the value of net financial assets may even increase in parallel. According to data in Figure 6, the two trends move in opposite directions in the case of the periphery signaling that debt was indeed contracted to finance current consumption. The pattern in the core is not so obvious, with aggregate debt on the rise since 1995 but net financial assets following their own independent trend.[5] All these pieces of evidence would indicate that low-income groups of the periphery borrowed to consume immediately, whilst higher income categories in the core accessed short-term credit to finance long-term financial investment and thus future consumption.

2. A simple descriptive framework

We build on a simple inter-temporal consumption model similar to the one in Blanchard and Giavazzi (2002).[6] The most important innovation we introduce to that model is individual heterogeneity. A fraction of the population consists of a low/middle-income group that obtains income from labour and consumes proportionally to her current and expected income under some credit constraint. The remaining fraction of the population consists of a high-income group that also receives income from labour and consumes on the basis of current and expected income, but is virtually under no credit constraint. Skill endowment for these two groups is fully exogenous.[7] Both groups maximize a life-time (two-period) utility function (V) of the following type:

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[5] This effect may be also driven by the composition of portfolios in favour of assets with more volatile returns in the core relatively to the periphery. No matter what the exact mechanics behind the evolution of debt and financial asset to income ratios, the evidence is still suggestive of the fact that the core is characterized by higher levels of financial sophistication than the core arguably the outcome of higher per capita GDP.

[6] The inter-temporal approach to the current account dates back to Sachs (1981) and was further elaborated by Obstfeld and Rogoff (1996).

[7] It should be noted that skill endowment represents a source of permanent income inequality in the economy.

$$max\ V \equiv C_t + \beta C_{t+1} \tag{1}$$

With logarithmic preferences, consumption spending in the current period is given by:

$$log(C_t) \equiv \frac{1}{2}\left[log(C_t) + \frac{1}{R(1+x)}log(C_{t+1})\right] \tag{2}$$

Where R is the so-called consumption interest rate and the parameter x the wedge between the world (EA) consumption interest rate (i.e. the policy rate set by the central bank) and the retail rate at which agents in each country can borrow/lend (i.e. here proxied by real long-term interest rates). While both groups derive utility from consumption and pay the same interest rate[8], they have different time preferences. Namely, the discount factor β (equation 1) is "group-specific", with low/middle-income groups being impatient and high-income groups patient, a common assumption in micro-based macroeconomic models (e.g. Frederick, Loewenstein, and O'Donoghue 2002). Moreover, as mentioned above, the two groups are subject to a different budget/wealth-flow constraint that is biting for low/middle-income groups, who remain credit-constrained, and virtually non-binding for high-income groups independently of the level of financial liberalization; the latter is a generally accepted simplification starting from Hall (1978). The inter-temporal budget/wealth-flow constraint for the low/middle-income (L) and high-income group (H) is respectively:

$$A^L \equiv W_t^L L_t^L + W_{t+1}^L L_{t+1}^L + B_t^L(1+x)R \tag{3}$$

$$A^H \equiv W_t^H L_t^H + W_{t+1}^H L_{t+1}^H + B_t^H(1+x)R \tag{4}$$

where $W_t L_t$ and $W_{t+1} L_{t+1}$ represent current and expected labour income. B_t^L is debt contracted by the low/middle-income group to satisfy consumption-smoothing purposes. Because these agents are credit-constrained, they can only borrow up to a fraction of what they can offer in the form of collateral (i.e. future labour income). It follows that under normal conditions on credit markets $B_t^L < m(W_{t+1}^L L_{t+1}^L)$, where m is an economy-wide shock in credit supply, whether driven by quantities (i.e. supply of credit by international and domestic markets) or prices (the parameters R and x), that is independent of income and potentially time-varying. On the other hand, B_t^H is debt contracted by the high-income group under a de facto non-binding credit constraint such that $B_t^H \geq m(W_{t+1}^H L_{t+1}^H)$;, here, -$B_t^H$ denotes financial assets, which high-income groups may be accumulating for future consumption or just for the pleasure of it.[9] Equilibrium is given, for each group, by:

$$C_t = \frac{1}{2}\left(\frac{1}{1+\beta}\right)A \tag{5}$$

The aggregate-consumption equilibrium condition (C_t) and the current account balance (CA_t) are:

$$C_t = \frac{1}{2}\left[n\left(\frac{1}{1+\beta^H}\right)A^H + (1-n)\left[\left(\frac{1}{1+\beta^L}\right)A^L\right]\right] \tag{6}$$

$$CA_t = \frac{1}{2}\left\{1 - [n\left(\frac{1}{1+\beta^H}\right)A^H + (1-n)\left(\frac{1}{1+\beta^L}\right)A^L]\right\} \qquad [7]$$

The parameter *m* is how we model financial liberalization in our inter-temporal consumption model. Starting from low levels of financial openness, a credit supply shock ($\delta m > 0$) is assumed to allow a fraction *a* of the credit-constrained group (1- *n*) to switch from semi-autarky to standard inter-temporal utility maximization, whilst having by construction no impact on the budget/wealth flow constraint of the unconstrained group (*n*). The larger the credit supply shock (i.e. the lower the initial level of financial openness and inclusion), the greater the fraction of the low/middle-income that finally gets access to credit and that, being impatient, uses it for immediate consumption, thereby accumulating debt. At the aggregate level, financial liberalization will be associated with deteriorating current account positions the larger the credit supply shock and the greater the size of $(1 - n)$, which is the share of the population that potentially becomes fully unconstrained in the face of a large enough credit supply shock.

This simple descriptive framework is equally useful to understand the asymmetric reversal of current account imbalances during the crisis. The latter came with a rapid rise in credit spreads – the parameter *x* – in the periphery yet not in the core (Figure 3), whilst obviously the policy interest rate remained the same across the two country groupings. The literature has used the term financial fragmentation to describe such divergent credit positions inside the EA. Borrowers in the periphery faced a tighter inter-temporal budget constraint, probably also because the value of their collateral fell in rising (low-skilled) unemployment and having difficulty in accessing additional credit were forced to deleverage cutting back on consumption. As a result, the debt-to-income ratio started descending (Figure 6) and current account deficits to unwind in parallel.

3. Empirical analysis

This paper's core argument builds on two testable hypotheses. First, financial liberalization has a qualitatively different effect depending on whether it opens up financially closed systems or further liberalizes already open systems. In the former, financial reform has mainly the effect of relaxing credit (or collateral) constraints and would disproportionally affect credit-constrained agents such as low/middle-income groups. In the latter, it leads to a sophistication in saving opportunities, increasing both their supply and quality, thus affecting disproportionally unconstrained agents such as high-income groups. When holding constant heterogeneity in the population, which we proxy by either income inequality or the employment rate of low-skilled agents, the impact of financial liberalization on the current account should be non-linear. The second hypothesis is that financial liberalization will lead to a deterioration of the current account only in high shares of the low/middle-income group.

a) The non-linear impact of financial liberalization

We test our first hypothesis on a panel including EA countries that entered in the first wave, namely Austria, Belgium, Finland, France, Germany, Ireland, Italy, Netherlands, Portugal and Spain (with the exception of Luxembourg), plus Greece, which is relevant in the context of the crisis. The period covered is 1980-2015. A well exploited empirical application of the inter-temporal approach to the current account consists of establishing whether there is a long-run relationship between the current account and standard macroeconomic fundamentals. Our baseline specification is indeed inspired by the standard literature on the medium-term determinants of external positions (see, for example, Debelle and Faruqee 1996; Chinn and Prasad 2003; Lee et al 2008) and consists of the following reduced form equation:

$$CA_{it} = \alpha_0 + \beta X_{it} + \partial FL_{it} * FL_{it} + \delta_t + \varepsilon_{it} \qquad [8]$$

where *CA* denotes the current account balance as a share of GDP in country *i* at the end of period *t*; X is a factor of conventional independent variables; FL_{it} is financial liberalization measured by each of four identified dimensions separately, namely capital account openness, bank ownership, real long-term interest rates and private credit to GDP; δ_t are time fixed effects and ε_{it} stands for the error terms. All variables are expressed as 4-year non-overlapping averages of the corresponding annual values so as to isolate structural determinants of current accounts beyond annual fluctuations. The estimation uses Ordinary Least Squares (OLS) with time fixed effects (δ_t) to allow the average current account to vary from one period to the other. [10]

The chosen independent variables include i) the (four-year-lagged) net foreign asset position (NFA) as a share of GDP; ii) the general government balance as a share of GDP; iii) the old dependency ratio, which is equal to those older than 64 years relative to the working-age population; iv) a measure of capital deepening consisting of the growth rate of labour productivity; v) real GDP growth; vi) two alternative proxies of the share of low/middle-income groups, namely the standardized Gini coefficient from the Standardized World Income Inequality Database (SWIID) and the employment rate of persons aged 25-64 who have completed less than primary, primary or lower secondary education; vii) the four selected dimensions of financial liberalization including the Chinn-Ito index for capital account openness, an index compiled by the Fraser Institute measuring the ratio of private to public banks, real long-term interest rates and, as a proxy of monetary depth, private credit to GDP.[11]

Table 1 presents the results. It is found that all dimensions of financial liberalization have a non-linear impact on the current account, but they are not significant in the same way. In particular, credit spreads and monetary depth are more robust determinants of current account movements than either capital controls or bank ownership. Probably, this is because the former capture dynamics both before and after the crisis when real long-term rates and credit to GDP started diverging inside the EA, whereas the opening of the capital account and the privatization of banks have been irreversible processes and following an initial spur would not affect medium-term movements in the current account. The results are confirmed when we proxy the share of the low-income with the employment rate of low-skilled agents.[12]

As in some of the existing empirical literature on EA macroeconomic imbalances (see, for example, Abiad et al 2007; Jaumotte and Sodsriwiboon 2010; Schmitz and Von Hagen 2011), relative income is a statistically robust predictor of the current account, with the external position improving in high levels of relative income, in line with the neo-classical hypothesis. That is to say that poorer countries are importing capital to finance investment or smooth consumption or both, whereas richer countries provide the necessary financial resources to the former group. We introduce income inequality to control for within-country heterogeneity. The variable is statistically significant across most specifications. Income inequality and per capita income may well be considered as two sides of the same coin and can both be interpreted, at least to some extent, as proxies of the size of liquidity constraints in each country. So for example, the positive sign for relative income implies that as income per capita increases, liquidity constraints are less of an issue and agents would not contract debt for immediate consumption. The same applies to income inequality. If the latter is a proxy of the share of the population that might face liquidity or collateral constraints, then the higher income inequality, the worse the current account in reaction to financial liberalization. By contrast, other

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[10] It should be noted that this approach has been recently criticized for ignoring model uncertainty (see for example Ca' Zorzi 2012). Whilst we appreciate the criticism, we are not necessarily after the "true" model but aim more modestly at bringing to light differences in the current account response across groups of countries.

[11] We do not include relative per capita income because it is highly correlated with inequality and instead capture catching-up processes by including capital deepening, which is not significantly correlated with inequality.

[12] Results for the share of low-skilled emplyment are not shown.

standard determinants of the current account such as the old dependency ratio and GDP growth are not statistically significant.

b) Financial liberalization and the share of impatient agents

We should equally find that each dimension of financial liberalization leads to a deterioration of the current account only when there is a sufficiently large share of (impatient) low/middle-income agents, namely in rising levels of income inequality. We estimate a reduced form equation similar to [8] adding but an interaction term:

$$CA_{it} = \alpha_0 + \beta X_{it} + \partial FL_{it} + \sigma(1-n)_{it} + \gamma FL_{it} * (1-n)_{it} + \delta_t + \varepsilon_{it} \qquad [9]$$

where *CA* denotes the current account balance as a share of GDP in country *i* at the end of period *t*; X is a factor of conventional independent variables; FL_{it} refers to our four dimensions of financial liberalization; $(1-n_{it})$ is the share of the impatient low/middle-income group; $FL_{it} * (1-n)_{it}$ is an interaction term capturing the joint effect of each dimension of financial liberalization and the share of liquidity-constrained agents; δ_t are time fixed effects and ε_{it} stands for the error terms. As above, all variables are expressed as 4-year non-overlapping averages.

Table 2 presents the results. All our financial liberalization dimensions appear to be important predictors of the current account, but their sign is inverted when there is a high growing share of impatient agents, as in our hypothesis. More precisely, we find that capital mobility would normally improve a country's external position, but it leads to its deterioration in relatively unequal countries where there is a significant share of the population that is likely to engage in debt-financed consumption once credit constraints are relaxed (Model 1). The same applies to private bank ownership (Model 2). Similarly, decreasing interest rates lead to current account deterioration only in unequal countries or countries with a high share of low-skilled employment (Model 3).

We do not find significant effects for private credit to GDP but this may be related to the fact that the measure can hardly be taken as a proxy of credit supply and it is in fact at least partly endogenous. We thus apply two-stage least squares (2SLS) using income inequality, our proxy of the share of impatient agents, as instrumental variable and obtain that higher credit to GDP comes with a worsening of the current account.[13] Our results correct those in Moral-Benito and Roehn (2016), where it was found that privatizing banks comes with an improved external position. We show that the effect is opposite in relatively more unequal countries where the share of the credit-constrained population is large prior to privatization.

c) The crisis and the return of liquidity constraints

To test for the return of liquidity constraints in the periphery of the EA during the crisis, we regress changes in (log) private consumption to changes in (log) gross domestic product, both expressed at constant prices, differentiating between the pre- and post-crisis period as well as between the periphery and the core. Table 3 shows the results. In line with some of the available literature (Campbell and Mankiw 1989), the reaction of consumption to changes in income can be interpreted as an indirect measure of liquidity constraints in the population. The higher the value of the coefficient, the truer that agents consume their current (rather than their permanent) income.

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[13] We test for endogeneity. The null hypothesis of the Durbin and Wu–Hausman tests is that the variable under consideration can be treated as exogenous. As both tests are highly significant at the 99.99 per cent level we must reject the null of exogeneity.

We find that in the midst of the liberalization process and prior to the crisis, 0.74 of the population in the periphery can be regarded as being credit-constraint, probably down from higher values prior to liberalization. In the core, the share of the credit-constrained population is 0.60. Following the crisis, liquidity constraints increase dramatically in the periphery de facto concerning the entire population but drop in the core.

4. Robustness checks

We run the same estimation in equation [1] expressing all variables except for net foreign assets to GDP as deviations from the GDP-weighted EA mean prior to calculating four-year averages, which should control for rest-of-the-world effects considering that the monetary union has been a closed for most of the period sampled. The fact that also the four identified dimensions of financial liberalization are measured in relative terms is an additional test of the robustness of our hypothesis considering that it is liberalization in each country compared with the rest of the union that matters. The results largely confirm the non-linear effect of financial reform with credit spreads and monetary depth being especially important drivers of macroeconomic imbalances.

Instead of assessing the marginal effects of financial liberalization on the current account, we identify the timing of major policy changes or financial liberalization episodes by large changes in the Chinn-Ito index, the share of private to public banks, real long-term rates and private credit to GDP. A large financial liberalization episode is defined as (four-year) changes in the above variables that exceed by two standard deviations the average (four-year) change over all observations. We also account for milder liberalizations. A moderate episode refers to changes that exceed by one standard deviation the average change over all observations, whereas a small financial liberalization episode is identified when the change is greater than the sample's average.

5. Conclusions

This paper has assessed the impact of financial on current account positions. The data suggest a differentiated response of current accounts across country groupings. We argued that such an outcome is driven by the fact that financial liberalization has a qualitatively different effect on the real economy as a function of starting conditions. In financially repressed (low-income) countries, the first step to financial reform implies above all a relaxation of liquidity/collateral constraints. In financially liberal (high-income) countries, further liberalization increases the supply and quality of saving opportunities available to unconstrained agents. Such an argument predict that financial liberalization has a non-linear impact. The ultimate effect on the current account depends on initial levels of financial openness and on the share of agents that are more likely to benefit from one or the other "type" of financial liberalization.

In terms of policy implications, our results suggest that it is crucial that first processes of liberalization are accompanied by appropriate macro-prudential policies that help taming financial cycles. At the same time, policies to reduce income inequality and improve the skill profile of the employed would be complementary to macro-prudential policies.

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Figures

Figure 1: Consumption rates (Cons rate) and current account positions (CA)
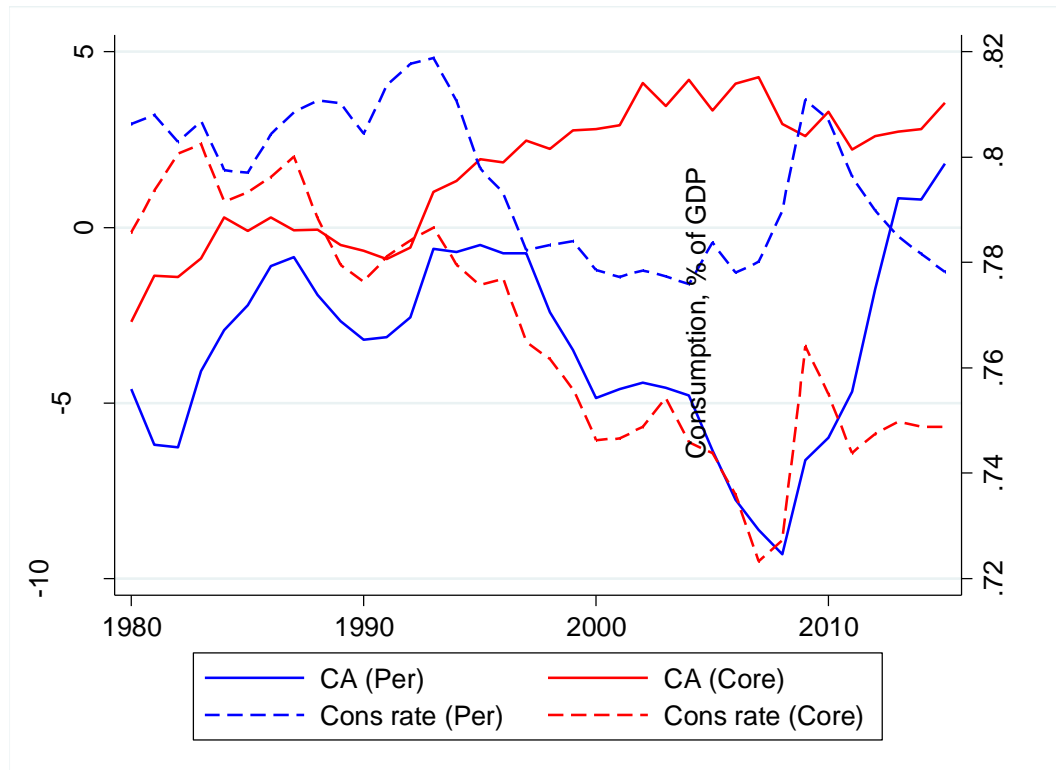
Key: "Per" stands for periphery including Greece (EL), Ireland (IR), Italy (IT), Spain (ES), and Portugal (PT); the "Core" includes Austria (AT), Belgium (BE), Finland (FI), France (FR), Germany (DE) and the Netherlands (NL). **Source:** Own elaboration based on the European Commission's AMECO Database.

Figure 2: Capital account openness (KA) and current account positions (CA)
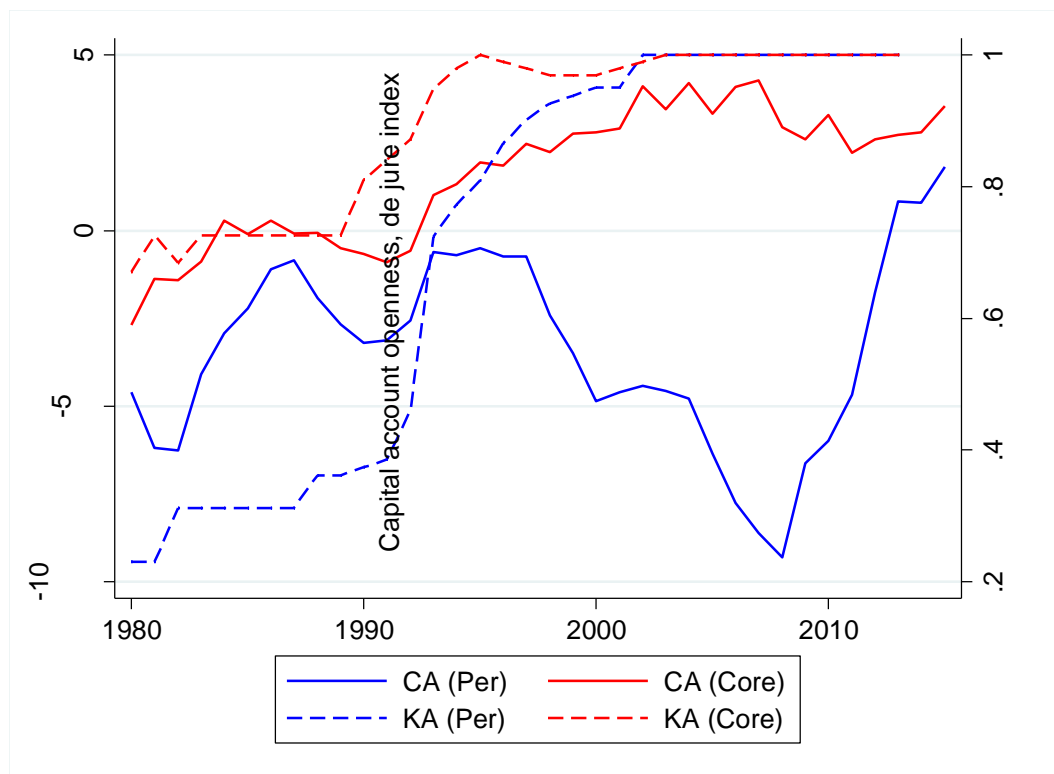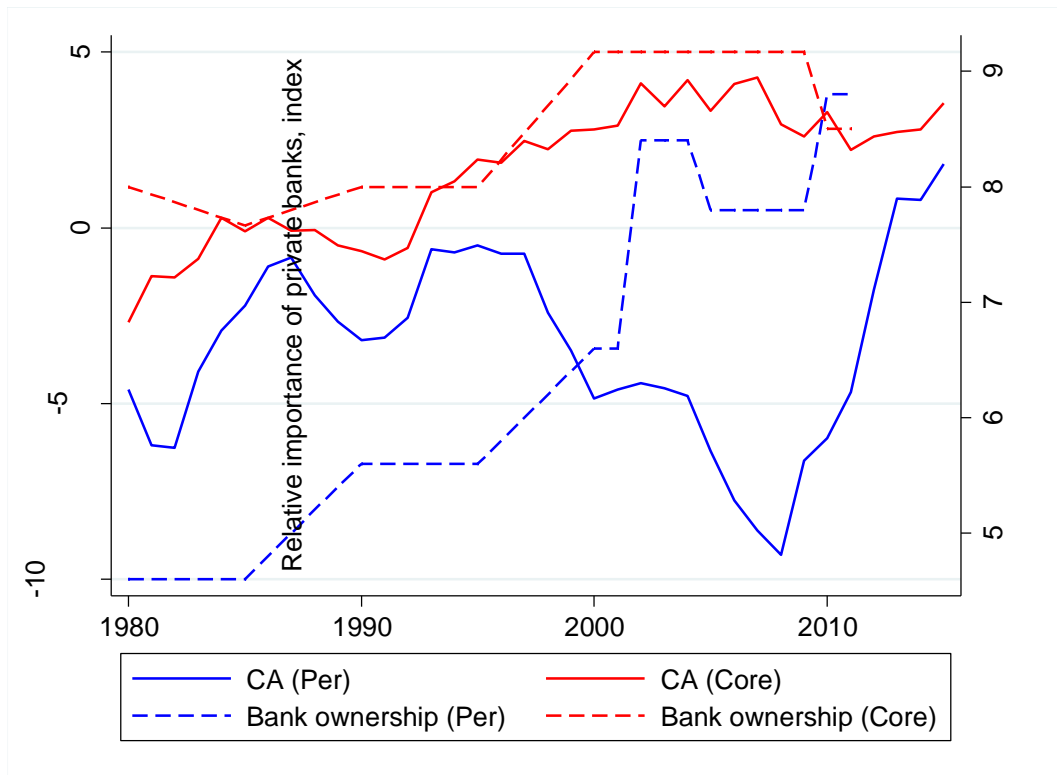

Key: "Per" stands for periphery including Greece (EL), Ireland (IR), Italy (IT), Spain (ES), and Portugal (PT); the "Core" includes Austria (AT), Belgium (BE), Finland (FI), France (FR), Germany (DE) and the Netherlands (NL). **Source:** Own elaboration based on the European Commission's AMECO Database and Chinn and Ito index.

Figure 3: Private ownership of banks and current account positions (CA)

Key: "Per" stands for periphery including Greece (EL), Ireland (IR), Italy (IT), Spain (ES), and Portugal (PT); the "Core" includes Austria (AT), Belgium (BE), Finland (FI), France (FR), Germany (DE) and the Netherlands (NL). **Source:** Own elaboration based on the European Commission's AMECO Database and Fraser Institute.

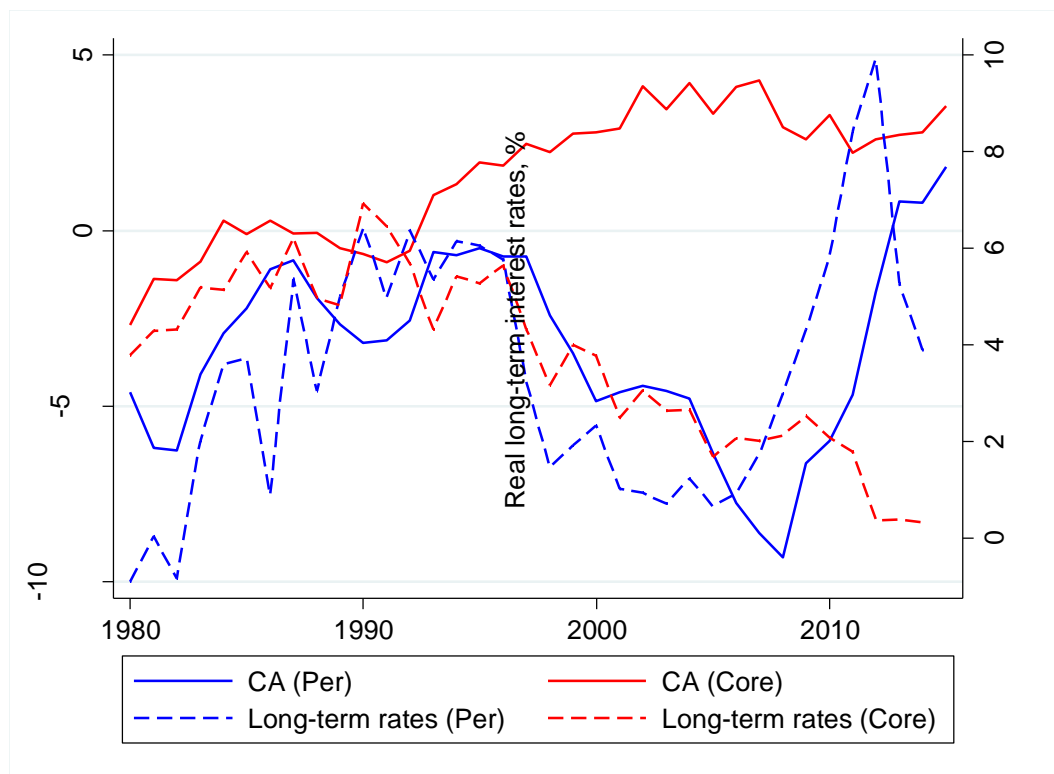**Figure 4: Real long-term interest rates and current account positions (CA)**

Key: "Per" stands for periphery including Greece (EL), Ireland (IR), Italy (IT), Spain (ES), and Portugal (PT); the "Core" includes Austria (AT), Belgium (BE), Finland (FI), France (FR), Germany (DE) and the Netherlands (NL). **Source:** Own elaboration based on the European Commission's AMECO Database.

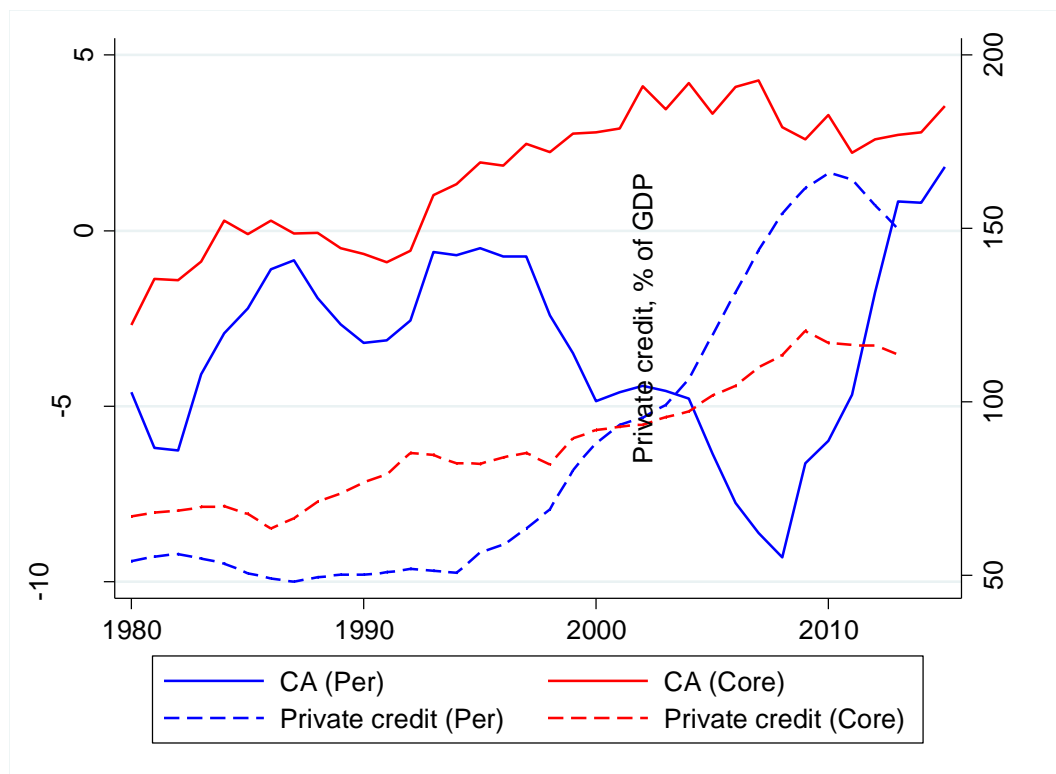**Figure 5: Private credit to GDP and current account positions (CA)**
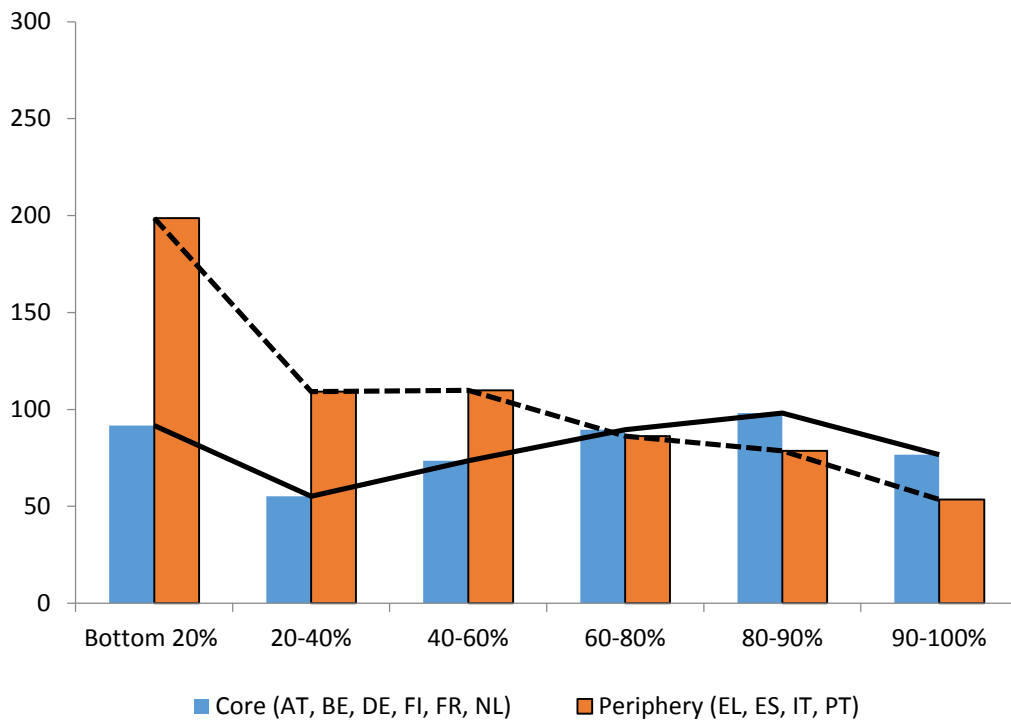

Key: "Per" stands for periphery including Greece (EL), Ireland (IR), Italy (IT), Spain (ES), and Portugal (PT); the "Core" includes Austria (AT), Belgium (BE), Finland (FI), France (FR), Germany (DE) and the Netherlands (NL). **Source:** Own elaboration based on the European Commission's AMECO Database and the World Bank's World Development Indicators (WDI).

Figure 6: Debt to income ratio by income quantile (2010)

Source: Own elaboration based on Eurosystem Household Finance and Consumption Survey (2010). The income reference year is 2007 (Spain), 2010 (Italy), 2009 (Austria, Belgium, Finland, France, Germany, Netherlands, Portugal). For Greece, the income reference period is the last 12 months preceding the survey (with the survey having taken place in 06/2009-09/2009).

Figure 7: Debt to income and net financial assets to income ratios
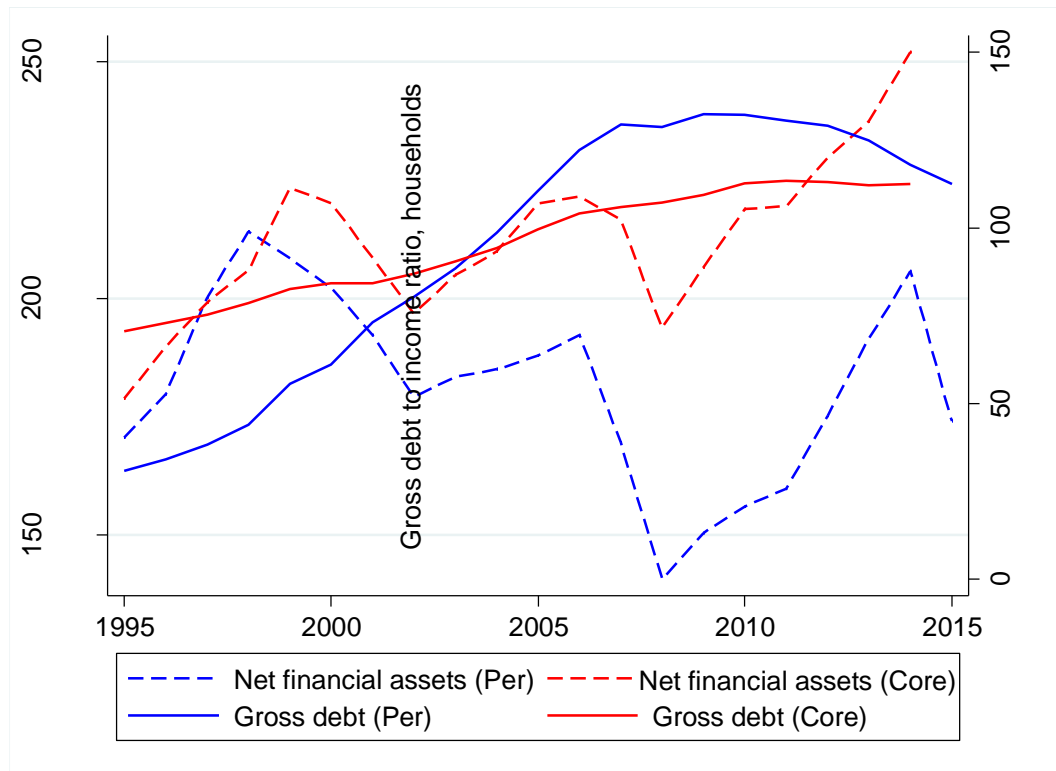
Tables

Table 1. The non-linear impact of financial liberalization, EA 1980-2015

VARIABLES	(1) OLS	(2) OLS	(3) OLS	(4) OLS
Lagged NFA	1.955	2.209	3.267*	4.102**
	[0.962]	[0.926]	[1.784]	[2.520]
Relative per capita income	0.164***	0.186***	0.149***	0.188***
	[3.105]	[2.797]	[3.074]	[4.590]
Old dependency ratio	0.284	0.233	0.141	0.327
	[1.092]	[0.899]	[0.528]	[1.400]
General government balance	0.277	0.261	0.524	0.388
	[0.908]	[0.964]	[1.630]	[1.415]
Real GDP growth	0.542	0.411	0.597	0.324
	[0.966]	[0.622]	[1.265]	[0.757]
Income inequality	-0.482**	-0.335*	-0.184	-0.291**
	[-2.501]	[-1.944]	[-0.861]	[-2.068]
Capital mobility	-52.74*			
	[-1.724]			
Squared capital mobility	28.47			
	[1.352]			
Bank ownership		-1.713		
		[-1.157]		
Squared bank ownership		0.130		
		[1.270]		
Real long-term interest rates			2.666***	
			[3.639]	
Squared real long-term interest rates			-0.189***	
			[-3.802]	
Private credit				-0.238***
				[-4.772]
Squared private credit				0.000933***
				[4.981]
Constant	11.61	-7.752	-21.21**	-3.297
	[0.709]	[-0.993]	[-2.616]	[-0.465]
Observations	57	47	56	57
R-squared	0.676	0.668	0.726	0.726

Robust t-statistics in brackets
*** p<0.01, ** p<0.05, * p<0.1

Key: Estimation method = Ordinary Least Squares (OLS) (Model 1, 2, 3, 4) with robust standard errors to account for heteroscedasticity with time effects. The dependent and independent variables are non-overlapping 4-year averages of the corresponding annual values. The sample includes all countries that participated in the first wave of EMU (AT, BE, FI, FR, DE, IE, IT, NL, PT, and ES) plus EL. Times dummies not reported.

Table 2. Financial liberalization and the share of impatient agents, EA 1980-2015

	(1) OLS	(2) OLS	(3) OLS	(4) OLS	(5) 2SLS
Lagged NFA	1.694	2.362	3.968+	1.427	2.983
	[0.902]	[1.013]	[1.861]	[0.586]	[0.766]
Relative per capita income	0.156***	0.203***	0.112*	0.122*	0.209***
	[3.050]	[3.324]	[1.960]	[1.992]	[3.246]
Old dependency ratio	0.264	0.310	0.247	0.251	-1.113+
	[1.056]	[1.133]	[1.082]	[0.910]	[-1.731]
General government balance	0.319	0.227	0.478	0.272	-0.0664
	[1.102]	[0.788]	[1.455]	[0.859]	[-0.130]
Real GDP growth	0.424	0.558	0.744	0.528	-0.691
	[0.791]	[0.792]	[1.504]	[0.901]	[-1.132]
Capital mobility	55.75**				
	[2.446]				
Income inequality	1.498**	0.874	-0.856**	0.340	
	[2.186]	[1.394]	[-2.231]	[0.873]	
Capital mobility*inequality	-2.073***				
	[-2.865]				
Bank ownership		4.525*			
		[1.837]			
Bank ownership*inequality		-0.149*			
		[-1.834]			
Real long-term rates			-3.118*		
			[-1.701]		
Real long-term rates*inequality			0.135**		
			[2.454]		
Private credit				0.260	-0.209*
				[1.525]	[-1.728]
Private credit*inequality				-0.00886	
				[-1.622]	
Constant	-61.44***	-52.16**	3.637	-27.38*	39.97
	[-3.355]	[-2.337]	[0.258]	[-1.976]	[1.192]
Observations	57	47	56	57	57
R-squared	0.698	0.681	0.718	0.680	n.r.

Durbin: 18.0955***
Wu-Hausman: 22.8826***
Robust t-statistics in brackets
*** p<0.01, ** p<0.05, * p<0.1

Key: Estimation method = Ordinary Least Squares (OLS) (Model 1, 2, 3, 4) with robust standard errors to account for heteroscedasticity and Two-Stage Least Squares (2SLS) (Model 5) with time effects. The dependent and independent variables are non-overlapping 4-year averages of the corresponding annual values. The sample includes all countries that participated in the first wave of EMU (AT, BE, FI, FR, DE, IE, IT, NL, PT, and ES) plus EL. Times dummies not reported.

Table 3. The crisis and the return of liquidity constraints, EA 1990-2015

VARIABLES	(1) FE Per (1990-2009)	(2) FE Core (1990-2009)	(3) FE Per (Post-2009)	(4) FE Core (Post-2009)
ΔlnReal GDP	0.737***	0.604***	1.085***	0.564***
	[11.05]	[6.035]	[6.199]	[4.886]
Constant	-0.00213	-0.00321	-0.00339	-0.00804***
	[-0.824]	[-1.123]	[-0.790]	[-3.871]
Observations	65	65	20	24
R-squared	0.674	0.382	0.733	0.584

t-statistics in brackets
*** p<0.01, ** p<0.05, * p<0.1

Key: Estimation method = Fixed effects (FE) (Model 1, 2, 3, 4). The dependent variable is the change in (log) private consumption. The sample includes all countries that participated in the first wave of EMU (AT, BE, FI, FR, DE, IE, IT, NL, PT, and ES) plus EL.

Table A. List of variables

Variable	Definition	Source
Current account balance (CA)	Current account balance as a percentage of GDP	AMECO Database
Consumption rate	Total consumption at 2000 prices divided by GDP at 2000 market prices	AMECO Database
Net Foreign Asset (NFA) position	Net foreign asset position as a percentage of GDP	Lane and Milesi-Ferretti (2007)
Income inequality	Standardised Gini coefficient, after taxes and benefits	Standardized World Income Inequality Database (SWII) (Solt 2009)
Low-skill employment	Number of employed people within the age group 20-64 years having attained less than primary, primary and lower secondary education divided by the total population of the same age group and with the same educational attainment level	EUROSTAT
Relative per capita income	Per capita income relative to the US (=100) at current prices (PPP)	Penn World Tables
Real GDP growth	Real GDP growth rate	OECD
Old dependency ratio	Ratio of people older than 64 to the working-age population	World Development Indicators (World Bank)
Government budget balance	Net lending/borrowing of general government as a percentage of GDP	AMECO Database
Capital mobility	Chinn and Ito index describes a country's degree of capital account openness capturing all de jure restrictions on cross-border financial transactions	Chinn and Ito (2008), updated 2017
Bank ownership	Share of private relatively to public banks	Fraser Institute (2017)
Private credit	Domestic credit to private sector as a percentage of GDP	World Development Indicators (World Bank)
Real long-term interest rates	Real long-term interest rates, deflator GDP	Ameco Database
Household debt to income ratio	The household debt-to-income ratio combines non-financial and financial accounts data. It is defined as the ratio of households' debt arising from loans, recorded at the end of a calendar year, to the gross disposable income earned by households in the course of that year. It thereby constitutes a measure of the indebtedness of households, in relation with their ability to pay back their debt's principal sum. The debt-to-income ratio is calculated on the basis of gross debt – that is without taking account of any assets held by households.	EUROSTAT
Net financial assets to income ratio	Net financial assets, consolidated liabilities of households as a percentage of GDP. They include: currency and deposits; securities other than shares; loans; shares and other equity; net equity of households in life insurance reserves; net equity of households in pension funds; prepayment of premiums and reserves against outstanding claims; and other accounts receivable.	EUROSTAT

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