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# Current Account Imbalances and Income Inequality: Theory and Evidence

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# Current account imbalances and income inequality: Theory and evidence*

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**Abstract**

In this paper we analyze theoretically and empirically the impact of an increase in income inequality on the current account balance. We develop a model with consumption externalities and heterogeneous agents which explains how an increase in income inequality can affect negatively or positively the current account balance. The relationship is exacerbated by the level of financial liberalization represented by changes in the borrowing constraints. Panel data regressions for a sample of developed and developing economies confirm that an increase in income inequality is mostly linked to a decrease in the current account balance. Moreover, we also find that relatively higher levels of financial liberalization interact with the level of income inequality so that the previous effect is amplified. These results are robust to different specifications.

**JEL-Classification: C33, D91, E21, E44, F32**
**Keywords**: Current account, income inequality, global imbalances, financial liberalization, consumption externalities, heterogeneity

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# 1 Introduction

One of the main features prior to the 2007-2009 global financial crisis was the existence of large and persistent global macroeconomic imbalances in an environment with very developed and complex financial markets (Portes, 2009). Several authors have stressed the potential role that global imbalances played in the magnification of the crisis by bringing down interest rates, creating a considerable volume of financial intermediation, and a major increase in global liquidity (Obstfeld and Rogoff, 2009; Portes, 2009). Portes (2009) argues that, in the case of the U.S., this pattern was not benign as the inflows did not finance U.S investment, but rather consumption and government deficits. Thus, these financial and macroeconomic conditions eased the access to credit for households leading to the surge in borrowing seen in the last decade. The ultimate inability to refinance or repay housing loans by households could be an important cause of the crisis (Rajan, 2010). Evidence on the impact of the global financial crisis on output and demand suggests that countries running large current account deficits during the pre-crisis years were the most severely affected, with the decline in domestic demand being particularly dramatic (Lane and Milesi-Ferretti, 2012).

Thus, it is fundamental to understand what the determinants of the current account balance are in order to reduce the sizable cross-country imbalances. While several interpretations were given in order to explain these features (see Portes, 2009, for a summary), they remain incomplete.[1] In particular they are not able to explain the increasing current account dispersion within developed countries.[2] The objective of this paper is to shed some light on these unexplained cross-country differences in the current account balance. We argue that a fundamental relationship exists between a surge in income inequality (well documented by Atkinson, Piketty, and Saez, 2011), over-borrowing and current account deficits (see Kumhof, Lebarz, Richter, Throckmorton, and Rancière, 2012).

The standard models with representative agents cannot explain this relationship, as by definition, every agent in the economy is identical. Actually, if heterogeneity is included, in the presence of borrowing constraints for the relatively poor a shift in the income distribution toward the rich might be thought to raise savings and thereby increase the current account balance. Hence, the question arises as to which factors, affecting poor and

[1] Portes (2009) presents two separate features of global imbalances: The much greater dispersion of current accounts (absolute values) and capital flowing the "wrong way", from developing countries and emerging markets to advanced countries. Counter-intuitively, developing countries with fast productivity growth shows capital outflows, while those with slow productivity growth attract capital inflows (see Jeanne and Gourinchas, 2009, for a discusion).

[2] In fact the global imbalances issue is not limited to a comparison between a group of developed countries with current account deficits against a group of emerging countries witnessing surplus in their current account balances. Developed countries such as Germany, Japan, the Netherlands, Switzerland, and France have all seen balanced or positive current account balances during the last two decades.

rich households at the same time, may have caused the observed changes in consumption behavior and the decline in savings in several developed countries. We argue that the mechanism behind this "counter-intuitive" relationship is a disproportionate borrowing from low and middle-income households to sustain their consumption in the light of stagnating incomes. The result is an increase in domestic demand compensated by an increase in borrowing from the rest of the world, which generates current account deficits. This long-run outcome has been facilitated by the process of financial reforms that governments undertook in response for the widening inequalities (see Rajan, 2010; Reich, 2010; Kumhof and Rancière, 2010).

In this paper we develop a simple model of the current account with heterogeneous agents, building up on the inter-temporal approach of the current account pioneered by Obstfeld and Rogoff (1995), to show how an increase in income inequality leads to a lower current account balance. We depart from the benchmark model by allowing for two types of agents: high income households and low/middle income households. Income inequality is taken as given because we use it as an explanatory variable for the current account balance and we are interested on its consequences rather than its sources. We base our approach on the relative consumption hypothesis (Duesenberry, 1949), assuming that an individual compares her consumption relative to some reference level or group.[3] In our model, low/middle income agents have as a reference the consumption level of high income households. The presence of these externalities from high to low/middle income agents can be justified for several reasons. For instance, the desire to keep-up with the consumption of low/middle income households through the existence and impact of reference groups and network effects (Dijk, Frank, and Levine, 2010; Bertrand and Morse, 2012; Ghiglino and Goyal, 2010), social effects on borrowing (Georgarakos, Haliassos, and Pasini, 2012) or conspicuous consumption (Heffetz, 2011) among others. To account for the role of financial liberalization we simply assume that a fraction of the low income households are unable to access the financial markets, and thus consume what they earn at each period. Finally, the model abstracts from the existence of physical capital. As mentioned previously, capital inflows to deficit countries financed essentially a consumption boom instead of productive investment. Hence, we focus only on the consumption side of the determinants of the current account balance.

By adding these features to the benchmark model, we show that following a permanent increase in inequality the current account balance can be reduced. Given the effects of consumption externalities, low income agents can borrow in excess of what the standard model would say despite the reduction in their income. The reduction in the current

[3]Several papers have emphasized the fact that the permanent income hypothesis does not empirically hold (see Frank, 2005; Gross and Souleles, 2002).

account balance results from a higher consumption of the high-income households and the sustained consumption of the fraction of low/middle income households having access to the financial markets. Kumhof, Lebarz, Richter, Throckmorton, and Rancière (2012) develop a model that reaches the same conclusion than ours. One of their key assumptions is that high income households prefer to accumulate financial assets instead of physical capital. In our case, it is the low/middle income households who show concern about their relative level of consumption with respect to high income households. In making this assumption we believe we stick more to the recent empirical evidence brought by, among others, Bertrand and Morse (2012) and Dijk, Frank, and Levine (2010) that low/middle income households increase their consumption in the light of an increase in the consumption of high income households. These two papers named this phenomenon, respectively, as "trickle-down consumption" and "expenditure cascades". In addition, our model offers a simple and tractable version of the inter-temporal model of the current account.

In a second step, we examine empirically for a group of developed and developing countries if the results of the model hold. Particularly, we are interested in examining the role played by financial liberalization in exacerbating the relationship between income inequality and current account imbalances. From a policy view, this is an important issue, as one of the solutions suggested to reduce the current account imbalances is to increase the level of financial liberalization in emerging countries that show high surpluses such as China. More precisely, as predicted by the model, we examine (a) what is the relationship between income inequality and current account balance, in particular if it is negative, and (b) if this relationship is conditional on the level of financial liberalization, as we argue. We find that this relationship holds among a large group of countries. Furthermore, it seems to be exacerbated when countries have levels of financial liberalization relatively higher than the rest of the world. Conversely, countries with relatively low levels of financial liberalization observe a positive association between income inequality and the current account balance. This second result allows extracting some policy implications that could enlighten the actual debate on international financial regulation and global imbalances.

The remainder of the paper is organized as follows. Section 2 reviews the literature. In section 3 we develop the theoretical model. Section 4 presents the data and the empirical results and section 5 concludes.

# 2 Literature review

Recent theoretical studies provide a rational link between the increase in income inequality from one side and the decline in savings and the increase in household borrowing from

the other. Several papers attempt to explain the huge rise in U.S households debt. For instance, Iacoviello (2008) develops an economy with heterogeneous agents which mimics the time-series behavior of the earnings distribution in the U.S from 1963 to 2003. He shows that the recent prolonged rise in U.S households' debts can be only explained by rising income inequality. Other authors focused on explaining the gap between income and consumption inequality. Krueger and Perri (2006) show that while income inequality in the Unites States increased during the last two decades, consumption inequality did not follow the same pattern. They explain that the increase in income volatility - i.e. increase in idiosyncratic income risk - has been an important cause of the increase in income inequality. However, at the same time it has led to an endogenous development of credit markets, allowing households to better smooth their consumption against idiosyncratic income fluctuations. Broer (2011) extends the previous framework to an open economy where an increase in individual income volatility makes default on foreign debt less attractive. As a result, this allows higher foreign borrowing against future income, leading to a decline in foreign net assets. Following a different approach, Dijk, Frank, and Levine (2010) build a network model which gives rise to expenditure cascades. They find empirical evidence for the U.S that rapid income growth concentrated among top earners has stimulated a cascade of additional expenditure by those with lower earnings between the 1990s and the 2000s. More specifically, they show that more unequal counties in the U.S display a higherdegree of non-business bankruptcy.

The approach we follow below is closer to Kumhof and Rancière (2010) since they assume that the increase in income inequality is due to a permanent change in income instead of an increase in income uncertainty as argued by Krueger and Perri (2006).[4] They show in a DSGE framework how a shock to the income distribution shifting income from workers to investors increases the probability of a crisis occurrence through an increase in households' leverage. The mechanism behind is an increase in credit demand from the part of the workers in order to keep-up with a certain level of consumption and an increase in credit supply from the part of investors. Kumhof, Lebarz, Richter, Throckmorton, and Rancière (2012) extend the previous model to an open economy, including financial liberalization shocks. They show that current account deficits arise endogenously in response to higher domestic income inequality. The low and middle class, assumed in their model

[4]Evidence for the U.S. strongly suggests that the rise in inequality over the past decades has been largely due to the permanent rather than transitory component of income. In fact, there is an intense debate on the nature of the increase in income inequality. Kopczuk, Saez, and Song (2010) show that lifetime rather than transitory income shocks are the driving force behind the increase in income inequality in the U.S. In fact, income inequality can be decomposed in a within and between components. The first one is also referred to as income risk and it represents the volatility in individual income. The between component describe the differences in income distribution between different groups of income that can be explained by differences across individuals, as is the top income inequality measure for example. In this paper, we focus on between-income inequality as it is more line with the theoretical argument that we want to follow in our empirical estimations.

not to have direct access to international capital markets, borrow from the rich to sustain their levels of consumption. The rich fund a significant part of the increased domestic lending by intermediating foreign savings from the rest of the world. The net effect is an increase in domestic demand, and therefore a current account deficit. Importantly, financial liberalization generates a strong additional stimulus to workers consumption.[5]

The main theoretical assumption, the existence of consumption externalities, is based on the considerable amount of literature in which they are analyzed.[6] The first theoretical approaches to the fact that agents gain utility from their relative rather than absolute levels of consumption date back to Duesenberry (1949). Abel (1990) and Galí (1994) use this framework to study habit formation and "keeping up with the joneses" behavior as explanations for the equity premium puzzle (see also Uhlig, 2007). Harbaugh (1996) shows how in an intertemporal framework with consumption externalities rapidly-growing countries may present higher savings rate despite their increased future income prospects. Alvarez-Cuadrado and Van Long (2011) incorporate consumption externalities into an overlapping generations framework. They find that consumption externalities are associated with inefficient outcomes with low levels of individual savings and over-working. Other authors have implemented consumption externalities into growth models (Carroll, Overland, and Weil, 1997) or optimal tax policy (Ljungqvist and Uhlig, 2000; Dupor and Liu, 2003). Directly related to the theory of the current account, Bussière, Fratzscher, and Müller (2004) introduce habit formation and allow for two types of agents: agents that are liquidity constrained and consume all of their income each period and of optimizing Ricardian agents. In our framework we make the same assumption concerning liquidity constraints.

We base our main theoretical assumptions, i.e. the existence of heterogeneous agents and the presence of consumption externalities, on the recent micro-studies which show how inequality could affect households' savings. Bertrand and Morse (2012) study the patterns of spending across US states between 1980 and 2008. They find that a rise in the level of consumption of top income households induces more consumption by the non-rich. Their results show that one quarter of the decline in savings rate can be explained by this "trickle down" effect over the last three decades. Non-rich households spend more on luxury goods and services supplied to their more affluent neighbors. Furthermore, in states where the highest earners were wealthier, non-rich households were more likely to report financial distress, a result similar to that of Dijk, Frank, and Levine (2010). The authors also find that legislators representing more unequal districts were significantly more likely

[5] On a related perspective Azzimonti, de Francisco, and Quadrini (2012) link the increase in the stock of government debt during the last three decades with the observed significant liberalization of international financial markets and the increase in income inequality in several industrialized countries.

[6] A survey can be found in Clark, Frijters, and Shields (2008)

to back a loosening of mortgage rules revealing how responsive a government is to rising income inequality, as suggested by Rajan (2010). Instead of focusing on households consumption behavior Georgarakos, Haliassos, and Pasini (2012) examine the role of social influences on debt culture, caused by perceived average income of peers. Using household survey data for the Netherlands, they find social effects on borrowing, particularly among those who categorize themselves poorer than their peers, and also on indebtedness, suggesting a link to financial distress. The link between these empirical findings and the current account balance occurs through the sustained (increased) domestic demand and the need to borrow from abroad to finance the desired level of consumption. Besides, lowering the liquidity constraints on low/middle income households plays a magnification role.

The other set of empirical literature that this paper contributes to is the one estimating the determinants of the current account balance (see Faruqee and Debelle, 1996; Chinn and Prasad, 2003; Lane and Milesi-Ferretti, 2012). We follow this literature by adopting a reduced form approach to measure current account determinants. It is not the objective of this paper to re-assess the determinants of the current account again since we focus on a specific theoretical argument, i.e. the potential link between income inequality and global imbalances. However, we build up on this framework for the empirical analysis and the choice of our control variables.

# 3 Income inequality, the current account and the relative consumption hypothesis

In this section we derive a simple two-period model of the current account in the presence of consumption externalities for low/middle income households. This model, based on the relative consumption hypothesis (Duesenberry, 1949), allows us to derive the current account balance in an environment with income inequality. The current account is only determined by the intertemporal consumption decisions of agents, which we assume to be heterogeneous in their income levels and preferences. In this simple two-period framework we show how a permanent increase in income inequality may lead to current account deficits.

## 3.1 The model: Income heterogeneity and relative consumption

We model a small open economy composed of a large number of agents. For simplicity we assume that the total size of the population in the economy is one and that individuals have perfect foresight. The economy lasts for two periods. There is no capital accumulation, so the only potential determinant of the current account balance are the

intertemporal consumption decisions. Two types of agents are present in the economy, both characterized by their incomes, which are exogenously given we are interested in studying its impact and not its sources. At each period, there is share $\xi \in [0,1]$ of agents who have low income, denoted by $Y_{L,t}$, whereas the rest have high income, denoted by $Y_{H,t}$, with $Y_{H,t} >> Y_{L,t}$.[7] We assume that agents cannot switch from one level of income to another, so that each individual belongs to the same group in both periods. Agents can freely borrow or lend in complete financial markets at a given gross world interest rate $1+r$, with the exception of a share $(1-\alpha) \in [0,1]$ of low income agents who are impeded from it. Therefore, this share of agents live in autarky so that they consume all their endowment at each period. The parameter $\alpha$ can be interpreted as an exogenous (increasing) index of financial liberalization.[8] Thus, we can express, respectively, aggregate income and consumption as:[9]

$$Y_t = (1-\xi)Y_{H,t} + \xi Y_{L,t}. \tag{3.1}$$

$$C_t = (1-\xi)C_{H,t} + \xi[\alpha C_{L,t} + (1-\alpha)Y_{L,t}]. \tag{3.2}$$

The agents who are not impeded from borrowing or lending face a standard intertemporal utility maximization problem (see Obstfeld and Rogoff, 1996, 1995), which is identical for every individual in each group $j = \{H, L\}$:

$$\begin{aligned} \underset{C_{j,t}}{\text{Max}}\ & u(C_{j,1}, \widetilde{C}_{j,1}) + \beta u(C_{j,2}, \widetilde{C}_{j,2}) \\ & s.t.\ (1+r)(B_{j,0} + Y_{j,1} - C_{j,1}) + Y_{j,2} - C_{j,2} = 0 \end{aligned} \tag{3.3}$$

where $B_{j,0}$ denotes initial wealth in form of net foreign assets held by an agent of type $j$. The second argument in the utility function, $\widetilde{C}_{j,t}$, shows that agents compare their own level of consumption relatively to that of some reference group, so that consumption externalities arise. Following Galí (1994), Harbaugh (1996) and Dupor and Liu (2003) the utility function takes the next form:[10]

$$u(C_{j,t}, \widetilde{C}_t) = \frac{1}{1-\sigma}\left[\frac{C_{j,t}}{\left(\widetilde{C}_{j,t}\right)^{\gamma_j}}\right]^{1-\sigma}$$

[7] From now on, we will use low income to denote low/middle income agents.

[8] In the literature these non-optimizing agents are usually described as "Non-Ricardian" or "rule-of-thumb" consumers. See e.g. Campbell and Mankiw (1989, 1991); Galí, López-Salido, and Vallés (2007); **?** In this simple way, we can analyze the interaction of current account balance and financial liberalization without explicitly studying the source of borrowing or lending constraints.

[9] Variables only with time subscript will stand for aggregate variables throughout the text.

[10] This form has been also extensively used in the analysis of habit formation in consumption substituting the second argument by past aggregate or individual consumption (see e.g. Abel, 1990; Fuhrer, 2000; Bussière, Fratzscher, and Müller, 2004). It is often assumed an additive form for the utility function instead of the former specification (see e.g. Alvarez-Cuadrado and Van Long, 2011; Dupor and Liu, 2003; Ljungqvist and Uhlig, 2000)

Where $\sigma \equiv \frac{u_{11}(C_{j,t},\widetilde{C}_{j,t})}{u_1(C_{j,t},\widetilde{C}_{j,t})}C_{j,t}$ is a constant measure of risk aversion and $\gamma_j \in [0,1]$ is the parameter which measures the degree of consumption externalities for group $j$. We restrict our analysis to cases where $\sigma > 1$, as the empirically relevant. In order to account for consumption externalities we make two crucial assumptions. First, low income agents are the only part of the population who care about relative consumption levels so that $\gamma_H = 0$ and, hence, the utility function for high income agents takes a standard CRRA form.Second, low income agents take high income consumption as a reference so that $\widetilde{C}_{L,t} = C_{H,t}$. This kind of modeling approach is supported by the findings of Bertrand and Morse (2012), Georgarakos, Haliassos, and Pasini (2012) and Heffetz (2011). The utility function for low income agents satisfies the next conditions:

$$u_1(C_{L,t}, C_{H,t}) > 0;$$

$$u_{11}(C_{L,t}, C_{H,t}) < 0;$$

$$u_{12}(C_{L,t}, C_{H,t})\frac{C_{H,t}}{U_1(C_{L,t}, C_{H,t})} = -\gamma(1-\sigma).$$

Where we have dropped the subindex $j$ from the parameter $\gamma$ because low income agents the only who care about relative consumption .[11] The first two conditions ensure that the utility function is well-behaved while the third one states that the elasticity of marginal utility of low income consumption with respect to high income consumption is equal to $-\gamma(1-\sigma)$. If this elasticity is positive then low income agents' marginal utility is increasing in the level of high income consumption. This is guaranteed for $\gamma > 0$ and $\sigma > 1$.

**Proposition 3.1.** *In a model with consumption externalities, the consumption level of agents who care about relative consumption decreases (grows) if consumption of the reference group is decreasing (growing) over time.*

*Proof.* Solving the maximization problem (3.3) yields the Euler equation:

$$u_1(C_{j,1}, \widetilde{C}_{j,1}) = \beta(1+r)u_1(C_{j,2}, \widetilde{C}_{j,2}) \tag{3.4}$$

In particular, the Euler equations for high and low income agents are given, respectively, by:

$$C_{H,2} = [\beta(1+r)]^{\frac{1}{\sigma}}C_{H,1} \tag{3.5}$$

$$C_{L,2} = [\beta(1+r)]^{\frac{1}{\sigma}}C_{L,1}\left(\frac{C_{H,2}}{C_{H,1}}\right)^{\gamma\left(1-\frac{1}{\sigma}\right)} \tag{3.6}$$

Using the first equation to substitute for $\frac{C_{H,2}}{C_{H,1}}$ in the second, the Euler equation for low

[11] Thus, from now on we will drop the subindex $j$ from $\gamma$.

income agents becomes:[12]

$$C_{L,2} = [\beta(1+r)]^{\frac{1}{\sigma}\left[1+\gamma\left(1-\frac{1}{\sigma}\right)\right]} C_{L,1}$$

We can rearrange the budget constraint in order to derive the path of consumption for both types of agents:

$$C_{H,1} = \frac{1}{1+(1+r)^{-1}\vartheta_H}\left(B_{H,0} + Y_{H,1} + \frac{Y_{H,2}}{1+r}\right) \tag{3.7}$$

$$C_{L,1} = \frac{1}{1+(1+r)^{-1}\vartheta_L}\left(B_{L,0} + Y_{L,1} + \frac{Y_{L,2}}{1+r}\right) \tag{3.8}$$

Where $\vartheta_H \equiv [\beta(1+r)]^{\frac{1}{\sigma}}$ and $\vartheta_L \equiv [\beta(1+r)]^{\frac{1}{\sigma}\left[1+\gamma\left(1-\frac{1}{\sigma}\right)\right]}$ are measures of patience for each group. We can differentiate with respect to $\gamma$ in order to know the effects on low income consumption of a higher concern about relative consumption:

$$\frac{dC_{L,1}}{d\gamma} = -\frac{1}{\sigma}\left(1-\frac{1}{\sigma}\right)\frac{(1+r)^{-1}\ln[\beta(1+r)][\beta(1+r)]^{\frac{1}{\sigma}\left[1+\gamma\left(1-\frac{1}{\sigma}\right)\right]}}{[1+(1+r)^{-1}\vartheta_L]^2}\left(B_{L,0} + Y_{L,1} + \frac{Y_{L,2}}{1+r}\right)$$

That is, when high income consumption is decreasing over time, $\beta(1+r) < 1$, then the more that low income agents care about relative consumption the higher will be their consumption in the first period. The opposite holds when $\beta(1+r) > 1$. □

Therefore, we reach the same conclusion as Harbaugh (1996) that in a relative consumption model consumption is higher when the reference group follow a decreasing consumption path. This result can be derived from the Euler equation (3.6) too. The last term on the right hand side explicitly expresses that low income consumption growth is increasing in high income consumption growth. Hence, the existence of consumption externalities in an intertemporal framework does not yield a level of consumption above that of a standard model in every period. It may result in a higher or lower level of consumption depending on the path that the reference group follows. In fact, it is possible that agents consume considerably less in the first period if high income consumption increases from the first to the second period. Low income agents wish to keep up with high income consumption, but they will do it in the period where the level of consumption of high income agents is higher. They achieve this through borrowing (lending) in the first period if high income consumption decreases (increases) over time.

[12]The drawbacks of this framework are stressed by Galí (1994), Abel (1990) and Harbaugh (1996). When we assume log utility ($\sigma = 1$) we end up with the same result as in a standard consumption behavior model without any role for consumption externalities. In this case the consumption-smoothing motive rules over any other motive for consumption.

**Current account determination**

From the agents' budget constraints we can define, in aggregate terms, the current account balance at time 1 as the change in net foreign assets:

$$CA_1 = B_1 - B_0 = Y_1 - C_1 \tag{3.9}$$

With $B_t = (1-\xi)B_{H,t} + \xi\alpha B_{L,t}$ being aggregate net foreign assets at time $t$.[13] Dissaggregating $Y_1$ and $C_1$ terms:

$$\begin{aligned} CA_1 &= (1-\xi)Y_{H,1} + \xi Y_{L,1} - (1-\xi)C_{H,1} - \xi\alpha C_{L,1} - \xi(1-\alpha)Y_{L,1} \\ &= (1-\xi)(Y_{H,1} - C_{H,1}) + \xi\alpha(Y_{L,1} - C_{L,1}) \end{aligned}$$

Substituting for the values of consumption of both types of optimizing agents:

$$\begin{aligned} CA_1 = (1-\xi)\left[Y_{H,1} - \frac{1}{1+(1+r)^{-1}\vartheta_H}\left(B_{H,0} + Y_{H,1} + \frac{Y_{H,2}}{1+r}\right)\right] + \\ + \xi\alpha\left[Y_{L,1} - \frac{1}{1+(1+r)^{-1}\vartheta_L}\left(B_{L,0} + Y_{L,1} + \frac{Y_{L,2}}{1+r}\right)\right] \end{aligned} \tag{3.11}$$

Once obtained a solution for the current account we can study the effects of consumption externalities on it. Total differentiation yields

$$\frac{dCA_1}{d\gamma} = -\xi\alpha\frac{dC_{L,1}}{d\gamma}$$

which is negative as long as $\beta(1+r) < 1$. In this case, if low income agents become more concerned about relative consumption and as a result they consume more, the economy would tend to run current account deficits. This effect is higher the higher are the share of low income agents in the population and the degree of financial liberalization.

## 3.2 The current account balance and the effects of an increase in income inequality

We now analyze the dynamic implications that a relative consumption model has on the current account when we introduce income inequality shocks. Assume that at period 2 both types of agents experience a shock to their incomes which shifts income from low to high income agents, so that $Y_{j,2} = \lambda_j Y_{j,1}$ for $j = \{H, L\}$ and $\lambda_j > 0$, leaving total income

[13] Correspondingly, the second period current account balance, assuming that agents end their lives without any outstanding debt or asset($B_2 = 0$), is:

$$CA_2 = -B_1 = rB_1 + Y_2 - C_2 \tag{3.10}$$

growth constant.[14] This would represent a permanent shock in an infinitely-lived agents model, where the second period represents the second part of agents' life.[15] The impact on the current account of this income shock can be summarized in the next proposition.

**Proposition 3.2.** *Assume a growth-neutral shock to the income distribution which shifts income from low to high income agents. Low income agents will borrow in the first period in case that $\lambda_L > \vartheta_L$ despite their future reduction in income. As a result, the economy will tend to run bigger current account deficits after an increase in income inequality.*

*Proof.* We can express the current account balance at period 1, from (3.11), as:

$$CA_1 = (1-\xi)\left\{Y_{H,1} - \frac{1}{1+(1+r)^{-1}\vartheta_H}\left[B_{H,0} + \left(1+\frac{\lambda_H}{1+r}\right)Y_{H,1}\right]\right\} + \\ + \xi\alpha\left\{Y_{L,0} - \frac{1}{1+(1+r)^{-1}\vartheta_L}\left[B_{L,0} + \left(1+\frac{\lambda_L}{1+r}\right)Y_{L,1}\right]\right\}$$

Rearranging:

$$CA_1 = (1-\xi)\frac{(\vartheta_H - \lambda_H)Y_{H,1} - (1+r)B_{H,0}}{1+r+\vartheta_H} + \xi\alpha\frac{(\vartheta_L - \lambda_L)Y_{L,1} - (1+r)B_{L,0}}{1+r+\vartheta_L} \quad (3.12)$$

Thus, the impact on the first period current account balance depends on the size of $\lambda_j$ and $\vartheta_j$. If the parameter $\vartheta_j$, the measure of patience, is lower than the gross income growth rate for both types of agent, then they would borrow in the first period. For low income agents this is only possible if $\beta(1+r) < 1$ because $\lambda_L < 1$. [16] If this holds the consumption behavior of low income agents would tend to generate current account deficits, which would be exacerbated in the presence of consumption externalities. At the same time, with respect to high income agents, if $\beta(1+r) < 1$ then $\lambda_H > \vartheta_H$ what would reduce the current account balance in the first period, although its impact may be negligible if $\xi$ is very close to one. □

The overall impact of an increase in income inequality depends crucially on the parameters $\vartheta_j$, $\lambda_L$, and the level of financial liberalization, $\alpha$. As seen above, the higher is the difference between the measure of patience with respect and the income growth rate the more likely it is for the economy to run current account deficits or surpluses. In addition, there is an additional effect through the denominators on the right hand side of equation (3.12). The lower are the parameters $\vartheta_j$, the bigger will be the primary effects determined by the numerator in both expressions on the right hand side of the expression. Besides, the level of financial liberalization, $\alpha$, expands any positive or negative effect on

[14] Assuming this we isolate any possible effect of total income growth on income inequality.

[15] By this we follow the findings of Kopczuk, Saez, and Song (2010) for the U.S. that permanent shocks drive the increase in income inequality.

[16] This effect is also more plausible the higher are the degree of consumption externalities, $\gamma$, and the level of risk aversion, $\sigma$.

the current account coming from low income agents.

We have shown from a preference-based perspective how permanent increases in income inequality can be a source of current account imbalances.[17] Therefore, we can make conjectures about the mechanism which underlies the relationship between the current account and inequality. The model showed above can replicate at the same time the opposite recent experiences of, for instance, the U.S. and China. For the latter, we may assume that the population has been postponing consumption, i.e. $\beta(1+r) > 1$, so that low and middle income population do increase their savings in the face of growing income inequality. In the case of the former, we can argue that agents anticipated present consumption against future income, so $\beta(1+r) < 1$. Therefore, increasing income inequalities in the U.S. could generate bigger current account deficits. Remarkably, the higher are the levels of risk aversion and of consumption externalities the higher would be the divergences in the current account balance between both countries. This results even in the case where they share the same parameter values for $\sigma$ and $\gamma$. As a final comment, an increase in the degree of financial liberalization, i.e. a reform which promotes a higher $\alpha$, could have an undesired effect through increasing imbalances. Therefore, the level of financial liberalization has an ambiguous impact on the current account, which depends on preferences and the size of the changes in inequality. We confirm this empirically in the next section.

These theoretical results are robust to a different assumption about agents' expectations and income shocks. In the Appendix we show an extension of our analysis where agents face idiosyncratic risks based on the model of Harbaugh (1996). The presence of uncertainty does not change our conclusions in Proposition 1.1 about consumption behavior in the presence of externalities. Besides, the implications of a change in income inequality are almost identical. As we show, under certain conditions, first-period individual consumption may decrease despite high future income growth, and viceversa.

Thus, based on the results of our model we are interested in empirically testing two hypothesis: a) what is the impact on the current account balance of an increase in income inequality and b) whether that impact is magnified by the level of financial liberalization as shown above.

[17] Although it seems that current account imbalances come up before the shock to the income distribution, it can be interpreted as a long-term gradual change over decades. Hence, the current account deficit/surplus can be contemporaneous to current as well as future increases in income inequality.

# 4 Empirical analysis

## 4.1 Data description

Preliminary evidence for the U.S and other developed countries corroborates the results of the theoretical model we presented and, especially, suggests a negative relationship between income inequality and the current account. Over the last three decades, income distribution in the U.S saw a considerable polarization: a growing inequality between the bottom and top of the distribution and a shrinking middle-income class (Piketty and Saez, 2003; Wolff, 2010; Atkinson, Piketty, and Saez, 2011). This phenomenon is not limited to the U.S but also to several other developed countries such as the United Kingdom, Canada, Australia, Ireland and New Zealand (Atkinson, Piketty, and Saez, 2011). At the same time, these countries' current account balance deteriorated, sometimes dramatically since the 1980s, while other countries such as Germany, the Netherlands, Japan, France and Switzerland presented surpluses or equilibrated external balances as well as stagnating or mildly increasing income inequality. Figure 1 shows this growing dispersion in the current account balances across OECD countries. In the U.S, since the 1970s, top 1% income share increased systematically and more than doubled, jumping from eight percent to 18 percent in 2007, a level that was not observed since the years preceding the Great Depression in 1929. The current account balance, conversely, declined persistently, reaching a deficit of more than five percent of GDP in 2007 while this ratio was close to zero in the 1970s. However, an econometric analysis is needed to assess the validity or not of the relationship between income inequality and the current account balance. In particular, it is important to conduct a cross-country analysis since there is no consensus so far on the validity of this relationship apart from the U.S case, which some have called a particular case and not a golden rule that can be generalized to all countries.

Table 1 in the Appendix lists all the variables that we use in our panel data analysis and their sources. Of particular interest in our case is the World Top Income Database (Atkinson, Piketty, and Saez, 2011). This database covers several European countries (Denmark, France, Germany, Netherlands, Switzerland, UK, Ireland, Norway, Sweden, Finland, Portugal, Spain, Italy), Northern America (U.S and Canada), Australia and New Zealand, one Latin American country (Argentina), and five Asian countries (Japan, India, China, Singapore, Indonesia), and two African countries (Mauritius and South Africa). Our choice of using this dataset to account for income inequality is twofold: the first reason is that our theoretical model assumes a redistribution of income from the low and middle-income households to the top of the distribution. Second, this database covers long time series with annual data, in contrary to standard measures of Gini coefficient, available only on a five-year basis. Another important variable in our analysis is the level of development of financial markets. We follow the literature by using private credit

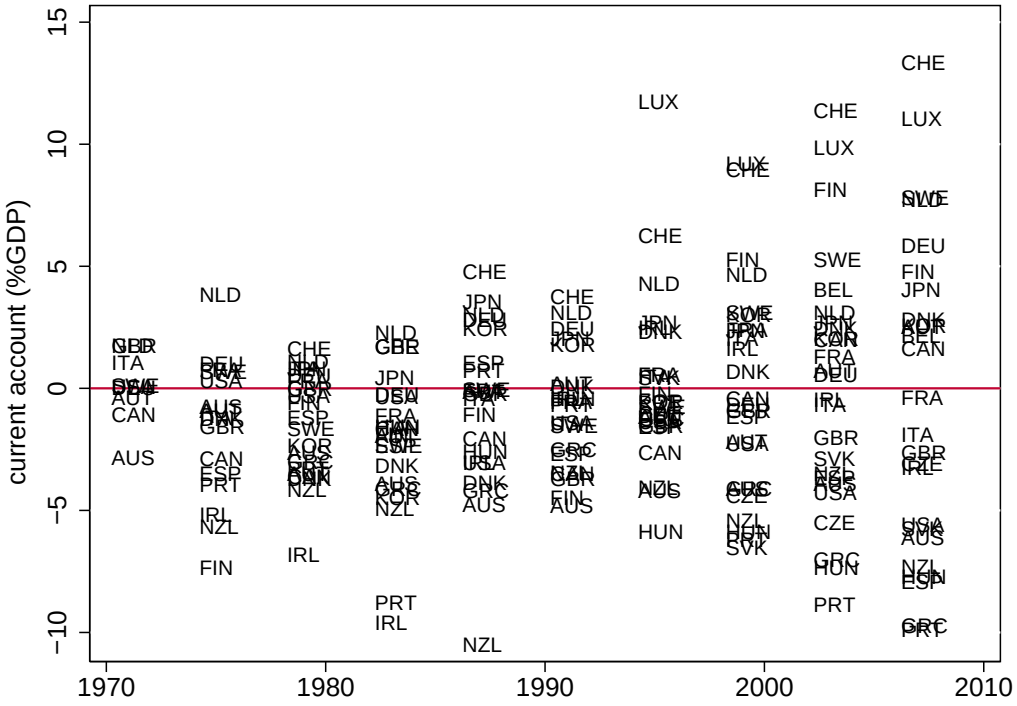


**Figure 1:** Current account balance since 1970 in OECD countries

by deposit money banks and other financial institutions (in percent of GDP) - hereafter called credit-to-GDP - as a proxy for financial liberalization. We will discuss later as robustness checks the use of institutional variables as proxies for financial liberalization and the endogeneity issues arising from using the credit-to-GDP variable. Our empirical analysis is performed over the 1970-2007 period on an unbalanced panel of 22 countries (when data is available). We allow our sample of countries to increase considerably when we use the Gini coefficient as a robustness check.

Empirically, it is difficult to distinguish between the roles played by each group in the income distribution in terms of their levels of savings and borrowing since disaggregated data is not available sufficiently to conduct a cross-country analysis. The only empirical elements concerning that issue are exposed in Krueger, Perri, Pistaferri, and Violante (2010). They find that over nine developed countries, long-run changes of disposable income inequality are larger than for consumption inequality. Interestingly, they also find that the positive gap between income and consumption inequality is more important at the bottom of the distribution than at the top, which should imply that households at the bottom of distribution are more able to insure themselves against shocks than households at the top of income distribution. Indeed, the evidence for countries where inequality increased suggests that the rise in leverage at the aggregate level has mostly been due to higher leverage of low and middle-income households. In our empirical analysis we abstract from these differences since we are not able to measure them.

## 4.2 Estimation methodology

We follow Chinn and Prasad (2003), Chinn and Ito (2007), Gruber and Kamin (2007) and Lane and Milesi-Ferretti (2012) by estimating the following model:

$$\begin{aligned} CA_{it} = \alpha + \beta_1 inequality_{it} + \beta_2 financial\ liberalization + \\ + \beta_3 (inequality_{it} * financial\ liberalization) + \beta_4 X_{it} + \delta_t + \varepsilon_{it} \end{aligned} \tag{4.1}$$

Where $CA_{it}$ is the current account balance, $inequality_{it}$ is our measure of income inequality and $financial\ liberalization_{it}$ is our specified measure for financial liberalization for country $i$ at time $t$. $X_{it}$ is a vector of control variables including the usual suspects used in the literature on current account determinants: government budget balance, age dependency ratio of old, age dependency ratio of young, trade openness, and net foreign assets.[18] Since the objective of the paper is not to assess the validity or not of the potential determinants of current account balances, our analysis of the results will not focus on this set of control variables. Finally, time dummies allow to control for common macroeconomic shocks.

The interaction term captures the previously mentioned second hypothesis we want to test. This interaction means that the slope of one continuous variable on the dependent variable changes as the values on a second continuous variable changes. We call inequality the main variable, financial liberalization the moderator and their multiplication the interaction term. Interaction terms should be used when one's hypothesis is conditional in nature, i.e. in our case a decrease in current account balance is associated with an increase in income inequality (only) when financial liberalization is relatively high, but not when it is relatively low. In order to know the overall impact of income inequality on the current account balance, we calculate the partial derivative of $CA_{it}$ on $inequality_{it}$, i.e. its marginal impact:

$$\frac{\partial CA_{it}}{\partial inequality_{it}} = \widehat{\beta}_1 + \widehat{\beta}_2 financial\ liberalization_{it} \tag{4.2}$$

$\widehat{\beta}_1$ is the marginal impact on $CA_{it}$ of the variable $inequality_{it}$ when $financial\ liberalization_{it} = 0$. A t-test for $\widehat{\beta}_1 = 0$ is therefore a test of the null of no effect of $inequality_{it}$ when $financial\ liberalization_{it} = 0$. In our econometric exercise, we consider the impact of top income inequality on the current account balance when financial liberalization is held constant at different values ranked from very low to very high. The control variables are held constant at their mean levels.

[18] Other variables were included previous studies. We decided to stick to the most common ones and also to follow Kumhof, Lebarz, Richter, Throckmorton, and Rancière (2012) in order to make comparisons. As stated above, the definitions and sources of the variables are reported in Table 1

It is worth mentioning that for understanding cross-country variation in current accounts, including country Fixed-Effects (FE) would detract from much of the economically meaningful parts of the analysis. As done in the empirical literature on current account determinants, in order to eliminate cross-country common factors all variables are demeaned with respect to their weighted GDP average.[19] Put it differently, the demeaning of the variables acts as a control for variation of "the rest of the world". In fact, as underlined by Gruber and Kamin (2007) current accounts are relative and should be only affected by the idiosyncratic country-specific element of the variables. In other words, a country's current account balance is determined by developments at home as well as abroad. For example, it is the relative superiority of countries' financial institutions that should attract capital flows from the rest of the world rather than its absolute level of development.[20]

Finally we run non-overlapping four-year averages regressions since the objective of this paper is to assess the long to medium-run variations in the current account balance. The averaging has the advantage of abstracting from short-run variations in current accounts and related variables, which are not of central interest. Our main interest is in low-frequency current account variations. Hence, as mentioned by Chinn and Prasad (2003), there is no distinguishing between the effects of temporary and permanent shocks among different sources of shocks. Given the frequency of the data for the 4-year averages, the interpretation of our results is less influenced by issues concerning the sources and persistence of the underlying shocks.

## 4.3 Results

Table 2 presents the pooled OLS regression results. The first column shows the estimated coefficients for the explanatory variables without the interaction term while the second and third columns report the estimated results when the interaction term is included. In line with our first hypothesis, the first column reports a negative and statistically significant relationship between top income inequality and current account balance. The coefficient is equal to -0.43, which means that an increase by one percentage point of top 1% income share is related to a fall in the current account balance by 0.43 percentage points during a 4-year average period. The coefficient on credit-to-GDP is negative, this

[19] demeaning is calculated as done previously in the literature, following the formula:

$$\widetilde{X}_{it} \equiv X_{it} - \frac{\sum_{i=1}^{J}(GDP_{it}X_{it})}{\sum_{i=1}^{J} GDP_{it}} \tag{4.3}$$

[20] Lane and Milesi-Ferretti (2012) construct the variables as deviations from a weighted average of a country trading partners instead of weighting with respect to GDP.

is in line with the argument that more developed domestic financial markets will allow the reduction of excessive savings, as the literature on the "global saving glut" predicts. However the coefficient is statistically not significant. The second specification in column two confirm our second hypothesis and shows that the interaction term is negative and statistically significant. Nonetheless, it should be mentioned that this result is sensitive to the inclusion of the few developing countries in this sample. In fact, the third column presents the regression results when only high-income OECD countries are kept.[21] The interaction term is no longer significant (though still negative) while the main variable (top income inequality) is still significant with approximately the same value for the coefficient than with the overall dataset. This can either mean that top 1% income share *per se* is negatively correlated with the current account balance and is not conditioned on a particular level of credit-to-GDP, or that our specification is not able to capture the potential interaction effect.

In order to interpret the coefficient on the interaction term in the second specification we calculate the partial derivative of current account balance with respect to top income inequality as explained previously. We fix the level of credit-to-GDP to a range of values between its minimum and maximum values, while the control variables are fixed at their respective means. The results in Table 3 give the marginal effect of top 1% income share on the current account balance for each value of credit-to-GDP. For example, when the level of financial development is equal to -0.6 (meaning that the deviation is of 60 percentage points below the GDP-weighted sample mean) the coefficient on top 1% income share is equal to a positive value of 0.065. In this case, an increase of one percentage point in top 1% income share would increase the current account balance by 0.065% points of GDP. On the contrary, when the relative level of credit-to-GDP is equal to 0.6 (meaning that the deviation is of 60 percentage points above the GDP-weighted mean) an increase of one percentage point in top 1% income share would decrease the current account balance by 0.57 percentages points of GDP. Thus the sign determining the impact of top income inequality depends on the relative level of credit-to-GDP. In the U.S top 1% income share increased by seven percentage points (with respect to sample GDP-weighted mean) between 1982 and 2006. According to our estimates it would imply a reduction of the current account balance (with respect to sample GDP-weighted mean) by four percentage points. This is close to the actual numbers, which report a decline of the current account balance in the U.S of five percentage points between 1982 and 2006. Of course, this is conditional on a specific level of credit-to-GDP, which in this example is equal to 0.6. In the case of the U.S the level of relative credit-to-GDP has ranged between 0.2 (in 1982) and 0.8 (in 2006).

Similarly, Figure 2 plots the results of the marginal effects of top 1% income share

[21] We follow World Bank income classification to determine the group of "high income" countries.

with the different values for credit-to-GDP. The figure shows on the y-axis the marginal effect of top 1% income share. The x-axis reports the range of possible values for the level of credit-to-GDP (ranging between around -1 and 0.8). This figure shows that when the deviation of credit-to-GDP is above a certain threshold, then the marginal effect of top 1% income share is negative, meaning that the overall impact of income inequality on the current account balance is negative. When the relative level of credit-to-GDP is below the threshold, then the marginal effect of top 1% income share is positive, meaning that the overall impact of income inequality on the current account balance is positive. As a consequence, the higher the deviation of credit-to-GDP from the sample mean, the stronger the marginal effect of top 1% income shares on current account balance will be.

Concretely, the more countries with a relatively high level of credit-to-GDP witness an increase in relative top income inequality, the more this will result in an excessive borrowing from the part of low and middle-income households to sustain a certain level of consumption, increasing domestic demand and by consequence decreasing the current account balance. However, when the level of credit-to-GDP is relatively low, an increase in top income inequality is associated with an increase in households' savings and surpluses in current account balances since households are not able to to sustain a level of consumption equivalent to their previous income levels. In terms of policy implication it is worth knowing what would be the threshold for the relative level credit-to-GDP after which increases in top income inequality are associated with reduction in current account balances. Our result suggests that it is located around -0.5, which is very low as almost all the countries in the regression are above this threshold.[22]

Finally, the coefficient on the control variables for the three specifications are close to the estimates already found in the previous papers in the literature on current account determinants. The government budget balance is negative but not significant, in line with most previous findings. Trade openness has a positive and significant impact on the current account balance, as well as the initial stock of net foreign assets.

**Robustness check: Fixed effects specification**

As explained earlier, pooled OLS does not capture the country-specific effects, leading to a potential correlation between our explanatory variables and an unobserved

[22]The interpretation of the overall impact of credit-to-GDP on the current account balance follows the same logic as for top income inequality. In this case, top income inequality is the "moderator" while credit-to-GDP is the "main variable". We also have a negative sign for the coefficient. Increasing credit-to-GDP results in a negative and stronger impact on the current account balance the higher is the relative level of top income inequality. This is in line with the reasoning that governments eased borrowing condition for consumers by financial deregulation as a response to the increase of income inequality, leading to a decline in households' savings and then in the current account balance (Rajan, 2010).

country-specific term. FE specification remedies this drawback by allowing the unobserved country-specific term to be correlated with the regressors. However, the within transformation implied by FE eliminates the time-invariant differences between countries and as consequence it prevents the investigation of time-invariant causes of the dependent variable. Thus, FE estimates only captures variation of the variables within countries while cross-country differences are no longer taken into account. Still, FE estimates elucidate the time-dimension of the relationship between income inequality and current account balance.

The results reported in Table 4 tend to confirm our previous results for pooled OLS. In the first column, estimation results show a negative but statistically not significant coefficient for top 1% income share, contrary to pooled OLS estimation result where the coefficient is highly significant. One explanation is that top income inequality variations within countries are not related to changes in the current account balance. Once we include the interaction term in column two, the interpretation of the coefficient on top income inequality changes. While the interaction term is statistically significant and negative, the main variable coefficient for top 1% income share is statistically not significant. However, the more critical variable is the statistically significance of the interaction terms and not the terms that were used to compute the interactions. Therefore, the fact that the main variable is not significant does not imply that top income inequality is not correlated to changes in the current account balance. Additionally, the interaction term is still significant even when we constraint our sample to high-income OECD countries. Then, in the FE estimates, the impact of top income inequality on the current account is uniquely conditional on some level of relative credit-to-GDP, which gives the interaction term all its importance in explaining the link between income inequality and global imbalances.

Again, in order to know the overall impact of top 1% income share we conduct the same exercise than previously by calculating the marginal impact of top income inequality on the current account balance. The results show that the marginal impact of top 1% income share is negative and significant when relative credit-to-GDP is very high (i.e. well above its sample mean). Most probably, in our sample only countries such as the U.S and the United Kingdom have such developed financial markets. Figure 3 in the appendix displays a similar pattern than Figure 2 with pooled OLS results.

In the three specifications for FE estimates, financial liberalization is significant, even in column one where there is no interaction term. This result is consistent with the findings of Chinn and Ito (2007) when they use fixed effect instead of pooled OLS, where the coefficient on credit-to-GDP is not significant. Thus, once-cross-country differences are controlled for, more developed financial markets lead to a decrease in the current

account balance. Chinn and Ito (2007) conjecture that this effect occurs through the reduction in national saving due to more efficient allocation of financial resources and thereby reduced need for precautionary saving. Also, the coefficient for the stock of net foreign assets (NFA) has a negative coefficient. In pooled OLS results the positive and significant coefficient on NFA reflects the fact that countries with higher NFA likely have stronger current account balances than countries with lower NFA, both because they earn more capital income and because their NFA reflects past strong current accounts. With country fixed effects included, however, only variations over time in NFA matter, and increases in NFA may be associated with increases in wealth that lead subsequently to higher imports and lower current accounts (Gruber and Kamin, 2007).

**Robustness check: Other measures of financial liberalization**

Another potential drawback of using pooled OLS is the possible joint endogeneity of the explanatory variables with the error term.[23] In our case, the variable measuring financial liberalization (credit-to-GDP) has serious chances to present contemporaneous endogeneity with the error term, leading to a bias in OLS coefficient estimates. In order to reduce the impact of this problem, we use an alternative variable as for financial liberalization instead of private credit-to-GDP ratio. This variable is the financial reforms index (see Beck, Demirg-Kunt, and Levine, 2000), a measure of the magnitude and timing of financial policy changes that combines several sub-indices and where higher values of the index imply more financial liberalization.[24] The advantage of this variable is that it is a *de jure* measure, or institutional measure and then should be less subject to endogeneity since exogenous shocks are less likely to affect both financial policy changes and the current account balances contemporaneously. The financial reforms index takes into consideration both domestic and international financial policy changes.

We also instrument the variable private credit-to-GDP, following Chinn and Ito (2007), using a two-stage least squares procedure for the same reason of endogeneity mentioned

[23]The equation specified for the empirical analysis includes some explanatory variables that could be jointly endogenous, i.e. correlated with the error term. In addition, unobserved country-specific factors may be correlated with the explanatory variables. A GMM specification would resolve both problems in pooled OLS and fixed effects since it controls for country-specific effects and accounts for endogeneity in the explanatory variables. The consistency of GMM estimates depends on whether lagged values of the explanatory variables are valid instruments in the current account regression (Sargan test of over identifying restrictions, which test the overall validity of model and examine whether the differenced error term is second-order serially correlated). Our GMM results confirm the negative relationship between inequality and current account balance (a result similar to Kumhof, Lebarz, Richter, Throckmorton, and Rancière (2012). However, in our case implementing GMM with annual observations is difficult since we have large T and small N. Furthermore, according to the Sargan test it appears that our lagged variables are correlated with the error term.

[24]The sub-indices are: directed credit/reserve requirements, aggregate credit ceilings, credit controls, interest rate controls, entry barriers/pro-competition measures, banking supervision, privatization, international capital flows, and security markets.

above. We use legal origin dummies and their interaction with top 1% income share as instruments, following the seminal work of La Porta, de Silanes, Shleifer, and Vishny (1997, 1998), who identified variation in countries' legal origin as an historical exogenous factor explaining current variation in countries' level of financial development.

Results in Table 5 are very close to the coefficient estimates with our previous measure of financial liberalization, both in terms of significance and in terms of values. Column one displays a statistically negative coefficient on top 1% income inequality while the coefficient on financial reforms is not significant, as found before for credit-to-GDP. Again, the interaction term between top 1% income share and financial reforms in column two is negative and statistically significant while it is not the case anymore once we constraint our regression sample to high-income OECD countries as shown in column three.

Figure 4 shows the marginal effect of top 1% income share for the specification in column two, i.e. the one using the relative financial reforms variable. We believe that financial reform is more suitable for our analysis since it incorporates several sub-indices accounting for both domestic and foreign financial policies reforms (for example it combines measures of credit controls as well as measure of international capital flows). The same interpretation than for the previous results still holds, the only notable difference now is that the significance of the coefficients is higher and the confidence intervals are smaller. Furthermore, now the threshold for the relative level of financial reforms after which the marginal effect of top income inequality turns negative is much closer to zero. This implies that it is mostly countries that are above the sample average in terms of financial reform that will experience a current account reduction in case of a relative increase in their top income inequality. This threshold seems much more reasonable than the one found using financial development previously, as international financial flows fly more to developed financial markets where it is expected that they will be better allocated (Portes, 2009). Columns four, five, and six display the results using the instrumental variable procedure. For the three specifications, the Hansen J-statistics for over-identification does not reject the null hypothesis that the instruments are not correlated with the error term. The results in specification (5) show that top 1% income inequality and the interaction term are both negative and statistically significant, confirming the results found in Table 2. However, the private credit-to-GDP coefficient is now positive and significant, which is conflicting with the assumption that more developed financial markets lead to lower current account balance.

Finally, the coefficients on the control variables for the different specifications are close to the estimates already found in the previous literature. The government budget balance is negative but not significant, in line with most previous findings. Trade openness has

a positive and significant impact on the current account balance, as well as the initial stock of net foreign assets. The value of the coefficient is also similar to what found in the previous works.

**Robustness check: Other measures of income inequality**

In order to verify if our measure of income inequality is, or not, the only variable that reports a negative association with the current account balance, we run the same regressions using now top 5% income shares (same dataset than for top 1% income share) and Gini EHII (Estimated Household Income Inequality Data Set), which is a large dataset that has the advantage of incorporating many countries. Thus using this Gini index to account for income inequality allows us testing the relationship with the current account balance on a much larger set of countries (more than 40 countries). Furthermore, the Gini index captures a different feature of income inequality than top 1% income shares: while still sensitive to what happens at tails, Gini index gives more weight to redistributions in the middle of the distribution.

Results reported in specification (1) and (2) for top 5% income share show that the coefficient on top income inequality is statistically significant and negatively associated to differences in the current account balance (Table 6). However, quantitatively the coefficient is much smaller than the one found for top1% income share previously. Once the interaction term is added in column two, the main variable (i.e. top 5% income share) and the interaction term are both not significant, contrary to the findings using top 1% income share. This difference might be due to the fact that variations across-countries are smaller for the top 5% income share than top 1% income share, particularly for countries such as the U.S (Atkinson, Piketty, and Saez, 2011). The third and fourth columns display the results using the Gini coefficient. The specification in column three, without the interaction term between Gini index and credit-to-GDP, reports a non-significant coefficient on Gini index, meaning that income inequality is not related to differences in current account balance for our sample. However, once we condition the impact of Gini index on the relative level of credit-to-GDP, the interpretation changes and, again, we need to calculate the marginal impact of Gini index. The results (not reported here) follow the same logic as done previously and deliver similar outcomes.

Incorporating a larger set of developing countries in our regression sample is an important robustness check for the hypothesis we are testing for. Global imbalances are seen as a divide between rich countries with relatively developed financial markets and emerging countries with relatively less developed financial markets. Increases in income inequality seem to be a common pattern for both groups of countries but, according to our arguments, the sign and the strength of the impact of this increase on the current ac-

count balance is conditional on the relative level of financial liberalization. Countries such as China display relatively low levels of financial liberalization and high current account surpluses, while countries like the U.S observe relatively high levels of financial liberalization, and high current account deficit. The results using the Gini index on this large group of countries confirm the theoretical argument Kumhof, Lebarz, Richter, Throckmorton, and Rancière (2012) made. Our empirical results confirm the simulations of their model, which shows that increases in domestic income inequality can also be the reason for these countries' large surpluses, beyond a response to higher borrowing in deficit countries. These very different responses to inequality can occur to the extent that financial markets in surplus countries are less developed and therefore do not allow the poor and middle class to respond to lower shares in aggregate income by borrowing. The resulting decrease in domestic demand then necessitates an export-oriented growth model, while the domestic wealthy end up deploying their additional income in foreign rather than domestic financial assets.

Finally, the coefficients on the control variables display one important change with respect to the results of the previous specifications. The coefficient estimates using the Gini index display a positive and significant coefficient on government budget balance of around 0.2, which is in the range of values found by most of the previous studies that included large sample of countries.

To conclude, the estimates confirm that there is a negative relationship between income inequality and current account balances. Also, there are also serious elements that tend to confirm that this relationship is exacerbated the more the countries are financially liberalized with respect to the rest of the world. Still, one should be careful since these results only present simple relationships and causality cannot be assessed with our methodology.

# 5 Conclusions

Global imbalances are still a major source of debate as they produced important international and domestic macroeconomic instability across countries. Several explanations were given in order to explain their disparities but it appears that there are still other elements that should be taken into consideration when analyzing cross-country differences, even among developed countries.

We developed a simple theoretical model of the current account where the level of consumption in high-income households has an impact on the inter-temporal consumption choices of low income households. Through this mechanism, a permanent shift of income from low to high income households will lead to current account balance reductions. Fur-

thermore, there is a strong and systematic tendency for increasing income inequality to be associated with greater financial liberalization, which allows the relatively poor to consume more even if the income distribution shifts toward the rich, leading to a gap between income and consumption inequality. The result is an increase in domestic demand that is compensated by increases in borrowing from the rest of the world, leading to current account deficits. However, our model misses some important determinants of the current account balance such as the existence of capital stock. The inclusion of investment and a role of intermediation for high income agents would probably generate some feedback effect of an increase in inequality as in Kumhof, Lebarz, Richter, Throckmorton, and Rancière (2012). Adding a role for the capital stock and features of portfolio selection are options to explore in future research.[25]

We assess empirically for a group of developed and developing countries and examine if (a) there is a negative relationship between income inequality and current account balance and (b) if this relationship is conditional to the level of financial liberalization, as we have shown in our theoretical framework. We find that this relationship holds among a large group of countries and it seems to be exacerbated when countries have levels of financial liberalization relatively higher than the rest of the world. Conversely, countries with relatively low levels of financial liberalization observe a positive association between income inequality and current account balances. This second result allowed extracting some quantitative policy implications that need more careful examination. For example, the results show that countries that reformed relatively more than the rest of the world their financial markets will witness current account reductions when top income inequality increases. The result is the opposite in the case of the countries that undertook relatively less financial reforms than the average of countries. Kumhof, Lebarz, Richter, Throckmorton, and Rancière (2012) warn that liberalizing lending without addressing the underlying income inequalities would reduce cross-country macroeconomic imbalances at the price of an increase in indebtedness within surplus countries, increasing the vulnerability to crises.

Finally, further empirical assessments on the relationship we discussed are needed since our results reflect simple correlation and are not able to detect proper causalities. Research using micro-data would allow us to know how each part of the income distribution (bottom, middle, or top) affects the overall households' savings and household's indebtedness. In terms of policy outcome it is very important, as underlined by Kumhof and Rancière (2010), that the distributional effects of a reform in the tax system cannot be analyzed from the results of a representative agent model since all agents behave identically. Undeniably, it is important to account for income heterogeneity in macroeconomic

[25] Martin and Ventura (2011) develop an overlapping generations model with imperfect enforceability in which financial reforms can exacerbate current account imbalances.

models and empirical macroeconomics.

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# A Appendix

## A.1 Extension: A two-period model with idiosyncratic risks

In this Appendix we develop a model of consumer behavior under uncertainty, whose results rest fundamentally on Harbaugh (1996). Consider the same economy as the one developed in Section 3, populated by a large number of individuals, each indexed by $i \in [0,1]$. We assume again the existence of two income groups: low income population representing a share $\xi$ with income growth $0 < \lambda_L < 1$ and high income population who represent a share $(1-\xi)$ and with income growth $\lambda_H > 1$. The economy again lasts for two periods and now, for simplicity, agents begin without any net foreign asset. Instead of assuming perfect foresight, every agent faces uninsurable idiosyncratic risks with respect to their future (second period) income. They choose their levels of consumption in both periods in order to maximize their expected lifetime utility:

$$\underset{C_{ij,t}}{\text{Max}} \quad \frac{1}{1-\sigma}\left(\frac{C_{ij,1}}{{C_1}^{\gamma_j}}\right)^{1-\sigma} + \frac{\beta}{1-\sigma}E_1\left\{\left(\frac{C_{ij,2}}{{C_2}^{\gamma_j}}\right)^{1-\sigma}\right\}$$
$$s.t.\ (1+r)(Y_{ij,1} - C_{ij,1}) + Y_{ij,2} - C_{ij,2} = 0$$

for each $i \in [0,1]$ and $j = \{H, L\}$. Thus, the reference group now is given by the average level of consumption, which is equivalent to the total level of consumption as we normalize the size of the economy to one. Following our previous approach, low income agents are the only ones who care about relative consumption levels, so that $\gamma_H = 0$. We assume that agents are identical in the first period and have the same income $Y_{i,1} = Y_1$. In the second period each individual faces an idiosyncratic shock so that their second period income is given by $Y_{ij,2} = \varepsilon_i \lambda_j Y_1$, for each $i$ and $j = \{H, L\}\varepsilon_i$ is an independently and identically distributed (i.i.d) multiplicative and positive shock with $E_1\{\varepsilon_i\} = 1$. Hence, the economy experiences an income shock in the second period, equivalent to a permanent shock in an infinite horizon model, from an egalitarian to an unequal income distribution. We assume again that a fraction $\alpha \in [0,1]$ of low income agents can access to the financial markets. In addition, given the big size of the population, we consider $C_2$ as deterministic throughout the analysis. The next two propositions summarize the implications of this model with respect to the consumption behavior and, as a result, we can make conjectures for the current account balance.

**Proposition A.1.** *In a model with consumption externalities and idiosyncratic shocks, the consumption level of agents who care about relative consumption decreases (grows) if consumption of the reference group is decreasing (growing) over time.*

*Proof.* Solving the maximization problem for low income agents, assuming that individual decisions do not affect aggregate consumption, yields again an Euler equation which relates

period 1 and period 2 consumption:

$$\left(\frac{C_{i,1}}{{C_1}^{\gamma}}\right)^{-\sigma} {C_1}^{-\gamma} = \beta(1+r)E_1\left\{\left(\frac{C_{i,2}}{{C_2}^{\gamma}}\right)^{-\sigma} {C_2}^{-\gamma}\right\}$$

Take into account that agents in the same group face the same prospects and initial income, so that $C_{i,1} = C_{j,1}$ for all $i \in j$. We can analyze the effects of consumption externalities differentiating, using the definition (3.2):

$$\frac{dC_{L,1}}{d\gamma} =$$

$$= \frac{(\sigma-1)\left(\frac{C_{L,1}}{{C_1}^{\gamma}}\right)^{-\sigma} C_1 \ln(C_2/C_1)}{-\sigma\left(\frac{C_{L,1}}{{C_1}^{\gamma}}\right)^{-\sigma-1}\left(\frac{C_1-\xi\alpha\gamma C_{L,1}}{{C_1}^{\gamma}}\right) - \xi\gamma\alpha\left(\frac{C_{L,1}}{{C_1}^{\gamma}}\right)^{-\sigma} - \beta(1+r)^2E_1\left\{\sigma\left(\frac{C_{iL,2}}{{C_2}^{\gamma}}\right)^{-\sigma-1}\left(\frac{C_2-\xi\alpha\gamma C_{iL,2}}{{C_2}^{\gamma}}\right) + \xi\alpha\gamma\left(\frac{C_{iL,2}}{{C_2}^{\gamma}}\right)^{-\sigma}\right\}}$$

The denominator of this expression is always negative from the definition of aggregate consumption. The numerator is negative when aggregate consumption decreases, $\ln(C_2/C_1) < 0$, and positive when aggregate income increases from period 1 to period 2, $\ln(C_2/C_1) > 0$. Thus, this is the same result as the one obtained above under the perfect foresight assumption. If agents care about the relative levels of consumption and at the same time the reference level of consumption is increasing, agents will save today in order to consume more in the future. The opposite occurs when the reference decreases from the first to the second period. □

**Proposition A.2.** *In a model with consumption externalities and idiosyncratic risks the level of low income consumption increases (decreases) when income growth is reduced (increased) if*

$$\gamma\xi\left(1-\frac{1}{\sigma}\right) > E_1\left\{\frac{C_2}{C_{iL,2}}\varepsilon_i\right\} \tag{A.1}$$

*Proof.* Following the same approach as above we can study the effects of second period income growth for low income agents, $\lambda_L$, on first period consumption:

$$\frac{dC_{L,1}}{d\lambda_L} =$$

$$= \frac{\beta(1+r)Y_{L,1}{C_1}^{\gamma+1}E_1\left\{\gamma\xi(\sigma-1)\left(\frac{C_{iL,2}}{C_2^{\gamma}}\right)^{-\sigma}{C_2}^{-\gamma-1} - \sigma\left(\frac{C_{i,2}}{C_2^{\gamma}}\right)^{-\sigma-1}{C_2}^{-2\gamma}\varepsilon_i\right\}}{-\sigma\left(\frac{C_{L,1}}{{C_1}^{\gamma}}\right)^{-\sigma-1}\left(\frac{C_1-\xi\alpha\gamma C_{L,1}}{{C_1}^{\gamma}}\right) - \xi\gamma\alpha\left(\frac{C_{L,1}}{{C_1}^{\gamma}}\right)^{-\sigma} - \beta(1+r)^2E_1\left\{\sigma\left(\frac{C_{iL,2}}{{C_2}^{\gamma}}\right)^{-\sigma-1}\left(\frac{C_2-\xi\alpha\gamma C_{iL,2}}{{C_2}^{\gamma}}\right) + \xi\alpha\gamma\left(\frac{C_{iL,2}}{{C_2}^{\gamma}}\right)^{-\sigma}\right\}}$$

Where the definition of aggregate income (3.1) has been used. As explained previously, the denominator is always negative and the condition introduced in the proposition comes up immediately from the numerator. Then, if condition (A.1) holds the last expression is negative, so that a negative relationship exists between income growth and first period consumption. □

Hence, the higher are $\gamma$, $\xi$ and $\sigma$ the more likely will be that an increase in aggregate income growth will lead to a decrease in consumption. The term on the left of condition (A.1) is bounded between 0 and $\xi$ because of the restrictions imposed on the parameters. The expression on the right is the expected value of relative income weighted by the value of the random variable $\varepsilon_i$. Thus, for those individuals who expect their consumption to be below the average, i.e. those with expected income below the average, it is less likely that they reduce their consumption in the first period. In the absence of uncertainty we would have that $C_{iL,2} = C_{L,2}$ and the expression (A.1) takes the next form:

$$\gamma\xi\left(1-\frac{1}{\sigma}\right) > \frac{C_2}{C_{L,2}}. \tag{A.2}$$

For instance, in the limiting case in which $\gamma = 1$ and $\sigma \to \infty$ the relative level of consumption of low income population must be below $\xi$ so that the announced affect takes place.

## A.2 Data, tables and figures

**Table 1:** Variable definition and sources

| Variable | Definition | Source |
|---|---|---|
| Current account | Current account balance (% GDP) | WDI and WEO |
| Top 1% income share | Top 1% share of total income | World Top Income database |
| Top 5% income share | Top 5% share of total income | World Top Income database |
| Gini coefficient | Gini coefficient (EHII) | Texas University Project on inequality |
| Private Credit-to-GDP | Private credit by deposit money banks and other financial institutions (%GDP) | World Bank Financial Structure Database (Beck, Demirg-Kunt, and Levine, 2000) |
| Financial reform index | | IMF Financial Reform Database (Abiad, Tressel, and Detragiache, 2008) |
| Government Budget balance | Government Budget balance (% GDP) | WDI |
| Net Foreign Assets | Net Foreign Assets (% GDP) | External Wealth of Nations Database |
| Age dependency ratio (old) | | WDI |
| Age dependency ratio (young) | | WDI |
| Trade openness | Exports plus imports (% GDP) | WDI |
| Relative Income | Ratio of each country GDP to the US (in PPP) | WDI |

Notes: WDI=World Development Indicators (World Bank), WEO=World Economic Outlook (IMF).

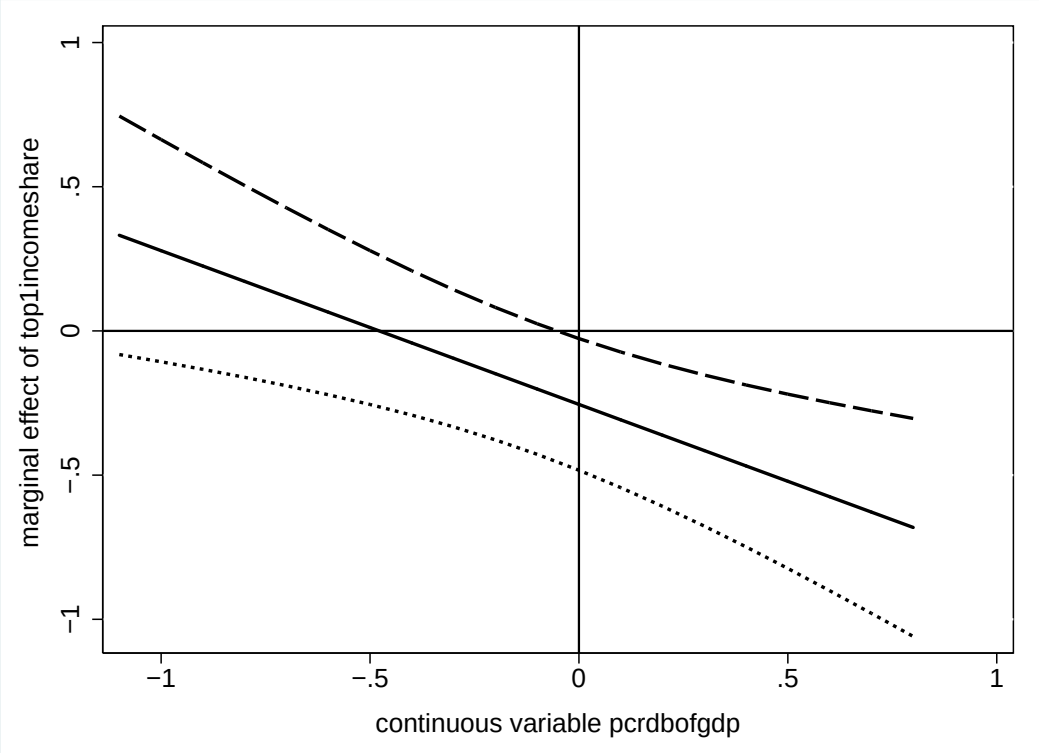


**Figure 2:** Marginal effect of top 1% income inequality for OLS estimates (using Credit-to-GDP). Slashed lines represent 95% confidence intervals.

**Table 2:** Pooled OLS estimations

| | (1) | (2) | (3) |
|---|---|---|---|
| Top 1% income share | -0.425*** | -0.255** | -0.458*** |
| | (0.107) | (0.116) | (0.132) |
| Government budget balance | -0.0547 | -0.0425 | -0.0874 |
| | (0.0789) | (0.0858) | (0.0789) |
| age dependency ratio (old) | -0.0611 | -0.110 | -0.0495 |
| | (0.0714) | (0.0786) | (0.0873) |
| age dependency ratio (young) | 0.0330 | 0.0178 | 0.0920 |
| | (0.0526) | (0.0569) | (0.0653) |
| relative income | 1.504 | 2.565 | 1.040 |
| | (1.837) | (2.100) | (2.185) |
| trade openness | 0.0249*** | 0.0269*** | 0.0219** |
| | (0.00833) | (0.00901) | (0.00896) |
| Net foreign assets | 0.0669*** | 0.0673*** | 0.0709*** |
| | (0.00746) | (0.00810) | (0.00926) |
| Private credit-to-GDP | -0.0335 | -0.601 | 0.320 |
| | (0.752) | (0.853) | (0.797) |
| inequality*private credit-to-GDP | | -0.533*** | -0.0240 |
| | | (0.174) | (0.252) |
| Constant | -0.727 | -1.664 | 0.251 |
| | (1.402) | (1.574) | (1.877) |
| Observations | 115 | 115 | 103 |
| Adjusted $R^2$ | 0.542 | 0.469 | 0.576 |

Dependent variable in all estimations: Current Account (% GDP). Standard errors in parentheses
Time dummies are not reported
* $p < 0.10$, ** $p < 0.05$, *** $p < 0.01$

**Table 3:** Marginal effect of top 1% income inequality with Pooled OLS (credit-to-GDP)

| Values of credit-to-GDP | $\frac{\partial CA_{it}}{\partial inequality_{it}}$ | Std. Err. | P>z | 95% Conf. Interval | |
|---|---|---|---|---|---|
| -1 | 0.278 | 0.197 | 0.157 | -0.107 | 0.664 |
| -0.9 | 0.225 | 0.183 | 0.218 | -0.133 | 0.583 |
| -0.8 | 0.172 | 0.170 | 0.312 | -0.161 | 0.504 |
| -0.7 | 0.118 | 0.157 | 0.452 | -0.190 | 0.427 |
| -0.6 | 0.065 | 0.146 | 0.656 | -0.221 | 0.351 |
| -0.5 | 0.012 | 0.136 | 0.931 | -0.255 | 0.278 |
| -0.4 | -0.042 | 0.128 | 0.745 | -0.292 | 0.209 |
| -0.3 | -0.095 | 0.121 | 0.434 | -0.333 | 0.143 |
| -0.2 | -0.148 | 0.117 | 0.206 | -0.378 | 0.081 |
| -0.1 | -0.202 | 0.115 | 0.081 | -0.428 | 0.025 |
| 0 | -0.255 | 0.116 | 0.029 | -0.483 | -0.027 |
| 0.1 | -0.308 | 0.120 | 0.010 | -0.543 | -0.073 |
| 0.2 | -0.361 | 0.126 | 0.004 | -0.608 | -0.115 |
| 0.3 | -0.415 | 0.134 | 0.002 | -0.677 | -0.153 |
| 0.4 | -0.468 | 0.143 | 0.001 | -0.749 | -0.187 |
| 0.5 | -0.521 | 0.154 | 0.001 | -0.824 | -0.219 |
| 0.6 | -0.575 | 0.166 | 0.001 | -0.901 | -0.249 |
| 0.7 | -0.628 | 0.179 | 0.000 | -0.979 | -0.277 |
| 0.8 | -0.681 | 0.193 | 0.000 | -1.059 | -0.304 |

**Table 4:** Fixed effects estimations

| | (1) | (2) | (3) |
|---|---|---|---|
| Top 1% income share | -0.101 | 0.0219 | 0.283 |
| | (0.233) | (0.200) | (0.318) |
| Government budget balance | 0.154* | 0.134 | 0.138 |
| | (0.0838) | (0.0864) | (0.100) |
| age dependency ratio (old) | -0.304 | -0.415* | -0.523** |
| | (0.241) | (0.204) | (0.199) |
| age dependency ratio (young) | 0.0953 | 0.0849 | -0.00365 |
| | (0.176) | (0.161) | (0.154) |
| relative income | -19.13* | -17.13* | -18.46** |
| | (9.907) | (8.789) | (8.470) |
| trade openness | 0.154** | 0.120** | 0.101* |
| | (0.0587) | (0.0532) | (0.0519) |
| Net foreign assets | -0.00542 | -0.00379 | -0.00239 |
| | (0.0162) | (0.0162) | (0.0189) |
| Private credit-to-GDP | -5.243*** | -5.595*** | -5.941*** |
| | (1.833) | (1.500) | (1.526) |
| inequality*private credit-to-GDP | | -0.510** | -0.832** |
| | | (0.211) | (0.350) |
| Constant | 10.60 | 9.612 | 12.55* |
| | (6.738) | (6.087) | (6.394) |
| Observations | 115 | 115 | 103 |
| Adjusted $R^2$ | 0.479 | 0.505 | 0.504 |

Dependent variable in all estimations: Current Account (% GDP). Standard errors in parentheses
Time dummies are not reported
* $p < 0.10$, ** $p < 0.05$, *** $p < 0.01$

**Table 5:** Estimations with other measures of financial liberalization

| | (1) | (2) | (3) | (4) | (5) | (6) |
|---|---|---|---|---|---|---|
| Top 1% income share | -0.406*** | -0.146 | -0.269 | -0.398* | -0.372*** | -0.507** |
| | (0.107) | (0.114) | (0.218) | (0.229) | (0.135) | (0.202) |
| Government budget balance | -0.0936 | -0.0218 | -0.0655 | 0.0490 | 0.0523 | 0.0558 |
| | (0.0758) | (0.0811) | (0.0810) | (0.139) | (0.102) | (0.0985) |
| age dependency ratio (old) | -0.0585 | -0.0945 | -0.0575 | 0.0909 | -0.0421 | 0.117 |
| | (0.0725) | (0.0788) | (0.0889) | (0.141) | (0.106) | (0.132) |
| age dependency ratio (young) | 0.0311 | -0.0589 | 0.0966 | 0.0466 | 0.0548 | -0.0605 |
| | (0.0495) | (0.0531) | (0.0666) | (0.102) | (0.0807) | (0.114) |
| relative income | 1.609 | -0.728 | 2.353 | -6.984 | 2.180 | 4.671 |
| | (1.692) | (1.797) | (2.227) | (5.759) | (2.952) | (4.117) |
| trade openness | 0.0289*** | 0.0356*** | 0.0209** | 0.0185* | 0.0154 | 0.0312*** |
| | (0.00894) | (0.00950) | (0.00963) | (0.0108) | (0.00989) | (0.00996) |
| Net foreign assets | 0.0650*** | 0.0624*** | 0.0717*** | 0.0271 | 0.0375** | 0.0282 |
| | (0.00668) | (0.00718) | (0.00880) | (0.0274) | (0.0191) | (0.0300) |
| Financial reform index | 0.177 | -1.843 | 0.680 | | | |
| | (1.894) | (2.024) | (2.479) | | | |
| inequality*financial reform index | | -1.182*** | -1.635 | | | |
| | | (0.422) | (1.479) | | | |
| Private credit-to-GDP | | | | 7.269* | 3.612** | 2.501 |
| | | | | (4.258) | (1.558) | (1.794) |
| inequality*private credit-to-GDP | | | | | -1.002*** | 0.185 |
| | | | | | (0.254) | (0.657) |
| Constant | -0.870 | 0.193 | -0.657 | 4.337 | -0.876 | -4.686 |
| | (1.325) | (1.405) | (1.914) | (3.789) | (1.985) | (4.007) |
| Observations | 118 | 118 | 103 | 115 | 115 | 103 |
| Adjusted $R^2$ | 0.561 | 0.473 | 0.573 | -0.431 | 0.100 | 0.257 |
| Under-identification LM statistic (p-value) | - | - | - | 0.0405 | 0.00357 | 0.0426 |
| Hansen J-statistic (p-value) | - | - | - | 0.249 | 0.494 | 0.230 |

Dependent variable in all estimations: Current Account (% GDP). Standard errors in parentheses. Columns (4), (5) and (6) are IV estimations for Private Credit-to-GDP.

using legal origins as instruments. Time dummies are not reported.

* $p < 0.10$, ** $p < 0.05$, *** $p < 0.01$

**Table 6:** Estimations with other measures of inequality

| | (1) | (2) | (3) | (4) |
|---|---|---|---|---|
| Top 5% income share | -0.176** | -0.173** | | |
| | (0.0682) | (0.0688) | | |
| Government budget balance | -0.0559 | -0.0640 | 0.224*** | 0.215*** |
| | (0.0814) | (0.0835) | (0.0527) | (0.0523) |
| age dependency ratio (old) | -0.0502 | -0.0677 | -0.182*** | -0.202*** |
| | (0.0782) | (0.0835) | (0.0608) | (0.0607) |
| age dependency ratio (young) | -0.0446 | -0.0469 | -0.00784 | -0.0112 |
| | (0.0683) | (0.0688) | (0.0187) | (0.0185) |
| relative income | -0.398 | -0.138 | 4.644*** | 4.248*** |
| | (1.747) | (1.840) | (1.264) | (1.263) |
| trade openness | 0.0315*** | 0.0308*** | -0.000294 | 0.00134 |
| | (0.0115) | (0.0116) | (0.00490) | (0.00491) |
| Net foreign assets | 0.0604*** | 0.0607*** | 0.0543*** | 0.0549*** |
| | (0.00765) | (0.00771) | (0.00478) | (0.00474) |
| Private credit-to-GDP | 0.893 | 1.126 | -0.677 | 0.638 |
| | (0.821) | (0.942) | (0.698) | (0.941) |
| inequality(top five)*private credit-to-GDP | | -0.0731 | | |
| | | (0.136) | | |
| gini coefficient (Texas Project) | | | 0.00592 | -0.0867 |
| | | | (0.0383) | (0.0593) |
| inequality(Gini)*private credit-to-GDP | | | | -0.147** |
| | | | | (0.0698) |
| Constant | 0.390 | 0.227 | -3.950*** | -3.456*** |
| | (1.538) | (1.587) | (1.135) | (1.148) |
| Observations | 102 | 102 | 265 | 265 |
| Adjusted $R^2$ | 0.577 | 0.573 | 0.546 | 0.554 |

Dependent variable in all estimations: Current Account (% GDP). Standard errors in parentheses
Time dummies are not reported
* $p < 0.10$, ** $p < 0.05$, *** $p < 0.01$

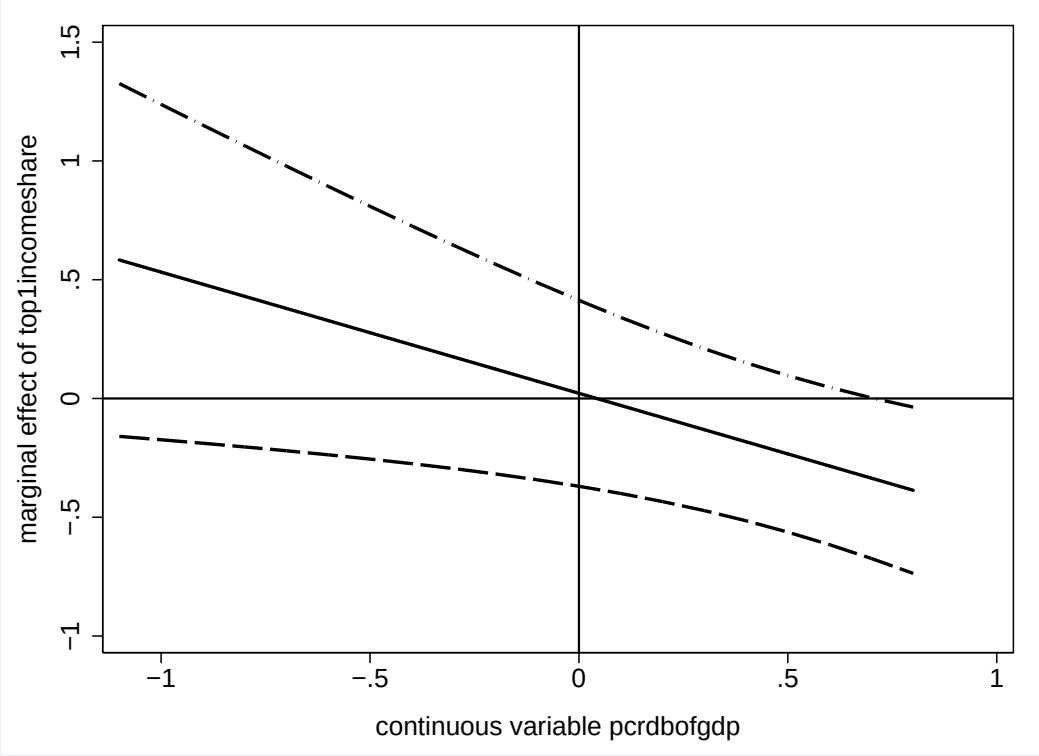


**Figure 3:** Marginal effect of top 1% income inequality for FE estimates (using Credit-to-GDP). Slashed lines represent 95% confidence intervals.

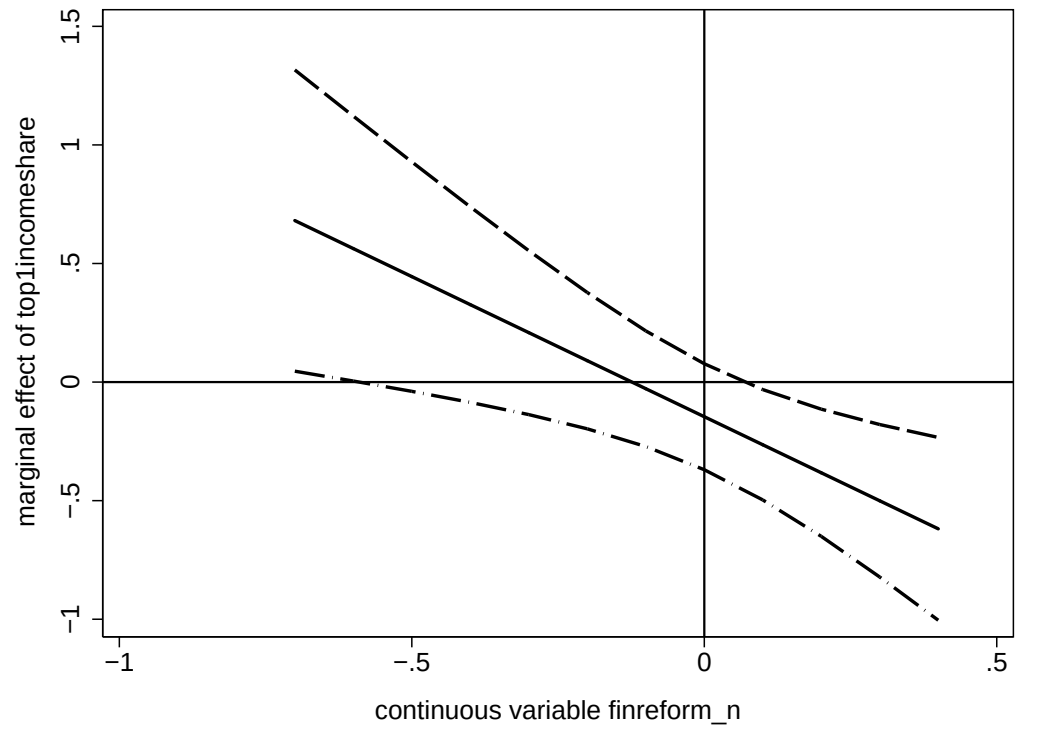


**Figure 4:** Marginal effect of top 1% income share for OLS estimates (using Financial Reform Index). Slashed lines represent 95% confidence intervals.