**Reforms, Finance, and Current Accounts**

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We analyze the implications of labor market reforms for an open economy's human capital investment and future production. A stylized model shows that labor market deregulation can imply more positive current account balances if financial markets are imperfect and labor market institutions not only distort labor allocation, but also smooth income. Empirically, in OECD country-level panel data, we find that labor market deregulation has been positively related to current account surpluses on average and more strongly so when and where financial market access was more limited. These results are robust to inclusion of standard determinants of current account imbalances, and do not appear to be driven by cyclical phenomena.

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## 1. Introduction

In recent decades, structural labor market reforms along the OECD (1994) guidelines have been accompanied by financial market development within countries, and by growing current account and net foreign asset imbalances across countries. In this paper we aim at characterizing how these trends may be linked to each other, isolating in theory and empirically the reform-related element of current account imbalances, and focusing particularly on the role of financial market imperfections in shaping the welfare and current account implications of labor market deregulation.

Several strands of literature have studied related issues. Starting from Gertler and Rogoff (1990), research has shown that both international financial integration and the depth of national financial markets influence global financial imbalances and portfolios choices (Mendoza et al., 2009; Caballero et al., 2008), and that capital may flow towards richer countries from countries where financial markets are underdeveloped (Matsuyama, 2004; Alfaro et al., 2008, and references therein). We consider the role of financial market imperfections in limiting risk diversification and investment funding within each country, rather than in determining a country's attractiveness for internationally mobile capital. Some of the relevant mechanisms are similar to those modeled by Song et al. (2011), Sandri (2010), and other studies of how removal of entrepreneurial constraints or firm-level financial frictions may influence growth and current account patterns in developing countries. Our theoretical and empirical work, however, is focused on the extent to which labor market risk and human capital investment are within each country shaped by both credit market imperfections and labor market institutions (Lo Prete, 2013). This makes it possible to analyze evidence from developed countries, where heterogeneous and changing labor market institutions may influence current account dynamics through several well-known mechanisms: to the extent that labor market regulation reduces production efficiency (Nicoletti and Scarpetta, 2003), reforms influence country-specific productivity growth, a key determinant of current account balances (Glick and Rogoff, 1995; Ventura, 2003). And as reforms of labor market institutions also increase labor income volatility along individual lifetimes, they induce precautionary savings (Carlin and Soskice, 2008), which make current accounts more positive

(Carroll and Jeanne, 2009). Macroeconomic data have been inspected from this perspective by Kennedy and Sløk (2005) and by Kerdrain et al. (2011), obtaining somewhat mixed results.

This paper contribution is twofold. First, it provides a tractable theoretical model that, extending Bertola's (2004) and other models of labor market institutions and imperfect financial markets, makes it possible to characterize the effects of labor market reforms on an open economy's human capital investment and future production. Second, it uncovers statistically robust and economic sensible estimates of covariation patterns between labor market reforms, household financial development indicators, and current accounts.

Section 2 lays out the model and shows that while in perfect financial markets labor market deregulation definitely implies more investment, faster income growth, higher consumption, and larger current account deficits, these predictions are not supported by the evidence: OECD countries that deregulated labor markets tended to experience current account surpluses. Since financial markets are differently imperfect across countries and periods, we proceed in Section 3 to model how the current account effects of labor market reforms depend on the same financial market imperfections that rationalize labor market regulation. When labor income risk is not diversifiable in financial markets and/or it is not possible to borrow in order to fund human capital investment, then labor market policies can smooth consumption at the same time as they decrease productivity, and deregulation can be associated with current account surpluses through precautionary-savings and funding-related consumption effects.

To assess empirically whether and how these theoretical mechanisms fit country-level panel evidence, in Section 4 we estimate main and interaction effects of labor market deregulation and financial market development as covariates of current accounts. We find that deregulation is significantly associated with smaller current account deficits, and that the coefficients of interaction terms indicate that this effect is larger where financial markets are less developed. We focus on observable elements of the mechanisms linking international phenomena to internal income distribution and financial development, but clearly current account imbalances may reflect the effects of deregulation along other policy reform dimensions and of factors other than labor market reforms and domestic

borrowing constraints. We extend our empirical model to account for these possibilities, finding that results are robust to specification variants suggested by standard empirical models of current accounts (see Debelle and Faruqee, 1996; Calderon et al., 2002; Chinn and Prasad, 2003) and hold when we remove the influence of cyclical factors by averaging data on 5-year non-overlapping sub-periods. Section 5 concludes summarizing the results, and discussing their implications for the interpretation of past trends and future developments.

## 2. A model and the data

To start our analysis, we assume perfect financial markets and consider an economy populated by a unit continuum of individuals. The model we propose and solve is tightly focused on the labor market allocation implications of institutions such as employment protection legislation, collective bargaining, and unemployment insurance. Its simplicity makes it possible to extend it in the next section to study the implications of limited financial market access by workers and households; in the empirical work of Section 4, we also control for standard determinants of output, investment, consumption, and current account that the simple theoretical model does not explicitly take into account.

Individual workers are allocated across two employment opportunities: a fraction $1-l$ is employed in jobs that have constant productivity $\pi_0$; a fraction $l$ is employed in jobs that require an investment of $k$ units of output in the previous period, and have potentially higher but decreasing marginal productivity $\pi_1(l)$.[1] Aggregate output is then

$$y(l) \equiv \int_0^l \pi_1(x)dx + (1-l)\,\pi_0. \tag{1}$$

To represent simply the effects of institutions that smooth labor incomes and reduce labor reallocation, we suppose that the revenue $s = [l\pi_1(l) + (1-l)\pi_0]\tau$ raised by a proportional tax $\tau$ is rebated equally to all workers in each period. Thus, each individual's total labor earnings (net of taxes and including the lump-sum subsidy) differ from productivity, and amount to

[1] The model's implications would be exactly the same if returns were decreasing in both employment opportunities. As long as returns remain decreasing, it would also be conceptually straightforward to let production employ physical capital as well as labor.

$$\begin{aligned} w_0 &= (1-\tau)\pi_0 + s \;\; = \;\; \pi_0 + (\pi_1(l) - \pi_0)\tau l, \\ w_1 &= (1-\tau)\pi_1(l) + s \; = \pi_1(l) - (\pi_1(l) - \pi_0)\tau(1-l), \end{aligned} \tag{2}$$

For given labor allocation $l$, the policy parameter $\tau$ leaves the gross and net labor income unchanged at $(1-l)\pi_0 + l\pi_1(l)$, and reduces the difference $(\pi_1(l) - \pi_0)(1-\tau)$ between net earnings in the economy's two types of jobs.

Each worker allocates a given (unitary) indivisible amount of labor to one of the two sectors. The lump-subsidy is irrelevant to this choice, which is based on the comparison of net wages. In equilibrium, the net wage differential implied by $l(\tau)$ should be such as to compensate the $k$ investment. Denoting with $r$ the rate of return and imposing that $w_1 - w_0 = (1+r)k$ in (2) yields

$$\pi_1(l(\tau)) - \pi_0 = (1+r)\frac{k}{1-\tau}. \tag{3}$$

Differentiating, we have

$$l'(\tau) = \frac{1}{\pi'_1(l)}\frac{(1+r)k}{(1-\tau)^2} < 0, \tag{4}$$

where the inequality follows from $\pi_1{}'(l) < 0$. A larger $\tau$ reduces the labor $l$ allocated to the decreasing-returns sector, which in equilibrium is more productive. The resulting larger gross earnings differential keeps net earnings in line with the investment cost, as in (3).

We model intertemporal choices in a two-period framework but, aiming to build intuition for the empirical application of the next section, we view the second period as the present discounted value of indefinitely many further periods. Denoting with $\tau\_$ the policy parameter that determined labor allocation in the previous period, and with $\tau$ the possibly different parameter enforced in the current and all future periods, we are interested in the economy's current account,

$$CA = rf + y(l(\tau\_)) - kl(\tau) - c, \tag{5}$$

where $f$ denotes net foreign assets, $r$ the rate at which the economy borrows or lends internationally, and $c$ aggregate consumption.

### 2.1. Reforms and the current account in perfect financial markets

As long as the functional form of utility allows aggregation of consumption decisions under perfect financial markets, aggregate consumption depends linearly on the present discounted value of the representative individual's current and future resources,

$$c = \mu\left(f + y(l(\tau_{-})) + \frac{y(l(\tau)) - k(1+r)l(\tau)}{r} - \frac{1+r}{r^2}\omega\right) \tag{6}$$

where $\mu$ and $\omega$ depend on parameters of the utility function.[2]

In the absence of reforms, $\tau = \tau_{-} > 0$ in (3) distorts labor allocation away from $l^*$ such that $\pi_1(l^*) - \pi_0 = (1+r)k$, and implies a smaller $y(l) - (1+r)kl$ production surplus. It is possible to show that the current account implications of this level effect are small and ambiguous: since output, investment, and consumption are all reduced by inefficient labor allocation, stable labor market distortions have no current account effects if the utility function has constant absolute risk aversion or, for more general functional forms, if the country's consumption is not expected to grow over time.

The empirical specifications we report in Section 4 check for such functional-form-dependent effects of output levels and control for plausible observable determinants of persistent consumption growth, such as demographic indicators, as well as for net foreign assets. Our theoretical and empirical work, however, is focused on the clearer implications of reforms that determine the expected growth rate of income in an otherwise stationary open economy.

Output is still determined by the past tax rate ($\tau_{-}$) in a period when that policy parameter changes to a new and, for simplicity, permanent value $\tau$, which influences forward-looking investment and consumption choices.[3] For concreteness, we consider the implications of labor market deregulation, as represented by a decline of $\tau$ below a positive past value. The investment reaction $kl'(\tau)$ is positive by (4), and consumption reacts in turn to the change of the present discounted value of output net of current and future investment; differentiating (6),

[2] This is the case if $u'(c) = c^{-\sigma}$ or $u'(c) = \exp(-\eta c)$, and for all the standard utility functional forms that support a representative-individual characterization of consumption and savings choices (see e.g. Bertola et al., 2006).

[3] Static effects of labor market policy, such as those deriving from labor supply incentives, would have similar effects on both current and future output, and the small and ambiguous current account implications discussed above.

$$c'(\tau) = \mu \frac{y'(l(\tau)) - k(1+r)}{r} l'(\tau) \tag{7}$$

has the same sign as $l'(\tau)$, since if $\tau > 0$ then $y'(l(\tau)) = \pi_1{}'(l(\tau)) - \pi_0$ is larger than $k(1+r)$ by (3). As investment and consumption both change in the opposite direction to the labor tax rate, if $\tau < \tau_-$ and $\tau_- > 0$ the economy's current account in (5) becomes more negative: labor market deregulation increases investment and improves welfare, and induces the country's consumption to anticipate the future income afforded by more efficient labor allocation.

### 2.2. Reforms and the current account in the data

This line of reasoning would lead us to expect a negative association between deregulation and current accounts. This is not the case in a panel of 16 OECD countries observed between the 1980s and the early 2000s (see the data Appendix for details). Figure 1 plots current account to GDP ratios against proportional changes in three indicators of labor market flexibility that, like the simple redistribution scheme of our theoretical model, redistribute and stabilize labor income at the expense of productive efficiency: marginal labor income taxation, employment protection legislation (EPL), and trade union density. We average data on a 5-year basis to reduce clutter are removed the influence of cyclical factors, and we remove country effect (panels in the first column) and country and period effects (panels in the second column) to account for unobserved heterogeneity and common trends. Changes of these indicators are signed so that a positive observation indicates more labor market flexibility, i.e. lower taxation, less stringent EPL, and less pervasive unionization. As all the panels show, the relationship between current account positions and reforms of labor market institutions is mildly positive, and certainly not as negative as the derivations above would lead us to expect.[4]

Available data indicate that not only the implications but also a key assumption of the derivations above has dubious empirical validity. In reality, financial markets are not perfect, and a negative relation is apparent in Figure 2 between current account positions and a time series of Loan-to-Value (LTV) ratios that refer specifically to real-estate mortgage transactions but indicate more generally,

[4] In panels plotting current account to GDP ratios against reforms in trade union density, Spain is an outlier; excluding it from the sample, the relationship remains positive. All the relationships are qualitatively similar, if somehow weaker, in levels.

and unsurprisingly, that households cannot in reality access a perfect financial market. In both panels, this indicator of financial market access is widely different across countries and periods, in ways that appear related to current account observations.

Next, we extend the model's simple representation of labor market interactions and institutions to account for restrictions on financial market's ability to ensure that all marginal utilities are aligned appropriately across agents and over time. As we shall see, these realistic extensions can reconcile the theory with the data, because the productivity effect of deregulation and the consumption response to it need not be positive, as they were in this section, when financial markets are imperfect.

## 3. Imperfect financial markets

In the model of the previous section, labor market policies and institutions only decrease productivity, and imply lower welfare. This is of course not their purpose in a reality where financial markets imperfections imply that income-smoothing policies can have beneficial welfare effects, and can influence the responses of human capital investment to reforms and of current consumption to output growth.

In what follows, we characterize the role first of uninsurable idiosyncratic shocks, then of borrowing constraints, in shaping decentralized equilibria where each worker chooses whether or not to pay the human capital investment cost $k$ in order to allocate his or her indivisible labor to the more productive sector.

### 3.1. Uninsurable risk

We let individual gross earnings differ from average marginal productivity by the realization of idiosyncratic mean-zero income shocks,[5] allowing the distributions of individual-specific shocks to differ across jobs that do and do not require investment, and supposing that their support is the same regardless of whether $k$ has been invested. This makes it impossible to infer from income realizations

[5] Aggregate uncertainty is tangential to the issues we focus on, except for the fact that reforms may be a source of country-specific risk. It would be conceptually straightforward to model less than completely unexpected reforms, but the data would not allow proper estimation of a realistic stochastic process, and the extension would beg the difficult questions of whether and how residents diversify internationally their wealth portfolios.

whether a specific worker's labor income embodies the returns to human capital investment of $k$ units of output in the previous period. Hence, neither private contracts nor public transfers can depend on human capital investments that are not directly observable.

As labor income differences result from both random shocks and unobservable costly investments, smoother labor income increases welfare for risk-averse individuals and decreases investment incentives. We do not model, and cannot observe, how this tradeoff may be addressed by private labor and financial contracts. The simple redistribution scheme in (2) smoothes out idiosyncratic individual-level risk at the same time as it reduces production efficiency, as in Varian (1980). A qualitatively similar role is played in labor markets not only by unemployment insurance and other mandatory contribution schemes, but also by collective bargaining and wage compression (Agell, 2002) and employment protection provisions (Bertola, 2004), both of which distort *laissez faire* equilibria in directions that can be shown to be equivalent to suitably defined distortionary taxes and subsidies.

We characterize the more general implications of decreasing and convex marginal utility under specific functional form assumptions. If idiosyncratic shocks are normally distributed and utility displays constant absolute risk aversion, wealth and consumption do not influence individual attitudes towards risk and intertemporal substitution. Then, uncertainty's implications for consumption levels and for wage differentials can be characterized separately and it is possible to solve the model explicitly, at the cost of neglecting the higher-order effects that would be implied by variable risk aversion.

In equilibrium, the investment cost $k$ offsets the discounted gain it affords in terms of the expected marginal utility of labor income in the next period. If the period utility function of the economy's workers has the CARA functional form $\mathrm{u(c)} = -\frac{1}{\eta}\mathrm{e}^{-\eta \mathrm{c}}$ and the rate of return on unconstrained saving choices is constant at $\mathrm{r}$, the response of human capital investment to policy changes is

$$l'(\tau) = \frac{1}{\pi_1{}'(l)}\left(\frac{(1+r)k}{(1-\tau)^2} - \frac{1}{2}\frac{\eta r}{1+r}(\sigma_1^2 - \sigma_0^2)\right), \tag{8}$$

where $\eta$ indexes the curvature of the utility function, and $\sigma_1^2$ and $\sigma_0^2$ are the variances of idiosyncratic shocks in the two sectors of the economy.

When $\sigma_1^2 = \sigma_0^2$, uninsurable risk does not influence investment, and (8) coincides with (4). If $\sigma_1^2 > \sigma_0^2$ instead, a larger $\tau$ reduces the relative riskiness of human capital investment, and makes it more attractive through this channel at the same time as it reduces its expected net returns; as in Andersen (2010) and its references, redistribution can encourage individuals to take socially beneficial risks. In our setting, this may or may not be realistic, because different types of human capital investment have different implications for labor income risk: earnings are more volatile for workers who move to new occupations or engage in entrepreneurial activities, but workers with more years of education are less likely to have volatile incomes (see Jensen and Shore, 2008, and their references).

As to consumption, reforms influence not only the mean but also the volatility of future labor income. The two effects are neatly additive for the specific functional forms considered, which also make it possible to express aggregate consumption as a function of aggregate income and wealth. In a period when the tax rate changes from its past value to $\tau$, consumption reacts according to

$$c'(\tau) = \frac{r}{1+r}\left(\frac{\pi_1{}'(l) - \pi_0 - (1+r)k}{r}\right) l'(\tau) - \eta r \frac{1-\tau}{(1+r)^2}\left(\sigma_0^2 + (\sigma_1^2 - \sigma_0^2)\left(l(\tau) - \frac{1}{2}(1-\tau)l'(\tau)\right)\right). \quad (9)$$

The first term, as in (7), applies the representative individual's marginal consumption propensity to the change in the present discounted value of the economy's net production flow: consumption increases if a reform increases $l(\tau)$ and future output. By (8), the deregulation represented by a decline of $\tau$ can have this effect, and certainly does if $\sigma_1^2$ is smaller than or equal to $\sigma_0^2$. As labor market regulation reduces uninsurable labor income risk, however, the other term on the right-hand side of (9) captures the change in precautionary motives: consumption declines upon deregulation if it becomes more risky, as is certainly the case if $\sigma_1^2 = \sigma_0^2$.

While the investment, consumption, and current account implications of reforms generally depend on the intensity and character of labor income uncertainty, and on the functional form of $l(\tau)$ and of $u(c)$, the same features of reality that explain why labor markets are often tightly regulated can also explain why their deregulation tends to be associated in the data with current account surpluses rather than deficits. The current account (5) need not become more negative upon deregulation: if labor market institutions mitigate labor income risk that would otherwise reduce welfare through consumption

fluctuations, investment does not necessarily increase upon deregulation, and consumption's precautionary decline can more than compensate any consumption effects of higher future output.

### 3.2. Borrowing constraints

The reaction of consumption and investment to reforms may also be muffled by borrowing constraints. Obviously, if the country as a whole cannot borrow, then the income growth implications of reforms would be reflected in the domestic interest rate rather than in the current account deficit implied by the model in Section 2. Less obviously, and more interestingly in a context where uninsurable labor income uncertainty implies that wealth is unequally distributed, the labor market and current-account implications of labor market regulation and reforms also depend on the tightness, measured by the LTV indicators considered in Figure 2, of individual-level borrowing constraints within the country. It is possible to show that liquidity constraints reduce human capital investment. Intuitively, if human capital investment at the margin cannot be financed at the same rate $r$ available to the aggregate economy, the effective discount rate applied to its returns is higher, and in equilibrium larger earnings differentials are needed to induce workers to accept the steep consumption profile implied by liquidity-constrained investment. Just like a larger investment cost or more intense redistribution, binding liquidity constraints imply that $l$, the fraction of labor allocated to more productive employment, falls short of achieving production efficiency at $y'(l) = (1 + r)k$.

Since constrained borrowing implies lower income, investment, and consumption, it has small and ambiguous implications for the economy's current account balance. As regards the more interesting effects of structural labor market reforms, actually or potentially binding liquidity constraints imply that the consumption function is nonlinear, even for preferences that would support representative-individual aggregation under perfect financial markets.[6] Depending on the distribution of resources across the economy's individuals and on the shape of utility and productivity functions, binding liquidity constraints may imply stronger or weaker responses of investment to labor market reforms.

[6] The implications of liquidity constraints are instead obvious in the context of development transitions (Sandri, 2010 or Song et al., 2012), where simple assumptions can be sensibly made as regards resource distribution and other relevant features.

If liquidity constraints weaken the response of human capital investment to reforms, they certainly imply smaller future income and current consumption effects, and deregulation has less negative current account implications. But even if liquidity-constrained investment reacts more strongly to reforms, current account effects are less negative when, at the margin, investment needs to be financed by lower consumption rather than borrowing. For a given reform impact on investment, borrowing constraints imply a more positive association between current accounts and deregulation: if a reform increases human capital investment and productivity but liquidity constraints are binding for the marginal investing worker, higher future output has less negative current consumption implications, both because the liquidity-constrained portion of the population cannot increase consumption and because additional investment implies a discretely lower consumption level, offset by higher future welfare, for the marginal worker.

## 4. Empirical analysis

According to our model, when financial markets are perfect and complete, labor income smoothing is not a sensible policy objective, and labor market deregulation should be associated with larger current account deficits. When instead financial markets are imperfect, the model predicts that reforms that improve productivity also decrease the smoothness of individual consumption processes and, depending on the relative strength of different theoretical channels, may imply that deregulation is associated with a more positive current account.

To assess the significance and relative importance of the various channels of interaction, in this section we estimate nonlinear specifications relating changes in country-level labor market institutions and indicators of financial development to current account patterns.[7] We rely on (observable) variation in labor market policies and financial development because any variation that remains after controlling

[7] The current account is a useful summary gauge of the intricate effects of labor market regulation on the intensity of labor income risk and efficiency of labor allocation. Theoretical implications for components of the current account are not as sharp as those for the overall current account level: an increase of undiversifiable risk may or may not encourage investment, and liquidity constraints may or may not weaken the response of investment to reforms. Thus, regressing investment and saving ratios separately on a variety of possible determinants can yield unstable and occasionally puzzling results, as in Kerdrain et al. (2011)'s regressions of current account elements on levels (rather than changes) of labor market institutions.

for country and time effects in the relevant idiosyncratic risk intensity cannot be observed directly, and it would be very difficult to disentangle its exogenous component from outcomes that are unavoidably influenced by labor market policies.[8] Since many details of the theory's implications depend on functional forms, we will check whether the empirical role detected for labor and financial market structure indicators is robust to inclusion of country and time effects, as well as of control variables.

### 4.1. Main results

Our basic specification implements the theoretical relationship studied in Section 3, allowing the coefficients of institutional changes to depend on financial development as suggested by the derivations above. Across countries indexed by *j* and over periods indexed by *t*, we estimate nonlinear least squares regressions of the current account to GDP ratio on a linear combination of the labor market deregulation indicators introduced and inspected in Section 2, in the form

$$CA/GDP_{jt} = \left( \sum_{i=1}^{I} \beta_i StrRef_{ijt} + \varphi \right) f(FinDev) + Z_{jt} + \varepsilon_{jt} \, . \tag{10}$$

The structural labor market reform variables ($StrRef_{ijt}$) measure proportional changes of the *i* policy indicators.[9] The specification weighs them by coefficients $\beta_i$ and interacts the result with an indicator of financial development that is defined in terms of deviations from its period means,

$$f(FinDev) = 1 + \gamma FinDev_{jt}, \quad \text{where} \quad FinDev_{jt} = LTV_{jt} - \frac{1}{J}\sum_{j=1}^{J} LTV_{jt}, \tag{11}$$

and is allowed to affect the dependent variable directly with coefficient $\varphi$. In this model, the $\beta$ coefficients measure the relationship between current accounts and reforms in a country with mean values of financial development. The control variables $Z_{jt}$, discussed below, are meant to capture differences across countries and periods in unobservable time-preferences, risk aversion, risk intensity, and other theoretically relevant factors.

[8] We have experimented with using unemployment rates as a proxy for individual labor market risk, interacted with labor market reform and financial development indicators. The results, while much weaker and more difficult to interpret than those we report, are not inconsistent with our theoretical perspective.

[9] Since it appears very hard to assess the extent to which changes in institutions are unexpected 'shocks,' we do not attempt to time and measure discrete 'reforms' (as in Duval, 2008).

We expect the main effect of financial development on current accounts to be negative, as relatively easier borrowing tends to worsen the current account in the absence of any other changes. As in Section 2, we define institutional indicators so that larger values are associated with more efficiency and more individual income risk. Our theoretical perspective suggests that $\beta_i$ coefficients may be negative or positive, depending on whether institutional change has larger effects on the future level or variability of incomes, and that financial development is a crucial determinant of the strength of the relevant effects. Easier access to financial markets for purposes of consumption smoothing and mobility investments should enhance the negative impact of deregulation on current accounts (making it possible to consume in anticipation of future income growth) and dampen its positive impact (as easier access to financial markets reduces precautionary savings).

In Table 1 we assess the fit of our theoretical perspective on annual data for 16 OECD countries over the period 1981-2003. In the first two columns we include country and time effects to capture, respectively, permanent country-specific imbalances within the sample period and the impact on the current accounts of OECD countries of common external factors. The estimated coefficients β of the structural reform variables are always positive, indicating that deregulation is associated to larger current account surpluses (or smaller deficits), and the interaction with financial development is significant.

The results are consistent with theoretical insights regarding the role of the labor market institutions we include in the specification. Less stringent employment protection and lower trade union density are associated with larger current account surpluses: in theory, employment protection and collective wage setting (proxied by trade union density) do stabilize labor incomes, and labor market deregulation may well increase the riskiness of labor income streams in ways that are not diversifiable in private financial markets. The marginal tax rate reflects the progressivity of the tax system, which automatically stabilizes incomes, and is also positively associated with current accounts. The inclusion of time effects in column 2 allows for more precise estimates of the variables of interests, and absorbs much of the variation in the EPL index and in the main effect of financial development, indicating that OECD countries have broadly followed similar reform paths along these dimensions.

The robustly negative estimate of γ, the interaction coefficient with the relative LTV variable, is consistent with the theoretical prediction that relationships between deregulation and current accounts should be less positive, and possibly negative, when financial markets are better developed. In the sample, the maximum positive deviation of relative LTV from the cross sectional mean is 23.75; the point estimate of γ in column 2 implies a negative association between flexibility-oriented reforms and the current account only in countries where LTV ratios exceeded 80% already in the early 1980s, such as the US, UK, Denmark, Finland, Sweden and Ireland, or exceeded 100% in the early 2000s, such as the US, UK, Spain, France, Belgium and the Netherlands.

To control for the current account implications of the initial configuration of national labor and financial markets, the specifications in columns 3 and 4 include the level (measured in the previous year) of the same labor market institutions whose changes appear as structural reform variables, and of the LTV measure of financial development. Recalling that the theoretical current account effects of these variables are small and generally ambiguous, it is not surprising to find that their coefficients are mostly insignificant, and not robust to inclusion of time effects. Reassuringly, the point estimates of the structural labor market reform variables and relative LTV are much the same as the baseline estimates reported in columns 1 and 2. We next proceed to check the robustness of the main results in columns 1 and 2 of Table 1 to inclusion of potentially relevant determinants of current accounts alongside unobserved country-specific factors, and to cyclical factors.

### 4.2. Extensions and robustness

Our results so far document that, in the data, the current accounts of initially highly regulated countries tended to move towards surplus positions as they tended to relax regulation over the sample period, while countries with initially looser regulation and better financial market access tended to move towards deficit. Country-specific dynamics are of course different in many other respects, and current account and institutional developments might be jointly caused by some observed underlying phenomenon. The nonlinear character of the effects of interest, and the paucity of relevant information, make it impossible to establish causality by instrumental variable methods. To assess

whether our results may be spurious, in what follows we extend the empirical model to account for economic developments that might have affected the current account along with labor market deregulation.

First, labor market institutions other than employment protection legislation, trade union density, and marginal tax rates may of course play a role in smoothing out shocks. We have experimented with reforms in unemployment benefits as measured by Gross Replacement Rates, and in the coverage of trade union agreement as measured by a Collective Bargaining Coverage indicator (available for a smaller set of countries and at only 1980, 1990, 2000). These structural reform variables do not attract a significant positive coefficient when included in the specifications of Table 1, and do not affect the other reform coefficients (in particular, the sparse data on collective bargaining add little or no information to that provided by the richer, if theoretically less appropriate, trade union density measure). The results are also very similar when we use as the dependent variable the sum of current account and capital account to GDP ratio.[10]

An important set of extensions focuses on determinants of current accounts other than deregulation and access to financial markets. Empirical models have characterized long- and short-term macroeconomic determinants of external balances in cross-section and panel data for industrial countries (Debelle and Faruqee, 1996) and developing countries (Calderon et al., 2002), as well as the effect of medium term determinants (Chinn and Prasad, 2003). In the first two columns of Table 2 a number of potentially relevant mechanisms are brought to bear on the data through the inclusion of various indicators. To control for the cyclical effects of fiscal policy, we include the government budget balance to GDP ratio, and we follow the empirical literature including changes of terms of trade and real effective exchange rates, as well as demographic structure and net foreign assets indicators, all drawn from the IMF World Economic Outlook and from the World Bank's World Development Indicators online database.[11]

[10] Pooling the current and capital accounts removes spurious variation due to a 1999 change of accounting conventions. We thank Gian Maria Milesi-Ferretti for alerting us to this potential issue.

[11] The regressions are meant to attest the relevance of our theoretical perspective and the robustness of our baseline results, rather than to specify and estimate a model of consumption and savings. The empirical role of

The coefficients of these control variables are often significant, and the sign and size of their point estimates are theoretically sensible. The coefficient of the government balance to GDP ratio is always positive and significant, and its point estimates are in or near the typical 0.2-0.3 range estimated by Abbas et al. (2011) and their references. The annual change in the terms of trade has a positive effect on current account balances, consistently with the Harberger-Laursen-Meltzler effect whereby temporary positive shock to the relative price of exports increase current income more than permanent income, thus improving the current account position (Obstfeld, 1982). The impact of changes in the real effective exchange rate is not significant, as predicted by the intertemporal approach to the current account (Razin, 1995). In our data, country and time effects appear to capture also most of the variation in relative demographic profiles, measured by dependency ratios in deviation from the sample mean. The stock of net foreign assets over GDP is positively and significantly associated with the current account.

The coefficients of labor market structural reform and financial market development indicators are not affected by these additional controls, with the notable exception of changes of marginal tax rates. Experimenting with different sets of control variables indicates that inclusion of terms of trade is responsible for loss of significance of marginal tax rates, and that accounting for the size of government by including the government spending to GDP ratio has similar implications. While such patterns may be interpretable, for example in the framework of the Epifani and Gancia (2009) model of terms of trade effects of government size, for our purposes it suffices to find that the significant and sensible interactions effects detected by the baseline specifications in Table 1 are robust to inclusion of controls that are theoretically unrelated to the institutional reform indicators we are interested in, and also empirically do not influence their coefficients estimates. These are arguably more interpretable and structural than the statistically more significant association of current accounts with income-related determinants of current account imbalances, such as the domestic output gap and country-specific output growth: these are driven by institutional change in our theoretical framework, and

some of the additional variables may be interpreted within our modeling perspective: government debt, for example, may help relax financing constraints. Due to limited availability of terms of trade data, the regressions in Table 2 are run on an unbalanced panel dataset including 14 countries.

causality might also run in the opposite direction if the likelihood of reforms is related to the cycle (Duval, 2008). [12]

In Table 2 we also extend the empirical model to assess the empirical role of international financial market development, and of alternative measures of the domestic financial development that our theoretical model focuses on. As a *de facto* gauge of international financial openness, columns 3 and 4 include the deviation from the cross-sectional mean of gross stocks of foreign portfolio assets plus liability, as a ratio to GDP (data from Lane and Milesi-Ferretti, 2007). This indicator enters with the expected negative sign and attracts a significant coefficient, but does not much influence the main and interaction effects of the LTV-based indicator of internal financial development on which our theoretical perspective focuses. The specifications in columns 5-8 consider indicators of financial development other than the LTV ratio indicator we have used so far (documented in the Online appendix). That indicator focuses on restrictions on the maximum allowed mortgage at a given assessed housing value (rather than on the collateral on typical actual contracts). Hence, it is relatively immune from spurious cyclical influences, unlike the *de facto* private credit to GDP ratios used in columns 5 and 6 of Table 2, and captures household financial conditions in an arguably more accurate way than the *de iure* IMF index of financial structure that we use in columns 7 and 8. In practice, these alternative indicators of domestic financial market restrictions yield results that, while much weaker, are qualitatively similar to those obtained when using the LTV ratio: the effect of structural reforms on current accounts is less positive in countries where the volume of financial market activities is relatively bigger, and where financial market regulations are relatively loose.

Finally, we consider the robustness to cyclical factors of our main results in Table 1, running the same regressions on non-overlapping time averages of annual observations over five sub-periods including 5 years each (three in the last one, 2001-2003). Results are reported in Table 3, where the level of the structural labor market reform variables refers to their value in the first year of each sub-period. With

[12] We also considered specifications that control for current output, which may also depend on labor market policies in our theoretical framework and is relevant to current account balances if countries with different output levels also expect to grow at different rates (see Chinn and Prasad, 2003, and their references). In our sample of fairly uniformly developed OECD countries, the level of per capita PPP-adjusted GDP is not significant, and all the results of interest are confirmed.

fewer observations the precision of the estimates decreases, but the main message conveyed by the data is the same. In all specifications the institutional reform variables are positively related to the current account, and less strongly so where financial markets are more developed.

## 5. Conclusions

Our regression results detect sensible relationships between current account behavior and labor market reforms in OECD countries between the 1980s and the early 2000s, and provide an interesting gauge of the contrasting policy-relevant effects of institutional change on the overall level and distribution of income. In theory, the relationship between an economy's current account and labor market reforms depends on financial market imperfections. The mechanisms whereby labor market institutions meant to reduce risk and even out earnings inequality also reduce production efficiency are more general than those illustrated by our theoretical model. They may be applicable to other income flows, such as those resulting from business investments, and to any policy that, like those considered by Andersen (2010) and its references, reduces incentives to seek higher expected income at the same time as it smoothes the consumption impact of income shocks.

In OECD country-level panel data we find that structural labor market reforms that improve productivity growth tend to bring current accounts towards surplus positions in initially highly regulated countries, and the strength of that effect depends on country-specific indicators of borrowing constrains. This suggests that the aggregate consumption and investment effects of efficiency-enhancing reforms are in practice constrained by internal financing difficulties. The same reforms are negatively associated to current account imbalances not only in the less regulated and more market-friendly Anglo-Saxon countries, but also in European countries with better developed financial markets.

In the context of our model, a negative aggregate consumption impact of reforms implies that their welfare effect is negative on average, and certainly negative for low-wealth individuals. Thus, deregulation experiences observed in the data may be driven by politico-economic mechanisms as well as by exogenous changes in policy feasibility constraints that also influence risk and productivity

for given policies. Further work could explore the exogenous component of international openness as a plausible shifter of the environment in which policy choices are made, along the lines of Bertola and Lo Prete (2013). While it does not seem possible reliably to detect and disentangle such high-order mechanisms in the data, the relationships we uncover indicate that labor market reforms may have contributed to the development of global imbalances. Should the recent financial crisis trigger re-regulation of labor markets in some countries, our results suggest that those countries should experience larger current account deficits and slower growth.

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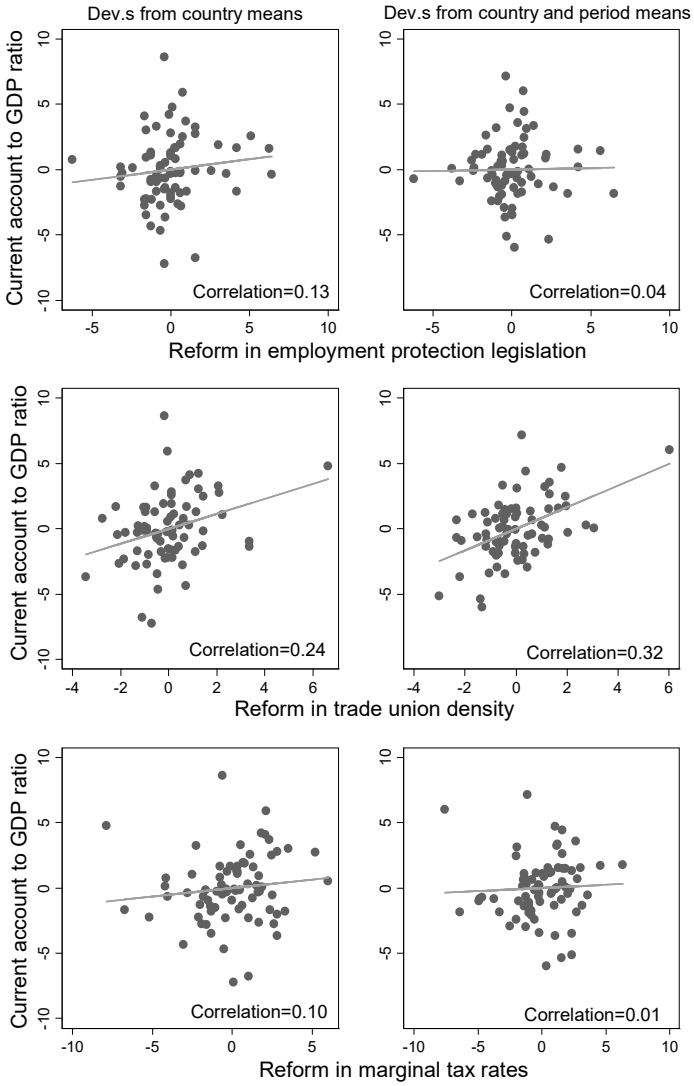
## Data Appendix

The dataset, documented in detail in the Online appendix, includes data for 16 OECD observed between 1981 and 2003, namely: Austria, Belgium, Canada, Denmark, Finland, France, Ireland, Italy, Japan, Netherlands, Norway, Portugal, Spain, Sweden, United Kingdom, and United States. Macroeconomic variables are drawn from the IMF World Economic Outlook, and the World Bank's World Development Indicators online database. Data on Loan-to-Value ratios refer to the maximum LTV ratios as reported by the OECD and other sources. Other financial development indicators are from the World Bank's "Financial Development and Structure Database", the IMF "Financial Reform Database", and other sources. Information on the evolution of labor market institutions and tax rates is drawn from the CEP-OECD Institutions Data Set compiled by the LSE in 2006, with the aim to rely on a reputable source of information and its careful standardization of institutional time series indicators. Since the CEP-OECD dataset contains information up to the early 2000s and has not been updated since its 2006 issue, the time span for the present analysis is limited accordingly. Structural labor market reform variables are computed as the annual rate of change in the institutional indicators of interest and measured so that an increase is associated with more efficiency and more individual income risk. Data have been interpolated when missing, and the panel is balanced with respect to the variables used to estimate the main specification.

**Table A.1. Descriptive statistics, labor market reforms and finance indicators in selected years**

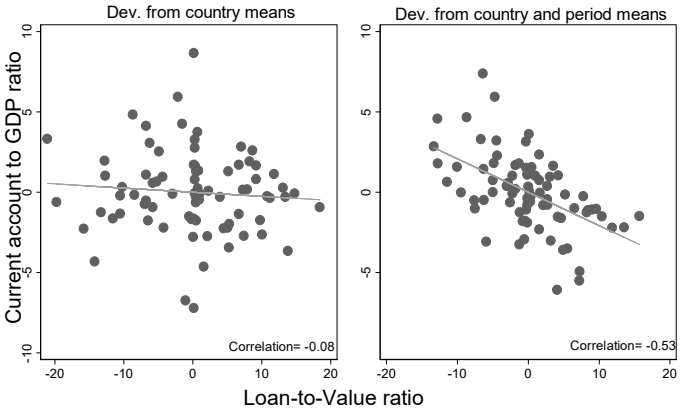
| | Rate of change of reform indicators | | | Level of Loan-to-Value ratios | | |
|---|---|---|---|---|---|---|
| Year | EPL | Trade union density | Marginal tax rates | Yearly average | Min. deviation | Max. deviation |
| 1981 | -0.5 | +1 | -2.2 | 75.7 | -21.7 | 17.6 |
| 1991 | +0.8 | -2 | -0.5 | 84.3 | -17.8 | 12.8 |
| 2001 | +1 | +1.3 | -0.1 | 92.5 | -12.5 | 22.5 |

**Figure 1. Current accounts and structural labor market reforms**




Notes: Regression lines from specifications including country dummies (first column) and country and period dummies (second column). Data are 5-year period averages, between 1980s and early 2000s.

**Figure 2. Current accounts and finance**




Notes: Regression lines from specifications including country dummies (first column) and country and period dummies (second column). Data are 5-year period averages, between 1980s and early 2000s.

**Table 1. Main results**

| Dependent variable: Current account / GDP | | | | |
|---|---|---|---|---|
| Columns: | 1 | 2 | 3 | 4 |
| *Structural reform variables* | | | | |
| Employment protection | 0.072 | 0.019 | 0.026 | 0.019 |
| | *2.45* | *1.18* | *1.98* | *1.20* |
| Trade union density | 0.189 | 0.177 | 0.158 | 0.160 |
| | *3.30* | *4.02* | *3.39* | *3.28* |
| Marginal tax rate | 0.042 | 0.035 | 0.031 | 0.032 |
| | *2.58* | *2.97* | *2.87* | *2.72* |
| Main effect of relative LTV | 2.767 | 0.980 | 1.457 | 0.656 |
| | *4.17* | *3.79* | *3.08* | *1.72* |
| *Financial development interaction* | | | | |
| Relative LTV | -0.065 | -0.156 | -0.179 | -0.171 |
| | *-4.59* | *-4.54* | *-3.83* | *-3.74* |
| *Control variables* | | | | |
| Employment protection (level, lagged) | | | -3.421 | 1.497 |
| | | | *-2.88* | *0.94* |
| Trade union density (level, lagged) | | | -0.036 | 0.037 |
| | | | *-1.23* | *0.92* |
| Marginal tax rate (level, lagged) | | | -0.036 | 0.006 |
| | | | *-0.77* | *0.13* |
| LTV (level, lagged) | | | 0.108 | -0.034 |
| | | | *4.17* | *-0.75* |
| Time effects | no | yes | no | yes |
| Number of observations | 368 | 368 | 368 | 368 |
| R2 | 0.510 | 0.620 | 0.573 | 0.623 |

Notes: All regressions control for country effects. Robust t-statistic in italics.

**Table 2. Extended and alternative specifications**

| Dependent variable: Current account/GDP | | | | | | | | |
|---|---|---|---|---|---|---|---|---|
| Columns: | 1 | 2 | 3 | 4 | 5 | 6 | 7 | 8 |
| *Structural reform variables* | | | | | | | | |
| Employment protection | 0.040 | 0.012 | 0.031 | 0.002 | 0.030 | -0.001 | 0.055 | 0.064 |
| | *2.09* | *0.56* | *1.71* | *0.09* | *1.48* | *-0.06* | *2.08* | *1.57* |
| Trade union density | 0.087 | 0.126 | 0.089 | 0.127 | 0.144 | 0.122 | 0.191 | 0.111 |
| | *2.42* | *3.18* | *2.41* | *3.09* | *3.00* | *2.48* | *3.26* | *2.61* |
| Marginal tax rate | -0.001 | 0.014 | 0.001 | 0.018 | 0.029 | 0.021 | 0.028 | 0.026 |
| | *-0.05* | *0.60* | *0.05* | *0.74* | *1.38* | *1.04* | *1.27* | *1.76* |
| Main effect of relative financial development | 5.760 | 3.742 | 5.615 | 3.540 | 2.095 | 1.236 | 2.748 | -0.207 |
| | *8.57* | *4.04* | *7.78* | *3.70* | *3.33* | *2.14* | *4.58* | *-1.28* |
| *Financial development interaction* | | | | | | | | |
| Relative LTV | -0.030 | -0.045 | -0.032 | -0.049 | | | | |
| | *-7.28* | *-4.01* | *-6.79* | *-3.71* | | | | |
| Relative financial openness | | | -0.002 | -0.003 | | | | |
| | | | *-2.43* | *-2.30* | | | | |
| Relative private credit/GDP | | | | | -1.095 | -1.824 | | |
| | | | | | *-1.89* | *-1.80* | | |
| Relative financial structure | | | | | | | -0.021 | -0.605 |
| | | | | | | | *-0.79* | *-2.79* |
| *Control variables* | | | | | | | | |
| Government balance/GDP | 0.181 | 0.229 | 0.184 | 0.240 | | | | |
| | *3.70* | *3.58* | *3.84* | *3.87* | | | | |
| Terms of trade | 10.170 | 10.812 | 10.286 | 10.864 | | | | |
| | *2.92* | *2.83* | *3.11* | *2.90* | | | | |
| Real effective exchange rate | -2.146 | -1.100 | -1.968 | -1.085 | | | | |
| | *-0.76* | *-0.38* | *-0.72* | *-0.39* | | | | |
| Demographics | 0.053 | 0.098 | -0.038 | 0.019 | | | | |
| | *0.74* | *1.36* | *-0.47* | *0.24* | | | | |
| Net foreign assets/GDP | 0.056 | 0.040 | 0.077 | 0.062 | | | | |
| | *2.57* | *1.70* | *3.41* | *2.50* | | | | |
| Relative GDP level per capita | | | | | | | | |
| Time effects | no | yes | no | yes | no | yes | no | yes |
| Number of observations | 296 | 296 | 296 | 296 | 368 | 368 | 368 | 368 |
| R2 | 0.634 | 0.687 | 0.642 | 0.693 | 0.433 | 0.532 | 0.405 | 0.512 |

Notes: All regressions control for country effects. Robust t-statistic in italics.

**Table 3. Main results on 5-year period averages**

| Dependent variable: Current account / GDP | | | | |
|---|---|---|---|---|
| Columns: | 1 | 2 | 3 | 4 |
| *Structural reform variables* | | | | |
| Employment protection | 0.251 | 0.112 | 0.142 | 0.132 |
| | *3.25* | *1.58* | *1.55* | *1.61* |
| Trade union density | 0.296 | 0.355 | 0.328 | 0.339 |
| | *2.33* | *2.55* | *2.81* | *2.41* |
| Marginal tax rate | 0.125 | 0.098 | 0.137 | 0.113 |
| | *1.74* | *1.41* | *1.89* | *1.41* |
| Main effect of relative LTV | 3.247 | 1.896 | 2.453 | 0.815 |
| | *2.50* | *1.99* | *1.51* | *0.58* |
| *Financial development interaction* | | | | |
| Relative LTV | -0.057 | -0.085 | -0.110 | -0.095 |
| | *-2.74* | *-2.41* | *-2.36* | *-2.58* |
| *Control variables* | | | | |
| Employment protection (level, lagged) | | | -0.702 | 4.894 |
| | | | *-0.28* | *1.77* |
| Trade union density (level, lagged) | | | -0.044 | 0.043 |
| | | | *-1.03* | *0.63* |
| Marginal tax rate (level, lagged) | | | -0.075 | 0.002 |
| | | | *-0.71* | *0.02* |
| LTV (level, lagged) | | | 0.099 | -0.082 |
| | | | *2.05* | *-0.94* |
| Time effects | no | yes | no | yes |
| Number of observations | 80 | 80 | 80 | 80 |
| R2 | 0.657 | 0.735 | 0.705 | 0.749 |

Notes: All regressions control for country effects. Robust t-statistic in italics.