Reforms, Finance, and Current Accounts

Giuseppe Bertola* and Anna Lo Prete **

This Draft: May 2009

ABSTRACT: We study theoretical and empirical relationships between countries' current accounts and reforms of institutions that shape labor's productivity and labor income risk. In theory, both consumption smoothing and precautionary motives shape saving behavior when deregulation speeds up income growth and amplify idiosyncratic income risk, and the relative importance of these two channels depends on workers' access to credit. Empirically, nonlinear regressions on a standard sample of OECD countries indicate that the association between deregulation trends and current accounts surpluses is statistically significant, robust to a variety of specification details, and stronger where financial markets are less developed. The relevant labor market regulation and financial indicators are empirically associated not only with lower consumption, faster production growth, and more investment, but also with higher wage dispersion.

JEL Classification: E44, F32, J08

Keywords: structural reforms, financial markets, current accounts.

---

* Università di Torino, CEPR; ** Università di Torino. This draft, while still preliminary, benefits from helpful comments by seminar and conference participants at Università di Torino, Università di Pisa, European University Institute, Università Bocconi, and CREI-UPF. Financial support by Università di Torino (G.Bertola: Ricerca Locale) and Regione Piemonte (A.Lo Prete: Azione A) and research assistance by Stella Capuano are also gratefully acknowledged.

1. Introduction

Since the early 1990s, structural reforms along the OECD (1994) guidelines have been accompanied by financial market development. We study in this paper how the uneven pace of these trends across countries is theoretically and empirically related to the role of financial markets in allowing labor mobility and consumption to respond to the expected growth of future income and smooth out its variability's consumption impact, and to the effects of redistribution policies and other institutional features of labor markets on country-level productivity and on within-country income distribution.

Labor market regulation generally decreases production efficiency, inserting wedges between labor's marginal product and worker's opportunity costs. It also redistributes that smaller production flow towards agents who earn labor income rather than capital income, and aims at smoothing (across realizations of uncertainty, and over time and across agents) the labor income flows that cannot be diversified in financial markets. Thus, deregulation should improve economic efficiency and should influence empirical growth, investment, and total factor productivity data. These effects may be detectable in country-level data, to the extent that is it possible to control for other relevant factors. Since the consumption volatility relevant to the "equity" side of the trade-off is not easy to measure in comparable fashion across countries and periods, we study how changes in institutions meant to smooth consumption risk are related, through savings and growth effects mediated by financial market developments, to countries' current accounts.

The elements of our approach are related to various strands of literature. Inasmuch as structural reforms should and do spur future income growth (Nicoletti and Scarpetta, 2003), they should be associated with initially higher consumption/income ratios. To the best of our knowledge only Kennedy and Slok (2005) have studied this mechanism. Their empirical specifications are difficult to interpret from an inter-temporal optimization perspective, however, and yield mixed and inconclusive results. We focus on the role of financial market development in allowing reforms to improve the economy's efficiency, and expected income growth to affect current consumption. If consumption-smoothing behavior anticipates that deregulation fosters future income growth, current accounts should be more negative when labor markets become more flexible. But liquidity constraints and precautionary savings may imply that the adjustment costs and uncertainty associated with policy reforms lead consumption to fall, reducing aggregate demand and possibly leading to a failure of reforms efforts. Carlin and Soskice (2007) argue that this mechanism has been at work in Germany. Many other contributions have studied interactions between financial development and macroeconomic phenomena. Abiad et al. (2009) explore the role of financial

integration in fostering income convergence across European countries, and a particularly relevant point is made by Buti et al. (2008), who point out that access to financial markets makes it possible for decision-makers properly to consider the future productivity implications of structural reforms, and study the empirical role of financial development indicators as a determinant of re-election probabilities in the aftermath of reforms. We are also not the first to relate international balances and exchange rates to within-country income distribution. Kocherlakota and Pistaferri (2007) show that within-country risk influences equilibrium exchange rate when individual consumption can be insured against observable country-specific shocks, while the need to elicit unobservable effort prevents complete insurance against individual idiosyncratic income fluctuations (this can in principle be tested empirically, and the paper claims some success in doing so on UK and US data; Kollman, 2009, shows that the same data offer little or no support to the theory). Broer (2008) proposes a different channel of interaction between risk and savings, based on the Kruger and Perri (2007) endogenous enforcement mechanism whereby more uncertain future income prospects relax borrowing constraints; Mendoza, Quadrini, and Ríos-Rull (2007) show that international financial integration across countries with different internal borrowing constraints have distributional implications, as it implies that rates of return increase – to the detriment of borrowers – in financially repressed countries.

In the context of this literature, we aim at contribute a deeper interpretation of patterns of risk variation across countries and over time. While existing contributions treat these as exogenously given (if perhaps determined by globalization or technological progress), we relate riskiness of labor incomes to institutional labor market aspects. We focus on the possible impact of institutional change as a source of balance of payment dynamics, rather than on the role of institutional configurations in shaping the international impact of shocks (Lo Prete, 2008, finds that the configuration of internal risk-sharing institutions matters for the relationship between aggregate consumption and aggregate production at the country level). To model the relationship between financial market development and allocative and distributional mechanisms, we choose to employ a standard liquidity-constrained self-insurance framework of analysis, which we find more natural than setting with more or less complete formal insurance mechanisms and proves capable to interpret cross-country patterns in remarkably robust and insightful ways.

In Section 2 we outline in some detail the relevant theoretical insights, in the context of a two-period economy where financial market access and redistribution policies influence choices by worker-consumers to engage in mobility towards more productive jobs. Since redistribution diminishes individual incentives to undertake such mobility, future aggregate incomes are predicted to increase when labor markets are deregulated. The extent to which this is reflected in current

consumption (and in the aggregate current account balance of investment and savings) depends on the one hand on individual access to financial markets, on the other on the implications of less generous redistribution and labor market deregulation on individual consumption risk. We characterize the relevant effects adopting functional forms that conveniently separate the effects of interest at the aggregate level from other interactions between income distribution and investment and saving choices. The resulting theoretical perspective implies interesting interactions between financial structure and current accounts. If financial markets allow households to anticipate and smooth consumption, then the representative individual saves less when regulatory reforms increase expected future income relative to current income. But consumption growth may be prevented by borrowing constraints and, to the extent that labor market regulation is meant to reduce uncertainty for workers, the same reforms that increase average production also increase idiosyncratic uncertainty and induce precautionary savings. Through this channel, reforms should be associated with smaller current account deficits, or larger surpluses.

In Section 3 we specify an empirical model aimed at detecting such effects. In a standard cross-country panel data set, relationships between indicators of labor market rigidity (drawn from standard OECD sources) and indicators of financial development can be interpreted in terms of reforms' impact not only on aggregate income, employment, and investment dynamics, but also on households' consumption, which is expected to increase when financial market reform allows previously repressed households to borrow, with a negative impact on current account balances. Many other cyclical and trend factors also shape current accounts, of course. In contrast to recent empirical studies of macroeconomic current account imbalances, which analyze the effects of a comprehensive set of variables on short, medium, and long term dynamics, relying on a wide range of theoretical models but without testing a particular one (see Debelle and Faruqee, 1996, Calderon et al., 2002, Chinn and Prasad, 2003), our perspective combines theoretical insights from models of labor market institutions' motivation and effects, and from models of consumption-smoothing channels of interaction between financial markets and other markets' structure.

The results offer remarkably significant and robust support to the empirical relevance of such theoretical insights. In our basic specification, deregulation is associated with smaller current account deficits, and the size of this effect is larger where financial markets are less developed. This can be explained by precautionary saving behavior in response to stronger labor income risk. While it is of course impossible to account for all possible channels of interaction, we find that the estimated effects of institutional change is robust to controlling for arguably exogenous variables (such as dependency ratios, real effective exchange rates, and the terms of trade), to 5-year averaging of the data (to reduce the importance of cyclical fluctuations), and other specification

variants. Section 4 explores the relationship to income and consumption, to investment, and to earnings inequality of the institutional interactions detected to be relevant to current account developments by our estimation procedure, and documents empirical associations consistent with our theoretical perspective: deregulation is associated with lower consumption, faster production growth, more investment, and higher earnings inequality.

Section 5 concludes summarizing the results and discussing their implications for the interpretation of past trends and possible developments after the 2008 crisis at the end of a long phase of financial deepening and labor market deregulation, when countries following trajectories of labor market deregulation and financial development accumulated foreign financial assets relative to those that already featured loosely regulated labor markets and easy access by households to borrowing and stock ownership.

2. Consumption, investment, and labor market policies

The relevant mechanisms can be illustrated by a two-period model where, as in Bertola (2004), an economy's risk-averse individuals decide whether to engage in costly mobility towards firms, sectors, or occupations where labor income is expected to be higher, and the payoff to that mobility is endogenously determined by mobility itself because employment in better jobs encounters decreasing returns.

In the economy's second period, output is produced in two sectors, indexed by b and g, and is paid out as income to labor and other factors. Labor allocation across the two sectors is endogenous: "good" jobs of type g are available only to workers who have made a specific investment of k in terms of first-period resources, while "bad" type b jobs are available by default to all workers. Denoting with $\pi(x, j)$ labor's marginal productivity when x units of labor are employed in type j jobs, we suppose that $\pi(x, g) > \pi(x, b) > 0$ for all x and that these functions are decreasing in the first argument. If labor is paid according to marginal productivity, as in competitive equilibrium, higher infra-marginal productivity implies that some of the production flow is paid as income to other factors of production.

If r is the opportunity cost of funds between the two periods, and normalizing total employment to unity, net production is maximized in the second period when the proportion l of labor employed in "good" jobs is such that

$$\pi(l, g) - \pi(1 - l, b) = (1 + r)k, \tag{1}$$

i.e. those productivity differentials offset the mobility cost at the margin.

On the demand side of the labor market, we assume that employment is such as to equate marginal productivity to gross labor costs. On the supply side, uninsurable risk, policies, and financial constraints interact in determining allocation of labor to the economy's two types of jobs. We let individual workers' wages differ from job-specific marginal productivity because of a (linear) tax and subsidy scheme, and because of uninsurable individual-specific shocks. Net earnings are given by

$$w_i = (1-\tau)(\pi(l,g)+\varepsilon_i)+\sigma \text{ if } i \text{ pays } k,$$
$$= (1-\tau)(\pi(1-l,b)+\varepsilon_i)+\sigma \text{ otherwise,} \qquad (2)$$

where τ is a proportional income tax and σ is a per capita subsidy.[1] Gross earnings are observable, at least by the government, and may therefore be taxed. They include the mean marginal productivity implied by aggregate labor's allocation, and a mean-zero shock ε_i that is idiosyncratic and uninsurable by private institutions, because it depends on effort and other private information. This shock may, as discussed below, be distributed differently for jobs that do and do not require a mobility investment.

Before realization of uncertainty, individuals decide how much to consume of their first-period income and other resources, and whether to spend k to finance their own mobility and future earnings. The remainder of their savings is invested in a financial asset that yields the rate r in equation (1). Crucially for our purposes, it may or may not be possible to borrow at that rate. As in Bertola and Koeniger (2007), redistribution affects the stringency of liquidity constraints, as well as the extent of uncertainty about future uninsurable earnings.

Formally, the problem facing individuals is that of choosing initial consumption c and the mobility indicator $m \in \{0,1\}$ to maximize a two-period welfare function

$$\max u(c) + E[\mathrm{V}(w+W_2 + (W_1 - c - km)(1+r))]$$
$$\text{s.t.} \quad W_1 - c - km > -\bar{b},$$

where W_1 is the amount of resources available in the first period, W_2 that of non-labor income in the second periods, $\bar{b}$ denotes a borrowing limit, and $u()$ and $V()$ are increasing and concave differentiable functions with positive third derivative. The latter may be interpreted as the continuation value of a longer-horizon planning program. An explicit multi-period model, however, would imply a changing and possibly non-stationary distribution of wealth, which may in turn

[1] We focus on a stylized redistributive policy, but more or less wasteful employment protection provisions can be represented in this setting by different effective mobility cost and job-specific wage taxes and subsidies (Bertola, 2004); collective bargaining and wage compression could be modeled in this framework along the lines of Agell (2002).

influence mobility choices. The results of interest are most easily derived when wealth does not influence individual attitudes towards risk and intertemporal substitution. For this reason, when we solve the model explicitly it will be convenient to adopt a negative exponential function form, abstracting from higher-order and compositional effects implied by variable risk aversion.[2]

Workers who do not exercise the option to move (indexed by s, "stayers") have lifetime utility

$$U_s = u(c_s) + E\left[V\left(w+W_2 + (W_1 - c_s)(1+r)\right)|m=0\right],$$

for a consumption level c_s that satisfies the Euler condition

$$u'(c_s) \geq (1+r)E\left[V'\left(w+W_2 + (W_1 - c_s)(1+r)\right)|m=0\right] \quad (3)$$

with equality if borrowing is unconstrained. For movers, lifetime utility is

$$U_m = u(c_m) + E\left[V\left(w+W_2 + (W_1 - c_m - k)(1+r)\right)|m=1\right]$$

where the expectation is based on the earnings outlook warranted by mobility (which must be the more favorable than its alternative if mobility is costly), and c_m is such that

$$u'(c_m) \geq (1+r)E\left[V'\left(w+W_2 + (W_1 - c_m - k)(1+r)\right)|m=1\right], \quad (4)$$

with equality if $c_m < W_1 - k$ and strict inequality if a binding constraint implies that $c_m = W_1 - k + \bar{b}$.

Since the mobility option is open to all individuals, in an interior equilibrium exercising it must be a matter of indifference. Imposing $U_s = U_m$ implies

$$u(c_s) + E\left[V\left(w + (W - c_s)(1+r)\right)|m=0\right] = u(c_m) + E\left[V\left(w + (W - c_m - k)(1+r)\right)|m=1\right]. \quad (5)$$

In an equilibrium where mobility is costly but unconstrained, the equilibrium earnings of movers and stayers depend on mobility decisions, shaped in turn by redistributive policies and access to credit markets. We proceed to study how these institutional and structural features, and the relationship (5) between the consumption levels and future wage distributions of movers and stayers, bear on the total difference between the first period flow of resources W_1 and total consumption, i.e. on the current account of this economy when it is possible for its residents to access an international financial market where funds yield r.

2.1 Consumption and mobility choices

If borrowing constraints are not binding, the movers' investment is funded by the same financial market accessed by stayers, where funds also accrue from non-labor income flows. Then,

[2] Explicit characterization is also possible for a constant relative risk aversion utility function in a log-linear environment where random shocks and mobility costs are multiples of wages.

indifference to mobility implies that current consumption and expected utility are both equalized in each period across those who do not move (and can look forward to worse earning opportunities but larger accumulated wealth) and those who do (and offset lower future wealth with the expectation of higher earnings).

As the timing of non-labor income is irrelevant under perfect borrowing and lending, denoting available lifetime resources other than second-period labor income with

$$W \equiv W_1 + \frac{W_2}{1+r}$$

entails no loss of generality. Total differentiation of (5) with respect to W yields

$$E[V'(w + (W - c_s)(1 + r))|m = 0] = E[V'(w + (W - c_m - k)(1 + r))|m = 1] \quad (6)$$

since (3) and (4) hold with equality, and relaxation of resource constraints has no first-order effect on welfare through consumption choice. Again by (3) and (4), this implies that first-period marginal utility and consumption levels are also independent of mobility choices:

$$u'(c_s) = u'(c_m), \;\; c_s = c_m. \quad (7)$$

The level of first-period consumption depends on uninsurable risk, as wage shocks that affect the argument of V(·) induce precautionary savings if its first derivative is convex. In general, this can be shown expanding the random realization of future marginal utility around the expectation of the future wage,

$$V'\big(w + (W - c_s)(1 + r)\big) = V'\big(E[w] + (W - c_s)(1 + r)\big) + V''\big(E[w] + (W - c_s)(1 + r)\big)(w - E[w]) + \\ + \frac{1}{2}V'''\big(E[w] + (W - c_s)(1 + r)\big)(w - E[w])^2 + \cdots \quad (8)$$

When inserted in the Euler equation, this implies that $u'(c_s) - (1 + r)V'\big(E[w] + (W - c_s)(1 + r)\big) = \frac{1}{2}V'''\big(E[w] + (W - c_s)(1 + r)\big)E(w - E[w])^2 + \cdots$: the left-hand side of this expression is increasing in c_s by concavity, and the right-hand side is positive if future income is uncertain and the third derivative of the future utility function is positive. Hence, in such circumstances optimal consumption is lower than the certainty-equivalent level that would equate the left-hand side to zero.

A closed-form solution is available if $V(x) = -\frac{1}{\eta}\frac{1}{1+\rho}e^{-\eta x}$, so that second-period marginal utility is multiplicatively separable in savings and random wage earnings. If first-period utility has a similar negative exponential CARA form, the Euler condition $e^{-\eta c} = \frac{1+r}{1+\rho}\, e^{-\eta(W-km-c)(1+r)}E[e^{-\eta w}|m]$ can be solved explicitly, for each of the $m = 0$ and $m = 1$ mobility choices, to yield

$$c = \frac{1}{(2+r)\eta}\Big(\ln\frac{1+\rho}{1+r} + \eta(W - km)(1 + r) - \ln E[e^{-\eta w}|m]\Big). \quad (9)$$

Since the resources denoted by W enter linearly in this expression, their sources and distribution (as well as their timing, if borrowing and lending are unconstrained) do not influence the level of aggregate consumption.

As to mobility choices, expansion as in (8) of future marginal utility makes it possible to rewrite the indifference condition (6) as

$$V'\big(E[w|m=0]+(W-c)(1+r)\big)+\frac{1}{2}V'''\big(E[w|m=0]+(W-c)(1+r)\big)\mathrm{Var}(w|m=0)^2+\cdots=$$
$$V'\big(E[w|m=1]+(W-c-k)(1+r)\big)+\frac{1}{2}V'''\big(E[w|m=1]+(W-c-k)(1+r)\big)\mathrm{Var}(w|m=1)^2+\cdots$$

If mobility only changes the mean of the wage distribution, leaving all other centered moments unaffected, this condition requires equality of the future utility function's arguments, hence the risk-neutral expected present discounted condition

$$E[w|m=0]=E[w|m=1]-(1+r)k$$

holds regardless of uninsurable uncertainty.

Higher-order derivatives of utility are relevant if mobility affects higher-order moments of the wage distribution. It is again informative to inspect the closed-form solution available when marginal utility has exponential form: the indifference condition (6) reads

$$E\big[e^{-\eta(w+(W-c_s)(1+r))}|m=0\big]=E\big[e^{-\eta(w+(W-c_m-k)(1+r))}|m=1\big]$$

and, using (7),

$$E[e^{-\eta w}|m=0]=e^{\eta k(1+r)}E[e^{-\eta w}|m=1]: \tag{10}$$

when borrowing is unconstrained, for mobility to be a matter of indifference at the margin its cost k must exactly offset discounted gains in terms of expected marginal utility of labor income. This ensures that investment in "jobs" (or any other risky asset) is priced correctly in equilibrium, and in light of (9) confirms that first-period consumption levels do not depend on mobility choices.

The relationship between uncertainty and individual choices can be made explicit noting that

$$\ln E[e^{-\eta w}]=-\eta E[w|m]+\tfrac{1}{2}\eta^2 Var[w|m] \tag{11}$$

if the idiosyncratic ε_i shocks are normally distributed, or by a second order approximation to more general distributions. When inserted in (9) this yields

$$c=\frac{1}{(2+r)\eta}\left(\ln\frac{1+\rho}{1+r}+\eta(W-km)(1+r)+\ \eta E[w|m]-\frac{1}{2}\eta^2 Var[w|m]\right)$$

And readily implies that larger variance of future uninsurable shocks implies lower consumption levels if $\eta > 0$ in the CARA specification of utility and, more generally, when marginal utility is convex. And inserting (11) in (10) makes it possible to write that no-risky-arbitrage condition as

$$(1 + r)k = E[w|m = 1] - E[w|m = 0] - (Var[w|m = 1] - Var[w|m = 0])\frac{\eta}{2}: \qquad (12)$$

as shown above, equilibrium mobility choices depend on wage risk if mobility affects higher moments – in this case, the variance – of idiosyncratic uninsurable risk.

In general, jobs with higher average productivity may be riskier, or less risky. If mobility towards better opportunities not only requires an ex-ante investment but also implies higher risk, then risk has the same implications as larger mobility costs for uninsured workers with precautionary motives.

2.2 Equilibrium and redistribution

In the model, jobs are risky assets with returns that depend on equilibrium allocation. Thus, mobility choices should affect the distribution of wages in such a way as to ensure that indifference to mobility obtains. Condition (12) is consistent with the production efficiency condition (1) if individual wages are expected to coincide with marginal productivity, and are equally random in all jobs around that expectation. If mobility is riskier instead, then individual choices imply lower high-productivity employment: intuitively, workers self-insure by refraining to engage in mobility.

Redistribution breaks equality between expected marginal productivity and wages, and changes wages' mean and variability in ways that bear on both consumption and mobility choices. A proportional tax τ reduces the variance of net wages below that of gross wages, since $Var[w] = (1 - \tau)^2 Var[\varepsilon_i]$. As modeled in (2), redistribution reduces the negative impact of uninsurable uncertainty on the welfare of risk-averse workers and on their first-period consumption through precautionary self-insurance behavior, and may improve overall welfare if tax revenues finance the lump-sum subsidy σ.

Since mobility is based on net wages, however, more intense redistribution reduces the average differential between good and bad wages as well as the variance of individual-specific shocks around them. Taxation reduces the extent to which productivity differences are reflected in wages and, at any labor allocation, lowers the net expected payoff of individually costly mobility. For mobility to be a matter of indifference in equilibrium, gross marginal productivity differentials have to be larger across good and bad jobs: thus, a smaller proportion l of the economy's labor will be employed in high-productivity jobs, and this decreases the economy's second-period production flow below the efficient level implied by (1).

To see this, insert the expressions (2) in the workers' indifference-to-mobility conditions (still assuming that borrowing is unconstrained), to obtain

$$E[V'((1-\tau)(\pi(1-l,b)+\varepsilon_i)+\sigma+(W-c_s)(1+r))|m=0] =$$
$$= E[V'((1-\tau)(\pi(l,g)+\varepsilon_i)+\sigma+(W-c_m-k)(1+r))|m=1].$$

Tax and subsidy parameters are known at the time consumption and mobility decision is taken and equilibrium is determined, so multiplicatively separable CARA preferences again yield an explicit solution: the lump-subsidy σ does not affect incentives to mobility when it does not influence risk aversion, and the no-risky-arbitrage condition (12) can be solved for the difference between marginal productivities,

$$\pi(l,g)-\pi(1-l,b)=\frac{(1+r)k}{1-\tau}+(1-\tau)\frac{\eta}{2}(Var[\varepsilon_i|m=1]-Var[\varepsilon_i|m=0]). \qquad (13)$$

A larger tax has the same implications for mobility and labor allocation as a larger mobility cost, namely a wider spread between wages and marginal productivities of the jobs that do and do not require investment. Perhaps less intuitively, taxation also reduces the extent to which mobility is discouraged by its risk implications: in the absence of taxation, in fact, uninsurable risk prevents labor allocation from maximizing total production flows, which would require satisfaction of the first-order condition $\pi(l,g)=\pi(l,b)+(1+r)k$. This makes it possible in theory for redistribution to encourage mobility that entail higher uninsurable risk. In reality, mobility investments may or may not entail additional risks, and private contractual arrangements may or may not leave uncovered such risks. Whether redistribution encourages individual risk-taking, and whether the effect is large relative to the first-order effect on expectations, are essentially empirical questions.

Changes of redistribution policy ("reforms") affect output dynamics through mobility decisions, and the theoretical implications most immediately relevant to our framework of analysis are those that pertain to first-period consumption levels. Inasmuch as redistribution reduces the variance of wages in (10), it is predicted to boosts first-period consumption through weaker precautionary saving motives.

Taxation, as long as its effect on the relative riskiness of earnings is not such as to foster mobility, reduces the efficiency of labor allocation and the size of the non-labor income flow W_2 accruing to owners of the economy's firms. When the labor force is allocated so that marginal productivity equals unit labor cost, in fact, operating profits

$$\Pi(l)=\int_0^l \pi(x,g)\,dx-\pi(l,g)l+\int_0^{1-l}\pi(x,b)\,dx-\pi(1-l,b)(1-l) \qquad (14)$$

are increasing in the proportion l of high-productivity employment as long as $\pi(x,g) > \pi(l,b)$, as must be the case to ensure that mobility is chosen by workers who pay mobility costs.

2.3 Borrowing constraints

In the model, as in reality, financial market incompleteness may make redistribution appealing because reducing uninsurable uncertainty improves welfare of risk averse workers (to the expense of non-wage production flows), and may affect individual incentives to undertake mobility investments. Another form of financial market incompleteness is also realistically relevant as regards labor incomes, and may affect the relative strength of efficiency and risk impacts on first period consumption: it need not be possible to finance mobility towards better jobs at equation (1)'s economy-wide inter-temporal rate of transformation.

We suppose for simplicity that W_1 and W_2 are the same for all individuals, and that the borrowing constraint is binding for those who move towards higher wages; so, $c_m = W_1 - k + \bar{b}$ fails to satisfy the Euler condition:

$$u'(c_m) = (1+r)E[V'(w+W_2 + (W_1 - c_m - k)(1+r))|m=1] + \lambda$$

for a strictly positive multiplier λ, and movers' consumption funds mobility at the margin.

For analytical convenience we suppose that stayers are not liquidity constrained; qualitatively similar results would hold if liquidity constraints were binding for all workers, since they would necessarily be tighter for movers than for stayers. When the Euler condition of movers holds with equality, changes of c_s cancel out when the indifference condition (in the absence of redistribution)

$$u(c_s) + E\big[V\big(\pi(1-l,b) + \varepsilon_i + W_2 + (W_1 - c_s)(1+r)\big)\big] =$$

$$= u\big(W_1 - k + \bar{b}\big) + E\left[V\left(\pi(l,g) + \varepsilon_i + W_2 - \bar{b}(1+r)\right)\right] \qquad (15)$$

is totally differentiated with respect to the borrowing constraint $\bar{b}$ and labor allocation l (neglecting the latter's impact on W_2) to obtain

$$\frac{dl}{d\bar{b}} = \frac{u'\big(W_1 - k + \bar{b}\big) - E\left[V'\left(\pi(l,g) + \varepsilon_i + W_2 - \bar{b}(1+r)\right)\right]}{-E\big[V'\big(\pi(1-l,b) + \varepsilon_i + W_2 + (W_1 - c_s)(1+r)\big)\big]\pi'(1-l;b) - E\left[V'\left(\pi(l,g) + \varepsilon_i + W_2 - \bar{b}(1+r)\right)\right]\pi'(l;g)};$$

this is a positive expression, since the numerator is the $\lambda > 0$ Kuhn-Tucker multiplier of the movers' borrowing constraints, and the slopes of marginal productivity functions are negative in the denominator. Thus, looser borrowing constraints imply that more labor is allocated to high-productivity employment opportunities. Liquidity constraints imply that individual marginal

utilities are misaligned both in cross section and over time. For movers, consumption is not smoothed, and this implies additional costs of mobility (this effect would be present in the absence of uncertainty). To make mobility is a matter of indifference, as it must be in an interior equilibrium, movers' higher marginal utility in the first period must be matched by lower expected marginal utility for stayers in the future. Thus, wage differentials must be larger: this outcome is supported by lower employment in good jobs, and mobility is lower in equilibrium than what would be implied by the no-risky-arbitrage condition (12) if savings and investment met on a financial market where r is the intertemporal rate of transformation.

The more productive allocation of labor implied by looser borrowing constraints increases future non-labor income (14), and easier borrowing allows this to be reflected more strongly in first-period consumption. Redistribution also affects incentives to undertake mobility. The empirical specifications of the next section aim at detecting interactions between these two effects, as well as direct effects through income growth and consumption levels, in country-level data.

3. Current accounts and reform trends

In our model, less pervasive redistribution on the one hand increases uncertainty about future net wage, to imply lower consumption through precautionary effects; on the other hand, it encourages -- to an extent that depends on the relationship between mobility and the intensity of uninsurable risk and on ease of access to financial markets by workers -- mobility investments that increase future output, and boosts the component of first-period consumption that is financed by future non-labor income. More general labor market deregulation (such as patterns of lower unionization and higher earnings dispersion) has qualitatively similar implications, and theoretical insights can be brought to bear on the relationship between current accounts and changes of institutions that redistribute and smooth the impact of shocks.

Our formal derivations characterize dynamic reallocation channels taking as given first-period resources, and abstract from static output effects of redistribution (e.g. through effort incentives) that, affecting output equally in all periods, are not relevant for the savings, investment, and current account phenomena we focus on. In the first period, the model economy's net assets at the end of the first period depend on aggregate consumption: as shown above, this depends on the riskiness of future uninsurable labor income and on the size of future non-labor income resources W_2, which also reflect the productivity of mobility investments. Less redistribution always fosters precautionary savings. Deregulation also increases future productivity and current consumption, but only to the extent that it encourages efficient labor market mobility and that higher future aggregate income can be anticipated by accessing the financial market: when borrowing is constrained, the

response of worker mobility to a reduction in taxes is not as strong as when it is unconstrained, and the response of current consumption to that smaller productivity increase is also smaller.

3.1 Main results

To assess the significance and relative importance of the various channels of interaction, we estimate nonlinear specifications relating changes in institutions and indicators of financial development to current account patterns. Our basic specification restricts the coefficients of institutional changes to be the same across countries and over time at a given level of financial development, but allows their absolute size to depend on each observation's level of financial development. Specifically, we estimate by nonlinear least squares

$$CA/GDP_{jt} = f(FinDev)\left(\varphi + \sum_{i=1}^{I} \beta_i \Delta Institution_{ijt}\right) + Controls_{jt} + \varepsilon_{jt} : \qquad (16)$$

the dependent variable is the current account ratio to GDP in country *j* at time *t* , and we estimate its relationship to financial development both directly (with parameter φ) and in interaction with a linear combination of institutional changes.

We measure financial development in terms of deviations from period-specific means of a Loan-to-Value (LTV) ratios time series, constructed from the data collected by Jappelli and Pagano (1996), Catte et al. (2004), and other sources (see Data Appendix). The exponential functional form

$$f(FinDev) = 1 + e^{\gamma FinDev}, \text{ for } FinDev_{jt} = LTV_{jt} - \frac{1}{J}\sum_{j=1}^{J} LTV_{jt}, \qquad (17)$$

ensures that differences in financial development influence the size but cannot change the sign of the interacted variables' coefficients. A high LTV ratio allows more access to credit: so observations for which financial development is high relative to the period average feature a larger $f(FinDev)$ if $\gamma > 0$ is positive, decreases it if $\gamma < 0$.

As to reform, a variety institutional features in reality have effects similar to those illustrated by redistribution in Section 2's model. The interacted term of equation (16) includes changes of several indicators, weighted by coefficients β_i, drawn from the standard CEP-OECD Institutions Data Set compiled at the LSE. 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). Our reforms indicator is based on annual changes of the indicators, interpolated when necessary, and is meant to capture the broad trends that are relevant to consumption and investment processed characterized by lagged and anticipation effects.

We consider three dimensions of relevant regulation: strictness of employment protection legislation, trade union density, and marginal tax rate.[3] These institutions, like the simple redistribution scheme of our theoretical model, interfere with labor markets for purposes of income stabilization and redistribution, presumably at the expense of productive efficiency, in ways that we discuss briefly when commenting the results below. Of course, these and other institutions have a variety of other roles in reality, but it is interesting to assess empirically their association with current accounts, through growth and risk effects, controlling for other potentially relevant factors. The basic specification includes the government budget balance to GDP ratio, to control for the cyclical effects of fiscal policy.[4] We also assess the robustness of the estimates of interest to inclusion of country effects and of time effects, capturing permanent country-specific imbalances within the sample period and the impact on the current accounts of OECD countries common external factors.

We expect the main effect of financial development on current accounts to be negative, as easier borrowing tends to worsen the current account even in the absence of other institutional evolution. We define institutional indicators so that larger values are associated with more efficiency and more individual income risk. Our theoretical perspective suggests that β_i coefficients may be positive or negative, 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 institutional change on current accounts (because easier access to financial markets makes it possible to consume in anticipation of future income growth), and dampen its positive impact (because easier access to financial markets reduces precautionary savings).

We assess the fit of our theoretical perspective on annual data for 19 OECD countries over the period 1980-2003 (see the Data Appendix for definitions and sources; the panel dataset is unbalanced, notably because LTV information for Australia and New Zealand is only available for the very early portion of the time-series dimension).

Table 1 reports the results of estimation by nonlinear least squares of equation (16), with the functional form (17) for the role of financial development; results are very similar when LTV enters

[3]

[4] The theoretical model can be extended to account for the effects of government debt, which can help relax financing constraints. The empirical model could be similarly extended to disentangle government budget balance changes due to cyclical movements, from those reflecting discretionary factors linked to structural reforms.

linearly in that function, but do imply some sign reversal for the estimated βs at the extremes of the range of variation in the data we use.

In all columns of Table 1, the estimated coefficients β of the Structural Reform Variables are positive, indicating that deregulation is associated to larger current account surpluses (or smaller deficits), and the interactions with financial development is significant. Thus, the evidence is consistent with a preeminent role, for these countries and periods, of income smoothing rather than income growth as the most important channel of interaction between internal institutions and CA dynamics. The negative estimate of the interaction coefficient γ with Relative LTV sensibly indicates that precautionary behavior is less relevant in better-developed financial markets. The coefficient of the government balance to GDP ratio is always positive, capturing cyclical variation in the denominator and/or the effects of fiscal policy shocks.

The results are consistent with theoretical insights regarding the role of the institutions we include in the specification. Less stringent employment protection and lower union density are associated with larger current account surpluses: in theory, employment protection and collective wage setting (proxied by 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. Financial market development weakens all these relationships between deregulation and current accounts: a tendency of deregulation to reduce consumption/income ratios is consistent with precautionary savings behavior, and it is theoretically sensible to find that the effect is stronger where liquidity constraints are more severe.

The four columns of Table 1 differ according to whether country and time effects are included in the specification. This leaves the signs of coefficient estimates unaffected, but does influence their precision. Interestingly, time effects absorb much of institutional variation of interest and strongly reduce the significance of the coefficients of interest, indicating that OECD countries have broadly followed qualitatively similar institutional paths. When country effects are included, conversely, differences in the time variation of institutional reforms yield very significant estimates coefficients, even when time effects are also include in column 4 of the table.

3.2 Additional controls and specification robustness

Of course, the mechanisms we want to focus on do not capture all determinants of current account dynamics in reality. In the empirical literature a number of other mechanisms are brought to bear on

the data through the inclusion of various indicators. The effects of institutional changes on which we focus are arguably more interpretable and structural than the statistically more significant role played, as explanatory variables of current accounts, by income growth and other variables which may themselves be driven by institutional change. Recent analyses characterized empirically the effect of short and long 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). Of course, cyclical indicators, current accounts, and reforms are jointly endogenous, as the likelihood of reforms may be also related to the cycle (Duval, 2008, analyzes relevant empirical regularities). The direction of the relationship is ambiguous, however, as serious crises may trigger reforms but labor market regulation is likely more popular at times of high unemployment.

We refrain from including in our regressions income-related determinants of current account imbalances, such as the domestic output gap and country-specific output growth, which in our framework of analysis are at least partly driven by institutional developments. In the first three columns of Table 2, we do assess the robustness of results from specification (16) to inclusion of demographic and macroeconomic indicators, drawn from the IMF World Economic Outlook (WEO) and from the World Bank's World Development Indicators online database (WB-WDI), that are arguably unrelated to institutional change: external determinants of current account positions, such as changes of terms of trade and real effective exchange rates, and "structural" determinants such as demographics. Estimates of the coefficients of institutional development and financial market development indicators are largely unaffected by these additional controls, some of which are significant (also depending on the presence or absence of country and period effects in the three specification) and yield theoretically sensible point estimates. 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 (see, for instance, 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 (see Razin, 1995). Demographics, measured by relative (with respect to the sample) dependency ratios, enter with the expected negative sign when they are significant: countries where young and old dependency ratios to the working age population are higher have lower savings, and thus smaller current account surpluses (higher deficits). As the age structure of the population is relevant to the extent that demographic profiles differ across countries and influence cross-country differences in aggregate

savings, it is not surprising that in our OECD sample country effects capture most of the variation along this dimension.

In the remaining columns of Table 2 we further extend the empirical model to assess the relevance of increasing international financial market integration for capital mobility, and hence income convergence (Abiat et al., 2008). Columns 4-6 include the deviation from the cross-sectional mean of gross stocks of foreign portfolio assets plus liability ratio to GDP (data from Lane and Milesi-Ferretti, 2006). This indicator of relative financial openness is not significant and leaves unaffected the point estimate and significance of main and interaction effects of the LTV-based indicator of internal financial development on which our theoretical perspective focuses. As regards the role of convergence dynamics, columns 7-9 extend the specification to test for the "stage of development" hypothesis that growing countries typically import capital, and thus run current account deficits. In the literature (see, Chinn and Prasad, 2003, and their references), this effect is captured by the level of PPP-adjusted GDP per capita in relative terms with respect to the average in the sample. In our sample of fairly uniformly developed OECD countries the size of that variable's coefficient is very close to zero and significant only when neither country nor time effects are included. Once again, the results of interest are broadly unaffected. Here, and in the other columns of Table 2, only changes in marginal tax rates display a tendency to become less significant when additional controls are included.

We proceed in Table 3 to assess the robustness of our main estimates along two further dimensions. Columns 1-3 address the issue of whether our reform variables may spuriously capture other unobservable country characteristics. The specifications reported so far are robust to unobservable time invariant heterogeneity when fixed effects are included linearly, so that deviations from country means of the left-hand-side variable are related to deviations from country means of the whole multiplicative expression. To the extent that trends towards deregulation are not uniform across countries and across policy instruments, however, time-invariant unobservable heterogeneity may still bias estimates of interaction effects (Bassanini and Duval, 2009). We check for the impact of country specific characteristics on deregulation patterns by including country effects α_j in the interaction term in (17), so that $f(FinDev) = \alpha_j + e^{\gamma \widehat{LTV}_{jt}}$. We see in Table 3 that allowing the relationship between institutional changes and current accounts to differ systematically across countries reduces the significance of the estimates of interest, not surprisingly in light of the rather short time span available for each country. The very imprecisely estimated coefficients, however, have the predicted signs when both country and time effects are included.

To check for the results' robustness to cyclical factors, in columns 4-6 we report results from regressions on non-overlapping time averages of annual observations over five sub-periods including five years each (four in the last one, 2000-2003). While the coefficients are again less precisely estimated for obvious reasons, institutional reform variables and their interaction with financial market development indicators have the correct sign and are significant when country and time effects are included.

4. Consumption, production, inequality, and reforms

Our results so far document that, in the data, the current accounts of initially highly regulated countries tended to move towards surplus 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 positions. The former countries are prevalently Continental European, the latter Anglo-Saxon, and since these groups of countries differ in many other respects, it is impossible to tell in general whether current account and institutional developments might be jointly and spuriously caused by some observed or unobserved underlying phenomenon. To the extent that institutional variation may be viewed as exogenous, however, it is interesting to assess whether more detailed patterns of consumption, production, and inequality changes across countries are consistent with our theoretical framework.

In this section we explore the empirical relationship between the current account effect of structural reforms and other variables. Our theoretical framework suggests that deregulation should accelerate production growth, and that consumption-to-GDP ratios should be related to the resulting trends by consumption-smoothing channels (mediated by ease of access to internal and external borrowing) and by precautionary savings behavior (mediated by instability of individual labor income streams). It is also an implication of our theory that deregulation, in interaction with financial development, should encourage investment and increase wage dispersion.

To assess the relevance of these theoretical relationships in the available data, we regress the relevant indicators on the summary reforms indicator constructed from the estimates of Table 1:

$$Ref_{jt} = \left(\hat{\varphi} + \sum_{i=1}^{I} \hat{\beta}_i \, \Delta Institution_{ijt}\right)\left(1 + e^{\widehat{\gamma LTV}_{jt}}\right).$$

Since consumption, production, investment, and inequality development may depend on time and country characteristics, we include in the regressions the same controls considered in Table 1, and in each case construct the summary reforms indicator using the estimated coefficients $\hat{\varphi}$, $\hat{\beta}_i$, and $\hat{\gamma}$ from the regressions that in Table 1 include the same controls. The resulting slow-moving variable represents the institutions-related component of our countries' current account observations.

Imposing that institutional changes' relative weight is determined by estimating specification (16) on highly variable current account data sharpens the message of the data; allowing institutions to enter the specification individually typically yields coefficients that either have the same sign as those reported below, or are insignificant.

As regards consumption, our empirical exercise is related to that performed by Loayza, Schmidt-Hebbel, and Servén (2000), where growth and inflation (as a proxy for uncertainty) are included among the weakly exogenous explanatory variables of private saving rates. Both their and our specifications also control for demographic characteristics and government savings. We also view growth and uncertainty as key determinants of savings behavior, however we focus on developed countries and, crucially, suppose that income processes are in turn determined by institutional changes which, in our specifications, are directly related to consumption/output ratios. Our reform indicator is constructed so as to become more positive when deregulation increases labor market risk, to an extent that depends on financial market development. Thus, we expect it to be negatively associated with consumption in a sample where reforms tend to bring current accounts towards surplus positions. To see whether this is the case, we run

$$C/GDP_{jt} = \gamma_C Ref_{jt} + \mu_C C/GDP_{j,t-1} + Controls_{jt} + \varepsilon_{jt} \quad (18)$$

In these and the following regressions, the primary government balance is included for consistency with Table 1's regressions (and always enters with the expected sign when it is significant), and lagged dependent variables control for slow and persistent effects of reforms on the phenomena of interest. In light of evidence of rather high persistence, the dynamic biased-corrected panel data specifications may or may not offer a fully reliable assessment of statistical significance. The reforms indicator is also persistent, and we plan to investigate stationarity issues formally in further work. The first three columns of Table 4 confirm that structural reforms, as summarized by the composite institutional trends indicator that by construction maximizes correlation with current account balances, co-vary negatively (and significantly when country fixed effects are included) with consumption, as implied by precautionary savings motives.

Next, we use per capita production as the dependent variable, and run

$$GDPpc_{jt} = \gamma_Y Ref_{jt} + \mu_Y GDPpc_{j,t-1} + Controls_{jt} + \varepsilon_{jt},$$

aiming to assess the effects of institutional developments on relative production dynamics. Columns 4-6 show that the coefficient of our aggregate reform variable is significantly positive and robust to

the inclusion of fixed effects.[5] While in theory reforms could lead to higher risk and lower productivity for a given technological and market setting, because redistribution can offset market incompleteness and foster investment (as in Bertola, 2004), the negative effects of regulation on expected rewards from investment are empirically dominant.

The remaining element of current account dynamics (besides the government balance, controlled for in all regressions) is the country's investment rate. Our model only features worker mobility investments, but it would be straightforward to extend it to physical investments: since future income of non-labor factors in the model is higher in less regulated labor markets, endogenous supply of such factors would increase upon deregulation. To assess whether capital is indeed attracted to less regulated economies, we regress national income account measures of investment, available only for a subset of our panel's countries on our reforms indicators. Results from the specification

$$I/GDP_{jt} = \gamma_I Ref_{jt} + \mu_I I/GDP_{j,t-1} + Controls_{jt} + \varepsilon_{jt},$$

are reported in columns 7-9 of the Table. The coefficient of the summary reforms indicator is positive, indicating that deregulation is associated with more investment, but insignificant when country and time effects are included. Finding that our reform-trend indicator is more robustly related to country-level GDP growth than to physical investment corroborates our modeling framework's focus on labor mobility choices and is in line with Nicoletti and Scarpetta's (2003) results on the productivity effects of structural reforms; in future work, we plan to explore our reform indicator's relationship to total factor productivity data.

The results of Table 4 confirm that all components of the current account balance respond to reforms in ways consistent with our theoretical framework. Next, we seek more direct evidence of the risk-based mechanism that links reforms, especially when financial market access is limited, to lower rather than higher consumption.

In columns 1-3 of Table 5 we run regression specifications similar to those of Table 4 for a measure of within-country earnings inequality: the ratio of the 90th percentile of earnings to the median,[6] available at yearly frequency for the 1980-2000 period. If deregulation depresses aggregate

[5] GDP per capita is deflated by the Consumer Price Index, to stress the impact of structural reforms on domestic variables; using the GDP per capita measure based on PPP would slightly decrease the significant of the coefficient in the specification with no fixed effect only.

[6] The definition of earnings may be different across countries, in ways that may or may not be appropriately controlled by fixed effects. The regression needs to be run on net earnings, because taxes have different implications for gross and net wage inequality in Section 2's model. The source does not specify whether net or gross earnings are used in computing the indicator.

consumption because it increases idiosyncratic risk, at least part of its effects on income instability should be detectable in the dispersion of ex-post income levels. We run regressions in the form

$$Ineq_{jt} = \gamma_Q Ref_{jt} + \mu_Q Ineq_{j,t-1} + Controls_{jt} + \varepsilon_{jt}$$

Consistently with the results of Koeniger, Leonardi, and Nunziata (2007), and with our theoretical perspective, there is a significantly positive relationship between our current-account-based measure of deregulation trends and changes of country-specific earnings inequality. The unitary coefficient of lagged inequality in the pooled OLS regression of column 1 gives evidence of very high persistence; the dynamic panel data specifications of columns 2 and 3 offer a more reliable estimates. In columns 4 and 5 we explore the relationship between earnings inequality levels (controlling for country effects) and an indicator of institutional configuration levels obtained by cumulating country-specific reforms indicators: the regression, specified as

$$Ineq_{jt} = \gamma_Q \sum_{y=1980}^{t} Ref_{yj} + Controls_{jt} + \varepsilon_{jt}$$

confirms that our indicator is positively and significantly related to earnings inequality, even when controlling for year effects.

Finally, we assess whether the savings impact of reforms may work through variability of aggregate (rather than idiosyncratic) income. This is not theoretically sound and empirically plausible: the theory and evidence in Kent et al (2005) and their references suggest that flexibility-oriented reforms, including financial liberalization and indirect measures of labor market deregulation, have contributed to the "great moderation" of country-level output fluctuations over our sample period. In Table 5, columns 6-10 assess whether the same finding holds in our data, justifying our focus on within-country income distribution and idiosyncratic risk, rather than on responses to country-level shocks, as the channel through which deregulation influences precautionary motives.

As a standard measure of output instability we compute 5-year standard deviations of output growth, computed on the same non-overlapping windows as in Table 3. In columns 6-8 of Table 5 we document its relationship to reforms using the same specification as in Table 4, regressing the output instability measure on 5-year averaged observations of our summary indicator of reforms, computed on the basis of the estimates in the relevant columns of Table 3. Dynamic panel estimation does not detect any evidence of a significant relationship between reforms and output instability, controlling for the latter's lagged level. In columns 9 and 10, using the same specification as in columns 4 and 5, we find that the relationship between output instability and cumulative reform processes is negative, albeit insignificantly so when period effects are included.

This weak evidence of a negative relationship between reforms and aggregate output stability is consistent with the findings of Kent et al (2005): since deregulation seems to have fostered income stability at the aggregate level, precautionary savings by each country's representative agent (under perfect within-country risk-sharing) could not rationalize the positive relationship between current accounts and labor market flexibility.

5. Conclusion

Our regression results on a sample of 19 OECD countries observed over the 1980-2003 period offer an interesting gauge of the contrasting policy-relevant effects of institutional change on the overall level and distribution of income. In theory, institutions meant to reduce risk and even out earnings inequality also reduce production efficiency. In the data, efficiency-oriented reforms that improve expectations of productivity growth tend to bring current accounts into surplus, through the precautionary-savings effects of higher uninsurable risk, to an extent that depends on financial development.

A causal interpretation of regression results is admittedly difficult, because institutional and structural dynamics are not independent of each other. Institutional change could itself be explained by deeper theoretical considerations. In the data, reforms appear to be associated with stronger precautionary motives and faster production growth. These may be consistent with country-specific trajectories along a tradeoff between social insurance and production efficiency. The shape of any such tradeoff is hard to gauge, because not all institutional evolution is exogenous: the exogenous changes that trigger reforms may also influence risk and productivity for given policies, rather than political preferences along the risk/productivity tradeoff.

To the extent that changes in the environment are common across countries, it is particularly interesting to find that inserting time effects in our preferred specification with country effects leaves all results unaffected, and actually increases the significance of the regression coefficients. This indicates that country specific policy deviations drive the results, and may in turn reflect political shocks along the tradeoff. Further work could explore the exogenous component of international openness as a plausible shifter of the environment in which policy is made, along the lines of Bertola and Lo Prete (2009). Trade liberalization may make financial reform more beneficial and politically sustainable. trigger politico-economic mechanisms that facilitate financial liberalization, and find evidence of such effects in a novel database of de jure institutional

indicators. In the data, trade liberalization predates deregulation of both internal and external financial relationships (external and internal aspects are not empirically sequenced).

The one we propose is not the only possible and plausible interpretation of the empirical relationships we detect. As regards theoretical channels, for example, increasingly flexible market relationships may shift purchasing power towards individuals with higher saving propensities. Empirically, we treat reforms as exogenous processes, but they may of course be shaped by their own impact on economic variables, or be a more or less predictable consequence of deeper changes. And our focus on linear (aside from interpretable interaction effects) regression specifications neglects other nonlinearities, such as the possible threshold effects of financial and other reforms (Kose et al, 2006). While it does not appear possible reliably to detect and disentangle such high-order mechanisms in the data, the relationships we uncover between imperfectly synchronized reforms, net income inequality, and aggregate investment and growth rates may have contributed to the development of global imbalances. The recent financial crisis has undoubtedly reduced ease of borrowing, and may well trigger some re-regulation of labor and product markets. Extrapolating our results, countries engaged in such institutional restructuring should experience larger *ceteris paribus* current account deficits and slower growth. This could, in combination with possibly restricted international economic integration, help interpret the evolution of the global economy in coming years.

REFERENCES

Agell, Jonas (2002). "On the Determinants of Labor Market Institutions: Rent Seeking vs Social Insurance," *German Economic Review,* 3:2, 107-135.

Bassanini, Andrea, and Romain Duval (2009). "Unemployment, Institutions and Reform Complementarities: Re-Assessing the Aggregate Evidence for OECD Countries," *draft*, January.

Bertola, Giuseppe (2004) "A pure theory of Job Security and Labor Income Risk," *Review of Economic Studies*, 71:1 43-61

Bertola, Giuseppe, and Anna Lo Prete (2009) "Openness, Financial Markets, and Policies: Cross-Country and Dynamic Patterns," *Annales d'Economie et de Statistique* forthcoming, *CEPR DP 7048*.

Bertola, Giuseppe, and Winfried Koeniger (2007). "Consumption Smoothing and Income Redistribution," *European Economic Review,* 51:8, 1941-1958.

Blanchard, Olivier, and Justin Wolfers (2000). "The Role of Shocks and Institutions in the Rise of European Unemployment: The Aggregate Evidence," *The Economic Journal,* 110, C1-C33.

Broer, Tobias (2008) Domestic or global imbalances? Rising inequality and the fall in the US current account, working paper, European University Institute.

Buti, Marco, Alessandro Turrini, Paul Van den Noord, and Pietro Biroli (2008). "Defying the 'Juncker Curse': Can Reformist Governments Be Re-elected?," *European Commission Economic Papers 324*.

Calderon, Cesar Augusto, Alberto Chong, and Norman V. Loayza (2002). "Determinants of Current Account Deficits in Developing Countries," *Contributions to Macroeconomics*, 2:1, 1-31.

Carlin, Wendy and David Soskice (2007). "Reforms, Macroeconomic Policy and Economic Performance in Germany," *CEPR DP 6415.*

Catte, P., Girouard, N., Price, R., Andrè, C. (2004). "The Contribution of Housing Markets to Cyclical Resilience," *OECD Economic Study* 38.

Chinn, Menzie D., and Eswar S. Prasad (2003). "Medium-term determinants of current accounts in industrial and developing countries: an empirical exploration," *Journal of International Economics*, 59, 47-76.

Debelle, Guy, and Hamid Faruqee (1996). "What Determines the Current Account? A Cross-Sectional and Panel Approach," *IMF Working Paper 96/58*, June.

Duval, Romain (2008) "Is there a role for macroeconomic policy in fostering structural reforms? Panel evidence from OECD countries over the past two decades" *European Journal of Political Economy* 24, 491–502.

Jappelli, Tullio, and Marco Pagano (1994). "Savings, Growth, and Liquidity Constraints," *Quarterly Journal of Economics,* 109, 83-109.

Kennedy, Mike, and Torsten Slok (2005). "Structural Policy Reforms and External Imbalances," *OECD Economics Department Working Papers 415*.

Kent, Christopher, Kylie Smith and James Holloway (2005) "Declining Output Volatility: What Role for Structural Change?" p.146-180 in C.Kent and D.Norman (eds.) *The Changing Nature of the Business Cycle*, Reserve Bank of Australia, 2005.

Kocherlakota, Narayana, and Luigi Pistaferri (2007) "Household Heterogeneity and Real Exchange Rates" Economic Journal 117 pp.C1-C25.

Koeniger, Winfried, Marco Leonardi and Luca Nunziata (2007). "Labour Market Institutions and Wage Inequality," *Industrial and Labor Relations Review*, 60:3, 340-356.

Kollman, Robert (2009) "Household Heterogeneity and the Real Exchange Rate: Still a puzzle" CEPR DP 7301

Kose, M. A., E. S. Prasad, K. Rogoff, and S.-J. Wei (2006). "Financial globalization: A reappraisal," *NBER Working Paper 12484*.

Krueger, Dirk and Fabrizio Perri (2007) "Does Income Inequality Lead to Consumption Inequality? Evidence and Theory" Review of Economic Studies 73 pp.163-193

Lane, Philip R., and Gian Maria Milesi-Ferretti (2006). "The External Wealth of Nations Mark II: Revised and Extended Estimates of Foreign Assets and Liabilities, 1970-2004," *IMF Working Paper* 06/69.

Lo Prete, Anna (2008). "International Consumption Insurance and Within-Country Risk Reallocation," *EUI Working Papers MWP 2008/03*.

Loayza, Norman, Klaus Schmidt-Hebbel, Luis Servén (2000) "What Drives Private Saving Across the World?" The Review of Economics and Statistics, 82: 2

Mendoza, Enrique G., Vincenzo Quadrini, and José-Víctor Ríos-Rull (2007) "On the Social Costs of Financial Globalization without Financial Development," NBER Working Paper No. W13412 Abiad, Abdul, Daniel Leigh, and Ashoka Mody (2009). "International Finance and Income Convergence: Europe is different," *Economic Policy,* 58 241-305.

Nicoletti, Giuseppe, and Stefano Scarpetta (2003). "Regulation, Productivity, and Growth," *Economic Policy* pp. 9–72.

Obstfeld, Maurice (1982). "Aggregate Spending and the Terms of Trade: Is There a Laursen-Metzler Effect?," *Quarterly Journal of Economics,* 97, May, 251-270.

OECD (1994). "*The OECD Jobs Study: Evidence and Explanations*," Paris: OECD.

Razin, A. (1995). "The Dynamic-Optimization Approach to the Current Account: Theory and Evidence," in P. Kenen (eds.) *Understanding Interdependence: The Macroeconomics of the Open Economy*, NJ: Princeton.

DATA APPENDIX

The dataset compiled for this paper includes structural reform indicators and macroeconomic variables for 19 OECD countries, from 1981 to 2003. The countries in the sample are: Australia, Belgium, Canada, Denmark, Finland, France, Germany, Ireland, Italy, Japan, Netherlands, New Zealand, Norway, Portugal , Spain, Sweden , United Kingdom, United States.

Structural Reform Variables. Information on the evolution of labour market institutions and tax rates is drawn from the CEP-OECD Institutions Data Set, compiled by LSE (issue: September 2006). Reform variables are computed as the annual change in the institutional indicators of interest, and measured so that an increase in the rate of change is associated with more efficiency and more individual income risk.

Employment Protection Legislation ("epl" in the CEP-OECD database). The EPL indicator indexes the strictness of mandatory measures that regulate hiring and firing. Its time series is built on the basis of data from the OECD labour market statistics database and from Blanchard and Wolfers (2000), interpolated and readjusted in mean.
Trade Union Density ("udnet_vis" in the CEP-OECD database). Union density is computed as the percentage of wage-earners who are members of trade unions. Values refer to administrative and survey information available in the OECD labour market statistics database, where administrative information for the EU countries refers to the so-called Visser's version.
Marginal Tax Rates ("sing1a" "sing2a" "sing3a" sing4a" in the CEP-OECD database). Data on taxation are from the OECD Taxing Wage Statistics and from the series computed by Faggio and Bentil. The marginal tax rate series in this dataset is computed as the un-weighted average of tax rates paid by a single person on the basis of "total tax payment less cash transfers" rates over four family types.

Financial Development Indicators. Financial development indicators, in level, are computed as deviations from the sample average.

Loan-to-Value ratios. Data refer to the maximum LTV ratios, reported by the OECD Economic Study by Catte et al. (2004), Jappelli and Pagano (1994), and various sources adding information on countries not accounted for by the OECD, namely: Canada (Canada Mortgage and Housing Corporation), Japan (Standard & Poor's Reports), and the USA (Millennial Housing Commission). The time series is built on authors' calculation according to the following compilation strategy: when yearly observations were missing, data have been interpolated; when data referred to a 5 (or more) sub-period average, the average value has been assigned to the mid year in the sub-period, and then interpolated; for years before (after) the first (last) observation available no change has been assumed, thus assigning the value recorded in the first (last) year of observation back (up) to all years since the starting (ending) point in the dataset.
Financial Openness. This indicator corresponds to the gross stocks of foreign portfolio assets plus liability ratio to GDP, based on data by Lane and Milesi-Ferretti (2006).

Control Variables. The macroeconomic variables included as controls are drawn by the IMF World Economic Outlook (IMF-WEO), April 2008 issue, and by the World Bank's World Development Indicators online database (WB-WDI), issue 2007.

Government Balance/GDP. General government balance as a percentage of GDP ("gbal" in the IMF-WEO database).
Terms of Trade. Annual change in Terms of Trade ("tot" in the WB-WDI database).
Real Effective Exchange Rate. Annual change in real effective exchange rate index ("ree" in WB-WDI database).
Demographics. Dependency ratios are computed as deviations from the sample average, on the basis of the percentage of total population that ages between 0 and 14 and that ages 65 or more ("d14r" and "d65r" in the WB-WDI database)

Relative GDP per capita. Data are computed in relative terms with respect to the sample average, on the basis of the Gross domestic product based on PPP per capita GDP ("pgdp" in the IMF-WEO database).

Variables in Table3. The macroeconomic variables included as controls are drawn from several data sources.

Consumption share of GDP. Household final consumption expenditure, in current local currency units ("hhc" in the WB-WDI database), divided by Population ("pop" in Penn World Tables 6.2 database), as a share of Gross domestic product per capita, in current prices ("gdp" in the IMF-WEO database).
GDP per capita, based on CPI. Gross domestic product per capita, in current prices ("gdp" in the IMF-WEO database), deflated by CPI, data for inflation being averages for the year, based on 2000=100 ("cpi" in the IMF-WEO database).
Investment share of GDP. Investment, percent of GDP ("invgdp" in the WB-WDI database).
Inequality. Earnings dispersion measured as the ratio of the 90^{th} percentile of earnings to the median ("ed90/50" in the CEP-OECD database, based on data from the OECD labour market statistics database, available for 1980-2000).

Table 1. Structural Reforms and the Current Account

Dependent variable: Current Account/GDP	1	2	3	4
Structural Reform Variables				
Employment Protection	4.1869	4.0018	1.9090	1.8585
	2.96	*3.45*	*1.42*	*1.54*
Trade Union Density	2.3145	6.2827	1.6599	6.0206
	1.10	*2.41*	*0.83*	*2.33*
Marginal Tax Rate	1.8438	1.4618	1.3089	1.2318
	2.24	*1.63*	*1.26*	*1.43*
Main effect of Financial Development	0.3268	2.2694	0.2972	2.1451
	2.55	*7.39*	*0.84*	*5.10*
Financial Development interaction				
Relative LTV	-0.0878	-0.0551	-0.1005	-0.0622
	-4.48	*-6.76*	*-1.83*	*-6.61*
Control Variables				
Government Balance/GDP	0.3218	0.2622	0.3239	0.2589
	6.03	*5.22*	*5.49*	*4.89*
Country effects	no	yes	no	yes
Period effects	no	no	yes	yes
Number of observations	393	393	393	393
R2	0.1778	0.5139	0.2940	0.6158

Notes: Robust t-statistic in italics.

Table 2. Extended specification

Dependent variable: Current Account/GDP	External and demographics controls			Financial Openness			Relative income level		
	1	2	3	4	5	6	7	8	9
Structural Reform Variables									
Employment Protection	3.0549	2.7694	1.4284	2.2188	1.8868	0.9656	3.2972	2.8900	1.4877
	2.40	*2.76*	*1.24*	*2.57*	*2.71*	*1.24*	*2.67*	*2.76*	*1.26*
Trade Union Density	1.8948	5.3243	5.8918	1.3618	3.6209	3.9481	2.9520	5.5974	5.9965
	0.95	*2.61*	*2.60*	*1.06*	*2.54*	*2.52*	*1.63*	*2.79*	*2.63*
Marginal Tax Rate	1.0441	0.0695	0.3384	0.7054	0.0541	0.2005	1.0357	0.0623	0.3428
	1.02	*0.07*	*0.34*	*1.05*	*0.08*	*0.29*	*1.09*	*0.06*	*0.33*
Main effect of Financial Development	0.5467	3.3469	3.1014	0.3609	2.2613	2.1474	0.3940	3.2544	3.0938
	3.80	*12.55*	*6.16*	*3.77*	*11.99*	*6.23*	*2.72*	*11.89*	*6.14*
Financial Development interaction									
Relative LTV	-0.0788	-0.0426	-0.0462	-0.0955	-0.0554	-0.0596	-0.0871	-0.0406	-0.0451
	-5.04	*-6.33*	*-5.80*	*-5.54*	*-6.30*	*-6.18*	*-4.42*	*-6.24*	*-6.10*
Relative financial openness				-0.0536	-0.2686	-0.2914			
				-0.04	*-0.57*	*-0.62*			
Control Variables									
Government Balance/GDP	0.3921	0.2089	0.2596	0.3961	0.2155	0.2752	0.3199	0.1968	0.2568
	7.11	*3.94*	*3.83*	*6.99*	*4.09*	*3.98*	*5.99*	*3.84*	*3.81*
Terms of Trade	8.4897	6.2027	6.0258	8.6068	6.3854	6.1448	8.6867	6.1165	5.9757
	2.82	*1.89*	*1.81*	*2.86*	*1.96*	*1.86*	*2.84*	*1.93*	*1.82*
Real Effective Exchange Rate	-2.3400	-0.7036	0.8315	-2.2755	-0.6542	0.7666	-1.8671	-0.7084	0.7992
	-0.79	*-0.27*	*0.32*	*-0.77*	*-0.26*	*0.30*	*-0.61*	*-0.27*	*0.31*
Demographics	-0.1975	-0.0679	0.0940	-0.2030	-0.1763	-0.0144	-0.1739	0.0147	0.1247
	-1.89	*-0.47*	*0.64*	*-1.94*	*-0.97*	*-0.08*	*-1.65*	*0.08*	*0.66*
Relative GDP level per capita							0.0002	0.0002	0.0001
							2.57	*1.21*	*0.46*
Country effects	no	yes	yes	no	yes	yes	no	yes	yes
Period effects	no	no	yes	no	no	yes	no	no	yes
Number of observations	296	296	296	296	296	296	296	296	296
R2	0.2596	0.6010	0.6640	0.2580	0.5958	0.6603	0.2855	0.6052	0.6646

Notes: Robust t-statistic in italics.

Table 3. Robustness checks

Dependent variable: Current Account/GDP	Country-specific reform patterns			5-year subperiods		
	1	2	3	4	5	6
Structural Reform Variables						
Employment Protection	11.2251	26.6421	12.3273	11.1985	13.0301	9.8117
	0.67	*0.65*	*1.03*	*1.80*	*2.59*	*1.88*
Trade Union Density	-98.5468	38.4479	23.2117	4.6333	11.3563	14.8903
	-0.84	*0.64*	*0.97*	*1.00*	*1.58*	*2.00*
Marginal Tax Rate	29.9205	14.2442	7.3300	9.7137	6.4540	5.4145
	0.82	*0.63*	*0.95*	*1.77*	*1.65*	*1.47*
Main effect of Financial Development	12.8337	13.6058	7.7258	0.5097	2.5391	2.0408
	0.85	*0.75*	*1.37*	*1.94*	*5.12*	*3.21*
Financial Development interaction						
Relative LTV	-0.0161	-0.0128	-0.0228	-0.0659	-0.0573	-0.0678
	-0.83	*-0.75*	*-1.44*	*-1.83*	*-4.11*	*-4.60*
Country effects	yes	yes	yes	no	no	no
Control Variables						
Government Balance/GDP	0.2576	0.2466	0.2491	0.3939	0.3668	0.3379
	5.68	*4.64*	*4.48*	*3.23*	*3.12*	*2.58*
Country effects	no	yes	yes	no	yes	yes
Period effects	no	no	yes	no	no	yes
Number of observations	393	393	393	85	85	85
R2	0.5325	0.5934	0.6815	0.2877	0.6963	0.7316

Notes: Robust t-statistic in italics.

Table 4. Relationship of reforms to consumption, growth, and investment

Dependent variable:	Consumption/GDP			GDP per capita, based on CPI			Investment/GDP		
	1	2	3	4	5	6	7	8	9
Summary Reforms indicator from CA/GDP regressions	-0.1588 *-0.47*	-2.0914 *-2.43*	-1.5074 *-1.65*	24.5677 *3.52*	44.2564 *2.25*	52.4439 *2.48*	0.1393 *2.05*	0.5174 *1.76*	0.0966 *0.38*
Lagged values of dep. variable									
Consumption/GDP, lagged	0.9901 *90.87*	0.9346 *49.35*	0.9566 *49.73*						
GDP per capita, lagged				1.0119 *220.93*	0.9371 *71.41*	0.9439 *68.05*			
Investment/GDP, lagged							0.8977 *33.55*	0.7728 *15.92*	0.7382 *11.53*
Control Variables									
Government Balance/GDP	-0.1044 *-0.54*	-0.3654 *-3.23*	-0.1385 *-1.03*	8.2984 *3.59*	10.7915 *4.61*	15.2277 *5.25*	0.1152 *3.54*	0.1265 *4.49*	0.1414 *4.92*
Country effects	no	yes	yes	no	yes	yes	no	yes	yes
Period effects	no	no	yes	no	no	yes	no	no	yes
Number of observations	375	375	375	375	375	375	150	150	150

Notes: T-statistic, in italics, are computed on the basis of robust standard errors when using the pooled-OLS estimator (in columns 1, 4, 7), and bootstrap standard errors when using the bias corrected LSDV dynamic panel data estimator (in the remaining columns).
The "Summary reforms indicator" is computed on the basis of the estimates of: Table 1 column (1) in columns (1), (4), and (7); Table 1 column (2) in the specifications including country effects; Table 1 column (4) in the specifications including country and period effects.

Table 5. Relationship between reforms, earnings inequality, and output stability

Dependent variable:	Earnings inequality					5-year standard deviation of output growth				
	1	2	3	4	5	6	7	8	9	10
Summary Reforms indicator from CA/GDP regressions	0.0047 *2.14*	0.0089 *1.63*	0.0106 *1.73*			0.0005 *0.40*	-0.0007 *-0.31*	0.0013 *0.70*		
Summary Reforms indicator, cumulated				0.0020 *10.12*	0.0023 *2.11*				-0.0006 *-2.88*	-0.0002 *-0.51*
Lagged values of dep. variable										
Inequality , lagged	1.0179 *46.27*	0.8068 *13.60*	0.6842 *9.09*							
Output instability, lagged						0.0711 *0.93*	0.0645 *0.69*	0.2231 *2.38*		
Control Variables										
Government Balance/GDP	-0.0001 *-0.23*	0.0009 *1.20*	0.0007 *0.76*	0.0035 *4.01*	0.0019 *0.45*	0.0010 *1.42*	0.0001 *0.15*	0.0007 *1.39*	0.0003 *0.40*	0.0005 *0.63*
Country effects	no	yes	yes	yes	yes	no	yes	yes	yes	yes
Period effects	no	no	yes	no	yes	no	no	yes	no	yes
Number of observations	163	163	163	194	194	66	66	66	85	85

Notes: T-statistic, in italics, are computed on the basis of robust standard errors when using the pooled-OLS estimator (in columns 1 and 6) and FE estimator (in columns 4, 5, 9 and 10), bootstrap standard errors when using the bias corrected LSDV dynamic panel data estimator (in columns 2, 3, 7 and 8).
The "Summary reforms indicator" is computed on the basis of the estimates of: Table 1 column (1) in columns (1) and (6); Table 1 column (2) in the specifications including country effects; Table 1 column (4) in the specifications including country and period effects.