Endogenous financial and trade openness: efficiency and political economy considerations[*]

by Joshua Aizenman and Ilan Noy

First version: April 2004
This version: January 2005[**]

This paper studies the endogenous determination of financial and trade openness. First, we outline channels leading to two-way feedbacks between the different modes of openness; next, we identify these feedbacks empirically. We find that one standard deviation increase in commercial openness is associated with a 9.5 percent increase in de-facto financial openness (% of GDP), controlling for political economy and macroeconomic factors. Similarly, increase in de-facto financial openness has powerful effects on future trade openness. While *de-jure* restrictions on capital mobility do not impact *de-facto* financial openness, *de-jure* restrictions on the current account have large adverse effect on commercial openness, suggesting that it is much easier to overcome restrictions on capital account convertibility than restrictions on commercial trade. Having established (Granger) causality, we investigate the relative magnitudes of these directions of causality using the decomposition test developed in Geweke (1982). We find that almost all of the linear feedback between trade and financial openness can be accounted for by G-causality from financial openness to trade openness (53%) and from trade to financial openness (34%). The residual is due to simultaneous correlation between the two measures.

Joshua Aizenman
Economics Department and the NBER
E2 building, 1156 High St.
UC Santa Cruz
Santa Cruz, CA 95064
jaizen@ucsc.edu

Ilan Noy
Economics Department
Saunders Hall 542, 2424 Maile Way
University of Hawaii, Manoa
Honolulu, HI 96822
noy@hawaii.edu

JEL Classification: F15, F21, F36, H21
Keywords: financial openness, trade openness, financial repression, political competition

[*] We would like to thank Michael Hutchison, Nancy Marion and Shang-Jin Wei for sharing their data. We would also like to thank for useful comments we received from Micha Ben-Gad, Benny Bental, Carl Bonham, Mike Dooley, Hadi Salehi Esfahani, Doireann Fitzgerald, Byron Gangnes, Charles Kahn, Ken Kletzer, Xenia Matschke, Richard Portes, Aaron Tornell, Donald Wittman, Ari van Asche and seminar participants at the Hebrew University of Jerusalem, UCSC, UCLA, University of Haifa, University of Illinois (Urbana-Champaign), University of Hawaii, Tel Aviv University, and University of Washington. Any errors are ours.
[**] This paper integrates and updates results reported previously in NBER Working papers # 10144 and 10496.

1. Introduction and overview

Salient features of the international economy during the last twenty years are the growing financial and commercial integrations of developing countries and recurring financial crises. These developments have led to contentious debates regarding the desirability of financial openness. Prominent economists have concluded that the gains from financial integration are illusive and caution developing countries against rushing towards financial openness (e.g. Rodrik, 1999, and Stiglitz, 2002). Yet, other studies have provided tentative support for the presence of significant gains from financial openness (e.g. Bekaert et. al., 2002, and Henry, 2003).[1] These studies frequently focus on the formal acts associated with *de-jure* financial opening, such as changing regulations and the attitude of the central bank and the treasury to financial flows. Yet, as has been noted by Prasad, Rogoff, Wei and Kose (2003), *de-facto* financial integration is, by itself, of considerable interest. Indeed, the actual level of financial openness (measured by the sum of gross private capital inflows and outflows) is the outcome of the interaction between market forces and the enforcement of existing regulations.

Our paper applies the distinction between *de-facto* and *de-jure* openness outlined above in a new context: we study the two-way feedbacks between *de-facto* financial and trade openness, and also investigate the residual role of *de-jure* openness. After reviewing models explaining the feedbacks between financial and trade openness, we show that *de-facto* financial openness (measured by the sum of gross private capital inflows and outflows as percent of GDP) depends positively on lagged trade openness, controlling for macroeconomic and political economy factors. Next, we confirm that *de-facto* trade openness depends positively on lagged financial openness, using similar controls. Interestingly, policies impacts commercial openness more than financial one; *de-jure* restrictions on the current account have large adverse effect on commercial openness, whereas *de-jure* restrictions on capital mobility do not impact *de-facto* financial openness.

[1] In contrast with this debate, most economists agree that the gains from trade integration are significant. For a recent attempt to measure these gains see Lee et al. (2004).

Having empirically established (Granger) causality between the measures of *de-facto* openness, we investigate the relative magnitudes of these causality channels using the decomposition test developed in Geweke (1982). Most of the linear feedback between trade and financial openness can be accounted for by Granger-causality from financial openness to trade openness and from trade to financial openness. Simultaneous correlation in annual data between the two series accounts for only a small fraction of the total linear feedback between the two series.

In Section 2 we outline two polar models where financial openness is determined endogenously. The first case describes a representative agent, public finance model of a developing country where the benevolent authorities finance a given fiscal outlay by means of distortionary taxes. The second case models a scenario where authorities pursue an opportunistic policy representing the interest of a narrow pressure group that faces political uncertainty. Interestingly, the two models provide similar predictions about the links between commercial openness, political economy factors and de-facto financial openness.

In the public finance model, financial openness is endogenously determined by the authority's choice of financial repression, and the private sector determines endogenously the magnitude of capital flight. Capital flight is intermediated via trade mis-invoicing, and exposes agents to the risk of interception and ultimately, confiscation of funds.[2] Agents view this risk as exogenous, and determine their optimal portfolio by weighing the gain from the higher interest rate on offshore deposits against the risk of confiscation. We characterize the optimal portfolio as a function of the attitude towards risk, the probability of capital flight interception, and the relevant interest rates. While the probability of intercepting capital flight is exogenous for the atomistic agent, it is endogenously determined by policies and the economic structure. Specifically, greater trade openness would make it easier to intermediate a given volume of capital flight. Hence, the probability of intercepting capital flight of a representative agent increases

[2] See Giovannini and de Melo (1993) for documenting and measuring financial repression as an implicit tax on savings, and Kletzer and Kohli (2003) for analysis of the fiscal implications of financial repression in India. See Dooley (1988), Tornell and Velasco, (1992), and Dooley and Kletzer (1994) on capital flight as a mean of political economy risk diversification. See Dooley (1996) for an overview of financial controls; and Claessens and Naudé (1993) and Boyce and Ndikumana (2001) for discussions on trade mis-invoicing and capital flight.

with the resources spent on enforcement relative to the trade openness, and declines with the magnitude of the aggregate capital flight.

The problem facing the fiscal authorities is to fund given fiscal outlays on public goods relaying on two types of taxes: income tax, and financial repression. Both taxes are costly: income tax is associated with collection costs, and enforcing financial repression requires direct expenditure on monitoring and policing trade invoices. We show that financial repression characterizes countries that are below a certain threshold of fiscal efficiency – high enough cost of tax collection would induce the implementation of financial repression as a means of taxation. In these circumstances, higher tax collection costs, higher fiscal expenditure and lower commercial openness would increase the "optimal" financial repression.

Applying the insight of Cukierman, et al. (1992), we expect that the cost of tax collection itself is endogenously determined. Functioning democracies will tend to have more efficient tax collection systems, and thus tend to be associated with lower capital flight. Similarly, we expect less polarized societies and those in which conflicts are solved peacefully within the political system to have more efficient tax collection mechanisms in place, reducing capital flight motivated by tax evasion and/or opportunistic behavior, looting, etc. This insight guides partly our use of political variables in the empirical section.

We close Section 2 with the polar case, corresponding to high degrees of opportunism and political uncertainty, and with a discussion of the impact of financial openness on trade openness. Here, first period policies are determined by a policy maker representing a narrow interest group that is facing political uncertainty. Specifically, we consider the case where the policy maker controls foreign exchange income from exporting a natural resource in the first period, and faces an uncertain future horizon. In these circumstances, his second period consumption would be partly determined by the income from first period savings, conveniently put offshore, beyond the control of the future regime. Second period output of the natural resource is impacted by the tangible investment in the extraction of the resource. Such an investment can be financed by the income controlled by the present policy maker. We illustrate that with opportunistic

behavior, the combination of policy uncertainty and polarization would lead to greater *de-facto* financial openness.

In section 3 we examine empirically some of the hypotheses suggested by our models. We estimate the level of *de facto* financial openness as a function of lagged trade openness, several macroeconomic control variables, and a vector of political-institutional variables. We apply a two-step FGLS procedure for a panel of developing and OECD countries for the years 1982-1998 using annual observations (the sample size was determined by the availability of data and by excluding off-shore financial centers). We find that de-facto financial openness depends positively on lagged trade openness, and GDP/Capita. The budget surplus to GDP ratio is occasionally significant and always negative for developing countries, but positive and significant for the OECD countries. Including the corruption variable in our regressions also yields negative and significant coefficients in almost all the iterations of the model we examined, confirming Wei's (2000) insight. For the full sample (developing and the OECD) and the developing countries sub-samples, the effect of greater democratization is negative, significant and apparently large. Any one-point increase in this index (out of the 20 points difference between full autocracy and democracy) reduces financial openness (international financial flows) by almost a one-half percentage point of GDP. The effect is about half as large when we do not control for the level of corruption.

We further investigate the political-economy nature of financial openness by replacing the democracy/autocracy (regime) variable with two others: a measure of political competition and an index of government fractionalization. For the political competition variable, we find that increased institutionalized competition within the polity decreases financial openness. As we observed before, this effect is more perceptible and significant once corruption is controlled for as well. We also find that the more a government is fractionalized (the ruling coalition includes more political parties), the higher is financial openness.

The empirical results reported above suggest *de-facto* sequencing, where greater *de-facto* trade openness is associated with larger future *de-facto* financial openness. The reverse association -- from financial openness to greater trade openness -- may hold due to different channels that are briefly discussed later. Hence, we expect to find two-way

positive linkages between financial and commercial openness and confirm these predictions empirically. Having established (Granger) causality, we investigate the relative magnitudes of these directions of causality using the decomposition test developed in Geweke (1982). We find that almost all of the linear feedback between trade and financial openness can be accounted for by G-causality from financial openness to trade openness (53%) and from trade to financial openness (34%). The residual is due to simultaneous correlation between the two annual measures.

Our present findings are consistent with the notion that a significant share of the volume of financial flows to and from developing countries are due to diversification of political risk, as advocated by Dooley (1988). This interpretation may provide an additional explanation for our finding concerning the negative marginal association of democracy and financial openness. This finding also suggests that the 'home bias' in the allocation of financial assets identified by the financial literature (dealing mostly with the OECD countries) may be less pronounced in developing countries – i.e. it may be attenuated by political risk considerations affecting some developing countries. An alternative interpretation, however, is that more democratic countries are also associated with better institutions, and thereby with higher marginal productivity of capital, thus reducing the incentive to buy foreign assets. This argument suggests that the political economy and efficiency aspects of the governing polity, and the quality of its institutions, deserve more careful investigation. All these issues are left for future research. Section 4 concludes the paper with further interpretive remarks.

2. The model

We consider two polar versions of models where financial openness is determined endogenously. The first is a representative agent model, of a developing country where the benevolent authorities finance a given fiscal outlay by means of distortionary taxes. The second is the case where authorities pursue an opportunistic policy representing the interest of a narrow pressure group that engages in capital flight due to political uncertainty.

2.1 The public finance model

The utility of the representative consumer, i, is given by[3]

$$(1) \qquad V_i = u(C_{1,i}) + \frac{u(C_{2,i})}{1+\rho},$$

where C is the consumption of the domestic good. The production of the home good uses domestic and foreign traded inputs:

$$(2) \qquad kX^{\alpha}Y^{\beta} \qquad ; \qquad 0 < \alpha, \beta, \quad \alpha + \beta = 1,$$

and k is a normalization factor, $k = \frac{1}{\alpha^{1-\alpha}\beta^{\beta}}$. To simplify, we normalize the prices of both the domestic and the foreign inputs to one. The representative consumer starts period 1 with past savings of $\overline{S}_{i,-1}(1+r_{-1})$. At the beginning of each period, the representative consumer is endowed with $\overline{X}_i$ units of the domestic input. The aggregate endowment is denoted by $\overline{X}$,

$$(3) \qquad \overline{X} = \sum_i \overline{X}_i .$$

The Cobb-Douglas production (2) implies that aggregate imports are

$$(4) \qquad \beta C$$

The fiscal authorities tax the endowment $\overline{X}$ and the interest rate income a rate t. The consumer allocates savings between domestic and foreign bonds, S and F, respectively, such that

$$(5) \qquad C_{1,i} = \overline{X}_i(1-t) + S_{0,i}[1 + (1-t)r_0] - S_i - F_i ,$$

where $S_{0,i}$ is savings in period zero, yielding interest rate r_0. The fiscal authorities impose capital control, leading to random interception of illicit capital flight. Let ϕ denote the probability of intercepting agent *i's* illicit capital flight, leading to confiscation. Hence, the second period consumption is contingent on the success (*s*) or failure (*f*) of capital flight:

---

[3] The present model extends Aizenman and Guidotti (1994), by allowing the endogenous linkage between commercial and financial openness, in circumstances where capital flight is subject to stochastic confiscation.

$$(6)\quad C_{2,i}=\begin{cases} C_{2,i}^{s}=(1-t)\overline{X}_i+S_i(1+r(1-t))+F_i(1+r^*) & \textit{with probability } 1-\phi \\ C_{2,i}^{f}=(1-t)\overline{X}_i+S_i(1+r(1-t)) & \textit{with probability } \phi \end{cases}.$$

2.2 Consumer's optimization

The allocation problem of the representative consumer is summarized by

$$(7)\quad \underset{S,F}{MAX}\ E\left[u(C_{1,i})+\frac{(1-\phi)u(C_{2,i}^{s})+\phi u(C_{2,i}^{f})}{1+\rho}\right],$$

Each consumer is small, thereby treating as exogenous the probability of capital flight interception. The first order conditions associated with optimal domestic and foreign savings are

$$(8)\quad u'(C_1)=\frac{(1-\phi)(1+r^*)}{1+\rho}u'(C_{2,s});$$

$$(9)\quad u'(C_1)=\frac{1+r(1-t)}{1+\rho}\left[(1-\phi)u'(C_{2,s})+\phi u'(C_{2,f})\right]$$

Applying (8) and (9), the equilibrium spread between the foreign and the domestic interest rates facing the consumer is:

$$(10)\quad \frac{r^*-r(1-t)}{1+r^*}=\phi\frac{\Omega}{1-\phi+\phi\Omega}\qquad \text{where}\ \ \Omega=\frac{u'(C_{2,i}^{f})}{u'(C_{2,i}^{s})}\ .$$

The premium between the foreign and the domestic after-tax real interest rates compensates for the probability of intercepting the illicit capital flight, ϕ, at a rate reflecting the consumer's attitude towards risk.[4] Henceforth we use ϕ as a measure of the *de-facto* financial repression. Applying the first order conditions (8) and (9), it can be verified that $\frac{dF_i}{d\phi}<0$ and $\frac{dF_i}{dt}>0$ -- higher financial repression ϕ and lower tax rate t reduce the expected yield on offshore saving, reducing capital flight.

---

[4] The term Ω is the ratio of the marginal utility of consumption in the case when the illicit capital is intercepted, relative to the case when the authorities fail to intercept. The premium increases with the probability of interception, and with the degree of risk aversion.

2.3 Endogenous enforcement

While the private agent views the probability of intercepting capital flight as given, the actual value is determined by the fiscal resources spent on enforcing capital controls, and by other macro variables impacting the efficacy of these controls.[5] We assume ϕ to depend positively on the ratio of resources spent on enforcement relative to the capacity to engage in illicit capital flows. Specifically, we denote by τ the fraction of endowment spent by the fiscal authorities enforcing capital controls. The experience of developing countries has illustrated that exports under-invoicing and imports over-invoicing have been important channels facilitating capital flight. In these circumstances, intermediating a given volume of capital flight would be easier in countries that are more open to international trade. Recalling that imports are proportional to β, we assume ϕ to depend positively on the enforcement/import rate, τ / β. We summarize the assumptions in a reduced form

(11) $\phi = \phi\left[\frac{\tau}{\beta}, F\right]$; $\phi_1^{'} > 0$; $\phi_2^{'} < 0; \phi_{1,1}^{''} < 0; \phi_{1,2}^{''} < 0$; where F is the aggregate capital flight [i.e., $F = \sum_i F_i$]. Higher capital flight implies fewer resources devoted to supervision per unit of capital flight, reducing the probability of intercepting a dollar of capital flight [though the total confiscation $F\phi$ would increase].

The enforcement of income and interest rate taxes is associated with collection cost λ per one dollar of gross taxes, implying that the net tax collected by a tax t is $(1-\lambda)t$. The fiscal budget constraint in period one is:

(12) $t(1-\lambda)[\overline{X} + S_{-1}r_{-1}] + S = G + \tau\overline{X} + \overline{S}_{-1}(1+r_{-1})$.

The net revenue from the income tax, plus the revenue from the domestic bond sold in period one finances the fiscal expenditure on public good (G), plus the cost of enforcing capital controls, plus the repayment of old debt. Similarly, the second period fiscal budget constraint is

(13) $t(1-\lambda)[\overline{X} + Sr] + \phi F(1+r^*) = G + S(1+r)$.

Applying (10), (12) and (13) we consolidate the two budget constraints into the intertemporal one:

$$(14)\qquad \begin{aligned} & t\left\{\bar{X}[1+\frac{1}{1+r^*}]+S_0 r_0\right\}+\phi F+S[\phi+\phi(1-\phi)\Gamma]= \\ & G[1+\frac{1}{1+r^*}]+S_0(1+r_0)+\tau\bar{X}+\lambda t\left\{\bar{X}[1+\frac{1}{1+r^*}]+S_0 r_0+\frac{Sr}{1+r^*}\right\} \end{aligned};$$

where $\Gamma=\dfrac{\Omega-1}{1-\phi+\phi\Omega}$.

The left hand side of (14) is the gross tax revenue. It is the sum of the net present value of the endowment tax and the tax on interest paid on the initial public debt (the first term), plus the "confiscation tax" on foreign bonds, F, at the rate ϕ (which equals the probability of intercepting capital flight), plus the implicit tax on domestic bonds, at a rate $\phi+\phi(1-\phi)\Gamma$. For a risk neutral consumer, expected yields on the domestic bond should match the expected yield on the foreign bond, $(1+r^*)(1-\phi)$. This is equivalent to imposing an implicit tax on first period savings at the rate ϕ (which equals the probability of intercepting capital flight).[6] Risk aversion magnifies the implicit tax induced by financial repression -- it further reduces the equilibrium cost of the public debt, by $\phi(1-\phi)\Gamma$. This term is the risk premium demanded by the holders of foreign bonds, needed to compensate for the confiscation risk. Unlike the private sector, the effective real interest rate facing the fiscal authorities equals the foreign interest rate. The RHS of (14) is the net present value of government outlays, which equals the net present value of the public good [the first term], plus financing the repayment of the outstanding initial pubic debt, plus financing the enforcement of capital controls and the cost of collecting taxes.

Equation (14) is the fundamental budget constraint facing the government. It defines implicitly a trade off between financial repression (as determined by the resources

---

[5] The paper is related to the growing literature on endogenous enforcement [see Anderson and Marcouiller (1998) for modeling endogenous predation and trade].

[6] In terms of (14), risk neutrality implies $\Gamma=0$, reducing the yield on domestic bonds to $\left[\phi+\phi(1-\phi)\Gamma\right]_{\Gamma=0}=\phi$. Note that our analysis *understates* the revenue from financial repression – part of it comes from taxing domestic financial intermediation. Adding the domestic banking system would not affect the paper's main results.

spent on enforcement) and the endowment tax: $t = t(\tau)$. The policy maker chooses the tax rates τ and the corresponding *t* determined by (14) that would maximize the utility of the representative agent.

It is convenient to normalize the endowment, and henceforth we assume that $\overline{X} = 1$. In the appendix we show that, for small changes,

$$\frac{dV}{d\tau}\frac{1}{u'(C_1)} = \tag{15}$$
$$-\left\{[1+\frac{1}{1+r(1-t)}]+S_0 r_0\right\}\frac{dt}{d\tau} - \frac{1+r^*-[1+r(1-t)](\Omega-1)}{(1+r^*)(1-\phi)}S\phi_\tau^{'} + \frac{u(C_2^f)-u(C_2^s)}{1+\rho}\phi_\tau^{'}$$

A useful benchmark is full financial integration, i.e. $\tau = 0$, where $\phi = 0, r(1-t) = r^*, \Omega = 1$. The welfare effect of imposing marginal financial repression is

$$\frac{dV}{d\tau}\frac{1}{u'(C_1)}|_{\tau=0} = (-\frac{dt}{d\tau}|_{\tau=0})[1+\frac{1}{1+r^*}+S_0 r_0] - S\phi_\tau^{'} \tag{16}$$

Imposing financial repression would allow reducing the tax rate t by $-\frac{dt}{d\tau}$, inducing a welfare gain equal to the drop in the tax rate times the relevant tax base. This welfare gain is offset by the adverse welfare effect associated with shifting the tax burden from an endowment tax to taxing savings, measured by the last term on the RHS of (16). Applying (12) and (14) we infer that, in the vicinity of full financial integration, government's intertemporal budget constraint induces the following trade off:

$$\frac{dt}{d\tau}|_{\tau=0} = -\frac{S[1+\lambda\frac{t}{1-t}]\phi_\tau^{'} - 1 + \lambda\frac{tr^*}{1+r^*}}{\left\{1+\frac{1}{1+r^*}+S_0 r_0\right\}(1-\lambda)+\lambda\frac{r^*}{1+r^*}\left[(1-\lambda)t\{1+S_0(1+r_0)\}-\frac{S}{1-t}\right]} \tag{17}$$

In the presence of lump sum income (i.e., $\lambda = 0$), equation (17) reduces to

$$\frac{dt}{d\tau}|_{\tau=0,\lambda=0} = -\frac{S\phi_\tau^{'}-1}{1+\frac{1}{1+r^*}+S_0 r_0}. \tag{18}$$

As long as $S\phi_\tau^{'} - 1 > 0$, spending on enforcing capital controls increases net revenue, allowing cutting the income tax rate, t. Hence, $S\phi_\tau^{'}|_{\tau=0} > 1$ is a necessary condition for

financial repression to be considered as a viable policy option.[7] Henceforth we will assume it to hold. Applying (17) to (15) we infer that

$$(19) \qquad \frac{dV}{d\tau}\frac{1}{u'(C_1)}|_{\tau=0,\lambda=0} = -1 .$$

With a lump sum endowment tax, there are no benefits associated with financial repression, and the welfare effect of a dollar spent on enforcing marginal capital controls reduces welfare by exactly one dollar. However, high enough collection costs would imply that financial repression leads to a large drop in the cost of collecting conventional taxes, inducing the tax authorities to add financial repression to the menu of taxes.[8] In these circumstances, the optimal depth of capital control is characterized by (15). Assuming that the cost of tax collection is high enough to induce positive but low financial repression, we can apply (15) and (17) to infer

Claim 1:

High enough tax collection costs would induce the implementation of financial repression. Under these circumstances, higher tax collection costs, λ, higher fiscal expenditure G and lower commercial openness would lead to increased "optimal" financial repression -- $\frac{d\phi}{d\lambda} > 0; \frac{d\phi}{dG} > 0; \frac{d\phi}{d\beta} < 0$ [see the Appendix for derivation].

Following the approach of Cukierman, Edwards and Tabellini (1992), one expects less polarized societies and better functioning democracies to be characterized by more efficient tax collection systems [hence by lower λ]. Applying this conjecture, a more efficient tax system would be associated also with a lower tax rate, t, thereby reducing the attractiveness of capital flight. It can be verified that with low enough financial repression, the net effect of improving the tax system is to lower the incidence of capital flight, thereby reducing *de-facto* financial integration.

---

[7] The condition $S\phi_\tau^{'} > 1$ indicates that the economy operates on the left side of the Laffer curve associated with financial repression.

[8] Note that the numerator of (17) increases with the cost of tax collection, λ, whereas the denominator is positive for low λ, approaching zero for a large enough tax collection cost, implying that (17) approaches infinity for high enough λ.

Of course, *de-facto* financial openness is impacted by other considerations not addressed by the public finance model described above, such as differentials in discount rates and investment opportunities across countries, etc. One should view the above model as suggestive of possible links between macro and political economy factors and de-facto openness, motivating the empirical research. Yet, we do not claim that our empirical work summarized in the next section is a test of this model. In fact, we argue that the links we identify may be attributed to other economic forces, explained by alternative models. To illustrate this point, we close this section by contrasting our public-finance model with (arguably) the opposite case, where financial openness is determined by pure opportunism associated with looting.[9]

2.4 Political uncertainty, opportunistic model

A fair criticism of the public finance approach described above is that it more accurately describes homogenous countries, where the policy maker is guided by the interests of the median voter, and there is little political uncertainty pertaining to competing parties and competing interest groups. Hence, it is useful to consider the polar case, corresponding to high degrees of opportunism and political uncertainty. One expects that most countries are characterized by regimes on a continuum between these two polar cases. Interestingly, we will illustrate that both approaches may lead to similar links between macroeconomic and political economy variables and de-facto financial openness. We describe a simple model summarizing *de facto* financial openness under circumstances where policies in the first period are determined by a policy maker representing a narrow interest group facing political uncertainty. Specifically, suppose that the policy maker controls foreign exchange income from exporting a natural resource in the first period, and faces an uncertain future horizon. With probability q, a new government will take over in period 2, ousting the first period policy maker. In these circumstances, his second period consumption would be determined by the income from the first period savings, conveniently put offshore, beyond the control of the future regime. The second period output of the natural resource is impacted by the tangible

[9] Russia in the early nineties may provide a good case study. See Akerlof and Romer (1993). See also Alesina and Tabellini (1989) for a model where political instability and the polarization between labor and capital determines the incidence of capital flight and financial openness.

investment in the extraction of the resource. Such an investment can be financed by the income controlled by the present policy maker. For concreteness, suppose that the situation is summarized by the following equations:

$$(20) \qquad M_1 = M(K_1);\ M_2 = M(K_1 + I), \quad M' > 0;\ M'' < 0$$

$$(21) \qquad u(C_1) + \frac{u(C_2)}{1+\rho}\ ,$$

where M_t in (20) is the surplus generated by the natural resource at time t (t = 1, 2). The second period surplus depends positively on first period investments, I, corresponding to the investment financed by the first period policy maker. K_1 is the initial stock of capital.

Equation (21) represents the utility of the policy maker. To simplify, we assume that the outside party is risk neutral. The policy maker determines the first period investment and saving by solving

$$(22) \qquad \underset{S,\ I}{MAX}\left[u(M_1 - S - I) + \frac{qu(S[1+r^*]) + (1-q)u(S[1+r^*] + M_2)}{1+\rho} \right]$$

The first order conditions are

$$(23) \qquad -u_1' + \frac{1+r^*}{1+\rho}\left[qu_{2,l}' + (1-q)u_{2,h}'\right] = 0;$$

$$(24) \qquad -u_1' + \frac{1}{1+\rho}(1-q)u_{2,h}' M_I' = 0\,.$$

where M_I' is the marginal product of capital; $u_{2,l}'$ and $u_{2,h}'$ are the second period marginal utilities, for the cases where the policy maker is ousted and stays in power, respectively. We can apply (23-24) to infer

Claim 2

$\frac{dS}{dq} > 0; \quad \frac{dI}{dq} < 0$ -- Higher probability of regime change induces the present policy maker to increase savings, channeling them to offshore accounts via capital flight, and to reduce investment, *I*. [10]

Greater commercial openness associated with greater availability of natural resources would lead to greater financial openness, as has been the case in the public finance model. This example also illustrates that with opportunistic behavior, the combination of policy uncertainty and polarization would lead to greater *de-facto* financial openness.[11] Note the similarity of the predictions of the opportunistic and the public finance approaches – in both cases, less cohesive social organization, greater political uncertainty and greater commercial openness are associated with higher *de-facto* financial openness.

The above example is also consistent with the voracity effect identified by Tornell and Lane (1999), where competition among several fiscal claimants may intensify the resultant capital flight.

2.5 On two way feedbacks between financial and trade openness

Our discussion so far focused on the possibility that greater trade openness will lead to higher financial openness. It is reasonable to expect that the linkages between trade and financial openness operate in both directions, and that higher financial openness would lead to greater trade openness.[12] A likely channel is vertical foreign direct investment. FDI allows multinationals to fragment production optimally, benefiting from

---

[10] The model can be extended to account for different economic structures. For example, suppose part of the first period investment is financed by foreign capital. If foreign investment today provides the option value of gaining greater access to the natural resource following a regime change, then higher probability of a regime change would increase *both* capital flight (by the present insider) and capital inflow (by foreign investors). In these circumstances, *de-facto* financial openness *increases* with the probability of regime change.

[11] In this example, polarization refers to the observation that the surplus is divided unequally among competing parties – the policy maker controls the surplus and uses it to maximize his expected utility. In this example, the political uncertainty is summarized by the probability of ousting the present regime, thereby shifting the future control of the surplus to anther party. Our example illustrates that, starting from the case of no political uncertainty [$q = 0$], higher probability of turnover will increase capital flight, increasing de-facto financial openness at a rate that depends positively on the commercial openness of the economy.

the cost advantage associated with locating labor intensive production stages in labor abundant countries (Gordon et al., 2001 provide comprehensive overview of vertical FDI). A by-product of this fragmentation is the growth of two-way trade: higher imports of primary and intermediate products, followed by higher exports of the upgraded products. Indeed, Gordon et. al. (2001) shows that vertical FDI from the OECD to developing countries has increased substantially in the last twenty years.[13]

The positive association between trade and financial openness may also be the outcome of political economy factors, as is highlighted in Rajan and Zingales (2003). They propose an interest group theory of financial development whereby incumbents oppose financial development because it breeds competition. In these circumstances, the incumbents' opposition will be weaker when an economy allows both cross-border trade and capital flows. They predict that country's domestic financial development should be positively correlated with trade openness, and identify the time varying nature of this association.[14] Anther interesting approach linking trade and financial openness is Portes and Rey (2003), showing that both international trades in goods and in assets are explained by similar gravity regressions. Their work highlights the role of information flows and frictions in accounting for trade in goods and assets, controlling for other conventional variables.[15]

We therefore expect to observe two-way linkages between trade and financial openness. In the next section, among other things, we look at these causal links empirically. We first confirm the importance of lagged commercial openness in Granger-causing contemporaneous financial openness, after controlling for macro and political

---

[12] See Helpman and Razin (1978) for an integrated theory of trade in goods and securities.

[13] Another channel operating in the same direction is due to the reliance of international trade on trade credit. Greater financial openness tends to reduce the cost of trade credit, thereby increasing international trade.

[14] See Braun and Raddatz (2004) for an empirical analysis of political economy considerations resulting from the distributional effect of financial development on competition.

[15] After writing the first version of our paper, we learned that Aviat and Coeurdacier (2004) extended the methodology of Portes and Rey (2003), investigating the geography of trade in goods and asset holdings. They found that the causality between bilateral asset holdings and trade in goods runs significantly in both ways and that these effects are strong. Kalemli-Ozcan et al. (2003) find a robust correlation between depth of the financial sector (which they utilize as an instrument for risk sharing) and the degree of industrial specialization.

economy variables. Next, we show that lagged financial openness plays an important role in accounting for commercial openness. We close the empirical evaluation of this question by decomposing the relative quantitative importance of the two channels.

3. The Empirical model

This section reviews the data, the methodology we employ and our main results on the determinants of financial openness and causality between financial openness and commercial/trade openness. We begin by describing the data and provide descriptive statistics. We next discuss the model we estimate for the determination of financial openness and finally examine the question of causality. Throughout, we discuss the empirical exercises' relevance to the theory we developed above. Appendix B provides a detailed summary of the variables, sources and samples described in this section.

3.1 The data

We measure *de facto* financial openness using the sum of total capital inflows and outflows (in absolute values) measured as a percent of gross domestic product. Capital flows are the sum of FDI, portfolio flows and other investments. This measure is exactly analogous to the standard measure of commercial openness, which we employ as an independent variable in our regressions.[16]

Tables 1A-1B describe our data for financial openness. Specifically, table 1A presents averages for financial openness for geographical regions, decades and the estimation samples we use. We find that for developing countries in general and in particular for Asian, African and Middle Eastern countries, financial openness decreased from the 1970s to the 1980s but rebounded and surpassed previous levels in the 1990s. This trend is most pronounced for the East Asian countries for which capital flows were 11.2% of GDP during the 1970s, 8.5% during the 1980s and 16.5% during the 1990s.[17]

---

[16] Wei and Wu (2002) previously used this financial openness variable. We thank Shang-Jin Wei for making it available to us. The data originates from the IMF's *Balance of Payments Statistics* database. See also Lane and Milesi-Ferretti (2001) for insightful analysis of the net asset position of nations, based upon careful aggregations of the IMF's database.

[17] Our data does not completely reflect the slowdown in capital flows as a result of the Asian crisis as it only covers up to and including 1998.

Developed economies (henceforth OECD) do not show this trend but show a continual increase in financial openness (from 7.3% to 9.3% to 16.8% for the 1970s, 1980s and 1990s respectively). Interestingly, Latin America shows a similar continuous trend in spite of the 1980s debt crisis.

For our commercial openness index, we average the sum of exports and imports as a percentage of GDP over the previous 4 years (*t*-1 to *t*-4). By averaging, we smooth out any fluctuations due to temporary changes in the terms of trade and obtain a more robust finding in our multivariate analysis with respect to the temporal effect of commercial openness on financial openness. In addition, we also investigate the dynamic causal structure of the interaction between commercial and financial openness using the original annual data for both.

Table 1B presents the correlation coefficients between our financial openness measure and the commercial/trade openness measure. Bi-variate analysis clearly shows a partial correlation between the two types of openness (both when commercial openness is measured annually and when it is averaged for the previous 4 years). Notably, the correlation appears to be significantly weaker for Latin American countries. The financial openness index measures gross capital flows. Accordingly, we also show, in column 3 of table 1B, the correlation of our gross flows measure with net flows (the current account). We find that there is only a weak and unstable correlation between the two (in some of our sub-samples the correlation is even negative).

Figures 1 and 2 further describe the correlations between the financial openness measure, commercial (trade) openness, and the current account (net financial flows) across time. As previously observed, there is an apparent partial correlation between the openness measures, but a much weaker relationship between gross and net financial flows. Furthermore, the partial correlation between commercial and financial openness appears to be more pronounced for the 1990s than it was for the 1980s.[18]

As the previous theoretical discussion suggests, one of the determinants of *de facto* financial openness should be the legal impediments to financial flows (*de jure* financial openness). Accordingly, we include in our multivariate analysis a binary

[18] The data cover the years 1980-1989 and 1990-1998. We do not present data for the 1970s as we do not have a sufficient number of observations on trade openness for that decade to allow for any robust conclusions.

measure for restrictions on the capital account and/or the current account. Both indicators are taken from the IMF's *Annual Report on Exchange Arrangements and Exchange Restrictions.* These binary measures, which we combine to make a single 0/1 indicator of legal restrictions, are the only internationally comparable measures of *de jure* financial openness available for a large sample of countries and over the time period.[19]

For the political-economy determinants of financial openness, we concentrate our empirical investigation on three political-institutional measures. The motivation for examining political variables is twofold. First, Cukierman, Edwards and Tabellini (1992) argue that functioning democracies will tend to have more efficient tax collection systems. And, in our theoretical work, we concluded that the degree of tax collection costs will determine the degree of financial repression. To investigate this hypothesis we examine whether the capacity of the political system to prevent friction (and consequently mediate conflicts through the political arena and facilitate more efficient tax and other regulatory structures), is a relevant measure. Again, we expect less polarized societies and those in which conflicts are solved peacefully within the political system to have more efficient tax collection mechanisms in place.

First, we employ a variable that measures the degree of democratic rule. Our democracy index is taken from the *Polity IV* project and ranges from -10 (fully autocratic) to +10 (fully democratic).[20] In addition, we employ a variable that measures the degree of political competition within a polity. This index combines two dimensions of political competition: (1) the degree of institutionalization, or organization, of political competition and (2) the extent of government restrictions on political competition. Combined, this measure identifies ten broad patterns of political competition that roughly correspond with the degree of "democraticness" of political competition within a polity (Marshall and Jaggers, 2000). As Marshall and Jaggers (2000, p. 79) note "[t]he polar opposite [to a competitive political system] is unregulated participation, in which there are no enduring national political organizations and no effective regime controls on

---

[19] A thorough description of these data is found in Glick and Hutchison (forthcoming).

[20] The "Polity IV database includes annual measures for both institutionalized democracy (DEMOC) and autocracy (AUTOC), as many polities exhibit qualities of both these distinct authority patterns….A third indicator, POLITY, is derived simply by subtracting the AUTOC value from the DEMOC value; this procedure provides a single regime score that ranges from +10 (full democracy) to -10 (full autocracy)." (Marshall and Jaggers, 2000, p. 12). We use the POLITY variable in our regressions.

political activity. In such situations political competition is fluid and often characterized by *recurring, contentious interactions and shifting coalitions of strongly partisan groups*" (italics ours). The 1-10 index defines steps between 1 (repressed competition – such as in totalitarian systems or military dictatorships) and 10 (institutionalized open electoral participation). As we show in table 2, this variable is highly correlated with the democracy-autocracy measure described above even though it was constructed based on different criteria.

Another political-economy variable we use to examine the robustness of our results comes from a political data set constructed at the World Bank (Beck et al. 2001 and Keefer, 2002). As we hypothesized that more polarized social and institutional arrangements will affect the efficiency of tax collections, we use an index that measures the fractionalization within government. This variable is constructed from a Herfindahl Index for government, which is obtained by summing the squared seat shares of all parties in the government. Thus, a completely unified government will have an index of 1 and a government that is composed of many small parties will have a smaller index.[21]

Following the work of Wei (2000) and Dreher and Siemers (2003), we examine whether corruption matters for the degree of financial openness. To that end, we use a measure of corruption that is taken from the *International Country Risk Guide.* The data are available in monthly observations. We obtain annual observations from 1982 onward by averaging the monthly data points for each year. This index ranges from -6 (low probability/risk of encountering corruption) to 0 (high risk of corruption).

Table 2 presents the correlation coefficients for the political variables we use. As noted earlier, the variable measuring political competition and the regime's autocratic/democratic nature are highly correlated (correlation of 0.94). Besides this pair, the other political variables do not seem significantly correlated.

In order to ensure our results are not driven by a 'missing variables' bias, we include a host of macroeconomic control variables. In all regressions we use the inflation rate (changes in the CPI), per capita gross domestic product (measured in PPP dollars), the government's budget surplus (as a percent of GDP), and a world interest rate (proxied

[21] This index records a missing observation if there is no parliament. If there are any government parties where seats are unknown, the index is also blank. Independents are calculated as if they were individual parties with one seat each.

by the US Treasury Bill 1-year rate). All the macroeconomic data are taken from the World Bank's *World Development Indicators* (2001 edition). In order to examine whether the occurrence of financial crises contaminates our result, as they might systematically change the relationship between financial openness and our control variables, we also include crises measures in a number of regressions.

A priori, we see no reason to restrict our sample and therefore attempted to include all 205 countries and territories for which data are available in the 2001 edition of the World Bank's *World Development Indicators* (*WDI*). Our control variables, though, are available for only a subset of this group. Most importantly, most of the data on financial flows as well as the data on corruption are typically available only from the 1980s and only for a much smaller set of countries. Our data set is therefore an annual panel of 83 countries for the years 1982-1998.

We further investigate the robustness of our results by examining various sub-samples. Notably, we hypothesize that results for OECD countries might be different from those for developing countries. We thus repeat our regressions for developed economies – which we define as those economies that were members of the OECD in 1990. As our focus is developing countries we include most of the regression results for this sub-sample. These are defined by excluding OECD countries and island economies (as these are often used as off-shore banking centers and their level of *de facto* financial openness is often dramatically different from other countries). For a summary of the information described in this section including detailed data sources and sample sizes, see appendix B.

3.2 Methodology and Regression Results

Based on our theoretical work, we estimate the statistical significance of various sources of financial repression by positing a linear structure for the determination of the level of financial openness whereby:

$$(25) \qquad FO_{it} = \alpha + \beta_1 X_{it} + \beta_2 \overline{CO}_{it-1} + \beta_3 P_{it} + \varepsilon_{it} \text{ , with } \varepsilon_{it} = \rho \varepsilon_{it-1} + \mu_{it} .$$

The dependent variable (FO_{it}), financial openness for country *i* at time *t,* is assumed to be dependent on an intercept (or alternatively separate country or regional intercepts), a vector X_{it} of macroeconomic control variables, average of lagged commercial openness

($\overline{CO}_{it-1}$), a vector of political-institutional variables (P_{it}) and an error term. The variables examined are described below.

A Durbin-Watson statistic for all iterations of the model strongly indicates that the error terms are autocorrelated. The autocorrelation coefficient was estimated to be between 0.7-0.9. The error term is thus assumed to have an AR(1) structure with μ iid.[22] We estimate the model using the Prais-Winsten algorithm. The Prais-Winsten procedure is a 2SLS procedure that utilizes the estimated correlation coefficient obtained from the Durbin-Watson statistic from the first-stage OLS regression as the initial autocorrelation value and reiterates a second-step FGLS till convergence (typically 2-3 iterations).[23]

Table 3 includes results for our benchmark regressions. For the first stage regression, the R^2 is between 0.20 and 0.67 depending on the exact specification and sample used.[24] For the second stage, the model converges very quickly (within two iterations) and most of the coefficients for the benchmark control variables are robust to the inclusion and exclusion of other variables. In column (1) of table 3, which includes the full sample (829 observations), we already observe many of the results that remain throughout the various specifications.

In examining the independent variables, we first turn to our control macro-variables. The coefficient for per-capita GDP is always significantly positive – i.e., an increase in GDP per capita increases financial openness (except for a regression containing only OECD countries in which the coefficient is insignificant). We find that an increase domestic per capita GDP of PPP$1000 will facilitate a 0.14 to 2.28 percentage points increase in the volume of capital flows (as percent of GDP). The ratio of budget surplus to GDP is typically significant and always negative for developing countries. A bigger budget deficit will increase *de facto* financial openness. Again, this result does not hold for our OECD sub-sample; for this case, reported in table 3 column (2), the budget surplus coefficient is positive and significant.[25] The inflation rate and the

---

[22] $E(\mu_t)=0$; $E(\mu_t^2)=\sigma_u^2$; and $Cov(\mu_t, \mu_s)=0$ for $t\neq s$.

[23] For technical details see Greene (2000, pp. 546-550) and Greene (2002, E7 pp. 4-7).

[24] The higher R^2 values are generally for the models that include more political/institutional variables and for the developing and OECD sub-samples.

[25] The disparity between the impacts of budget surplus in developing and OECD countries may be explained by the differential cyclical patterns of fiscal policy. In contrast to the OECD countries, fiscal

world interest rate (proxied by the US T-Bill rate) are always insignificantly different from zero. But, as with the previous results, the coefficients for inflation and the world interest rate seem to be different for the OECD sub-sample; although these are still insignificant for standard significance levels, the effect of inflation on financial openness is larger (and negative) for the OECD countries and the effect of the US T-Bill rate is smaller. Both these results correspond with our intuition. We also include a binary variable for the 1990s and as expected given the information presented in table 1A, the coefficient for this variable is always positive and significant; i.e., the 1990s saw an across-the-board increase in financial openness (increased capital flows). This increase in capital flows is found to be between 1.3 and 4.9 percent of GDP.

Additionally, we find that the trade openness coefficient (ratio of exports and imports to GDP) is always positive and highly significant. As this variable describes the average openness over the previous four years, we find that a history of more commercial openness will increase financial openness significantly. This result is robust to all the iterations we present in table 3 and elsewhere.

Before discussing our empirical analysis of the political-economy determinants of international financial flows, we note that including the corruption variable in our regressions also yields negative and significant coefficients in almost all the iterations of the model.[26] Similar results from different data are analyzed in detail in Wei (2000) and Dreher and Siemers (2003).

Our foci in this section are the political-economy variables. First, we examine the affect of the nature of the political regime on financial openness (this index is between 10 – full democracy and –10 – full autocracy). For the full sample (table 3 column 1) and the developing countries sub-samples (table 3 column 3) the coefficient for this variable is negative, significant and apparently large.[27] Any one-point increase in this index (out of

---

policy tends to be pro-cyclical in developing countries: i.e., government spending drops and taxes increase during recessions. Financial crises tend to lead to recessions in developing countries, inducing abrupt fiscal adjustment, reducing fiscal deficits. These observations may lead to the positive association between smaller budget deficits and lower *de facto* financial openness [see Gavin, Hausmann, Perotti and Talvi (1996), Aizenman, Gavin and Hausmann (2000) and Talvi and Vegh (2000)].

[26] Once more, this result does not hold for the OECD sub-sample (reported in table 3 column 2). In this case, the coefficient is still positive but insignificant. Variability of the corruption variable for the OECD sub-sample is much lower.

[27] For the OECD sample (table 3 column 2), the coefficient has the same sign and magnitude but is statistically insignificant.

the 20 points difference between full autocracy and democracy) reduces financial openness (international financial flows) by almost one-half a percentage point of GDP. The effect is about half as large when we do not control for the level of corruption (reported in table 3 column 4).

Since the results for the OECD sub-sample are consistently different, and our theoretical modeling is focused on developing countries, we give most attention to the developing countries sub-sample (these include all non-OECD countries that are not islands/financial-centers). Columns 5 and 6 in table 3 repeat our specification for the developing countries sample but exclude the regime variable in column 5 and both the regime and corruption measures in column 6. In both cases, we find that all the other results reported above remain robust to these omissions.

Table 4 presents information on the quantitative significance of our findings for the benchmark model. For the sample of developing countries, we find that a one standard deviation increase in the commercial openness is associated with a 9.5 percentage points increase in de-facto financial openness (percent of GDP), a one standard deviation increase in the democratization index reduces financial openness by 3.5 percentage points, and a one standard deviation increase in corruption is associated with a reduction of financial openness by 3.1 percentage points. Similarly, the corresponding associations for the whole sample are 12.3, 3.1 and 2.9. Furthermore, a developing country will have higher financial openness (measured as 3 additional percentage points of GDP), were it to have the median level of trade openness of an OECD country; would be 2.2% less open were it as democratic as the typical OECD country; and 4% more open to financial flows were it less corrupt as the typical developed country is.

In table 5 columns (1)-(4) we further investigate the political-economy nature of financial openness by replacing the democracy/autocracy (regime) variable with two others: a measure of political competition, and an index of government fractionalization. For the political competition variable, we find that increased institutionalized competition within the polity decreases financial openness. This result is not empirically puzzling considering that this variable is highly correlated with our measure of democracy/autocracy (even though the variable was created using different criteria).

Thus, a more openly competitive, free and inclusive political system will lead to lower levels of financial openness after controlling for incomes, macroeconomic policy (inflation and budget surpluses), interest rates and commercial openness. As we observed before, this effect is more perceptible and significant once corruption is controlled for as well.

For the government fractionalization index (reported in table 5 columns 3 and 4), we find that the more a government is fractionalized (the ruling coalition includes more political parties), the higher is financial openness. Quantitatively, the estimated coefficient of 1.4-1.9 does not seem to suggest a very large effect on the level of international financial flows. This result is suggestive as to the validity of some of the conjectures we raised in our second theoretical model.

In column (5) of table 5 we re-estimate our benchmark specification (table 3 column 3) but also include the *de-jure* measure of financial openness. Interestingly, the coefficient for this binary measure of restrictions on the capital and current accounts combined is not significant in this specification nor in other specifications we ran. Our main results with respect to commercial openness and the political regime remain significant even when the *de jure* measure is included; though the corruption coefficient is no longer significant reflecting a correlation between corruption and the decision by the authorities to use financial repression.[28]

3.3 Robustness of Main Results

In addition to the specifications discussed above, we tested a number of alternative specifications of our empirical model in order to verify the robustness of our results. Because of space considerations we do not include the full specifications in our tables but all these results are available upon request.

First, we hypothesized that financial crises (either banking or currency crises) might significantly affect the level of financial openness in general and more specifically the use of financial repression for generating government revenues. Interestingly, in all

[28] The same results are obtained if a binary index for restrictions only on the current (or capital) account is included.

iterations of the model we attempted, none of the coefficients for the crises variables comes out significant for the developing countries sample (nor for the other samples).[29]

Second, besides including the average of past commercial openness, we also included in our specification the contemporaneous TRADE/GDP variable and obtained the following: In all cases, the lagged commercial openness variable remains positive and highly significant. For the developing countries sample as well as the whole sample, the lagged average is positive and highly significant with a now larger coefficient (0.20 and 0.21 respectively) while the contemporaneous variable is negative and significant. For the OECD sample, the lagged average is still positive and highly significant while the contemporaneous variable is now positive but insignificant. The sum of the two coefficients (summarizing the effect of commercial openness both past and present) is 0.05, 0.06, and 0.09, for the developing, OECD and the whole sample, respectively. This sum is always positive and highly significant for the three different samples.[30]

As the political and institutional variables we use do not vary sufficiently over time we do not present results for the model estimated with country effects. Typically, the goodness of fit is higher but the independent political-institutional variables lose most of their statistical significance (as would be expected). We include regional effects (binary variables for Latin America and East Asia) in our large and developing countries samples. Time effects do not provide any additional explanatory power besides a significant finding for the 1990s (reported above).

3.4 Causality

In the previous section we have established that past trade openness Granger-causes financial openness (see Granger, 1969 and Sims, 1972 for a definition of G-

[29] We utilized a number of variants of these binary indicators (currency crisis and banking crisis, their onset year only, and these separately or together in the same specification) and we never reject the null (no effect). For currency crises, our indicator is identified by periods in which an index, composed of a weighted average of the real exchange rate and foreign reserves, changed dramatically – by more than 2 standard deviations. This measure is described in detail and evaluated in Hutchison and Noy (2002). The banking crisis binary indicator is taken from Caprio and Klingebiel (1999) and is analyzed in Arteta and Eichengreen (2002) and Hutchison and Noy (forthcoming).

[30] One possible interpretation is that major recessions in developing countries (potentially triggered by capital flight) are associated with a drop in commercial openness, as would be the case if the drop in imports dominated any increase in exports. Likewise, capital flight may increase financial openness. It is difficult to provide a better rationale for it without desegregating financial openness into its various sub accounts.

causality). As we suspect that causality might also run from past financial openness to present trade openness we also estimate the opposite specification:

$$(26) \qquad CO_{it} = \gamma + \delta_1 X_{it} + \delta_2 \overline{FO}_{it-1} + \delta_3 FO_{it-1} + \delta_4 P_{it} + \eta_{it}$$

We use the same assumptions, methodology, definition of variables and samples as before. Results for several specifications are reported in table 6. Our focus in this paper is the determination of financial openness and we therefore concentrate our attention on the financial openness index. In all the specifications reported in table 6 it appears apparent that financial openness is not only Granger-caused by trade openness but that financial openness also Granger-causes trade openness. These results hold whether we examine a one-year lag of the financial openness measure (columns 1-3), or 4-year average of past financial openness for the various sub-samples previously described. Comparing tables 5 and 6 reveals an interesting asymmetric effect of *de-jure* restrictions on *de-facto* openness: while *de-jure* restrictions on capital mobility (capital account) do not impact *de-facto* financial openness, *de-jure* restrictions on the current account have large adverse effects on commercial openness. Qualitatively similar results, with even larger coefficients, are obtained (but not reported) when both restrictions on the capital and current accounts are included as explanatory variables. *De-jure* restrictions have no effect on financial openness but a strong and statistically significant effect on trade openness. These findings suggest that it's much easier to overcome (evade) restrictions on capital account convertibility than restrictions on commercial trade.

In Granger (1969), the possibility of simultaneous causality between the two time series is assumed away by arguing that dividing the time series into shorter periods. This should enable the researcher to identify accurately the exact chronology of effects and do away with the correlations in the contemporaneous data series. Wei (1982), also points to the problems inherent in identifying causality structures for flow variables that are aggregated over time periods. As we employ annual data, and since financial flows respond quickly to exogenous shocks, it is reasonable to expect that our data will also contain what appears to be instantaneous causality between trade and financial openness. Furthermore, Granger's (1969) approach does not allow us to estimate and compare the relative magnitudes of causality between the two time series.

Geweke (1982) suggests a methodology to distinguish between (temporal) causality from *x* to *y*, from *y* to *x* and simultaneous causality between the two. We briefly describe the methodology and provide results.[31]

First we estimate the following 5 equations using a panel fixed-effects least squares estimation for our developing countries sample.

$$(27) \qquad FO_{it} = \alpha_i^1 + \sum_{s=1}^{p} \beta_{1s}^1 FO_{it-s} + \sum_{s=0}^{p} \beta_{2s}^1 CO_{it-s} + \varepsilon_{it}^1$$

$$(28) \qquad FO_{it} = \alpha_i^2 + \sum_{s=1}^{p} \beta_{1s}^2 FO_{it-s} + \sum_{s=1}^{p} \beta_{2s}^2 CO_{it-s} + \varepsilon_{it}^2$$

$$(29) \qquad FO_{it} = \alpha_i^3 + \sum_{s=1}^{p} \beta_{1s}^3 FO_{it-s} + \varepsilon_{it}^3$$

$$(30) \qquad CO_{it} = \alpha_i^4 + \sum_{s=1}^{p} \beta_{1s}^4 CO_{it-s} + \sum_{s=1}^{p} \beta_{2s}^4 FO_{it-s} + \varepsilon_{it}^4$$

$$(31) \qquad CO_{it} = \alpha_i^5 + \sum_{s=1}^{p} \beta_{1s}^5 CO_{it-s} + \varepsilon_{it}^5$$

Next, following Geweke's (1982) notation we define $F_{CO \to FO}$ as the linear feedback (i.e. G-causality) from trade openness to financial openness, $F_{FO \to CO}$ as the G-causality from financial openness to trade openness, and $F_{FO \bullet CO}$ as the instantaneous linear feedback between the two series.[32] $F_{FO,CO}$, defined as the total measure of linear dependence between the two series is therefore given by:

$$(32) \qquad F_{FO,CO} = F_{FO \to CO} + F_{CO \to FO} + F_{FO \bullet CO}.$$

Given these definitions, Geweke (1982) concludes the following:

$$(33) \quad F_{FO \to CO} = \log[\mathrm{var}(\varepsilon_{it}^5) / \mathrm{var}(\varepsilon_{it}^4)]$$

$$(34) \quad F_{CO \to FO} = \log[\mathrm{var}(\varepsilon_{it}^3) / \mathrm{var}(\varepsilon_{it}^2)]$$

---

31 Readers may also consult Geweke (1984) and Granger (1988). The only applications we are aware of which apply this methodology to macro-economic data series are Chong and Calderón (2000) and Calderón and Liu (2003). Other approaches to identifying causality in macroeconomics will typically rely on an instrumental variable methodology. An excellent book length treatment of the issue of causality in macroeconomics is Hoover (2001).

32 Geweke (1982) prefers the term 'linear feedback'. Pierce (1982), in a comment on Geweke's work, argues that a more appropriate term to describe the measures defined in our equations (32)-(35) would be 'G-causality.' Zellner (1982), in another comment, argues that the word 'causality' should not be used if it is only based on statistical observed relationships rather than together with economic theory. We

(35) $F_{FO \bullet CO} = \log[\text{var}(\varepsilon_{it}^{2}) / \text{var}(\varepsilon_{it}^{1})]$

Geweke (1982) shows that the null hypothesis (H_0: F=0) can be statistically examined using the χ^2 distribution. In estimating (27)-(31), we started with three lags (p=3) of the independent variables in each regression and reduced step-wise the number of lags using the Akaike Information criterion. In all cases, it turned out that a single lag (p=1) contained all the information required to estimate the model. Consequently, we set p=1 throughout. Table 7 provides our results for distinguishing among the different channels of causality between the two series. Most of the linear feedback between trade and financial openness (87%) can be accounted for by Granger-causality from financial openness to trade openness (53%) and from trade to financial openness (34%). Simultaneous correlation between the two only accounts for 13% of the total linear feedback between the two series.

When we repeated this algorithm using the same methodology but including in regressions (27)-(31) the control variables previously described (as in table 3 column 3) we obtained qualitatively and quantitatively very similar results for the feedback measures.

4. Concluding remarks

Our analysis indicates that the *de-facto* financial openness of developing countries is a complex endogenous variable, systematically impacted by economic and political economy factors which include commercial openness, the political regime and corruption. For the sample of developing countries, we find that a one standard deviation increase in the commercial openness index is associated with a 9.5 percent increase in de-facto financial openness (international financial flows as percent of GDP), a one standard deviation increase in the democratization index reduces financial openness by 3.5 percent, and a one standard deviation increase in corruption is associated with a 3 percent reduction of financial openness (see table 4).

We show that *de-facto* financial openness is the outcome of both efficiency and political economy considerations; hence one should be careful in attaching normative

---

use the term 'G-causality' throughout as it is more familiar to the economics profession. Hoover (2001) provides an extended discussion of the problems inherent with the usage of this term.

implications to these findings without having a good model of the economy. Yet, the results reported in this paper may provide some guidelines to policymakers. For example, a country that undergoes rapid commercial integration will find it impractical to enforce rigid financial repression. Hence, the question for China is not if, but when and how to implement *de-jure* financial integration. To economists that are concerned about the possibility that financial integration may lead to greater instability, our paper suggests that the process of democratization may provide the side benefit of reducing financial openness. And to economists who worry that some developing countries may find it difficult to rely on external financing, steps to reduce corruption should make it easier to overcome this obstacle.

While *de-facto* financial openness is a useful concept, it combines capital flows motivated by political economy considerations with those motivated by efficiency considerations. A remaining empirical challenge is to disaggregate *de-facto* financial openness into its various components. Our second political-economy model, for example, might apply for foreign direct investment (FDI) but might not be relevant for equity finance. More generally, since each type of flow can be taxed differently with varying degrees of efficiency in tax collection (as the first model suggests) and faces different degrees of expropriation risk (as the second model suggests), one can expect the determinants of openness for each type of flow to be different. Therefore, constructing different financial openness indicators using quantity data for the different types of financial flows (FDI, equity, official, bank lending, etc.) appears to be an obvious next step.

References

Aizenman, J., M. Gavin and R. Hausmann, (2000) "Optimal Tax and debt Policy with Endogenously Imperfect Creditworthiness", *Journal of International Trade & Economic Development*, Volume 9 Number: 4, pp. 367 – 395.

_____ P. Guidotti. (1994): "Capital controls, collection costs, and domestic public debt," *Journal of International Money and Finance* , February, pp. 41 - 54.

Akerlof, G. A. and P. M. Romer, **"**Looting: The Economic Underworld of Bankruptcy for Profit.**"** *Brookings Papers on Economic Activity*, 2, pp. 1-60 and 70-74, (1993).

Alesina, A. And G. Tabellini (1989) "External Debt, Capital Flight, and Political Risk", *Journal of International Economics*, 27: 199-220.

Anderson, J. E. and S.J. Marcouiller, (1998): "Autarky and Anarchy: Endogenous Predation and Trade," working paper, Boston College.

Arteta, Carlos and Barry Eichengreen (2002). "Banking Crises in Emerging Markets: Presumptions and Evidence" in M. Blejer and M. Skreb (eds.), *Exchange Rate and Financial Vulnerability in Emerging Markets*, MIT Press.

Aviat A. and N. Coeurdacie (2004), "The Geography of Trade in Goods and Asset Holdings," manuscript, Cnrs–Ehess–Ens.

Beck, Thorsten, Asli Demirgüç-Kunt and Ross Levine (2001). "New tools in comparative political economy: The Database of Political Institutions," *World Bank Economic Review* 15(1): 165-176.

Bekaert, G, C. R. Harvey and C. Lundblad, (2001). "Does financial liberalization spur growth?" NBER Working paper #8245.

Boyce, J. K., and L. Ndikumana (2001): "Is Africa a Net Creditor? New Estimates of Capital Flight from Severely Indebted Sub-Saharan African Countries, 1970-1996." *Journal of Development Studies*, 38(2).

Braun M. and C. Raddatz (2004), "Trade liberalization and the politics of financial development," Manuscript.

Calderón, César and Lin Liu (2003). "The direction of causality between financial development and economic growth." *Journal of Development Economics,* 72, 321– 334.

Caprio Gerard and Daniela Klingebiel (1999). Episodes of Systemic and Borderline Financial Crises. Manuscript (October).

Chong, Alberto and César Calderón (2000). "Causalilty and Feedback Between Institutional Measures and Economic Growth." *Economics and Politics*, 12(1), 69-81.

Cukierman, Alex, Sebastian Edwards and Guido Tabellini (1992). "Seigniorage and Political Instability." *American Economic Review*, 82(3), June, 537-555.

Dooley, M. (1988). "Capital Flight: A Response to Differences in Financial Risks," *IMF Staff Papers*, September 1988.

_____ (1996): "A Survey of Literature on Controls Over International Capital Transactions," *IMF Staff Papers*, 43(4):639-687.

_____,M. and K. Kletzer (1994) "Capital Flight, External Debt and Domestic Policies," *Federal Reserve Bank of San Francisco Review*, Summer 1994, pp. 24- 38.

Dreher, Axel and Lars-H.R. Siemers (2003). "The Intriguing Nexus Between Corruption and Capital Account Restrictions", mimeo, June.

Gavin, M., R. Hausmann, R. Perotti and E. Talvi (1996) 'Managing Fiscal Policy in Latin America and the Caribbean: Procyclicality, Volatility, and Limited Creditworthiness', mimeo, Inter-American Development Bank.

Geweke, John (1982). "Measurement of Linear Dependence and Feedback Between Multiple Time Series." *Journal of the American Statistical Association*, 77(378), 304-313.

Geweke, John (1984). "Measures of Conditional Linear Dependence and Feedback Between Time Series." *Journal of the American Statistical Association*, 79(388), 907-915.

Giovannini, A. and M. de Melo (1993). "Government Revenue from Financial Repression," *American Economic Review* 83, 953-63.

Glick, Reuven and Michael Hutchison (forthcoming). "Capital Controls and Exchange Rate Instability in Developing Economies." *Journal of International Money and Finance*.

Granger, Clive W. J. (1969). "Investigating Causal Relations by Econometric Models and Cross-spectral methods." *Econometrica*, 37(3), 424-438.

Granger, Clive W. J. (1988). "Some recent developments in a concept of causality," *Journal of Econometrics*, 39, 199-212.
Greene, W. (2000). *Econometric Analysis*. Prentice-Hall, New Jersey.
Greene, W. (2002). Linear models for panel data. *LIMDEP Econometric Modeling Guide* Volume 1. Plainview, NY: Econometric Software, Inc.
Gordon H. Hanson, G. H., R. J. Mataloni and M. J. Slaughter (2001). "Expansion Strategies of U.S. Multinational Firms," NBER Working paper 8433.
Helpman E. and A. Razin (1978). *A Theory of International Trade Under Uncertainty*, Academic Press.
Henry, P. B., (2003). "Capital Account Liberalization, The Cost of Capital, and Economic Growth", *American Economic Review*, 93(2), May, pp. 91-96.
Hoover K. (2001). *Causality in Macroeconomics.* Cambridge University Press, Cambridge, UK.
Hutchison, Michael and Ilan Noy (2002). "Output Costs of Currency and Balance of Payments Crises in Emerging Markets," *Comparative Economic Studies*, XLIV(2), Summer.
Hutchison, Michael and Ilan Noy (forthcoming). "How Bad Are Twins? Output Costs of Currency and Banking Crises" *Journal of Money, Credit and Banking*.
Kalemli-Ozcan, Sebnem, Bent E. Sørensen, and Oved Yosha (2003). "Risk Sharing And Industrial Specialization: Regional and International Evidence." *American Economic Review,* 93(3), 903-918.
Keefer, Philip (2002). "DPI2000: Database of Political Institutions: Changes and Variable Definitions". Mimeo, The World Bank.
Kletzer K. and R. Kohli (2001). "Financial Repression and Exchange Rate Management in Developing Countries: Theory and Empirical Evidence for India," IMF working paper 01/103.
Lane, Philip R., and Giani Maria Milesi-Ferretti (2001). "The External Wealth of Nations: Measures of Foreign Assets and Liabilities for Industrial and Developing Nations," *Journal of International Economics,* Vol. 55, pp. 263–94.
Lee, Ha Yan, Luca Antonio Ricci, and Roberto Rigobon (2004). "Once Again, is Openness good for Growth?" Manuscript, April.
Marshall, Monty G and Keith Jaggers (2000). "POLITY IV PROJECT - Political Regime Characteristics and Transitions, 1800-1999: Dataset Users' Manual". Mimeo, University of Maryland.
Pierce, David A. (1982). "Comment: Measurement of Linear Dependence and Feedback Between Multiple Time Series." *Journal of the American Statistical Association*, 77(378), 315-316.
Portes, R. and H. Rey (2003), "The Determinants of Cross Border Equity Flows," manuscript, Princeton University.
Prasad, Eswar, Kenneth Rogoff, Shang-Jin Wei and M. Ayhan Kose (2003). "Effects of Financial Globalization on Developing Countries: Some Empirical Evidence." Mimeo, IMF, March.
Rajan, G. R. and L. Zingales (2003). **"**The Great Reversals: The Politics of Financial Development in the 20th Century," forthcoming, *Journal of Financial Economics*.
Rodrik, D. (1999): "Who Needs Capital-Account Convertibility?" in Peter Kenen (ed), *Should the IMF Pursue Capital Account Convertibility? Essays in International Finance* no. 207, Princeton: Princeton University Press (May).
Sims, Christopher A. (1972). "Money, Income, and Causality." *The American Economic* Review, 62(4), 540-552.
Stiglitz, J., (2002). *Globalization and Its Discontents* (New York: W.W. Norton & Company, June).
Talvi, Ernesto, and Carlos A. Vegh (2000). "Tax Base Variability and Procyclical Fiscal Policy." NBER Working Paper No. W7499, January.
Tornell, A. and A. Velasco, (1992). "Tragedy of the Commons and Economic Growth: Why Does Capital Flow from Poor to Rich Countries?," *Journal of Political Economy*, 100 (6):1208-31.
_____ and P. Lane, (1999). "Are Windfalls a Curse? A Non-Representative Agent Model of the Current Account and Fiscal Policy," *Journal of International Economics*, vol. 44, pp. 83-112, 1998.
Wei, Shang-Jin (2000). "How Taxing is Corruption on International Investors?" *The Review of Economics and Statistics*, 82(1):1-11, February.
Wei, Shang-Jin and Yi Wu (2002). "The Life-And-Death Implications of Globalization." Mimeo, IMF.
Wei, William W. S. (1982). "The Effects of Systemic Sampling and Temporal Aggregation on Causality – a Cautionary Note." *Journal of the American Statistical Association*, 77(378), 316-319.
Zellner, Arnold (1982). "Comment: Measurement of Linear Dependence and Feedback Between Multiple Time Series." *Journal of the American Statistical Association*, 77(378), 313-314.

Appendix A - Derivations

This appendix overviews the derivation of several key results.

Equation (15)

Differentiating the expected utility (7) we infer that

$$dV = u'(C_1)dC_1 + \frac{\phi u'(C_2^f)dC_2^f + (1-\phi)u'(C_2^s)dC_2^s}{1+\rho} + \frac{u(C_2^f)-u(C_2^s)}{1+\rho}d\phi =$$

$$\text{(A1)} \qquad u'(C_1)dC_1 + \frac{\phi u'(C_2^f)+(1-\phi)u'(C_2^s)}{1+\rho}dC_2^f + \qquad .$$

$$\frac{(1-\phi)u'(C_2^s)}{1+\rho}[dC_2^s - dC_2^f] + \frac{u(C_2^f)-u(C_2^s)}{1+\rho}d\phi$$

Consumer's budget constraints [(5) and (6)] imply

$$\text{(A2)} \qquad dC_1 = -[1+S_{0,i}r_0]dt - dS - dF$$

$$\text{(A3)} \qquad \begin{aligned} dC_2^f &= [1+Sr]dt + (1+r(1-t))dS + S(1-t)dr \\ dC_2^s &= dC_2^f + (1+r^*)dF \end{aligned} \quad .$$

Substituting (A2) and (A3) to (A1), and collecting terms, we infer that

$$\text{(A4)} \qquad \begin{aligned} &\frac{dV}{u'(C_1)} = -[1+S_0r_0]dt - dS - dF + \\ &\frac{\phi u'(C_2^f)+(1-\phi)u'(C_2^s)}{(1+\rho)u'(C_1)}\{[1+Sr]dt + (1+r(1-t))dS + S(1-t)dr\} \\ &+ \frac{(1-\phi)u'(C_2^s)(1+r^*)}{(1+\rho)u'(C_1)}dF + \frac{u(C_2^f)-u(C_2^s)}{(1+\rho)u'(C_1)}d\phi \end{aligned}$$

Applying the first order conditions [(8), (9)] to (A4), and collecting terms, we find

$$\text{(A5)} \qquad \frac{dV}{u'(C_1)} = -[\overline{X} + S_{0,i}r_0 + \frac{\overline{X}+Sr}{1+r(1-t)}]dt + \frac{S(1-t)}{1+r(1-t)}dr + \frac{u(C_2^f)-u(C_2^s)}{(1+\rho)u'(C_1)}d\phi$$

Note that (10) implies that

$$\text{(A6)} \qquad dr = \frac{r}{1-t}dt - \frac{[1+r(1-t)]\left[1+r^*-[1+r(1-t)](\Omega-1)\right]}{(1+r^*)(1-\phi)(1-t)}d\phi$$

Applying (A6) to (A5) we find that

(A7)

$$\frac{dV}{u'(C_1)} = -[1 + S_0 r_0 + \frac{1}{1+r(1-t)}]dt + \frac{1+r^* - [1+r(1-t)](\Omega-1)}{(1+r^*)(1-\phi)} S d\phi + \frac{u(C_2^f) - u(C_2^s)}{(1+\rho)u'(C_1)} d\phi$$

Equation (15) is obtained from (A7), using the fact that $d\phi = \phi_\tau' d\tau$.

Claim 1

Recall that the first order condition determining optimal financial repression is

(A8) $$\frac{dV}{d\tau}\frac{1}{u'(C_1)} = 0$$

where $\frac{dV}{d\tau}\frac{1}{u'(C_1)}$ is given by (15). Denoting the RHS of (15) by $\Re$, and the optimal financial repression by $\tilde{\tau}$, the implicit function theorem and the second order condition for maximization imply that

(A9) $$sign\frac{d\tilde{\tau}}{d\lambda} = sign\frac{\partial \Re}{\partial \lambda}.$$

Assuming that the initial equilibrium is in the vicinity of low financial repression, we can apply (16) and (17):

(A10)

$$sign\frac{\partial\tilde{\tau}}{\partial\lambda} = sign\frac{\partial\Re}{\partial\lambda} = sign\frac{\partial[-\frac{dt}{d\tau}|_{\tau=0}]}{\partial\lambda} =$$

$$sign\frac{\partial \frac{S[1+\lambda\frac{t}{1-t}]\phi_\tau' - 1 + \lambda\frac{tr^*}{1+r^*}}{\left\{1+\frac{1}{1+r^*}+S_0 r_0\right\}(1-\lambda)+\lambda\frac{r^*}{1+r^*}\left[(1-\lambda)t\{1+S_0(1+r_0)\}-\frac{S}{1-t}\right]}}{\partial\lambda} > 0$$

Similar logic implies that

(A11) $$sign\frac{d\tilde{\tau}}{d\beta} = sign\frac{\partial\Re}{\partial\beta} < 0\,;\ sign\frac{d\tilde{\tau}}{dG} = sign\frac{\partial\Re}{\partial t} > 0\,.$$

Appendix B – Data Sources and Samples

Code	Source	Description
KTOTAL	*IMF-BOP statistics* [a]: Wei (2002)	Sum of capital inflows and outflows (% of GDP)
GDPPCPP	*WDI* [b]: NY.GDP.PCAP.PP.CD	GDP per capita, PPP (current international $)
TRADG	*WDI*: TG.VAL.TOTL.GG.ZS	Sum of exports and imports (% of goods GDP)
TRADGAV	*WDI*: TG.VAL.TOTL.GG.ZS	Average for TRADG for t-1,…,t-4
DLCPI	*WDI*: FP.CPI.TOTL.ZG	Inflation, consumer prices (annual %)
BDGTG	*WDI*: GB.BAL.OVRL.GD.ZS	Overall budget deficit, including grants (% of GDP)
USTBILL	*IMF-IFS*[c]	Interest rate on U.S. Treasury bill
CORRUPT	*PRS*: International Country Risk Guide	Level of Corruption [d]
POLITY2	*POLITY IV* project	Political regime type [e]
POLCOMP	*POLITY IV* project	Degree of political competition [f]
HERFGOV	*World Bank*'s political dataset	Herfindehl index for ruling coalition [g]
KKCCAR	IMF- *EAER* [h]	Binary measure for current account and/or capital account restrictions
	Samples (1982-1998) [i]	
ALL	All countries in the 2001 edition of the *WDI* (83 countries)	
OECD	OECD countries (21 countries)	
DEV	Developing countries – defined as all countries excluding OECD countries and island states (60 countries)	

[a] The IMF's *Balance-of-Payments Statistics*.
[b] The World Bank's *World Development Indicators*.
[c] The IMF's *International Finance Statistics*.
[d] This index runs from -6 (low probability/risk of encountering corruption) to 0 (highly corrupt).
[e] The index runs between -10 (fully autocratic) to +10 (fully democratic).
[f] The index defines incremental steps between 1 (repressed competition –such as in totalitarian systems or military dictatorships) and 10 (institutionalized open electoral participation).
[g] The index is constructed by summing the squared seat shares of all parties in the government. Thus, the index runs between 0 and 1 (a single party in the coalition).
[h] The IMF's *Annual Report on Exchange Arrangements and Exchange Restrictions;* see Glick and Hutchison (forthcoming).
[i] Data availability further constrained our samples. Thus, the numbers reflect countries for which data were available for the specifications described in table 3 columns 1-3 (but not necessarily for the whole 1982-1998 time period for each country).

Table 1A. Financial Openness – Descriptive Statistics

	1970s	1980s	1990s	All years
Developing countries	6.23	5.43	8.63	6.82
OECD countries	7.34	9.31	16.79	11.50
East Asia	11.20	8.47	16.53	12.38
Latin America	4.81	6.05	8.15	6.53
Other [a]	6.21	4.89	7.10	5.93
All	6.83	6.96	10.35	8.23

[a] Other includes Africa (North and Sub-Saharan), Middle East and South Asia.

Table 1B. Financial Openness - Correlations

Correlation of financial openness measure with…	Comm. openness (t)	Comm. openness (previous average)	Current account
Developing countries	0.34	0.34	0.25
OECD countries	0.39	0.37	-0.04
East Asia	0.32	0.27	-0.23
Latin America	0.25	0.18	0.20
Other [a]	0.34	0.39	0.36
All	0.39	0.38	0.23

[a] Other includes Africa (North and Sub-Saharan), Middle East and South Asia.

Table 2. Correlation Coefficients for Political Variables

	POLITY2	HERFGOV	POLCOMP
CORRUPT	-0.26	0.12	-0.22
POLITY2		-0.27	0.94
HERFGOV			-0.27

Table 3. Benchmark Model Results

	(1)	(2)	(3)	(4)	(5)	(6)
Per capita GDP	0.64**	0.14	2.28***	2.14***	2.02***	1.41***
	(2.14)	(1.09)	(4.09)	(4.28)	(3.67)	(3.11)
Budget surplus	-0.26*	0.44***	-0.40**	-0.28*	-0.42**	-0.26*
(% of GDP)	(-1.70)	(4.60)	(-2.07)	(-1.62)	(-2.16)	(-1.81)
Inflation (CPI)	0.00	-0.14	0.00	0.00	0.00	0.00
	(-0.16)	(-1.46)	(-0.38)	(-0.27)	(-0.47)	(-0.28)
US Treasury bill rate	-0.32	-0.03	-0.26	-0.31	-0.19	-0.13
	(-0.88)	(-0.14)	(-0.53)	(-0.70)	(-0.38)	(-0.32)
Trade openness	0.11***	0.09***	0.07***	0.08***	0.08***	0.09***
(Average for t-1,…,t-4)	(9.08)	(7.99)	(4.52)	(5.51)	(5.15)	(7.19)
Democracy/autocracy	-0.44***	-0.40	-0.51**	-0.26*		
	(-2.71)	(-0.37)	(-2.48)	(-1.60)		
Corruption	-2.01**	-0.12	-2.74**		-1.86*	
	(-2.23)	(-0.25)	(-2.24)		(-1.59)	
The 1990s	4.89***	3.04***	4.65**	4.04**	3.52*	3.83**
	(2.99)	(3.71)	(2.10)	(2.08)	(1.62)	(2.17)
ρ [a]	0.88***	0.86***	0.88***	0.88***	0.88***	0.88***
Observations	829	222	607	694	607	768
Sample [b]	ALL	OECD	DEV	DEV	DEV	DEV

t-statistics for all variables are given in parentheses. We denote significance levels at the 10%, 5% and 1% with *, ** and *** respectively.
The LHS variable is the sum of financial inflows and outflows (as % of GDP).
Estimation using the Prais-Winsten algorithm assuming an AR(1) process for the error terms.
For definitions of variables, see appendix B.

[a] ρ is the correlation coefficient for the AR(1) process: $\varepsilon_{it} = \rho\varepsilon_{it-1} + \mu_{it}$.

[b] ALL denotes the whole sample, OECD includes only OECD countries and DEV denotes the developing countries sample. For precise definitions see appendix B and text.

Table 4. Effects of Changes in Independent Variables on Financial Openness

	Effect of positive change of one standard deviation		Effect of moving from the median value of the variable in developing countries to the median value in the OECD sample
	Whole Sample[a]	Developing Countries[b]	Whole Sample[a c]
Trade openness	12.27	9.42	2.95
Democracy/autocracy	-3.13	-3.51	-2.21
Corruption	-2.89	-3.12	4.01

[a] Specification in table 3 column 1.
[b] Specification in table 3 column 3.
[c] From our data, the median developing country is less open to trade, less democratic and more corrupt.

Table 5. Robustness - Political Variables

	(1)	(2)	(3)	(4)	(5)
Per capita GDP	2.26***	2.15***	0.64***	0.33**	1.40***
	(3.94)	(4.17)	(5.70)	(2.03)	(2.47)
Budget surplus	-0.44**	-0.30*	-0.03	-0.10*	-0.28
(% of GDP)	(-2.19)	(-1.71)	(-0.60)	(-1.70)	(-1.41)
Inflation (CPI)	0.00	0.00	0.00	0.00	0.00
	(-0.45)	(-0.32)	(0.02)	(-0.29)	(-0.27)
US Treasury bill rate	-0.26	-0.27	-0.30***	-0.22	-0.56
	(-0.51)	(-0.59)	(-2.61)	(-1.41)	(-1.15)
Trade openness	0.08***	0.08***	0.05***	0.06***	0.07***
(Average for t-1,…,t-4)	(4.65)	(5.47)	(15.04)	(12.88)	(4.48)
Political competition	-0.67*	-0.39			
	(-1.75)	(-1.19)			
Government fractionalization			-1.87**	-1.40	
			(-2.22)	(-1.24)	
Democracy/autocracy					-0.35*
					(-1.69)
De jure restrictions on the capital account					-3.34
					(-0.99)
Corruption	-2.07*		0.73***		1.15
	(-1.74)		(2.93)		(0.93)
The 1990s	4.01*	3.70*	1.27***	1.89***	3.42*
	(1.79)	(1.88)	(2.56)	(2.78)	(1.56)
ρ [a]	0.88***	0.88***	0.73***	0.83***	0.89***
Observations	591	673	552	635	578
Sample [b]	DEV	DEV	DEV	DEV	DEV

t-statistics for all variables are given in parentheses. We denote significance levels at the 10%, 5% and 1% with *, ** and *** respectively.
The LHS variable is the sum of financial inflows and outflows (as % of GDP).
Estimation using the Prais-Winsten algorithm assuming an AR(1) process for the error terms. For definitions of variables and samples, see appendix B.

[a] ρ is the correlation coefficient for the AR(1) process: $\varepsilon_{it} = \rho\varepsilon_{it-1} + \mu_{it}$.

[b] DEV denotes the developing countries sample.

Table 6. Reverse Causality (from FO to CO) - Benchmark Model Results

	(1)	(2)	(3)	(4)	(5)
Per capita GDP	0.00***	0.00	0.02***	0.02***	0.02***
	(5.94)	(1.07)	(12.43)	(12.08)	(12.40)
Budget surplus	1.37***	-1.05**	0.93**	0.90*	1.07**
(% of GDP)	(3.53)	(-2.06)	(1.98)	(1.88)	(2.16)
Inflation (CPI)	0.00	-0.11	0.00	0.00	0.00
	(0.29)	(-0.46)	(0.23)	(0.21)	(0.34)
US Treasury bill rate	1.72**	0.68	1.60	1.91*	2.58**
	(2.03)	(0.77)	(1.51)	(1.74)	(2.36)
Financial openness	0.67***	1.46***	0.43***		
(t-1)	(11.42)	(4.71)	(6.44)		
Financial openness				0.47***	0.43***
(average t-1….t-4)				(6.01)	(5.43)
De jure restrictions on the current account					-20.66***
					(-4.01)
Democracy/autocracy	-1.20***	-1.36	-2.06***	-2.26***	-2.79***
	(2.72)	(-0.23)	(4.06)	(-4.34)	(-5.18)
Corruption	-4.50**	-6.42***	-10.34***	-11.28***	-6.00*
	(1.99)	(2.54)	(3.54)	(3.70)	(1.89)
The 1990s	4.16	0.39	-1.75	0.47	-2.33
	(0.93)	(0.08)	(0.30)	(0.08)	(-0.40)
ρ [a]	0.91***	0.88***	0.89***	0.86***	0.89***
Observations	965	269	696	670	642
Sample [b]	ALL	OECD	DEV	DEV	DEV

t-statistics for all variables are given in parentheses. We denote significance levels at the 10%, 5% and 1% with *, ** and *** respectively. The LHS variable is the sum of exports and imports (as % of GDP). Estimation using the Prais-Winsten algorithm assuming an AR(1) process for the error terms. For definitions of variables, see appendix B.

[a] ρ is the correlation coefficient for the AR(1) process: $\varepsilon_{it} = \rho\varepsilon_{it-1} + \mu_{it}$.

[b] ALL denotes the whole sample, OECD includes only OECD countries and DEV denotes the developing countries sample. For precise definitions see appendix B and text.

Table 7. Geweke (1982) Decomposition of Causality

	Decomposition of feedback [a]	Percent of overall linear feedback [b]
From financial openness to commercial openness ($F_{FO\rightarrow CO}$)	0.27***	53
From commercial openness to financial openness ($F_{CO\rightarrow FO}$)	0.17***	34
Simultaneous causality between financial and commercial openness ($F_{FO\bullet CO}$)	0.06***	13

** represents rejection of H_0: no causality, at the 1% significance level based on a χ^2 test as in Geweke (1982).
[a] As defined in equations (33)-(35).
[b] As percent of the total linear feedback between the two time-series as defined in equation (32).

Figure 1

Correlation of financial and trade openness

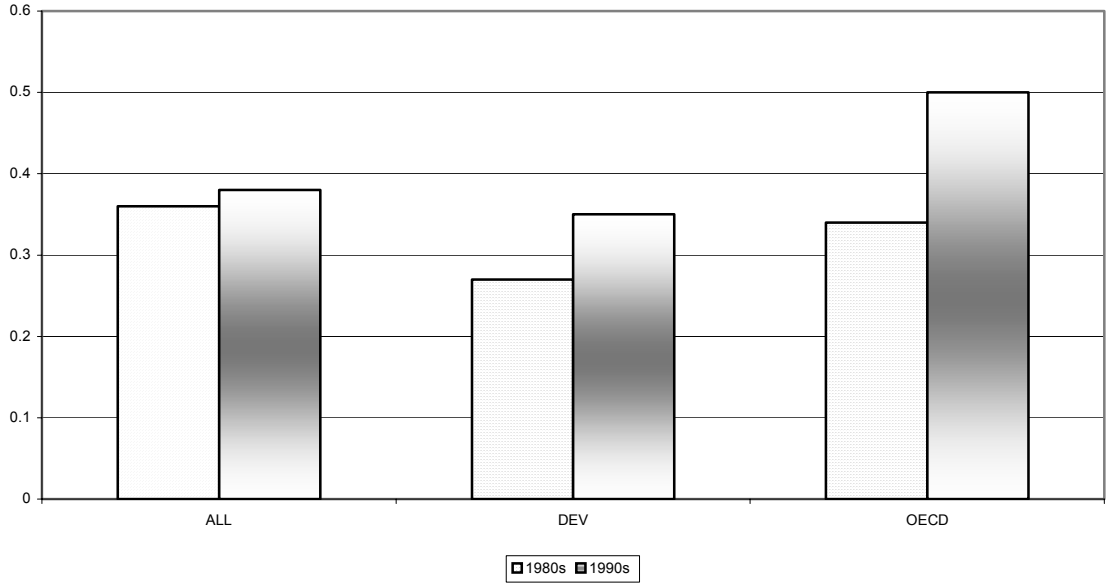

Figure 2

Correlation for financial openness (gross flows) and the current account (net flows)