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Capital account liberalization and inflation☆

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Abstract

Evidence from over 100 countries suggests a strong link between capital account openness and lower inflation. In particular, widespread capital account liberalization during the early 1990s appears to have contributed to the world-wide disinflation observed during that decade. Alternative indices of capital account openness, including those of Quinn and Toyoda [Measuring International Financial Openness and Closure, Department of Political Science, Georgetown University, Washington, DC, 1996, mimeo] yield similar results.
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The benefits of capital account liberalization remain subject to debate, especially for developing countries. We present empirical evidence linking capital account liberalization to lower inflation, especially in the 1990s. Focusing on trade rather than the capital account, Romer (1993) finds openness is associated with lower inflation—an empirical regularity he attributes to the disciplining effect of nominal exchange rate changes on monetary policy. Of the 112 countries in Romer's 1973–89 sample, two-thirds eased capital or current account convertibility restrictions in the 1990s. This liberalization wave provides an opportunity to study the relationship between capital controls and inflation. Studying changes in inflation and liberalizations rather than inflation and the intensity of

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Table 1
Capital account openness and inflation

	OLS					GMM-2SLS[b]			
Regression equation:	Romer (1993) (1.1)	QT 73–88[a] (1.2)	IMF -ERAR (1.3)	IMF -CBI (1.4)	IMF-Fix fx (1.5)	QT 73–88[a] (1.2a)	IMF -ERAR (1.3a)	IMF -CBI (1.4a)	IMF-Fix fx (1.5a)
Constant	2.58	2.11	1.25	1.94	2.66	1.69	0.71	− 1.65	1.16
	(0.54)	(0.86)	(0.54)	(0.81)	(0.51)	**(1.03)**	(0.72)	**(1.52)**	**(0.77)**
GDP per capita 1980$ppp	− 0.003	0.14	0.21	0.12	0.08	0.23	0.30	0.48	0.30
	(0.07)	**(0.11)**	**(0.07)**	(0.10)	**(0.70)**	**(0.14)**	(0.10)	**(0.17)**	(0.11)
Trade openness[c]	− 0.73	− 0.71	− 0.67	− 0.85	− 0.68	− 0.50	− 0.49	− 1.37	− 0.46
	(0.25)	**(0.43)**	**(0.25)**	(0.40)	**(0.25)**	**(0.33)**	**(0.22)**	**(0.45)**	**(0.20)**
Capital account openness[a]		− 0.26	− 0.28	− 0.34	− 0.23	− 0.49	− 0.50	− 0.64	− 0.64
		(0.12)	**(0.07)**	(0.11)	**(0.07)**	**(0.16)**	**(0.13)**	**(0.17)**	**(0.13)**
Latitude		− 0.01	− 0.01		− 0.01	− 0.01	− 0.01		− 0.01
		(0.004)	**(0.003)**		**(0.003)**	**(0.004)**	**(0.002)**		**(0.003)**
Latin America		0.85	0.36		0.42	1.01	0.30		0.32
		(0.27)	**(0.15)**		**(0.15)**	**(0.025)**	**(0.16)**		**(0.18)**
Political instability[c]	1.03		0.83				0.72		
	(0.32)		**(0.28)**				**(0.42)**		
Central bank turnover[d]				1.93				5.43	
				(0.65)				(1.77)	
Exchange rate regime				− 0.35	− 0.40			0.30	− 0.23
				(0.23)	(0.15)			**(0.27)**	(0.14)
Number of observations	112	64	109	60	110	64	109	59	110
Adjusted R^2	0.17	0.37	0.44	0.42	0.41	0.33	0.34	0.05	0.20
White heteroskedasticity Test—significance level	0.04	0.17	0.18	0.84	0.43				
SEE	0.69	0.74	0.58	0.68	0.57	0.77	0.61	0.86	0.67
OLS consistency test (significance level)[e]		0.38	0.65	0.74	0.27				
Hansen–Sargan Instrument Test—Significance level[f]						0.72	0.20	0.94	0.27

Dependent variable: log average CPI inflation 1973–89 from Romer (1993) (White Heteroskedasticity—Consistent standard errors); notes: see Table 2.

capital controls is also, in effect, a specification test of the latter regressions, such as those reported by Grilli and Milesi-Ferretti (1995).

Table 1 explores how changes in the intensity of capital controls affect inflation, holding other structural variables such as openness to trade constant. Our dependent variable is Romer's (1993) log average inflation rate for 1973–1989. Equation 1.2 adds the average of the 1973 and 1988 capital account openness indices developed by Quinn and Toyoda (1996) to one of Romer's benchmark equations, reported here as equation 1.1 in Table 1. Equation 1.3 tests a capital controls index we constructed from three current and capital account restrictions tracked in the IMF's annual report on Exchange Arrangements and Exchange Restrictions (EAER).[2] Both our index and Quinn and Toyoda's rise with capital account openness. These results suggest that given openness to trade and other inflation determinants across countries, inflation tends to be lower in countries with more open capital accounts. Of course it is possible that countries with lower inflation are better able to ease capital controls. To check for this sort of endogeneity, equations 1.2a–1.5a instrument out capital controls using a set of instruments related to country size—total 1980 GDP and area in square miles—and endowments (a dummy for oil exporters). The two-stage estimates are similar to the OLS except that the impact of capital account openness tends to be larger. The Hausmann tests suggest the OLS estimates are generally not inconsistent. The last line of Tables 1 and 2 report the Sargan-Hansen tests of over-identifying restrictions for each two-stage estimate. The null that these instruments are uncorrelated with the residuals—that is, are valid instruments—cannot be rejected at conventional significance levels.

Table 2 focuses on disinflation in the 1990s. The dependent variable is now the change in log average CPI inflation during 1991–96 compared to 1981–90. The capital account openness variable in Table 2 captures relaxation or imposition of capital controls during the 1990s relative to the 1980s. No estimates of central bank independence (CBI) are available for the 1990s, so CBI and latitude remain 'state' variables.[3] Equation 1.5 (2.5) includes a dummy variable for countries that had (switched to) a fixed exchange rate in the 1990s. Evidently, conditioning on exchange rate regime increases the measured impact of capital account liberalization on inflation. As our index rises from 0 to 3 as the

[2]The IMF annual EAER report changed formats in 1996. Annual reports from 1966 to 1996 (IMF, 1966–96) were used to construct an openness index by subtracting the proportion of years a restriction was in place during that decade from one. Adding together the capital account, current account and surrender export proceeds restrictions yields an index ranging from 0 to 3 with a larger value indicating a more open capital account. This composite index is a broader indicator of openness than the single capital account index employed by Grilli and Milesi-Ferretti (1995) and Rodrik (1998). The Quinn–Toyoda or QT index remedies several deficiencies of the EAER-based indices by incorporating information from written descriptions of convertibility restrictions and legislation. Unfortunately, the QT index is available for only 63 countries in 1973 and 1988. We averaged these two QT indices for Table 1 regressions. Table 2, equation 2.2 uses the change in a predicted or 'synthetic' QT index (see Footnote 3). See Eichengreen (2001) for a useful survey of various capital account openness indices. For more on the development and testing of these indices—as well as the indices themselves—see Gruben and McLeod (2001), Appendix A available at www.fordham.edu/economics/mcleod/CCAppendix.pdf

[3]The QT index is not available for the 1990s. To create a 'synthetic' QT index for the 1990s, we regressed their 1988 index on ERAR current and capital account restrictions reported for 1986–90, controlling for a number of country characteristics including size and location. We then used the same independent variables for 1991–96 and 1981–89 to create a synthetic QT (SQT) index for those periods—note that because of this estimation process, the SQT index is available for more than 60 countries. The capital account liberalization variable used in equations 2.2 and 2.2g is the change in this SQT index. Note that both EAER current and capital account restrictions are significant in the regressions used to construct the synthetic QT index used for Table 2 estimates, providing a justification of our composite index as well. See Appendix A of Gruben and McLeod (2001) for more details on the construction of these indices.

Table 2
Capital account liberalization and inflation

	OLS				WLS	GMM-2SLS[b]			
Equation:	IMF -ERAR (2.1)	SQT index[a] (2.2)	IMF -ERAR + CBI (2.3)	ΔFx-Regime LDCs (2.4)	IMF -ERAR + CBI (2.3w)	IMF -ERAR (2.1g)	SQT index[a] (2.2g)	IMF -ERAR + CBI (2.3g)	ΔFx-regime LDCs (2.4g)
Constant	2.53	2.57	3.99	2.44	3.73	2.63	2.50	2.91	1.92
	(0.56)	**(0.68)**	**(0.91)**	**(0.82)**	**(0.93)**	**(0.53)**	**(0.60)**	**(0.98)**	**(0.91)**
GDP per capita 1980$ppp	− 0.34	− 0.35	− 0.47	− 0.31	− 0.45	− 0.33	− 0.29	− 0.33	− 0.22
	(0.07)	**(0.09)**	**(0.11)**	**(0.11)**	**(0.11)**	**(0.07)**	**(0.08)**	**(0.10)**	(0.12)
Change in trade openness[c]	− 0.36	− 0.13	− 0.79	− 0.84	− 0.39	− 0.31	− 0.02	0.32	− 0.63
	(0.23)	**(0.22)**	**(0.59)**	**(0.32)**	**(0.55)**	**(0.22)**	**(0.12)**	**(0.49)**	**(0.19)**
Capital/current account	− 0.70	− 1.00	− 0.77	− 0.76	− 0.72	− 1.01	− 1.88	− 0.74	− 1.13
liberalization 80s to 90s[a]	**(0.16)**	**(0.23)**	**(0.18)**	**(0.19)**	**(0.16)**	**(0.33)**	**(0.64)**	**(0.25)**	**(0.49)**
Latitude	0.01					0.01			
	(0.00)					**(0.00)**			
Central bank turnover[d]			− 1.02		− 0.93			− 2.29	
			(0.74)		**(0.65)**			**(1.10)**	
Switch to fixed fx rate				− 0.52					− 0.68
				(0.28)					(0.22)
Number of observations	101	80	60	79	60	101	80	59	79
Adjusted R^2	0.34	0.33	0.42	0.31	0.47	0.30	0.20	0.33	0.26
White heteroskedasticity test—significance level	0.68	0.56	0.03	0.76	0.16				
SEE	0.80	0.78	0.81	0.92	0.73	0.82	0.86	0.71	0.95
OLS consistency test—significance level[e]	0.13	0.29	0.92	0.36					
Sargan–Hansen Instrument Test—significance level[f]						0.18	0.23	0.41	0.21

Dependent Variable: Change in Log Average CPI Inflation from 1981–90 to 1991–96 (White Heteroskedasticity—Consistent standard errors).

[a] Equations 1.2 and 1.2a use an average of the 1973 and 1988 Quinn Toyoda indices while equation 2.2 and 2.2g in Table 2 employ the change in a 'synthetic' QT (SQT) openness index constructed by the authors (see Footnote 2). The other equations all use the composite index derived from three current and capital account ERAR restrictions: current and capital account restrictions and 'seize export proceeds.' Table 2 uses changes in that index in Table 2. Other than equation 2.4 where they sample less developed countries (LDCs) only, we start with Romer's (1993) 114-country sample but then lost some countries to various missing data problems.

[b] Instruments include all variables except the capital controls index plus total GDP PPP$1980, log area in square miles and a country dummy for fuel exporters. The data for these last three variables was obtained from Romer (1993), Appendix 2 and from the GDN data base 'Fixed Factors' spreadsheet—also the source of the latitude measure (see World Bank Growth Research Web Page: www.worldbank.org/research/growth/GDNdata.htm#4).

[c] Trade openness in Table 1 is the share of imports in GDP 1973–1989, in Table 2 it is the change in this import share divided by the import share in the 1980s. The political stability measure came directly from Romer (1993), Appendix 2.

[d] Central Bank Turnover is our indicator of Central Bank Independence as prepared for 61 countries by Cukierman et al. (1992) and reported in their Table 11, page 380.

[e] This Durbin-Wu-Hausman test statistic compares the TSLS and OLS estimates assuming the former are consistent. The confidence level for rejecting the null of consistent OLS estimates is reported here.

[f] This is the significance level for rejecting the overidentifying restriction that the instrumented regressors are orthogonal to the error term.

capital account is opened, the results reported in Table 2 suggest that full capital account liberalization is associated with a 3–6% fall in average inflation rates.

Elsewhere, we argue that by allowing freer access to substitute currencies, capital account liberalization raises the interest rate elasticity of money demand thereby reducing the seigniorage-maximizing rate of inflation (Gruben and McLeod, 2001). Rodrik (1998), on the other hand, argues that capital account liberalization makes developing economies in particular more vulnerable to destabilizing, inflationary capital flows. Equations 2.4 and 2.4g include data only on developing countries, the group for which exchange rate regime was a significant determinant of inflation or disinflation. These estimates suggest an equally strong association between capital account liberalization and disinflation in developing countries.

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