Flexing Your Muscles:

Effects of Abandoning Fixed Exchange Rates for Greater Flexibility

Barry Eichengreen and Andrew K. Rose*

Draft: June 5, 2011

Abstract

We identify 51 instances since 1957 when a country or territory abandoned a fixed exchange rate and could have reasonably been expected to see its exchange rate appreciate. After "flexing," countries experienced a wide variety of macroeconomic responses. Those with high investment rates and rapidly growing trade tended to experience sharper declines in growth, while more open economies and countries with more international reserves tended to experience a sharper fall in inflation. These patterns have obvious implications for the current economic circumstances and prospects of China.

Keywords: data, empirical, panel, country, fixed, floating, flexible, regime, switch, change, monetary, regression

JEL Classification Number: E58, F33

Barry Eichengreen
Department of Economics
Berkeley CA 94720-3880
+1 (510) 642-2772
eichengr@econ.berkeley.edu
emlab.berkeley.edu/users/eichengr

Andrew K. Rose
Haas School of Business
Berkeley CA 94720-1900
+1 (510) 642-6609
arose@haas.berkeley.edu
faculty.haas.berkeley.edu/arose

* Eichengreen is Pardee Professor of Economics and Political Science at UC Berkeley; Rose is Rocca Professor of Economic Analysis and Policy, Associate Dean and Faculty Chair at the Haas School, UC Berkeley.

This draft was prepared for the International Seminar on Macroeconomics, Malta, June 2011. We are grateful to Carmen Reinhart for help with data and to Rachita Gullipalli for research support.

1. Introduction

The maintenance of currency pegs by fast-growing emerging markets has become a flash point in discussions of international economic policy. Observers concerned for the stability of the international economic and financial system – senior staff and management at the International Monetary Fund for example – argue that international balance could be better maintained and global financial stability enhanced if emerging markets like China abandoned their pegs in favor of managed floats. More flexible exchange rates would give emerging markets more ability to tailor policy to domestic conditions. Where growth is strong and inflation is a problem, as in China, currency appreciation would help damp down inflationary pressures and avoid asset bubbles and overheating. It would facilitate efforts in these countries to rebalance away from exports in favor of domestic spending. It would slow the accumulation of reserves in the form of U.S. treasury and other advanced-country securities. It would help the United States grow its exports. Insofar as exchange rates fixed at inappropriate levels contributed to global imbalances and thereby helped to plant the seeds for the global financial crisis, this is an issue of international significance. Thus, not just the IMF but high officials in both the United States and Europe regularly make the case for greater exchange-rate flexibility and, implicitly or explicitly, currency appreciation by emerging markets like China.

Spokesmen for emerging markets counter that abandoning pegs for significantly freer floating and appreciation would damage their economies' growth prospects. A high degree of currency stability against the dollar, they argue, has been integral to their successful economic development. Greater variability would make doing international business more difficult,

especially where banks and enterprises lack experience in dealing with currency fluctuations and the relevant hedging markets are missing. Rapid currency appreciation could cause export growth to slow. In turn this could precipitate financial problems for firms heavily invested in the production of tradables and their banks. The exchange rate once de-linked from its anchor, typically the American dollar, could become dangerously unstable. Asset prices might react badly, compounding these other economic and financial problems. In a period when a majority of the growth of global demand emanates from emerging markets, problems in this set of countries are the last thing the world economy needs.

Economic theory and logic have been deployed on both sides of this debate. On the one hand, authors like Chinn (2007) have invoked the Mundell-Fleming model to show how currency appreciation would help countries in China's position to restore internal and external balance. On the other, authors like McKinnon and Schnabl (2006) have invoked elasticity pessimism and the specter of deflationary slumps to show how currency appreciation would do little to correct global imbalances and could lead to falling wages and prices and, in the worst case, a Japanese-style deflationary syndrome.

This arena, characterized by competing models and conflicting priors, has not exactly been informed by copious empirical analysis. Evidence on the effects of abandoning currency pegs for greater flexibility has largely been limited to estimates of import and export demand elasticities, which are used to project prospective changes in the net exports of China and other countries. (For surveys see Marquez and Schindler 2007 and Garcia-Herrero and Kiovu 2010). McKinnon and Schnabl, to inform their analysis of China, lean on the behavior of

macroeconomic variables in the aftermath of Japan's exit from its dollar peg in 1971-73. Kappler, Reisen, Schularick and Turkisch (2011) study 25 substantial nominal and real appreciations, but a number of their observations are step revaluations rather than appreciations occurring in conjunction with a change in the exchange rate regime.

Our approach is different. For purposes of this short paper we examine a comprehensive data set covering over 200 countries and territories since 1957.[1] We then narrow our focus to 51 instances where countries abandoned currency pegs for regimes of greater flexibility and allowed their exchange rates to appreciate.[2] This permits us to examine systematically the impact of these events, which we call "flexes," on a range of macroeconomic and financial variables, including GDP growth, export growth, consumption, investment and inflation. We look for and, if necessary, correct for selectivity bias by searching for differences in country circumstances in the period before the decision to flex was taken.[3]

This approach is not without its limitations. There is of course no single definitive definition of what constitutes flexing. Fortunately, similar results obtain under a number of alternative formulations. Some of the cases we examine are likely to be dismissed as special. For example, a number of them are clustered around the time of the collapse of the Bretton Woods System. Others occur in developing countries whose historical experience has not attracted much attention. But experience following the collapse of the Bretton Woods System may be directly relevant to the future prospects of countries like China, insofar as their decisions to flex could result in the end of the regime that has been widely referred to as Bretton Woods II (Dooley, Folkerts-Landau and Garber 2003).[4] The experience of those few

low-to-middle-income countries that have appreciated out of fixed exchange rate regimes in the past may have not received much prior attention, but it is directly relevant to the prospects for middle-income countries like China today. And the advantage of constructing as large a sample as possible is that the supposed special nature of a subset of those cases need not dominate the results.[5]

We find a very wide range of responses of macroeconomic and financial variables. Another way of putting this is that the very wide dispersion of results makes it hard to identify significant differences in the behavior of the variables of interest before and after flexing, or between the flexers and other countries in the wake of the event.

This suggests that our 51 cases are a heterogeneous lot. In a subset of cases, however, the decision to flex is followed by a discernible slowdown in the rate of growth of the economy. Slowdowns are most likely, we show, when the investment ratio is high, consumption, investment, exports and imports are growing rapidly, and credit growth is rising. Since we only have 51 observations, we cannot hope to be precise, but our results are robust in the case of high investment rates and rapid import growth in particular; both of these presage a decline in growth following flexing. The implication is that China may have some basis for worrying about the growth effects of appreciating out of its fixed exchange rate regime.

In a subset of cases, the decision to flex was also followed by a significant decline in the rate of inflation. Slower inflation is most likely, we show, in countries that are relatively open to trade (where the reduction in the rate of import price inflation presumably has the greatest impact) and with high foreign reserves (which had presumably been sterilizing capital inflows

with less than complete success prior to the change in exchange rate regime). These results also have obvious implications for China, which is currently characterized by inflation and the other macroeconomic characteristics in question.

Section 2 describes our data and definitions and provides some basic information on our sample of 51 cases. Section 3 discusses the determinants of flexing and addresses the possibility of selection bias. The main results are in Section 4, which presents event studies, and in Section 5, where we report some simple regression analysis. Section 6, in concluding, draws out the implications for China and the global-rebalancing debate. The appendix then presents some case studies of flexing that were and were not accompanied by significant growth slowdowns.

2. Data and Definitions

We first identify cases where countries abandoned exchange rate pegs with a reasonable expectation that their currencies might appreciate. Doing so is not straightforward. Exchange rate regimes come in many flavors, not just pegs and floats. Many countries, while not attempting to maintain a peg, manage their rates heavily; these are intermediate regimes of one type or another. Others have a stated (*de jure*) exchange rate regime that differs from actual (*de facto*) practice. Some countries have multiple exchange rates; they may regulate one according to official policy but have a different exchange rate (often on the black market) that moves differently and is used for unofficial transactions. Finally, in some cases where an appreciation is expected, it may not be realized.

The first step is to identify shifts from extended regimes of fixed exchange rates to greater flexibility. For this purpose we utilize the Reinhart-Rogoff (RR) classification of exchange rate regimes, as extended by Reinhart and Rogoff with Ilzetzki. This distinguishes 15 exchange rate regimes by degree of flexibility and is available monthly from 1946m1 through 2007m9 for 218 countries. In constructing their index RR utilize information on both official and black market exchange rates. The first four of their categories – no separate legal tender; pre-announced peg or currency board arrangement; pre-announced horizontal band narrower than or equal to +/-2%; and *de facto* peg – can be considered as fixed rate regimes.[6] We look for cases where countries moved away from these regimes; there are 119 departures of relevance in the sample.[7]

There of course exist a number of alternative classifications of exchange rate regimes. The most prominent, published by the IMF, has been based on government's stated *de jure* exchange rate policy.[8] But it is what officials in charge of exchange rate policy actually *do* rather than what they *say* that is of interest here. Similarly, we choose not to use Shambaugh's (2004) classification, since this relies exclusively on *de jure* exchange rate data and provides only a coarse classification (peg/no-peg) at an annual frequency. Levy-Yeyati and Sturzenegger's (2003) categorization incorporates information on movements in both exchange rates and international reserves, but their data set is annual, begins only in 1974, ends in 2004, and has a number of missing and inconclusive observations, all of which are disadvantages for our purposes.

We look for cases where countries moved away from these regimes and then experienced either exchange rate appreciation or at most minor depreciation over the subsequent period.[9] Implementing this criterion requires answering to two further questions: how long a subsequent period, and exchange rate movements against what? We examine exchange rate changes over the three months following the regime change. This is long enough for the exchange rate change to be unaffected by high-frequency considerations – transient financial shocks, for example – while retaining our focus on the aftermath of regime changes. Lengthening and shortening the subsequent period does not notably change the results. We examine currencies that appreciated by any amount or else depreciated by less than 5 per cent; the latter figure is again arbitrary but seems reasonable. Finally, we consider official exchange rates against both the U.S. dollar and the SDR.[10]

We review these observations one by one. We exclude cases where the RR data set indicate a regime transition but there was no subsequent change in the official SDR exchange rate. (Virtually without exception, there was also no change in the official dollar exchange rate in these cases.) We also exclude some more questionable cases. For instance, we exclude Germany's 1971 exit, leaving only German departures in 1969 and 1973.[11]

We are left with 51 cases. These are tabulated in Table 1 along with the three-month rates of change of the SDR, official dollar rate and parallel market rate (where available). We see there a number of prominent cases (Canada in 1970, Germany in 1973) along with some more obscure ones. The earliest flexing is Paraguay in 1960, the most recent Malaysia in 2005.[12] A substantial fraction of cases (20 out of 51) are clustered around the time of the

collapse of the Bretton Woods System (1971-3). But we also detect flexing in the 1960s, 1980s, 1990s and 2000s. By way of illustration, we describe the background and context for a few of these cases in the appendix below.

3. Determinants of Flexings, and Selection

In the next section we ask how macroeconomic and financial variables behave in the wake of a decision to abandon a currency peg in favor of greater flexibility and allow the currency to appreciate or at least not depreciate significantly. But a logically prior question is whether the post-exit behavior of our variables is affected by their exceptional behavior in the immediately preceding period. Are our findings for the post-exit period contaminated by selectivity, in other words? After all, countries choosing to move to greater exchange rate flexibility do not do so randomly. An obvious source of selectivity is country size. Very small open economies tend not to have floating exchange rates.[13] Correspondingly, they are less likely to abandon their fixed exchange rates in favor of greater flexibility and currency appreciation. Other sources of selectivity are less obvious. For example, it is not obvious to us that fast growing countries might deliberately decide to flex as opposed to remaining in a fixed exchange rate regime. As observers of the Chinese economy might put it, why mess with success?

Why do countries flex, appreciating out of fixed exchange rate regimes as they relax their exchange rate flexibility? We analyze the possibility of selectivity bias by examining whether countries that flex differ systematically from other countries in our sample. Since the

decision to leave a fixed exchange rate is an event with potentially important medium-term consequences, and because the exact timing of the regime change is less important, we begin by converting our annual data to 3-year averages. (Using 5-year averages makes little difference.) We then construct a binary left-hand side variable where a value of unity signifies a flexing during the period and all other observations take on values of zero. We use this as the dependent variable in an encompassing set of probit regressions to see whether any of the usual suspects register significantly on the right-hand side of the equation. Since we already know that country size and openness vary with exchange rate regime, we include them, along with country- and time-specific fixed effects, as conditioning variables. We are interested in asking whether there is evidence that the variables of interest affect the likelihood of flexing. If the rate of GDP growth, for example, has a significant effect in the probit model, this is prima facie evidence of selection bias – that relatively slow or, more plausibly, fast growing countries (depending on the sign of the coefficients) are more likely to flex.

Results are in Table 2. The top panel displays a set of bivariate probit regressions. Those in the middle include both fixed time- and random country-specific effects, while those on the right have neither. Almost without exception, the variables of interest (GDP growth, export growth, investment growth, consumption growth, credit growth) do not enter the probit regressions significantly. We interpret this as indicating that selection bias in the relevant sense is unimportant. While we do find that size and openness are systematically associated with the probability of flexing, these variables are fixed (or at least very slowly moving), and as a result they are not the focus of our analysis. In other words, their significance in these regressions is

not relevant to the question at hand.[14] These results are confirmed in the multivariate results tabulate in the lower panel of Table 2.

We conclude that when analyzing their consequences, it seems reasonable to ignore the determinants of flexing (other than size). We turn now to that task.

4. Main Results

4.1 Event Studies

We now examine the behavior of the flexers in more detail. We use annual data throughout, and extract almost all our series from the World Bank's *World Development Indicators.* The behavior of GDP growth for the 51 flexings, for example, is shown in the top left panel of Figure 1, starting five years beforehand, continuing through the event and another five years afterwards. Average (mean) behavior is bracketed by a pair of +/- 2 standard error deviation confidence bands to give some idea of the spread of the data. In all, sixteen key macroeconomic and financial variables are shown in Figure 1. We choose these variables to cover a broad range of aspects of the macro-economy, placing special emphasis on those of particular relevance to China (e.g., export growth and the spending shares of consumption and investment).[15]

The overwhelming impression is of little change between the periods before and after the event. The reassuring interpretation of this is that the negative effects of concern to those who resist the idea that emerging markets like China should abandon their pegs are not evident

in similar prior episodes: for the sample as a whole, there is no sign of a significant deceleration in rates of GDP growth, investment growth, or export growth. A less reassuring interpretation from an analytical point of view is that there is considerable variation in behavior both before and after the event, making it impossible to pick out overall responses. Flexing has occurred under a variety of different circumstances, the argument would go. Heterogeneity makes it impossible to identify subsequent changes in macroeconomic and financial outcomes. The width of the two standard deviation bands relative to the means is consistent with this view.

We examine this behavior more systematically by regressing each of these variables, with the dependent variable centered on the date of the flex, on its own leads and lags. There is little evidence unusual behavior in any of these variables in the years prior to the exit. The same is true of the coefficients on the leads: as in Figure 1, where there is little evidence of changes in the behavior of our macroeconomic and financial variables before and after the 51 flexes, here there is no evidence of significant changes in the behavior of the key variables after the fact.

This impression is further confirmed by Figure 2, which uses a subset of our 51 flexes to check for robustness. In particular, we restrict our attention to the 32 exits from fixed regimes where the exchange rate appreciated or did not move over the subsequent three months. Otherwise, Figure 2 is analogous to Figure 1 in both construction and results.

4.2 A Closer Look

Event studies like those just undertaken are intrinsically univariate and may therefore mask significant covariation among variables. A next logical step is to examine bivariate correlations. Figures 3 and 4 links GDP growth rates to a range of economic and financial conditions around the time of our 51 flexes. In particular, the evolution in GDP growth rates – how they change from the three years *prior to* our flexes to the analogous three-year period *subsequent to* the event – is juxtaposed against behavior of a number of different variables (averaged over the three years before the flexing). We look at these changes in growth rates, and see whether they are correlated with other potential variables of interest. Figure 5 is the analogue for inflation rates.

The two figures indicate that countries experiencing rapid consumption, investment, export and import growth are more likely to experience slowdowns in the subsequent period. These bivariate relationships are statistically significant at standard confidence levels. All this points to China as a plausible example of an economy that might expect to see a significant slowdown in the wake of abandoning its peg and allowing its currency to appreciate.

Note that the relationship between the post-flex slowdown and import growth is statistically significant at a higher level than that between the post-flex slowdown and export growth. In addition, there is a significant bivariate relationship between pre-flex M2 growth and the post-flex growth slowdown, as if countries experiencing rapid credit booms prior to their flexes are more likely to experience subsequent slowdowns. Again, this suggests that Chinese policy makers' caution over the consequences of flexing a pegged exchange rate is not entirely unwarranted.

Table 3 reports the regression estimates corresponding to Figures 3 and 4. The first two rows confirm that GDP growth is most likely to fall following a flex in low consumption, high investment rate economies. The high pre-exit M2 growth and high pre-exit export and import growth results also come through clearly.

The small number of observations limits our ability to run multivariate regressions controlling for a number of these country characteristics simultaneously. A few simple multivariate regressions, reported in Table 4, suggest, however, that the most robust determinants of the change in GDP growth are a high investment rate and high import growth before the fact.

Where Figures 3 and 4 suggests that the change in the rate of growth is a function mainly of domestic policies and conditions, Figure 5 for inflation suggests that the change in this variable depends more heavily on the external side of the economy. Inflation is more likely to fall when reserves had been high as a share of M2 or GDP, indicating a difficulty in completely sterilizing the effects of reserve accumulation. It is more likely to fall in economies that are more open to trade, plausibly reflecting the moderating impact on import price inflation of the flexing. One anomaly is that countries with current account deficits appear to be more likely to experience a decline in inflation than countries with surpluses; this result, however, is heavily driven by one observation.[16] The regressions in Table 5 confirm that these partial correlations are usually statistically significant at standard confidence levels.

Finally, we examined whether the period after flexes are more likely to have financial crises than the periods before. We used three measures for both banking and currency crises

constructed by previous investigators, in particular Bordo et at (2001), Kaminsky and Reinhart (1999), Demirguc-Kunt and Detragiache (2005) and Jeanne (2007). The number of crises and non-crises is tabulated for both the (five) years before and after exits in Table 6, which also provides chi-squared tests for equality across the periods. There is no sign of any significant relationship for either banking or payments crises, and it seems reasonable to conclude that flexes are not associated with any large change in crisis incidence.[17]

5. Conclusion

Fast-growing emerging markets – even those with inflation problems – remain reluctant, with few exceptions, to abandon their pegged exchange rates in favor of regimes of greater flexibility. At one level their reluctance is understandable: the policy of pegging the exchange rate has served them well. At another level, however, it is increasingly clear that the policy has outlived its usefulness. The main factor feeding their reluctance to move is fear of the unknown – that abandoning their pegged exchange rates for a regime of greater flexibility will have uncertain consequences. And policy makers, like investors, are not fond of uncertainty.

Since these issues are debated in an empirical vacuum, actual evidence on the macroeconomic and financial consequence of flexing should have considerable value. We have therefore assembled an historical data base of some 51 such cases, putting aside cases of large depreciations. While these observations stem from a comprehensive approach to the available data, in the end our results are limited by the fact that we only have 51 observations of interest. The results in this short paper should be taken cautiously in this light. Still, we find

strikingly little evidence of major macroeconomic effects – little support in other words for the view that flexing is likely to be a disaster.

At the same time, it is possible to pinpoint the kind of circumstances where the decision to move to greater flexibility is likely to be followed by a significant economic slowdown. The slowdown-prone economies are those with exceptionally low consumption rates and high investment rates. They are economies where exports and domestic credit have been growing most rapidly. To put it simply, they are economies with Chinese characteristics.

These findings suggest that China may have had good reason to be cautious about not moving away from its peg to the dollar too abruptly. But they also point to the kind of policy reforms and macroeconomic rebalancing that the country should pursue in order to prepare the way for its eventual adoption of a more flexible exchange rate.

Table 1. 51 Flexings with Three-Month Exchange Rate Changes

Country	Year	SDR	$	Parallel $
Australia	1974	1%	-2%	-3%
Botswana	1980	-2%	-1%	
Canada	1970	-2%	-2%	-1%
Costa Rica	1963	0%	0%	-1%
Costa Rica	1971	0%	0%	1%
Finland	1973	4%	-7%	-6%
France	1971	0%	-8%	-2%
Germany	1973	0%	-10%	-10%
Germany	1969	0%	0%	0%
Greece	1966	0%	0%	-4%
Haiti	1985	2%	0%	0%
Hong Kong	1972	-1%	-1%	-2%
Iran	1974	0%	0%	0%
Iraq	1982	-2%	0%	-4%
Ireland	1979	0%	-2%	0%
Israel	1970	0%	0%	-2%
Italy	1973	3%	3%	0%
Jamaica	1983	0%	0%	0%
Japan	1973	-2%	-2%	-1%
Kuwait	1975	-2%	2%	1%
Liberia	1998	-2%	-5%	0%
Libya	1971	0%	0%	-11%
Lithuania	2003	-1%	-2%	
Malawi	1973	-2%	-2%	-14%
Malaysia	2005	-2%	0%	
Malaysia	1975	1%	0%	0%
Malta	1972	3%	3%	
Mauritania	1974	-1%	-1%	0%
Mexico	1976	1%	1%	-7%
Morocco	1973	2%	2%	1%
Mozambique	2004	-5%	-5%	
Nepal	1978	3%	0%	-21%
Netherlands	1971	-3%	-3%	-3%
New Zealand	1973	-9%	-9%	-5%
Nicaragua	1993	4%	1%	4%
Paraguay	1960	0%	0%	0%
Peru	1967	0%	0%	0%
Philippines	1970	1%	1%	-4%
Portugal	1973	-12%	-12%	-12%
Singapore	1973	-1%	-1%	-6%
South Africa	1972	0%	-10%	-8%
Spain	1974	-3%	-3%	-3%
Sri Lanka	1968	0%	0%	1%
Sri Lanka	1990	4%	1%	-2%
Suriname	1974	-1%	0%	-2%
Sweden	1973	-10%	-10%	-11%
Switzerland	1973	-1%	-1%	-1%
Tunisia	1974	3%	3%	-3%
Turkey	1961	0%	0%	-4%
Turkey	1972	0%	0%	-1%
UK	1972	5%	5%	-2%

The observations tabulated are for countries that have exited a fixed exchange rate regime (RR<5) to a more flexible exchange rate regime and have subsequently either a) appreciated or b) depreciated less than 5% over the next three months. Subsequent SDR, dollar, and parallel dollar depreciation rates tabulated on the right; further description available in the text. Exchange rates quoted as domestic price of foreign exchange, so that negative values indicate exchange rate appreciation.

Table 2. Determinants of Flexes

A. Bivariate

Lags of:	Time + Random Country Effects	No Time or Country Effects
GDP Growth	.33	.20
Consumption/GDP	.16	.04**
Investment/GDP	.07*	.21
Government spending/GDP	.71	.29
GDP Inflation	.44	.08*
Consumption growth	.95	.91
Investment growth	.34	.65
Government Spending growth	.62	.10
Domestic Credit growth	.66	.90
M2 growth	.60	.34
Reserves/M2	.39	.41
Reserves/GDP	.27	.78
Trade/GDP	.74	.06*
Current Account/GDP	.23	.87
Export growth	.32	.19
Import growth	.54	.26
Log Population	.00***	.00***

P-values for hypothesis that coefficients from panel probit regressions =0; one/two/three asterisk(s) indicates that the coefficient is significantly different from zero at the .10/.05/.01 significance level. Regressand = 1 if flexing occurred during three year period, = 0 otherwise. Regressors are three-year averages of lagged variables in left column. Intercepts included but not recorded. Each cell represents a separate regression.

B. Multivariate

Lags of:	Time + Random Country Effects	Random Country Effects Only
Consumption/GDP	-.003 (.006)	-.010* (.006)
Investment/GDP	.011 (.010)	.008 (.009)
GDP Inflation	-.007 (.008)	-.016* (.008)
Log Population	.081 (.058)	-.008 (.047)
Trade/GDP	.002 (.003)	-.005** (.002)

Coefficients (standard errors in parentheses) from panel probit regressions; one/two/three asterisk(s) indicates that the coefficient is significantly different from zero at the .10/.05/.01 significance level. Regressand = 1 if flexing occurred during three year period, = 0 otherwise. Regressors are three-year averages of lagged variables in left column. Intercepts included but not recorded. Each column represents a separate regression.

Table 3. Impact of Various Factors on Change in GDP Growth Rate, Flexes

Three-year lagged averages of:	Coefficient
Consumption/GDP	0.05 (0.6)
Investment/GDP	-0.26*** (-3.9)
Government spending/GDP	0.10 (1.3)
Consumption growth	-0.3** (-2.5)
Investment growth	-0.21*** (-3.7)
Government Spending growth	-0.08 (-0.5)
Inflation	-0.09 (-0.6)
Domestic Credit growth	-0.05 (-0.8)
M2 growth	-0.15** (-2.3)
Reserves/M2	0.00 (0.0)
Reserves/GDP	-0.02 (-0.4)
Trade/GDP	0.01 (1.1)
Export growth	-0.10* (-1.7)
Import growth	-0.17*** (-3.0)
Current Account/GDP	-0.02 (-0.2)

Coefficients from bivariate OLS regressions, with robust t-statistics recorded in parentheses; one/two/three asterisk(s) indicates that the coefficient is significantly different from zero at the .10/.05/.01 significance level. Regressand: three year post-flex GDP growth rate – three year pre-flex GDP growth rate. Regressors are three-year averages of lagged variables in left column. Intercepts included but not recorded. Maximum of 51 observations (tabulated in Table 1).

Table 4. Multivariate Impact of Various Factors on Change in GDP Growth Rate, Flexes

Three-year lagged averages of:								
Consumption/GDP	0.00 (0.0)							
Investment/GDP	-0.25*** (-2.9)		-0.15* (-1.8)			-0.22** (-2.0)	-0.20** (-2.5)	-0.18** (-2.4)
Government spending/GDP	0.07 (1.1)							
Consumption growth		-0.22 (-0.8)						
Investment growth		-0.15 (-1.3)	-0.15** (-2.1)					
Government Spending growth		0.13 (0.7)						
Inflation				-0.14 (-0.8)				
Domestic Credit growth				0.17* (1.9)			0.04 (0.7)	
M2 growth				-0.32** (-2.5)		0.00 (0.0)		
Reserves/M2				0.0 (0.7)				
Reserves/GDP				-0.11 (-1.5)				
Trade/GDP					0.02 (1.3)			
Export growth					-0.08 (-1.6)			
Import growth					-0.16*** (-2.9)	-0.10 (-1.4)	-0.12 (-1.5)	-0.12* (-1.8)
Observations	44	32	34	31	38	27	35	38
R^2	0.37	0.21	0.31	0.29	0.19	0.30	0.31	0.27

Coefficients from multivariate OLS regressions (one for each column), with robust t-statistics recorded in parentheses; one/two/three asterisk(s) indicates that the coefficient is significantly different from zero at the .10/.05/.01 significance level. Regressand: three year post-flex GDP growth rate – three year pre-flex GDP growth rate. Regressors are three-year averages of lagged variables in left column. Intercepts included but not recorded. Maximum of 51 observations (tabulated in Table 1).

Table 5. Impact of Various Factors on Change in Inflation Rate, Flexes

Three-year lagged averages of:	Coefficient
Consumption/GDP	0.06 (0.5)
Investment/GDP	-0.08 (-0.6)
Government spending/GDP	0.00 (0.0)
Consumption growth	-0.18 (-0.6)
Investment growth	-0.10 (-0.6)
Government Spending growth	-0.19 (-0.5)
Inflation	-0.52*** (-2.6)
Domestic Credit growth	0.00 (0.0)
M2 growth	-0.05 (-0.3)
Reserves/M2	-0.07** (-2.2)
Reserves/GDP	-0.09** (-2.0)
Trade/GDP	-0.03* (-1.8)
Export growth	-0.07 (-0.8)
Lag Import growth	-0.02 (-0.1)
Lag Current Account/GDP	0.33** (2.2)

Coefficients from bivariate OLS regressions, with robust t-statistics recorded in parentheses; one/two/three asterisk(s) indicates that the coefficient is significantly different from zero at the .10/.05/.01 significance level. Regressand: three year post-flex inflation rate – three year pre-flex inflation rate. Regressors are three-year averages of lagged variables in left column. Intercepts included but not recorded. Maximum of 51 observations (tabulated in Table 1).

Table 6. Comparing Five Years before and after Flexes

A. Banking Crises

	Before Exits	After Exits	Total
Non-Crises	10	18	28
Crises	6	3	9
Total	16	21	37

Test of Equality: $\chi^2(1) = 2.7$; p-value = .1. Crises taken from World Bank.

	Before Exits	After Exits	Total
Non-Crises	93	132	225
Crises	1	4	5
Total	94	136	230

Test of Equality: $\chi^2(1) = .9$; p-value = .3. Crises taken from Bordo et al.

	Before Exits	After Exits	Total
Non-Crises	22	42	64
Crises	0	1	1
Total	22	43	65

Test of Equality: $\chi^2(1) = .5$; p-value = .5. Crises taken from Kaminsky and Reinhart.

B. Foreign Exchange Crises

	Before Exits	After Exits	Total
Non-Crises	83	123	206
Crises	11	13	24
Total	94	136	230

Test of Equality: $\chi^2(1) = .3$; p-value = .6. Crises taken from Bordo et al.

	Before Exits	After Exits	Total
Non-Crises	21	39	60
Crises	1	4	5
Total	22	43	65

Test of Equality: $\chi^2(1) = .5$; p-value = .5. Crises taken from Kaminsky and Reinhart.

	Before Exits	After Exits	Total
Non-Crises	46	47	93
Crises	0	1	1
Total	46	48	94

Test of Equality: $\chi^2(1) = 1.0$; p-value = .3. Crises taken from Jeanne.

References

Bohlin, Jan (2010), "From Appreciation to Depreciation – The Exchange Rate of the Swedish Krona, 1913-2008," in Rodney Edvinsson, Tor Jacobson and Daniel Waldenstrom (eds), *Historical Monetary and Financial Statistics for Sweden: Exchange Rates, Prices and Wages, 1277-2008*, Stockholm: Sveriges Riksbank.

Bordo, Michael, Barry Eichengreen, Daniela Klingebiel, and Maria Soledad Martinez-Peria (2001) "Is the Crisis Problem Becoming More Severe?" *Economic Policy* 16, 51-82.

Chinn, Menzie (2007), "Attaining Internal and External Equilibrium in China," www.econobrowser.com (18 March).

Demirguc-Kunt, Asli and Enrica Detragiache (2005), "Cross-country Empirical Studies of Systemic Bank Distress : A Survey" World Bank *Policy Research Working Paper Series 3719*.

Dooley, Michael, David Folkerts-Landau and Peter Garber (2003), "An Essay on the Revived Bretton Woods System," NBER Working Paper no.9971 (September).

Garcia-Herrero, Alicia and Tuuli Kiovu (2010), "The Impact of China's Exchange Rate Policy on Trade in Asia," in Simon Evenett ed., The US-Sino Currency Dispute: New Insights from Economics Politics and Law, *VoxEU.org eBook* (15 April).

Jeanne, Olivier (2007), "International Reserves in Emerging Market Countries" *Brookings Papers on Economic Activity* 1, 1-79.

Kaminsky, Graciela and Carmen Reinhart (1999) "The Twin Crises: Causes of Banking and Balance-of-Payments Problems" *American Economic Review* 89(3), 273-500.

Kappler, Marcus, Helmut Reisen, Morris Schularick and Edouard Turkish (2011), "Macroeconomic Effects of Large Exchange Rate Appreciations," OECD Working Paper no.296 (February).

Levy-Yeyati, Eduardo and Federico Sturzenegger (2003), "To Fix or Float: Evidence on the Impact of Exchange Rate Regimes on Growth," *American Economic Review* 93, pp.1193-1193.

Marquez, Jaime and J.W. Schindler (2007), "Exchange Rate Effects on China's Trade," *Review of International Economics* 15, pp.837-853.

McKinnon, Ronald and Gunther Schnabl (2007), "China's Exchange Rate and International Adjustment in Wages, Prices and Interest Rates: Japan Déjà vu?" CES-Ifo Working Paper no. 1720 (May).

Reinhart, Carmen and Kenneth Rogoff (2004), "The Modern History of Exchange Rate Arrangements: A Reinterpretation," *Quarterly Journal of Economics* 119, pp.1-48.

Shambaugh, Jay (2004), "The Effect of Fixed Exchange Rates on Monetary Policy," *Quarterly Journal of Economics* 119, pp.301-352.

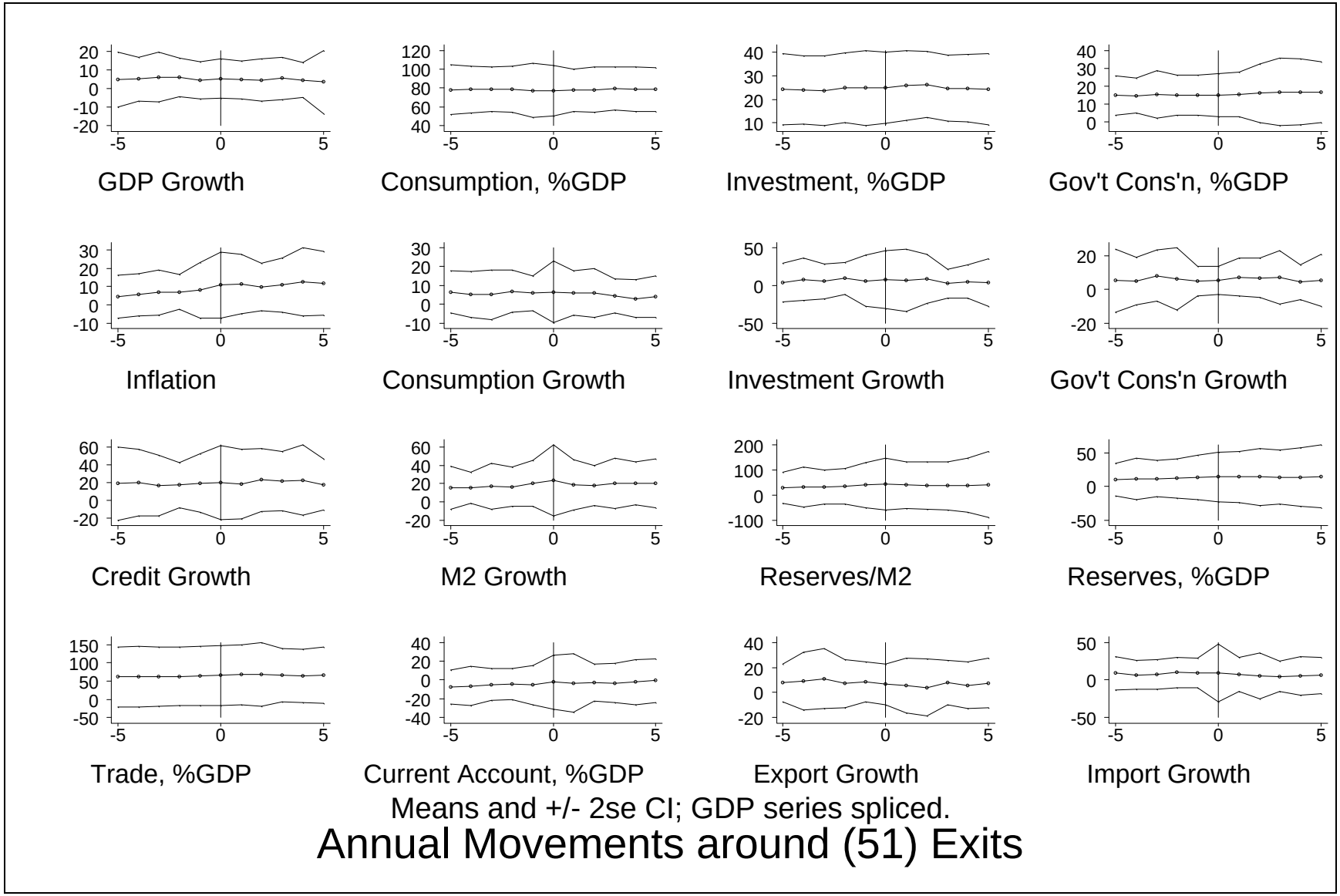

Figure 1: Default Event Study

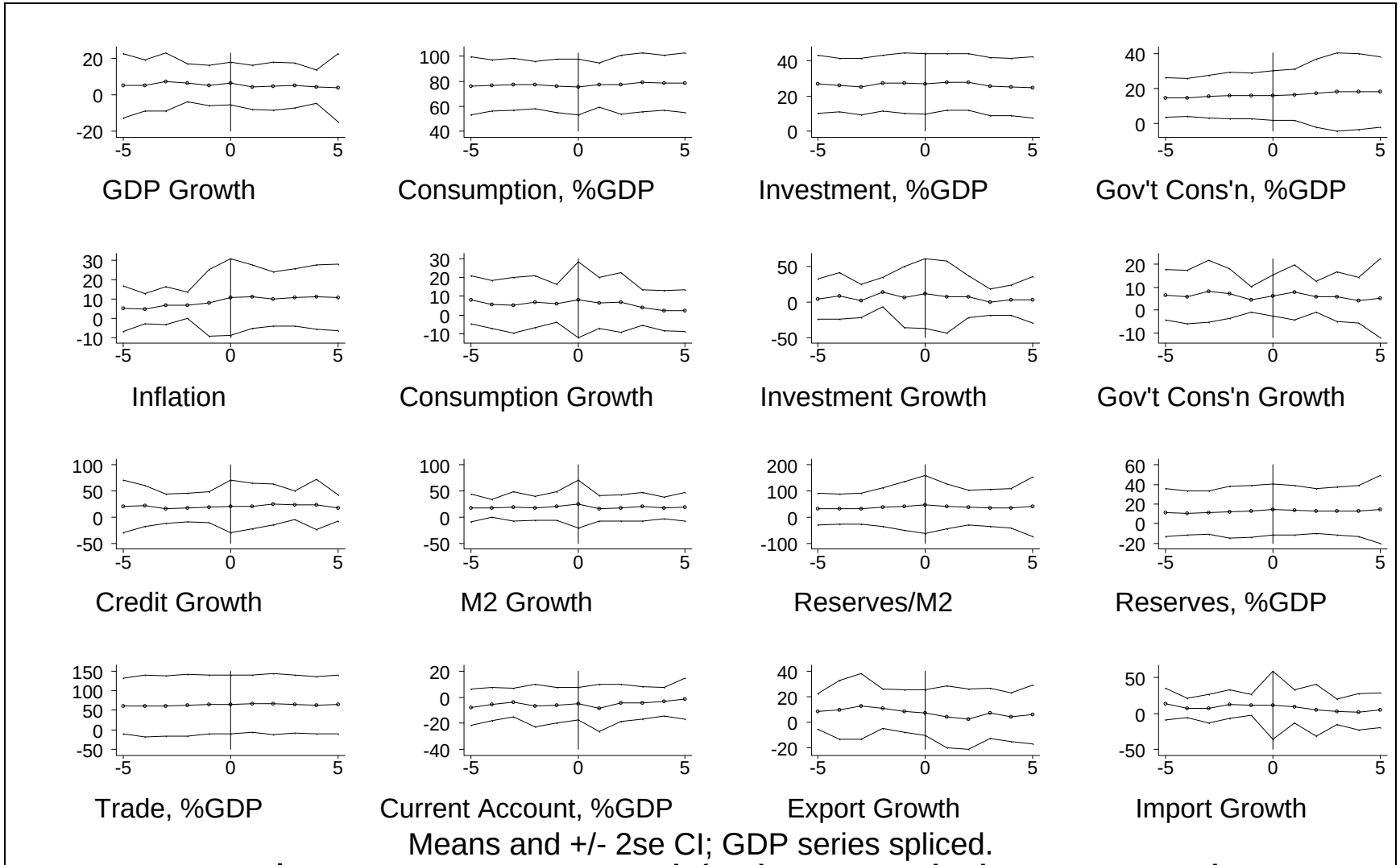

Figure 2: Event Study, Sensitivity Analysis

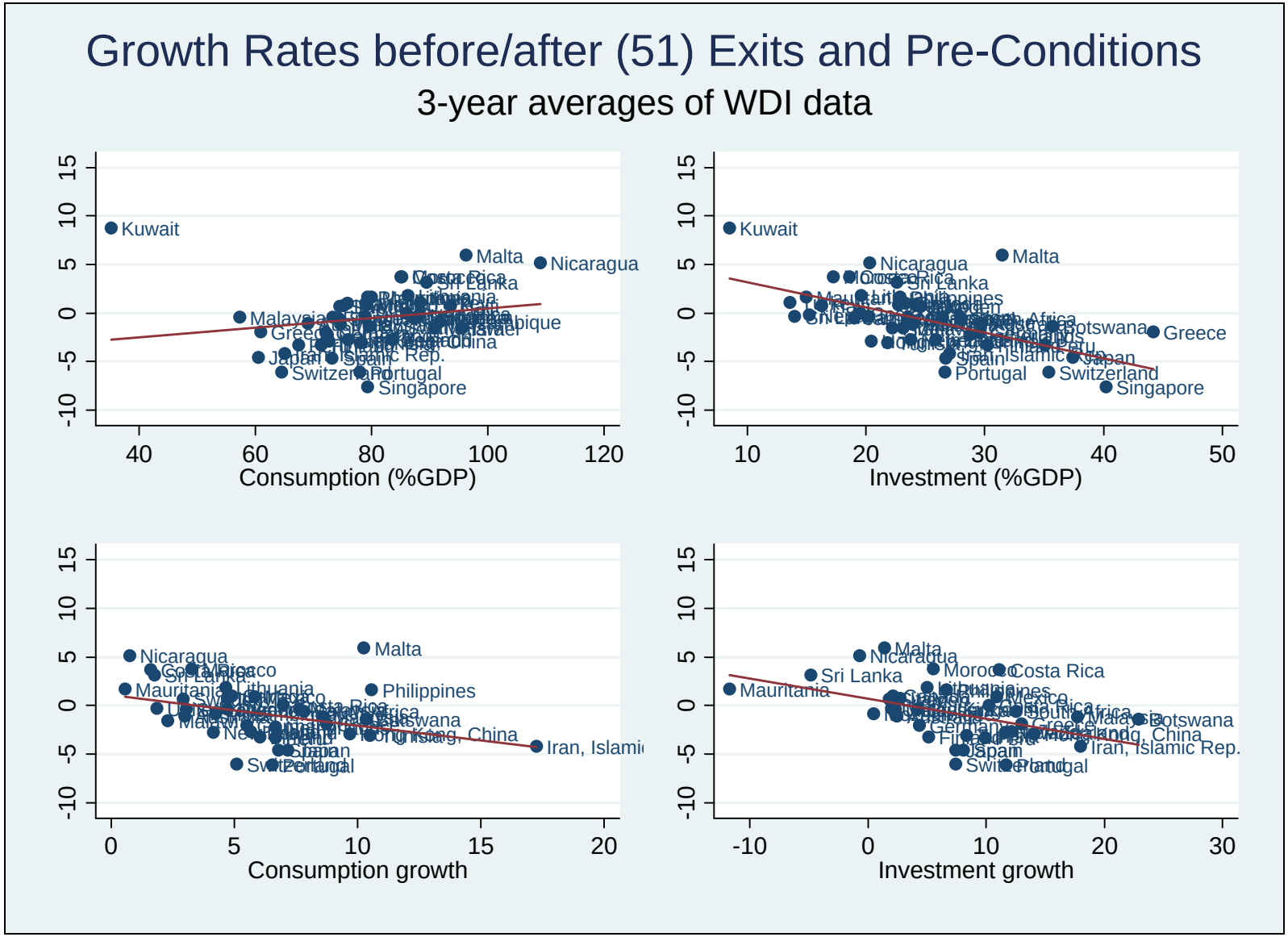

Figure 3: Growth Rate Scatterplots

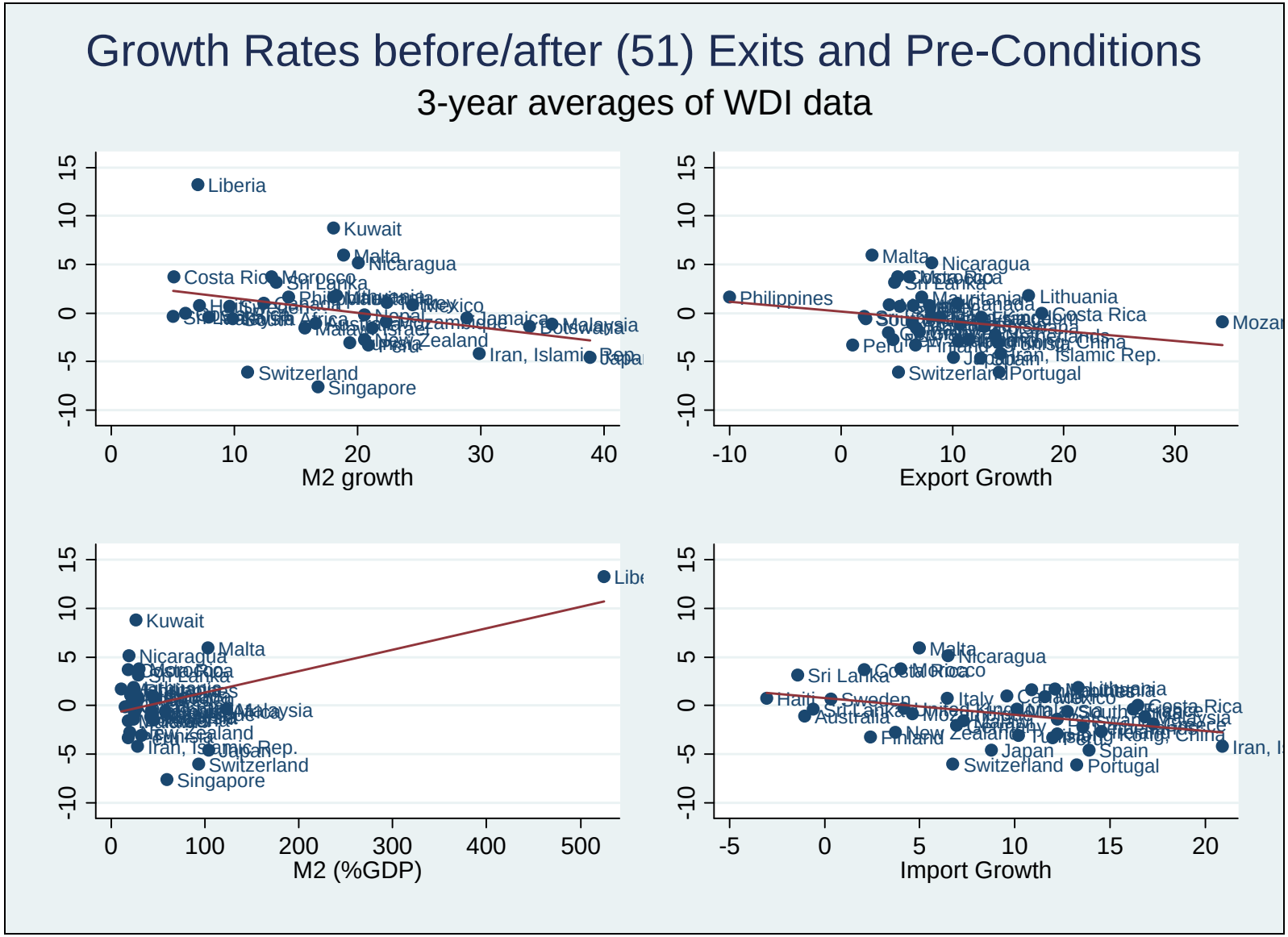

Figure 4: More Growth Rate Scatterplots

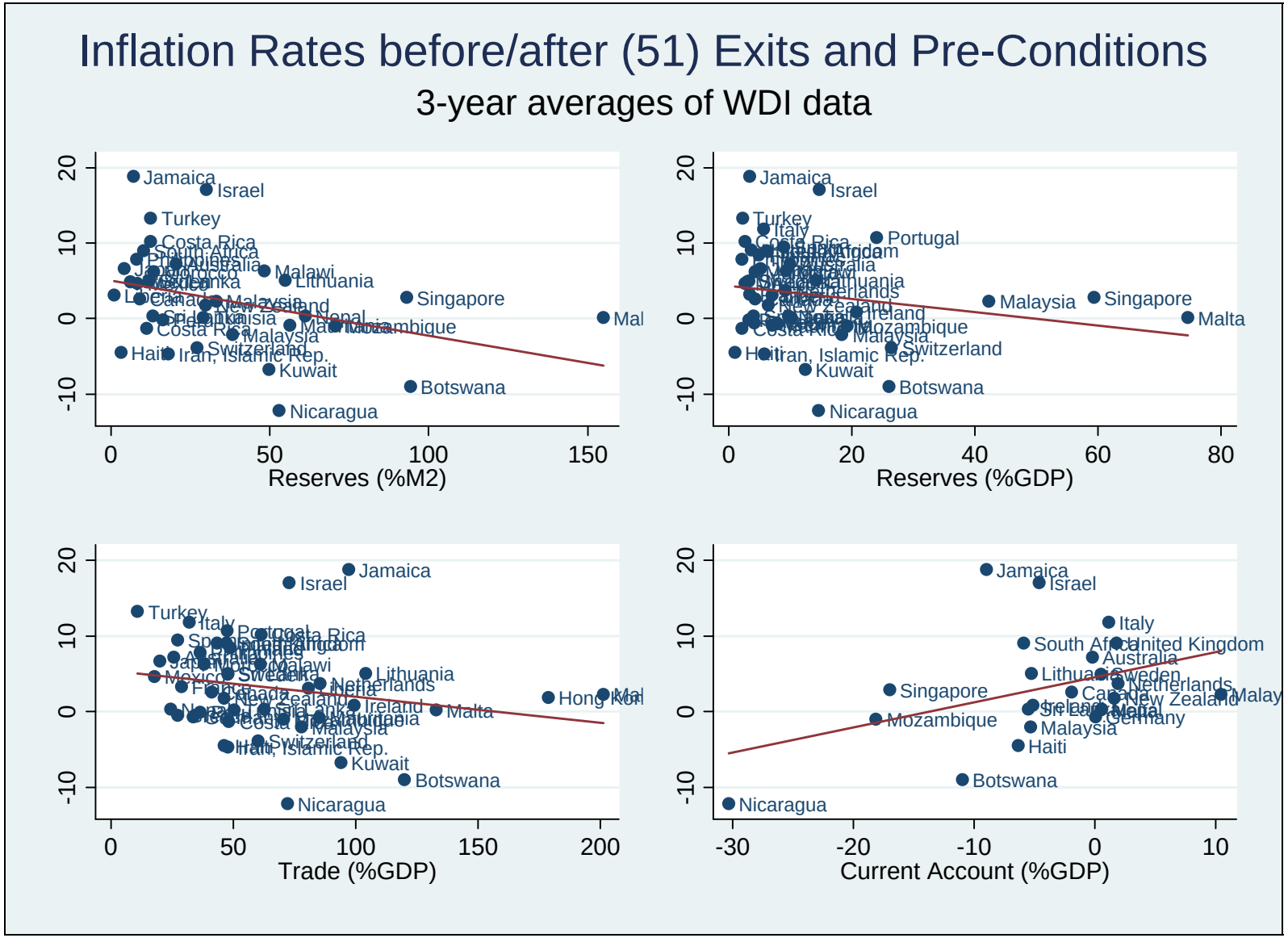

Figure 5: Inflation Rate Scatterplots

Appendix: Selected Country Cases

Canada[18]

After more than a decade of floating and dispute between the central bank and government over management of the currency, the Canadian dollar was pegged to the U.S. dollar at 108C$ in 1962, a relatively competitive level. In the wake of this decision, the country then experienced an extended expansion. After a slight deceleration in 1967, economic activity picked up in 1968 and 1969. Buoyed by exports to the United States, growth averaged 4.5 per cent these two years.

Toward the end of 1968 growth then began slowing in the U.S. and other OECD countries. Since exports to the U.S. constituted 70 per cent of Canada's exports, slower U.S. growth found reflection in Canada in the second half of 1969, with export growing slowing to only a third of 1968 rates. Despite this, however, the Canadian economy continued to expand. Rising inflation spurred the Bank of Canada under Governor Louis Rasminsky to adopt restrictive monetary policies starting in 1968. But capital inflows associated with relatively attractive interest rates of close to 8 per cent put further upward pressure on inflation.

Growth decelerated in 1970 (by 2.4 per cent, down from 4.9 per cent the previous two years). The softening in domestic demand came mainly from the slower growth of durable goods spending (including new cars, new residential construction and business investment in new plant and equipment).

Less demand meant slower import growth and more production available for export – a stronger current account in other words. 1970 was the first time since 1952 that Canada recorded a surplus. The primary reason was the massive increase in the surplus on merchandise trade. Exports grew by 10 per cent in real terms in 1970 after having risen by 8 per cent in 1969. A big change in 1970 was that growth came mostly not from exports not to U.S. but to other OECD countries. Capital inflows combined by this current account surplus to put upward pressure on the Canadian dollar, leading to intervention as a result of which reserves increased by C$ 1.5 billion (US$1.1 billion).

The pressure of capital inflows made currency appreciation an obvious way of countering inflation. Concerned that the government was losing its battle against inflation and also that expectations of a currency revaluation would lead to speculative short-term inflows, the authorities decided to float the currency in May. The Canadian dollar appreciated by 4 per cent in June 1970. By September cumulative appreciation reached 6.4 per cent. By the end of 1970 the exchange rate had risen to US$ 0.989 per C$; and by the first quarter of 1971 the C$-US$ exchange rate came close to parity. By 1972 the Canadian dollar passed the parity mark with the U.S. dollar. By April 1974 Canadian dollar was worth US$ 1.0443.

The float had the desired impact on inflation. Consumer prices rose by 3.3 per cent in 1970 compared to 4.1 per cent per annum on average in the previous three years. As inflation subsided, monetary policy was relaxed. Bank rate was reduced from 8 per cent at the beginning of 1970 to 5.25 per cent by February 1971.

The period from 1971 to 1973 was again one of strong growth. Expansion was accompanied by only inflation initially, but prices rose more rapidly in 1972. The driving force behind the expansion was now the domestic sector; foreign trade, influenced by currency appreciation since the change in exchange rate regime, played less of a role. Private fixed investment strengthened, growing in 1973 by nearly 12 per cent. Monetary policy was generally expansionary and aimed at reducing unemployment and inflation, but due to rising productivity wage increases had only a limited influence on prices.

After strong current surpluses in 1970-1971, Canada's current account moved back into deficit. This was financed by strong capital inflows, both short-term and long-term. As a result (despite the current account deficit) there was again upward pressure on the exchange rate. By April 1974 the Canadian dollar had appreciated to US$ 1.0443 from the parity level in early 1972.

Spain[19]

Spain is an example of a country whose flexing in 1974 was followed by a sharp deceleration in growth, which was 4.3 per cent slower in the three years following the event than in the three before.

The ten years preceding the end of the fixed exchange rate regime had witnessed sharp cyclical fluctuations. The government alternated between contractionary and expansionary policies in a not-entirely-successful effort to achieve a balance between growth and inflation.

The mid-1968 peseta devaluation resulted in a period of feverish expansion which led to overheating of the economy. To moderate the boom, the government reduced subsidies in 1969. But then in 1971-2 it returned to expansionary policies designed to boost investment and demand (increasing directed bank credit, reducing interest rates, providing tax-credits for capital expenditures, and increasing public spending). There was strong recovery in 1972 but also rising inflation. Investment picked up in response to ample availability of credit, positive economic expectations, a favorable shift in price/cost relationship, and the tax credit provided for business investment. Despite the availability of spare capacity at the end of previous year, there was a 15 per cent increase in business investment.

Even then, however, the Spanish current surplus was exceeded only by Italy, Japan and Belgium-Luxembourg.[20] Exports grew faster than in other neighboring European countries. The composition of exports also changed, with the share of industrial goods rising from one-third in 1963 to three-fourths in 1972. The boost in industrial exports was attributed to the installation of additional modern plant capacity reflecting earlier investment subsidies.

Spain was also a net importer of capital. Roughly two-thirds of inflows were foreign direct investment and purchases of land and buildings, one-third business borrowing. The combined trends in the current and capital accounts resulted in a large accumulation of foreign reserves in the years preceding the change in exchange rate regime. But this sterilization was incomplete: inflation rose to 8 per cent in 1972. In 1973 this fed through into wages, which rose by 20% over the year, causing inflation to accelerate to 14 per cent.

The combination of surpluses on current and capital account together with mounting inflation made flexing the obvious way of addressing the inflation problem. Following the U.S. dollar devaluation of February 1973, the authorities decided to maintain the parity of peseta against the SDR. From Feb 13th the central rate for peseta against the dollar was set at 58.0263 pesetas instead of 64.4737.[21]

The stronger exchange rate, higher oil prices and political uncertainty at home resulted in a significant deceleration in growth. GDP growth fell from 7.5 per cent annually in 1970-1973 to only 2.7 per cent pa 1973-1976. This period coincided with the first oil shock, but the latter was not the entire story: Spanish GDP growth rates during the latter period were only slightly higher than OECD average growth rate whereas in the past they used to considerable higher than average OECD rates. GDP then grew at 2 per cent in 1976 and 2.4 per cent in 1977. Fixed investment, which had been the mainstay of growth in early 1970s, declined by 1.6 per cent and in both 1976 and 1977. The only component of GDP that remained relatively steady was public consumption.

The external accounts, which had been in marked surplus in the early 1970s, weakened in the next four years. Some of this may have been due to the flex, but a role was also played by the deterioration in the terms of trade association with the oil shock and global recession. Other previously compensating items like invisibles also declined over 1974-1977. Thus, Spain's flexing was, in a sense, unfortunately timed, coinciding as it did with the end of a period of catch-up growth, rising political uncertainty, and an oil shock that led to sharply slower growth worldwide.

Sweden[22]

The period preceding the 1973 floating of the krona was characterized by growing consensus that social welfare improvements must, to some extent, prevail over quantitative material objectives. Sweden was one of the first countries to adopt full employment as a principal economic policy goal. As a result, fiscal and monetary policies were geared more towards long-term needs than smoothening short-term or cyclical fluctuations.

Growth was sluggish from 1970 through 1973. A growth slowdown began in the second half of 1970; weakness on the domestic front reflected slow growth of both private and public consumption. Fixed investment rose, but more slowly than forecast.

The primary element contributing to the current account deficit of 1970 was the high level of inventory formation (3.2 per cent of GDP compared to the usual 1.4 per cent), which had significant import content. Also contributing to the weakened external balance was an abnormally high level of expenditure on tourism.

In 1971 output and demand stagnated for the first time in more than twenty years. After record deficits in 1970, 1971-1973 was a period of sustained balance of payment surpluses. These external surpluses helped prevent a drop in Sweden's output.

Real GDP then rose at an average annual rate of less than 1 per cent 1971-1972. The slow growth of output was accompanied by higher unemployment and spare capacity. Domestic consumption growth was weak; reversing the trend in 1969 and 1970, inventory

formation declined and, given the high import content of stock-building, import growth consequently slowed. Private consumption fell by 3 per cent in real terms, due primarily to a sharp rise in savings ratio from 3.5 per cent in 1970 to 6.2 per cent in 1971 and 5.3 per cent in 1972. However, business fixed investment responded to the strong pro-investment measures implemented by the government and fluctuated counter-cyclically in 1971-1972.

After the record current deficit in 1970, the balance of payments then strengthened. 1971 and 1972 were both marked by substantial surpluses on current account and net capital inflows. For the first time since 1951, Sweden in 1971 recorded a trade surplus, owing to the rapid growth of commodity exports. The first part of 1973 then saw a further increase in reserves resulting from both higher capital imports as well as a sustained increase in the current surplus.

The Swedish authorities considered the current account surplus in 1972 to be temporary and expected deficits on services and transfers to increase rapidly. In addition they worried that the strong external position was achieved at the expense of a relatively high rate of unemployment and underutilization of resources at home.

On December 21, 1971, in response to the Smithsonian Agreement, the krona was set at the rate of SKr4.8129 per USD (equivalent of 0.170066 grams of fine gold per SKr). This represented a 1 per cent reduction from its previous par value in terms of gold. A few days later the government decided to avail itself of wider margins. The krona then strengthened in 1972. By the time of the downward float of the pound sterling in May 1972, the krona had appreciated of 2.1 per cent on a nominal effective basis since December 1971.

Effective February 15, 1973, the authorities then set the central rate of krona at SKR 4.56 per USD, equivalent to 0.161549 grams of gold per SKr. The krona depreciated by 5 per cent in relation to gold (and therefore other European countries) while appreciated by 5.5 per cent relative to the dollar. Sweden then joined the Snake in March 1973. As a result the krona was stable against the German mark for the next two years.[23]

1973 was a year of disappointing growth. Against a forecast of 5 per cent, real GDP grew by only 3.4 per cent. Consumption grew slowly; real gross fixed investment stagnated; and stocks fell further. The current balance improved further, reflecting weak domestic demand. Inflation accelerated from 6 per cent in 1972 to 7 per cent in 1973, reflecting the effects of the oil shock, but remained subdued by the standards of other OECD countries.

The economy then expanded in 1974, reflecting stronger domestic demand, even while other developed countries experienced a marked slowdown. The contrast reflected expansionary fiscal measures were undertaken to compensate for the income loss from the oil-price induced deterioration in the terms of trade. As a result, gross fixed investment, consumption and stock formation all grew faster. The improvement in domestic demand along with weaker demand abroad and higher oil prices caused exports to fall short of forecasted levels; and the current account surpluses of the previous year swung to a deficit.

Prior to the flotation of the exchange rate Sweden's external sector grew at the expense of its domestic demand; post flotation, public policies boosted domestic demand and private investment at the expense of its foreign trade. Then in 1976 and 1977, while domestic demand and employment remained robust in response to expansionary measures, the external position

deteriorated further. Initially the commodity price boom that benefitted Sweden was counteracted through reductions in indirect taxes and increased subsidies. But eventually the inflation rate, which was lower than the OCED average in preceding years, rose above the OECD average rate in 1977 (to 11.5 per cent). Since 1975 unit labor costs had also grown at high rates and were far above those in competitor countries. This made it harder for Sweden to turn around its growing current deficits. Business fixed investment which had declined somewhat in 1975 declined even more during 1976 and 1977, with manufacturing investment showing a sharper decline. By 1977 industrial production was in its fourth straight year of decline; and as capacity utilization dropped and the stock-support scheme was phased out, inventory formation was negative in 1976.

Thus, Sweden appears to be a case where not just the change in exchange rate regime but sharp swings in other policies shaped the subsequent development of internal and external balance.

Malaysia

Through the 1960s the Malaysian dollar (the ringitt from 1968) was pegged to the pound sterling.[24] The currency was also used by Singapore and Brunei under an interchangeability agreement.

Through 1971 the ringitt's parity rate was M$3.06122 per pound sterling. The collapse of the Bretton Woods System then led sterling to be floated and the Sterling Area to be

dismantled. At this point Malaysia decided to replace sterling with the US dollar as its reference currency. The rate for the Malaysian dollar was set at M$2.82/USD with a fluctuation band of +/-2.25%.

When after six months dollar volatility then rose further, the ringitt was revalued to M$2.54/USD. In the face of continuing uncertainty in foreign exchange markets and in an attempt to control inflation, the government allowed the ringgit to float upwards on a controlled basis in June 1973. This led to an almost immediate appreciation of approximately 5%.[25] The central bank intervened only to ensure orderly market conditions.[26] In September 1975, in order to maintain stable exchange rates, it was then decided that exchange rate would be managed relative to a basket comprised of currencies of the countries that were Malaysia's principal trading partners.

The context for these decisions was a period of strong expansion, interrupted only temporarily by a slowdown in 1971. By early 1972 recessionary conditions had started to abate. The expansion then resumed in 1972 then accelerated further in 1973.

Strong growth made currency appreciation a logical instrument with which to fight inflation. With the outbreak of the oil crisis, the Malaysian dollar was revalued to reduce the inflationary impact on the economy. In May 1973 the government enacted the Banking Act o provide the Bank Negara Malaysia (BNM) with greater flexibility in use of policy to promote monetary stability. Malaysia severed its financial ties with Singapore and Brunei by ending the interchangeability agreement. Groundwork was then laid for the establishment of a separate Malaysian stock and commodity exchange.[27]

The Malaysian government thus decided to float the currency on a managed basis.[28] Inflation had surged from 3.2% in 1972 to 10.5% in 1973. Given relatively strong growth and the stimulus derived from strong commodity prices, the authorities opted for a more restrictive monetary policy, which was made possible by de-linking the currency from the dollar.[29] Inflation having averaged 17.4% in 1974, the rate of price increase then slowed to 12% in 1974. In 1975 consumer price inflation then slowed further to 4.5%.

The strong external position was the other thing that made floating upward a logical way of responding to the inflation problem. Exports surged in 1973, rising by 51% from the year before. The strong recovery of the industrial world and large price increases for commodities were the major reasons for this growth. As a result, the merchandise trade surplus jumped sharply in 1973 and despite a sharp increase in the services deficit as well there was a current surplus at the end of the year. Net capital inflows declined due to unfavorable international conditions but the balance of payments remained positive.[30] While the cyclical downswing in the OECD countries in 1974 caused export volumes to stagnate, strong increases in commodity prices boosted export revenues by 42%. The current account once again moved into deficit but strong net capital inflows, especially for the corporate sector, keeping the balance of payments in surplus overall.

Gross fixed investment and domestic demand both grew in 1976 but more slowly than external demand, their growth rates remaining below their averages in 1970-1975. Inflation control was sustained, as in the previous year, with consumer prices rising by 2.6% in 1976. This decline in inflation rate came primarily from slower growth in food prices. The country

enjoyed a large measure of price stability for the next four years, with inflation regularly below 5%.

However the persistence in the worldwide slowdown and growing external imbalances of OECD countries meant that the high growth in exports could not be sustained over the following years. Exports grew at relatively subdued rates of 13-15% in 1977-1978 (down from 42% in 1976). As in previous years, agricultural products continued to be the leading source of export earnings. The share of rubber, traditionally the economy's leading export, declined steadily, and was replaced by petroleum as the leading commodity export (thanks to high oil prices).

Appendix Table A1: List of Reinhart-Rogoff Countries and Territories

Afghanistan	Albania	Algeria	Amer. Samoa
Andorra	Angola	Anguilla	Antigua & Barbuda
Argentina	Armenia	Aruba	Australia
Austria	Azerbaijan	Bahamas	Bahrain
Bangladesh	Barbados	Belarus	Belgium
Belize	Benin	Bermuda	Bhutan
Bolivia	Bosnia & Herzegovina	Botswana	Br. Virgin Isl.
Brazil	Brunei	Bulgaria	Burkina Faso
Burundi	Car	Cambodia	Cameroon
Canada	Cape Verde	Cayman Isl.	Chad
Channel Isl.	Chile	China	Colombia
Comoros	Congo, PDR	Congo, Rep.	Cook Isl.
Costa Rica	Cote d'Ivoire	Croatia	Cuba
Cyprus	Czech Rep.	Czechoslovakia	Denmark
Djibouti	Dominica	Dominican Rep.	Ecuador
Egypt	El Salvador	Equatorial Guinea	Eritrea
Estonia	Ethiopia	Faeroe Isl.	Fiji
Finland	France	French Guyana	French Poly.
Gabon	Gambia	Georgia	Germany
Germany, East	Ghana	Gibraltar	Greece
Greenland	Grenada	Guadeloupe	Guam
Guatemala	Guinea	Guinea Bissau	Guyana
Haiti	Honduras	Hong Kong	Hungary
Iceland	India	Indonesia	Iran
Iraq	Ireland	Isle of Man	Israel
Italy	Jamaica	Japan	Jordan
Kazakhstan	Kenya	Kiribati	Korea
Korea, North	Kuwait	Kyrgyz Rep.	Lao
Latvia	Lebanon	Lesotho	Liberia
Libya	Liechtenstein	Lithuania	Luxembourg
Macao	Macedonia	Madagascar	Malawi
Malaysia	Maldives	Mali	Malta
Marshall Isl.	Martinique	Mauritania	Mauritius
Mayotte	Mexico	Micronesia	Moldova
Monaco	Mongolia	Montenegro	Morocco
Mozambique	Myanmar	N. Mariana Isl.	Namibia
Nepal	Netherlands	Netherlands Antilles	New Caledonia
New Zealand	Nicaragua	Niger	Nigeria
Niue	Norway	Oman	Pakistan
Palau	Panama	Papua new Guinea	Paraguay
Peru	Philippines	Poland	Portugal
Puerto Rico	Qatar	Reunion	Romania

Russia	Rwanda	Samoa	San Marino
Sao Tome& Principe	Saudi Arabia	Senegal	Serbia
Seychelles	Sierra Leone	Singapore	Slovak Republic
Slovenia	Solomon Isl.	Somalia	South Africa
Soviet Union	Spain	Sri Lanka	St. Kitts & Nevis
St. Lucia	St. Vincent & Gren.	Sudan	Suriname
Swaziland	Sweden	Switzerland	Syria
Taiwan	Tajikistan	Tanzania	Thailand
Togo	Tonga	Trinidad & Tobago	Tunisia
Turkey	Turkmenistan	Turks and Caicos	UAE
UK	USA	Uganda	Ukraine
Uruguay	Uzbekistan	Vanuatu	Venezuela
Vietnam	Vietnam, D.R.	Virgin Isl.	West Bank & Gaza
Yemen	Yemen, A.R.	Yemen, D.R.	Yugoslavia
Zaire	Zambia	Zimbabwe	

Endnotes

[1] Hereafter "countries."
[2] Or at least not depreciate noticeably.
[3] Merriam Webster's on line dictionary defines the term as "bending especially repeatedly."
[4] In recognition of its de facto resemblance to the original Bretton Woods System.
[5] We check for influential outliers in what follows.
[6] The other eleven regimes are: pre announced crawling peg; pre announced crawling band that is narrower than or equal to +/-2%; de facto crawling peg; de facto crawling band that is narrower than or equal to +/-2%; pre announced crawling band that is wider than or equal to +/-2%; de facto crawling band that is narrower than or equal to +/-5%; moving band that is narrower than or equal to +/-2% (i.e., allows for both appreciation and depreciation over time); managed floating; freely floating; freely falling; and dual market in which parallel market data is missing.
[7] We exclude cases where a country moved away from its fix and began to "freely fall" in an inflationary spiral. We also exclude observations where a dual market existed but parallel market data is missing.
[8] For most of its history. Construction of this index differs somewhat now.
[9] We exclude cases where a country moved away from its fix and began to "freely fall" in an inflationary spiral. We also exclude observations where a dual market existed but parallel market data is missing.
[10] We use IFS data for end of period exchange rates, "ae" for the price of an American dollar and "aa" for the price of a SDR. It would be desirable to look also at real effective exchange rates. Unfortunately these data are available for only a small subset (five) of the relevant observations.
[11] Details are available online at http://faculty.haas.berkeley.edu/arose/.
[12] China in 2005 is not counted as a flex because Reinhart and Rogoff do not code it as a regime change.
[13] Indeed they sometimes do not have any national money at all.
[14] That these variables enter significantly is also reassuring in the sense that they indicate that our methodology is capable of finding significant effects of economic variables on exchange rate regime transitions, so long as they are truly relevant.
[15] We have also examined a range of other variables with comparably weak results.
[16] That for Nicaragua in 1993.
[17] Recall that we are considering exits up rather than the more conventional regime collapses followed by currency crashes.
[18] This section draws heavily on the OECD's *Economic Surveys* for the period.
[19] The main sources for the summary that follows are the OECD's *Economic Surveys*.
[20] Spain's trade balance though was always in deficit. The biggest countervailing factor was the large (and unexpected) increase in net invisible receipts – travel earnings and workers' remittances starting from 1968.
[21] When the dollar appreciated in March-April and then depreciated in June-July, the Spanish authorities opted to follow the dollar. Thereafter they considered the depreciation of peseta excessive and widened the limits for central bank intervention, moving them closer to the lower edge of IMF fluctuation band.
[22] This case draws on *OECD Economic Surveys* 1969/1970 through 1978/1979 and Bohlin (2010).
[23] Then in 1976 Sweden was hit hard by a structural crisis in manufacturing and a loss of competitiveness due to rising labor costs. In April 1977 it devalued by 6 percent against the Snake currencies and by 10 another percent in August 1977, on the latter occasion withdrawing from the Snake. The krona was then pegged to a basket of 14 currencies (each weighted for its value in Swedish trade and a double weight for the US dollar).
[24] "Pegging the Ringitt Against the US dollar", Abdul Latib Talib.
[25] "Money and Banking in Malaysia", Bank Negara Malaysia, 1989, p. 51.
[26] And to avoid excessive fluctuations in the value of the ringitt away from the M$2.50-M$2.60 per US dollar range.
[27] Mainly for rubber.
[28] "Money and Banking in Malaysia", Bank Negara Malaysia, 1989, pages 50-51.

[29] The government also adopted more restrictive fiscal and credit policies, including export taxes, credit growth ceilings and fiscal restraints.

[30] Malaysia liberalized its capital account in May 1973 to allow capital inflows from non-Sterling Area countries. However long-term capital inflows were relatively insignificant in the 1970s relative to the 1980s and especially the early 1990s.