Fear of Appreciation

Eduardo Levy-Yeyati and Federico Sturzenegger and Pablo Gluzmann

UTDT, CEDLAS - UNLP, CONICET

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Fear of Appreciation [1]

Eduardo Levy-Yeyati
Universidad Torcuato Di Tella

Federico Sturzenegger
Universidad Torcuato Di Tella

Pablo Alfredo Gluzmann
CEDLAS-UNLP and CONICET

Abstract

In recent years the term "fear of floating" has been used to describe exchange rate regimes that, while officially flexible, in practice intervene heavily to avoid sudden or large depreciations. However, the data reveals that in most cases (and increasingly so in the 2000s) intervention has been aimed at limiting appreciations rather than depreciations, often motivated by the neo-mercantilist view of a depreciated real exchange rate as protection for domestic industries. As a first step to address the broader question of whether this view delivers on its promise, we examine whether this "fear of appreciation" has a positive impact on growth performance in developing economies. We show that depreciated exchange rates indeed lead to higher growth, but that the effect, rather than through import substitution or export booms as argued by the mercantilist view, works largely through the deepening of domestic savings and capital accumulation.

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I. Introduction

In recent years developing countries have increasingly joined the group of economies that officially run inflation targeting regimes in the context of freely floating exchange rates. While this trend has been heralded as the triumph of floating regimes, many countries are still actively pursuing active exchange rate policies. In fact, the trend seems to point this other way. In June 2003, according to the IMF, 35 countries had fully flexible regimes. By 2008 the number had dropped to just 25[2]. Additionally, even with the global financial crisis yet unresolved, international reserves in most developing countries have continued growing even when at a historical high, while some countries in recent years introduced controls on capital inflows to countervail the appreciation of their currencies. Are we re-enacting the fear of floating of the 90s, or is this a new breed of active exchange rate policy? If so, are its premises validated in the data?

To address these questions, we pursue two objectives. First, we examine the evolution of exchange rate regimes over the recent period, to identify old and new trends and, more generally, to characterize the evolution of exchange rate policy in the 2000s. It documents the prevalence of a *fear of appreciation* –namely, the tendency to intervene to depreciate (or to postpone the appreciation of) the local currency–, a fear of floating in reverse that contradicts the growing consensus built around a float cum inflation targeting (FIT) paradigm predicated on the absence of an active exchange rate policy. Second, we evaluate the implications of fear of appreciation in terms of economic performance –and, in particular, whether the neo-mercantilist rhetoric underscoring this policy delivers on its promises in terms of export growth and import substitution– for developing economies where the premise of temporary protection to domestic industries applies more naturally. We find that fear of appreciation does contribute to growth, but the channel, rather than a boost to the tradable sector, appears to lie on the effect of currency undervaluation on savings and capital accumulation.

In perspective, the exchange rate debate in developing economies in recent years revolved around the interplay of two contrasting features of financial development. First, the fact that financial globalization led to a growing ineffectiveness of monetary policy. More precisely, capital controls were found to be decreasingly effective as economies became more sophisticated, thus

[2] For both dates we exclude countries from the European economic and monetary union.

strengthening the restrictions imposed by the *impossible trinity* –previously circumvented due to the absence of de facto financial integration (Rose, 2007) – all of which made floating regimes more attractive. Second, the role of (domestic and external) financial dollarization, namely, the foreign currency denomination of residents' assets and liabilities that, to the extent that it introduced currency exposures that raised the risk associated with exchange rate jumps, made pegged regimes look more attractive.[3] Indeed, it was the risk of balance sheet losses to financially dollarized governments and firms in the event of a devaluation –stressed in the third generation models of currency crises popularized in the context of the Asian crisis– that led to the definition of *fear of floating* (Calvo and Reinhart, 2002), namely, recurrent de facto exchange rate intervention in officially floating regimes.

The first aspect of the debate led naturally to the bipolar view (the inherent ineffectiveness and instability of conventional exchange rate bands and pegs in the presence of de facto capital mobility) that argued that financially integrated economies could either float or hard peg.[4] Combined with the fear of floating view, this approach derived naturally into a "unipolar view" according to which hard pegs were the only sensible option for financially dollarized economies: if devaluations were contractionary due to balance sheet effects, exchange rate flexibility would only amplify the cycle, rather than smooth it out as predicated by the standard theory.[5]

However, while theory was going one way, policy seemed to head in the opposite direction. By the end of the decade, the success in building central bank autonomy and monetary credibility, together with the resulting decline in inflation and exchange rate pass-through, led to the growing popularity of the flexible pole of the bipolar view as the background for different varieties of inflation targeting arrangements that prioritized the inflation rate, rather than the exchange rate, as the key nominal anchor. Not surprisingly, among emerging countries, this trend started in economies with relatively low levels of financial dollarization (Chile, New Zealand, South Africa, Brazil), gradually extending to other countries *pari passu* with a reduction in their degree of dollarization. In addition, the disappointing Argentine experience with a currency board cast doubt on the premises (monetary and fiscal discipline) on which the case for hard pegs had been

[3] See Levy Yeyati (2006).
[4] See Eichengreen (1994) and Fischer (2002).
[5] See Frankel (2005) on balance sheet effects and contractionary devaluations, and Calvo (2000) on the unipolar view.

predicated.[6] Ultimately, the debate in the new millennium appears to have converged to an inverted unipolar view, whereby flexible regimes are seen as the only sensible (and durable) choice as economies grow financially integrated and sophisticated.[7]

To evaluate whether this shift towards the flexible pole is actually taking place, in this paper we update and extend Levy Yeyati and Sturzenegger's (2005) dataset (LYS) on de facto exchange rate regimes. Based on this evidence, we find that the convergence to the FIT paradigm is not taking place across the board: the share of non-floats (intermediates, conventional and hard pegs) represented 75% of the sample in 2004, exactly the same share as in 2000.

Does that mean that fear of floating has continued to be prevalent despite the favorable context and the reduced currency exposure? To get a full answer to that question, it is crucial to note a semantic nuance that has been surprisingly understated in the recent exchange rate regime literature: fear of floating, as originally defined by Calvo and Reinhart (2002), entails a clearly asymmetric exchange rate policy. Since only depreciations trigger fears of financial distress or inflation pass-through, under fear of floating the intervention response should be stronger for (if not limited to) upward exchange rate movements. More generally, the incentives and implications to intervene in order to avoid an appreciation are radically different from those related to avoiding a depreciation: where the latter focus on short-run financial crises, the former is usually predicated on long-term economic growth. Similarly, the context conducive to one or the other differs: whereas fear of floating would tend to arise in times of financial turmoil, fear of appreciation will likely be triggered by economic bonanzas. At any rate, treating interventions in a symmetric way – in particular, attributing any intervention to fear of floating as has been previously the case in the literature – may lead to overstate the incidence of financial factors – more so in recent years when fear of appreciation appears to have prevailed.

The mercantilist view that exchange rate policy – more precisely, a temporarily undervalued currency – could be used to protect infant industries as a development strategy has a long tradition in economic theory and have recently enjoyed a minor revival. The issue of undervalued exchange rates has received considerable attention as a result of China's reluctance to float its exchange rate,

[6] De la Torre et al. (2002) discusses the Argentine debacle and its implications for the exchange rate debate.
[7] See Levy Yeyati (2005) and references therein. Rose (2007) makes an eloquent case for the new FIT paradigm.

a strategy presumed to be aimed at preserving the competitiveness of China's exports.[8] In academic circles, the role of depreciated real exchange rates for stimulating growth has been discussed in Rodrik (2008), it has also been found important in growth accelerations (Hausmann et al., 2005 and Johnson, Ostry and Subramanian, 2006), and has been regarded as an efficient development tool (Rodrik, 2006). More recently, the effects of overvaluation have been invoked to explain the "dutch desease" effect of foreign aid (Rajan and Subramanian, 2011) or the disappointing growth dividends of financial integration (see Prassad, Rajan and Subramanian, 2007). Despite this indicative evidence, neo-mercantilist views have been saluted, at best, with skepticism.

To assess the economic impact of fear of appreciation, we proceed in two steps. First, we refine the de facto regime classification to identify two types of foreign exchange interventions: one aimed at defending the domestic currency (as in the traditional fear of floating), and one aimed at depressing it (as in fear of appreciation). In turn, with this finer classification at hand, we assess the economic implications of fear of appreciation. Specifically, we evaluate whether foreign exchange interventions geared towards containing a process of appreciation actually help sustain a depreciated real exchange rate and, once this fact is established, we study the effect of interventions on growth. We find that fear of appreciation lead to faster output and productivity growth, which is not restricted to short-term cyclical output changes: we report a significant positive effect on the long-run component of GDP growth. However, as opposed to what it is usually argued, we find that the effect seems to come not from export-led expansions or import substitution, but rather from increased domestic savings and investment rates.

The paper is organized as follows. Section II introduces our extended exchange rate regime classification and reports some stylized facts on exchange rate policy in recent years. Section III characterizes fear of appreciation and documents its relative importance over time. Section IV explores the economic implications of fear of appreciation, identifying links with the real exchange rate and economic growth, and examining alternatives channels that could account for the growth effect. Section V reviews alternative theoretical explanations for our findings, and concludes.

[8] See Aizenmann and Lee (2007).

II. De facto regime classification: Updating

In Levy-Yeyati and Sturzenegger (2001) we introduced a de facto classification of exchange rates that relied on clustering country-year observations on the basis of three classifying variables: the movements of the nominal exchange rate within each year, the movements in central bank reserves (intended to capture interventions in exchange rate markets) and changes in the rate of change of the exchange rate (to capture crawling-peg regimes).[9] The use of reserve changes distinguished our classification from later attempts at classifying exchange rate regimes that relied solely on exchange rate volatility,[10] and was critical to characterize exchange rate *policy* – as opposed to exchange rate volatility. It was this measure of foreign exchange intervention that allowed us to tell whether a stable exchange rate was the result of an active policy aimed at limiting exchange rate volatility (as is often assumed), or just the reflection of a stable environment in the context of a flexible exchange rate that does not impose any constraint on macroeconomic policy. In turn, the direction of the intervention will be the key variable to identify fear of floating from fear of appreciation in the finer regime classification that we propose here.

Central Bank interventions are notoriously difficult to measure and they usually differ from a simple measure of reserve variation. To approximate as closely as possible the intervention impact of changes in reserves, we subtract government deposits at the central bank from the Central Bank's net foreign assets.[11] More specifically, we define net reserves in dollars as:

$$R_j = \frac{Foreign.Assets_j - Foreign.Liabilities_j - Gov.Deposits_j}{e_j}, \quad (1)$$

[9] The methodology classifies the country year data by the k-means algorithm, through a two step procedure with five groupings. See Levy Yeyati and Sturzenegger (2004a, 2004b, 2005) for further reference.

[10] See, among others, Reinhart and Rogoff (2004) and Shambaugh (2004).

[11] Oil producing countries and countries with important privatization programs are examples of cases where the latter correction matters. Calvo and Reinhart (2002) indicate other reasons (hidden foreign exchange transactions, use of credit lines, derivative transactions, or issuance of debt in foreign currency) that make it difficult to compute the real movement in reserves. To these one could add coordinated intervention by other central banks (though this should be limited to G-3 economies) and the measurement error introduced by the fact that all accounts are transformed to dollar units. If the Central Bank holds a portfolio of assets with several currencies, changes in the parities between the reserve currencies can be mistaken for foreign exchange interventions. We believe this measurement error problem should not be significant as most of the reserves are held in dollar-denominated assets.

where e indicates the price of a dollar in terms of local currency.[12] In turn, our measure of intervention for country s and year t is defined as the annual average of the absolute value of monthly interventions (months are indexed by j), that is, the average absolute change in net international reserves relative to the monetary base in the previous month, both measured in US dollar:

$$MR_{s,t} = \sum_{j=1}^{12} \frac{\left| R_{s,t,j} - R_{s,t,j-1} \right|}{\left(\frac{Money.Base_{s,t,j-1}}{e_{s,t,j-1}} \right)}, \quad (2)$$

where the monthly absolute change in reserves is normalized by the monetary aggregate (both measured in the same currency) to capture the monetary impact of the intervention.

Using this measure of intervention, together with data on the volatility of exchange rates, we updated the LYS dataset to cover the period 1974-2004 and, based on new information, completed the classification for a number of undisclosed basket pegs. As a result, the new dataset includes 179 countries and 4189 observations, covering 82% of all country-year observations for the period.[13]

We can use the measure in (1) to benchmark actual interventions by type of regime against a "typical" intervention under a float, which can be proxied by the distribution of the intervention variable R for the Australia, Japan and the US, three countries that are often considered the closest to textbook floating regimes (**Figure 1**).[14] As can be seen, while pegs generally exhibit heavier intervention than floats, there are still many pegs with limited intervention – relative to the benchmark floats – a fact that can reflect the success of pegs in preempting market pressure, or the fact that many countries choose to peg only when they do not anticipate that the peg will be subject to considerable shocks.

[12] All variables correspond to the end of period for a specific month.
[13] To our knowledge, the updated LYS regime classification offers the largest country and year coverage over the post-Bretton Woods period. The data is available online at the authors' web pages.
[14] The distributions are based on pooled observations of the variable R averaged over the year.

Figure 2 shows the distribution of exchange rates over the recent years. The graph shows that regime choices remained remarkably stable, particularly since 1990. This evidence looks unkind to the bipolar view that forecast the disappearance of intermediate regimes, although it shows a very slight increasing trend in floating regimes. Furthermore, as noted in the introduction, de facto floats continue to represent less than one fourth of the total sample.[15]

III. Fear of appreciation

As noted in the introduction, the nature of de facto intermediate and pegged regimes involves a clear asymmetry. While the prototypic fear of floater would exhibit a low tolerance to exchange rate depreciations, there is little in the story to motivate the defense of a depreciated real exchange rate through (often unsterilized) reserve accumulation. Grouping both types of interventions together when studying the implications of the regime choice is likely to misrepresent either of them.

Because the LYS classification is already built on actual interventions, we can identify these two types of intervention with only minor additional work. The simplest way to do so is to sort out countries according to whether they intervene to depress or to defend the exchange rate, i.e. whether the intervention in (2) is positive or negative. We capture this dichotomy in a new measure of intervention *Int*1 defined as the annual average of the monthly interventions:

$$Int1_{s,t} = \sum_{j=1}^{12} \frac{\left(R_{s,t,j} - R_{s,t,j-1}\right)}{\left(\frac{MBase_{s,t,j-1}}{e_{s,t,j-1}}\right)}, \tag{3}$$

which now will be negative or positive according to whether the central bank is selling or purchasing the foreign currency.

[15] This broad distribution masks important differences across groups of countries. For example, Latin American countries seem to have embraced floating arrangements full-heartedly (mostly in combination with inflation targeting regimes), with the amount of floats doubling between 2000 and 2004 at the expense of both intermediate and pegged regimes. On the other hand, emerging Asia has preserved its bias toward more rigid arrangements. Interestingly, this evidence is *a priori* at odds with the bipolar view, since currency mismatches in Latin America are large, and certainly larger than in Asia.

Figure 3 distinguishes among intermediate regimes by indicating the percentage of cases where intervention is positive. As the figure shows, the direction of intervention has changed over time in a predictably way. The debt crises years found most developing countries selling foreign currency to defend their exchange rate anchors, while in recent years (with the unsurprising exception of crisis year 1998) countries have increasingly intervened in the opposite direction. As it turns out, conventional fear of floating represents today less than 20% of intermediate regimes. The same story emerges when interventions are detrended (to factor out the positive intervention that may be associated with the long-run growth of output and monetary aggregates), and when very small reserves changes are filtered out (with the cutoff defined as the 95% confidence interval of the distribution of interventions in benchmark floats Australia, Japan and the US). Results are comparable when the exercise is replicated for the joint sample of intermediate and pegged regimes.

To what extent can the recent fear of appreciation be attributed to active interventions geared towards preventing currency appreciation in the face of capital inflows, as opposed to the precautionary motives often debated in the related literature? While currency stability may not be the sole argument behind intervention, it is easy to show that it is its key determinant, even after controlling for precautionary motives.

Precautionary motives have been proxied by the time proximity to financial crises (Aizenman and Lee, 2007), the presence of financial dollarization and currency mismatches (Levy Yeyati, 2008) and, more recently, by financial depth (as captured, e.g., by M2 over GDP), under the hypothesis that foreign currency liquidity works as a buffer in the event of capital flight much in the same way as deposit insurance does for domestic deposits (Obstfeld et al., 2010 and Lane et al., 2010).[16] Here, we follow this recent approach and use as dependent variable the intervention measure. Additional controls include the financial account balance, the trade balance and the change in terms of trade. We add year dummies to control for common global factors (e.g., dollar weakness or global risk appetite) that may temporarily influence the balance of payments in the emerging

[16] Precautionary reserves are often connected to a "fear of the IMF" (namely, the need to accumulate hard currency liquidity to avoid resorting to the Fund in the event of a shortage), which is particularly strong in emerging economies where local constituencies preserve a very negative view of the role of the Fund in the resolution of the financial crises of the late 90s and early 2000s. We thank an anonymous referee for pointing this out.

world. We look, alternatively, at two sample periods: 1974-2007 and 1993-2007. The regression results support the fear of appreciation view, as indicated by the significantly positive link between intervention, on the one hand, and balance of payments inflows on the other (**Table 1**). The results make intuitive sense, as intervention has typically been associated with (and advocated by policy makers on) the need to prevent "excessive" appreciation (and has in some cases been followed by the threat or imposition of restrictions or taxes on capital inflows).

While reserve accumulation may be largely explained by exchange rate policy, the fact that the stock of reserves may also grow with monetary aggregates for precautionary motives may bias our tests of the economic implications of intervention, inasmuch as increases in output tend to induce increases in money demand that, in turn, may be met by increases in precautionary international reserves.[17] To the extent that our intervention measure confounds this growth-induced precautionary increase in reserves with exchange rate interventions, it may be biased by endogeneity problems.

To address this potential concern, we adopt a conservative strategy: we modify our intervention measure to filter out the effect of changes in money demand. Specifically, we define first the ratio of reserves to broad money (*M2*):[18]

$$R2_j = \frac{Foreign.Assets_j - Foreign.Liabilities_j - Gov.Deposits_j}{M2_j}, \tag{4}$$

and then we compute a new intervention measure, *Int*2, as the annual average change of this ratio:

$$Int2_{s,t} = \sum_{j=1}^{12} \left(R2_{s,t,j} - R2_{s,t,j-1} \right) \tag{5}$$

Notice that a positive *Int*2 implies a strong degree of intervention, because for intervention to be positive reserve accumulation must exceed the increase in monetary aggregates. Thus, positive values of this "strong intervention" measure cannot be interpreted as a response to an increase in

[17] Alternatively, under a flexible exchange rate regime without a precautionary motive, the increase in money demand would be met by money supply with no change in the stock of reserves.
[18] Alternative estimations using the ratio to base money provide the same results and are available upon request.

money demand. For robustness, in the empirical tests that follow we use both intervention measures.

IV. Economic implications

Having shown that fear of appreciation has been the prevailing pattern in recent years among countries with an active exchange rate policy; the next step is to understand the implications of this choice and to examine whether the priors often cited in the related literature are empirically validated. In particular, it is worth exploring whether these interventions have a significant and lasting effect on real variables despite the traditional view that nominal interventions are unlikely to have a real economic impact.[19]

a. Does intervention depreciate the real exchange rate?

The first critical link to be explored empirically is the one between intervention and real appreciations, that is, whether interventions indeed manage to preserve a depreciated real exchange rate. To that end, we run a panel regression of the real exchange rate on key determinants of the exchange rate: terms of trade, the output of trading partners, and capital inflows.[20] All regressions include year dummies to control for global factors such as international liquidity or risk appetite, as well as country fixed effects. Finally, we include estimates for 2- and 3-year non-overlapping intervals to test for cumulative effects. Our sample, here as well as in the following tests, comprises all developing economies.

Our benchmark specification is given by:

$$(6)\quad y_{s,t} = \beta\, Intj_{s,t} + \gamma' \mathbf{X}_{s,t} + \mu_t + \theta_s + \varepsilon_{s,t},$$

[19] All tests are conducted for the post-Bretton Woods period prior to the 2008 global crisis.

[20] We choose the bilateral over the multilateral exchange rate for these tests because it is the one typically targeted by intervention. However, comparable results are obtained using the IMF's real effective exchange rates are comparable.

where *y* is the log of the real exchange rate, **X** is a vector of controls including the log difference of the terms of trade, the log difference of the trade-weighted average of the GDP of the country's trading partners, and the ratio of the financial account over GDP (to measure capital inflows), and μ_t, θ_s , $\varepsilon_{s,t}$ are, respectively, the year and country dummies and the error term.

Exchange rates and reserves tend to change dramatically and endogenously over periods of financial distress that may lead to strong positive correlations (for example, a reserve drain followed by a currency collapse) that could be misleadingly construed as a policy choice. To make sure that these extreme events do not contaminate our results, all our regressions exclude extreme values of the intervention measure and the dependent variable.[21]

Table 2 shows our results. We find the expected positive effect of intervention on the real exchange rate: the contemporaneous effect is positive and significant. The results indicate that a 10% increase in the reserves-to-broad money ratio leads to a contemporaneous 1.16% increase in the real exchange rate and that the effect almost doubles if intervention is sustained over two years. The estimated effect is smaller (but still significant) for *Int*1. Moreover, the effect declines (and ceases to be significant) beyond the second year, but does not revert.

A similar exercise can be conducted for a Balassa Samuelson-based undervaluation proxy. We follow Rodrik (2008) to constructs such a proxy by computing an index of overvaluation in three steps. First, we use data on exchange rates (*XRAT*) and *PPP* conversion factors (*PPP*) from Penn World Tables 6.3 (Aten, Heston, and Summers, 2009) to calculate a "real" exchange rate (*RER*) defined as:

$$\ln RER_{it} = \ln\left(\frac{XRAT_{it}}{PPP_{it}}\right),$$

where *i* is an index for countries and *t* is an index for the time period. *XRAT* and *PPP* are expressed as national currency units per U.S. dollar. When *RER* is greater than one it indicates that the value of the currency is lower (more depreciated) than is indicated by purchasing-power parity.

[21] Specifically, we include values of *Int1* between -150% and 150%, and values of *Int2* between -100% and 100%. Similarly, we restrict our sample to values inside a 4-standard deviation interval around the mean of all dependent variables. Including outliers, however, does not affect the sign of significance of the results.

So the second step is to account for the Balassa-Samuelson effect (the fact that non-traded goods are cheaper in poorer countries) by regressing *RER* on per-capita GDP (*RGDPCH*):[22]

$$\ln RER_{it} = \alpha + \beta \frac{\ln RGDPCH_{it}}{\ln RGDPCH_{USt}} + f_t + u_{it} \quad (1)$$

where f_t is a fixed effect for time period and u_{it} is the error term. This regression yields an estimated β = -0.247 (with a very high absolute value of the t-statistic around 43).

Finally, to arrive at his index of undervaluation the difference between the actual real exchange rate and the Balassa-Samuelson-adjusted rate is taken:

$$\ln UNDERVAL_{it} = \ln RER_{it} - \ln \hat{RER}_{it},$$

where $\ln \hat{RER}_{it}$ is the predicted values from equation (1). Defined in this way, *UNDERVAL* is comparable across countries and over time. Whenever *UNDERVAL* exceeds unity, it indicates that the exchange rate is set such that goods produced at home are cheap in dollar terms: the currency is undervalued. When *UNDERVAL* is below unity, the currency is overvalued. (In what follows we also follow Rodrik in using its logarithmic transform). **Table 3** reports the results, which replicates closely those in **Table 2**.

It is important to note at this point that reverse causality should not be a concern here: since positive interventions are likely to be triggered by real appreciations, endogeneity, if anything, would offset the positive correlation found in the table. Similarly, to the extent that mercantilist interventions occur when potentially unobservable "good things happen", it is unlikely that omitted variables can account for the observed positive coefficient: on the contrary, uncontrolled favorable external factors would tend to weaken the positive association between intervention and the real exchange rate.

To complete the characterization of fear of appreciation, standard economic theory provides another natural testable implication: intervention to prevent a downward exchange rate adjustment

[22] Here, we depart slightly from Rodrik's results by using per capita GDP relative to the US (rather than per capita GDP), as the exchange rate is measured relative to that country. We found this not to alter the results in any significant way.

should derive, in the absence of price controls, in inflationary pressures, as the system countervails the effects of intervention to move the exchange rate gradually towards its equilibrium level. **Table 4** shows this by estimating a standard log differenced money demand equation (including the lagged dependent variable to control for inertial inflation), where intervention variables are added as additional controls. The data shows that, while intervention is not significantly correlated with inflation, it is associated with price increases when the latter is measured on the change in the implicit GDP deflator, which is fully in line with the expected increase in the price of tradables relative to non-tradables due to foreign exchange intervention.[23] This is confirmed in columns 5 and 6, and again –for tree-years averages– in columns 7 and 8, where we find that the ratio of the GDP deflator over the CPI is positively related to foreign exchange intervention.[24]

In sum, we can preliminary conclude that both measures of intervention (particularly the second one involving an increase in the international reserves backing of monetary aggregates) are associated with a contemporaneous increase in the real exchange rate, driven by an increase in the price of tradables relative to the consumer consumption basket.

b. Does intervention foster output and productivity growth?

Does fear of appreciation have any influence on economic activity? If so, is it related with short-lived and quickly reverted cyclical fluctuations, or does it contribute to long-lasting output expansions? To explore this issues empirically, we face two methodological problems. On the one hand, there is the already noted positive link between the growth of output and monetary aggregates, which we address here introducing a second intervention variable (*Int*2) that traces reserve accumulation in excess of monetary expansions.[25] On the other hand, there is the possibility that interventions and growth respond to common factors. Favorable conditions (both domestic and external) are expected to lead both to faster growth and stronger demand for

[23] The rather weak impact on CPI inflation may reflect the fact that, at least in recent years, intervention has been mostly sterilized.

[24] The tradable component of the GDP is typically larger than that of the consumption basket. Note that, if real wages are kept constant, this difference should translate into an increase in the retribution to capital relative to labor, a point to which we come back in the next section.

[25] While in principle there seems to be no reason why the ratio or reserves over broad money (*Int*2) should increase during economic booms, an argument can be made that in the presence of mean reversing real exchange rate swings, a currency mismatched country should prevent appreciation for fear of an ulterior depreciation (Levy Yeyati, 2005). See Caballero and Lorenzoni (2006) for an analytical model along these lines.

domestic assets, creating appreciation pressures. Moreover, growth itself can stimulate capital inflows that add to the appreciation bias. In both cases, fear of appreciation may lead the monetary authorities to intervene, inducing a positive association between intervention and economic performance that may be incorrectly interpreted as the result of a positive growth effect of intervention.

Our additional controls (terms of trade, external demand shocks, and capital inflows) should help alleviate this potential problem. We also control for initial wealth (proxied by the initial per capita GDP) and population growth. As before, we include country dummies, and year dummies to capture the effect of global factors such as international liquidity or risk appetite.

One potential caveat of the present analysis is the possibility that an association between intervention (that is, growing reserves) and growth captures the recovery that typically follows a financial crisis or, conversely, a protracted output contraction after a boom. While extreme events are already excluded from the regression, the results may nonetheless capture the aftermath of the crisis. To make sure that this is not the case, we add the initial output gap (computed as the HP-cyclical component of output) as an additional control.[26]

Table 5 reports the results. The intervention effect appears to be consistently significant and economically important. Column (1)-(4) tells us that a 10% intervention is associated with roughly a 0.11% increase in the growth rate in the following year. As expected, for the stronger *Int2*, the associated increase is 0.2%. The results are consistent when estimated over three-year averages. Are these results the reflection of a crisis, that is, an economic downturn at a time when reserves are falling? Columns (2) and (4) dispel this concern: it is not negative intervention (a defensive sale of reserves by central banks under attack) that is driving the results. On the contrary, negative interventions have no additional impact on output growth; if anything, they exert (as in the specification of column 4) no significant impact on economic activity.

[26] We also tested an alternative measure of past output drops, namely, the current depth of the recession that measures the vertical distance to the previous local GDP maximum. Results were virtually unchanged and are omitted for brevity.

Similar results are obtained when we substitute labor productivity (measured as real GDP per worker) for real growth in the previous specification. **Table 6** reproduces the specification of **Table 5** with the new dependent variable. The findings are more mixed. This is not unexpected: while it is not unlikely that a one year intervention may in itself trigger a growth process, interventions may have a higher chance to elicit productivity gains only over time.

The previous results are subject to (at least) two potential criticisms. The first one is related to the fact that, by working with short one- and three-year windows, our findings may be the reflection of short-lived cyclical effects on GDP. Moreover, if intervention is induced by economic expansions driven by domestic real shocks not captured by the additional controls, the positive intervention-growth link may be in part reflecting a reverse causality not fully eliminated by the lagging of the independent variables. On a more conceptual ground, the mercantilist view is based on the infant-industry premise that temporary protection leads to permanent effects in terms of competitiveness. More generally, the case for active exchange rate policy is certainly stronger if the effects of temporary intervention prove to be persistent.

A straightforward way of testing for this is to examine the effect of intervention on the trend and cycle components of GDP separately. We do that in **Table 7**, where we re-run the baseline specification of **Table 5** for output cycle and trend, respectively, where the latter are constructed, alternatively, using the Hodrick-Prescott (HP) filter and the Baxter-King's (BK) band-pass procedure, and add the first three lags if the intervention variable. The main result, which do not diverge qualitatively across methodologies, show a positive and significant effect on the long-run component (the effect on the cyclical component is significant only for the first intervention variable). The number, again, indicates sizeable economic effects: based on the BK decomposition, a 10% increase in *Int1* and *Int2* leads, respectively, to cumulative 0.22% and 0.46% increases in long-run growth over four years. All things considered, the evidence suggests a robust, persistent and economically important effect of intervention on economic growth.

The previous statement, however, should be taken with a grain of salt. While growth regressions have been standard in the macroeconomic literature due to their ability to exploit large cross-country datasets amenable to statistical testing, they often raise concerns regarding the robustness of the results, among other reasons because of the combination of potential simultaneity and

endogeneity problems and the fact that it is virtually impossible to find credibly exogenous variables to instrument the relevant controls –almost any time-varying macroeconomic variables have been found to be correlated with growth in the prolific growth literature.[27]

The fact that the link between intervention and growth identified here still holds over three-year periods and for long-run output trends should help dispel part of the natural skepticism associated with growth regressions. This notwithstanding, in order for the argument to be convincing, it needs to provide a clear empirical characterization of the channel through which this link materializes. Hence, the second criticism mentioned above, to which we turn next.

IV. Intervention and growth: The channel

If we accept for a moment the implication of the previous findings, namely, that there is indeed an effect of exchange rate intervention on growth, where does this effect come from? Is it by promoting import substitution and stimulating the production and export of more sophisticated manufactures previously overpriced relative to international competitors, as the mercantilist view predicates? Does it induce a shift in the production structure that moves the economy to high productivity growth tradable sectors? This is certainly the prime suspect in this case, and the one we examine first in this section.

To do so, we start by looking at the export-import effects, both as a share of GDP, and in terms of their real growth rates. Export and import shares are often used in the literature to measure the impact of the exchange rates on trade. However, they suffer from an important drawback in this context because they are bound to reflect changes in the relative price of tradables. In particular, the shares should increase with a real devaluation, thus delivering almost by definition a positive relation between depreciation and their participation in output even if the former has no effect on traded volumes. It is more accurate to look at the growth volume of exports and imports.

We present the two sets of regressions in **Table 8**. The specifications are similar to those in **Table 5**. In addition, the growth of trade volumes is conditioned on GDP growth to filter the influence

[27] See Rodrik (2005).

of economic activity on trade.[28] The results are rather disappointing: not only is the *volume* of exports virtually unaltered; the contemporaneous effect, as measured over three-year windows, turns out to be significantly negative. On the other hand, imports are positively correlated with intervention, again at odds with the import substitution premise of the mercantilist view.[29]

Intervention may exert its benign influence on the quality rather than the quantity of exports. Absent a good proxy for export quality, a second best alternative often used to assess export sophistication is its degree of concentration. However, this avenue does not provide positive results either: export diversification (as measured by a Herfindahl index of exports revenues) appears to be unaffected by intervention (columns 15 and 16).

This negative result on the trade front eliminates one of the key channels through which a depreciation may influence output: export-led expansions. If it is not an export boom what triggers an increase in output, how can we explain the finding that interventions stimulate growth?

Table 9 points at one alternative explanation. Here we look at the link between interventions, on the one hand, and savings and investment rates, on the other. Importantly, saving rates are computed at current prices, whereas investment ratios are at constant prices (to avoid capturing the valuation effect of the real appreciation on imported investment goods, typical in many developing economies). The results are now significant and unambiguous. The savings ratio increases contemporaneously about 1.9 percentage points if the reserves-to-M2 ratio doubles (column 2); as can be seen, the result is not driven by external or internal bonanzas, which are captured by the additional controls in the regression. In turn, the investment ratio grows, with a predictable lag, by 2.4 percentage points (column 4), and interventions remain significant even after controlling for the contemporaneous increase in savings (columns 5 and 6).

The savings channel highlighted in the previous results has not gone unnoticed in the literature. As early as 1965, Diaz Alejandro suggested that a devaluation may generate important income

[28] Note that the mercantilist view presumes that intervention affects trade volumes directly and, in turn, trade has a positive influence on growth. If that is not the case, intervention may still affect trade through its effect on growth, but that will not identify the intervention-growth channel that we are after.
[29] Thus, any direct impact of intervention on trade ratios would be entirely driven by the relative price change due to the real depreciation of the currency.

distribution effects, shifting resources from workers to firms or agricultural producers. Yet, Diaz Alejandro believed such changes to be contractionary, due to the negative income effect on consumers and the associated slump in domestic absorption.[30] A "modern" view, in turn, would stress the contractionary effect of balance sheet effects in the presence of financial dollarization. Firms with foreign currency denominated liabilities will find themselves increasingly cash-constrained following a sharp devaluation, triggering a potentially large fall in investment.[31]

A consistent story for our findings could be built, however, by combining Díaz Alejandro's story with the presence of financial constraints. To the extent that a real devaluation reduces labor costs, it contributes internal funds to financially constrained firms, thereby fostering savings and investment. Alternatively, in a financially constrained economy, the implicit transfer from low-income, low-saving propensity workers to high income capitalists should boost overall savings, lowering the cost of capital to the same effect.[32] Unlike in the original story, in this version the real devaluation should be expansionary because it relaxes the borrowing constraints that bind the firms (in the first case) of the economy (in the second).

Why isn't this benign effect on financial constraints outweighed by the adverse balance sheet effect? Presumably, the policy decision to keep the currency undervalued is not independent of the financial dollarization: fear of appreciation is likely to arise in countries where balance sheet effects are small or inexistent. At any rate, the hypothesis that fear of appreciation induces a redistribution towards financially constrained firms relies on the premise that interventions – and, in turn, devaluations – entail a transfer of income from labor to capital (or, more precisely, an increase in the profitability of capital at the expense of labor income). We should examine, then, whether this intervention-induced redistributions actually materialize in practice.

We do this in two ways. First, we look directly at the effects of intervention on the ratio of labor over capital income (**Table 10**) –an exercise that, to our knowledge, was last done in this context by Edwards (1989). We first run the specification in **Table 5**, which controls for population

[30] In fact, his work led to a long debate on whether devaluations were contractionary of expansionary, long before financial dollarization introduced an additional –and often dominating– ingredient in the equation.
[31] This is the channel popularized by the sudden stop literature (Krugman, 1999; Chang and Velasco, 2001) that led to the unipolar view of exchange rate policy.
[32] The first channel is more likely to apply to small and medium enterprises with limited access to finance; the second, to large companies that fund their investments in capital markets.

growth, and external factors (terms of trade shocks, external demand shocks and capital inflows). Since a lower labor income ratio may signal a higher productivity of capital, we add lagged productivity growth as an additional control (which comes up with the expected negative sign). The results are encouraging. We find that a 10% intervention leads to a 0.5% decline in the labor share when intervention is measured by *Int1*, and to a 2.4 % decline when it is measured by *Int2*.

A second way to test the premise of the redistribution story is through the effect of interventions on the labor market, more specifically, its incidence on unemployment (**Table 11**). Either when we include our set of external indicators in columns 1 and 3, or when we control for the effect of current output growth (which has the expected negative coefficient) in columns 2 and 4, interventions exhibit a significantly negative effect on unemployment. The fact that the redistribution from labor to capital indeed happens at a time of declining unemployment further supports the view that the effect of fear appreciation on real variables, at least in the medium run captured by the previous tests, is mainly driven by a decline in real wages.

Note that these results are in line with our findings in **Table 4**. To the extent that intervention induces inflationary pressures, less than perfect wage indexation should result in lower real wages. However, this is not necessary to explain the redistribution effect reported in **Table 10**: inasmuch as the higher relative price of tradables is not fully passed through to the CPI (as our results in **Table 4** indicate), capital income should increase relative to labor income even if wages are kept constant in terms of the local CPI. Indeed, the higher return from exports due to the undervalued currency may boost employment and real wages at the same time – particularly in the case of commodity producers with a low component of imported capital where the countervailing effect of a high exchange rate on the cost of imports is only minor.[33]

V. Discussion: Evidence in search of a theory

Our findings provide an interesting vantage point from which we can revisit the link between nominal and real variables and, in particular, the several hypotheses that have been suggested by the literature regarding the role of exchange rates as a development strategy. While in principle our

[33] Note that the same argument applies to countries where capital and infrastructure investment has been made at the previous lower exchange rate, or is curently subsidized (or regulated) by the government.

results are consistent with the claim that undervalued exchange rates foster growth, they cast doubts on the channel of import substitution cum export stimulus often highlighted by its advocates. Instead, our tests suggest that the mechanism is associated with an increase in aggregate savings and investment, and a decline in labor income relative to capital compensation.

This preliminary evidence seems to assign a more limited role for the recent incarnations of export-led strategies such as self discovery (Hausmann and Rodrik, 2005). The presumed benign influence of mercantilist interventions on export growth and diversification appears not to be there, although the consequences in terms of their potential to foster growth by improving the quality of the export mix (Hausmann, Hwang and Rodrik, 2007) remain to be tested. Moreover, our results seem at odds with previous findings on the effects of overvaluation on the tradable sector by Rajan and Subramanian (2011). However, it is conceivable that those results simply reflect the effect of the relative price change on the output of sectors with varying degrees of exportability.[34] By contrast, the findings, reported in the same paper, that an undervalued currency fosters growth in labor intensive sectors is fully in line with the negative correlations between fear of appreciation and labor compensation documented here.

Our empirical results point at two possible alternative channels through which devaluations may contribute to growth. The first one is a labor market enhancing effect reminiscent of the channels identified in classical models of economies with unlimited supply of labor (Lewis, 1958, Fei and Ranis, 1961). In those models, the development challenge was to move workers from unproductive subsistence agricultural jobs into high productivity industrial jobs. While a depreciated exchange rate may be a plausible vehicle to entice firms to hire this surplus labor, the quantitative effects that we find are relatively minor (a 10% increase in the reserve-to-M2 ratio decreases unemployment rate in 0.15 percentage points).

A second, alternative channel relates to the benign effect of lower labor costs on access to internal funds by financially constrained enterprises, an aspect that has been highlighted as a source of the rapid recovery in the aftermath of recent emerging market crises (Calvo and Talvi, 2006) and,

[34] The paper looks at the nominal value added by sector, deflated by a GDP implicit price level. As a result, a real devaluation should reflect positively in the valued added of exportable industries that benefit from higher prices, even if produced quantities remain constant or even decline.

more generally, as a source of growth in developing economies (Aghion et al. 2009).[35] This channel should be particularly relevant for low and middle income economies where financial constraints are more prevalent. Interestingly, the same authors have also flagged, elsewhere, the deleterious effects of a devaluation on firms with foreign-currency liabilities (Calvo et al., 2006; Aghion et al., 2004). Two factors help reconcile these two seemingly contradictory claims. The first one has already been noted: the degree of financial dollarization or, more precisely, its gradual decline in the developing world.[36] The second factor relates to the fact that fear of appreciation, as measured here, captures voluntary interventions to bring down the exchange rate, rather than the involuntary depreciations that occur in period of financial stress *despite* defensive exchange rate intervention, which underlie the predictions of the traditional fear of floating literature.

How can we reconcile the earlier and modern versions of the redistribution argument? In particular, how does the income transfer from labor to capital that was contractionary in the earlier version (Díaz Alejandro, 1965) become expansionary here? The previous discussion offers a possible explanation. Diaz Alejandro's view, embedded in a Keynesian framework, revolved around the question of how the income that was transferred from workers to capitalists was ultimately spent. Because Diaz Alejandro was thinking on an agricultural society (his 1965 piece was inspired by the Argentine economy), he did not see these increased savings translating into sources of domestic finance but rather going abroad in the form of foreign assets; hence, the depressed aggregate demand that explained the drop in output. Our findings suggest that the funds that in the earlier version were spent abroad may in fact be allocated domestically to productive investment previously postponed due to insufficient financing.

A final aspect that deserves to be noted relates to the connection between fear of appreciation and global imbalances. While they are certainly related (as exchange rate policy incides both on the current account surpluses of global lenders and on the allocation of these surpluses to reserve currency assets) causality is less clear: Is exchange rate intervention in emerging economies a

[35] In Aghion et al (2009), rather than a source of finance, internal funds are a vehicle that domestic financial markets use to collateralize a joint projects with foreign direct investors carrying state-of-the-art technology.

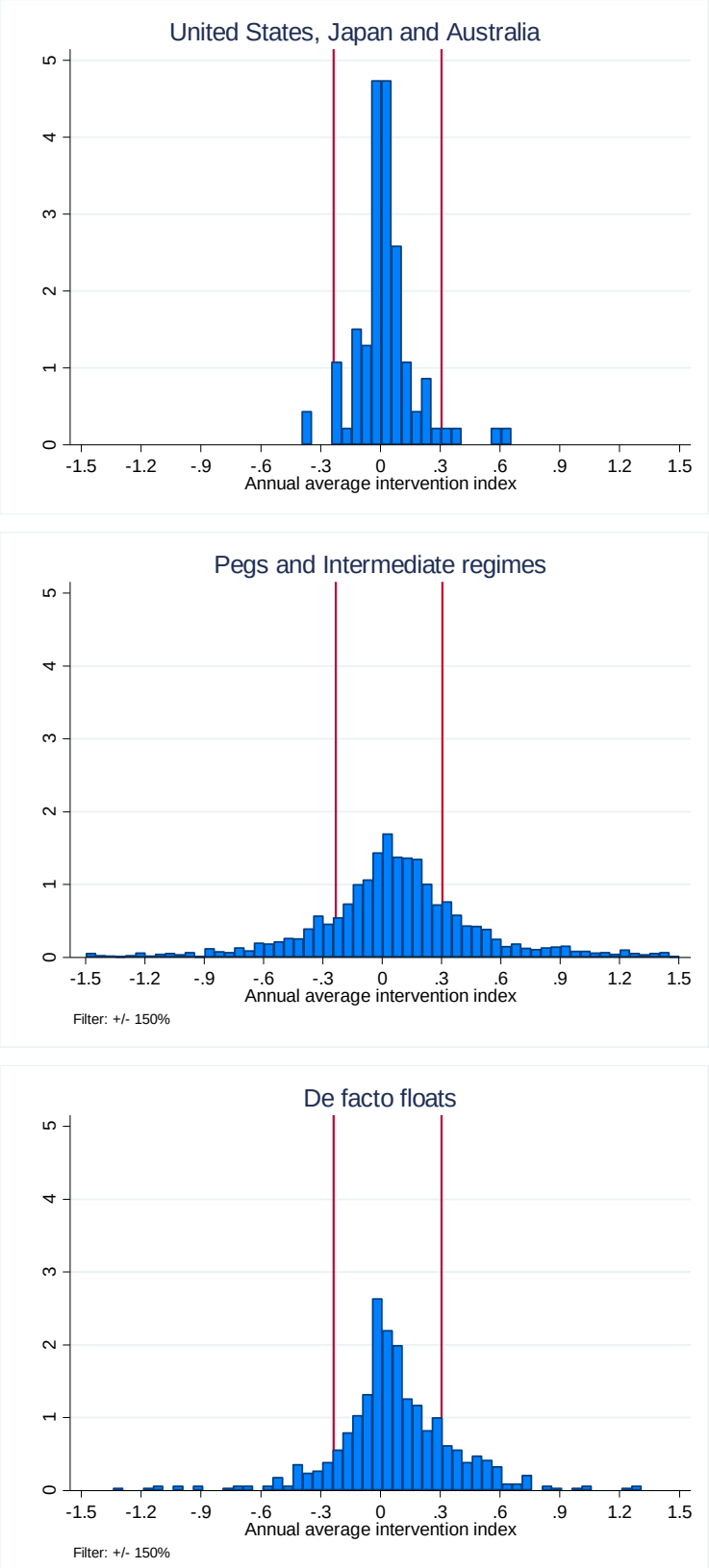
[36] Financial dollarization is possibly the sole aspect that may turn the exchange rate from a countercyclical shock absorber into a procyclical source of economic contractions (see Frankel, 2005; and Levy Yeyati, 2006). Given that the pro-growth consequences of fear of appreciation are more likely to materialize in the absence of the severe currency mismatches usually found in financially dollarized economies, it is not surprising that its popularity has grown in recent years *pari passu* with a gradual dedollarization of financial markets in developing countries in the 2000s.

deliberate policy choice that ultimately fosters global imbalances as the US authorities have often argued, or simply the reflection of external surpluses and capital inflows that are, in turn, the passive reflection of external developments (favorable terms of trade and productivity shocks in the developing world; domestic imbalances and expansionary policies in the advanced world) as emerging economies typically claim?37 While the consensus view seems to point at a two-way causality,38 for the purpose of our analysis an increase in reserves associated with a balance of payments surplus can only defined as active market intervention –in contrast with, for instance, advanced commodity exporting countries like Australia or New Zealand that witnessed the real appreciation of their currencies in the 2000s without building up a reserves stock. In other words, we believe that exchange rate intervention should be considered a deliberate policy choice regardless of the underlying drivers.

To conclude, in light of the current international context and the recent changes in debt composition and policy in developing countries, we anticipate that the fear of appreciation analyzed here will be the main contender to the current FIT paradigm among developing economies. With this in mind, in this paper we sought to contribute to the ongoing debate on exchange rate policy by characterizing this policy and documenting its implications for the real economy. The promising results reported here only confirm that the exchange rate debate is still alive and in need of a reappraisal.Crucially, we do not claim that fear of appreciation (or, more generally, exchange rate policy) should be considered as a development strategies in itself; on the contrary, our findings suggest that, unlike the Chinese example, the effects of intervention in other developing economies tend to be more modest and short lived. However, by keeping local costs depressed, fear of appreciation may give growth and investment a temporary boost, which in turn may create the conditions for long-term development provided the productivity dividends of investment materialize.

[37] We thank an anonymous referee for highlighting this point to us.
[38] See, e.g., Bernanke (2005) and Blanchard and Milesi-Ferretti, 2009).

Figure 1


United States, Japan and Australia
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Annual average intervention index
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Annual average intervention index
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Annual average intervention index
Filter: +/- 150%

Figure 2

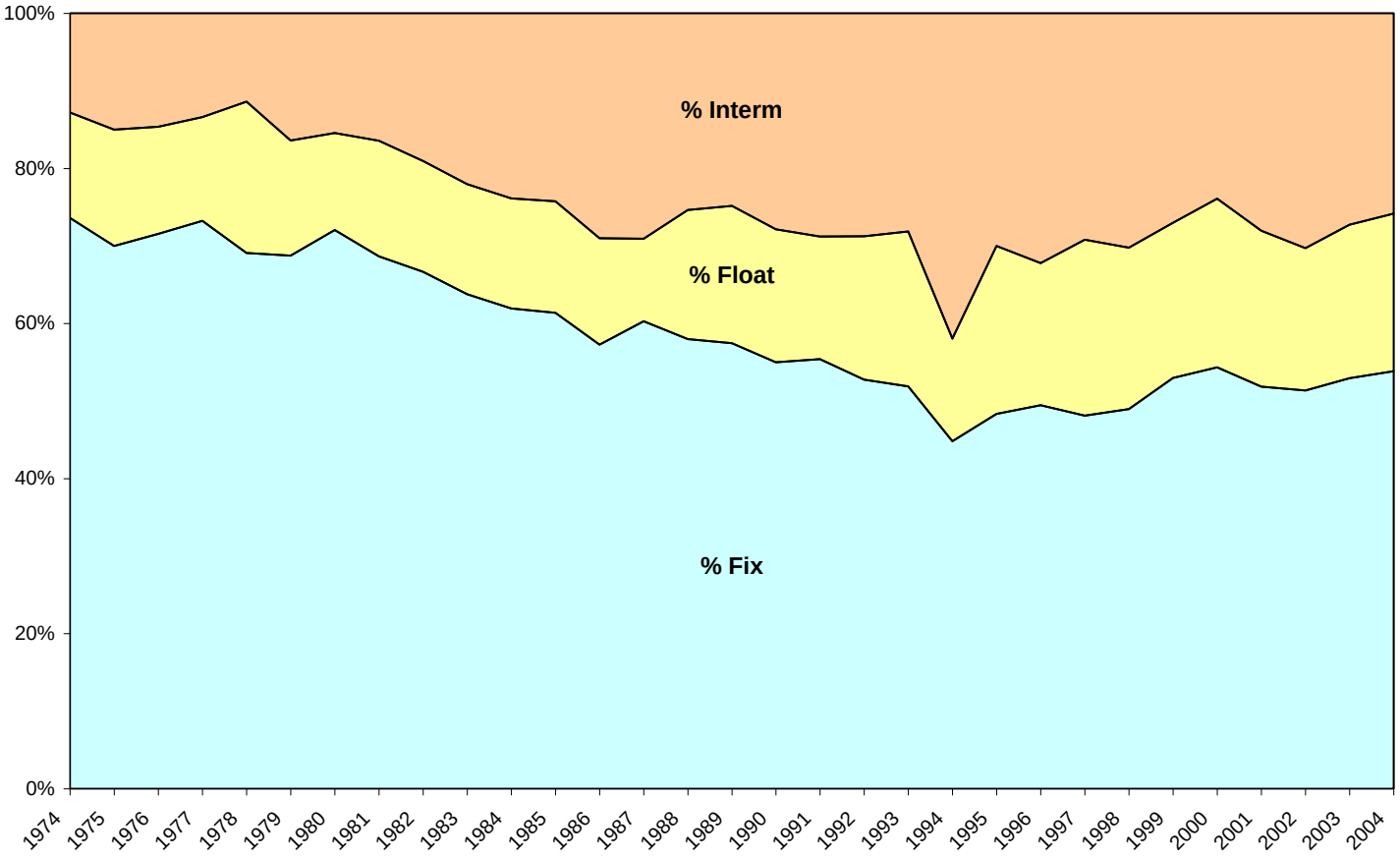
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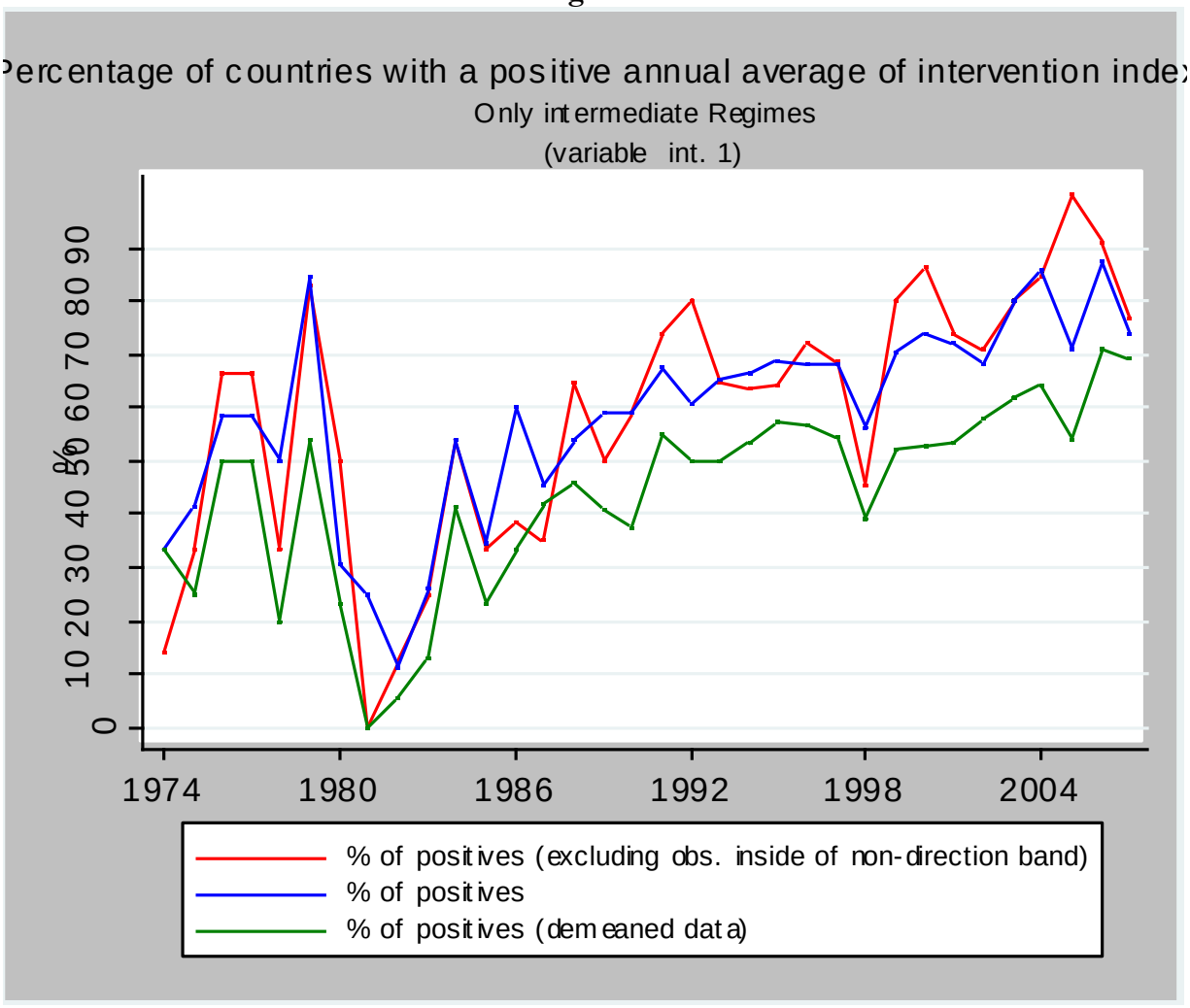
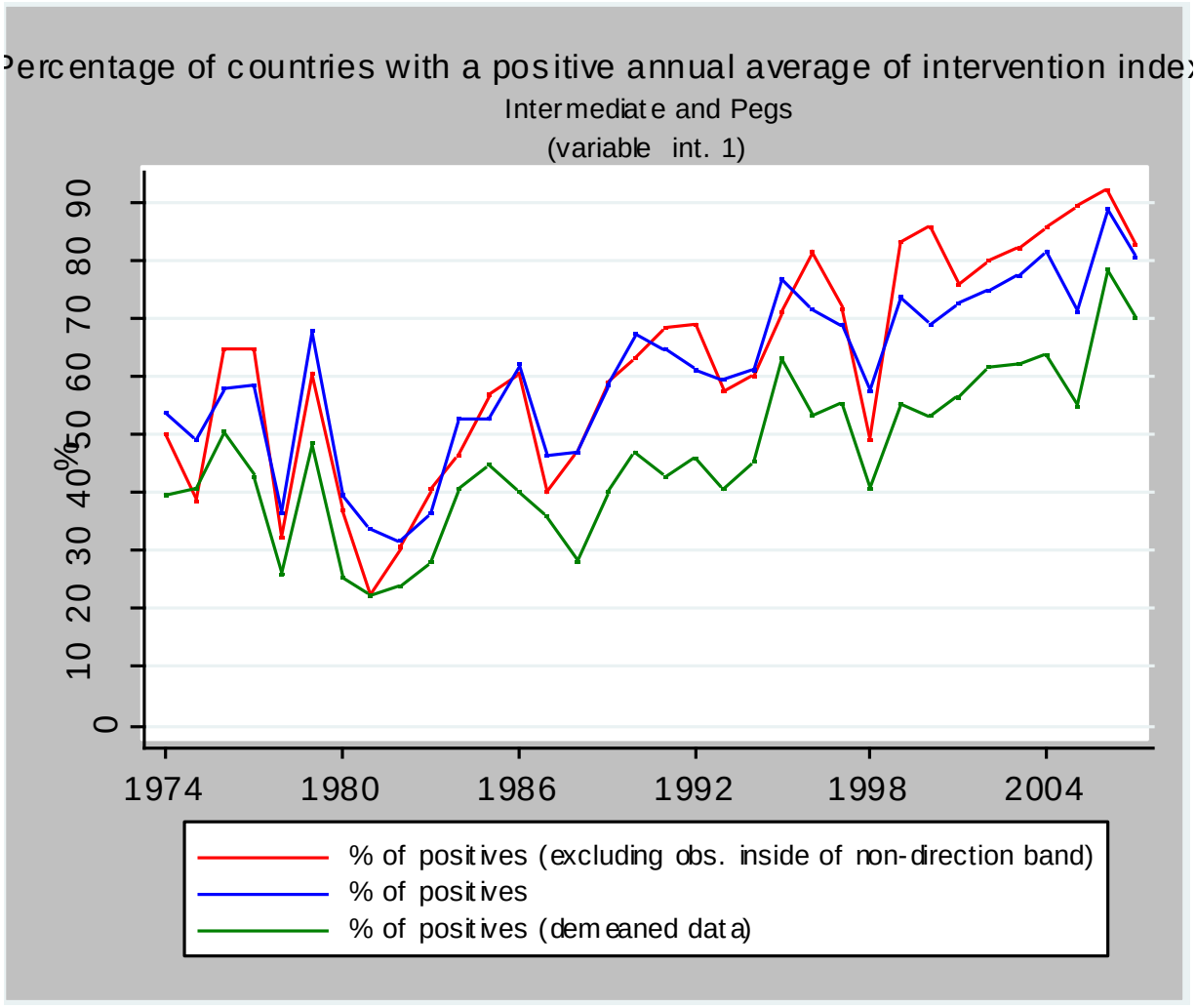
Figure 3


Percentage of countries with a positive annual average of intervention index
Only intermediate Regimes
(variable int. 1)
%
0
10 20 30 40 50 60 70 80 90
1974
1980
1986
1992
1998
2004
% of positives (excluding obs. inside of non-direction band)
% of positives
% of positives (demeaned data)


Percentage of countries with a positive annual average of intervention index
Intermediate and Pegs
(variable int. 1)
%
0
10
20
30
40
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60
70
80
90
1974
1980
1986
1992
1998
2004
% of positives (excluding obs. inside of non-direction band)
% of positives
% of positives (demeaned data)

Table 1

Dependent Variable: Intervention index

	Int1 (t)	
	Sample of 1974-2007	Sample of 1993-2007
Variables	**[1]**	**[2]**
Control Variables		
ΔLog(M2/GDP)	0.116**	-0.113
	(0.058)	(0.092)
Δ (X-M)/GDP	0.427**	0.675***
	(0.174)	(0.219)
ΔLog(ToT) (t)	0.002***	0.001
	(0.001)	(0.001)
Financial account to GDP (t)	0.003***	0.005***
	(0.001)	(0.002)
Observations	2512	1379
R-squared	0.184	0.192
Mean Dep. var.	0.091	0.159
St Dev Dep. var.	0.383	0.356

Note:

All regressions included country fixed effects and Time dummies

Robust standard errors in parentheses / * significant at 10%; ** significant at 5%; *** significant at 1%

Table 2

Sample of 1974-2007

Dependent Variable: Logarithm of Real Exchange Rate

	LRER					
	(t)		(t) (Two year average)		(t) (Three year average)	
Variables	[1]	[2]	[3]	[4]	[5]	[6]
int1. Index (t)	0.047***		0.065***		0.070**	
	(0.014)		(0.022)		(0.032)	
int2. Index (t)		0.116***		0.218***		0.236***
		(0.034)		(0.055)		(0.072)
Control Variables						
∆Log(ToT) (t)	0.000	0.000	0.001**	0.001	0.002***	0.002***
	(0.000)	(0.000)	(0.001)	(0.001)	(0.001)	(0.001)
Trading partners growth (t)	0.001	0.001	0.005	0.003	0.003	0.001
	(0.001)	(0.001)	(0.003)	(0.003)	(0.005)	(0.005)
Financial account to GDP (t)	-0.004***	-0.004***	-0.005***	-0.005***	-0.005***	-0.005***
	(0.001)	(0.001)	(0.001)	(0.001)	(0.001)	(0.001)
Observations	2356	2436	1254	1281	841	859
R-squared	0.79	0.798	0.805	0.813	0.814	0.82
Mean Dep. var.	0.901	0.888	0.895	0.885	0.892	0.885
St Dev Dep. var.	0.408	0.416	0.404	0.413	0.403	0.409

Note:

All regressions included country fixed effects and Time dummies

Robust standard errors in parentheses / * significant at 10%; ** significant at 5%; *** significant at 1%

Table 3

Sample of 1974-2007
Dependent Variable: Logarithm of Undervaluation

	lnunderval					
	(t)		(t) (Two year average)		(t) (Three year average)	
Variables	[1]	[2]	[3]	[4]	[5]	[6]
int1. Index (t)	0.042***		0.055**		0.053*	
	(0.013)		(0.022)		(0.030)	
int2. Index (t)		0.095***		0.167***		0.172**
		(0.032)		(0.055)		(0.069)
Control Variables						
ΔLog(ToT) (t)	0.001	0.001	0.001**	0.001*	0.003***	0.002***
	(0.000)	(0.000)	(0.001)	(0.001)	(0.001)	(0.001)
Trading partners growth (t)	0.001	0.002	0.002	0.002	-0.001	-0.002
	(0.001)	(0.001)	(0.003)	(0.003)	(0.005)	(0.005)
Financial account to GDP (t)	-0.004***	-0.003***	-0.004***	-0.004***	-0.004***	-0.004***
	(0.001)	(0.001)	(0.001)	(0.001)	(0.001)	(0.001)
Observations	2339	2407	1246	1267	834	848
R-squared	0.756	0.761	0.77	0.775	0.786	0.788
Mean Dep. var.	0.093	0.090	0.085	0.083	0.084	0.085
St Dev Dep. var.	0.364	0.366	0.362	0.364	0.358	0.356

Note:
All regressions included country fixed effects and Time dummies
Robust standard errors in parentheses / * significant at 10%; ** significant at 5%; *** significant at 1%

Table 4

Sample of 1974-2007

Dependent Variable: Percentage of Change of Consumer Price Index and GDP Deflator

	∆%CPI		∆%Deflator		∆%Deflator - ∆%CPI		∆%Deflator - ∆%CPI	
			(t)				(3-year average)	
Variables	[1]	[2]	[3]	[4]	[5]	[6]	[7]	[8]
int1. Index (t)	0.702		1.178*		0.687**		1.932***	
	(0.578)		(0.711)		(0.322)		(0.721)	
int2. Index (t)		1.100		0.997		1.935**		6.933***
		(2.244)		(2.183)		(0.944)		(1.840)
Control Variables								
Dep. var. (t-1)	0.156***	0.175***	0.124***	0.123***	-0.003	0.016	-0.064	-0.049
	(0.028)	(0.031)	(0.017)	(0.018)	(0.022)	(0.020)	(0.040)	(0.034)
∆%GDP (t)	-0.089**	-0.099**	-0.176***	-0.212***	-0.011	-0.033	0.026	0.000
	(0.043)	(0.040)	(0.057)	(0.052)	(0.029)	(0.027)	(0.063)	(0.061)
∆%M2 (t)	0.137***	0.170***	0.239***	0.314***	-0.013	-0.004	0.001	-0.007
	(0.034)	(0.024)	(0.051)	(0.030)	(0.008)	(0.007)	(0.006)	(0.009)
Interest Rate (t)	0.367***	0.338***	0.331***	0.283***	0.002*	0.000	-0.000***	-0.000***
	(0.038)	(0.037)	(0.032)	(0.025)	(0.001)	(0.000)	(0.000)	(0.000)
Observations	2026	2105	2250	2322	1971	2038	655	670
R-squared	0.755	0.745	0.686	0.699	0.150	0.150	0.298	0.289
Mean Dep. var.	8.743	9.033	9.847	9.807	0.264	0.258	0.249	0.248
St Dev Dep. var.	11.371	11.637	13.061	12.953	4.024	4.074	2.774	2.818

Note:

All regressions included country fixed effects and Time dummies

Robust standard errors in parentheses / * significant at 10%; ** significant at 5%; *** significant at 1%

Table 5

Sample of 1974-2007

Dependent Variable: Percentage of Change of the Real Gross Domestic Product

	∆%GDP					
	(t+1)				(t+1) (Three year average)	
Variables	**[1]**	**[2]**	**[3]**	**[4]**	**[5]**	**[6]**
int1. Index (t)	1.147***	1.110***			1.236***	
	(0.204)	(0.299)			(0.373)	
int1. Index_neg (t)		0.092				
		(0.575)				
int2. Index (t)			2.072***	1.411**		1.557*
			(0.475)	(0.684)		(0.929)
int2. Index_neg (t)				1.421		
				(1.308)		
Control Variables						
Dep. var. (t)	0.298***	0.298***	0.300***	0.300***	0.018	0.004
	(0.025)	(0.025)	(0.024)	(0.024)	(0.029)	(0.029)
LGDP_HP_cycle (t)	-34.375***	-34.378***	-34.995***	-35.079***		
	(2.447)	(2.449)	(2.409)	(2.416)		
∆Log(ToT) (t+1)	0.019**	0.019**	0.021***	0.021***	0.092***	0.090***
	(0.008)	(0.008)	(0.008)	(0.008)	(0.013)	(0.013)
Population growth (t+1)	0.261*	0.260*	0.283*	0.281*	0.252	0.315
	(0.150)	(0.150)	(0.154)	(0.154)	(0.232)	(0.230)
Financial account to GDP (t+1)	0.048***	0.048***	0.049***	0.048***	0.057***	0.063***
	(0.014)	(0.014)	(0.013)	(0.013)	(0.020)	(0.020)
Trading partners growth (t+1)	0.031	0.031	0.046	0.046	0.086	0.082
	(0.065)	(0.065)	(0.068)	(0.067)	(0.069)	(0.067)
LGDP (t)	-0.858	-0.856	-0.942*	-0.946*	-6.467***	-6.576***
	(0.537)	(0.537)	(0.533)	(0.532)	(0.812)	(0.801)
Observations	2307	2307	2384	2384	780	800
R-squared	0.425	0.425	0.426	0.427	0.533	0.523
Mean Dep. var.	3.939	3.939	3.919	3.919	3.63	3.629
St Dev Dep. var.	3.981	3.981	3.991	3.991	3.172	3.154

Note:

All regressions included country fixed effects and Time dummies

Robust standard errors in parentheses / * significant at 10%; ** significant at 5%; *** significant at 1%

Table 6

Sample of 1974-2007

Dependent Variable: Percentage of Change of the Real Gross Domestic Product Per Worker

	∆%GDPpw					
	(t+1)				(t+1) (Three year average)	
Variables	**[1]**	**[2]**	**[3]**	**[4]**	**[5]**	**[6]**
int1. Index (t)	1.328***	1.627***			0.038***	
	(0.270)	(0.378)			(0.015)	
int1. Index_neg (t)		-0.731				
		(0.772)				
int2. Index (t)			1.503**	2.041**		0.063*
			(0.656)	(0.925)		(0.035)
int2. Index_neg (t)				-1.144		
				(1.859)		
Control Variables						
Dep. var. (t)	0.131***	0.131***	0.137***	0.137***	0.104***	0.105***
	(0.026)	(0.026)	(0.026)	(0.026)	(0.040)	(0.040)
LGDP_HP_cycle (t)	-18.694***	-18.717***	-18.963***	-18.932***		
	(3.128)	(3.121)	(3.111)	(3.114)		
∆Log(ToT) (t+1)	0.037***	0.037***	0.041***	0.041***	0.002***	0.002***
	(0.008)	(0.008)	(0.008)	(0.008)	0.000	0.000
Population growth (t+1)	-0.147	-0.143	-0.137	-0.135	0.003	0.005
	(0.203)	(0.203)	(0.212)	(0.212)	(0.004)	(0.004)
Financial account to GDP (t+1)	0.030	0.031*	0.042**	0.043**	0.002***	0.002***
	(0.018)	(0.018)	(0.018)	(0.018)	(0.001)	(0.001)
Trading partners growth (t+1)	0.127**	0.127**	0.128**	0.128**	-0.005	-0.005
	(0.055)	(0.055)	(0.052)	(0.053)	(0.004)	(0.004)
LGDPpw (t)	-2.148***	-2.154***	-2.242***	-2.230***	-0.152***	-0.152***
	(0.613)	(0.613)	(0.618)	(0.615)	(0.022)	(0.023)
Observations	2257	2257	2332	2332	710	726
R-squared	0.304	0.304	0.301	0.301	0.536	0.529
Mean Dep. var.	1.415	1.415	1.367	1.367	0.031	0.03
St Dev Dep. var.	4.929	4.929	4.967	4.967	0.098	0.098

Note:

All regressions included country fixed effects and Time dummies

Robust standard errors in parentheses / * significant at 10%; ** significant at 5%; *** significant at 1%

Table 7

Sample of 1974-2007

Dependent Variable: Percentage of Change of the Real Gross Domestic Product

	trend (% change)				cycle (% change)			
	BK		HP		BK		HP	
	(t+1)				(t+1)			
Variables	[1]	[2]	[3]	[4]	[5]	[6]	[7]	[8]
int1. Index (t)	0.757***		0.364***		0.473***		0.906***	
	(0.150)		(0.092)		(0.151)		(0.188)	
int1. Index (t-1)	0.586***		0.369***					
	(0.140)		(0.090)					
int1. Index (t-2)	0.619***		0.379***					
	(0.147)		(0.087)					
int1. Index (t-3)	0.262*		0.338***					
	(0.140)		(0.090)					
int2. Index (t)		1.623***		0.786***		1.012***		2.041***
		(0.304)		(0.193)		(0.347)		(0.462)
int2. Index (t-1)		1.462***		0.938***				
		(0.298)		(0.204)				
int2. Index (t-2)		1.085***		0.791***				
		(0.298)		(0.185)				
int2. Index (t-3)		0.434		0.661***				
		(0.288)		(0.184)				
Control Variables								
LGDP_BK_trend (t)	-4.318***	-4.487***						
	(0.453)	(0.435)						
LGDP_HP_trend (t)			-3.352***	-3.561***				
			(0.295)	(0.285)				
LGDP_BK_cycle (t)					-60.051***	-60.425***		
					(2.887)	(2.829)		
LGDP_HP_cycle (t)							-26.699***	-27.353***
							(1.755)	(1.787)
∆Log(ToT) (t+1)	0.026***	0.025***	0.013***	0.013***	0.01	0.01	0.013*	0.015**
	(0.004)	(0.004)	(0.003)	(0.003)	(0.005)	(0.005)	(0.008)	(0.007)
Population growth (t+1)	0.618***	0.610***	0.349***	0.324***	-0.18	-0.16	-0.03	0.01
	(0.142)	(0.143)	(0.078)	(0.078)	(0.139)	(0.143)	(0.123)	(0.125)
Financial account to GDP (t+1)	0.047***	0.049***	0.034***	0.036***	0.01	0.01	0.027**	0.029**
	(0.010)	(0.009)	(0.007)	(0.006)	(0.011)	(0.010)	(0.012)	(0.013)
Trading partners growth (t+1)	0.039	0.048	0.021	0.022	-0.015	-0.008	0.009	0.019
	(0.035)	(0.035)	(0.024)	(0.023)	(0.033)	(0.033)	(0.054)	(0.055)
Observations	1916	2034	2010	2127	2188	2260	2308	2384
R-squared	0.537	0.540	0.664	0.672	0.363	0.368	0.261	0.259
Mean Dep. var.	3.510	3.506	3.540	3.537	0.184	0.174	0.321	0.298
St Dev Dep. var.	2.055	2.039	2.063	2.048	2.681	2.673	3.225	3.226

Note:

All regressions included country fixed effects and Time dummies

Robust standard errors in parentheses / * significant at 10%; ** significant at 5%; *** significant at 1%

Table 8

Sample of 1974-2007

Dependent Variable: Percentage of Change of Real Exports and Imports, and Herfindahl Index of Exports

	∆%Import						∆%Export						∆%Export Herfindahl	
	Volume						Volume						Index	
	(t+1)		(t+1) (3-year average)		(t)		(t+1)		(t+1) (3-year average)		(t)		(t+1) (3-year average)	
Variables	[1]	[2]	[3]	[4]	[5]	[6]	[7]	[8]	[9]	[10]	[11]	[12]	[13]	[14]
int1. Index (t)	4.310***		3.768***		2.627*		-1.660*		0.264		-1.757		0.009	
	(1.010)		(1.454)		(1.505)		(0.977)		(1.131)		(1.129)		(0.014)	
int2. Index (t)		5.918**		8.832***		-1.535		-0.775		3.027		1.312		0.028
		(2.669)		(3.266)		(4.352)		(2.293)		(2.859)		(3.096)		(0.037)
Control Variables														
Dep. var. (t)	-0.103***	-0.092***	-0.128***	-0.117***	-0.101***	-0.088**	-0.080***	-0.087***	-0.069*	-0.048	-0.061	-0.056	0.334***	0.320***
	(0.023)	(0.022)	(0.038)	(0.038)	(0.038)	(0.038)	(0.027)	(0.027)	(0.038)	(0.041)	(0.039)	(0.041)	(0.099)	(0.094)
∆%GDP (t+1)	1.171***	1.226***	1.111***	1.145***	1.118***	1.173***	0.472***	0.453***	0.382**	0.389***	0.342**	0.332**	0.001	0.002
	(0.122)	(0.121)	(0.184)	(0.181)	(0.170)	(0.179)	(0.107)	(0.099)	(0.148)	(0.145)	(0.146)	(0.144)	(0.002)	(0.002)
∆Log(ToT) (t+1)	0.070***	0.070***	0.179***	0.189***	0.186***	0.201***	0.156***	0.157***	0.185***	0.184***	0.224***	0.197***	0.001*	0.001**
	(0.023)	(0.016)	(0.060)	(0.059)	(0.062)	(0.062)	(0.038)	(0.033)	(0.052)	(0.050)	(0.054)	(0.052)	(0.001)	(0.001)
Population growth (t+1)	-0.832	-0.879	-1.742**	-1.891***	-1.692**	-1.716**	0.598	0.546	0.063	0.008	0.248	0.210	-0.014	-0.015
	(0.684)	(0.689)	(0.721)	(0.715)	(0.742)	(0.763)	(0.475)	(0.479)	(0.860)	(0.852)	(0.882)	(0.860)	(0.012)	(0.012)
Financial account to GDP (t+1)	0.142**	0.126**	0.098	0.101	0.101	0.124*	0.073	0.094	0.078	0.043	0.087	0.045	-0.001	-0.001
	(0.064)	(0.063)	(0.079)	(0.077)	(0.077)	(0.075)	(0.061)	(0.064)	(0.072)	(0.074)	(0.071)	(0.073)	(0.001)	(0.001)
Trading partners growth (t+1)	0.946***	0.716*	0.826*	0.795*	0.786*	0.860*	0.306	0.235	0.145	0.222	0.027	0.199	-0.011**	-0.011**
	(0.332)	(0.376)	(0.473)	(0.464)	(0.458)	(0.467)	(0.352)	(0.334)	(0.441)	(0.431)	(0.446)	(0.443)	(0.005)	(0.005)
Observations	1389	1434	451	460	454	464	1490	1561	480	496	485	499	380	391
R-squared	0.293	0.279	0.468	0.482	0.472	0.47	0.211	0.210	0.398	0.392	0.402	0.391	0.861	0.855
Mean Dep. var.	5.412	5.698	5.533	5.659	5.720	5.727	5.434	5.397	5.649	5.696	5.760	5.762	0.170	0.173
St Dev Dep. var.	13.247	13.201	8.434	8.428	8.418	8.481	13.079	12.905	6.941	6.933	7.001	6.971	0.149	0.149

Note:

All regressions included country fixed effects and Time dummies

Robust standard errors in parentheses / * significant at 10%; ** significant at 5%; *** significant at 1%

Table 9

Sample of 1974-2007

Dependent Variable: Nominal Gross Domestic Savings and Real Gross Capital Formation as a share of GDP

	Nominal Gross Domestic Savings as % GDP		Real Gross Capital Formation as % GDP			
	(t+1)		(t+1)			
Variables	**[1]**	**[2]**	**[3]**	**[4]**	**[5]**	**[6]**
int1. Index (t)	1.243***		1.438***		1.235***	
	(0.374)		(0.218)		(0.213)	
int2. Index (t)		1.945**		2.394***		2.109***
		(0.927)		(0.570)		(0.559)
Control Variables						
Dep. var. (t)			0.638***	0.631***	0.596***	0.592***
			(0.026)	(0.025)	(0.026)	(0.025)
Saving nominal/GDP (t+1)					0.138***	0.140***
					(0.018)	(0.017)
∆%GDP (t)	0.148***	0.146***	0.097***	0.099***	0.083***	0.086***
	(0.037)	(0.035)	(0.022)	(0.022)	(0.022)	(0.021)
∆Log(ToT) (t+1)	0.053***	0.052***	0.001	0.001	-0.008	-0.007
	(0.010)	(0.008)	(0.006)	(0.006)	(0.006)	(0.006)
Population growth (t+1)	0.331	0.273	0.175	0.220	0.115	0.164
	(0.225)	(0.227)	(0.164)	(0.167)	(0.154)	(0.158)
Financial account to GDP (t+1)	-0.122***	-0.150***	0.112***	0.114***	0.152***	0.152***
	(0.035)	(0.027)	(0.018)	(0.018)	(0.021)	(0.020)
Trading partners growth (t+1)	0.078	0.050	0.044	0.036	0.031	0.025
	(0.052)	(0.052)	(0.056)	(0.054)	(0.057)	(0.056)
Observations	2272	2353	2065	2146	2065	2146
R-squared	0.784	0.781	0.826	0.818	0.836	0.828
Mean Dep. var.	15.84	16.11	21.99	22.13	21.99	22.13
St Dev Dep. var.	11.71	11.52	7.27	7.28	7.27	7.28

Note:

All regressions included country fixed effects and Time dummies

Robust standard errors in parentheses / * significant at 10%; ** significant at 5%; *** significant at 1%

Table 10

Sample of 1974-2007

Dependent Variable: Ratio of Retribution to Labor to Capital Compensation , (wL/rK)

	Retribution to Labor as % Capital	
	(t)	
Variables	[1]	[2]
int1. Index (t)	-5.613***	
	(1.998)	
int1. Index (t-1, t-3)	-0.980	
	(3.429)	
int2. Index (t)		-23.867***
		(7.519)
int2. Index (t-1, t-3)		-19.578**
		(9.429)
Control Variables		
∆Log(ToT) (t)	-0.036	-0.044
	(0.070)	(0.063)
Population growth (t)	3.065	2.847
	(3.388)	(3.456)
Financial account to GDP (t)	0.262*	0.304**
	(0.142)	(0.144)
Trading partners growth (t)	-1.510	-1.306
	(0.959)	(0.920)
∆%GDPpw (t)	-0.010	-0.028
	(0.207)	(0.190)
Observations	579	596
R-squared	0.885	0.886
Mean Dep. var.	95.11	94.72
St Dev Dep. var.	47.38	46.94

Note:

All regressions included country fixed effects and Time dummies

Robust standard errors in parentheses / * significant at 10%; ** significant at 5%; *** significant at 1%

Table 11

Sample of 1974-2007

Dependent Variable: Unemployment Rate

	Unemployment Rate (in %)			
	(t+1)			
Variables	**[1]**	**[2]**	**[3]**	**[4]**
int1. Index (t)	-0.672***	-0.648***		
	(0.170)	(0.162)		
int1. Index (t-1)	0.236	0.221		
	(0.217)	(0.202)		
int2. Index (t)			-1.473***	-1.425**
			(0.533)	(0.562)
int2. Index (t-1)			0.533	0.535
			(0.509)	(0.491)
Control Variables				
Dep. var. (t)	0.684***	0.686***	0.670***	0.675***
	(0.058)	(0.054)	(0.053)	(0.049)
∆Log(ToT) (t+1)	-0.001		0.000	
	(0.007)		(0.007)	
Population growth (t+1)	-0.303		-0.272	
	(0.213)		(0.210)	
Financial account to GDP (t+1)	-0.017		-0.02	
	(0.012)		(0.015)	
Trading partners growth (t+1)	-0.116		-0.183**	
	(0.080)		(0.080)	
∆%GDP (t)		-0.066***		-0.066***
		(0.016)		(0.016)
Observations	731	799	799	867
R-squared	0.893	0.900	0.887	0.893
Mean Dep. var.	8.894	9.209	8.932	9.219
St Dev Dep. var.	4.471	4.638	4.429	4.587

Note:

All regressions included country fixed effects and Time dummies

Robust standard errors in parentheses / * significant at 10%; ** significant at 5%; *** significant at 1%

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