

Export Surges

The Power of a Competitive Currency

Caroline Freund
Martha Denisse Pierola

The World Bank
Development Research Group
&
Poverty Reduction and Economic Management Network
October 2008



Abstract

How can countries stimulate and sustain strong export growth? To answer this question, the authors examine 92 episodes of export surges, defined as significant increases in manufacturing export growth that are sustained for at least seven years. They find that export surges in developing countries tend to be preceded by a large real depreciation—which leaves the exchange rate significantly undervalued—and a reduction in exchange rate volatility. In contrast, in developed countries, the role of the exchange rate is less pronounced. The authors examine why the exchange rate is so important in

developing countries and find that the depreciation leads to a significant reallocation of resources in the export sector. In particular, depreciation generates more entries into new export products and new markets, and the percentage of new entries that fail after one year declines. These new products and new markets are important, accounting for 25 percent of export growth during the surge in developing countries. The authors argue that maintaining a competitive currency leads firms to expand the product and market space for exports, inducing a large reorientation of the tradable sector.

This paper—a product of the Trade Team, Development Research Group, and the Trade Department, Poverty Reduction and Economic Management Network—is part of a larger effort in the departments to understand competitiveness. Policy Research Working Papers are also posted on the Web at <http://econ.worldbank.org>. The author may be contacted at cfreund@worldbank.org.

The Policy Research Working Paper Series disseminates the findings of work in progress to encourage the exchange of ideas about development issues. An objective of the series is to get the findings out quickly, even if the presentations are less than fully polished. The papers carry the names of the authors and should be cited accordingly. The findings, interpretations, and conclusions expressed in this paper are entirely those of the authors. They do not necessarily represent the views of the International Bank for Reconstruction and Development/World Bank and its affiliated organizations, or those of the Executive Directors of the World Bank or the governments they represent.

Export Surges: The Power of a Competitive Currency*

Caroline Freund, World Bank
Martha Denisse Pierola, World Bank

* Contact information: cfreund@worldbank.org, mpierola@worldbank.org, 1818 H Street, NW Washington DC 20433. We are very grateful to Richard Baldwin for extensive discussions and comments on an earlier draft. We would also like to thank Simeon Djankov, Bernard Hoekman, Hiao Looi Kee, Aaditya Mattoo and participants at a seminar at the World Bank for useful comments. The authors would like to thank the Trade Department in the Poverty Reduction and Economic Management Network for funding. The views expressed in this paper are those of the authors and do not necessarily reflect the views of the World Bank.

I. Introduction

The motivation for this study is to understand how developing countries can stimulate and sustain strong export growth. Export growth is important for a number of reasons. First, it can generate income growth when domestic demand lags. This is especially important in small economies, where foreign markets are likely to be the main engines for growth (Bhagwati 1996, Krueger 1998). Second, robust export growth yields both more jobs and better jobs. Manufacturing exports are typically labor intensive, so the demand for labor rises with them. Exporting firms also create jobs that pay higher wages and offer better working conditions than otherwise similar import-competing firms.¹ Third, strong export growth tends to induce a more efficient production structure. This happens through compositional shifts, as the most productive exporting firms tend to grow most rapidly when exports boom.² Finally, strong export growth helps prevent balance of payments crises. While many studies have examined the effect of openness on growth and productivity,³ our focus is different—it is on how exports take-off.

The advantage of exploring export surges is that their dynamics may provide insight into how export-led growth begins. For example, if export expansions are the result of domestic productivity shocks, we should see an increase in investment and GDP before the surge. In this case, export-led growth is a misnomer in the sense that the expansion is domestically driven and exports simply follow a productivity shock. If, on the other hand, export expansions are the result of trade liberalization or real exchange

¹ Bernard and Jensen (1995) report detailed statistics for the United States. A number of papers followed their approach and find similar results in both developing and developed economies. Shank, Schnabel and Wagner (2007) provide a summary of these papers in Appendix A, and offer similar evidence for Germany. Bernard, Jensen, Redding, and Schott (2008) also provide a summary.

² See Bernard, Jensen, Redding, and Schott (2008) for a summary of the literature.

³ See Winters (2004) for a summary of the literature on trade and growth.

rate movements that make domestic exports more competitive, then we should observe changes in these variables before the expansion.

We identify and examine 92 episodes of export surges. An export surge is defined as a significant and sustained increase in manufacturing export growth from one 7-year period to the next 7-year period. We focus on manufactures for two reasons. First, expansion in the manufacturing sector has been associated with strong growth in developing countries (Jones and Olken 2008 and Johnson, Ostry, and Subramanian 2006). Second, we want to avoid surges due to commodity price booms. We use data for both developing and developed countries in order to distinguish whether there is a fundamental difference between surges in the two types of countries. We examine movements in trade policy and macro variables, such as the exchange rate, GDP growth, savings, investment, foreign demand, and consumption before and after the surges begin. We also examine the type of countries that have surges and the reorientation of exports during the surge.

We identify four important characteristics of export surges. First, surges are more likely in open economies or economies that are liberalizing. Second, surges are preceded by a large depreciation of the real exchange rate and lower exchange rate volatility. Third, in developing countries, the real depreciation is large enough so as to leave the exchange rate undervalued by 20 percent on average. And fourth, the extensive margin—the discovery of new products and new markets—is important for export surges in developing countries, accounting for 25 percent of total manufacturing exports growth in the 7 years of the surge.

The dominance of the real exchange rate in stimulating export surges is striking, especially given the modest effects of exchange rates on exports typically found in the literature.^{4,5} Only in a few cases have exchange rates been identified as important factor stimulating export growth. A number of recent papers discuss the link between exchange rate undervaluation and export growth for China (Dooley et al. 2004 and Eichengreen 2008), though Ahearne et. al. (2006) find that external demand is far more important. Arslan and van Wijnbergen (1993) and Bernard and Jensen (2004) highlight links between exchange rate depreciation and export booms in Turkey and the United States, respectively. Bayoumi (1999) finds sizable exchange rate elasticities of trade for industrial countries.

The strong relationship between the exchange rate and export surges is, however, consistent with recent work on the exchange rate and income growth. Hausmann, Pritchett, and Rodrik (2005) find that exchange rate depreciation is an important part of growth accelerations, and Rodrik (2007) shows that undervaluation leads to income growth in developing countries. Rodrik (2007) argues that undervaluation can be welfare improving, a kind of second best policy, if there is a market failure that affects the tradables sector more than the nontradables sector.⁶ Consistent with this idea, there is evidence that tradables are relatively more important for growth. Jones and Olken (2008) and Johnson, Ostry, and Subramanian (2006) find that a reorientation of production

⁴ In the postwar period, the term “exchange rate pessimism” was coined to describe the low exchange rate elasticities of trade typically found in the literature (see Obstfeld 2002 for a discussion). More generally, the absence of a link between exchange rates and economic fundamentals has been dubbed the “exchange rate disconnect puzzle”. In recent work, Colacelli (2006) finds small elasticities in developing countries. Likewise, Fang, Lai, and Miller (2006) find that in seven Asian countries the effects of depreciation on exports are small and in Singapore are non-existent.

⁵ There is also a large literature on the effect of exchange rate volatility on trade flows. While that literature finds small effects, the literature on currency unions tends to find very large effects, suggesting volatility is important. See Baldwin et. Al. (2005) for a discussion.

⁶ He focuses on information and coordination problems and contractual complexity.

towards manufactures (tradables) is correlated with high growth in developing countries. Eichengreen (2008), however, points out that an important weakness of this literature is that “the nature of the externality remains obscure”.

An important contribution of this paper is to understand how the exchange rate stimulates exports in developing countries and whether the channel is consistent with some type of externality or market failure. To do this we focus on the implications of new trade theory for how exports grow. Krugman (1981) shows that in a model with intra-industry trade, larger economies trade more because they export more products. Hummels and Klenow (2005) examine this empirically using a large cross section of countries and find strong support for these types of models. Studies using time-series data, however, find a smaller contribution of the extensive margin (trade in new products and to new markets) in explaining export growth.⁷ A large real depreciation should stimulate both the intensive and the extensive margins, as it lowers the cost to foreign consumers of varieties already sold abroad while increasing returns from exporting to new markets or exporting new products.

To examine the mechanics of the export surge, we examine entry into new export industries and new export markets, and the failure rate of these entries from the time the depreciation begins through the surge. We find that the change in relative prices leads to entry in new export industries and the discovery of new markets. Equally important, the undervalued exchange rate makes it easier to succeed in these new products and markets. On average, entry levels in developing countries increase by about 75 percent during the export surge from levels five years before. The new products and new markets are

⁷ See, for example, Besedes and Prusa (2007) and Amurgo-Pacheco and Pierola (2008). Part of the discrepancy may also be due to difference in calculating the extensive margin, whether it is from year to year or over a longer period, and the weights that are used to calculate the contribution of each margin.

important, accounting for 17 percent of total exports at the end of the surge, and 25 percent of export growth, in developing countries. The importance of the exchange rate for the extensive margin in developing countries is confirmed using regression analysis for the full sample of annual data from 1980-2006.

These results are consistent with a distortion that disproportionately affects the tradables sector and offers insight into the nature of the distortion. The large real exchange rate depreciation facilitates a reorientation of production towards the most efficient manufacturing industries in developing countries. While the product and market space is well explored in developed markets; there is ample room for expansion along both dimensions in developing countries. We find that in developing countries the extent of depreciation and the importance of new export markets and new export products are much larger than in developed countries. Moreover, only in developing countries is undervaluation an important part of the surge. This is suggestive of a market failure that leads to suboptimal entry in new products and new markets at the “equilibrium” exchange rate. Undervaluation—or, put another way, *a competitive currency*—is the big push that encourages both more entries and more successes. It performs like a “grand opening sale”, and once customers start coming many of the new relationships are maintained even after the sale is over.

The paper is organized as follows: The next section defines export surges and describes the data. Section III examines the relationship between export surges, GDP surges, and export collapses, to look for cyclical effects. Section IV looks at the conditions that lead to an episode. Section V focuses on the composition of the export

surge. Section VI examines sustained and unsustained episodes. Section VII discusses country cases. And Section VIII concludes.

II. Identification of surges

Following Freund (2005) on current account reversals and Hausmann, Pritchett, and Rodrik (2005) on growth accelerations, we use a filter to identify episodes of export surges that are supply driven. Specifically, a surge must satisfy the following criteria:

- a) Real average export growth over 7 years is above 6 percent.
- b) Real average 7-year export growth increases by one third from the previous 7-year average and is at least 3 percentage points above the previous 7-year average.
- c) The average 7-year import share of the exporter in its three five markets is greater than in the previous 7-year period.
- d) The minimum level of exports observed during each of the 7 years following a surge is higher than the maximum level of exports during each of the 7 years before the surge starts.
- e) Average growth during the surge, excluding the strongest year of growth, is greater than average growth before the surge.

Condition (a) ensures that export growth is strong and above the world average for a surge. Condition (b) ensures that growth increased significantly from the previous seven-year period—i.e. it is not just trend. Condition (c) ensures that the episode is supply driven, as opposed to a demand increase in a country's largest trade partners. Condition (d) ensures that exports are higher in the post surge period and prevents against volatility driven surges. And condition (e) excludes surges that are due to one year of very strong growth.

We only consider those periods where we have a full set of observations; i.e. we have information for each of the seven years before and after the surge starts. We took 7 years as the relevant time horizon, as in Hausmann, Pritchett and Rodrik (2005), however, for robustness purposes we also calculate results for 5-year periods and find the results very similar, and in Section V1, we discuss results for episodes that are sustained for 12-years.

To identify the surges, we use export data from COMTRADE covering the period from 1980 to 2005.⁸ Also, since our objective is to focus on what happens in the manufacturing sector, we use the trade data reported under the SITC Rev. 2 classification (Chapters 5 to 8).⁹ Appendix Table A1 describes all of the data used in the analysis in more detail.

After applying the criteria mentioned above, we obtain 92 episodes of export surges. The full list of episodes by country including the year when the surge starts can be found in Appendix Table A2.

Figure 1 shows the evolution of the average and median values of real manufacturing exports for developing and developed countries before and after the year when the surge starts (year 0) in the upper panel, and manufacturing export growth in the lower panel. For both developing and developed economies, the level and growth of manufacturing exports increases significantly after the surge starts. Figure 2, shows the rise of manufacturing exports during the surge, both as a percent of GDP and as a percent

⁸ In order to reduce the number of missing observations, we have used mirror data (imports) from all countries. Because of noise in the data, we eliminate countries with annual trade below \$1,000,000 during the period.

⁹ These chapters include all manufactured goods classified by materials, chemicals, miscellaneous manufactures and machinery and transport equipment. Also, we alternatively used the manufactured goods reported under the ISIC classification, chapters 31 to 39, and we obtained nearly identical results.

of total merchandise exports. These figures demonstrate a significant move toward manufacturing exports.

Figure 3 shows income growth, real consumption, and unemployment. Export surges are associated with relatively high GDP growth, especially during the surge, real per capita consumption expenditure increases, and unemployment shows some decline in over the period.¹⁰ Export surges are welfare enhancing.

III. The relationship between export surges, GDP surges, and export collapses

In this section, we analyze the relationship between export surges and GDP surges in order to assess whether the episodes identified in the first part correspond to periods of pure export growth or whether the surges are a result of the overall performance of the economy. For that purpose, we define GDP surges using similar criteria as those utilized to identify export surges episodes; however, in the case of GDP surges, taking into account that 6 percent could be considered very high for GDP growth (GDP growth rates tend to be lower than export growth rates), we used 3.5 percent as the cutoff value for the condition imposed on the average rate over the 7-year period.

As a result, we obtained 71 episodes of GDP surges. Table 1 shows the results from the comparison of the timing of GDP surges and export surges for those countries that experienced both episodes within a period of 8 years. We find that an export surge episode is close in time to a GDP surge episode in 33 cases. In most of them, the export surge happens before or at the same time as the GDP surge starts. Almost two-thirds of the export surge episodes happen within periods where there is no GDP surge or if there

¹⁰ One caveat is that the unemployment data is limited with only 14 observations in developed countries and 14 in industrial. In all graphs we use a balanced sample to avoid changes due to entry or exit (see Table A4).

is, it is far enough in time distance so as to consider them completely separate events. Although we are not formally testing causality, this evidence supports the fact that the export surges identified are not a consequence of an economic boom.

Likewise, in order to evaluate whether the export surge episodes reflect a cyclical component (ie. recovery from a previous collapse or a boom before a collapse); we compared the timing of the export surges to the timing of the export collapses.¹¹ We obtain only 14 episodes of export collapses (listed in Appendix Table A3), indicating that collapse is a much rarer event. If we compare collapses and surges, we find that three countries have had both a surge and a collapse. These are Bahamas, Congo, and Lebanon. However, following the same criteria as in the previous comparison between export surges and GDP—a maximum time distance of 8 years in between—surges and collapses occur together in only one case. This is the Bahamas, where the surges preceded the collapse by 8 years. In the other two cases, the export collapses were the consequence of unrest in the countries.

IV. What conditions precede an episode?

In this section, we examine the similarities in the economies in the years leading up to the surge. We look at the trade policy stance and the movement in various macro variables, such as the real exchange rate, savings and investment.

¹¹ For that purpose, we defined export collapses in a similar way to export surges:

- a) Real average export growth over 7 years is below zero and real average 7-year export growth decreases by one third from the previous 7 year average.
- b) Real average 7-year export growth is at least 3 percentage points below the previous 7-year average.
- c) The average 7-year share of the exporter in its five top markets is smaller than in the previous 7-year period.
- d) The maximum level of exports observed during each of the 7 years following a collapse is below the minimum level of exports observed during each of the 7 years before the collapse starts.

Trade liberalization

We use the Sachs and Warner (1995) data on the date of trade liberalizations, as updated by Wacziarg and Welch (2008), to determine the relationship between liberalization and export surges. Of our 92 episodes that take place in 82 countries, they have information on openness for 65 countries.

Sachs and Warner (1995) and Wacziarg and Welch (2008) construct a dummy variable for openness based on five specific trade-related policies. A country is classified as closed if it displayed at least one of the following characteristics: (a) an average tariff rates of 40 percent or more (TAR); (b) nontariff barriers covering 40 percent or more of trade (NTB); (c) a black market exchange rate that is depreciated by 20 percent or more relative to the official exchange rate (BMP); (d) A state monopoly on major exports (XMB); and (e) a socialist economic system (as defined by Kornai, 1992) (SOC).

Using these criteria, they classify the date of openness as the first year when none of these policies is in place. We compare the dates of the export surges with the dates of the liberalizations. Table 2 reports the results. We find that surges are more likely in open economies (36 percent of observations), or within five years of liberalizations (40 percent of observations). In 7 percent of the observations, the liberalization year and the episode year are identical, and they are within one year of each other in an additional 4 percent of observations.

While this is suggestive that openness is important for surges, a concern is that by the end of the period most countries are open, so perhaps liberalization in the surge countries simply reflects global trends. Table 3 compares openness between the

countries with surges and the countries without surges. It shows that at the beginning of the period, three-quarters of the countries in the surge sample and the no-surge sample were closed. However, at the end of the period, only 18 percent of the surge countries were closed, as compared with 34 percent of the non-surge countries. The t-test of the difference between the means at the beginning of the sample is not significant. At the end of the sample, it is significant at the 5 percent level, implying that countries in the surge sample are significantly more likely to have liberalized than countries in the non-surge sample.

One criticism that has been leveled at this measure is that it tends to pick up exchange rate management and/or state ownership more than trade liberalization (see discussion in Wacziarg and Welch 2008). An alternative way to examine trade policy more directly is to look at average tariffs during the surge. Figure 4 shows the average tariff around the time of the surge.¹² There is a general trend towards liberalization, especially in developing countries, over the period. However, liberalization immediately before the surge tends to be modest (2-4 percentage points) and there is little evidence of a discrete jump.

Time series view of macro variables

In this section, we examine how various macro variables change before and during the surge. As above, all of the graphs are shown for a balanced sample to ensure that

¹² The tariff data are from the World Bank, Trade Research Division, "Trends in average applied tariff rates in developing and industrial countries, 1981-2007" (<http://econ.worldbank.org/WBSITE/EXTERNAL/EXTDEC/EXTRESEARCH/0,,contentMDK:21051044~pagePK:64214825~piPK:64214943~theSitePK:469382,00.html>). The data are compiled from UNCTAD, IMF, WTO, and country sources. The graph shows the unweighted overall annual average applied tariff rates.

movements reflect within country changes and not the addition or subtraction of particular observations.¹³

The exchange rate

We first look at the real exchange rate. Figure 5 shows movements in the real exchange rate, exchange rate misalignment, and volatility. Export surges are preceded by a significant currency depreciation, especially in the case of developing countries where we observe that, on average, there is a depreciation of about 30 percent before the surge.

How does the depreciation leave the exchange rate relative to its equilibrium level? To answer this question we estimate exchange rate misalignment adjusting for the Balasa-Samuelson effect. Specifically, using data from the Penn World Tables, we regress the real exchange rate at PPP on real per-capita GDP and calendar-year fixed effects, and the extent of misalignment is measured as the difference between the log of the real exchange rate at PPP and the log of the fitted value from the regression (as in Frankel 2006, Cheung, Chinn, and Fujii 2007, and Rodrik 2007). The middle panel of Figure 5 shows misalignment. In developing countries a move toward undervaluation tends to precede surges. At the onset of the surge, the exchange rate tends to be about 10 percent undervalued and by the end of the surge it is about 20 percent undervalued.

Exchange rate volatility is measured as the standard deviation of the monthly nominal rate as recorded in the IFS IMF Statistics. As shown in Figure 5, it declines before the surge, especially in developing countries. Together these graphs suggest that a steady and large real depreciation stimulates the export surge.

¹³ Table A4 lists the number of countries with data for all of the relevant years for each variable, which are included in each of the graphs.

Savings and investment

One channel that has been proposed for the transmission of the real exchange rate to income growth is through savings and investment, with a more depreciated rate leading to higher savings, investment, and income growth.¹⁴ The savings rate rises during the boom (Figure 6). However, we do not find that the domestic investment rate increases. Rather, increased savings results in a boost to the current account position, as predicted by the well-known model of Dooley, Folkerts-Landau, and Garber (2004). In their model, increased savings are invested abroad because of better financial intermediation in the foreign economy. The fact that investment growth does not precede the surge also suggests that the surge is not a result of a productivity shock.

Foreign investment may also respond to the depreciation, since domestic assets will be cheaper for external investors. While there is evidence of an increased ratio of FDI to GDP, in constant dollars it looks more like a trend increase over the period, especially in developing countries (Figure 7). Moreover, if we look at countries with large depreciations (above the median), as compared with those with small depreciations, we do not see a sharper increase in foreign direct investment in the countries with more depreciation.

Foreign demand effects

In order to evaluate whether the surge is a result of increased foreign demand, we look at the top five markets of each country and examine their total imports and import growth

¹⁴ In a recent cross-country study, Montiel and Servén (2008) find no evidence of an exchange-rate related savings channel in stimulating income growth.

from the rest of the world.¹⁵ Our focus is supply driven export surges, and condition (c), that market share abroad increases, makes this unlikely. Still it could be the case that both supply and demand forces are at work. If import growth from the rest of the world increases dramatically during the surge then foreign income growth or foreign liberalization may be an important part of the story. Figure 8 shows average and median total imports and import growth from the rest of the world. For both developing and developed countries there is some evidence of higher import growth especially in the first year of the surge, but growth is very volatile. In addition, for developing countries import growth slows markedly as the surge progresses. This suggests that import demand is not a major factor for maintaining surges in developing countries.

In sum, the exchange rate displays the clearest and strongest relationship with the export surge, especially in developing countries. On average, a 30 percent real depreciation precedes export surges in developing countries. Sizeable undervaluation and reduced volatility also accompany the surge.

V. Composition

The purpose of this section is to understand how the real depreciation influences trade patterns using disaggregated 4-digit SITC (Rev. 2) bilateral trade data. The large real depreciation of the exchange rate has three potential effects. First, it makes existing domestic goods cheaper abroad, increasing demand for them. This is the standard effect. Second, it makes entries into new markets or new export products more profitable, which would generate more entries. And third, for a given level of entries, it reduces the

¹⁵ The top 5 markets for each exporting country were identified by calculating the share of each importing country (destination market) in the exporting country's total trade during the period between 1985 and 2006 and selecting the five markets with the highest share throughout this period.

likelihood of finding a new market or product unprofitable and exiting. Thus, the failure rate associated with entry would fall.

To explore how important these channels are, we define an entry as an export observation in a product line that was not exported in the previous year or as a new market for an existing product. A failure is defined as entry that exists for just one year, i.e. a new market/product was tried in year t , but it is unsuccessful and does not appear in year $t+1$. In order to avoid entries as a result of countries that begin reporting imports during the period—recall, we use mirror data—we use a balanced sample of 43 importers that report trade continuously from 1980 to 2005. These countries account for on average 82 percent of total manufacturing trade of the 182 exporters over the period. Using a balanced sample implies that we are likely to underestimate the importance of new markets, since some destinations are left out, though the importance of these markets is likely to be small in most cases, as these are small countries.

Figure 9 shows the median number of entries and median misalignment for developing and developed countries (graphs using means look similar). The extent of undervaluation is positively correlated with an increasing number of entries. Figure 10 shows the median misalignment and the median failure rate in developing and developed countries. The failure rate appears to be declining in the misalignment. This is consistent with the hypothesis that undervaluation generates a significant amount of entry and a lower failure rate. It is noteworthy that the failure rate is quite high, well over 50 percent. This is consistent with work by Besedes and Prusa (2007) that shows that entry is frequent, it is the duration of new exports that separates successful exporters, such as the countries of East Asia, with unsuccessful exporters.

To determine if this is an effect of the undervalued exchange rate, we split the developing country sample into countries with more depreciation (above the median change during the surge) and less depreciation (below the median). We find that entries increase more in the countries with greater changes in misalignment (Figure 11). We also find that the failure rate falls by more (Figure 12). These effects are stronger in developing countries.

But are these new entries important? Figure 13 shows the cumulative share of new products and new markets in total exports. Products are considered new if they were not exported in year -4,-5, or -6 relative to the surge. We use three years to avoid picking re-entries as new entry, this is important for products where demand may vary from year to year. Note that this is a conservative estimate of the extensive margin, if we use just one year as the base we get larger results. In developing countries, new products and new markets are worth about 17 percent of exports by the end of the surge and 25 percent of export growth. In developed countries, where nearly all of the entry is in new markets, entries make up 8 percent of total exports by the end of the sample. The smaller impact is because developed countries have previously expanded to most of the key markets in their main products.

As an alternative way of looking at restructuring in the manufacturing export sector, we calculate an index of revealed comparative advantage before the surge begins (years -6 to -4), and see what happens to these industries over time.¹⁶ Figure 14 shows the share of these initial revealed comparative advantage (IRCA) industries in total

¹⁶ The Revealed Comparative Advantage Index (RCA) was calculated by taking the share of product “i” in the total trade of country “j” from years -6 to -4 and dividing that by the share of product “i” in the total World’s trade during the same period. The IRCA industries include all those products with an RCA larger or equal to one.

manufacturing exports for more and less undervalued currencies. The decline of the IRCA industries is starker among episodes with more depreciation in both developing and developed countries, implying that resources are moving away from the traditional exports more rapidly when depreciation is large.

The downward slope of the IRCA in all of the figures implies that revealed comparative advantage today does not portend future trends in growth. This is likely because the IRCA sectors have already matured, providing less room for rapid growth in the future. Export growth is largely due to strong growth of relatively small existing exports, and in developing countries, it is also due to growth of new products. The more rapid decline in export share of the traditional sectors in countries with a larger depreciation is consistent with the idea that a more competitive currency facilitates the restructuring process.

In sum, the graphs show more exploration of new products and markets, and more restructuring of trade away from traditional export sectors, during surges with more undervaluation in developing countries. In developed countries, we also see more restructuring, but the extensive margin is less important. Below, we control for other factors that could affect these results.

Regression analysis

To evaluate the robustness of these results, both for the episodes and more generally, we turn to regression analysis, which allows us to control for country and time effects that might be driving the results. We use both the surge-country sample and a larger sample of all countries with available data from 1980 to 2005. We create a panel of five 5-year periods in order to eliminate noise that may affect annual data and because exchange rate effects may take more than one year to appear. Specifically, we consider the following relationship:

$$X = \gamma_i + \gamma_t + \beta_0 \ln(\text{misalignment}_{it}) + \varepsilon_{it}$$

where γ_i is a country-fixed effect and γ_t is a period-fixed effect. X are the variables that may be affected by misalignment and depreciation, including \ln manufacturing exports, \ln entry and the failure rate. We estimate all equations in first differences.

$$(1) \quad dX = \alpha_t + \beta_0 d \ln(\text{misalignment}_{it}) + \varepsilon_{it}$$

The coefficient β_0 reflects the effect of misalignment on the set of dependent variables that is not due to country-specific effects or global growth effects. We report results for the set of countries with surges, and also using all countries for which data on misalignment are available (130 countries). We also control for country size, trade liberalization, and ultimately country-fixed effects. In this growth specification, country-fixed effects will control for country-specific growth rates or, put differently, country-specific trends in levels.

Simple correlations between the variables of interest are reported in Table 4. The simple correlations confirm a positive correlation between the change in misalignment and export growth. In addition, increased currency competitiveness is associated with

less openness, more entries into new markets and products, and a lower failure rate. In tables 5-7, we explore these relationships in more detail.

Table 5 examines the effect of the change of misalignment on entry into new products and markets (estimating equation 1). The first column reports results for the sample of countries with surges. We find that depreciation leads to higher entry growth, after controlling for period-fixed effects. Column 2 shows results for the full sample. The effect of depreciation on entry is similar, implying that this is a robust finding—depreciation tends to stimulate entry in all countries. From here on we focus on the full sample in order to identify the effect of exchange rate movements on entry, which may be part of the mechanism through which large depreciations lead to surges in developing countries. Column 3 includes openness and lagged GDP. More open countries have higher entry growth as do smaller countries (presumably because larger countries are already in many markets already). In column 4, we include country-fixed effects and while depreciation remains significant, openness and lagged GDP are no longer significant, suggesting that changes in size or openness within countries have little effect on entry growth. The final two columns show results for developing and developed countries separately. Increased currency competitiveness is only significant in boosting entry growth in developing countries. In particular, a 10 percentage point increase in misalignment leads to 2 percentage point higher entry growth.

Table 6 reports similar results for the failure rate. Greater currency competitiveness reduces the failure rate, but significantly only in the developing countries. In contrast for developed countries, a move to openness or an increase in size

has a larger effect on reducing the fail rate. The results imply that a 10 percentage point increase in misalignment leads to a 4 percentage point lower failure rate.

Table 7 examines the effect of the change in misalignment on export growth. We also report results using the level of misalignment as an independent variable. The argument for using the level is that a more competitive currency will be associated with a higher level of entry and a lower failure rate—as well as greater demand abroad—and thus potentially higher export growth.¹⁷ Using both measures, we find that increased currency competitiveness leads stronger export growth (columns 1-4). In column 5, we include both the change in misalignment and the level and find a stronger relationship with the level. For this reason, we continue the analysis including the level of misalignment only. Column 6 includes country-fixed effects and the results are slightly stronger, implying that within countries, export growth is higher when the currency is more competitive. Columns 7 and 8 report results for developing and developed countries, and results are only significant for developing countries. In columns 9 and 10, we control of openness and the lagged level of GDP. The effect of a competitive currency on export growth is strong and robust in developing countries. It implies that a 10 percent increase in currency competitiveness leads to 5 percentage point higher export growth.

¹⁷ We also try levels of misalignment in the regressions on entry and the failure rate. Both had the same sign as for changes, but in both cases the larger and more significant effect was from changes. This is intuitive since changes in misalignment will likely have a greater effect the growth rate of entries and the change in the failure rate. In the case of export growth, a more competitive currency generates a higher level of entry and a lower failure rate, as well as greater demand, which will lead to higher export growth.

VI. Sustained export surges

Does the undervaluation jump start the export surge, allowing countries to find new successful export products and markets, or is it a requirement for sustained strong export growth? To answer this question we explore which of the 92 surges are maintained for at least 12 years. Specifically, we identify those episodes where the export growth is sustained for at least 12 years (our original definition of export surge considers episodes of sustained growth during 7 years), using the same criteria utilized for the identification of the export surges, but extending the 7-year restriction to 12 years.¹⁸ As a result, we identify 53 episodes with sustained export growth, of which 40 are in developing countries.

Using 68 comparable episodes for developing countries, we contrast the average and median of the exchange rate movement, misalignment, and exchange rate volatility for those episodes with sustained export growth for 12 years, vs. the average and median of all those variables for the unsustained episodes. The sample is smaller because we examine only developing countries, and only episodes before 1996 which have the potential to last 12 years.

The top panels of Figure 15 show real exports and export growth for the sustained and unsustained episodes. Sustained episodes have stronger export growth for a longer period, resulting in much higher exports on average. The middle panels show movement in the real exchange rate and estimated misalignment. The sustained episodes tend to maintain the depreciation, while there is a reversal in the unsustained episodes in the third year. The sustained episodes have a large undervaluation (of about 25-30 percent) and

¹⁸ The restrictions to identify supply-driven surges and to avoid surges due to only one year of strong growth are absent because by using them to identify surges in the first place, we eliminated the possibility of having problems related to these two issues, regardless of whether the export growth lasts 7 or 12 years.

maintain a competitive currency throughout the period. In contrast, the large undervaluation in the unsustained episodes is short-lived and is substantially eroded after five years. This implies that continued undervaluation is important to maintain strong growth. Still, the unsustained episodes are able to maintain the higher *level* of exports they achieved as a result of the export surge. There is hysteresis in the sense of export volumes not retreating after the exchange rate reverses; however, strong export growth does not persist.¹⁹ Put another way, the competitive currency allows the countries to find new customers and new export products, and these new relationships survive even after the exchange rate reverts. However, once the sale is over the country no longer continues to attract new customers or augment sales to old customers at such a high rate.

The sustained episodes are also associated with sustained strong and stable GDP growth. In the unsustained episodes, GDP growth falls after the fifth year of the surge. In sum, the results suggest that sustained strong export growth requires sustained undervaluation in developing countries—at least for 12 years.

VII. Specific country cases

In this section, we discuss in detail some of the specific country experiences with export surges. In particular, we look at the experiences of China and Turkey, which are often described as export-led growth. We discuss Portugal, Spain, and South Africa, where regime changes led to increased integration with the rest of world. We examine the debt crisis in the 1980s, the resulting devaluations and country experiences. And, we look at

¹⁹ Baldwin (1988), Baldwin and Krugman (1989), and Dixit (1989) discuss the hysteretic effect of exchange rate changes on trade and import prices in the presence of sunk costs.

the devaluation of the CFA (*coopération financière en Afrique*) franc that affected countries in Central and Western Africa.

China and Turkey each experienced two episodes of export surges. In the case of China, the currency has moved steadily from an estimated overvaluation of more than 50 percent in the early 1980s to an estimated undervaluation of more than 50 percent in the mid 1990s. In the case of Turkey, there has been more volatility, but each of the surges was accompanied by a large move (of about 40 percent) away from an overvalued currency to a more competitive level. Both countries also liberalized trade and promoted manufacturing exports with tax incentives and subsidies. Still, the exchange rate seems the dominant force in both countries. In the case of Turkey, Arslan and Wijbergen (1993) examine the importance of import demand, domestic policies, and the exchange rate and find that by far the most important factor explaining export growth in the 1980s was the exchange rate. For China, Rodrik (2007) also highlights the exchange rate as a key stimulant to exports and growth. Wei and Dollar (2007) show that industrial policies in China have tended to channel resources to inefficient state owned enterprises, without which, China would likely have grown just as fast with lower investment and more consumption.

In Portugal, Spain, and South Africa, the defeat of inward looking regimes led to more integration with the rest of the world and ultimately export surges. The dictatorships of Salazar in Portugal and Franco in Spain kept these countries isolated from the rest of Europe until the early-mid 1970s. Following, their deaths, the two countries moved towards integration with the West. Negotiations for entry to the EU began in the late 1970s and both countries joined the European Community (EC) in

1986—the precise year of their export surges. While their currencies were depreciating in the years up to 1985, they appreciated sharply as soon as it was clear they would enter the EC and continued to appreciate for the next several years—suggesting that depreciation did not play a major role in the surges. In South Africa, apartheid was dismantled in 1990-91 and democratic elections took place in 1994. The end of apartheid was rewarded with the removal of sanctions by the industrial countries that had been limiting exports. The currency appreciated in the years leading up to the surge. While moderate depreciation accompanied the surge, strong export growth was likely more related to the regime shift and greater openness to South Africa's exports in major markets.

One noticeable feature of the data on export surges is that a number of developing countries experienced surges in 1986 or 1987. This is not a coincidence. The debt crisis, which started with Mexico's default in 1982, led to large real devaluations in nearly all of the highly indebted developing countries on the order of 30 to 90 percent from the early 1980s to 1986. And these large devaluations resulted in export surges. What is especially interesting in these cases is that because of the crises, trade liberalization initiatives were most often reversed. Among the most drastic reversals were Argentina and Philippines, both of which experienced export surges. In Argentina, non-tariff barrier coverage was low before the crisis; however, after it 62 percent of tariff lines had non-tariff barriers. Similarly, in the Philippines, NTB coverage increased from 40 to 100 percent of tariff lines. In addition, because of increased exports from many developing countries, developed countries increased import barriers during this period (Laird and Noguez 1988). This suggests that even when trade barriers are on the rise, a competitive

exchange rate goes a long way to stimulate exports. Laird and Nogues (1988) also highlight the effect of the depreciations on stimulating manufacturing exports in a number of the debt crisis countries—they find a 0.37 correlation between annual movements in the real exchange rate and manufactured exports.

Finally, another group of countries where exchange rate depreciation loomed large in generating export surges is the CFA countries in Africa (Benin, Burkina Faso, Congo, Equatorial Guinea and Togo). The CFA was created in December 1945 and it is the common currency of 14 African countries, members of the Franc Zone. The CFA was created with a fixed exchange rate versus the French franc and this exchange rate was changed only twice: in October, 1948 and in January, 1994. The devaluation of 1994 was preceded by the nominal appreciation of the French franc against the U.S. dollar, which in turn led to the deterioration of the countries' competitive position. The 1994 devaluation was significant in its magnitude (50 percent in foreign currency terms, or 100 percent in domestic currency terms) and it was uniform across all the members of the Franc Zone (van den Boogaerde and Tsangarides, 2005; Devarajan, 1997). The large real depreciation that accompanied the devaluation was the main reason these countries experienced export surges.

Our work highlights a major role for a competitive currency in stimulating exports in developing countries. The case studies support this relationship—many of the surges occurred in the aftermath of a large devaluation or steady depreciation.²⁰ Regime shift

²⁰ The industrialization of Latin America in the late 19th century has also been attributed to depreciation and export-led growth. Most of Latin America was tied to silver, which fell significantly in value relative to gold during the last two decades of the century. Thus, their currencies depreciated with respect to gold-backed North Atlantic economies. See Haber (2005) for a detailed discussion.

can also play an important role, with a move to more engagement with the rest of the world accompanied by increased exports.

VIII. Conclusions

We find that a large depreciation, resulting in a 20 percent undervaluation, and reduced exchange rate volatility tends to precede export surges in developing countries.

Moreover, countries with longer periods of sustained export growth have experienced relatively larger depreciations and continued undervaluation. In contrast, countries where the surge fizzles after seven years tend to experience a reversal of the depreciation.

We highlight a new role for a competitive currency in generating export growth. In addition to stimulating exports along the intensive margin, the large undervaluation leads to more entry into new markets and a lower failure rate in those markets. We argue that there is a distortion that leads to suboptimal entry in new markets and new products in developing countries. The undervalued exchange rate is a useful tool to alleviate that distortion. It is especially effective because it works across all export industries—it does not require the government to pick favorites.

The dominance of the exchange rate over trade policy may reflect the scarcity of large trade liberalizations in the data. A real exchange rate depreciation of 20 percent gives a large and immediate boost to exporters. Trade liberalization tends to be variable across products and take place in smaller steps of 2 or 3 percentage points in a year. In addition, while trade liberalization supports exporters it does not support tradables vis-à-vis nontradables. In contrast, real exchange depreciation moves resources out of import-competing sectors into both the export sector and the non-tradable sector. If the main

issue is getting resources into the tradables sector, undervaluation may be more effective tool.

An important concern is how and when to allow the currency more mobility. Our results on sustained episodes suggest that the time line is more than 12 years. The export successes that lasted for 12 years maintained an undervalued exchange rate throughout the period. Still, eventually there will be costs to promoting tradables, as this sector will reach a point of diminishing returns. In addition, there is a threat of disruptive inflation as the domestic economy strengthens (Eichengreen 2008). As the manufacturing sector expands, and these costs become large as compared with their benefits, it will be time to change. How long to pursue this policy and potential exit strategies remain an important area for future research.

Our work has important implications for recent demands that there is more global regulation of exchange rates. With all eyes on China, a number of papers have argued that the use of policy to maintain an undervalued real exchange rate, which effectively serves as an import tariff and export subsidy, should be regulated by the IMF and/or WTO (Goldstein 2005, Mussa 2008, and Mattoo and Subramanian 2008). Mattoo and Subramanian (2008), argue that the WTO would be a better enforcer with the IMF providing technical assistance.²¹

As this paper—in combination with the work of Hausmann, Prichett and Rodrik (2005)—shows, one of the most effective tools available to developing countries to improve income growth through trade is a competitive currency. Stricter regulations and enforcement against undervaluation would thus prevent developing countries from

²¹ Even if the WTO had the authority over enforcement, Staiger and Sykes (2008) show that translating exchange rates into trade policy equivalents is very complex and unlikely to serve the interest of the trade system.

following a path likely to produce income growth, a path that countries such as Japan and Korea have already taken. Developing countries have repeatedly argued that the international institutions do not serve their interests. Our results imply that regulations and enforcement on exchange rate management would strengthen that argument.

References

- Ahearne, A., J. Fernald, P. Loungani and J. Schindler (2006) "Flying Geese or Sitting Ducks: China's Impact on the Trading Fortunes of Other Asian Economies" Board of Governors of the Federal Reserve System, International Finance Discussion Papers: 887.
- Amurgo-Pacheco, A and M.D. Pierola (2008) "Patterns of Export Diversification in Developing Countries" World Bank Policy Research Working Paper 4473.
- Arslan, I and S. van Wijnbergen (1993) "Export Incentives, Exchange Rate Policy and Export Growth in Turkey." *Review of Economics and Statistics*, 128-133.
- Baldwin, R. (1988). "Hysteresis in Import Prices: The Beachhead Effect" *American Economic Review* 78, 773-785.
- Baldwin, R. and P. Krugman (1989) "Persistent Effects of Large Exchange Rate Shocks" *Quarterly Journal of Economics* 54: 635-654.
- Baldwin, R., F. Skudelny, and D Taglioni (2005). "Trade Effects of the Euro: Evidence from Sectoral Data" European Central Bank Working Paper 446.
- Bayoumi, T. (1999) "Estimating Trade Equations from Aggregate Bilateral Data," IMF Working Paper No. 74, May.
- Bernard, A. and B. Jensen, (1995) "Exporters, jobs, and wages in U.S. manufacturing: 1976-1987" *Brookings Papers on Economic Activity. Microeconomics*, pp. 67-119.
- Bernard, A. and B. Jensen (2004) "Entry, Expansion and Intensity During the U.S. Export Boom 1987-1992." *Review of International Economics* 12(4): 662-675.
- Bernard, A. Jensen, B, Redding, S. and Schott (2007) "Firms in International Trade" *Journal of Economic Perspectives*, 21(3): 105-130.
- Besedes, T. and T. Prusa (2007) "The Role of Extensive and Intensive Margins and Export Growth," NBER Working Papers 13628.
- Bhagwati, J. (1996) "The Miracle that did Happen: Understanding East Asia in Comparative Perspective." Keynote speech, conference on Government and Market: The Relevance of Taiwanese Performance to Development Theory and Policy.
- Cheung, Yin-Wong, Menzie Chinn and Eiji Fujii, 2007b, "The Overvaluation of Renminbi Undervaluation," *Journal of International Money and Finance* 26(5) (September): 762-785.
- Colacelli, M. (2006) "Export Responses to Real Exchange Rate Fluctuations: An Empirical Analysis." Mimeo, Columbia University.

- Devarajan, S (1997). “Real Exchange Rate Misalignment in the CFA Zone”. *Journal of African Economies*, Volume 6, Number 1, 35-53.
- Dixit, A. (1989) “Hysteresis, Import Penetration, and Exchange Rate Pass-Through” *Quarterly Journal of Economics* 54, 205-228.
- Dooley, M. D., Folkerts-Landau, and P. Garber. (2004), “The Revived Bretton Woods System” *International Journal of Finance and Economics* 9(4): 307-313.
- Eichengreen, B. (2008)- “The Real Exchange Rate and Growth” Working Paper Number 4, Commission on Growth and Development.
- Fang, W., Y. Lai and S. Miller (2006) “Export Promotion through Exchange Rate Changes: Exchange Rate Depreciation or Stabilization?” *Southern Economic Journal* 72(3): 611-626.
- Frankel, Jeffrey A., 2006, “On the Yuan: The Choice Between Adjustment Under a Fixed Exchange Rate and Adjustment under a Flexible Rate,” in *Understanding the Chinese Economy*, edited by Gerhard Illing, CESifo Economic Studies, vol. 52, no. 2, (Oxford University Press), 246-275.
- Freund, C. (2005) “Current Account Adjustment in Industrial Countries” *Journal of International Money and Finance* 24, 1278-1298.
- Goldstein, M (2005) “Currency Manipulation and Enforcing the Rules of the International Monetary System” Paper prepared for conference on “IMF Reform” Institute for International Economics, September 23.
- Haber, S. (2005) “Development Strategy or Endogenous Process? The Industrialization of Latin America” Mimeo, Stanford University.
- Hausmann, R., L. Pritchett, and D. Rodrik (2005) “Growth Accelerations” *Journal of Economic Growth*, 10: 303-329.
- Hummels, D. and P. Klenow (2005). “The Variety and Quality of a Nation’s Exports” *American Economic Review*, 95, 704-723.
- Johnson, S., J. Ostry, and A. Subramanian (2006) “Levers for Growth” *Finance and Development* 43(1): 28-31.
- Jones, B. and B. Olken (2008) “The Anatomy of Start-Stop Growth” *Review of Economics and Statistics*, forthcoming.
- Krueger, Anne (1998) “Why Trade Liberalization is Good for Growth” *Economic Journal*, 108 (September): 1513-22.

Krugman, P. (1981) "Intraindustry Specialization and the Gains from Trade" *Journal of Political Economy* 89, 959-973.

Laird, S. and J. Noguez (1988) "Trade Policies and the Debt Crisis" World Bank, Working Paper 99.

Mattoo, A. and A. Subramanian (2008) "Currency undervaluation and sovereign wealth funds : a new role for the World Trade Organization" World Bank, Working Paper 4668.

Montiel, P. and L. Serven "Real Exchange Rates, Saving and Growth: Is There a Link?" World Bank Policy Research Paper 4636.

Mussa, M. (2008) "IMF Surveillance over China's exchange Rate Policy" In M. Goldstein and N. Lardy Eds. *Debating China's Exchange Rate Policy*. Peteresen Institute for International Economics: Washington DC.

Obstfeld, M. (2002) "Exchange Rates and Adjustment: Perspectives from the New Open Economy Macroeconomics" NBER Working Paper 9118.

Rodrik, D. (2007) "The Real Exchange Rate and Economic Growth: Theory and Evidence" Mimeo, Harvard University.

Sachs, J. and A. Warner (1995) "Economic Reform and the Process of Global Integration". *Brookings Papers on Economic Activity*, 1: 1-118.

Schank, T. C. Schnabel, and J. Wagner (2007) "Do exporters really pay higher wages? First evidence from German linked employer–employee data" *Journal of International Economics*, 72(1): 52-74.

Staiger, R. and A. Sykes (2008), "Currency Manipulation' and World Trade" (June 13, 2008). Available at SSRN: <http://ssrn.com/abstract=1151942>.

Van Den Boogaerde, P. and C. Tsangarides (2005) "Ten Years After the CFA Franc Devaluation: Progress Toward Regional Integration in the WAEMU" IMF Working Paper No. 05/145

Wacziarg, R and K. H. Welch (2008) "Trade Liberalization and Growth: New Evidence" World Bank Economic Review, forthcoming.

Wei, S and D. Dollar (2007) "Das (Wasted) Capital: Firm Ownership and Investment Efficiency in China" IMF Working Paper WP/07/9.

Winters, L. A. (2004). "Trade Liberalization and Economic Performance: An Overview" *Economic Journal* 114: F4-F21.

Table 1: The Relationship between Export Surges and GDP Surges

	Export surges (number of episodes)	GDP surges (number of episodes)
1. Countries experiencing both episodes within a 8-year period:	33	33
- Both start at the same time		8
- Export happens before GDP		15
- Export happens after GDP		10
2. Countries experiencing either just one type of episode, or both but with more than 8 years in between	59	38
Total number of episodes	92	71

**Table 2: Openness and Export Surges
Percentage of Episode in Each Category**

Surge first	Same Year	Liberalization first	Open	Closed
18.67	6.67	14.67	36.00	24.00

Note: Surge first indicates surge was 5 years or less before, liberalization first indicates that the liberalization was 5 years or less before. For 17 countries with surges (18.5 percent of sample), Wacziarg and Welch do not have data on the data of liberalization.

Table 3: Openness in Surge Countries vs. Openness in Other Countries

	Percent of countries with surge	Percent of countries without surge	t-test
Closed in 1980	75.38	75	0.05
Closed in 2004	18.46	34.21	2.11
nob	65	76	

Note: t-test is a test of the difference in the means between countries with surge and without.

Table 4: Correlations

	dllexport	dmisalignment	open	dlentry
dmisalignment	0.08*			
	0.06			
	520			
open	0.04	-0.17***		
	0.44	0.00		
	404	404		
dlentry	0.33***	0.16***	-0.18***	
	0.00	0.00	0.00	
	520	520	404	
dfail	-0.21***	-0.20***	-0.04	-0.35***
	0.00	0.00	0.46	0.00
	520	520	404	520

* Significant at the 5 percent level. ** Significant at the 5% level. *** Significant at the 1 percent level.

Table 5: The Effect of the Change in Misalignment on Entries

	<i>Dependent variable: dln Entry</i>					
	Surge (1)	Full (2)	Full (3)	Full (4)	Developing (5)	Developed (6)
dmisalignment	0.19*** [0.06]	0.16*** [0.04]	0.12* [0.07]	0.16** [0.07]	0.18*** [0.07]	-0.27 [0.44]
open			0.08** [0.03]	0.09 [0.10]	0.09 [0.10]	0.27 [0.59]
L.Ingdp			-0.05*** [0.00]	-0.14 [0.11]	-0.15 [0.12]	0.00 [0.18]
Observations	292	520	300	300	213	87
R-squared	0.13	0.09	0.319	0.604	0.505	0.587
Country effects				X	X	X

Period fixed effects in all regressions. Errors adjusted for clustering at the country level.

* Significant at the 5 percent level. ** Significant at the 5% level. *** Significant at the 1 percent level.

Table 6: The Effect of the Change in Misalignment on the Failure Rate

	<i>Dependent variable: dFailrate</i>					
	Surge (1)	Full (2)	Full (3)	Full (4)	Developing (5)	Developed (6)
dmisalignment	-0.05*** [0.02]	-0.04*** [0.01]	-0.03** [0.01]	-0.04** [0.02]	-0.04** [0.02]	-0.07 [0.08]
open			0 [0.01]	-0.02 [0.02]	-0.01 [0.02]	-0.17* [0.10]
L.lngdp			0 [0.00]	0 [0.02]	0.01 [0.02]	-0.08* [0.05]
Observations	292	520	300	300	213	87
R-squared	0.133	0.075	0.118	0.34	0.372	0.301
Country effects				X	X	X

Period fixed effects in all regressions. Errors adjusted for clustering at the country level.
 * Significant at the 5 percent level. ** Significant at the 5% level. *** Significant at the 1 percent level.

Table 7: The Effect of Misalignment on Export Growth

	<i>Dependent variable: dln Exports</i>									
	Surge		Full				Developing		Developed	
	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	(10)
misalignment	0.18*		0.23***		0.21***	0.35**	0.34*	0.53	0.51*	-0.14
	[0.10]		[0.06]		[0.07]	[0.17]	[0.18]	[0.44]	[0.29]	[0.46]
dmisalignment		0.32**		0.23**	0.12					
		[0.13]		[0.10]	[0.12]					
open									0.38	-0.47
									[0.24]	[0.41]
L.lngdp									-0.48**	-0.47
									[0.24]	[0.40]
Observations	292	292	520	520	520	520	360	160	213	87
R-squared	0.044	0.046	0.066	0.049	0.069	0.385	0.397	0.338	0.426	0.619
Country Fixed Effects						X	X	X	X	X

Period fixed effects in all regressions. Errors adjusted for clustering at the country level. * Significant at the 5 percent level. ** Significant at the 5% level. *** Significant at the 1 percent level.

Figure 1: Manufacturing Exports During a Surge

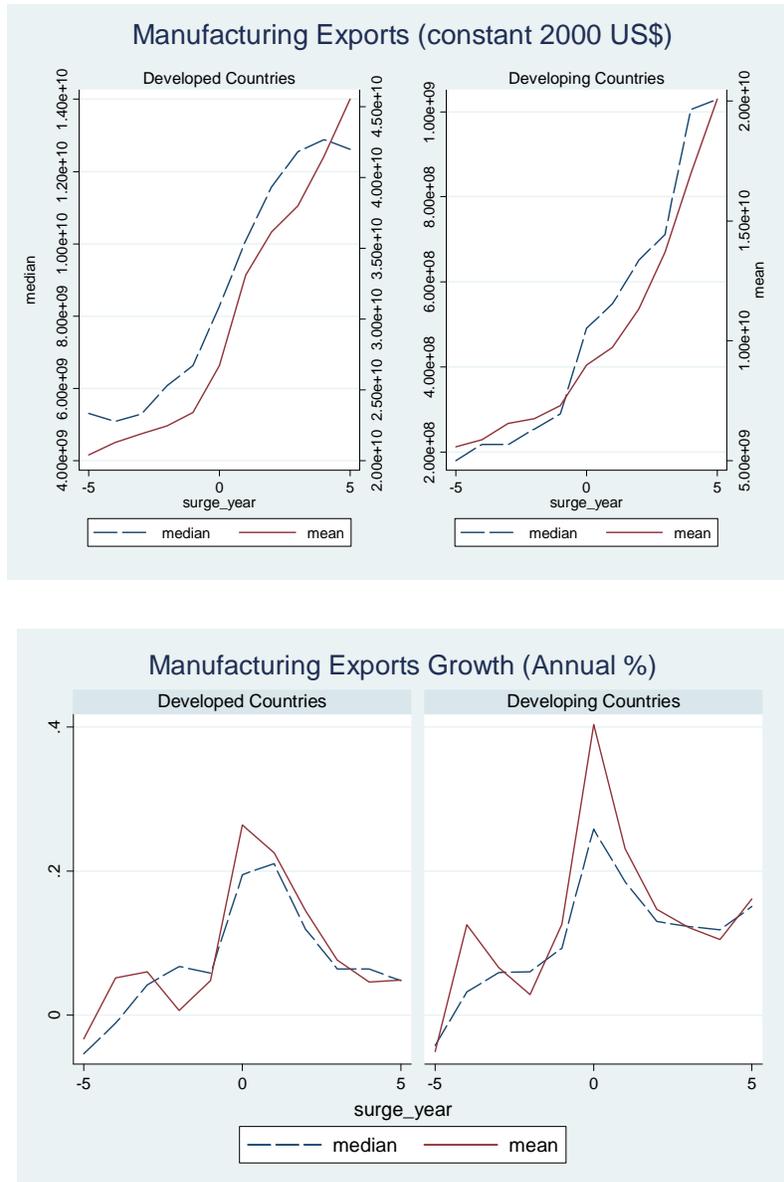


Figure 2: Manufacturing Exports Share in GDP and Merchandise Exports

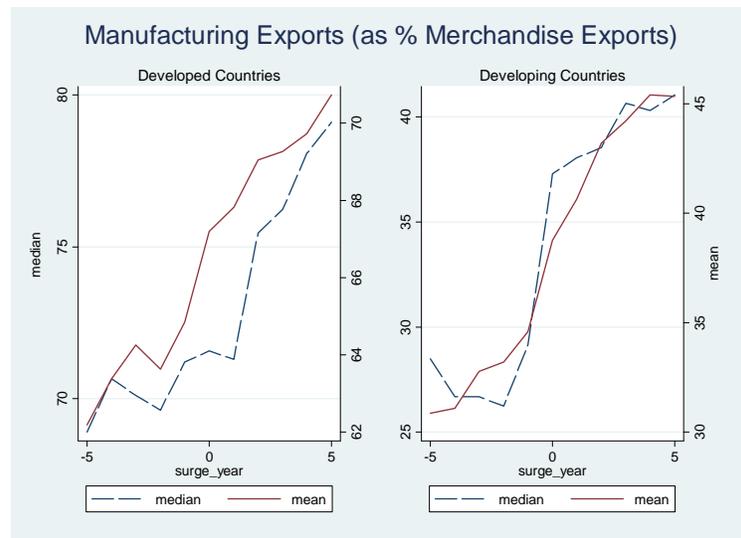
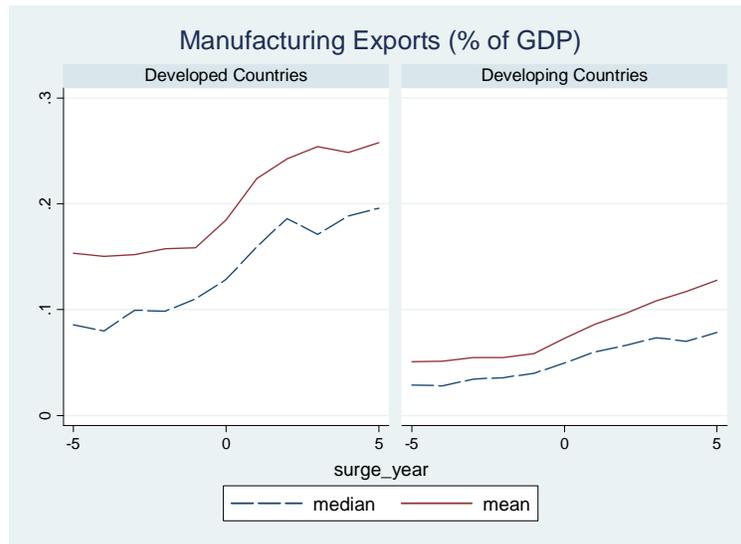


Figure 3: Real GDP Growth, Real Consumption Per Capita, and Unemployment during the Episode

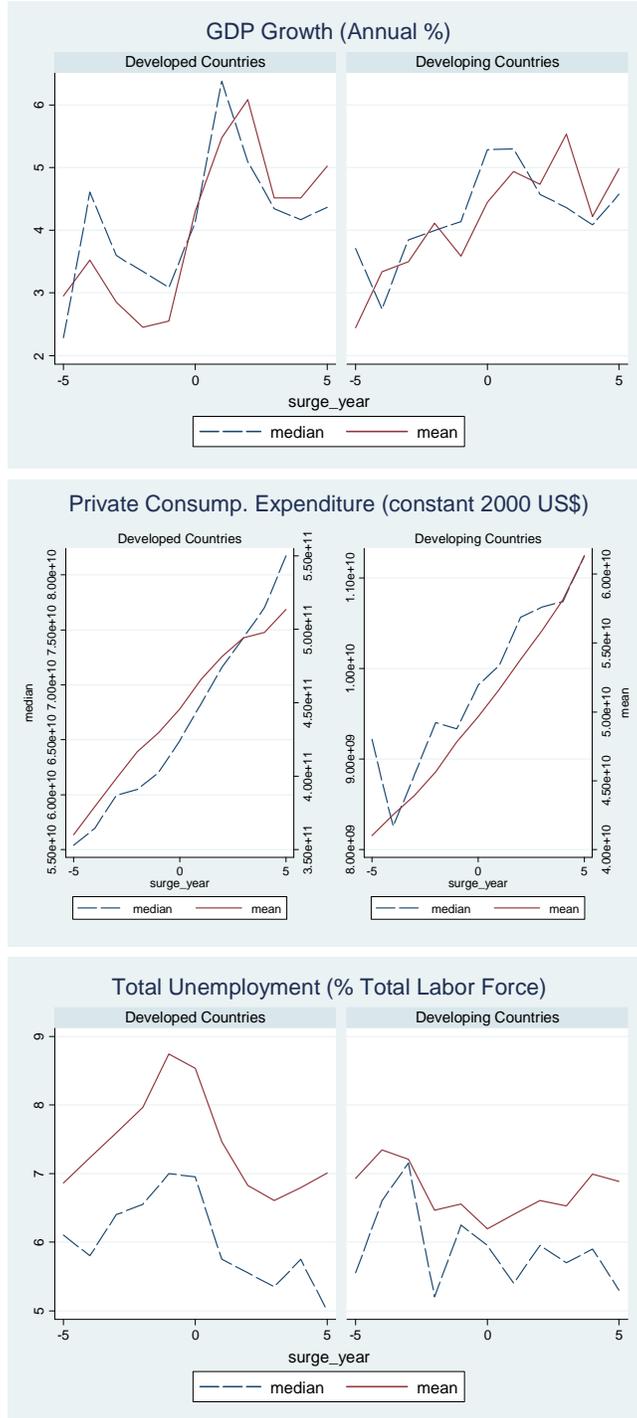


Figure 4: Applied Tariff Rates

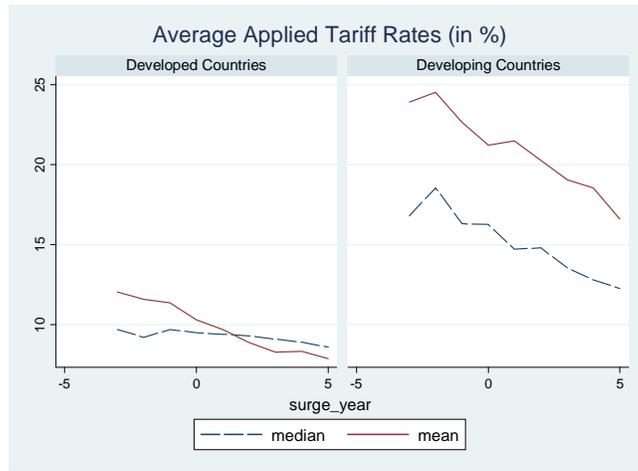


Figure 5: Real Exchange Rate Depreciation, Misalignment and Volatility

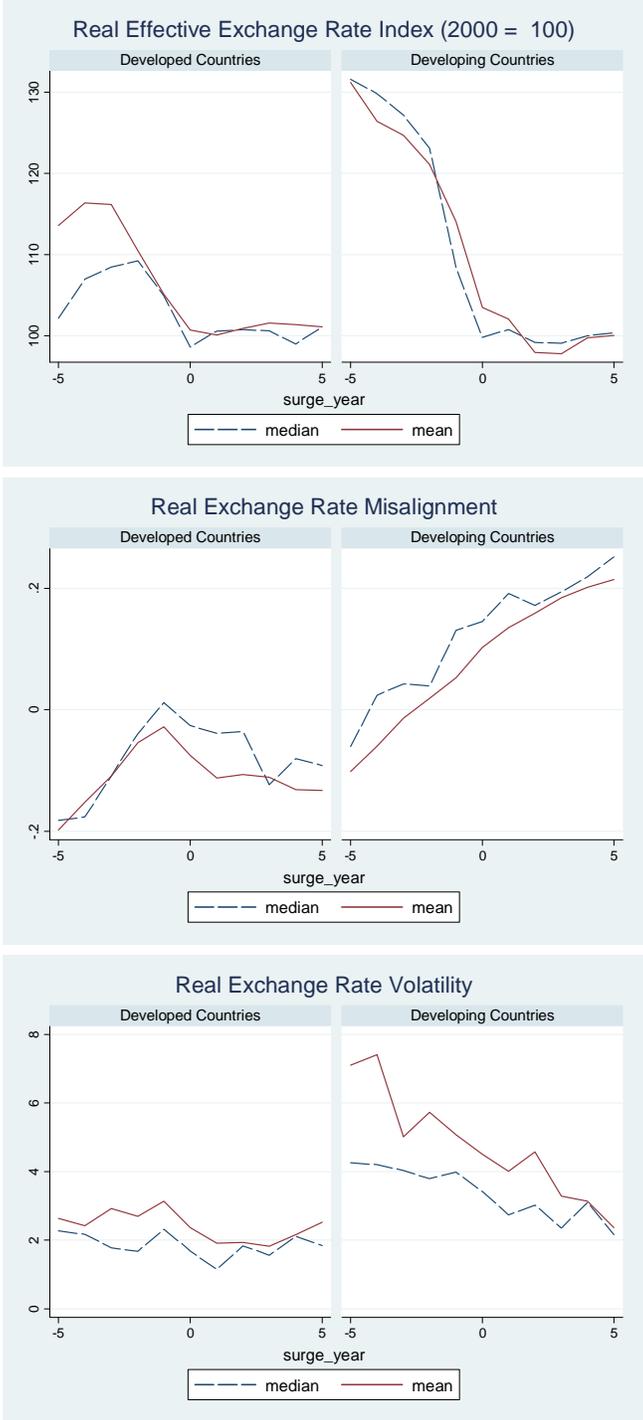


Figure 6: The Savings and Investment Rate

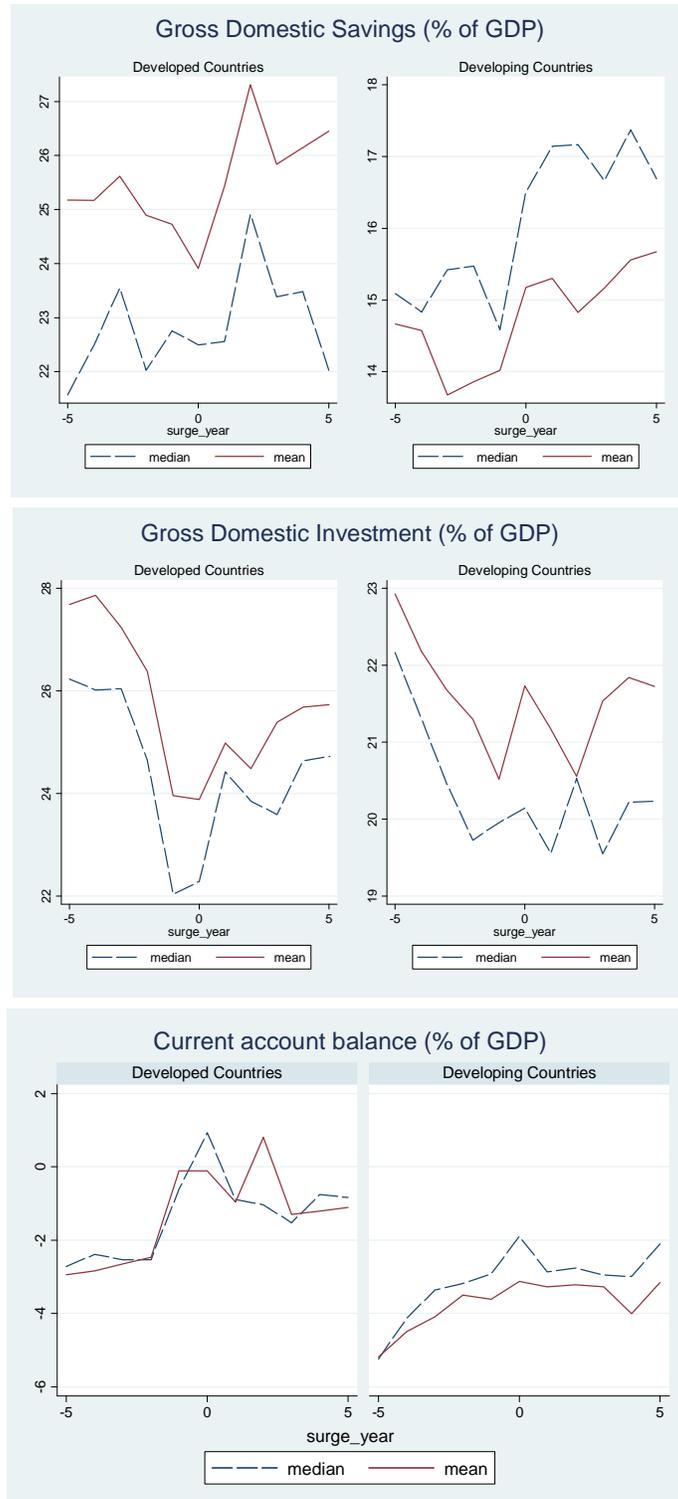
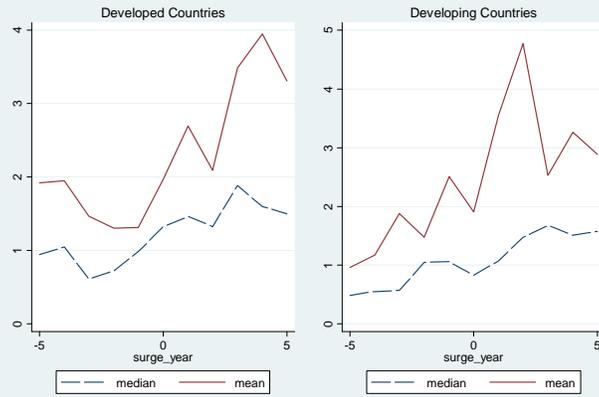


Figure 7: Foreign Direct Investment

Foreign Direct Investment, net Inflows (% of GDP)



Foreign Direct Investment, net Inflows (constant 2000 US\$)

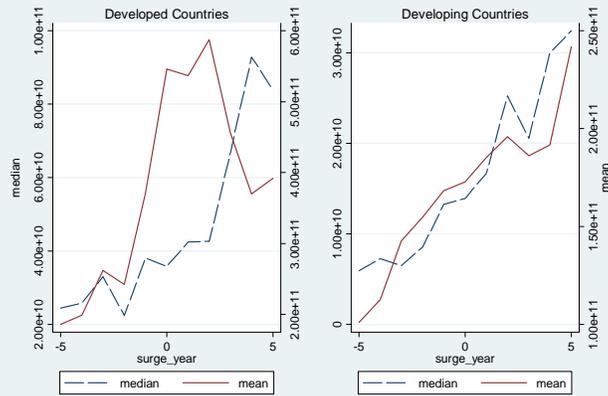


Figure 8: Import Demand from the Rest of the World, Top 5 destinations

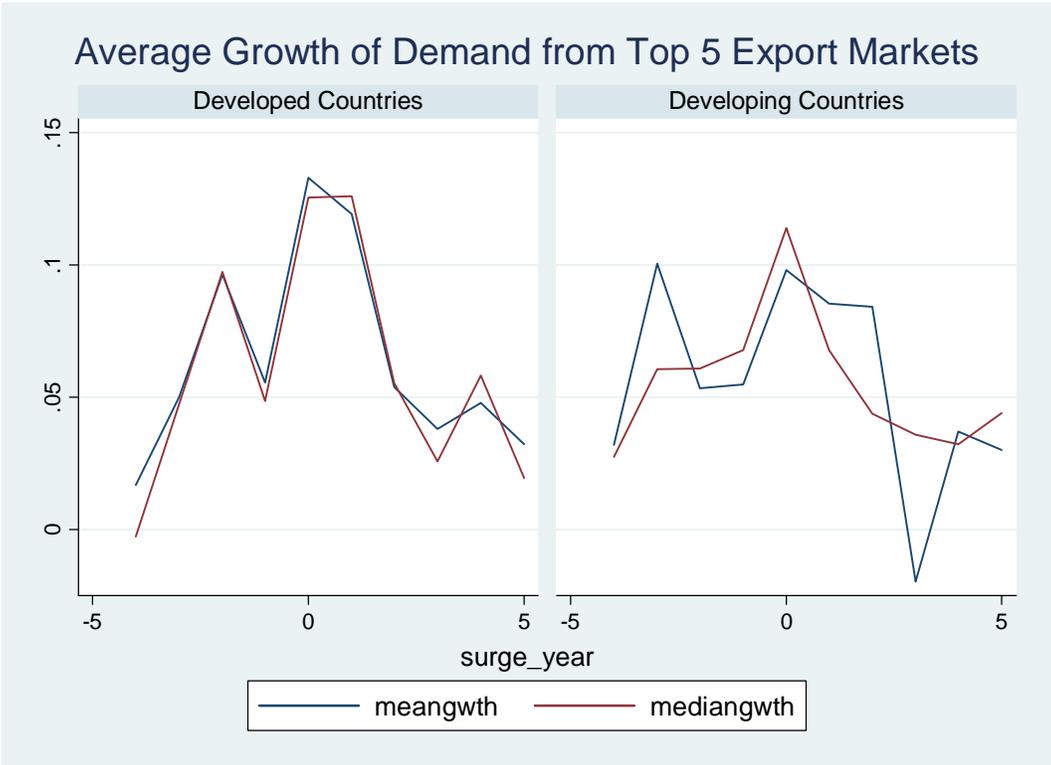
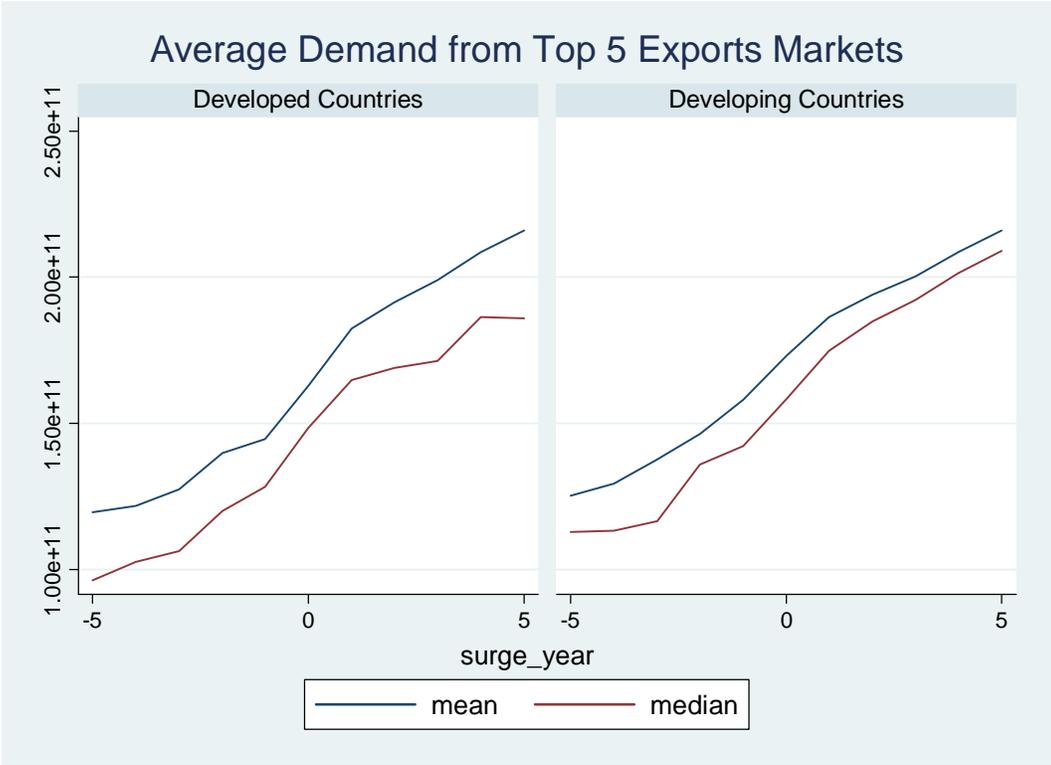


Figure 9: New Markets Entries and Misalignment

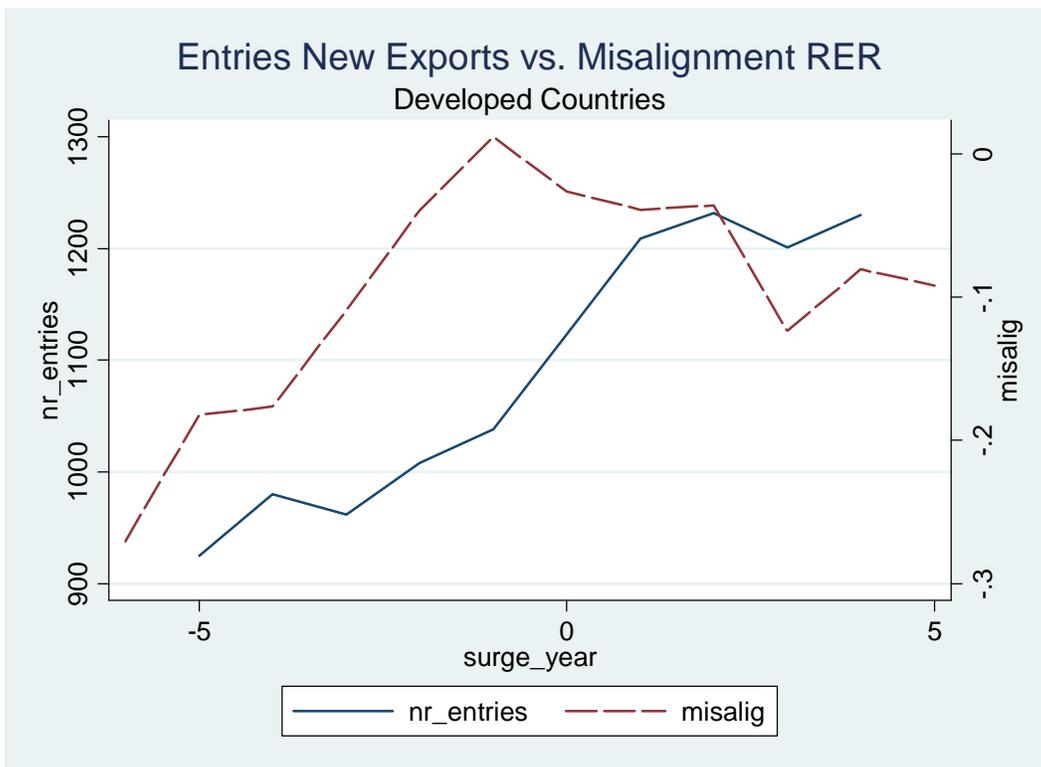
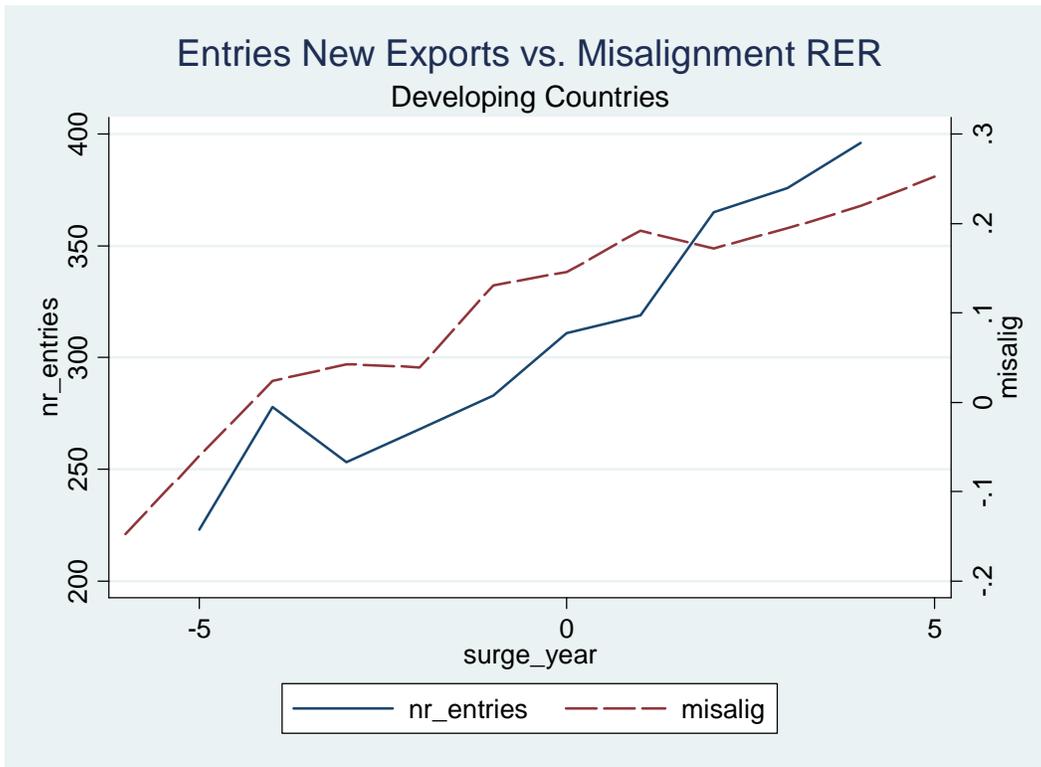


Figure 10: Failure Rate and Misalignment

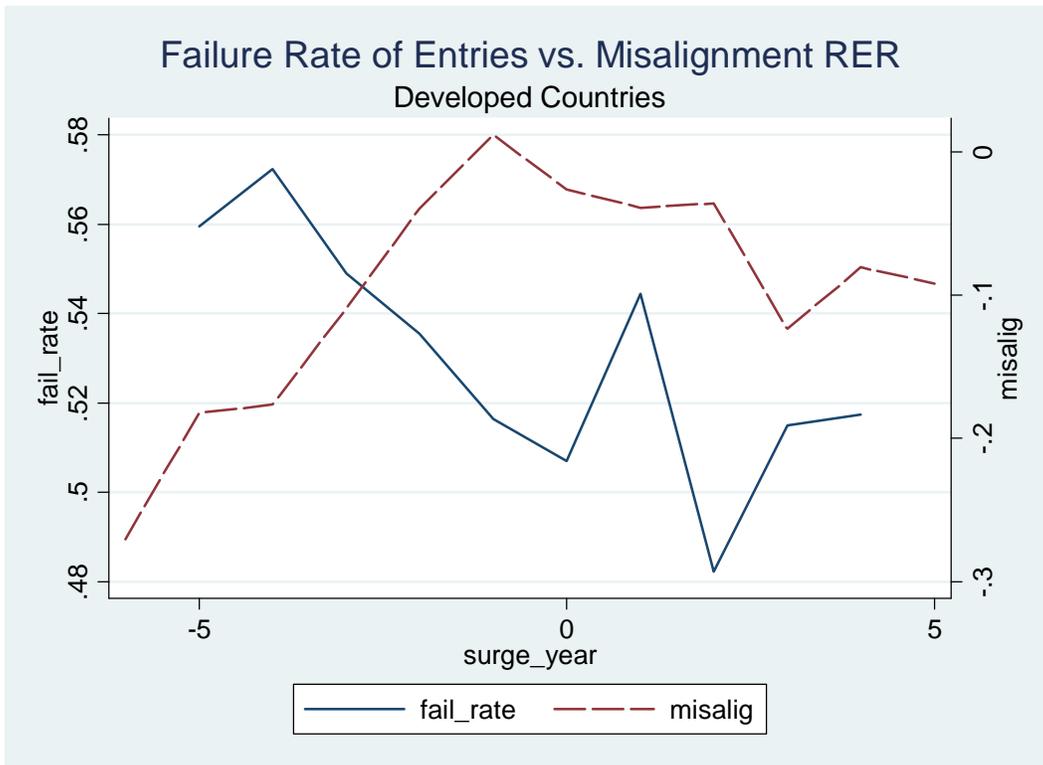
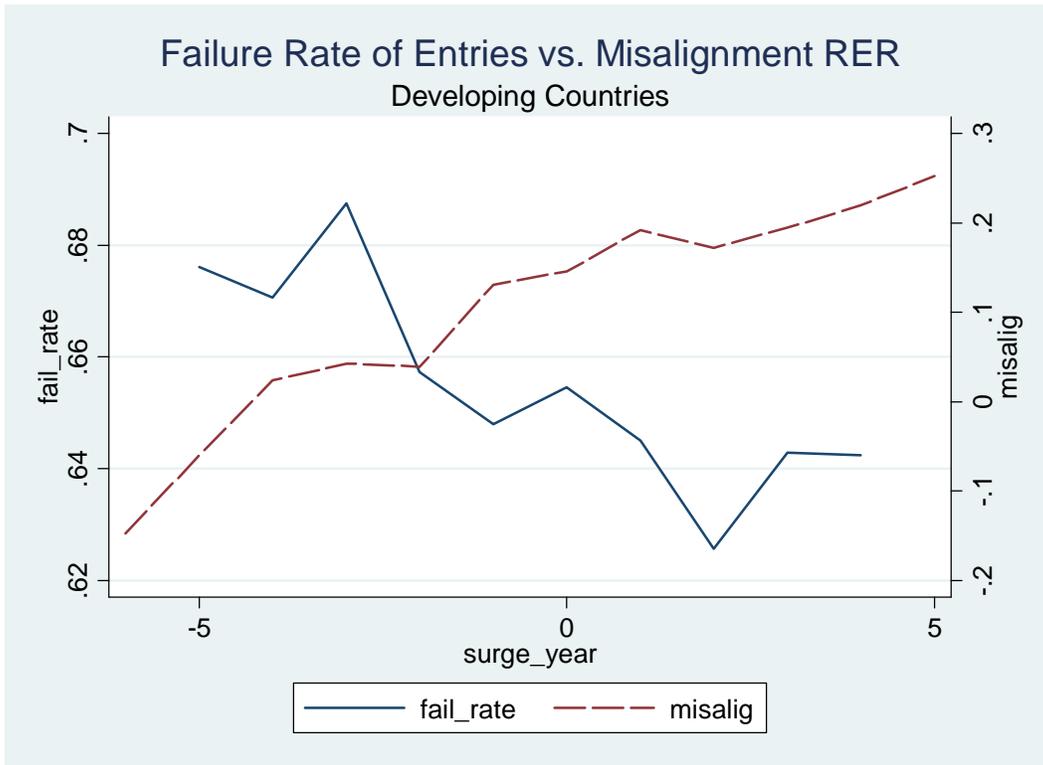


Figure 11: Entries with more and Less Depreciated Currencies

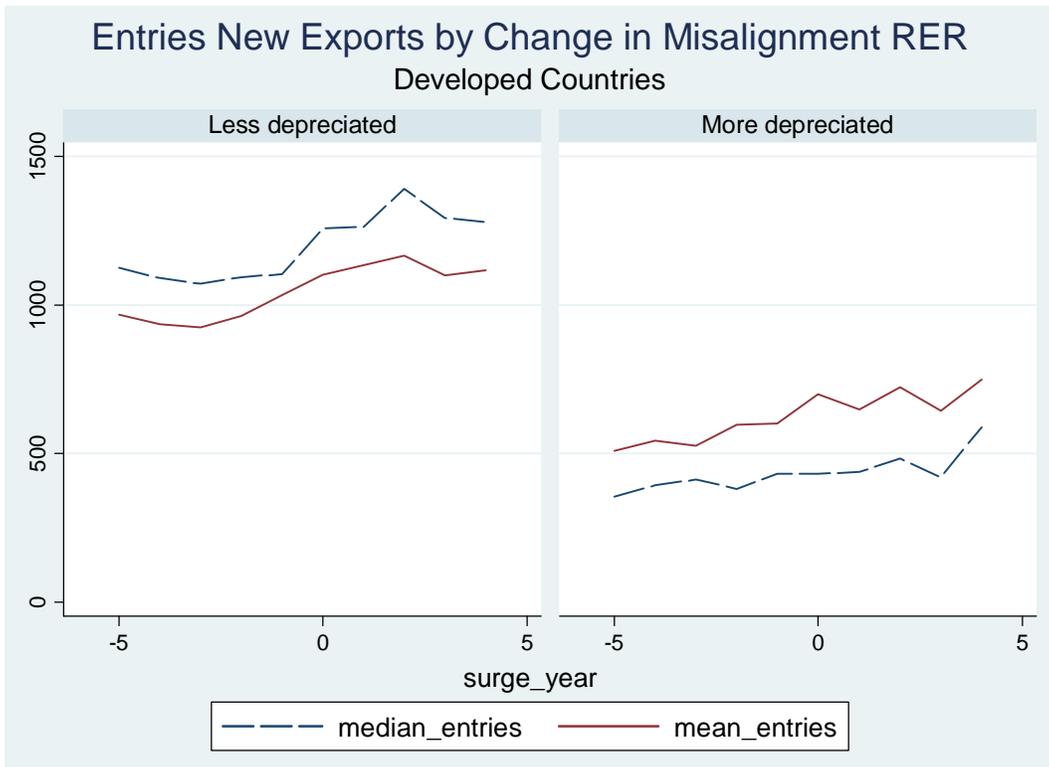
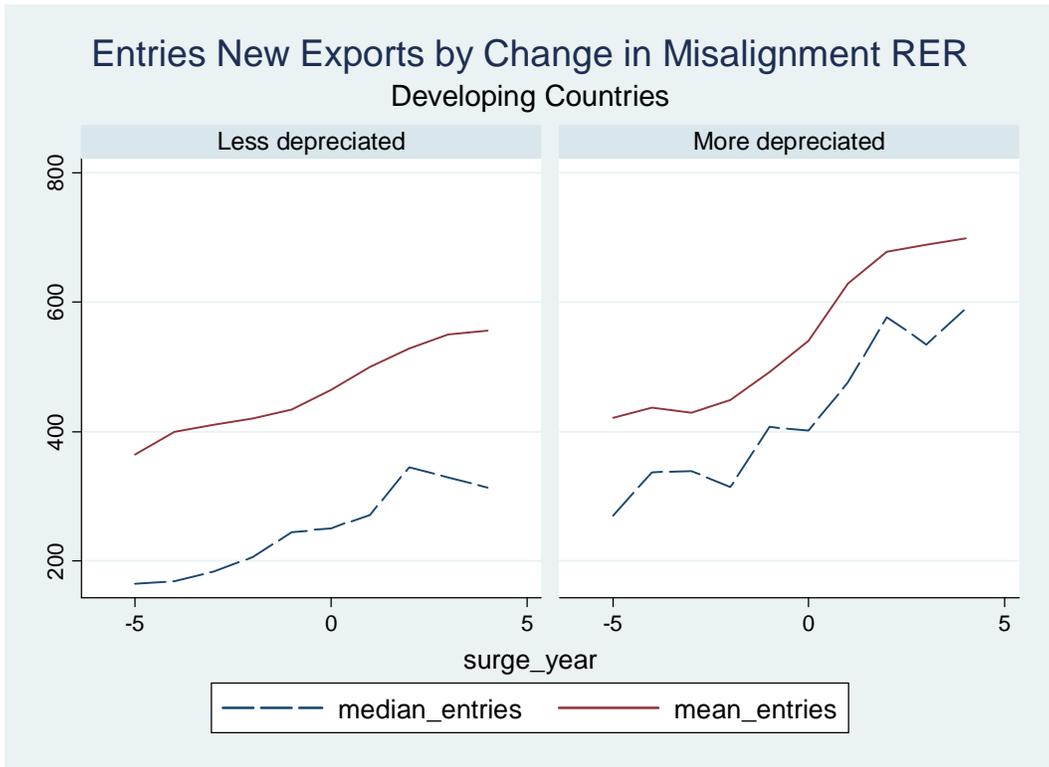


Figure 12: Entry and Failure with more and Less Depreciated Currencies

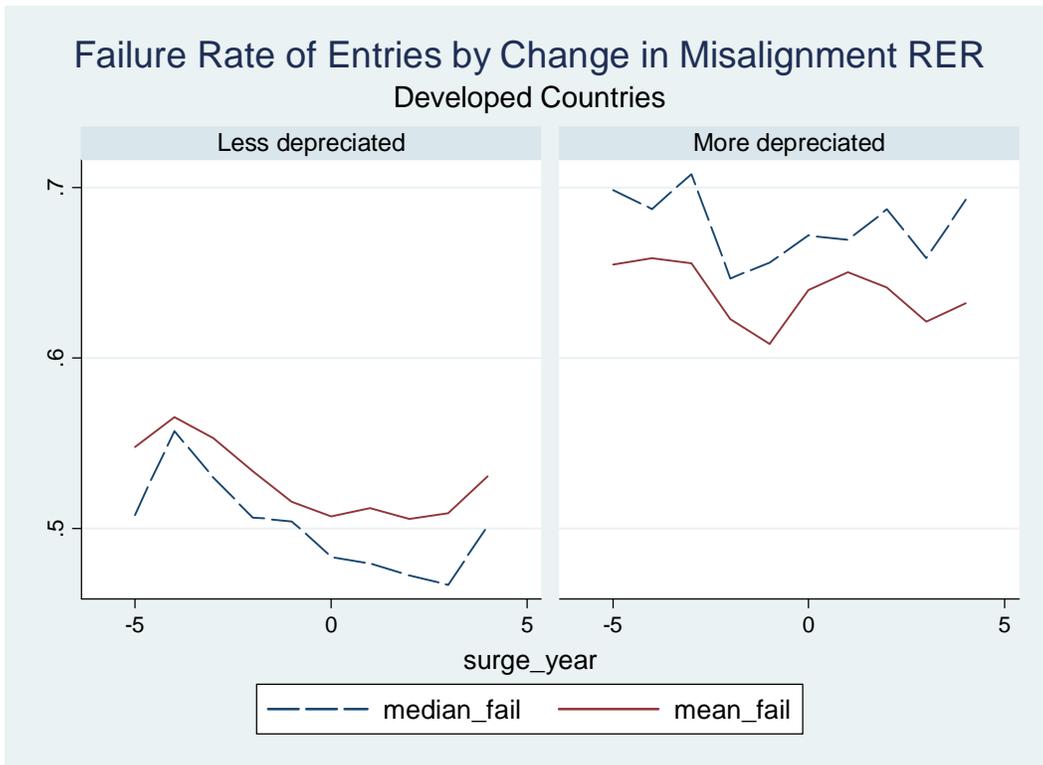
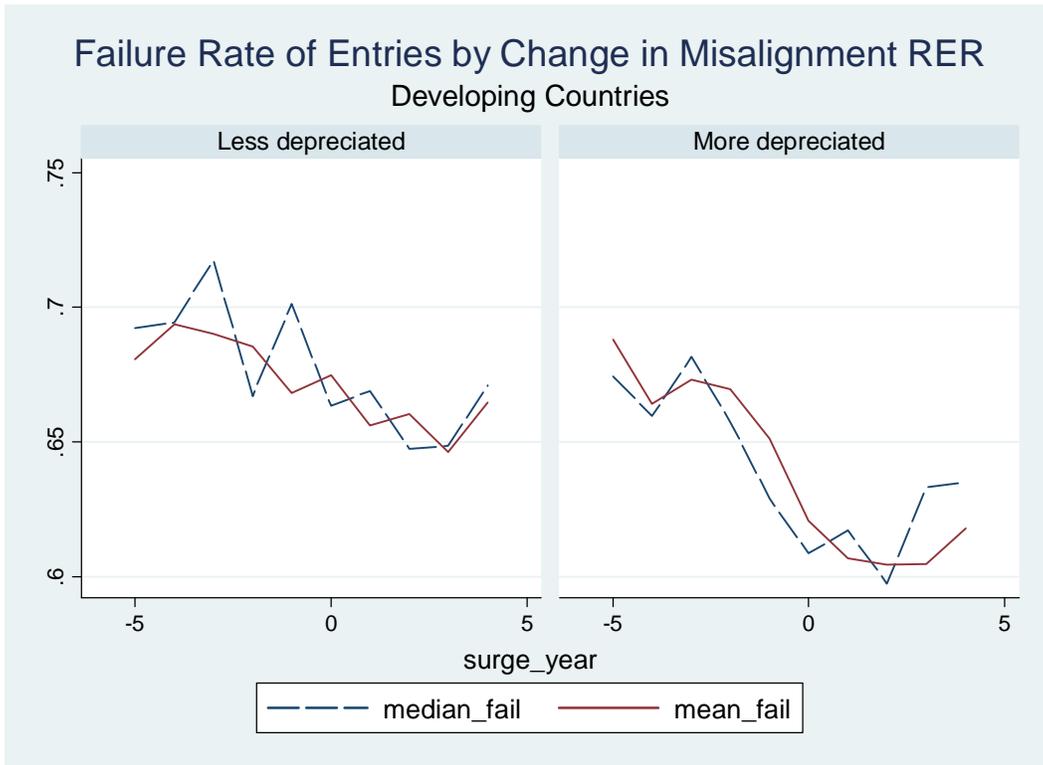


Figure 13: Share of New Markets and New products in Exports

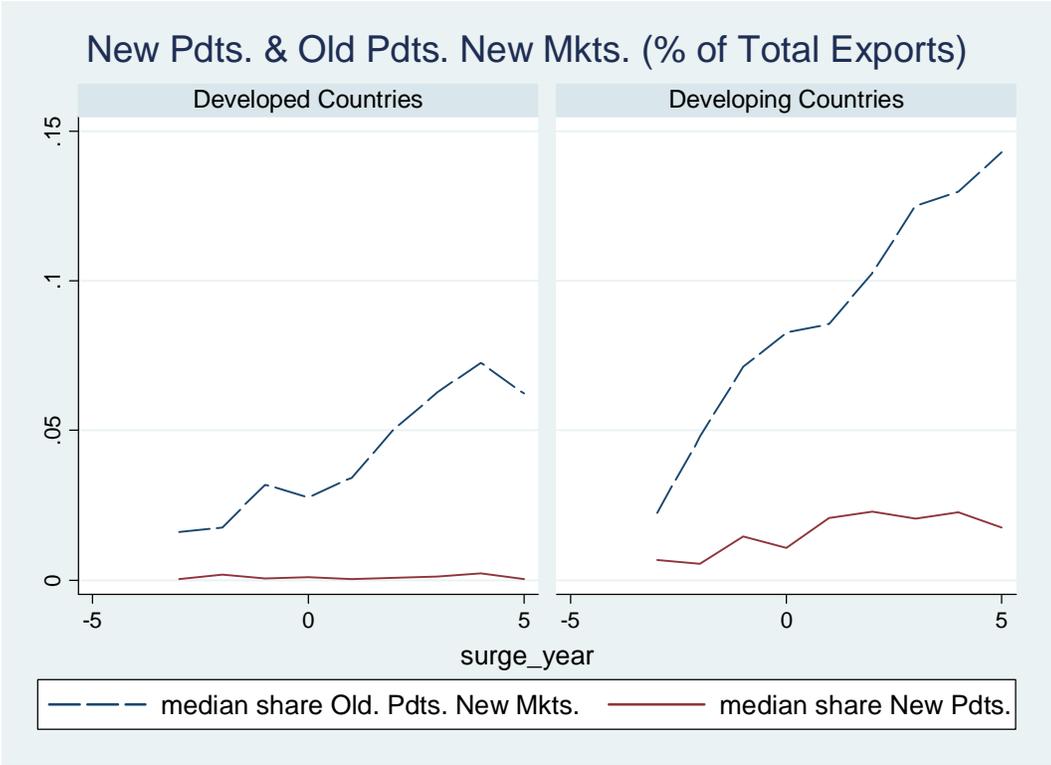


Figure 14: Export Share of Initial Revealed Comparative Advantage (IRCA) Industries in Developing Countries

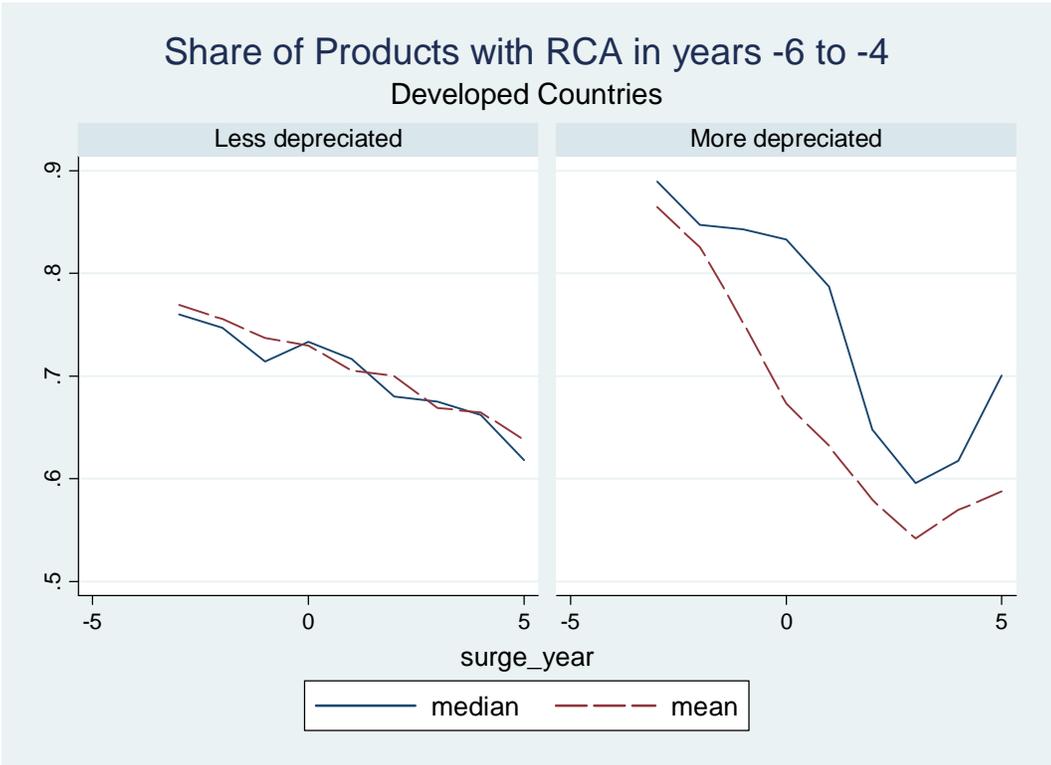
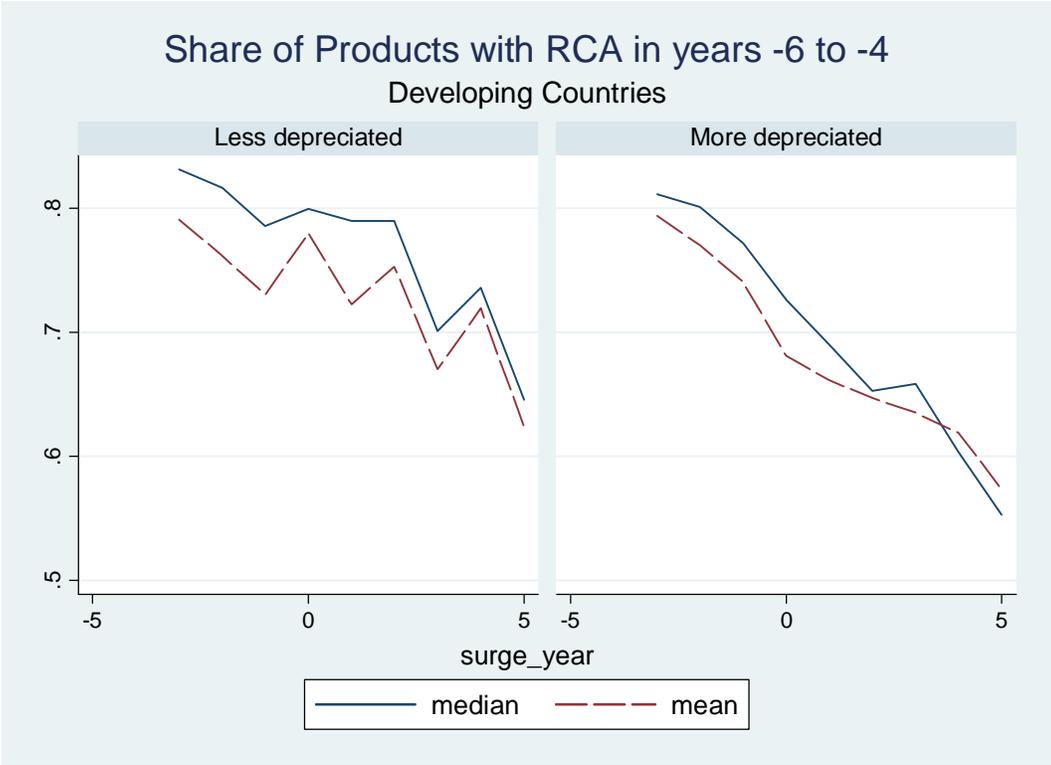
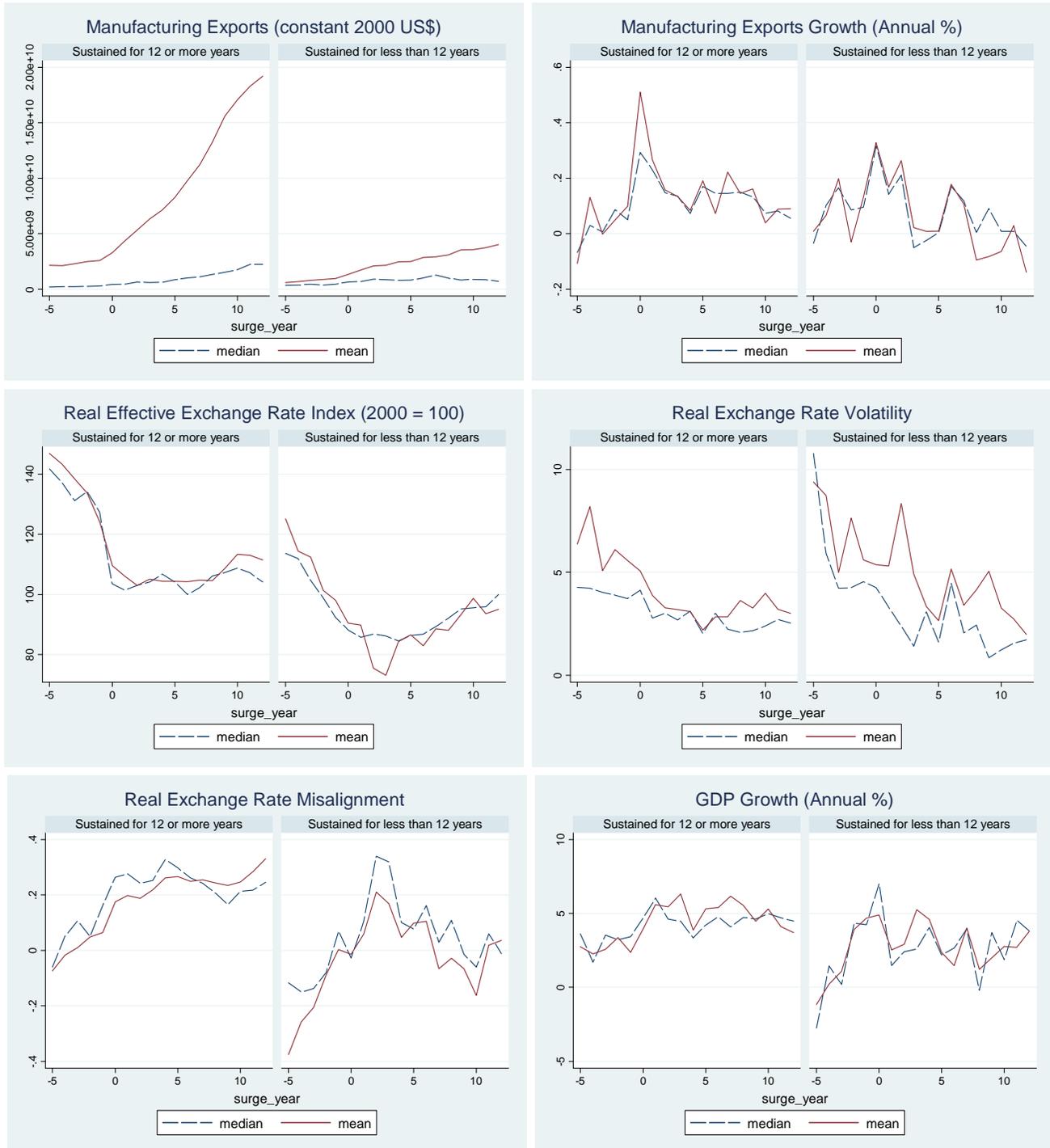


Figure 15: Differences between Sustained and Unsustained Episodes in Developing Countries



Appendix

Table A1: Variables Description

Variable	Name	Description	Source
Consumer price index	cpiusa	CPI (base year:2000)	WDI
Current Account Balance	currac_perc	Current account balance as percent of GDP	WDI
Failure Rate	failrate	Failure rate after 1 year	COMTRADE
FDI inflows	fdi_inf, fdi_usd	FDI inflows as percent of GDP and in US\$ (constant 2000)	WDI
GDP constant	gdp_cons	in US\$ (constant 2000)	WDI
GDP growth	gdp_gwth		WDI
Gross Dom. Savings	sav_perc, sav_usd	Savings as percent of GDP and in US\$ (constant 2000)	WDI
Gross Dom. Investment	invest_perc, invest_usd	Private investment as % GDP and in US\$ (constant 2000)	WDI
Manufacturing Exports	exports	Real Exports (base year 2000)	COMTRADE
Manufacturing Exports Growth	dexpclc		COMTRADE
Misalignment	misalignment	RER observed – RER equilibrium	PENN DATA
Number of attempts	sumtry	New exports with respect to the previous year	COMTRADE
Private consump. Expenditure	Pconsump_usd	Consumption in US\$ (constant 2000)	WDI
Private consump. Expenditure per capita	Pconsump_pcusd	Consumption per capita in US\$ (constant 2000)	WDI
Real Exchange Rate (RER)	reer	Based on a nominal rate adjusted for relative changes in consumer prices	WDI
RER Volatility	sdreer_ifs	Standard Deviation real exchange rate based on monthly calculations	IFS
Average Applied Tariff Rates	tom	Tariff rates based on unweighted averages for all goods in ad valorem rates, or applied rates, or MFN rates whichever data is available in a longer period.	Trade Research Department, World Bank (Data on Trade and Import Barrier)
Unemployment	unemp_tot_per	Unemployment, total (% of total labor force)	WDI

Table A2: List of Export Surge Episodes

Nr.	Country	Year=0	Nr.	Country	Year=0
1	Albania	1995	47	Kenya	1989
2	Angola	1987	48	Korea, Rep.	1986
3	Antigua and Barbuda	2000	49	Korea, Rep.	1999
4	Argentina	1986	50	Kuwait	1998
5	Australia	1987	51	Lebanon	2000
6	Austria	1986	52	Madagascar	1998
7	Bahamas	1986	53	Malawi	1992
8	Bahrain	1988	54	Malaysia	1987
9	Bangladesh	1987	55	Malta	1987
10	Benin	1996	56	Mauritania	1994
11	Bosnia and Herzegovina	2000	57	Mauritius	1986
12	Brazil	2000	58	Mexico	1986
13	Burkina Faso	1995	59	Mongolia	1998
14	Cambodia	1991	60	Morocco	1986
15	Chile	1988	61	Mozambique	2000
16	China	1986	62	Myanmar	1987
17	China	2000	63	Myanmar	1996
18	Colombia	1986	64	Nicaragua	1988
19	Colombia	2000	65	Nigeria	1988
20	Congo, Rep.	1989	66	Oman	1992
21	Costa Rica	1986	67	Pakistan	1987
22	Costa Rica	1997	68	Paraguay	1987
23	Cyprus	1987	69	Philippines	1987
24	Dominican Republic	1986	70	Poland	1998
25	Ecuador	1991	71	Portugal	1986
26	Egypt, Arab Rep.	1987	72	Qatar	1997
27	Egypt, Arab Rep.	2000	73	Romania	1996
28	El Salvador	1987	74	Saudi Arabia	1986
29	Equatorial Guinea	1994	75	Seychelles	1998
30	Fiji	1986	76	Singapore	1986
31	Gambia	1987	77	South Africa	1994
32	Guatemala	1986	78	Spain	1986
33	Guinea	1986	79	Sudan	1995
34	Guyana	1993	80	Syrian Arab Republic	1990
35	Honduras	1986	81	Thailand	1986
36	Hong Kong, China	1986	82	Togo	1994
37	Hungary	1994	83	Trinidad and Tobago	1988
38	Iceland	1997	84	Tunisia	1986
39	India	1987	85	Turkey	1986
40	Indonesia	1986	86	Turkey	1998
41	Ireland	1986	87	Uganda	1996
42	Ireland	1994	88	United Arab Emirates	1988
43	Israel	1986	89	United States	1987
44	Israel	1994	90	Uruguay	1987
45	Jordan	1984	91	Venezuela	1988
46	Jordan	1998	92	Vietnam	1985

Table A3: List of Export Collapse Episodes

N.	Country	Year=0
1	Afghanistan	1989
2	Bahamas, The	1994
3	Bermuda	1994
4	Bolivia	1985
5	Congo, Rep.	1998
6	Gabon	1990
7	Ghana	2000
8	Haiti	1990
9	Iraq	1991
10	Jamaica	2000
11	Lebanon	1984
12	Niger	1990
13	St. Lucia	1997
14	Zambia	1996

Table A4: Number of countries included in the graphs of preconditions by development status and of sustained episodes

	All episodes		Sustained episodes (only Developing Countries)	
	Developed Countries	Developing Countries	Sust. for 12+ years	Sust. less than 12 years
Manufacturing Exports (US\$)	24	68	39	8
Manufacturing Exports (% GDP)	23	62		
Manufacturing Exports Growth (% Annual)	24	68	39	8
Average Applied Tariff Rates (%)	5	30		
GDP Growth (% Annual)	23	62	35	7
Private Consump. Expendit. per cap. (US\$)	12	51		
Private Consump. Expendit. (US\$)	12	51		
Total Unemployment (% Labor Force)	14	14		
Real Effective Exchange Rate Index	18	28	17	5
Misalignment Real Effect. Exchange Rate	23	55	29	8
Volatility Real Effect. Exchange Rate	18	28	17	5
Manufacturing Exports (% Merchandise Xs)	18	34		
Manufacturing Value Added (% GDP)	12	53		
Current Account Balance (% GDP)	22	58		
Gross Domestic Saving (US\$)	22	60		
Gross Domestic Investment (US\$)	22	60		
Foreign Direct Invest., inflows (US\$)	20	59		
Gross Domestic Saving (% GDP)	22	62		
Gross Domestic Investment (% GDP)	22	63		
Foreign Direct Invest., inflows (% GDP)	20	60		