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RATE CHANGES: DO FIRMS REACT
DIFFERENTLY AND WHY?

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Abstract

This paper uses firm level data from 28 developing countries to examine the relationship between manufactured firms' export orientation and exchange rate. The analysis incorporates the role of firm heterogeneity and country characteristics. We capture firms' heterogeneity through the share of imported inputs, the size of the firm and labor productivity and country characteristics through the quality of domestic institutions and the degree of financial development. The data set allows constructing three sub-samples according to firms' status on the export market (survivors, entrants and exitors). The results show important differences between survivors, entrants and exitors. Firm characteristics have little effect on survivors while many of these characteristics have significant effect on entry and on exit. Among the country characteristics of interest, only financial development has consistent effect across samples. The effect of exchange rate on exports volume is influenced by firm size and country financial development. The effect on entry is influenced by firm size and imported inputs but not by country characteristics. In contrast to entry, no firm characteristic has an impact on the effect of exchange on firm exit while financial development does on exit but not on entry. Splitting the REER into Equilibrium REER and misalignment shows that both components have effects on firm export orientation. Such effects depend only on the level of financial development but the dependence is not monotonic.

JEL Classifications: F2, L1, D5

Keywords: Exports, Exchange Rate, Firms, Manufacturing

ملخص

تستخدم هذه الورقة بيانات على مستوى المؤسسات من 28 بلدا ناميا لدراسة العلاقة بين التوجه نحو التصدير للشركات المصنعة وسعر الصرف. ويتضمن التحليل دور الخصائص المتجانسة وصفات الدول. نجد تجانس الشركات من خلال حصة المدخلات المستوردة، وحجم والخصائص الثابتة وإنتاجية العمل وصفات الدول من خلال جودة المؤسسات المحلية ودرجة التطور المالي. تسمح مجموعة البيانات ببناء ثلاث عينات فرعية وفقا لحالة الشركات على السوق والتصدير (الناجين، الداخلين والخارجين). أظهرت النتائج اختلافات هامة بين الناجين، الداخلين والخارجين. خصائص الشركات يكون لها أثر يذكر على الناجين في حين أن العديد من هذه الخصائص يكون لها تأثير كبير على الداخلين وعند الخروج. ومن بين خصائص سعر الفائدة، نرى أن التنمية المالية هي الوحيدة التي لديها تأثير ثابت عبر العينات. وتتأثر بتأثر سعر الصرف على حجم الصادرات بنسبة حجم الشركة والتطور المالي البلاد. وتتأثر بتأثر على الدخول من قبل حجم الشركة والمدخلات المستوردة ولكن ليس من خصائص البلاد. وعلى النقيض من الدخول، لا يوجد تأثير لصفات الشركات على سعر الصرف وعلى خروج الشركات في حين إن التنمية المالية على الخروج ولكن ليس على دخول. تقسيم REER إلى التوازن REER واختلالها يدل على أن كل من المكونات لها آثار على التوجه نحو التصدير. تعتمد هذه الآثار فقط على مستوى التنمية المالية ولكن الاعتماد ليس رتيبا.

1. Introduction

Export-orientation of manufacturing firms has been credited as a successful development strategy. Compared to traditional primary product exports, manufactured export is considered as a better driver of economic growth. The income elasticity of demand being higher for manufactured goods, growth prospects for a country's exports along with growth in foreign income can be expected to improve by specializing in manufacturing. Moreover, the development of the manufacturing sector involves substantial prospects for dynamic productivity gains through economies of scale, learning effects, and externalities among firms and industries. However, empirical evidence shows that that number of firms engaging in exports is low. Mayer and Ottaviano (2007) showed that in Europe aggregate exports are driven by a small number of top exporters. The top one, five and ten percents of exporters account for around 40, 70 and 80 percents of aggregate exports respectively. In the USA, Bernard et al. (2007) found that out of 5.5 million firms operating in the country just 4 percent were exporters. Among these exporting firms, the top 10 percent accounted for 96 percent of total U.S. exports. For developing countries, data are hardly available to investigate similar issue. Following Lederman, et al. *(*2014) similar observation holds in developing countries. As an indication, they reported that, according to the World Bank's Enterprise Surveys of more than 25,000, 36 percent of developing countries manufacturing firms are exporting. These data which are not censuses are probably upwardly biased in terms of numbers of exporters. The same data also show that the average export intensity (the ratio of exports to total sales) ranges from less than 1 percent in Burundi to 29 percent in Bangladesh. Understanding the export orientation of manufacturing firms is, therefore, important for development policy.

The literature suggests number determinants of firms' decision to export. These include firm, industry and country features. This paper focuses one country feature; namely exchange rate. The literature on exchange rate has highly developed since the early 1970s with abandonment of the Breton Wood system. The main concern was the impact on the volume of trade. The first contributions focused on the high variability of exchange rate which might create uncertainty and reduce trade. Two types of variability were considered: volatility, which concerns frequent and non-persistent fluctuations, and misalignment which concerns less frequent and more persistent swings. The empirical evidence regarding volatility has been inconclusive while those concerning misalignment found consistent negative effect on the volume of trade.[1]

A second generation of research was motivated by the large swings of the dollar in the 1980s and the failure of the US trade deficit to improve. Trade volumes reacted modestly despite the strong fall of the dollar. A first explanation was proposed and confirmed empirically by Dornbush (1987) who emphasized the role of competition. Under perfect competition, an exchange rate change will reflect one for one in exports prices and export volumes will change consequently. Under imperfect competition, the same exchange rate change will reflect in a change of exports prices lesser than under perfect competition. A part of adaptation to changes is reflected in profits margins. Hence, the impacts on prices and volume depend on the degree of competition. Two complementary explanations have been proposed and confirmed empirically. Baldwin and Krugman (1989) argued that some goods induce non-recoverable fixed costs of entry into new markets. In this case, exchange rate depreciation will induce more exports of this good only if it is perceived as permanent in order for these non-recoverable expenses to be justified. In a similar vein, Froot and Klemperer (1989) assumed the existence of consumer switching costs for some goods and showed

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[1] According to Frenkel and Goldstein (1989), the difficulty in identifying a significant link between volatility and trade variables might reflect the availability of hedging instruments against exchange rate risks. Misalignment seems to generate uncertainty against which there is little possibility of insurance.

that exchange rate changes will not lead to exports changes unless it is perceived as permanent. In sum, depending on the characteristics of the good under consideration and on those of its markets, a given exchange rate change will have different impacts on exports.

Contemporary research shifted the focus from the good and market characteristics to the firm characteristics in line with the theoretical analysis of firm heterogeneity initiated by Melitz (2003). The role of firms' heterogeneity comes from the existence of fixed costs to export which generate a selection mechanism through which only the best performers are able to export. Heterogeneity implies that a very large share of aggregate exports is made by a small portion of high-performance firms. The implications concerning firms' reaction to exchange rate changes touch to change in export volume by exporters as well as to the decision to enter or exit the export market. High performing firms can choose to only partially reduce their exported volume to, let's say, an exchange rate appreciation and "absorb" a part exchange rate movements in their mark ups. In the same vein, appreciation may push relatively well performing firms (i.e. less performing than incumbent exporters but more performing than non-exporters) to enter the exporting market. In term of exit, the least performing firms will leave the export market before the others. Most of the empirical studies of firm heterogeneity and exchange rate have been devoted to developed countries (see Berman et al., 2012). Exceptions are Chatterjee et al. (2013) on Brazil, Cheung and Sengupta (2013) on India and Héricourt and Poncet (2015), Li et al. (2015) and Tang and Zhang (2012) on China.

This paper contributes to the debate by examining the relationship between manufactured firms' export orientation and exchange rate changes in 28 developing countries (i.e. disregarding "transition economies") using firm level data. Each of the above cited papers dealing with developing countries focuses on a specific country while our paper offers a cross-country firm-level analysis. The two approaches are complementary. Cross-country studies reveal some regularities ("average") in the studied relationship while the single country studies uncover specific country characteristics that affect the "average" relationship.

To study of the relationship between manufactured firms' export orientation and exchange rate changes one needs at least two observations across time for each firm. We, therefore, need a panel of firms over at least two years for each country. Our data comes from the World Enterprise Survey (WES) of the World Bank which includes both exporting and non-exporting firms. The survey also provides a rich set of information regarding firms' characteristics (e.g. age, size, productivity, imported inputs, share of exports in total sales etc.). Moreover, the survey has a panel dimension for a number of developing countries i.e. information on the same set of firms is available for different years. These features of the WES allow investigating a number of interesting questions e.g. the impact of firms' intrinsic characteristics on their response to exchange changes, the impact of such changes on firms' entry into and exit from the export markets and comparison of firms which export or have exported and those which are mainly domestic market oriented. Hence, we will be able to disentangle the effects of firm and country characteristics on the response of firms export orientation to exchange rate changes. These advantages of the WES panel data set come, however, at some costs. First, we can identify neither the types of goods exported nor their destinations. The customs data, frequently used since few years, provide such information and could be useful but available firms' intrinsic characteristics are extremely limited. The WES data set allows computing finer and much more firm control variables than the customs data. Unfortunately, it is not possible to match firms across the two data sets. Second, while the WES panel allows following the same sets of firms across time, years of observations are neither the same for all countries nor are they consecutive for a given country. The latter poses the problem

of distinguishing between incumbent exporters, entrants in and exitors from export markets. For instance for Mali the same firms are observed in 2003, 2007 and 2010. If a firm was exporting in 2003 and 2007, it will be considered as an incumbent exporter. However, it is possibly that the firm has stopped exporting in between 2004 and 2006 but restart exporting in 2007. If we have had information over consecutive years, this firm would have been classified as exitor in 2004 and entrant in 2007.

With the above caveats in mind, our approach is the following. At a given point in time, we distinguish two broad categories of domestic firms: those which are exporting and those which are not. Stating with firms which are exporting, if the domestic currency depreciates they should export more while if the domestic currency appreciate they should export less or even exit the export market. Similarly, among firms which are not exporting some might react to the domestic currency depreciation by entering the exporting markets while others will not. Hence, we end up with four groups of firms: *survivors* (those which were exporting and continue exporting), *entrants* (those which have not exported in the past and started exporting), *exitors* (those which have been exporting in the past and stopped) and a last group of firms called *domestic oriented* which have never been involved in export over the period of observation. We will examine the reaction of these groups to exchange rate changes.

As mentioned above, empirical studies of firm heterogeneity and exchange rate in developing countries are of very limited number. The closest paper to ours is Li et al. (2015) which explores the effect of exchange rate movements on the export behavior of Chinese firms. Their database combines firm export transactions (from 2000 to 2006) collected by the Chinese Customs Office and the Annual Survey of Industrial Production (from 1999 to 2007) conducted by the National Bureau of Statistics of China. This allows them identifying specific firms' characteristics and specific exported goods (by firm and destination) as well as firms' entry into and exit from export markets. They found a small and insignificant effect of exchange rate changes on firm export volume but a significantly negative effect of exchange rate appreciation on the probability of a firm to enter and survive in the export market. Moreover, firms are heterogeneous in their responses to exchange rate changes. The paper by Cheung and Sengupta (2013) is relatively close to ours since its focuses on the effect of exchange rate changes in India but considers only exporting firms (survivors following the definition above) which are publicly traded. They use the database of the Center for Monitoring Indian Economy (CMIE) which allows them controlling for specific firms' characteristics. The empirical analysis over the period 2000-2010 reveals that, on average, there has been a strong and significant negative impact from currency appreciation and currency volatility on Indian firms' export shares. The response is, however, different across firms. Firms that have smaller export shares tend to have a stronger response to exchange rate changes.

The rest of the above mentioned papers are relatively different from ours since they all rely on custom data which don't allow isolating the role of specific firms' characteristics. Tang and Zhang (2012) used monthly data of the Chinese export transactions over the period 2000–2006 to examine the effect of exchange rate on exporters' entry, exit, product mix and exported volume. They found statistically (but not economically) significant effects on entry and exit. Héricourt and Poncet (2015) focused on the impact of exchange rate volatility and financial constraints on Chinese firms' exports over the period 2000–2006. The authors confirmed the expected negative effect of volatility on both on export volumes and on the Chinese firms' decision to begin exporting. These effects are more important for financially vulnerable firms. Finally, Chatterjee et al. (2013) considered the case of Brazil over the period 1997-2006. They found that following depreciation, multi-product firms increase the importance of non-core competency exports (i.e. those with lower

productivity) relative to core products. This leads a within-firm reallocation of resources towards less efficient use.

The rest of the paper is organized as follows. The next section presents the data and the methodology. Section 3 is devoted to the empirical analysis of the effect of exchange rate. Section 4 extends the analysis by splitting exchange rate into equilibrium exchange rate and misalignment. Section 5 concludes.

2. Data and Methodology

2.1 Data

We use a panel of firm data covering about 28 developing countries, drawn from the World Bank's World Enterprise Surveys (WES). The countries in the sample belong to three regions: Sub-Saharan Africa, Latin America and MENA. The data are available for two (not necessarily successive) years for all countries except Ecuador, Egypt and Mali for which we have more years. We end up with 30 country-panels.

The panel dimension of the data set allows distinguishing four categories of firms according to as their status on the export market. These are *survivors* (those which were exporting and continued exporting), *entrants* (those which have not exported in the past and started exporting), *exitors* (those which have been exporting in the past and stopped) and a last group called *domestic oriented* which have never been exporting over the period of observation.

We restrict our attention to firms for which the declared main activity belongs to manufacturing. This notably excludes wholesalers. Firms in the data set belong to 11 sectors: 1) Food, beverages and tobacco, 2) Textiles, 3) Wearing, 4) Chemicals, 5) Rubber and plastic, 6) Non-metallic mineral products, 7) Basic metals, 8) Fabricated metal products, except machinery and equipment, 9) Electrical equipment, computer, electronic and optical products, 10) Machinery and equipment and 11) Other manufacturing.

Out of 12344 manufacturing firms covered by the survey only 5231 can be used for the empirical analysis. The difference between the number of manufacturing firms covered by the survey and the firms in the sample is due to a number of missing observations for some key variables for our analysis. On average, *domestic oriented* firms represent around 54% of the sample and firms that have exported at least once represent around 46%. This is much higher than the 36% reported by Lederman, et al. *(2014)* which confirms that the WES data are probably upwardly biased in terms of the number of exporters. Among the 46% of firms having exported at least once, 28% are survivors, 9% are entrants and 9% are exitors.

There are important differences across countries. In the sample, the share of *domestic oriented* firms lies between 95% in Angola and 23% in Honduras. The median is 57% and corresponds to Ecuador, Guatemala and Nicaragua. The share of *survivors* is between 0% in Angola, Panama, Uganda and Venezuela and 62% in Honduras. The median is 24% and corresponds to Niger. The share of *entrants* is between 0% in Ecuador and 20% in Kenya while the share of exitors is between 1% in Angola and Mexico and 29% in Panama. For *entrants* and *exitors*, the median is 7% and 8% respectively. It corresponds to Nicaragua and Peru regarding entry and Ecuador, El Salvador, Honduras, Paraguay, Peru and Zambia regarding exit. Finally, our 30 country panels include 18 occurrences of appreciation and 12 of depreciation.

2.2 Methodology

Our purpose is to examine whether there is differences in firms' export orientation in response to exchange rate changes and which factors determine such differences. As explained in Section 1,

there are three types of changes in export orientation: changes in exports volume, entry into export market and exit from export markets. We use a specification similar Berman et al. (2012) in order to examine the determinants of the three types of changes. The difference between the specifications lies in the definition of the dependent variable. The general specification is:

$$Dependent_{ijt} = \beta_{0i} + \beta_1 \, \Delta Log\left(REER_{jt}\right) + \beta_2 \, Log\left(Characteristics_{it}\right) +$$
$$\beta_{12} \, Log\left(Characteristics_{it}\right) \Delta Log\left(REER_{jt}\right) + \beta_3 \, \Delta Log\left(Demand_{it}\right) + \sum_k \beta_4^k X_{ijt}^k + \varepsilon_{ift} \tag{1}$$

The operator Δ corresponds to the difference between the **two years in the panel for each country** in the sample (e.g. for Morocco this is the difference between the observations in 2007 and 2004). The indexes i, j and t refer to the firm, country and time respectively. *Dependent* is the dependent variable which differs according to the question under consideration. When considering the change in export volume, *Dependent* is the **change** (between the **two years in the panel for each country** in the sample) **in the share of exports** in total sales. For entry, *Dependent* is a dummy taking the value one if firm i enters the exports market and zero otherwise. For exit, *Dependent* is a dummy taking the value one if firm i exits from the exports market and zero otherwise.

The *REER* is the real effective exchange rate, *Demand* is the demand perceived by the firm and X_{ijt}^k are control variables. The *REER* series are drawn from Darvas (2012) and an increase means depreciation. The variable $Demand_{it}$ is proxied by the world imports of the goods produced by firm i (it is drawn from COMTRADE). We also use firms and country control variables (X_{ijt}^k), regional dummies and sector dummies (β_{0i}). All variables except dummies are in log.

The rest of this section motivates the methodology we are using. As explained in Section 1, heterogeneous reaction to a change in the value of the domestic currency is determined by a set of firm, industry and country characteristics. Here we focus on firm and country characteristics which are the heart of the current debate about export orientation and exchange rate. The role of industry characteristics having been largely investigated both for developed (Dornbush, 1987; Baldwin and Krugman, 1989 and Froot and Klemperer, 1989) and developing countries (Grobar,1993 and Sekkat and Varoudakis, 2000), we limit ourselves, here, to introducing industry fixed effects in the regressions.

The theoretical underpinning of the relationship between firm's characteristics and exports is Melitz (2003). Assuming that firms willing to export incur a fixed cost, he concluded that their productivity must exceed a threshold for them to be able to export. The fact that firms don't have the same productivity (i.e. are heterogeneous) implies that, faced with exchange rate changes, some firms will change the level of their exports but stay in the export market, some might enter, others would exit and a final group would stay away from the export market. Here the discriminating characteristic among firms is productivity. However, as pointed out by Berman et al. (2012), higher productivity often appears in larger firms. Moreover, the large size of a firm may enable it to respond smoothly to exchange rate fluctuations than small sized firms. Hence, the size could explain the different reaction of firms to exchange rate changes. Another strand of the literature suggests another discriminating factors; that is imported inputs. Mody and Yilmaz (2002), although not working at the firm level, found that investment in imported machinery helps lowering export prices in developing countries. Goldberg et al. (2010), using trade and firm-level data from India, uncovered an impact of imported intermediates on domestic firm product scope. Based on these findings, we capture firms' heterogeneity in the regressions through three indicators: the share imported inputs, the size of the firm and the labor productivity. The size is

simply firm's total employment, labor productivity is the ratio of output to total employment and the third variable is the share of imported inputs in total firm's input.

The literature suggests, however, other firm characteristics which might be relevant as control variables. These include the share of foreign ownership, the age and the legal status of the firm. The legal status is a dummy tacking the value one if the firm is "sole proprietorship" and zero otherwise. To take account of possible rigidity in adapting the volume of export, we introduce as additional firm control variable the previous **share of exports** ($\log(Exports_{ijt-1})$). This is, of course, only introduced when analyzing change in the share of export and entry. All these control variables are provided by the WES

Turning to country characteristics, the recent literature emphasizes two country characteristics which are relevant for our purpose. Rodrik (2008) pointed to the role of domestic institutions. Considering that sophisticated goods are, in general, more contracts–intensive and more relationship-intensive (Nunn, 2007) than primary products', some countries' weak institutions "tax" manufactured and sophisticated exports more than primary products'(Méon and Sekkat, 2007). Hence, the impact of exchange rate changes will depend on the country's institutional quality. Aghion et al. (2009) and El Badawi et al. (2012) focused on financial development. In countries with weak financial system, exporters may face credit constraints which disable them from taking advantage from depreciation of the national currency. A similar argument is that lower financial development discourages investments. These arguments echo the finding by Frenkel and Goldstein (1989) that the effect of exchange rate volatility on exports is small in countries with well-developed financial system. Empirical studies using developing countries' firm level data seem to support to the role of domestic institutions and financial development.

Regarding financial development, Berman and Héricourt (2010), using a cross-country-firm-level database containing 5000 firms in 9 developing and emerging economies, have found a significant impact of firms' access to finance on the decision to enter export markets but not on the volume of exports. Moreover, productivity is only a significant determinant of the export decision if the firm has a sufficient access to external finance. Paravisini et al. (2015), focusing on the export behavior of Peruvian firms during the 2008 financial crisis, have found that credit shortage reduces exports through raising the variable cost of production, rather than the cost of financing sunk entry investments. Wei and Zhang (2015) provided firm-level evidence that credit constraints restrict international trade and affect the pattern of multinational activity in China. Foreign affiliates and joint ventures have better export performance than private domestic firms in financially more vulnerable sectors. These results are stronger for destinations with higher trade costs and are not driven by firm size or other sector characteristics.

As far as domestic institutions are concerned, Brach and Naudé (2012) focused on 3281 firms from the five Middle Eastern countries and found that these firms are relatively more constrained in terms of entering export markets because of institutional weaknesses. The institutional environment does not limit entrepreneurship in general, but constrains international entrepreneurship significantly. Vertinsky and Zhang (2013) examined the impact of the quality of local institutions (at the city level) in China on exports of over 198,000 firms. They found that higher quality legal systems in a location are associated with higher exports. However, firms that have higher access to local informal institutions benefit less from better developed legal institutions. This suggests that informal institutions can serve as substitutes to the legal system in reducing transaction costs associated with export. Finally, Svensson (2003) using quantitative information on bribe payments of Ugandan firms has found that there is considerable variation in

reported graft across firms facing similar institutions/policies. In particular firms engaged in trade face a higher probability of having to pay bribes.

Given the preceding discussion, we focus on financial development and the quality of institutions as country relevant characteristics. Financial development is defined as domestic credit by banks to private sector in % of GDP (Source WDI) and the quality of institutions is the WB composite index on the quality on governance (Source WB). Increases mean improvement. We also introduce the *REER* volatility computed as the standard deviation of the month to month change of *REER* (Darvas, 2012). Because all the estimation must be conducted in first difference, we end, in general, with one observation in time per country. Hence country's fixed effects cannot be included in the regression to avoid multi-co-linearity with other country's characteristics. Instead we use regional dummies to control for geographic effects.

3. Empirical analysis using the REER

3.1 Export volume of survivors

To examine the changes in exports volume, we need to focus on firms which were exporting and are still doing so; these are firms in the *survivors* group and give 1030 observations. The dependent variable is the *change in the share of exports* in total sales. To take account of possible rigidity in adapting the volume of export, we introduce as additional firm control variables the previous *share of exports* ($\log(Exports_{ijt-1})$). The resulting equation is estimated using the GMM method with the lagged values of the exogenous variables as instruments.

Equation (1) assumes that the reaction to exchange rate changes can be firm and/or country specific. This is captured by the term:

$$\beta_1 + \beta_{12} \, Log\left(Characteristics_{it}\right) \tag{2}$$

to which we refer as the *total marginal effect* of exchange rate on exports volume. Based on the discussion above, we consider that three firm's characteristics (size, share of imported inputs and the labor productivity) and two country's characteristics (financial development and quality of institutions) can affect the reaction to exchange rate changes. To take account of potential country's specificity that affects the three firm's characteristics, these characteristics are scaled by the median of firms' characteristic in the corresponding country. To limit the risk of simultaneity bias, we take the lagged values of firms' characteristics.

Note also that the total marginal effect of exchange rate depends on two parameters: β_1 and β_{12}. We refer to β_1 as the *direct effect* of exchange rate and to β_{12} as the *indirect effect* of exchange rate through the corresponding characteristic. The *total marginal effect* of exchange rate depends on the value of the characteristic only if β_{12} is not equal to zero.[2] If β_{12} is nil, the total marginal effect of exchange rate changes is given by β_1 which is expected to be positive since depreciation should foster exports. If β_{12} is not equal to zero, the total marginal effect is given by Equation 2.

The results in Table 2 shows that p-value of the test of over identifying restrictions is far below the critical level for all specification implying that the GMM estimation is valid. The analysis of the results will start by ignoring the coefficient of the interaction terms.

With regard to the firm characteristics, the coefficient of the share of foreign ownership is never significant. Hence, the structure of ownership doesn't seem to affect the decision of surviving

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[2] For a discussion of the specification of interactive models, the interested reader may refer to Brambor et al. (2005).

exporters regarding export volume. The coefficient of the age of the firm is significant only in Specifications 4 and 5. The significance is, however, weak and the sign is negative meaning that older survivors increase their exports lesser than younger ones. The coefficients of the past export share of the firm are significantly negative in all specifications. The latter suggest a difficulty in adapting the volume of exports quickly enough. The coefficients of the legal status are also significantly negative in all specifications. These negative coefficients mean that firms with "sole proprietorship" increase their exports lesser than others which might be related to risk taking (a sole owner might be more averse to risk than a pool of owners), to the size ("sole proprietorship" characterizes, in general smaller firms) or other possible legal or financial constraints on "sole proprietorship"'s firm. As we will see, however, the size exerts an independent effect from proprietorship. The coefficient of size is (weakly) significant only in Specifications 1, 4 and 5. The significant coefficients are positive implying that bigger firms export more than smaller ones. The coefficients of the share of imported inputs and of productivity are never significant.

As far as country characteristics are concerned, exchange rate volatility has significantly negative coefficients in all specifications which imply a depressing effect on exports. The coefficient of exchange rate has the positive expected sign and is significant in Specifications 1 and 3. It is not significant in Specifications 2 and 5 and significant and unexpectedly negative in Specification 4. The coefficient of the quality of institutions is not significant and the one of financial development is significantly positive implying that firms located in countries with well developed financial system export more than those located in countries with weak financial system.

To sum up, among the firm characteristics the past export share and the legal status have consistent (across regression) effect on survivors' decision to increase or not the exports volume. The age of the firm and its size don't have such consistent effect. The shares of foreign ownership, the share of imported inputs and productivity have no effects at all. Among the country characteristics financial development has an effect but not the quality of institutions.

Turing to interaction terms, among the firm's characteristics focused on, only the coefficient related to size is significant. This means that exchange rate has also an indirect positive effect on the volume of exports through firm size. Since the focus of this study in on the effect of exchange rate, we should combine this information with the sign of the coefficient of exchange rate in the corresponding specification (Specification 1). This coefficient is significantly positive. The combination implies, therefore, that the total marginal effect of exchange rate is positive and increasing in size. Hence, depreciation will induce higher increase in exports by large firms than by smaller ones. In sum, not only bigger firms increase export more than smaller ones (their direct effect) but they also increase export in response to depreciation than smaller ones. Given these results, we only kept the interaction with size when we introduce the country characteristics in specification 4 and 5.

Among the interaction terms with country characteristics, only financial development has a significant coefficient. In more financially developed countries, firm exports increase more in response to depreciation than in less financially developed countries. As above, we should combine this information with the sign of the coefficient of exchange rate in the corresponding specification. The coefficient of the exchange rate in Specification 4 has an unexpectedly negative and significant sign. Depreciation can reduce exports growth. However, given the indirect effect, this reduction will be lower the more financially developed a country is. To get the sign of the total marginal effect of exchange rate, we should compute the values of Equation 2 for different level of the characteristic 'financial development'. The computation of total marginal effects at the minimum

(8.3%), average (30.2%) and maximum (51.9%) levels of financial development in the sample gives to -0.149, 0.191 and 0.476respectively.

To sum up, only firm size and financial development influence the effect of exchange rate. Firms increase their exports in response to exchange rate changes but they increase it further when they are big or belonging to a country with well developed financial system.

3.2 Entrants

Regarding entry, we will consider firms that were not exporting. Some of them would start exporting while others will not. These corresponds to firms in the **entrants** and the **domestic oriented firms** groups and gives 2696 observations. The basic regression is similar to Equation (1) except that the dependent variable is a dummy taking the value one if firm *i* enters the exports market and zero otherwise. The method of estimation is, therefore, Probit. The explanatory variables are the same as in Equation (1) except that, naturally, there is no past export.

The results in Table 3 shows that fraction of correct predictions is high (86%) irrespective of the specification. In contrast to the regressions with survivors more firm characteristics are significant with the expected sign meaning that they have direct effects on the decision to enter the export market but not on exports volume change once the firm is installed on the exported market. In all specifications, the share of ownership has a positive and significant coefficient suggesting that having foreigners among shareholders facilitates entry into export market. The coefficients of imported inputs are also always significantly positive which is in accordance with the literature (e.g. Mody and Yilmaz, 2002) and Goldberg et al., 2010). Firm size is also important for the decision to enter exports market. The corresponding coefficients are significantly positive in all specifications. . Larger firms are more likely to enter than smaller ones. The negative sign of all the coefficients of legal status means that firms with "sole proprietorship" are less likely to enter exports market. As before, this might be related to risk taking, to the size (although as we have seen, the size exerts an independent effect from proprietorship) or other possible legal or financial constraints on "sole proprietorship"'s firm.

Regarding country characteristics, exchange has significant positive coefficient only in Specifications on 6, 7 and 8. The coefficients of volatility, financial development and the quality of institutions are never significant.

Turing to interaction terms, the coefficients related to firm size, imported inputs and productivity are not significant as well as those related to financial development[3] and the quality of institutions. However, unlike in the previous section this doesn't mean that exchange rate has no indirect effect related to one or more of the characteristics. As shown by Ai and Norton (2003), even if $\beta_{12} = 0$ in Equation 1 there may be still an indirect effect if the model is non linear as it is the case of Probit used here. The Probit model we are using is non linear and the indirect effect is **not** given by the coefficient β_{12}. The indirect effect is 0 only if $\beta_{12} = 0$ and $\beta_1 = 0$ or $\beta_{12} = 0$ and $\beta 2 = 0$ (See Appendix A). Table 3 shows that $\beta_{12} = 0$ for all the characteristics under consideration, β_1 is significant in the three cases and β_2 is significant only when size and imported inputs are considered. Combining these results suggests that exchange rate has an indirect effect on the likelihood of entry. Such indirect effect is related to size and imported input through $G''(Y^*)$.

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[3] In specification 10 no coefficients related to the financial development is significant which might be surprising. One possible explanation is that the coefficient of foreign ownership is significant meaning that entrants are, in general partially or completely foreign owned which may relax financial constraints.

The signs of both indirect effects are first positive and then become negative. This is because if and β_1 and β_2 are positive while $G''(Y^*)$ is positive for Y^* between minus infinity and zero and negative afterward. Since Y^* is increasing in size and imported input, the indirect effects are first positive and then become negative; provided the other variables are held constant.

The total marginal effect of exchange rate depreciation is, however, always positive as shown by Equation (A3). From this equation it also appears that as size and imported input increase, the total marginal effect of depreciation on the likelihood of entry first increase and then decrease.

The results in Table 3 contrast with those of Table 2. In addition to size, imported input has direct effect on the likelihood of entry and adds another indirect effect to the influence of exchange rate on such likelihood while only size has both impacts on the volume of exports. The coefficient of exchange rate volatility is never significant in Table 3 while it was always significant in Table 2. Finally no country characteristic seems to affect the likelihood of entry while financial development seems to affect exports volume.

To sum up, it seems that, among our variable of interest, firm's characteristics are the important driving forces behind entry into exports market. Country characteristics, except exchange rate, don't seem to have any effect on entry. Moreover, firm's characteristics that play a role are markedly different from those behind the adaptation of exporter's volume of exports once they are installed in this market. Firms are likely to enter export market in response to exchange rate depreciation but their entry is more likely for bigger firm and those importing more inputs. Firm entry is independent from country characteristics.

3.3 Exitors

For exit we should consider firms which were exporting and examine why some exit the export market while other do not. Hence, the relevant groups are *exitors* and *survivors;* which gives 1411 observations. The basic regression is similar to Equation (1) except that the dependent variable is a dummy taking the value one if firm i exits the exports market and zero otherwise. The explanatory variables are the same as in Equation (1).

The results in Table 4 shows that fraction of correct predictions, although lower than in Table 3, is high (76%) irrespective of the specification. Focusing on firm characteristics, the results of entry and exit regressions are almost the same except, of course, for the sign of the coefficients. Often, a characteristic which has a significant coefficient in the entry regression also has a significant coefficient in the exit regression. The exception is the variable age which is significant for exitors (in four specifications out of five) but not for entrants. Older firms are less likely to exit the exports market than younger ones.

The coefficients of foreign ownership, firm size, share of imported inputs are in general significantly negative i.e. an increase of these variables decrease the likelihood of exit. The coefficient of legal status is positive. This positive sign means that firms with "sole proprietorship" are more likely to exit exports market than others. The coefficients of the past export share of the firm (not present in entrants equation) are significantly negative in all specifications. The latter suggest that firms which have used to export a large share of their output are less likely to exit the market of exports.

Regarding country's characteristics, volatility has no significant coefficient. Exchange rate has a negative and significant direct effect only in Specification 14. Financial development and the quality of institutions have significant and respectively positive and negative coefficient. Disregarding any indirect effect, the likelihood that a firm exits export markets is higher if it is

located in a country with well developed financial system. The reverse holds with better quality of institutions.

Turning to the interaction terms, among all firm and country characteristics of interest only financial development has a significant interaction coefficient. However as explained above, this is not sufficient to conclude that this is the only variable inducing an indirect effect of exchange rate. The indirect effect is 0 if $\beta_{12} = 0$ and $\beta_1 = 0$ or $\beta_{12} = 0$ and $\beta_2 = 0$. Based on this, the results suggest that there is no indirect effect of firm characteristics. As far as country characteristics are concerned, the same reasoning implies that the quality of institutions has no indirect effect while financial development has.

Based on Equation (A3) in the appendix and computing the values of $(\beta_1 + \beta_{12} x_2)$ for different level of financial development shows that, since $G'(Y^*)$ is always positive, the ***sign of the total marginal effect of exchange rate depreciation*** on the likelihood of exit is negative between 0 and 34.32% of financial development and become positive afterward. This means that exchange rate depreciation decreases the likelihood of exit below a certain level of financial development and increases it beyond such level.

The results in Tables 4 a 3 have high similarities regarding the direct impact of firm characteristics. The same characteristics have significant coefficients in the entry and exit regressions but, of course, with the opposite sign. The exception is the variable age which is significant for exitors but not for entrants. Foreign ownership, firm size, past export share of the firm and the share of imported inputs decrease the likelihood of exit. In contrast firms with "sole proprietorship" are more likely to exit exports market than others. Regarding country's characteristics, volatility has no significant coefficient neither in Table 4 nor in Table 3 but the coefficients of financial development and of the quality of institutions are significant in Table 4 but not in Table 3. Finally, no firm characteristics induce an indirect effect of exchange on firm exit while some do on entry. At the opposite, no country characteristic induces such indirect effect on entry while financial development induces it on exit.

To sum up, it seems that, among our variable of interest, firm's characteristics are important driving forces behind exit from export markets but induce no indirect effect of exchange rate. Among country characteristics of interest, financial development increases the likelihood of exit and induces an indirect effect of exchange rate. This indirect effect is not monotonic.

4. Empirical Analysis Focusing on the Role of Misalignment

The Real Effective Exchange Rate (*REER)* can be broken down into two components: The Equilibrium Real Effective Exchange Rate (*EREER*) and misalignment. Misalignment is the departure of the actual *REER* from its equilibrium level. Across time misalignment has been used by different countries to boost their growth. After their independence, many of developing countries thought that overvalued exchange rates might foster manufactured production: the export-oriented agricultural sector would be indirectly taxed while industry would benefit from cheap imports of machinery and other inputs. In the early 1980s, empirical analysis started casting doubt on such view (e.g. Cottani et al., 1990 and Ghura and Grennes, 1993). Grobar (1993) and Sekkat and Varoudakis (2000), among others, showed that exchange rate overvaluation decreases the ratio of manufactured exports to GDP.

Recently, a new view emerged suggesting that an undervalued currency can foster manufactured exports (e.g. Rajan and Subramanian, 2011 and Freund and Pierola, 2012). A prominent example is the Chinese-European-American controversy about the Renminbi (RMB). China is accused of maintaining the RMB rate below its equilibrium level to favor its exports (see Evenett (2010) for

an extensive discussion). The Chinese authorities reject these allegations. Nouira et al. (2011) investigated whether developing countries are receptive to the spirit of a proactive exchange rate policy, in accordance with price incentives for fostering manufactured exports. Their results did not reject the hypothesis that a number of developing countries used undervaluation to foster the price competitiveness of manufactured exports.

In what follows we will split the *REER* into its two components: Equilibrium *REER* (*EREER*) and misalignment and run the same preferred regressions as in Section 3 to examine whether these two components have different impacts on our variables of interest; that is export volume, entry into and exit from the export market.

Table 5 presents the estimations results using the model based measure of misalignment. The methodology for computing such a measure of misalignment is the same as in Elbadawi and Kaltani (2014). For robustness, Appendix D presents the results using two other measures of misalignment: the HP and the PPP based measures. The methodology for computing the measures of misalignment is summarized in Appendix C.

The results pertaining to survivors, entry and exit will be analyzed in turn. For each, we will start by ignoring the coefficient of the interaction terms.

The results for survivors show that p-value of the test of over identifying restrictions is far below the critical level for all specification implying the GMM estimation is valid. Regarding firm characteristics, only the coefficients of the legal status and of the past export share of the firm are significant. They are both negative suggesting respectively that firms with "sole proprietorship" increase their exports lesser than others and a difficulty in adapting the volume of exports quickly enough. Hence, the results are not dramatically different from those in Table 2. As for country characteristics, exchange rate volatility has a significantly negative coefficient which implies a depressing effect on exports. The coefficient of exchange rate is significant and unexpectedly negative while the coefficient of misalignment is positive and significant meaning that undervaluation boosts export volume. The coefficient of financial development is not significant.

Turing to interaction terms, none of the coefficients related to size is significant while both coefficients related to financial development are significant. The interaction with exchange is positive while the one with misalignment is negative. This means that exchange rate and misalignment have also indirect effect on the volume of exports through the country's level of financial development.

Since our focus in on the effect of exchange rate and misalignment, we should combine the above results with the coefficient of exchange rate and misalignment in the corresponding specification. Using Equation (2) the marginal effects of exchange rate at the minimum (8.3%), average (30.2%) and maximum (51.9%) levels of financial development are -0.204, 0.006 and 0.182. The corresponding marginal effects of misalignment are 0.956, 0.135 and -0.553. As the financial system develops, depreciation first decreases and then increases exports volume while undervaluation first increases and then decreases exports volume.

The results for entrants show that fraction of correct predictions is high (85%). Again more firm characteristics are significant with the expected sign in contrast to the regressions with survivors. The share of ownership, the size of the firm and share of imported inputs has positive and significant coefficients. Firm having foreigners among shareholders, importing inputs or of a big size are more likely to enter export markets. The negative and significant sign of the coefficient of legal status mean that firms with "sole proprietorship" are less likely to enter exports market.

Regarding country characteristics, only misalignment and volatility are significant and have positive and negative coefficients respectively.

Turing to interaction terms, only the coefficient related to financial development are significant. This means that exchange rate and misalignment have indirect effects through the level of financial development. Using Equation (A3) in Appendix A, we see that exchange rate has a positive, and increasing marginal effect, in financial development, on the likelihood of entry; depreciation increases entry. Misalignment has first a positive marginal effect on the likelihood of entry and, then, a negative marginal effect as financial development increases. Undervaluation first increases and then decreases entry.

The results for exitors show that fraction of correct predictions is high (81%). Focusing on firm characteristics, the coefficients of the age and size of the firm, share of imported inputs, productivity and the share of past exports are significantly negative meaning that their increases reduce the likelihood of exit. Regarding country characteristics, only the coefficient of exchange rate is significant. It is negative. Given that no interaction coefficient is significant, Equation (A3) implies that the marginal effect of exchange rate is negative and constant. Depreciation decreases the likelihood of exit.

5. Conclusion

Export-orientation of manufacturing firms is a major factor of development strategy. Given the importance of exchange rate for such orientation, this paper uses firm level data from 28 developing countries to examine the relationship between manufactured firms' export orientation and exchange rate. The analysis incorporates the role of firm heterogeneity and country characteristics that the recent literature has identified as conditioning such relationship. Based on previous findings, we capture firms' heterogeneity through the share of imported inputs, the size of the firm and labor productivity while for country characteristics we use the quality of domestic institutions and the degree of financial development.

Firm level data come from the WES which provides a rich set of information regarding firms' characteristics. Moreover, the survey has a panel dimension for a number of developing countries i.e. information on the same set of firms is available for different years. These features of the WES allow constructing three sub-samples of firms according to their status on the export market: survivors, entrants and exitors. Hence, it is possible to examine the impact of firm and country characteristics on their response to exchange changes and whether such impact differs between survivors, entrants and exitors. The difference in the impact is captured through an interaction term between exchange rate and the relevant characteristic.

The results show important differences across the three categories of firms. Disregarding exchange rate effects, only two firm characteristics have consistently significant coefficient across survivors' regressions: the past share of exports in the sales of a firm and the legal status of the firm. The coefficients of the former suggest a difficulty in adapting the volume of exports quickly enough while those of the latter imply that firms with "sole proprietorship" increase their exports lesser than others which might be related to risk taking, to the size of the firm or to other possible legal or financial constraints. Among country characteristics, only exchange rate volatility and financial development have significant coefficients in all specifications. The coefficients of volatility imply a depressing effect on exports while the coefficients financial development suggest that firms located in countries with well developed financial system export more than those located in countries with weak financial system.

In contrast to the regressions with survivors more firm characteristics are consistently significant with the expected sign in the entry regressions. These characteristics have direct effects on the decision to enter the export market but not on exports volume once the firm is installed on the exported market. In all specifications, the coefficients imply that having foreigners among shareholders, big size or large share of imported inputs facilitate entry into export market. The coefficient of the legal status is significantly negative in all specifications. Regarding country characteristics, none has consistently significant coefficients.

The results of the exit regressions are very similar to those of entry regarding firm characteristics, except, of course, for the sign of the coefficients. The exception is the variable age of the firm which is significant for exitors but not for entrants. Older firms are less likely to exit the export markets than younger ones. The coefficients of foreign ownership, firm size and the share of imported inputs imply that an increase of any of these variables decreases the likelihood of exit. The positive sign of legal status means that firms with "sole proprietorship" are more likely to exit exports markets than others. The coefficients of the past export share of the firm suggest that firms which have used to export a large share of their output are less likely to exit the market of exports. Regarding country's characteristics, however, there is a difference between entry and exit. The likelihood that a firm exits export markets is higher if it is located in a country with well developed financial system. The reverse holds with better quality of institutions. In the entry regressions no country characteristics has consistently significant coefficients.

Turning to the exchange rate, only firm size and country financial development influence the effect of exchange rate in the survivors' regressions. Survivors increase their exports in response to exchange rate depreciation but they increase it further when they are big or belonging to a country with well developed financial system. Turning to the entry response to exchange rate depreciation, firms are likely to enter export market the bigger they are and the more inputs they import. The entry response to exchange rate depreciation is independent from country characteristics. In contrast to entry, no firm characteristic has an impact on the effect of exchange on firm exit while financial development does on exit but not on entry.

Pushing the analysis of the effect of exchange rate further, we split the REER into its two components: Equilibrium REER (EREER) and misalignment and run the same preferred regressions to examine whether these two components have different impacts on our variables of interest. The results in the survivors' regressions show that as the financial system develops depreciation first decreases and then increases exports volume while undervaluation first increases and then decreases exports volume. Regarding, entry, depreciation has a positive and increasing effect, in financial development, on the likelihood of entry. Undervaluation has first a positive effect on the likelihood of entry and, then, a negative effect as financial development increases. Finally, depreciation decreases the likelihood of exit but this effect does not depend on any firm or country characteristics.

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Table 1: Main Features of the Sample

Country	Years of observations	Exchange rate changes+	Number of firms covered by the survey	Number of firms in the Sample				
				Exitors	Entrants	Survivors	Never exported	Total
Angola	(2006,2010)	-0,255	156	1	3	0	74	78
Argentina	(2006,2010)	0,065	752	35	33	154	142	364
Bolivia	(2006,2010)	-0,259	132	5	5	11	31	52
Brazil	(2003,2009)	-0,494	896	42	39	101	226	408
Chile	(2006,2010)	-0,060	630	21	27	77	172	297
Colombia	(2006,2010)	-0,213	414	21	18	54	105	198
Ecuador	(2003,2006)	0,089	350	10	0	34	103	147
Ecuador	(2006,2010)	0,007	130	5	3	18	34	60
Egypt	(2004,2007)	-0,172	1390	35	39	124	479	677
Egypt	(2007,2008)	-0,076	1554	139	127	125	370	761
El Salvador	(2003,2006)	0,006	612	21	21	109	123	274
Guatemala	(2003,2006)	-0,046	82	1	2	12	20	35
Honduras	(2003,2006)	-0,008	432	1	1	8	3	13
Kenya	(2007,2013)	0,019	102	7	10	14	20	51
Malawi	(2005,2009)	-0,095	154	3	4	15	55	77
Mali	(2007,2010)	-0,042	186	9	6	6	72	93
Mali	(2003,2007)	-0.001	132	1	8	8	43	60
Mexico	(2006,2010)	0,070	312	2	23	28	85	138
Morocco	(2004,2007)	0,014	548	18	12	153	87	270
Nicaragua	(2003,2006)	0,022	480	2	2	8	16	28
Niger	(2005,2009)	-0,064	142	4	5	8	16	33
Panama	(2006,2010)	0,026	110	12	1	0	28	41
Paraguay	(2006,2010)	-0,286	140	5	3	14	38	60
Peru	(2006,2010)	-0,11	404	15	13	75	91	194
Senegal	(2003,2007)	-0,039	142	6	9	22	28	65
Turkey	(2005,2008)	-0.112	409	26	42	217	124	409
Uganda	(2006,2003)	0,121	110	7	8	0	37	52
Uruguay	(2006,2010)	-0,346	362	10	9	54	76	149
Venezuela	(2006,2010)	-0,598	124	3	2	0	49	54
Zambia	(2007,2003)	-0,051	186	7	6	11	69	93
Total			12344	474	481	1460	2816	5231

Notes: + This is the difference between the *two years in the panel.* For instance, for Morocco this is the difference between the observations in 2007 and 2004. Positive values means depreciation

Table 2: Survivors

(The dependent variable is the change in the share of exports in total sales and the method of estimation is GMM)

	Interaction with firm characteristic			Interaction with country characteristic	
	Size	**Imported inputs**	**Productivity**	**Finance**	**Institutions**
	Specification 1	**Specification 2**	**Specification 3**	**Specification 4**	**Specification 5**
Constant	-0.086	-0.085	-0.087	-0.115	-0.191
	(1.099)	(1.093)	(1.105)	(1.461)	(1.125)
Share of foreign ownership	-0.001	0.001	0.001	0	-0.002
	(0.025)	(0.008)	(0.039)	(0.006)	(0.044)
Age of the firm	-0.018	-0.018	-0.018	-0.019	-0.02
	(1.577)	(1.617)	(1.603)	(1.683)*	(1.730)*
Size of the firm	0.009	0.004	0.004	0.009	0.01
	(1.802)*	(1.089)	(1.054)	(1.785)*	(1.910)*
Share of imported inputs	0.001	-0.003	0.001	0.001	0.001
	(0.263)	(0.592)	(0.332)	(0.411)	(0.321)
Productivity	0.003	0.003	0.004	0.003	0.004
	(0.794)	(0.710)	(0.776)	(0.801)	(0.949)
Legal Status	-0.079	-0.078	-0.078	-0.068	-0.074
	(2.251)***	(2.214)***	(2.222)***	(1.901)*	(2.089)**
$\log(Exports_{ijt-1})$	-0.288	-0.284	-0.286	-0.296	-0.293
	(12.884)***	(12.764)***	(12.86)***	(13.135)***	(13.041)***
$\Delta Log(REER_{jt})$	0.086	0.08	0.092	-0.44	0.869
	(1.742)*	(1.624)	(1.858)*	(2.759)***	(1.317)
Volatility	-0.036	-0.036	-0.036	-0.036	-0.042
	(2.366)***	(2.348)***	(2.377)***	(2.39)***	(2.522)***
$\Delta Log(Demand_{it})$	0.023	0.021	0.022	0.021	0.018
	(0.810)	(0.754)	(0.780)	(0.730)	(0.634)
Size of the firm * $\Delta Log(REER_{jt})$	0.044			0.039	0.044
	(1.853)*			(1.705)*	(1.880)*
Share of imported inputs * $\Delta Log(REER_{jt})$		-0.03			
		(1.386)			
Productivity * $\Delta Log(REER_{jt})$			0.012		
			(0.481)		
Financial development				0.117	
				(1.783)*	
Financial development * $\Delta Log(REER_{jt})$				1.847	
				(3.460)***	
Quality of institutions					0.054
					(0.725)
Quality of institutions * $\Delta Log(REER_{jt})$					-0.483
					(1.222)
Number of observations	1030	1030	1030	1030	1030
Test of over identifying restrictions; P-value	0.58	0.71	0.65	0.80	0.38
Adjusted-R^2	0.16	0.16	0.16	0.17	0.16

Notes: All regressions include sector and region dummies; t –statistics are heteroscedastic consistent. They are in parentheses. *** = significant at 1%, ** = significant at 5%, * = significant at 10%

Table 3: Entrants

(The dependent variable is a dummy taking the value one if the firm enters the exports market and the method of estimation is Probit)

	Interaction with firm characteristic			Interaction with country characteristic	
	Size	Imported inputs	Productivity	Finance	Institutions
	Specification 6	Specification 7	Specification 8	Specification 9	Specification 10
Constant	-0.592	-0.696	-0.606	-0.669	-0.897
	(1.113)	(1.301)	(1.139)	(1.257)	(1.192)
Share of foreign ownership	0.895	0.892	0.896	0.872	0.900
	(4.445)***	(4.416)***	(4.445)***	(4.329)***	(4.457)***
Age of the firm	0.086	0.092	0.09	0.093	0.073
	(1.182)	(1.262)	(1.239)	(1.273)	(0.996)
Size of the firm	0.14	0.167	0.169	0.141	0.142
	(3.764)***	(5.894)***	(5.961)***	(3.796)***	(3.795)***
Share of imported inputs	0.143	0.162	0.141	0.143	0.143
	(8.014)***	(7.055)***	(7.921)***	(8.047)***	(8.009)***
Productivity	0.012	0.015	-0.006	0.016	0.010
	(0.462)	(0.595)	(0.175)	(0.634)	(0.404)
Legal Status	-0.561	-0.561	-0.562	-0.54	-0.55
	(4.829)***	(4.829)***	(4.841)***	(4.616)***	(4.732)***
$\Delta Log(REER_{jt})$	1.023	0.798	0.955	-0.057	2.666
	(2.830)***	(2.291)***	(2.720)***	(0.069)	(1.433)
Volatility	0.138	0.119	0.137	0.113	0.145
	(1.175)	(1.014)	(1.171)	(0.953)	(1.182)
$\Delta Log(Demand_{it})$	-0.014	-0.005	-0.016	0.018	-0.080
	(0.088)	(0.030)	(0.099)	(0.113)	(0.491)
Size of the firm * $\Delta Log(REER_{jt})$	-0.259			-0.256	-0.25
	(1.195)			(1.187)	(1.140)
Share of imported inputs * $\Delta Log(REER_{jt})$		0.165			
		(1.407)			
Productivity * $\Delta Log(REER_{jt})$			-0.149		
			(0.852)		
Financial development				-0.11	
				(0.272)	
Financial development * $\Delta Log(REER_{jt})$				4.184	
				(1.465)	
Quality of institutions					0.308
					(0.916)
Quality of institutions * $\Delta Log(REER_{jt})$					-1.518
					(0.973)
Number of observations	2696	2696	2696	2696	2696
Number of positive observations	390	390	390	390	390
Fraction of Correct Predictions	86%	86%	86%	86%	86%

Notes: All regressions include sector and region dummies; t –statistics are heteroscedastic consistent. They are in parentheses. *** = significant at 1%, ** = significant at 5%, * = significant at 10%

Table 4: Exitors

(The dependent variable is a dummy taking the value one if the firm exits the exports market and the method of estimation is Probit)

	Interaction with firm characteristic			Interaction with country characteristic	
	Size **Specification 11**	**Imported inputs** **Specification 12**	**Productivity** **Specification 13**	**Finance** **Specification 14**	**Institutions** **Specification 15**
Constant	0.192	0.124	0.158	-0.174	1.081
	(0.267)	(0.171)	(0.22)	(0.234)	(1.118)
Share of foreign ownership	-0.377	-0.386	-0.382	-0.416	-0.362
	(1.627)*	(1.658)*	(1.645)*	(1.771)*	(1.561)
Age of the firm	-0.148	-0.154	-0.154	-0.18	-0.131
	(1.681)*	(1.752)*	(1.752)*	(2.026)*	(1.475)
Size of the firm	-0.065	-0.109	-0.109	-0.052	-0.07
	(1.571)	(3.54)***	(3.546)***	(1.240)	(1.690)*
Share of imported inputs	-0.123	-0.116	-0.122	-0.125	-0.122
	(5.444)***	(3.952)***	(5.414)***	(5.488)***	(5.393)***
Productivity	-0.01	-0.01	-0.017	-0.008	-0.012
	(0.355)	(0.38)	(0.47)	(0.304)	(0.448)
Legal Status	1.019	1.024	1.024	0.99	0.992
	(5.909)***	(5.935)***	(5.932)***	(5.693)***	(5.736)***
$\log(Exports_{jt-1})$	-1.412	-1.408	-1.404	-1.45	-1.384
	(7.54)***	(7.501)***	(7.51)***	(7.596)***	(7.369)***
$\Delta Log(REER_{jt})$	-0.616	-0.594	-0.605	-4.092	-0.73
	(1.388)	(1.337)	(1.365)	(3.246)***	(0.301)
Volatility	0.04	0.027	0.034	0.126	0.077
	(0.280)	(0.189)	(0.242)	(0.863)	(0.521)
$\Delta Log(Demand_{it})$	-0.619	-0.593	-0.601	-0.652	-0.475
	(2.32)***	(2.233)***	(2.276)***	(2.356)***	(1.734)*
Size of the firm * $\Delta Log(REER_{jt})$	0.371			0.452	0.375
	(1.558)			(1.828)*	(1.559)
Share of imported inputs * $\Delta Log(REER_{jt})$		0.051			
		(0.302)			
Productivity * $\Delta Log(REER_{jt})$			-0.062		
			(0.272)		
Financial development				2.544	
				(4.817)***	
Financial development * $\Delta Log(REER_{jt})$				11.921	
				(2.837)***	
Quality of institutions					-0.708
					(1.687)*
Quality of institutions * $\Delta Log(REER_{jt})$					0.251
					(0.123)
Number of observations	1411	1411	1411	1411	1411
Number of positive observations	374	374	374	374	374
Fraction of Correct Predictions	76%	76%	76%	77%	76%

Notes: All regressions include sector and region dummies; t –statistics are heteroscedastic consistent. They are in parentheses. *** = significant at 1%, ** = significant at 5%, * = significant at 10%

Table 5: Results Focusing on the Role of Misalignment

(Model based measure of misalignment)

	Survivors[+]	Entrants[++]	Exitors[+++]
Constant	-0.161	-1.511	0.056
	(2.009)***	(2.553)***	(0.067)
Share of foreign ownership	0.002	0.917	-0.285
	(0.065)	(4.225)***	(0.985)
Age of the firm	-0.017	0.085	-0.214
	(1.534)	(1.111)	(1.924)*
Size of the firm	0.008	0.221	-0.132
	(1.595)	(5.006)***	(2.653)***
Share of imported inputs	0.001	0.138	-0.136
	(0.100)	(7.172)***	(4.669)***
Productivity	0.003	0.005	-0.089
	(0.732)	(0.203)	(2.296)***
Legal Status	-0.073	-0.538	0.003
	(1.999)*	(4.514)***	(0.009)
$\log\left(Exports_{ijt-1}\right)$	-0.295		-1.805
	(12.689)***		(7.51)***
$\Delta Log\left(REER_{jt}\right)$	-0.335	-1.485	-1.863
	(3.041)***	(1.417)	(1.822)*
Misalignment	1.312	9.830	4.988
	(2.914)***	(2.337)***	(1.174)
Volatility	-0.054	-0.092	0.116
	(3.555)***	(0.700)***	(0.707)
$\Delta Log\left(Demand_{it}\right)$	-0.005	0.019	-0.245
	(0.156)	(0.050)***	(0.81)
Size of the firm * $\Delta Log\left(REER_{jt}\right)$	0.013	0.048	0.179
	(1.278)	(0.533)	(1.476)
Size of the firm * Misalignment	-0.048	-0.464	-0.751
	(1.151)	(1.448)	(1.568)
Financial development	0.046	0.096	0.771
	(0.617)	(0.170)	(1.003)
Financial development * $\Delta Log\left(REER_{jt}\right)$	1.141	5.359	4.802
	(3.255)***	(1.735)*	(1.481)
Financial development *Misalignment	-4.461	-34.5	-9.724
	(3.136)***	(2.761)***	(0.726)
Number of observations	1009	2504	1108
Test of over identifying restrictions; P-value	0.77		
Adjusted-R^2	0.17		
Number of positive observations		367	220
Fraction of Correct Predictions		85%	81%

Notes:

+: The dependent variable is the change in the share of exports in total sales and the method of estimation is GMM

++: The dependent variable is a dummy taking the value one if the firm enters the exports market and the method of estimation is Probit

+++: The dependent variable is a dummy taking the value one if the firm enters the exports market and the method of estimation is Probit

All regressions include sector and region dummies; t –statistics are heteroscedastic consistent. They are in parentheses. *** = significant at 1%, ** = significant at 5%, * = significant at 10%

Appendix A: Marginal effect with Probit

To illustrate the issue, let's start from a simplified version of Equation (1):

$$Y^* = \beta_0 + \beta_1 x_1 + \beta_2 x_2 + \beta_{12} x_1 x_2 \tag{A1}$$

where $x_1 = \Delta Log\left(REER_{jt}\right)$ and $x_2 = Log\left(Characteristics_{it}\right)$. Our interest is on the effect of change rate, x_2, on the probability that entry Pr (Entry). We can write $Pr(Y) = G(Y^*)$. Where G is a nonlinear link function, that maps the unbounded index Y^* into the bounded probability space [0, 1]. In the case of Probit, G is the Gaussian normal cumulative density function. The indirect effect, of x_1 through x_2, is given by the cross derivative of the expected value of G:

$$\frac{\partial^2 Pr(Y)}{\partial x_1 \, \partial x_2} = \beta_{12} G'(Y^*) + (\beta_1 + \beta_{12} x_2)(\beta_2 + \beta_{12} x_1) G''(Y^*) \tag{A2}$$

The total marginal effect of x_1 is (Berry et al., 2010) is:

$$\frac{\partial Pr(y)}{\partial x_1} = G'(Y^*) (\beta_1 + \beta_{12} x_2) \tag{A3}$$

Note that in the traditional linear model as in the previous section $G(Y^*) = Y^*$. Hence, $G' = 1$, $G''= 0$ and the indirect effect is given by β_{12} . With Probit, in contrast, even if $\beta_{12} = 0$, there is still an indirect effect which equals (Ai and Norton, 2003):

$$\frac{\partial^2 Pr(Y)}{\partial x_1 \, \partial x_2} = \beta_1 \beta_2 G''(Y^*) \tag{A4}$$

In the case of Probit, $G''(Y^*)$ is positive for Y^* between minus infinity and zero and negative afterward. When Y^* is increasing in a characteristic, the indirect effect is first positive and then become negative.

Appendix B: Data Sources

World Bank Enterprise Survey

Coverage: Enterprise Surveys offers an expansive array of economic data on 130,000 firms in 135 countries. An Enterprise Survey is a firm-level survey of a representative sample of an economy's private sector. Firm-level surveys have been conducted since 2002.

Interviewees: These surveys are answered by business owners and top managers. Typically 1200-1800 interviews are conducted in larger economies, 360 interviews are conducted in medium-sized economies, and for smaller economies, 150 interviews take place. Formal (registered) companies with 5 or more employees are targeted for interview. Firms with 100% government/state ownership are not eligible to participate in an Enterprise Survey.

Content: The surveys cover a broad range of business environment topics including access to finance, corruption, infrastructure, crime, competition, and performance measures. The Enterprise Surveys Unit uses two instruments: the Manufacturing Questionnaire and the Services Questionnaire. The standard survey topics include firm characteristics, gender participation, access to finance, annual sales, costs of inputs/labor, workforce composition, bribery, licensing, infrastructure, trade, crime, competition, capacity utilization, land and permits, taxation, informality, business-government relations, innovation and technology, and performance measures. Over 90% of the questions objectively ascertain characteristics of a country's business environment. The remaining questions assess the survey respondents' opinions on what are the obstacles to firm growth and performance. The mode of data collection is face-to-face interviews.

Sector coverage: The manufacturing and services sectors are the primary business sectors of interest. This corresponds to firms classified with ISIC codes 15-37, 45, 50-52, 55, 60-64, and 72 (ISIC Rev.3.1). Services firms include construction, retail, wholesale, hotels, restaurants, transport, storage, communications, and IT. Occasionally, for a few surveyed countries, other sectors are included in the companies surveyed such as education or health-related businesses.

In some countries, other surveys, which depart from the usual Enterprise Survey methodology, are conducted. Examples include 1) Informal Surveys- surveys of informal (unregistered) enterprises, 2) Micro Surveys- surveys fielded to registered firms with less than five employees, and 3) Financial Crisis Assessment Surveys- short surveys administered by telephone to assess the effects of the global financial crisis of 2008-09.

Appendix C: Misalignment[4]

C.1 The model based approach

The most popular methodologies to determine the equilibrium RER are based on a single-equation, reduced-form model that attempts to account for current-account flow variables as well as factors influencing longer-run stock equilibrium. Motivated by the theoretical models of Elbadawi and Soto (2008) and Elbadawi (1998), we estimate a version of such empirical models. Our model predicts the equilibrium RER to be more appreciated with higher terms of trade (TOT), larger productivity in the traded-goods sector relative to the non-traded sector (PROD), lesser trade openness (OPEN), higher government consumption (GOV), higher foreign aid (AID), and larger net foreign income (NFI), or less flexible exchange rate regimes (EXRregimes). Therefore, our specification is:

$$
\begin{aligned}
\log(RER)_{it} = {} & \beta_{0i} + \beta_1 \log(TOT)_{it} + \beta_2 \log(PROD)_{it} + \beta_3 OPEN_{it} + \beta_4 \log(GOV)_{it} \\
& + \beta_5 NFI_{it} + \beta_6 AID_{it} + \beta_7^{'} \text{EXRregimes}_{it} + \varepsilon_{it}
\end{aligned}
\tag{C.1}
$$

Where subscripts i and t represent country and time indexes, respectively, and β_{0i} and ε_{it} are country-specific intercepts and disturbance terms.

We estimate an error-correction model accounting for the above fundamentals for a world panel comprised by annual data for 50 countries for 1980-2011. We use three econometric estimation methods appropriate for an error-correction specification of equation (C.1) applied to panel data. The pooled mean group (PMG) estimator –which imposes the restriction that all countries share the long-run coefficients; the more general mean group (MG) estimator –which assumes that the economies differ in their short and long-run parameters; and the dynamic fixed-effects (DFE) estimator,--which assumes that all parameters are constant across countries, except for the intercept which is allowed to vary across countries. The choice between the three estimators entails a trade-off between consistency and efficiency. The DFE estimator dominates the other two in terms of efficiency if the restrictions of equality of short and long-run parameters are valid. If they are false, however, the DFE will generate inconsistent estimates. The MG estimator imposes no cross-country parameter restrictions and can be estimated on a country-by-country basis, provided that the time-series dimension of the data is sufficiently large. For our purposes, the PMG offers the best compromise between consistency and efficiency: we expect the long-run path of the RER to be driven by a similar process across countries, while the short-run dynamics around the long-run equilibrium path may differ from one country to another because it is likely to be driven by idiosyncratic news and shocks to the fundamentals.

The results of the PMG regression are consistent with the theoretical and empirical literature for all of the RER fundamentals. Save for the dummy for the free floating exchange rate regime all long-run coefficient estimates are highly significant (at significance levels of 1% and 5% for all and less than 10% for the crawling peg regime). Moreover, all coefficients enter with the expected signs according to theory, except for the effect due to foreign aid, which was found to have promoted RER depreciation rather than appreciation. Regarding the short-term, the PMG results suggest that productivity, openness and government consumption have had significant effects that are also consistent with the direction of their long-run impact. Moreover, unlike its long-run effect, the crawling peg regime was found to promote real depreciation in the short-run. The two pieces

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[4] This Appendix draws on Elbadawi and Kaltani (2014)

of evidence combined suggests that a crawling peg regime is not necessarily an effective monetary institution for the promotion of long-term real exchange rate competitiveness.

Using the estimation results we construct indexes for the equilibrium real exchange rate (ERER) and real exchange rate misalignment (MIS). The ERER is obtained by feeding the estimated model with the permanent components of the fundamentals (estimated with the Hodrick-Prescott filter). These permanent components are characterized as sustainable levels and are therefore consistent with the concept of equilibrium. The ERER is normalized (through the country-specific intercept) so that the long-run misalignment for each country is set equal to zero. This imposes the plausible identification condition that no country can be overvalued (or undervalued) on a sustained basis for the full estimation period. The log of the actual RER is then subtracted from the log of the resulting normalized ERER to obtain the RER undervaluation (RERundval) time-series measures for each country.

C.2 The PPP approach

The PPP approach consists in using another measure of the real exchange rate, given by RER (=XRAT/PPP), which is the ratio of the nominal exchange rate and the PPP conversion factors from Penn World Tables 7.1[5]. In turn, we use this RER measure to construct an index of the real exchange rate undervaluation (RERunderval). This index is calculated according to the methodology of Rodrik (2008), which adjusts the measured real exchange rate (RER) to the Balassa-Samuelson effect through the following regression:

$\ln RER_{it} = \alpha + \beta \ln RGDPCH_{it} + f_t + \mu_{it}$,

Where RGDPCH is real GDP per capita (international \$ in 2005 constant prices, chain series). Following Rodrik (2008), we estimate the above equation for a panel of 1509 5-year time periods from 1950-54 to 2005-07. We estimate $\hat{\beta} = -0.24$ at a very high significance level (with a t-statistic at 21.3). Though we use a recently revised and extended Penn World Table (PWT) data set, our estimates are very close to that of Rodrik (2008), which suggests that the Balassa-Samuelson effect is very strongly corroborated by the data. Using the predicted $\ln RER_{it}$ ($\ln \tilde{RER}_{it}$) from the above equation, the log of RERunderval is simply derived as the difference between the actual and predicted log RER: $\ln RERunderval_{it} = \ln RER_{it} - \ln \tilde{RER}_{it}$.

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[5] PWT 7.1: Penn World Table: the Center for International Comparisons at the University of Pennsylvania (https://pwt.sas.upenn.edu/php_site/pwt71/pwt71_form.php).

Appendix D: Alternative measures of misalignment

Table D1: Survivors

(The dependent variable is the change in the share of exports in total sales and the method of estimation is GMM)

	HP Measure	Rodrik Measure
Constant	-0.084	-0.184
	(0.861)	(1.824)*
Share of foreign ownership	0.002	-0.004
	(0.046)	(0.101)
Age of the firm	-0.017	-0.018
	(1.546)	(1.606)
Size of the firm	0.01	0.008
	(1.859)*	(1.757)*
Share of imported inputs	0.001	0.001
	(0.185)	(0.199)
Productivity	0.003	0.003
	(0.759)	(0.74)
Legal Status	-0.071	-0.074
	(1.956)*	(2.044)**
$\log(Exports_{ijt-1})$	-0.294	-0.298
	(12.874)***	(12.729)***
$\Delta Log(REER_{jt})$	-0.693	-0.301
	(3.213)***	(1.814)*
Misalignment	3.610	1.305
	(3.160)***	(1.988)*
Volatility	-0.028	-0.054
	(1.212)	(2.839)***
$\Delta Log(Demand_{it})$	0.023	-0.008
	(0.753)	(0.258)
Size of the firm * $\Delta Log(REER_{jt})$	0.044	0.013
	(1.748)***	(1.159)
Size of the firm * Misalignment	-0.155	-0.043
	(1.533)	(1.274)
Financial development	0.139	0.113
	(1.871)*	(1.378)
Financial development * $\Delta Log(REER_{jt})$	2.895	0.936
	(3.119)***	(1.893)*
Financial development *Misalignment	-12.343	-3.973
	(3.478)***	(2.067)**
Number of observations	1009	1030
Test of overidentifying restrictions; P-value	0.37	0.64
Adjusted-R^2	0.17	0.16

Notes: All regressions include sector and region dummies; t –statistics are heteroscedastic consistent. They are in parentheses. *** = significant at 1%, ** = significant at 5%, * = significant at 10%

Table D2: Entrants

(The dependent variable is a dummy taking the value one if the firm enters the exports market and the method of estimation is Probit)

	HP Measure	Rodrik Measure
Constant	-2.338	-1.961
	(3.865)***	(3.586)***
Share of foreign ownership	0.877	0.899
	(4.046)***	(4.392)***
Age of the firm	0.055	0.097
	(0.727)	(1.312)
Size of the firm	0.178	0.211
	(3.723)***	(5.419)***
Share of imported inputs	0.134	0.137
	(7.017)***	(7.453)***
Productivity	0.022	0.01
	(0.809)	(0.400)
Legal Status	-0.505	-0.532
	(4.180)***	(4.477)***
$\Delta Log(REER_{jt})$	0.591	-1.048
	(0.448)	(1.870)*
Misalignment	14.258	6.623
	(1.727)*	(2.65)***
Volatility	-0.302	-0.107
	(2.141)***	(0.808)
$\Delta Log(Demand_{it})$	0.235	-0.126
	(0.613)***	(1.911)*
Size of the firm $*\Delta Log(REER_{jt})$	-0.246	0.08
	(0.980)	(1.208)
Size of the firm * Misalignment	-0.181	-0.261
	(0.205)	(1.363)
Financial development	-0.699	-0.026
	(1.471)	(0.059)
Financial development $* \Delta Log(REER_{jt})$	-4.355	2.269
	(0.954)	(1.262)
Financial development *Misalignment	-43.313	-17.416
	(1.964)*	(2.277)***
Number of observations	2504	2696
Number of positive observations	367	390
Fraction of Correct Predictions	85%	85%

Notes: All regressions include sector and region dummies; t –statistics are heteroscedastic consistent. They are in parentheses. *** = significant at 1%, ** = significant at 5%, * = significant at 10%

Table D3: Exitors

(The dependent variable is a dummy taking the value one if the firm enters the exports market and the method of estimation is Probit)

	HP Measure	Rodrik Measure
Constant	-1.948	1.008
	(2.228)***	(1.154)
Share of foreign ownership	-0.592	-0.383
	(2.314)***	(1.621)
Age of the firm	-0.171	-0.219
	(1.846)*	(2.426)***
Size of the firm	-0.056	-0.14
	(1.038)	(3.279)***
Share of imported inputs	-0.146	-0.139
	(6.191)***	(5.995)***
Productivity	-0.014	-0.015
	(0.506)***	(0.54)***
Legal Status	0.819	0.716
	(4.479)***	(3.944)***
$\log\left(Exports_{ijt-1}\right)$	-1.4	-1.306
	(7.062)***	(6.722)***
$\Delta Log\left(REER_{jt}\right)$	-3.019	0.650
	(1.914)*	(0.857)
Misalignment	19.787	-4.232
	(2.076)**	(1.225)
Volatility	-0.38	0.169
	(2.079)**	(1.002)
$\Delta Log\left(Demand_{it}\right)$	-1.304	-1.073
	(3.719)***	(4.088)***
Size of the firm * $\Delta Log\left(REER_{jt}\right)$	0.363	-0.027
	(1.270)***	(0.339)***
Size of the firm * Misalignment	-1.123	0.093
	(1.102)	(0.410)
Financial development	2.166	0.71
	(3.639)***	(1.299)
Financial development * $\Delta Log\left(REER_{jt}\right)$	-1.388	-4.549
	(0.207)	(1.945)*
Financial development *Misalignment	-38.14	20.921
	(1.290)	(2.021)**
Number of observations	1371	1411
Number of positive observations	358	374
Fraction of Correct Predictions	78%	77%

Notes: All regressions include sector and region dummies; t –statistics are heteroscedastic consistent. They are in parentheses. *** = significant at 1%, ** = significant at 5%, * = significant at 10%