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Invited Article

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How important is the real exchange rate for exports and growth?

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Economists have long debated whether the real exchange rate (RER) has a significant impact on export performance and output growth. Some claim that export performance depends only on non-price competition and the RER is irrelevant to long-run growth, whereas others argue that the RER is a key variable for promoting long-run economic development. Neither extreme view is supported by recent empirical evidence. Most econometric studies find significant effects of RERs on exports and growth, but subject to numerous qualifications. For example, RER effects on exports differ by type of goods exported, while the negative effects of overvaluation on growth may be stronger than the positive effects of undervaluation. Even if RER effects on growth rates are found only for medium-run transitions, these may imply a long-run impact on levels of output.

Keywords: *real exchange rate, economic growth, overvaluation, export performance, structural change, traverse*

JEL codes: *F43, O24, F31, O19*

1 INTRODUCTION

In most theoretical models of long-run growth, whether mainstream (old neoclassical/exogenous growth, new neoclassical/endogenous growth) or heterodox (classical-Marxian and post-Keynesian models), the real exchange rate (RER) does not play any role. Even growth models that emphasize the impact of international trade typically focus on other variables rather than the RER. For example, Grossman/Helpman (1991) develop growth models in which a country's international specialization affects its (endogenous) rate of technological innovation. In the heterodox tradition, many post-Keynesian economists are especially suspicious of emphasizing relative prices instead of income effects. Most notably, the balance-of-payments-constrained growth (BPCG) model of Thirlwall (1979), in spite of its focus on balanced international trade as the limiting factor in the growth process, specifically excludes RER effects from the canonical solutions for the 'Thirlwall's law' long-run equilibrium growth rate (see Blecker 2022).

Nevertheless, in models of export-led growth influenced by the Kaldorian approach (Dixon/Thirlwall 1975; Setterfield/Cornwall 2002; Boggio/Barbieri 2017), relative price variables such as RERs or relative unit labor costs play a key role in determining growth rates of exports and output across national economies. A different relative price variable – the terms of trade for primary commodity exports – is an important factor that drives growth in developing countries in the Latin American structuralist tradition (Prebisch 1950) and an important

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equilibrating variable in many models of North–South trade (Taylor 1981; Dutt 1988, 2002). Economists in the Brazilian new developmentalist school (Bresser Pereira et al. 2015; Oreiro et al. 2020; Marconi et al. 2021) particularly emphasize maintaining a competitive level of the RER – what they call the ‘industrial equilibrium’ rate – as a key determinant of success in developing the manufacturing sector and promoting sustainable long-run growth.

In recent years, a large empirical literature has found econometric evidence that competitive RERs have positive effects on export performance and/or output growth rates (see, among others, Gala 2008; Rodrik 2008; Rapetti et al. 2012; Caglayan/Demir 2019; Rapetti 2020; Demir/Razmi 2022). Berg et al. (2012) found that avoiding RER overvaluation increases the duration of ‘growth spells’. Rodrik (2008) interprets this type of evidence as showing that RER undervaluation can be a ‘second-best policy’ for promoting manufacturing production if first-best policies for taking advantage of positive externalities and spillovers (such as carefully targeted tax-cum-subsidy schemes) are not politically or institutionally feasible.

The following two quotes exemplify the polar extremes in the debate over RER effects (or relative price effects more generally) on exports and growth. On the one hand, defenders of the BPCG approach argue that only nonprice competitiveness affects long-run export performance and economic growth:¹

Non-price competitiveness encompasses, by definition, all those factors other than price that directly affect consumer choice. These include quality, reliability, speed of delivery, the extent and efficacy of the distribution network and the availability of export credit and guarantees ...

It is a central tenet of this book that when long-run economic performance is considered, non-price factors are of much greater importance than price competition in determining the success or otherwise of a country in overseas markets ... changes in relative prices have explained very little of the differences between countries in the long-run growth rates of exports and imports. (McCombie/Thirlwall 1994: 265, 300)

Given that, according to Thirlwall’s law, the long-run equilibrium growth of output is determined by the ratio of the income elasticities of exports and imports multiplied by the growth rate of foreign income – or, alternatively, the ratio of the growth rate of exports to the income elasticity of import demand – the same conclusion applies to overall economic growth in the authors’ BPCG framework.

On the other hand, advocates of Brazilian new developmentalism argue that the RER – which is the relative price of foreign to domestic goods – is one of the most important drivers of long-run growth and structural change. The new developmentalists criticize the BPCG model for treating income elasticities as fundamental parameters, because ‘each country’s productive structure, and therefore, the income elasticities of exports and imports are not immutable constants, but depend on the exchange rate’ (Bresser-Pereira et al. 2015: 37). They further argue that a country should seek to prevent overvaluation relative to an industrial-equilibrium exchange rate (IEER),² because

1. Parallel views were expressed by several neo-Schumpeterian economists around the same time, but they placed more emphasis on technological innovation as the prime (nonprice) driver of export success among industrialized countries. See, for example, Fagerberg (1988) and Amable/Verspagen (1995), who found evidence that technology variables were more important than cost differences in explaining export performance (although the former also emphasized delivery time).

2. Definitions of the IEER have varied. Bresser-Pereira et al. (2015: 11) defined it as ‘the exchange rate that makes competitive the business enterprises that use state-of-the-art technologies independently of protectionist policies’. Marconi et al. (2021: 1302) give a similar definition, but

[W]hen the level of the real exchange rate is chronically overvalued due to both the non-neutralization of the Dutch disease and to uncontrolled and unnecessary capital inflows, the country's productive structure will be affected, inducing a process of perverse specialization in the production of natural resource-intensive goods and causing low growth because of deindustrialization

Conversely, if the current value of the exchange rate is at the level of the industrial equilibrium – or a little above it [more depreciated] – then there will be a deepening of the country's process of industrialization, which will lead to an increase in the income elasticity of exports and to a decrease in the income elasticity of imports, thereby raising the balance-of-payments equilibrium growth rate

The exchange rate affects both the expected increase in sales to domestic and foreign markets and the expected profit margin. In fact, it determines the degree of access of domestic business enterprises to these markets. Therefore, the exchange rate is a variable of the utmost importance in the process whereby investment adjusts to the increase in autonomous demand; it is the most strategic macroeconomic price for economic development. (Bresser-Pereira et al. 2015: 37, 40)

These divergent views in turn have important implications for the formulation of macro-development policies in developing and emerging countries. How critical is it for policy-makers to try to maintain RERs at competitive levels, or to avoid currency overvaluation? Or is a focus on the RER misguided or unnecessary? Perspectives on this key set of questions vary not only between BPCG theorists and the new developmentalists, but also in other approaches including mainstream neoclassical economics and what Fritz et al. (2022) call 'social developmentalism' in Latin America. Fritz et al. (2022) highlight that social developmentalism largely neglects the role of the RER and focuses instead on domestic income redistribution, while (as noted above) new developmentalism puts a competitive RER at the center of efforts to promote industrial growth. This article will try to evaluate the empirical evidence on both sides of the debate about RER effects and assess the policy implications.

Before proceeding further, a few caveats are in order. First, the focus will be almost entirely on empirical studies and policy implications; theoretical models of RER effects are cited only briefly and in passing. Second, the emphasis here is on medium-run and long-run effects of RERs; the debate about the short-run impact of RER changes (e.g., whether a devaluation improves the trade balance) is not considered. Finally, whether RERs (or other relative prices) automatically adjust to clear the balance of payments (i.e., to maintain current account balance) and whether RER changes (given that they occur) have a significant impact on exports and growth in the medium-to-long run are two separate questions; this article considers only the latter question. It is entirely possible for the RER to have a significant impact on trade and growth, even if it does not automatically adjust in an equilibrating direction.³

argue that it is equivalent to 'the exchange rate level that equalises real unit labour costs between local producers of manufactured goods and their trading partners' (Marconi et al. 2021: 1297, 1304–1306). Oreiro et al. (2020: 32) define the IEER as 'the exchange rate that guarantees a constant share of manufacturing output' in total output.

3. This author suspects that conflation of these two distinct issues is what has led some post-Keynesian economists to dismiss RER effects because they do not believe in an automatic adjustment mechanism.

2 CONCEPTS, COMPLEXITIES, AND CHANNELS

To begin with, it is important to clarify the key alternative definitions of the RER and related measures of international competitiveness. Three of the most commonly used concepts, all defined so that a higher value represents a real depreciation, are:⁴

External RER (relative price of foreign goods): EP^*/P

Internal RER (relative price of tradable goods): P_T/P_N

Relative (foreign) unit labor costs: $(E \cdot ULC^*)/ULC$

where E is the nominal exchange rate in home/foreign currency, P is the average price level (measured, for example, by the CPI), P_T is a price index for tradable goods, P_N is a price index for nontradable goods, ULC is unit labor costs (labor costs per unit of output), and * indicates a foreign variable measured in foreign currency. The first and third measures emphasize competitiveness vis-à-vis foreign countries, while the second one emphasizes internal incentives to produce tradables compared with nontradables. The internal RER is commonly used in models of small open economies, often in conjunction with the assumption of a small country (so that P_T is exogenously given). Relative ULC , which is usually measured for the manufacturing sector, is an important indicator of industrial competitiveness in global markets. For empirical purposes, the first measure is usually expressed as a trade-weighted real effective exchange rate (REER) index, which is a weighted average of the RERs, with foreign countries using shares of trade with different trading partners as weights.

Researchers often make various transformations of REER indexes to better reflect whether currencies are overvalued or undervalued. For example, over/undervaluation is frequently measured relative to some definition of an equilibrium REER. Four commonly used benchmarks for an equilibrium REER are: (1) standard purchasing power parity (PPP) exchange rates; (2) PPP exchange rates adjusted for Balassa–Samuelson effects⁵ (Rodrik 2008); (3) fundamental equilibrium exchange rates (FEERs), which are rates that would maintain a sustainable current account balance (Williamson 1985); and (4) the IEER as defined by the new developmentalists⁶ (Bresser Pereira et al. 2015; Marconi et al. 2021). Razmi/Blecker (2008) and Blecker/Razmi (2008) distinguished REERs (and other measures of trade-weighted relative prices) for developing country exporters of manufactures relative to two different sets of currencies: those of rival developing country exporters and those of the industrialized countries (destination markets).

In the empirical literature, estimated effects of RERs and other measures of relative prices (or costs) differ depending on numerous factors, including:

- The specific RER measure or relative price/cost variable used
- The dependent variable (for example, output versus exports)
- The time dimension (short, medium, or long run)
- How the variables are measured (levels or shares; first differences or rates of change⁷)

4. For details on additional alternatives and underlying assumptions, see Demir/Razmi (2022: 388–389).

5. This adjustment corrects for the tendency of nontraded goods to be cheaper in countries with lower per capita income.

6. See footnote 2 above. The author is not aware of any studies that have compared these alternative benchmarks for an ‘equilibrium’ REER to see if they imply significantly different empirical results.

7. Of course, if the variables are expressed in natural logarithms, as they frequently are, then first differences of the logs are equivalent to proportional rates of change.

- The type of country(ies) studied (income level, structure)
- Type of goods traded or country specialization
- Possible nonlinearities or asymmetries in the relationships
- Controlling for different causes of RER fluctuations
- The econometric technique(s) used
- Model specification (including lag lengths)
- Control variables included (or omitted)
- Identification strategies employed (if any)

Given all these subtleties and complexities, it is not surprising that studies that differ across all these dimensions have reached different conclusions about the impact of RERs (or other relative price measures) on exports and growth, as will be discussed in the following sections.

Before turning to the empirical evidence, however, it is important to review the possible channels through which the RER can affect exports and output. First, of course, there is the traditional channel of price-competition effects on export and import demand. This is largely relevant to short-run issues such as whether a real depreciation improves the trade balance, which under certain assumptions requires that the price elasticities of demand satisfy the Marshall–Lerner condition or a modified version thereof. Recent evidence on these elasticities is given by Bussière et al. (2020), who find that depreciation does improve the trade balance in spite of low estimated price elasticities of demand because of endogenous adjustments of export and import prices.

Second, and more relevant to the present discussion, are the channels through which RER changes affect income distribution and capital accumulation. A real depreciation tends to redistribute income from wages to profits, because higher prices for imported goods lower real wages while greater international price competitiveness allows firms to raise profit markups, and a real appreciation does the opposite. Hence, the outcome for growth depends in part on whether growth is wage-led or profit-led (see Blecker 1999; Ribeiro et al. 2017b). More broadly, a redistribution toward profits can boost both saving and investment rates (Levy-Yeyati et al. 2013). On the one hand, the marginal propensity to save out of profits is typically higher than out of profits for well-known reasons. On the other hand, raising profitability tends to encourage investment (and attracts foreign direct investment) in tradable goods industries (Ibarra 2018; Ibarra/Ros 2019), thereby expanding export capacity and potentially diminishing the need for imports (unless the exports are highly intensive in imported capital and intermediate goods).

Third, neoclassical analysis (and some post-Keynesian and structuralist work) emphasizes supply-side effects of RER depreciation. Especially using the internal RER, a depreciation is expected to lead to a reallocation of resources to tradable goods sectors, with implied improvements in both export performance and import substitution. Using either the internal or external RER, a depreciation can also represent a ‘second-best’ solution for promoting growth of manufactures in the presence of production externalities and spillover effects, when these are combined with institutional weaknesses and a lack of other feasible policy instruments (Rodrik 2008; Guzmán et al. 2018). In effect, RER depreciation is equivalent to an export subsidy and an import tariff combined, and in the presence of both market and government failures it can substitute for the theoretical ‘first-best’ policies that would more directly subsidize the sectors or activities that generate the positive externalities and spillovers (or tax other sectors and activities). Korinek/Servén (2016) construct a model in which the dynamic productivity gains from such effects eventually outweigh the static welfare losses from an RER depreciation (which are similar to those for an export subsidy cum import tariff).

Economists in the post-Keynesian, neo-Schumpeterian, and structuralist traditions have argued that RER depreciation promotes structural change favoring industries with learning spillovers, scale economies, greater product variety, and increased scope for innovation (e.g., Missio/Jayme Jr. 2012; Oreiro et al. 2015; Missio et al. 2017). These and other economists influenced by the Thirlwall BPCG model have also argued that RER depreciation can induce an expansion of export sectors that have higher income elasticities of demand, leading to a rise in the weighted-average income elasticity of export demand (and/or a fall in the same elasticity for imports) and ultimately to a relaxation of the balance-of-payments constraint on output growth (see also Oreiro 2016; Cimoli et al. 2019; Marconi et al. 2021).

3 THE EVIDENCE ON EXPORTS

There is an enormous empirical literature that has estimated how RERs or relative prices affect exports (see Caglayan/Demir 2019 for extensive citations of previous studies). Here, we will discuss only a few of the most important recent studies using a variety of techniques and covering a range of different findings. Pariboni/Paternesi Meloni (2022) directly test for effects of both relative prices and nonprice competition and find that both are significant in explaining exports among high-income OECD countries, in the long run as well as the short run. They use RERs based on *ULC* for relative prices and the countries' export complexity indices as a proxy for qualitative (nonprice) competitiveness.

Boggio/Barbieri (2017) found that relative *ULC* have a statistically significant positive effect on the growth of export market shares in manufacturing when *ULC* are measured in levels, but not in rates of change. They interpret this finding as supporting the export-led growth model of Beckerman (1962) rather than the Kaldorian export-led growth model of Dixon/Thirlwall (1975). In contrast, León-Ledesma (2002) found significant relative price effects on export growth in rate-of-change form in an extended Dixon–Thirlwall model. Note that these divergent results may be sensitive to the use of different dependent variables (increase in market share versus growth rate of exports).

Caglayan/Demir (2019) studied the effects of RERs on exports for two global regions (the developed North and developing/emerging South) and five types of exports based on Lall (2000): primary commodities and four types of manufactures (resource intensive and high, medium, and low skill). In their full-sample estimates, RER effects are significant for total exports and three types of manufactures (low and medium skill, resource intensive). Turning to the direction of trade, RER effects for all goods are significant in all directions except South–North (perhaps because many Southern economies are heavily specialized in primary commodities). Focusing on South–North exports, RER effects are strongest for medium-skill and resource-intensive manufactures, and positive but weaker for high-skill (they are insignificant for primary commodities and low-skill manufactures). Using an alternative classification of exports from the OECD, Caglayan/Demir (2019: 1643–1645) find that RER effects are strongest and most significant for medium-high and medium-low technology-and-skill intensity goods (especially for exports in the South–North direction), and mostly insignificant for high and low technology-and-skill intensity goods and 'other' goods (mostly primary commodities).⁸

8. An interesting exception is that, for trade in the North–South direction, the RER has large and significant positive effects for high technology-and-skill goods and other goods, as well as medium-high (but not medium-low or low). This suggests that Northern countries do compete at least partly on price for selling high and medium-high technology-and-skill goods in the South.

Qualitatively similar results are found by Palazzo/Rapetti (2023), who take a more disaggregated approach using Argentinian trade data for 502 four-digit SITC categories. Aggregating back up to the Lall classification, they find that the effects of RER depreciations on exports are positive and significant for all three levels of technological sophistication, where the estimated coefficients are inversely related to the skill level (i.e., highest for low-skill goods). They also find that RER effects are statistically insignificant for exports of primary products and resource-intensive goods. Using an alternative classification from Rauch (1999), they find that these effects are positive and significant for two types of goods, differentiated products and products with world reference prices, but notably higher for the former, while RER effects are insignificant for homogeneous products. Palazzo/Rapetti (2023) emphasize that these heterogeneous impacts of RER depreciations imply that they can influence industrial composition and drive structural change, thereby promoting long-run growth, even if weighted-average aggregate RER elasticities appear relatively low.

Two recent studies have found that relative price or RER effects on exports become (mostly) insignificant after controlling for technological differences across countries (Romero/McCombie 2018; Bottega/Romero 2021). The former study uses total factor productivity as a proxy for technological differences, while the latter uses patent data. Nevertheless, when Bottega and Romero disaggregate their export data into high-technology and low-technology goods, they find that ‘non-price and technological competitiveness are more relevant for the export performance of high-tech products, while price competitiveness is a more determinant factor for exports of low-tech products’ (Bottega/Romero 2021: 182).

4 THE EVIDENCE ON GROWTH

A large number of empirical studies published around 2008–2013 found significant positive effects of RER depreciation or undervaluation on economic growth, using a variety of different conceptual frameworks and econometric methodologies (see Gala 2008; Rodrik 2008; Berg et al. 2012; Rapetti et al. 2012; Razmi et al. 2012; Levy-Yeyati et al. 2013). More recently, Rapetti (2020) and Demir/Razmi (2022) have written excellent surveys of this entire literature, including many other studies published either earlier than 2008 or after 2013, and have also provided new econometric estimates of their own. Starting with Rodrik (2008), much (although not all) of this literature uses measures of RER overvaluation or undervaluation relative to PPP exchange rates adjusted for Balassa–Samuelson effects. Some of this literature also finds negative effects of RER volatility on economic growth.

This recent literature has also identified important asymmetries and nonlinearities in the RER–growth relationship. Although the findings are diverse and there are exceptions, the most typical results are as follows:

- RER effects on growth are larger and/or more statistically significant for developing and/or emerging countries compared with advanced economies.
- Negative effects of overvaluations tend to be stronger (and more statistically significant) than positive effects of undervaluations.
- There are diminishing growth gains from larger undervaluations.

The general presumption of positive effects of currency undervaluation (or depreciation) on growth has been challenged theoretically by Ribeiro et al. (2017b) and empirically by Ribeiro et al. (2020). On the theoretical side, Ribeiro et al. (2017b), following earlier work

of Blecker (1999), show that the short-run impact of a currency depreciation on output growth depends in part on how the distributional effects of the depreciation (which raise the profit share and lower the wage share) affect aggregate demand, which in turn depends on whether demand is profit-led or wage-led. Assuming that the depreciation makes home goods more competitive,⁹ in a wage-led economy the depreciation definitely improves the balance of trade but has an ambiguous effect on output growth in the short run, whereas in a profit-led economy a depreciation is always expansionary for output growth but has an ambiguous effect on the trade balance.

On the empirical side, Ribeiro et al. (2020) show that when relative productivity (home/foreign) and the home country wage share are included in a growth regression, RER undervaluation becomes insignificant (even though the RER has a positive and significant effect when those other variables are omitted). Ribeiro et al. (2020) argue that RER undervaluation causes changes in technological capabilities (proxied by the relative productivity variable) and income distribution (the wage share), and hence interpret their empirical findings as showing that the apparent significance of the RER (when these other variables are excluded) masks the true, underlying causal effects of technology and distribution on growth. In other words, they argue that the RER operates only through its impact on technology and distribution, which in turn drive growth, rather than having an independent causal effect of its own. Interestingly, the positive effect (sum of current and lagged coefficients) they find for the wage share implies that growth is wage-led in the medium run (they use data averaged for four-year periods).

Nevertheless, it is easy to see that another interpretation of the results in Ribeiro et al. (2020) is possible. Suppose we assume markup pricing on *ULC* at home and abroad (ignoring intermediate inputs for simplicity), so that $P = (1 + \tau)W/y$ and $P^* = (1 + \tau^*)W^*/y^*$, where τ and τ^* are the (positive) home and foreign markup rates, W and W^* are the nominal wage rates, and $y = Y/L$ and $y^* = Y^*/L^*$ are labor productivities (output per worker-hour). Then the external RER can be decomposed as follows:

$$RER = \frac{EP^*}{P} = \left(\frac{EW^*}{W}\right) \left(\frac{1 + \tau^*}{1 + \tau}\right) \left(\frac{y}{y^*}\right), \quad (1)$$

where the home and foreign wage shares are $(1 + \tau)^{-1}$ and $(1 + \tau^*)^{-1}$, respectively. Thus, assuming markup pricing, the external RER is *definitionally* related to both the wage share $(1 + \tau)^{-1}$ and relative productivity (y/y^*) , so we should not be surprised that RER itself becomes insignificant when these variables are included in a regression equation. Note that equation (1) becomes linear in natural logarithms, so if the variables used in a regression model are expressed in logs (as they usually are), there is likely to be multicollinearity between the logs of the RER and these other two variables.

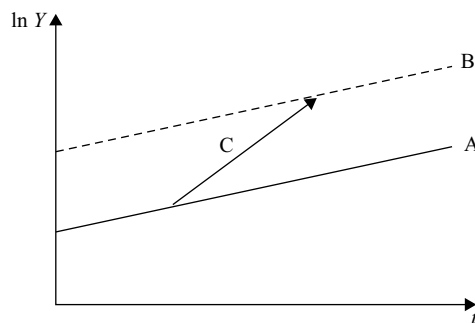
It is difficult, therefore, from the econometric findings of Ribeiro et al. (2020) alone, to know if they constitute evidence in favor of the authors' causal model or rather simply reflect a definitional relation between the RER and two of its component variables. In

9. Ribeiro et al. (2017b) also consider a scenario in which a depreciation makes home goods less price-competitive, which seems like a special case that could only result under extreme parameter values (the case in which there is simply no change in competitiveness would seem more plausible). It should be noted that Ribeiro et al. (2017b) analyze the effects of a *nominal* depreciation, so their results are not exactly comparable with those of studies that have focused on real depreciations. Essentially, their 'uncompetitive' case is the situation in which a nominal depreciation leads (through strong increases in prices of imported intermediate inputs) to a real appreciation (domestic products become relatively more expensive).

an alternative interpretation, the RER could be considered as an important channel for conveying effects of income distribution and technological progress, if these are seen as underlying determinants of the RER (rather than, or in addition to, being functions of the RER).

Another criticism of the studies that have found positive effects of RER depreciation on growth is that the results pertain only to temporary growth surges (or ‘transitions’) and do not establish long-run effects (see, for example, Mhlongo/Nell 2019: 499).¹⁰ From an econometric point of view, there is some truth to this claim. For example, most of the studies based on international panel data use time periods of four or more years to eliminate short-run fluctuations and business cycles from the time-series dimension; such periods could be interpreted as ‘medium-run’. Several studies explicitly consider determinants of medium-run growth spurts. Notably, Berg et al. (2012) found that RER overvaluation shortens the duration of ‘growth spells’ (episodes of sustained rapid growth) of at least eight years. In a related vein, Libman et al. (2019) found that RER undervaluation increases the probability of initiating an ‘investment surge’ of at least eight years.¹¹

However, it is simply incorrect to say that because RER effects on growth *rates* are only found for medium-run periods, there are no long-effects of the RER level on the long-run growth *path* of an economy. On the contrary, one can conceptualize a sustained medium-run growth spurt as a transition or ‘traverse’ from one steady-state growth path to a higher one (the importance of the traverse is emphasized by Setterfield (2002)). Such a traverse is illustrated by the steeply sloped upward arrow (C) in Figure 1, which shows a movement from a lower steady-state path (A) to a higher one (B), on the assumption (for the sake of



Notes: The growth rate equals the slope of each line, $g_t = d \ln Y / dt$, where Y is a measure of output or per capita income and t is time. Lines A and B are steady-state growth paths; arrow C is a sustained medium-run growth spurt.

Source: Author.

Figure 1 A sustained growth spurt shown as a traverse between steady-state growth paths

10. Ribeiro et al. (2017a) show theoretically how Kaldor–Verdoorn effects (endogenous productivity growth) on price competitiveness can affect the equilibrium growth rate in the medium run (but not the long run) in an extended version of the BPCG model.

11. Other studies have found positive effects of RER undervaluation specifically on manufacturing investment (for example, Ibarra (2018) for Mexico and Marconi et al. (2022) for Brazil), and one study has found a positive effect on manufacturing output (Nalín/Moreno-Brid 2022). These results suggest that RER depreciation can influence structural change in favor of the manufacturing sector, which can contribute to long-run growth.

illustration) that the two steady-state growth paths have the same growth rate (i.e., the slopes are the same). Of course, growth never occurs in such a smooth fashion in reality, but the steady-state assumption is used here to facilitate the comparison of medium-run adjustments with long-run trends.

The two growth paths A and B have equal steady-state growth rates (by construction), yet path B clearly offers a distinctly higher level of output (or average standard of living, if Y is defined as income per capita). Thus, a 'medium-run' acceleration of growth *can* have a lasting long-run impact, even if the growth rate does not stay permanently higher. If RER undervaluation or depreciation contributes to the type of growth spurt illustrated by arrow C, and assuming the growth spurt is sustained and not subsequently reversed, then the RER *does* affect the long-run income *level* (height of the steady-state growth path) even if the growth spurt (increase in the growth *rate*) is 'only' transitional or medium run in duration. This point gets forgotten in discussions that focus only on long-run equilibrium (steady-state) growth rates, as is frequently the case in regard to the BPCG model and Thirlwall's law (for an exception, see Bhering et al. 2019).

5 KEY QUALIFICATIONS AND POLICY IMPLICATIONS

In spite of the increasingly robust empirical evidence that depreciated RERs (with some limits and qualifications) help to boost exports and growth, there are several notes of caution that should be sounded before endorsing a policy of depreciating the RER as a general strategy for economic development. The first qualification relates to the international competitive implications of RER depreciation, which by its nature must be matched by real appreciation of some other countries' currencies. Robinson (1947: 156) famously depicted currency devaluation (among other means of increasing the trade balance) as a 'beggar-my-neighbour' policy, because the competitive gains for any given country come at the expense of other countries' output and employment. For example, China experienced a historically rapid export-led growth boom and vastly increased its share of global markets for manufactured goods, partly as a result of RER undervaluation, in the late 1990s and early 2000s (roughly, 1994–2007). Nevertheless, these gains for China came at the expense of massive job losses in the US (Autor et al. 2016) and the displacement of large amounts of exports that would otherwise have come from (and created jobs in) Mexico (Gallagher et al. 2008).

Second, currency depreciation usually increases inequality, at least in the short run, through the redistribution of income it causes from wages to profits (for the reasons explained earlier). Hence, it is important to ensure that the long-term gains from currency depreciation include eventual increases in real wages large enough to outweigh the short-term losses. Third, and partly connected to the second point, devaluations are often contractionary in the short run, especially in developing countries. Krugman/Taylor (1978) note that a redistribution from wages to profits would reduce consumption demand and this would have a net contractionary effect in what they implicitly assumed to be a wage-led economy (see also Blecker 1999). Depreciations also have adverse balance sheet effects for countries that have borrowed in foreign currency as the real burden of servicing that debt and repaying principal rises when the home currency depreciates, which can further depress domestic demand and output (see Blecker/Razmi 2008).

Turning to the medium-run and long-run consequences, Pariboni/Paternesi Meloni (2022) observe that chronically undervalued and overvalued currencies are associated with persistent global trade imbalances (current account surpluses and deficits, respectively) and consequent financial instability. Export-led economies like those of China

and Germany typically have undervalued RERs, while debt-driven economies like the US and many Latin American nations typically have overvalued ones. Blecker/Razmi (2008, 2010) emphasize the ‘fallacy of composition’, according to which lowering the relative price of exports or depreciating the RER is only effective when a few countries do it and others do not, but not when all attempt to do it at the same time. In their econometric work, Blecker/Razmi (2008, 2010) find that gains in exports and growth for developing country exporters of manufactures to advanced country markets come from (real) devaluations relative to the currencies of rival exporting nations, not devaluations relative to those of the advanced economies (the latter instead are contractionary).

On the theoretical side, it is implicit in models of export-led growth with cumulative causation (e.g., Setterfield/Cornwall 2002; Araujo 2013) that enhancing ‘virtuous circles’ of rising productivity, competitiveness, and export-led growth in some countries or regions is likely to come at the expense of imposing ‘vicious circles’ of slower productivity growth, diminished competitiveness, and economic stagnation in others. In these models, growth rates of exports and output are driven by changes in relative prices (RERs), while Kaldor–Verdoorn effects are assumed to generate positive feedbacks from output growth to productivity growth (and hence to external competitiveness) in the medium run. Thus, if one country’s RER depreciates faster, other countries’ RERs must appreciate more rapidly (or depreciate more slowly), thereby diminishing competitiveness and growth rates in the latter countries and reducing their ability to benefit from positive feedbacks (as noted by Blecker 2022: 448). Given all these considerations, real depreciation may be beneficial to any given country, but cannot be regarded as a win-win policy approach for all countries or the global economy as a whole.

Then there is the question of what governments can do to influence their RERs, which are not simple policy instruments.¹² The external RER is obviously affected by fluctuations in nominal exchange rates (when these are flexible or adjustable) and relative price levels (or relative inflation rates) across countries. With regard to nominal exchange rates, Harvey (2019: 391) observes that ‘currency prices are driven by the portfolio decisions of financial investors throughout the world, with the latter’s primary foci being interest rates, expected exchange rate movements, and forecast own-price changes of financial assets, especially the first two’. Hence, if it is important to avoid RER overvaluation, as the empirical literature surveyed above suggests, then it is imperative to avoid strict inflation-targeting monetary policies that tend to maintain high interest rate differentials vis-à-vis the major currencies (US dollar, UK pound, euro) resulting in chronic overvaluation of national currencies.

Beyond ordinary monetary policy, there is also the question of whether governments (central banks and/or treasuries) can use foreign exchange (FE) market intervention to depreciate the RER, and if so, does this achieve the desired gains in exports and/or growth. Levy-Yeyati et al. (2013) find that FE market intervention is effective for depreciating RERs for up to two years and the intervention-induced depreciations are not reversed subsequently. They also find that FE market intervention is effective for raising GDP growth rates, including over three-year periods and for trend as well as cyclical components of real GDP. Surprisingly, however, Levy-Yeyati et al. (2013) find no evidence for a ‘trade channel’ of FE market interventions. According to their econometric estimates, FE market intervention has no significant effect on exports and the wrong sign (positive)

12. Pérez Caldentey et al. (2022) express skepticism that the government could use a depreciated RER as a policy lever for promoting industrial development in a resource-exporting economy like that of Chile, where the RER is heavily influenced by the terms of trade for commodity exports as well as financial inflows.

for imports. In contrast, their estimates show that FE interventions raise saving and investment rates, implying a capital accumulation channel for the growth gains. Levy-Yeyati et al. explain the latter results by noting that FE market interventions that depreciate the RER tend to lower the wage share and redistribute income to profits (see also Ibarra/Ros 2019).

Another related question is whether capital controls can be effective for preventing RER overvaluation. Montecino (2018) finds that controls significantly slow the adjustment of the RER toward its long-run equilibrium path (but he does not dispute the conventional idea of a fundamentals-based long-run equilibrium). Montecino also finds that capital controls are more effective in slowing RER adjustment in response to undervaluations than overvaluations, and with fixed rather than flexible exchange rates. These results imply a mixed picture for policy, since capital controls are found to be more effective for maintaining undervalued RERs but are less effective at doing so in the increasing number of countries that have flexible exchange rates.

6 CONCLUSIONS

The available empirical evidence does not support sweeping generalizations to the effect that RERs (or relative prices more broadly) are either completely irrelevant to long-run growth or are the single most important variable for the growth process. Abundant econometric estimates find robust evidence that RERs (and other measures of cost competitiveness, such as relative unit labor costs) do have a strong and significant impact on export performance and output growth. There is especially strong evidence that currency overvaluation (relative to a standard benchmark, such as a Balassa–Samuelson adjusted PPP rate) is harmful to growth. Nevertheless, the evidence suggests a number of important nuances and qualifications. One key finding is an important nonlinearity: moderate currency undervaluation is more likely to be beneficial for growth than extreme undervaluation. Another key set of findings is that both price and nonprice (qualitative) competition are important determinants of exports and their relative impacts differ according to the type of goods exported (especially different skill and technology levels for manufactures).

The estimated effects of RERs on exports vary notably by the type of export specialization (primary commodities, different types of manufactures) and by the direction of trade (between the developed North and developing/emerging South). While there is some variation in the results, in general the export gains from RER depreciation are estimated to be strongest for (depending on the classification) low-technology manufactures, or (in a more detailed classification) resource-intensive, medium-skill and low-skill manufactures. RERs appear to be less important for high-tech or high-skill manufactures and largely irrelevant for exports of primary commodities. Taken together, all of these findings imply that a competitive RER is important for promoting growth of exports and output, but is not a panacea or a replacement for other, complementary policies (especially for promoting high-technology/high-skill exports). Furthermore, the existing literature focuses mainly on identifying whether RERs and other relative price variables have statistically significant effects, but it does not quantify how important RERs and relative prices are compared with other drivers of exports and growth.

The recent empirical evidence also has important theoretical implications for how we conceptualize long-run growth. Most importantly, the findings summarized here suggest that growth models should not focus exclusively on long-run, steady-state growth rates, but instead should also pay attention to the level of long-run growth paths. Even if the

RER has little or no effect on the long-run equilibrium growth *rate*, a significant impact on medium-run growth rates (which is what most of the empirical literature identifies) implies a persistent influence on long-run income *levels* (growth paths), as long as the growth ‘spurts’ are sustained for some time and not subsequently reversed. Of course, if the long run is seen as a succession of medium-run periods, the RER may also influence long-run average growth rates but an impact on the long-run equilibrium (steady-state) growth rate is not strictly necessary for the RER to have a long-run impact on average living standards and levels of well-being (subject, of course, to concerns about income distribution, especially if RER depreciation redistributes income to profits). Recognition of ecological constraints (global warming, resource depletion) also suggests a greater focus on raising levels of economic well-being rather than permanently increasing steady-state rates of compound growth.

In regard to development policy, the evidence seems clear that RER overvaluation should be avoided. For a given country, maintaining a competitive or moderately undervalued currency seems beneficial, indeed essential, in regard to both export and growth objectives. Nevertheless, the policy implications also need to be carefully qualified. In particular, currency undervaluation cannot be a general or global strategy. It is still a beggar-thy-neighbor policy, which boosts one country’s exports and growth at the expense of other countries’. Moreover, RERs are relative variables, and all countries cannot depreciate at the same time. Therefore, the best policy is to maintain a stable, competitive RER (perhaps something like the IEER of the Brazilian new developmentalists, as defined earlier), while using other policy levers to help achieve equitable and sustainable growth and development. At the macro level, coordinated fiscal expansions are needed to maintain global demand at levels commensurate with robust growth and full employment without risking the destabilizing trade imbalances that can result from either uncoordinated stimulus policies or depreciation-induced export booms. In regard to income distribution, incomes policies are needed to tie real wage growth to labor productivity growth, while anti-trust and other competition policies are needed to prevent rising profit markups of monopolistic firms that depress real wages and boost profit shares. On the ‘supply side’, industrial policies, social policies, innovation policies, and public investment are necessary complements to all these other measures.

The evidence summarized here suggests several important avenues for future research. One unresolved issue is what kinds of policies (monetary policies, FE market intervention, capital controls, industrial/innovation policies, distributive norms, etc.) are most effective for maintaining a stable, competitive RER. Another key question that remains unresolved is whether and how the impact of the RER differs according to the source of variation in the RER. Combining the findings of Levy-Yeyati et al. (2013), Romero/McCombie (2018), Ribeiro et al. (2020), and Bottega/Romero (2021), a plausible hypothesis would be the following: RER depreciations caused by FE market intervention raise growth through an income distribution and capital accumulation channel (redistribution to profits boosts investment and saving), whereas RER depreciations brought about by rapid productivity growth raise growth through the trade channel (mostly by boosting exports; evidence for reducing imports is weaker).

However, this hypothesis needs much more investigation, both theoretically and empirically, especially in regard to teasing out the direction(s) of causality involved. For example, does a lower wage share cause the RER to depreciate, or does a real depreciation cause the wage share to fall, or is there mutual causation between the RER and wage share? More broadly, additional research is needed to model the (likely mutual) causal relationships (both static and dynamic) between the exchange rate, labor productivity, and income distribution. It is especially important to analyze under what conditions the short-term

sacrifices in real wages that result from currency depreciation are ‘worth it’ for raising real wages and average living standards in the long run. Lastly, the finding that RERs have a weaker impact on high-tech or high-skill exports than on other types of manufactured exports suggests that RER undervaluation is more likely to help a developing country reach middle-income status than to help an emerging economy escape the middle-income trap and achieve high-income status. For the latter objective, additional policy measures would seem to be essential.

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