Exchange Rate Policy and Export Performance in Efficiency-Driven Economies

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Abstract

Increased globalisation, coupled with rising domestic competition, has led a growing number of firms to search beyond their traditional domestic markets for business opportunities in recent years. As a result, export-led economic growth has gained renewed attention amongst policy makers, particularly amongst those in industrialising nations, or so-called efficiency-driven economies. This search for drivers of economic growth has gained further impetus from the economic pressures brought about by the fall in growth in advanced markets following the global financial crisis coupled with the rising competitiveness of other industrialising emerging economies. A common policy proposal amongst countries trying to improve their competitiveness is to weaken the domestic exchange rate as a means to stimulate exports. However, depreciation also increases exchange rate risk. Given the renewed emphasis on this policy lever, this research examines the impact of exchange rate on export performance in a sample of nine efficiency-driven economies over the period 1990 to 2009. These economies that we survey include Brazil, the Dominican Republic, Malaysia, Mauritius, Mexico, Peru, South Africa, Thailand and Turkey, which all have floating exchange rate arrangements during the survey period. Panel data models using a fixed-effects method were used, and it was found that a weakening of the exchange rate does not necessarily improve export performance. To the contrary, for the nine countries surveyed, export growth seems to be associated with stronger exchange rates. Whilst our results suggest that the lag effect of exchange rate movement on export performance is slightly more pronounced, the relationship nevertheless remains statistically insignificant.

1 INTRODUCTION

Current global market conditions, where many economies are undergoing financial strain or economic restructuring and realignment, have brought to the fore the concept of a 'currency war' or, less dramatically, competition based on exchange rate weakness (Ahamed, 2011). According to Dolan (2010), certain world economies are investigating pegging or weakening their exchange rates to

gain global export market share through price competitiveness. This policy proposal has gained support by virtue of the fact that the last two decades has seen many economies become more dependent on exports, an attribute compounded by recent bouts of slower domestic economic growth and hence lower domestic demand. Thus, it is argued, a relatively weaker exchange rate would help countries' exported goods to become more competitive (Kaiser & Wroughton, 2010), thereby helping these countries achieve higher economic prosperity.

Despite recent attention, the concept of a 'currency war' is not a new phenomenon. Prebisch (1950, 1964) demonstrates this in a shift in early thinking on economic growth and development. Initially, inward-looking strategies (Prebsich, 1950), where reliance was placed on a home market for manufactured goods in a process of import substitution, were preferred by countries in Latin America and sub-Saharan Africa (Keesing, 1967). Outward-looking strategies were later given preference by many developing economies, in particular those in Asia, as manufactured export industries were seen as a key component of industrial development and economic success (Keesing, 1967).

Prebisch (1964) further developed the argument in support of export-oriented industrialisation as a key component for economic growth. Such economic growth could be achieved through an expanded export market share achieved via comparative cost advantages, such as cheap labour or exchange rate weakness (Prebisch, 1964; Keesing, 1967). In time, most economies have shifted to outward-looking strategies of export promotion (Dollar, 1992).

Thus, policies that promote currency weakness may be viewed as favourable by countries in pursuit of export-led growth (Owen, 2005). This follows from the argument that a weaker home currency would reduce the price of exports by making them cheaper in comparison to other competitors within the export market (Mussa & Rosen, 1978; Auer & Chaney, 2009). Economic growth follows, as a greater demand for exports would encourage higher domestic production and in so doing, boost employment and adjust the trade balance in favour of the 'weakening' currency. According to this argument, the net effect would be to boost gross domestic product (GDP) and raise domestic income and incomes per person (Owen, 2005). Such a proposal, in isolation, appears plausible. In reality, however, there are a number of other factors which impact any competitive advantages as a result of currency weakness in developing nations, as well as in developed nations (Boltho, 1996).

Arguably, the proposal to weaken a currency to gain global export market share through price competitiveness is most relevant for developing countries which experience, or aim to achieve, substantial industrial growth that is fuelled by exports (Clark, 1996). The so called efficiency-driven economies, as defined by Porter (1998) and described in the World Economic Forum Global Competitiveness Report (Schwab, 2013), are developing, industrialising nations for whom export sectors are a key contributor to economic growth.

Previous studies on the relationship between currency weakness and export performance fail to clearly isolate the relationship between currency movements and export performance by providing inconclusive, and sometimes contradictory, evidence. By way of example, Bautista (1982), Abeysinghe and Yeok (1998),

Musila and Newark (2003) and Auer and Chaney (2009) found that currency weakness improves export performance. To the contrary, Lizondo and Montiel (1989), Calvo and Reinhart (2002), Musila (2002), Frankel (2005) and Berman and Berthou (2009), amongst others, found currency weakness either to have a negative effect on export performance or to have little effect. However, many of these studies reviewed a small sample of developing or developed countries with a particular focus on fixed exchange rate regimes due to the historical prevalence of fixed exchange rates under the Bretton Woods system (Dooley, Folkerts-Landau, & Garber, 2004). Furthermore, many of these studies focussed on short-run analysis and did not emphasise the effects of currency movement in the longer run. While there is a general agreement in the literature that currency weakness – or depreciation and devaluation in the case of flexible and fixed exchange rate regimes, respectively – impacts export performance via the mechanism of price, there is still much debate on the direction, extent and duration of the impact of currency movements on export performance. In sum, previous research fails to provide conclusive evidence indicating causality between currency movement and export performance – and in particular improved export performance that is expected to follow from a weaker exchange rate.

It is against this backdrop that the current study examines the relationship between currency weakness in floating rate efficiency-driven economies and export performance across a relatively large sample of countries over a longer time frame than previous related studies. Specifically, the study seeks to assess whether export performance is improved by currency depreciation in efficiency-driven economies and evaluate the extent to which – if at all – export growth lags currency depreciation in efficiency-driven economies. This study contributes to existing literature on exchange rate and economic growth in many ways. First, an improved understanding of this relationship may provide policymakers and economic advisors with a greater depth of knowledge upon which to make decisions to 'restore economic equilibrium to a nation' (Owen, 2005: 99). Given recent attention paid to the issue of 'currency wars', this relationship requires further exploration. Second, contrary to most studies, this study focuses on floating exchange rate regimes across a relatively large sample of countries over a longer time frame and a more relevant population. Third, efficiency-driven economies are considered more relevant subjects when it comes to the question of exchange rate movements and export sector performance because they tend to be developing economies which explicitly aim to achieve substantial industrial growth fuelled by exports (Clark, 1996). Finally, most studies conducted in this field have tended to refer to a number of independent variables and failed to isolate the relationship between currency weakness and export performance clearly. This study differentiates itself by focussing explicitly on the relationship between currency weakness in floating rate efficiency-driven economies and export performance.

The remainder of the paper is structured as follows: the next section discusses the literature, focusing specifically on currency weakness, export performance and efficiency-driven economies. The analytical framework employed in this study is discussed in Section 3. Results are presented and discussed in

Section 4. Section 5 concludes the study.

2 LITERATURE REVIEW

2.1 Introduction

In this section, currency weakness and its impact on export performance, as well as the concept of efficiency-driven economies, is explained. Hence, three primary concepts and their relationships with each other are explored within this section: currency weakness; export performance; and efficiency-driven economies.

2.2 Currency Weakness

(i) Nominal and Real Exchange Rates The nominal exchange rate is the officially quoted exchange rate. However, this nominal rate does not account for effective purchasing power of a currency (Colander, 2010). The real exchange rate, by contrast, accounts for purchasing power, as it is adjusted for differences in price levels and rates of price inflation (Colander, 2010).

Where depreciation in the nominal exchange rate is offset by increased domestic price inflation, the real exchange rate may remain unchanged (Bird, 1983). In such instances, the potential export price competitiveness advantages of currency weakness would be offset by domestic price inflation (Bird, 1983). Burstein, Eichenbaum, and Rebelo (2004) and Owen (2005) argue that the real exchange rate provides a more accurate representation of the effective exchange rate, as it accounts for changes in purchasing power.

(ii) Exchange Rate Arrangements The International Monetary Fund (IMF) defines an exchange rate arrangement as the manner in which a country's currency operates (IMF, 2008). Exchange rate arrangements may differ according to the degree of control a country has over its currency and whether a formal or informal commitment to the exchange rate path has been made (Calvo & Reinhart, 2002). Using the IMF (2008) classification scheme, exchange rates may be broadly classified into two types of exchange rate arrangements, namely fixed exchange rates and floating exchange rates.

A floating exchange rate is determined by free market forces of demand and supply (Owen, 2005). By contrast, a fixed or pegged exchange rate is one set by the government or by central bank policy (Bautista, 1982). A fixed exchange rate may be associated with a basket of currencies or a single currency, such as the United States (US) dollar; or maintained by the central bank within a particular price range relative to another currency or currency basket (Owen, 2005).

Since the 1970s, many developing economies have been encouraged by the IMF and the World Bank to adopt policies of floating exchange rates to facilitate price corrections and promote export-led growth through efficient price discovery (Musila & Newark, 2003). Historically, however, with the legacy of the fixed-rate Bretton Woods system (Dooley *et al.,* 2004), some reluctance amongst policy

makers to relinquish control over the exchange rate has been experienced. This 'fear of floating' (Reinhart, 2000:65) may emanate from uncontrollable changes to the exchange rate due to market forces, to which a floating exchange rate exposes an economy (Millman, 1990).

Reinhart (2000:65) argues that the 'official labels' of a country's exchange rate arrangement do not always provide an adequate representation of actual country practice. Hence, a country may officially commit to an exchange rate arrangement, but this does not preclude practice from deviating from the arrangement to which a country's policy makers have committed. Regardless of whether an exchange rate path has been committed to by a country, the *de facto* exchange rate arrangement provides a more realistic representation thereof. In a similar approach to several authors cited by Edwards (2011), the *de facto* exchange rate is used for purposes of this study (IMF, 2008). Based on the *de facto* exchange rate arrangement in evidence, the mechanics by which a currency may weaken differ, namely devaluation or depreciation.

(iii) Devaluation versus Depreciation Owen (2005:1) states that 'the relative value of a currency can be reduced through either depreciation or devaluation'. Currency depreciation is usually the result of market operations to achieve a reduction in currency value, consistent with the concept of a floating exchange rate (Krugman & Obstveld, 1997). Currency devaluation is a more conscious event. It is normally the result of a policy decision, whereby a country's official exchange rate is reduced relative to all other currencies (Todaro & Smith, 2009).

A weakening exchange rate, in the absence of price inflation, decreases export prices measured in home currency relative to other currencies (Junz & Rhomberg, 1973). This decrease in export prices renders goods more affordable and thus, arguably, more competitive from a price perspective (Junz & Rhomberg, 1973). Such price competiveness is viewed by some to be a favourable effect of currency weakness (Owen, 2005). However, a reduction or weakening in an exchange rate may have other unanticipated consequences, such as price inflation caused by the rising demand for exports as well as higher import prices (Todaro & Smith, 2009). For example, if the economy is at full employment, prices are pulled upwards as consumers buy fewer imports and foreigners increase their demand for the home country's cheaper exports (Mussa & Rosen, 1978; Bautista, 1982; Todaro & Smith, 2009). Thus, Kamin and Rogers (2000) argue that price inflation is a material risk should the real exchange rate be weakened or targeted on a sustained basis. Reinhart (2000) argues that such negative effects might be compounded further in the case of emerging markets by virtue of the fact that the bulk of public and private sector debt often is denominated in foreign currency. A home currency that is worth less relative to the foreign currency in which the debt is denominated makes it far more expensive to service the debt. In addition, Boltho (1996) claims that the effects of a weakened currency on price elasticities and the real exchange rate are not perfectly predictable for policy makers. Further, wage inflation may also be imported with a weakened home currency because workers may seek wage increases to protect the real purchasing power of their incomes in the face of price inflation (Owen, 2005).

To boot, Liaquat (2011) holds that any competitive advantage conferred by currency weakness may be further eroded in the instance that economies experience currency weakness simultaneously. To this end, Liaquat (2011) examines evidence from the 1930s where many countries pursued export-led growth via price competitiveness by weakening their currencies. The results suggest that such simultaneous devaluations (or depreciations) created turmoil in foreign exchange markets and rendered the entire exercise 'self-defeating' (Liaquat, 2011:97).

Boltho (1996), however, also offers the view that, under a floating exchange rate regime, currency depreciation may result in a temporary increase in sales, thereby conferring only a temporary competitive advantage. All else equal, this increase in sales will elevate cumulative hours of experience and accelerate learning by doing (Arrow, 1963; Keesing, 1967), thereby taking efficiency-driven firms down their long-run cost curves. In this way, a currency depreciation would transform a temporary competitive advantage into a sustained advantage (Boltho, 1996; Clark, 1996). Berman and Berthou (2009:103) refine this argument in stating that whilst 'a real depreciation of the exchange rate would increase the volume of exports', the extent and duration of such an increase is indeterminate.

Junz and Rhomberg (1973) show that the effects of price competitiveness, achieved through a depreciated currency, may take as long as one year to eighteen months to present themselves. This is because of a number of lag effects, including recognition lags, whereby it takes buyers time to recognise price competitiveness; decision lags, as it takes time for new orders to be placed; delivery lags, as trade flows are recorded upon receipt of payment which may be delayed due to credit terms of trade; replacement lags, as buyers may need to use up existing inventories before ordering replacement stock; and production lags, as export manufacturers take time to increase production to meet enhanced demand (Junz & Rhomberg, 1973). Against this backdrop, this paper reports our findings in seeking to understand better the long-run effects of currency depreciation on exports to ascertain whether significant competitive advantage is inferred in the short run and sustained in the long term.

2.3 Export performance

Export performance has demand- and supply-side effects which may result from currency weakness (Owen, 2005). From a demand perspective, in many instances competition is based on price (Razmi, 2007). Currency depreciation involves a 'positive competitiveness effect' as it may 'induce an increase in world demand for domestic goods, following a decrease in domestic relative prices' (Berman & Berthou, 2009:107). However, Razmi (2007:462) states that in instances where developing countries target high-income markets, increased price competition due to a weakening currency may 'lead to high-income country protectionism' which may include pressure to re-align exchange rates.

The price elasticity of export demand will also influence the impact of currency weakness on the price competitiveness of exports (Bird, 1983). Elasticity

of demand for an export product will be greater where export product prices are quoted in domestic currency and hence the effect that currency weakness is expected to have on export demand will be greater (Bird, 1983). Where the price of export products is quoted in foreign currency, export elasticity of demand is largely irrelevant as depreciation does not effectively reduce the product price and enhance price competitiveness (Bird, 1983). However, the invoicing currency may determine 'whether exchange rate fluctuations lead to a switching of demand between goods produced in different countries' because of preferences for exchange rate risk (Goldberg & Tille, 2010). Generally, the US dollar has been extensively used as the invoicing currency for global transactions (Goldberg & Tille, 2010). Thus, the relative strength or weakness of a home currency to the US dollar specifically may further impact the effect of a depreciated home currency on export growth.

Currency depreciation may also lead to detrimental supply-side effects relating to an economy's ability to produce and supply exports (Owen, 2005). These factors include labour, infrastructure, technological capability and business funding. Moreover, at the firm level currency weakness may induce a balance-sheet effect where firm's production capability and ability to compete in the export market is reduced. As noted by Berman and Berthou (2009), because the home currency is worth less, a firm's ability to fund inputs into production may be reduced as a result.

(i) Export growth Kamin and Rogers (2000) show that a real exchange rate depreciation boosts aggregate demand across an economy via export growth and a substitution from imports to domestic goods. Bird (1983:474) argues further that currency depreciation induces relative price changes at an aggregate level and is insufficiently selective in its effects as it 'fails to discriminate between individual sectors or industries'. Prebisch (1964) proposes outward-looking strategies to support economic growth, primarily in developing economies. Such strategies seek to overcome the constraints of a home economy in the development of export-oriented industrialization. Thus, improved export performance, or growth in export market share, is supportive of economic growth (Keesing, 1967; Svedberg, 1991). Bautista (1982:354) supports this argument and claims that 'superior export performance' is empirically associated with 'superior economic performance', particularly amongst developing, industrial economies.

However, export performance is a complex variable to define and measure (Lages, 2011), as it has financial and non-financial measures and may be operationalised and conceptualised in many different ways. There are internal and external factors that may impact on export performance (Lages, 2011). Internal factors include firm characteristics and competencies, product characteristics and management characteristics (Donthu & Kim, 1993); whereas external factors comprise industry, foreign market characteristics and domestic market characteristics (Diamantopoulos & Inglis, 1988). Arguably, it is a combination of these factors that leverage off fundamental productivity, factor endowments and demand from abroad which leads to increased export performance.

Notably, an increase in export performance could be seen as an increase in export market share (Durand & Giorno, 1987); export growth (Sousa, 2004) or

an improved balance of trade (Santos-Paulino, 2002) which refers to net exports (Musila & Newark, 2003). Sousa (2004) shows that export growth is one of the most prevalent indicators of export performance in the review of 43 empirical studies on export performance published between 1998 and 2004. In this vein export growth, measured by market-clearing quantity exported, is treated in this study as indicative of increased market share and is used as the measure of export performance in this study.

2.4 Efficiency-driven economies

Using the definition of Schwab (2010), efficiency-driven economies are developing economies which experience industrial growth, fuelled by exports. Efficiency-driven economies have an upper GDP limit of $9 000 *per capita* (Schwab, 2010) and thus fall into the broad classification of developing economies (Clark, 1996). However, there are certain traits that set efficiency-driven economies apart from developing economies.

Tan and Phang (2005:3), state that efficiency-driven economies are buttressed by 'efficient infrastructure' that facilitates the efficient operation of an economy and further supports the economy's export orientation, for example, transportation and telecommunications infrastructure. Supported by an open market economy, efficiency-driven economies seek to overcome the constraint of a limited domestic market by participating in the export market (Baldauf, Cravens, & Wagner, 2000). Such an outward-looking strategy is intended to support export-oriented industrialisation and economic growth (Prebisch, 1964). Acs, Desai, and Hessels (2008) state that efficiency-driven economies are characterised by large markets which exhibit efficient production practices which allow for economies of scale. Porter (1998) argues that such economies have a strong export orientation to support such economies of scale. In addition, large firms and multinationals are the primary drivers of these exports that are derived mainly from manufacturing industries (Porter, 1998). The emergence of substantial manufacturing export industries in such developing countries, however, has been a recent development. The Prebisch-Singer hypothesis (Bloch & Sapsford, 2000), based on a historical predominance in the 1950s of primary good exports from developing countries and industrial imports from developed countries, showed a deterioration in the terms of trade for developing countries in their dealings with developed countries. Recent developments in trading patterns show dramatic increases in exports of industrial goods from developing countries (Bloch & Sapsford, 2000), such as the efficiency-driven economies, which allow for an improvement in the terms of trade and enhanced price competitiveness.

Balassa (1978) argues that an export-oriented growth is preferable for developing economies in a phase of industrialization, because such a focus leads to more efficient resource allocation, greater capacity utilisation, increased employment and technological enhancements. These improvements and advances are thus in the category of efficiency enhancers, which is defined as an important area of development for efficiency-driven economies (Schwab, 2010). Efficiency

enhancers include improvements in goods and labour market efficiency; gains in market size; financial market development; technological readiness; and higher education and training.

2.5 Empirical findings on currency weakness and export performance

An examination of the literature on the relationship between currency weakness and export performance provides mixed evidence. As early as the 1960s, Prebsich (1964) held that currency depreciation was a means to boost export performance through price competitiveness. More recently, Todaro and Smith (2009) also find that a nation can improve the competitive position of its exports by reducing the price of its home currency. However, the effects of currency weakness on export performance are not always found to be positive. For instance, Musila (2002) finds that currency weakness in the case of a small open economy worsened export performance in the short run and only marginally improved performance in the long run. Calvo and Reinhart (2002) find corroborating evidence that exports do not initially increase after the weakening of an economy's currency. Rather, they find exports initially decline for the first eight months after a home currency devaluation. This decline is caused by a variety of factors, including corporate financial stress, the drying up of trade credit and increased costs of imported inputs into export production (Calvo & Reinhart, 2002). Frankel (2005), Berman and Berthou (2009) and Lizondo and Montiel (1989) agree with the finding that exports rebound only moderately and tend only to reclaim initial levels in the long run rather than achieve higher market share.

In this vein, Berman and Berthou (2009) find the impact of currency depreciation on exports to be negative in 27 developed and developing countries over the period 1990 to 2005. This negative relationship was particularly prevalent when the magnitude of the currency devaluation or depreciation was large; and financial market imperfections, such as foreign currency denominated borrowings and credit constraints, were present (Berman & Berthou, 2009).

Bautista (1982) found in a study of 23 developing countries between 1973 and 1979 that currency depreciation, regardless of magnitude, did not lead to a permanent improvement in export competitiveness for the majority of the sample reviewed. However, small, incremental exchange rate changes were found to improve export performance more than 'large, once-and-for-all devaluations and those under a crawling peg regime' (Bautista, 1982:372). Even so, improvements resulting from the small incremental changes were found to be marginal (Bautista, 1982).

Contrary to earlier findings, a simulation analysis performed by Musila and Newark (2003) found that 'devaluation may help improve export performance and curtail the growth of imports in the long run in the case of a small, open economy. In line with this, Auer and Chaney (2009) found a positive association between depreciation of the real exchange rate and exporting firms' volumes. In this vein, Edwards (2011:1) argues that a 'relatively stable real exchange

rate, that does not become overvalued, is a key component of outward-oriented, export based development strategies'. According to Edwards (2011), this is seen in the case of China, which he argues has effectively promoted exports by deliberately maintaining an undervalued exchange rate.

Regardless of whether improvements in export performance are experienced as a result of currency weakness, certain unintended consequences may occur. Abeysinghe and Yeok (1998) argue that the greater the proportion of imported inputs into export production, the lesser the impact of currency weakness on export performance. Profit margins effectively narrow to maintain price competitiveness in such instances (Abeysinghe & Yeok, 1998). Reduced profitability may then negate the benefits of export market share growth.

Fears also exist that any increase in export performance may not cover the additional costs incurred due to the effect of currency depreciation on import costs (Musila & Newark, 2003). Further, Clark (1996) found that, in the case of sensitive export products, an importing country may consider the erection of protectionist barriers to counteract the effects of significant currency devaluation and apply pressure for a revaluation.

3 DATA AND METHOD

3.1 Research Design

To estimate the impact of currency depreciation on export growth we employ a quantitative causal method (Blumberg, Cooper, & Schindler, 2008). The explanatory variables in our model are currency and world income to indicate the purchasing capacity of the international community (Blumberg *et al.,* 2008). Annual changes in global gross domestic product (GDP) are used as a proxy for growth in world income, similar to the approach used by Owen (2005). The required variables for analysis include annual percentage growth in exports of goods and services, GDP and annual average real exchange rate (XRAT) against the US dollar from 1990 to 2009. Such data was obtained from macroeconomic databases, which include the Penn World Table (Heston, Summers, & Aten, 2011) and the World Bank (2010b, 2011).

All other economic factors that may impact export performance have been held constant in an attempt to isolate the impact and influence of currency weakness on export performance (the dependent variable) (Blumberg *et al.,* 2008). Such an approach is in line with existing frameworks utilised by several researchers testing the effects of currency weakness on export or trade balance performance. These studies have largely adopted either panel data models (Berman & Berthou, 2009; Santos-Paulino, 2002); or time series analysis (Owen, 2005). Musila and Newark (2003) examine four empirical approaches to such research. Such approaches include a 'before-and-after' approach, which examines changes in the trade balance at the time of devaluation; a control group approach, where a sample of devaluing countries are compared to a control group of non-devaluing countries; a time series approach; and a macro-

simulation model (Musila & Newark, 2003). Several authors are cited regarding all four approaches. However, predominant support is in favour of time series and simulation models.

Time series models for individual countries tend to portray a more accurate representation of the relationship, yet have difficulties in representing the lag structure between exports and currency weakness (Poon, 1994). In contrast, cross-sectional analysis assumes similar structural and behavioural relationships for all countries within the sample and offers a high level generalisation of the relationship (Poon, 1994). Panel data models comprise cross-sectional and time series dimensions and, as such, they allow for a larger number of observations to be considered whilst providing for country-specific and time-specific effects as well as a more accurate representation of lag structures (Dougherty, 2006; Santos-Paulino, 2002). Given the hypotheses formulated, a panel data model is considered to be most appropriate for purposes of this study.

There are three models that can be used for analysing panel data. The first model, referred to as pooled least squares, combines time-series and cross-sectional data, assuming a common intercept (Mohamad, 2008). The underlying model is then estimated using ordinary least squares which allows for the estimation of parameters. This model assumes a constant intercept and slope, which Mohamad (2008) argues is unreasonable for such research as intercepts and slope may vary. The second model recognises that omitted variables may lead to changes in the time-series and cross-sectional intercepts (Bond, 2002). This fixed-effects model allows for intercepts to be different for different cross-sections (Santos-Paulino, 2002). The third, random-effects model, allows for variation in cross-sections as well as the periods (Mohamad, 2008). Use of the fixed-effects model is preferred by Santos-Paulino (2002) and Mohamad (2008), and we adopt a similar approach as it allows for cross-sectional variation, whilst a fixed time period is maintained. Drawing on Owen (2005) and Mohamad (2008), we express the export function as:

$$y_{it} = \alpha_{it} + \beta_i X_{it} + \varepsilon_{it} \tag{1}$$

where $i(i= 1, \ldots n)$ is the cross-section units (countries) and $t(t= 1, \ldots \mathrm{T})$ is the periods. The dependent variable measures the export performance; the vector β is the parameter of interest; and the residual is denoted by ε. The design matrix (x) for the model is as follows:

$$x = [XRAT, GDP] \tag{2}$$

where XRAT is the country's annual average exchange rate to the US dollar, defined such that an increase in XRAT represents a depreciation of the exchange rate against the US dollar. An increasing value for XRAT means that more of the country's home currency is required to purchase one US dollar (Colander, 2010). GDP is the annual change in global gross domestic product (Owen, 2005; Mohamad, 2008). From this specification, five different models are run, first with XRAT; second with XRAT and GDP; third with GDP; fourth with XRAT, GDP and a dummy variable for each country; and last with XRAT, GDP

and all countries (composite model). Based on findings in earlier research, we also included a one-year lag effect for each of XRAT and GDP in all of the model specifications.

Given the specified model, measures for the variables in this study, namely export performance and currency, require further explanation. Considering export performance, Blades (2000) propose two methods of measuring export performance. The first measure considers the value of exports as a ratio of gross output of domestic producers. The second measure considers the real growth rates of GDP of each export partner country compared with the real growth rate of exports to these countries. In the case of the latter, export market share is said to be increasing if export growth exceeds real GDP growth (Blades, 2000). Gertner, Gertner and Guthery (2007) present an operational definition of export performance, which considers export sales volume, export profitability and changes in export sales or profitability. By contrast, Berman and Berthou (2009), in their study of 27 developed and developing countries, utilise simple export volume as a measure of export performance. Building on Berman & Berthou (2009), Sousa (2004) shows that export growth measured in real terms is one of the most prevalent indicators of export performance in a review of 43 empirical studies on export performance published between 1998 and 2004. Drawing on this finding, this study adopts the convention of annual percentage growth in exports of goods and services as a measure of export performance, similar to that used by Blades (2000). Exports of goods and services, as an annual percentage growth rate is based on constant home currency and represents the value of all goods and other market services provided to the rest of the world (World Bank, 2010b). These exported goods and services include merchandise, freight, insurance, transport, travel, royalties, license fees, communication, construction, financial, information, business, personal and government services but exclude compensation of employees and investment income and transfer payments (World Bank, 2010b).

Currency depreciation, as an independent variable, is a reduction in the relative value of the exchange rate (Owen, 2005). Exchange rates, however, have numerous measures (Bautista, 1982). Burstein et al. (2004) and Owen (2005) use the real exchange rate, which is the nominal exchange rate adjusted for changes in purchasing power. Mohamad (2008) utilises an annual average exchange rate to the US dollar. Berman and Berthou (2009) use domestic currency in terms of special drawing rights (SDR) to account for competitiveness gains. Whilst arguments can be made in favour of each measure, because of data limitations; relative data granularity; the makeup of our sample countries' export functions; the prevalence of invoicing in US dollar amongst our sample countries; and the differing policy implications of targeting a single, predominant currency – such as the US dollar – versus a weighted basket of currencies, we employ the annual average exchange rate to the US dollar (XRAT), in line with Mohamad (2008) and as supported by Goldberg and Tille (2010).

3.2 Sample Selection

This study focuses on efficiency-driven economies, which are global, industrialising economies that have experienced meaningful industrial growth that has been fuelled by exports (Clark, 1996). As export growth is the dependent variable in this study, such a measure is most relevant to economies that seek export-led growth (Schwab, 2010). Schwab (2013) defines efficiency-driven economies as 'Stage Two' economies with a GDP *per capita* (in US$) of between $3 000 and $9 000. GDP *per capita* at market rates is a widely available measure, which has been used here as a proxy for wages, as internationally comparable data on wages are not available for all countries covered (Schwab, 2010).

Another criterion used to determine the stage of development is the extent to which a country is driven by basic factors, efficiency enhancer or innovation, as shown in Panel A of Table 1. Schwab (2013, 46) notes that the stage of development has direct implications for the nature of exports. For instance, in the case of factor-driven economies, mineral goods typically make up more than 70 percent of exports, whereas in efficiency-driven economies this number falls to an average of 40 percent.

The criteria used in the selection of the sample for this study include the specific, *de facto* exchange rate arrangements broadly classified as floating exchange rate arrangements, as denoted in Panel B of Table 1 (IMF, 2008); percentage of GDP derived from manufacturing value-added in order to approximate the percentage of the economy that is manufacturing based (World Bank, 2009); and the human population number to control for scale and size effects, as explained below (United Nations, 2010). Manufacturing value-added is the net output of a sector after adding up all outputs and subtracting intermediate inputs (World Bank, 2009). This figure is calculated without making deductions for depreciation or depletion of natural resources to denote gross manufacturing value-added (World Bank, 2009).

Thresholds have been applied to each criterion for the purposes of sample selection. First, only economies with the *de facto* floating exchange rate arrangements have been selected. This is done to isolate the effect of market forces to depreciate or weaken the currency value (Owen, 2005), as opposed to a policy decision. In addition, under IMF rules, large devaluations are no longer necessary as corrective measures as small, gradual exchange rate adjustments are deemed more effective (Bautista, 1982). Second, economies with greater than ten percent manufacturing value added as a percentage of GDP have been included in the sample. This is because industrialising nations should have substantial manufacturing sectors to support export-oriented economic growth (Chow, 1987). Third, populations greater than one million people were required. Whilst this is a figure subjectively selected, we deliberately chose a meaningful population size to exclude "financial" economies, such as those in the Channel Islands or small island economies.

Based on the applied thresholds, we arrived at a list of 12 economies. From this set of 12 we deleted Albania and Romania because of poor data availability. Data for the remaining ten economies were then gathered for the twenty

years from 1990 to 2009. As an aside, given the limitations of such a sampling approach, it was not anticipated that the sample would be representative of the entire population (Blumberg et al., 2008). However, the sample represents a collective population of more than 600 million people, which we consider to be a good representation of efficiency-driven economies with floating rate exchange rate arrangements.

3.3 Specification tests

With the fixed-effects method confirmed in section 3.1, a number of additional tests were performed to ascertain the existence of certain effects within the data model. Baltagi (2005) notes that cross-sectional dependence may be problematic in macro-level panels with long time-series data. This may arise from the presence of common shocks and unobserved components within the data due to economic and financial integration of countries, which may imply strong interdependencies within the cross-sectional units in the panel (Baltagi, 2005). For this reason the Breusch-Pagan LM test and the Pesaran CD test for cross-sectional dependence in panels were run, where the results indicated that cross-sectional dependence does not exist.

Serial correlation tests were also applied, as macro-level panels with long time-series data may display correlation over time (Baltagi, 2005). The Breusch-Godfrey/ Wooldridge test was run for serial correlation in panel models, and it was found that serial correlation is absent in the data.

The Augmented Dickey-Fuller test was used to test for stationarity, and it was found that the data are stationary at the one percent significance level, hence data transformation was not required (Baltagi, 2005).

Heteroskedascity was the final test applied to ascertain the existence of differing variance within the data (Torres-Reyna, 2010). The p-value of 0.07 for the Breusch-Pagan test suggests the data are homoscedastic. For brevity, the detailed results of these tests are not provided in this study.

4 ANALYSIS OF RESULTS

4.1 Descriptive statistics

Annual observations for the percentage export growth and XRAT were obtained for all ten countries for the period 1990 to 2009. A box plot representation of export growth across each of the ten countries over the twenty year time period is displayed in Figure 1.

The greater the length of the box plot, the greater the variance in export growth data for a country (Albright et al., 2009). Such large variance in data points, as is seen in the case of Brazil, Malaysia and Turkey, can be interpreted as volatility in export growth. Narrower box plots, as is seen in the instance of Peru, Colombia and South Africa indicate less variance in export growth data and hence less volatility.

Table 2 illustrates the mean or average annual export growth values over the twenty year period. The mean values of export growth per country show that, on average, Brazil, Colombia, Malaysia, Mexico, Peru Thailand and Turkey have higher export growth rates than the Dominican Republic, Mauritius and South Africa

Relatively poor export market performance is observed for 2001 and 2009 which coincide with the bursting of the technology bubble and global economic slowdown and the depths of the global financial crisis, respectively. More specifically, data for 2009 shows a significant decline in annual export growth for all ten countries, with all countries experiencing export market contraction or negative growth.

XRAT by country for the period 1990 to 2009 is shown in Figure 2. As noted before, the longer the box plot, the more variance or volatility the exchange rate displays against the US dollar. Anomalies in the underlying data are seen for Malaysia for the period 1999 to 2004, when the Malaysian Ringgit was temporarily fixed at 3.8 to the US dollar (Talib, 2005), before reverting back to a floating exchange rate arrangement. Notably, this does not have a distorting effect on the data.

Data for Colombia reveled that its exchange rate was extremely weak against the US dollar, an effect that was worsened by inflationary pressures. This outlier creates a significant distortion in the overall data and hence is excluded in further tests. The sample size is therefore reduced to nine countries, with 180 data points which remain available for observation.

A view of the combined XRAT for all nine countries over the twenty year period (not reported in the study for brevity), displays an overall trend of depreciation or weakening against the US dollar. Thailand, Mauritius and the Dominican Republic's currencies consistently weaken against the US dollar over the twenty year period, whilst the Brazilian Real, Turkish Lira and Peruvian Sol show a more significant depreciation than the previously mentioned three currencies.

In the case of Turkey and Brazil the effect is particularly noticeable. The low base figures for 1990 for Turkey and Brazil, however, may distort these results somewhat. Turkey experienced significant intervention with regards to the Lira during the 1990s, as the currency was artificially appreciated in an effort to counteract significant inflationary pressures (Akyüz & Boratav, 2003). For these reasons the ten year period from 1990 to 1999 has been excluded from the data to prevent distortions. In the case of Brazil, the Real was only adopted in 1994. Prior to that, Brazil had the Cruzeiro from 1990 to 1993 and the Cruzeiro Real from 1993 to 1994 (Garcia & Valpassos, 1998). The conversion to the Real was part of a deliberate policy effort to redress significant inflationary pressures experienced in Brazil during this period. This five year period up until 1994, before adoption of the Real, has therefore been excluded due to the potential distorting effects on the data. The removal of these fifteen data points eliminates these distortions, leaving 165 data points used in subsequent testing.

4.2 The effect of exchange rate and GDP on export performance

As an initial test of the relationship between XRAT and export growth, an ordinary least squares (linear) regression was run. From this regression, XRAT is not deemed statistically significant with a p-value of 0.12. The adjusted R-squared is 0.01, indicating a very weak fit of the model. Scatterplots, with a linear regression line fitted, were plotted for each country, as shown in Figure 3. Visual inspection of Figure 3 reveals differing relationship trends for each individual country, with a predominance of inverse relationships between export performance and exchange rate weakness.

When GDP is introduced into the ordinary least squares regression model, the fit of the model improves substantially. GDP is considered a statistically significant explainer of export growth at the one percent level. Furthermore, XRAT is deemed statistically significant at the one percent level. The adjusted R-squared of this model is 0.31, indicating 31% of the variance in export growth can be explained by the combined influence of GDP and XRAT.

To assess the effect of country on the data, a fixed regression model with dummy variables is run. The effect of XRAT is significant at the one percent level, as shown in Table 3. Overall, the fit of the model is statistically significant also at the one percent level, with an adjusted R-squared of 0.47, indicating as much as 47 percent of the variability in export growth can be explained by XRAT and country. However, when GDP is introduced to the fixed regression model, the statistical significance of the model and explanatory power improves. Overall, the fit of the model remains statistically significant at the one percent level, as are the effects of XRAT and GDP. GDP, however, displays a stronger significance than XRAT.

Tested individually, the effect of country, GDP and XRAT on export growth is significant only for Mexico at the seven percent level and Thailand at the one percent level, as shown in Panel B of Table 3.

The adjusted R-squared is 0.65, indicating that 65% of export growth variation is explained by *XRAT*, *GDP* and country. The direction of the relationships is further explained upon examination of the coefficients for *XRAT* and *GDP*, which are -0.28 and 2.75 respectively. In the case of *GDP* and export growth, there is a positive or direct relationship. As *GDP* increases, so too does export growth. *XRAT*, however, has a negative coefficient and therefore a negative or inverse relationship with export growth. As export growth increases, so *XRAT* decreases. The effect of each of these variables on export growth in efficiency-driven economies shall be discussed separately in the proceeding sections.

(i) Exchange rate effect on export performance XRAT was found to be significant in terms of an effect on export growth for the remaining sample of nine economies. This concurs with the arguments presented by Boltho (1996) and Schwab (2010) that the strong outward, export orientation of efficiency-driven economies renders them most sensitive to currency movements. However, as XRAT has a negative coefficient, it therefore displays a negative or inverse relationship with export growth. As export growth increases, so XRAT decreases.

These findings were consistent at the sample and individual country level. Seven out of the nine efficiency-driven economies displayed the inverse relationship between XRAT and export growth as shown in Table 4.

Brazil and Peru were the two countries that displayed a contrary, direct relationship between XRAT and export growth. This may be as a result of the predominance of commodity-based exports for these countries. However, this is not observed in the case of South Africa which displays a similar weighting of commodity exports to Brazil and Peru over the survey period. Regardless, the anomalies noted with these two countries do not impact the overall findings, given that it is a sample of efficiency-driven economies under review, rather than individual countries. The resultant relationship indicates a decrease in XRAT – effectively a relative appreciation in the home countries' currency – corresponds with an improvement in export growth. This allows us to accept the alternate hypothesis that export growth is not improved by currency depreciation in efficiency-driven economies.

This overall finding aligns with the results of Lizondo and Montiel (1989), Calvo and Reinhart (2002), Musila (2002), Frankel (2005) and Berman and Berthou (2009), where a weakening currency was found to have a negative effect on export performance. Berman and Berthou (2009:104) reviewed 27 developed and developing countries using a similar method over a shorter time period and found that financial market imperfections have a negative impact on the reaction of countries' exports to currency depreciation. This negative effect was particularly prevalent in developing countries with medium to high levels of foreign currency borrowing and low or intermediate levels of financial development. Efficiency-driven economies, being a sub-set of developing economies typically would fall within this categorisation (Schwab, 2010). Financial market imperfections have not been included in this study, yet the findings are consistent in terms of the direction of the relationship between export growth and currency depreciation. However, quantifying the extent of the effects of currency depreciation on export growth is problematic. Many studies are silent on this issue and, at best, refer to the effects as marginal (Bautista, 1982), moderate (Berman & Berthou, 2009) or insignificant (Santos-Paulino, 2002) in nature.

In addition, there are a number of ancillary effects that could result from currency weakness, which may negate any improvement in export performance and thus help explain the findings in this research. Kamin and Rogers (2000) found that price inflation is a real risk should the real exchange rate be weakened on a sustained basis. Significant price inflation may therefore result in negative export growth, or negate any improvements, as the price of export goods effectively rises (Todaro & Smith, 2009). Further, if workers seek wage increases to protect the real purchasing power of their incomes in the face of price inflation then it follows that wage inflation would also be imported with a weakened home currency (Owen, 2005).

Boltho (1996) argues further that the effect of currency depreciation on price elasticities is not always perfectly predictable. A weaker currency, and therefore cheaper export prices relative to the currency of the purchaser, may not always result in increased export sales or market growth where export goods

display low price elasticity (Boltho, 1996). That said, it is unlikely that this argument applied to a country's full export basket, but rather to specific products or product sets. In either event, competing on the basis of a relative, weakening currency to achieve price competitiveness has been held out as a viable policy since the work of Prebisch (1964). This prospect encouraged Prebisch (1964) to regard price-led, export-oriented industrialisation as a driver of economic growth. Whilst this policy argument remains evident today it must be recognised that the initial argument by Prebisch (1964) was established in an economic era where fixed exchange rate arrangements were predominant (Dooley *et al.,* 2004). In the current global economic landscape, floating exchange rate arrangements are more prevalent (World Bank, 2010a). This regime switch means that the basis for much of this early work on currency weakness may not apply to the current economic context, and in particular to efficiency-driven economies with floating exchange arrangements.

All of this said, and as noted, research by Bautista (1982), Abeysinghe and Yeok (1998), Musila and Newark (2003) and Auer and Chaney (2009) maintains that currency weakness improves export performance. However, these results are generated on individual countries and on relatively small sample periods. Moreover, these findings are challenged by the results of Lizondo and Montiel (1989), Calvo and Reinhart (2002), Musila (2002), Frankel (2005) and Berman and Berthou (2009), who found that currency weakness has no impact or a negative impact on export performance. Drawn together, the mixed findings in previous research on this topic points to the need for more detailed research spanning longer survey periods and embracing more complete country sets, which is the aim of this study. As such, the findings presented in this research adds weight to those studies which find that currency weakness is not a valid means to improve export growth, and therefore economic growth, through price competitiveness. Competing on the basis of currency may further be seen as 'self-defeating' (Liaquat, 2011:97) due to the ancillary effects that are associated with it, as well as the negligible longer-term effects, although we do not delve into this aspect of the literature in this paper. Nevertheless, our findings suggest that competitive advantage to improve export performance should be sought in places other than price competition through currency weakness, such as fundamental productivity within a country (Econometrix, 2011).

(ii) GDP effect on export performance GDP was found to be a significant variable in the determinant of export growth, and was noted to be a more significant coefficient of determination when compared to XRAT. GDP and export growth display a positive or direct relationship, therefore, as GDP increases so too does export growth. GDP may be seen as proxy for income (Owen, 2005); whereas XRAT could be seen as a measure of price from an export perspective (Todaro & Smith, 2009). It therefore follows that, as GDP displays a greater significance than XRAT, export growth may be impacted to a greater extent by income than price. Anecdotal evidence of this is provided by the significant contraction in export growth experienced during the global financial crisis.

Whilst the two variables each have a significant effect on the variance of export growth, the combined effect estimated by our model is even more signif-

icant. Specifically, the adjusted R-squared value of 0.35 indicates that as much as one-third of the variance in export growth of efficiency-driven economies is explained by XRAT and GDP. Together, XRAT and GDP provide a measure of purchasing capacity (Mohamad, 2008) and the combined effect is therefore more significant than price (XRAT) or income (GDP) in isolation.

4.3 Improvements in export growth lag currency depreciation

The coefficient on XRAT displayed in Table 5 remains negative when a lag effect is applied to our model and therefore underscores the observed negative relationship between export growth and currency weakness in our simple model without lags. However, a slightly higher absolute value of the coefficient of XRAT is noted in the lagged effects model, indicating that the negative relationship is slightly more pronounced when our model allows for lagged currency weakness as an explanatory factor. That said, the explanatory power attributed to the lag effects is statistically insignificant. Based upon this finding, the null hypothesis which

proposed that a currency weakness in efficiency-driven economies leads to export growth is therefore, rejected. In passing, we note that Junz and Rhomberg (1973) found that the lag effects of price competitiveness, achieved through a weaker currency, may take as long as one year to 18 months to present themselves. However, these findings apply to a period of fixed exchange rates. Still, a case can be made to extend our models to allow for lag effects of longer than 12 months.

5 CONCLUSIONS

The purpose of the research was to assess whether efficiency-driven economies, developing could achieve export growth through the price competitiveness effect that is brought about by currency depreciation. In this regard, Prebisch (1964) developed the early arguments that currency weakness was a means to boost export performance through price competitiveness. Subsequent research has produced mixed results and has tended to be limited in terms of sample size and survey period. Hence, further research in this field is justified.

Our principal finding in this regard, which extends to a sample of nine economies over a period of twenty years, is that a weakened currency does not improve export performance. Contrary to popular thinking, our findings show that export growth is associated with currency strength in the case of efficiency-driven economies with flexible exchange rate regimes. Moreover, when we allow for lag effects of exchange rate movement, we find that the impact on export performance is slightly more pronounced – although the explanatory power of currency moved is statistically insignificant in the lagged specifications of our model. Moreover, we find that any explanatory power afforded by currency is

superseded by the explanatory power of GDP growth. This suggests that export growth may be impacted to a greater extent by income than price.

5.1 Recommendations

The research has policy implications concerning exchange rate as a tool to promote export-led growth. Current global conditions, where many economies are competing in a somewhat stressed economic environment have bought to prevalence the concept of competition based on currency weakness (Ahamed, 2011). Given our finding that a weakened currency does not improve export growth in efficiency-driven economies, we infer that such policy action would invoke a "race to the bottom" (Liaquat, 2011).

If anything, the declining purchasing power and weaker country balance sheet that follow from currency weakness would ensure that countries, firms and individuals are worse off. Further, whilst we do not evidence this, it may well be the case that the desired price competitiveness may instead manifest in price inflation and wage inflation because of imported inflation pass-through mechanism. Resources spent in attempting to weaken or manipulate the exchange rate would be wasted and attention diverted from where it is needed. Further, whilst we do not show this, our findings suggest that policies that focus on improvements in fundamental productivity, efficient use of factor endowments, generating demand from abroad and providing a stable investment environment would be considerably more effective in boosting export performance than policies that imagine prosperity gains can be "bought" through a weaker currency.

5.2 Areas for further research

These recommendations suggest future research using, as a basis, the theory covered and observations made as part of this study. Future research could focus on the effect of exchange rate movements on export growth in factor- or innovation-driven economies. Sector based analysis could also be performed within the population of efficiency-driven economies to take account of price elasticity of demand and industry-level effects. Firm-level data could also be investigated to understand the supply-side effects and variation in margins of trade associated with a relative, weakening exchange rate (Berman & Berthou, 2009). A greater consideration of lag effects could also cast different light on the findings of our study, as well as a consideration of real effective exchange rates in place of a single currency model.

The inclusion of further explanatory variables, such as financial market imperfections and other country-specific variables would lead to a more refined model, and potentially more significant results. We did not consider this in an effort to isolate the relationship between currency and export performance. A volatile exchange rate may also create an environment in which it is difficult to predict costs and prices, which may be highly disruptive to trade flows. Such an effect has not been considered here and would benefit from further study.

More importantly, the social costs of currency depreciation, such as diminished national wealth or an increased cost of living, need to be better understood and researched (Owen, 2005).

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Table 1, Panel A: Weights of the Three Main Sub-Indexes at Each Stage of Development			
Sub-index	**Factor-driven stage (%)**	**Efficiency-driven stage (%)**	**Innovation-driven stage (%)**
Basic requirements	60	40	20
Efficiency enhancers	35	50	50
Innovation & sophistication	5	10	30
Table 1, Panel B: Sample of Efficiency-Driven Economies			
Stage 2 economies	**Floating Exchange rate arrangement**	**Manufacturing, value added, as % GDP**	**Population ('000)**
Thailand	Managed Float with no pre-determined path	34%	68139
Malaysia	Managed Float with no pre-determined path	25%	27914
Dominican Republic	Managed Float with no pre-determined path	24%	10225
Mauritius	Managed Float with no pre-determined path	19%	1297
Mexico	Independently floating	17%	110645
Turkey	Independently floating	17%	75705
Brazil	Independently floating	15%	195423
South Africa	Independently floating	15%	50492
Colombia	Managed Float with no pre-determined path	14%	46300
Peru	Managed Float with no pre-determined path	14%	29496

Source: *IMF, 2008; World Bank, 2009; Schwab, 2010; United Nations, 2010*

Table 2: Average Annual Export Growth (1990 to 2009)

Country	**Average Annual Export Growth (%)**
Brazil	6.0%
Colombia	5.6%
Dominican Republic	4.1%
Malaysia	8.7%
Mauritius	3.9%
Mexico	8.1%
Peru	7.4%
South Africa	3.2%
Thailand	7.9%
Turkey	7.7%

Source*: World Bank (2010b) and authors' calculations*

Table 3: Regression Results for *XRAT, GDP* and Country (1990-2009)

Panel A			Panel B		
Coefficients	**Estimate**	**p-value**	**Coefficients**	**Estimate**	**p-value**
XRAT	-0.3	*** 0.01	*XRAT*	-0.28	*** 0.01
Brazil	6.34	*** 0.01	GDP	2.75	*** 0.01
Dominican Republic	10.56	*** 0.01	Brazil	1.29	0.44
Malaysia	9.64	*** 0.01	Dominican Republic	2.85	0.23
Mauritius	11.24	*** 0.01	Malaysia	2.27	0.13
Mexico	10.63	*** 0.01	Mauritius	3.48	0.18
Peru	8.2	*** 0.01	Mexico	3.17	** 0.06
South Africa	4.95	*** 0.01	Peru	0.85	0.57
Thailand	18.25	*** 0.01	South Africa	-2.47	0.12
Turkey	6.82	*** 0.01	Thailand	10.31	*** 0.01
Adjusted R^2 0.31			Turkey	-0.29	0.88
F-Statistic 38.37 ***			Adjusted R^2 0.65		
			F-Statistic 29.03 ***		

***Source**: (World Bank 2010b, 2011) and authors' calculations*
******, **, * denotes significance at the level of 1%, 5% and 10%, respectively***

Table 4: Estimate by Country (1990-2009)

Country	Estimate
Brazil	4.2
Dominican Republic	-0.3
Malaysia	-7.0
Mauritius	-0.3
Mexico	-0.9
Peru	1.1
South Africa	-0.9
Thailand	-0.2
Turkey	-12.9

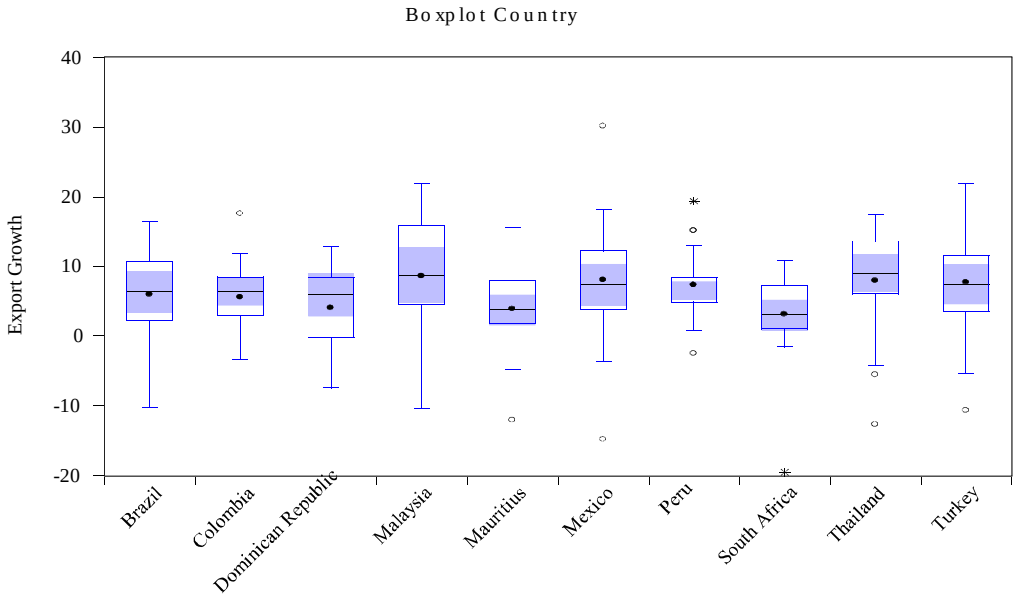
***Source:** (World Bank 2010b, 2011) and authors' calculations*

Table 5: Regression Results for Lagged *XRAT, GDP* and Country (1990-2009)

Coefficients	Estimate	p-value
XRAT	-0.39	*** 0.01
GDP	2.73	*** 0.01
Brazil	-0.45	0.79
Dominican Republic	5.06	** 0.03
Malaysia	2.21	0.14
Mauritius	5.67	** 0.03
Mexico	4.15	0.01
Peru	1.44	0.33
South Africa	-1.65	0.28
Thailand	13.55	*** 0.01
Turkey	-0.66	0.73
Adjusted R^2 0.67%		
F-Statistic 29.84 ***		

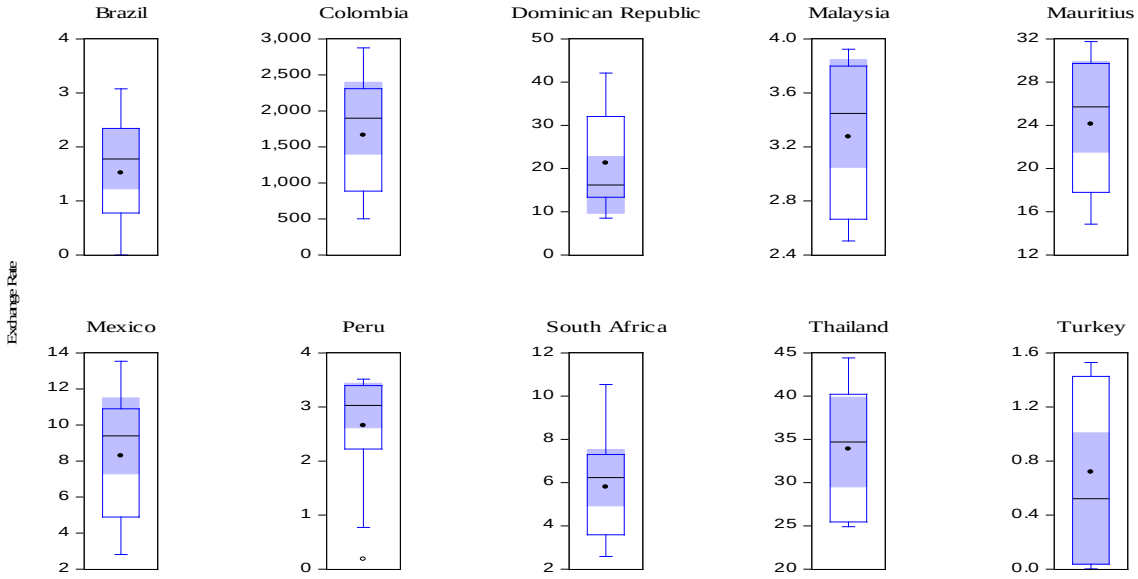
***Source:** (World Bank 2010b, 2011) and authors' calculations*
******, **, * denotes significance at the levels of 1%, 5% and 10%, respectively*.**

Figure 1: Export Growth by Country (1990-2009)



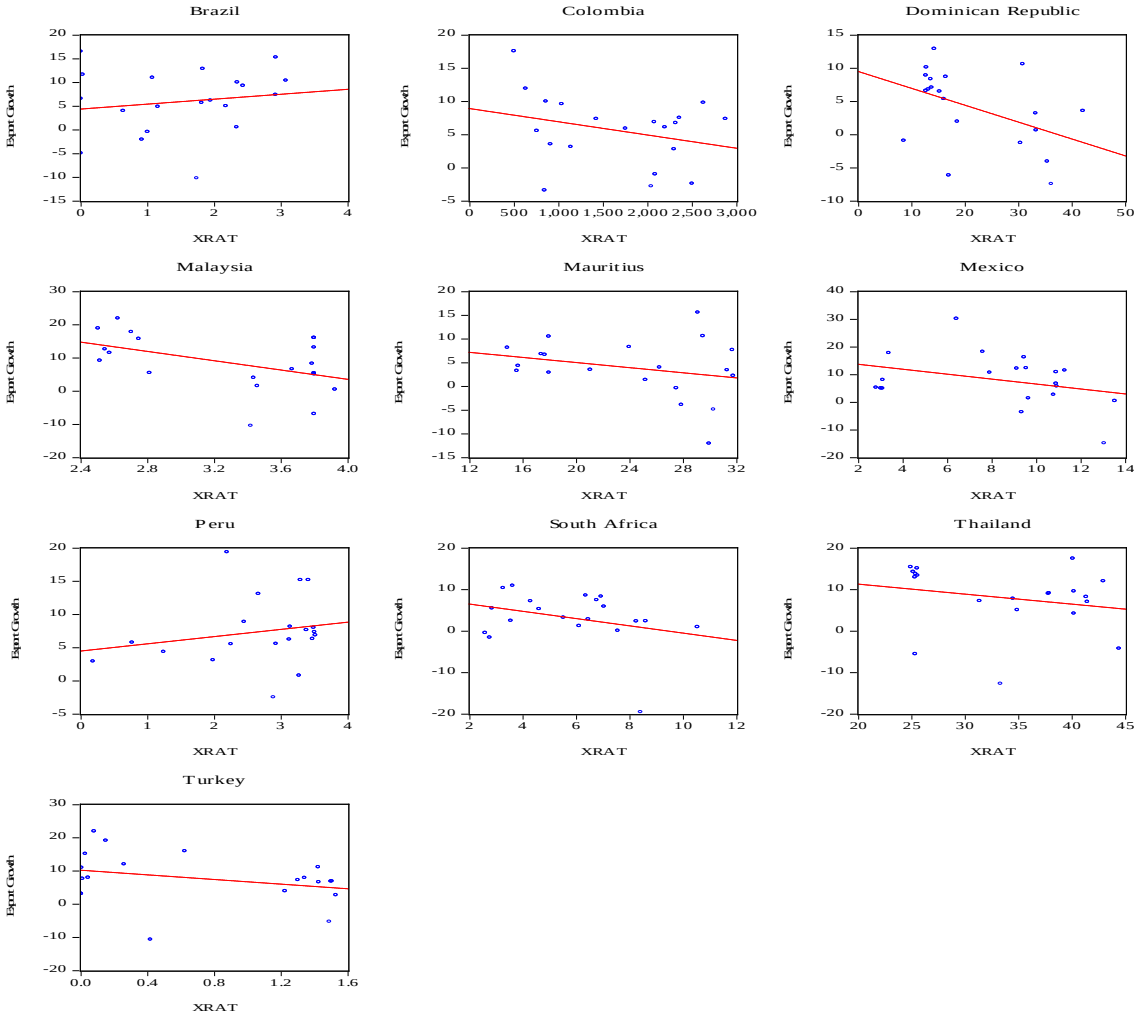
***Source**: World Bank (2010b, 2011) and authors' calculations*

Figure 2: *XRAT* by Country (1990-2009)



***Source:** World Bank (2010b, 2011) and authors' calculations*

Figure 3: Scatterplot of Country Export Growth and *XRAT* (1990-2009)



Source: *World Bank (2010b, 2011) and authors' calculations*