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Structural Reforms and External Rebalancing

by Alexander Culiuc and Annette Kyobe

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I N T E R N A T I O N A L M O N E T A R Y F U N D

IMF Working Paper

Strategy and Policy Review Department

Structural Reforms and External Rebalancing¹**Prepared by Alexander Culiuc and Annette Kyobe**

Authorized for distribution by Petya Koeva Brooks

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Abstract

Empirical research on structural reforms has focused primarily on their impact on growth and productivity. Yet an often-invoked rationale for structural reforms is their impact on external adjustment. This paper finds little evidence that structural reforms improve the current account in the short run, but they can increase the responsiveness and resilience of the economy to external shocks. In particular, elasticities of exports with respect to the real effective exchange rate increase with some structural indicators, suggesting that structural reforms facilitate the reallocation of resources to the tradable sector in response to a negative external shock. The paper concludes that structural reforms, while not having an immediate positive impact on the current account balance, can be an important complement to traditional macroeconomic adjustment.

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I. INTRODUCTION

Research on structural reforms has focused primarily on their impact on growth and productivity. Yet an often-invoked rationale for structural reforms is their impact on external adjustment. The empirical literature on this subject is limited and has focused on the impact of structural reforms on external balances in OECD countries. We fill this gap by studying the link between structural reforms and current account adjustments in a broader set of countries. This is an important issue from a policy perspective, as it informs thinking about the impact of structural reforms on external balance and stability, as well as macroeconomic projections.

We place our work in the context of three different strands of work. First, recent Fund efforts establish the importance – particularly in the absence of fiscal and monetary space – of reforms in increasing productivity and growth (IMF 2015a). Second, the latest Crisis Program Review (IMF 2015b) shows that internal devaluation through structural reforms (in programs with fixed exchange rates) proved difficult to achieve; even if devaluation did occur, it was not followed by a commensurate increase in exports. Lastly, Tressel et al. (2014) discuss the importance of structural reforms in supporting the reallocation of resources to the tradable sector, with the understanding that this would facilitate external adjustment.

There are two broad sets of arguments linking structural reforms and external balance. First, structural reforms can affect the *steady state* external balance, potentially by growing the tradable sector and ultimately improving the trade and current account balances. Second, structural reforms can affect the *adjustment* of the economy to a new steady state determined by some outside factors channeled, for example, through an exchange rate shock. We test empirically the following two hypotheses: (i) do structural reforms lead to improvements in external *balance*? and (ii) do structural reforms lead to more *resilience* to external shocks? We investigate these questions using cross-country panel regressions and a rich dataset of structural indicators spanning a variety of sources.

We find little evidence supporting the view that structural reforms improve the current account balance. This is broadly in line with the standard intertemporal open economy model, as well as related empirical work. The result remains unchanged across various reforms, as well as across countries in different income groups. However, we do find that structural reforms can affect the elasticity of exports with respect to the real exchange rate. This means that, when faced with an external shock, an economy with a better structural environment will see a faster pick up in the tradable sector. Overall, we conclude that, despite the lack of an immediate positive response on current account balances, structural reforms are an important ingredient to ensuring the resilience of the economy to external shocks. A normative assessment is beyond the scope of this paper, but it is worth emphasizing that a deterioration of the current account balance does not necessarily equate to a weaker external position. Some reforms may worsen the headline numbers of the current account, but these

could also affect the current account norm²; hence, when measured against the norm, a country's external position could be stronger.

The rest of the paper is structured as follows. Section II analyzes the direct impact of structural reforms on the current account balance and its main components. Section III analyzes the indirect impact of structural reforms on export elasticities. These two sections present the relevant literature, lay out the empirical strategies, and discuss the results. Section IV concludes and discusses policy implications.

II. DIRECT IMPACT ON EXTERNAL BALANCE

A. Theory and Prior Evidence

The effect of structural policies on current account adjustment is theoretically ambiguous. Reforms can affect saving and investments of firms and households (thus trade flows) through a variety of channels. Indirectly, structural policies can impact the current account balance through increasing productivity. Reforms can also have a direct impact. For example, *strengthening property rights* reduces uncertainty, which should raise the investment rate, reduce precautionary savings, and worsen the current account balance. By increasing competition in the capital goods sector and lowering the price of investment goods, *product market reforms* can also boost investment (OECD, 2011).

The literature has used DSGE models to capture the complex reform interactions and dynamics. In a two country DSGE, Fournier and Koske (2010) find that the impact of a positive productivity shock on savings (and thus the current account) depends on several considerations—namely, consumers' preferences for consumption smoothing; if the rise in productivity and income is believed to be permanent or temporary; and whether the productivity shock is in the tradable or non-tradable sectors. Cacciatore et al. (2016) show in a DSGE set-up with micro-founded labor and product market frictions that unanticipated and permanent product market reforms generally deteriorate the current account balance, while labor market reforms tend to strengthen it. Testable hypotheses and theoretical considerations emerge from the literature that we take to the data.

Under our first hypothesis, *productivity increases due to structural reform in the tradable sector will improve the current account balance*. This is most easily derived from a static trade model, in which a productivity increase leads to an increase in tradable output and exports. Here, the current account may strengthen in the immediate aftermath of reforms if (i) consumers have a low propensity for inter-temporal consumption smoothing, so they postpone their consumption to benefit from lower prices in the future as productivity rises and/or (ii) reform increases productivity temporarily or agents perceive it as temporary or not

² The "current account norm" is the CA balance that is consistent with economic fundamentals and desirable policies. See IMF (2017) for details.

credible. In these instances, the current account balance strengthens temporarily as households save part of the higher income for the future. The same result is derived in Fournier and Koske (2010).

In our second hypothesis, *productivity increases lead to a decline in the current account balance in the short-run but an increase over the long-run*. The standard infinite horizon open economy model predicts that, following a productivity increase, consumption and investment will increase instantaneously, as agents are adjusting to the new equilibrium (a higher sum of discounted future incomes). Output, on the other hand, increases gradually, reflecting adjustment costs. The timing difference results in a current account deficit in the initial years following reform. Glick and Rogoff derive a theoretical model of the negative link between total factor productivity and the current account balance. A similar hypothesis is derived in Fournier and Koske (2010) in a two-sector model, which links increased productivity in the tradable sector to higher consumption (and therefore worsening external balance). They identify that the standard consumption smoothing channel (consume more today in response to expected higher income tomorrow) is supplemented by frontloading consumption on the expectation of a rising relative price of non-tradable goods on the account of the Balassa-Samuelson effect.³

The overall impact of structural reforms on the current account balance therefore depends on the speed at which consumption adjusts to a higher permanent income and the speed of factor mobility. The current account balance will improve the slower consumption responds to income and the faster factors move to the tradable sector. Other factors affecting the sign and magnitude of the impact of reforms on the current account balance relate to the characteristics of the reform shock, e.g., permanent versus temporary, anticipated versus unanticipated, affecting supply in the short term versus only the longer term.

There are further complexities in the relationship between structural policies and the current account balance that depend on country-specific circumstances. Structural policies can interact with other policies, macroeconomic conditions (output gap), or features of the economy (structure of the export basket) to influence the S-I behavior of firms and households. Wealth effects on saving could be larger in countries with more developed financial markets (Boone *et al.*, 2001). And while structural reforms contribute to reducing CA imbalances in countries running surpluses, their potential to reduce imbalances in deficit countries is found to be more limited (IMF, 2012). Ultimately, the impact of structural reforms on the current account is an empirical question.

The empirical literature finds that structural reforms have a positive impact on productivity and growth (IMF 2008 and 2016, OECD 2008 and 2012, Bouis et al. 2016). Importantly, the

³ If, however, reforms boost productivity in the non-tradable sector, the direction of the short-run current account reaction is ambiguous. It depends on consumers' preferences for intra-temporal (composition of the consumption basket stable) vs. inter-temporal (overall consumption stable) consumption smoothing.

payoff from reforms varies across income group (IMF 2015b), how far a country is from the technology frontier (IMF2013), as well as institutional quality (IMF 2008).

In turn, productivity shocks have been identified—since the seminal work of Glick and Rogoff (1995)—as one of the driving forces behind current account movements. In their framework, country-specific productivity shocks negatively affect the current account balance, while global productivity shocks do not have any significant impact. Overall, the inter-temporal model is shown to perform well if confronted with the data. Since then, several empirical papers have confirmed the validity of the Glick and Rogoff results and studied the incidence of productivity shocks on the current account in an open economy.⁴ More recently, Bussière, Fratzscher and Müller (2005) investigate the role of productivity shocks compared to budget deficits in determining current account balances in 21 OECD countries from 1960 to 2003. They find no evidence of a contemporaneous effect of budget deficits, while productivity shocks appear to play an important role.

Empirical work on the direct impact of reform on the current account is limited, and few studies find a robust link. Using pooled time series (controlling for cyclical factors), Kennedy and Sløk (2005) find that while product and financial market reforms exhibit a significant negative relationship with the current account, their contribution to explaining current account positions is limited.

Jaumotte and Sodsriwiboon (2010) focus on the impact of labor market indicators (minimum wages, unemployment benefits and employment protection legislation). They find that higher minimum wages lower the current account balance, presumably by raising wage costs and reducing competitiveness. Other indicators are insignificant.

Cheung et al. (2010) and IMF (2012)⁵ find that institutional quality negatively impacts current account balances. This negative relationship can be interpreted in several ways. For some it may reflect capital flowing from emerging economies towards countries perceived to possess more efficient institutions. Or it may be that improved institutions lower the need for precautionary savings, reducing current account balances. Kerdrain, Koske and Wanner (2010) disentangle the transmission channels and investigate separate impacts on savings and investment. They find that (i) product market liberalization boosts investment and weakens the current account balance; (ii) financial market deregulation lowers savings; (iii) stricter employment protection is associated with lower saving rates if unemployment benefits are low.

⁴ Hoffman (2001), Nason and Rogers (1999), Gregory and Head (1999).

⁵ Regulatory quality captures a wide set of structural indicators including: price controls, competitive environment, trade barriers, labor and product market liberalization, regulatory burdens, ownership restrictions, investment climate, legal regulation, and tax effectiveness.

B. Empirical Approach

We estimate the impact of structural reform on the current account using a sample of 108 countries from 1970 to 2011; data sources are detailed in Annex 1. The focus is mainly on structural policies that affect domestic settings but also include policies that directly affect capital flows (e.g., removal of restrictions on trade and foreign direct investment). As discussed in the previous section, interpreting the estimated coefficient of the structural indicator on the current account is challenging. We proceed by disentangling the impact and looking separately at import and export equations.⁶

We use Jordà (2005) local projection (LP) technique to estimate current account, import, and export impacts of structural reforms dynamically for up to 5 years after the reform occurred. This specification allows us to capture year-by-year impacts in the event reforms have a J-curve effect on the current account balance. For example, the initial deterioration due to higher imports of capital goods in response to the productivity can be followed by an improvement as exports gradually increase on the back of higher productivity and investment. Aside from tracking such dynamics over time, LP is flexible in accommodating nonlinear impacts. Here, we investigate if reform effects differ depending on the structure of the export basket, i.e., if a country is a commodity exporter. The LP technique also allows to control for endogeneity of the the reform variable by including crises and controlling for several time-varying and time-invariant factors including country-fixed effects. However, including crises may not be enough. Countries could share other characteristics beyond the occurrence of crises that also determine current account changes. For example, countries with more efficient governments may be less likely to adopt reforms and yet achieve external adjustment if needed.

Reform shocks are identified using structural variables (described in Annex 1). An improvement in the variable is assumed to signal a “reform” which depending on the magnitude of the change can be small or large. The reform *shock* is derived as the year-on-year change in reform indicator (if it is positive) and takes the value 0 if no reform was identified. We estimate the impact of the reform *shock* on the current account, imports, and exports in the next five years using impulse response functions. The following cross-country time series equation is estimated for each of the five years $h = 1 \dots 5$ after the reform shock has occurred:

$$y_{i,t+h} = \beta_h R_{i,t} + \mu_h(L)y_{i,t+h-1} + X'_{i,t-1}\varphi_h + u_i + \lambda_t + \epsilon_{i,t+h}$$

where $y_{i,t+h} = Y_{i,t+h} - Y_{i,t-1}$, and Y_{it} is the current account in country i observed at year t . We estimate the model at each horizon $h = 0, 1, \dots, 5$. The approach estimates a set of five

⁶ An alternative would be to look at savings and investment separately. As our sample of interest includes low income countries we use an approach that has the least data limitations. Also, focusing on exports provides a link to the second section where we analyze the role reforms can help play in helping an economy adjust to shocks through increasing export elasticities.

independent equations. $R_{i,t-1}$ is a shock across each reform indicator or institutional variable. The estimated β_h coefficients give the impact at horizon h and capture short and medium-term impacts of reforms on three dependent variables: the current account, exports and imports in percent of GDP. Current account balances are the outcome of general equilibrium processes and depend not only on domestic economic conditions but also on conditions abroad. For simplicity, our analysis assumes no reforms take place in the rest of the world or at least that any such reforms have smaller effects than those at home. We only include trade flows and exclude the income account.

The equation includes lags of the dependent variable to control for persistence and a set of controls for the cycle X_{it} , growth in domestic and foreign demand and terms of trade.⁷ Control variables are lagged one year to minimize endogeneity concerns. Five lags of crisis dummies, taking the value one if the country experienced a banking or currency crisis, or a recession are included. Economic crises can affect the dependent variables (e.g., current account adjustment through import compression) while being correlated with the probability of observing a reform shock. Hence, not controlling for them could introduce an omitted variable bias (Duval 2008). The model includes country fixed effects to account for unobserved time-invariant factors (i.e., cross-country heterogeneity such as differences in institutions) as well as time fixed effects, to account for unobserved global shocks and country-specific time trends. Country fixed effects may dampen the estimated link between slow-changing structural indicators and the current account balance.

Standard errors are clustered by country. The specification is estimated over the total sample rather than by income group. Our prior, confirmed in robustness tests, is that the impact of reform does not vary directionally across countries by income group. Furthermore, we do not always have sufficient reform shocks in each group to look for differential impacts in a dynamic specification. In this exercise, we leave the REER out of from the estimated equation, as the REER is not an exogenous driver of the current account. Some reforms could affect the current account through the REER, or might affect the REER at the same time as the current account, with the risk that the coefficient on structural variables becomes insignificant. In an economy starting at full employment, a reform shock that shifts consumption on a sustained basis will first directly affect the CA and output—but such a shock will also induce macroeconomic adjustment involving changes in relative prices, including the REER.

This analysis has shortcomings that cannot be overcome. First, it captures an average effect across heterogeneous reform experiences, which reduces chances of obtaining significant and

⁷ We include a complete set of controls from the IMF's External Balance Assessment analytical toolkit as robustness. These are averages of log GDP per capita, previous period growth, fiscal balance to GDP, net foreign assets to GDP, old (young) age dependency ratios and trade openness. Explanatory variables are converted into deviations from a GDP-weighted cross-country average to emphasize that current accounts are influenced also by foreign economic conditions.

robust results. Second, structural policies are likely to influence saving and investment decisions through changes in the macroeconomic control variables, reducing the chances of finding significant coefficients on the policy variables themselves. Third, IMF's surveillance on select countries has found that changes in structural indicators do not always neatly map to known reform episodes, and vice-versa. Finally, countries usually do not embark on a single reform—instead, reforms are usually implemented as part of a package. Given that we look at one reform at a time, reform impacts could be underestimated. However, the last two points are not specific to our findings.

C. Baseline Results

Evidence of a positive impact of structural reforms on current account balances is limited. Rather, results support the hypothesis that in the short-run, most reforms—financial, trade openness, institutions, product market, labor and higher R&D spending—have no impact. (The results are summarized in Table 1, and detailed results are presented in Table A1–Table A3). If anything, some reforms—banking sector, business regulations and improvements in legal system—are associated with a deterioration of the current account balance in the short-term as imports and possibly investment respond to higher levels of productivity. In the medium-term, exports do respond to large reform episodes. Though capturing a positive impact on the current account balance remains elusive for most reforms—except for reform of securities market, product market reform in the telecom sector, and higher research and development spending. Controls for the relative cyclical position are significant. In the current account equation, higher GDP growth relative to trading partners comes in significant. In the exports equation, partner growth increases exports while domestic demand growth significantly predicts import growth.

Labor markets: The sign on lower *collective bargaining power* suggests a positive link with the current account balance, though the estimated coefficient is not significant.

Product markets: Indicators of product market regulation are significant in the current account and export specifications. In the short-run, a better regulated *business environment* weakens the current account and increases imports. Deregulating product markets leads to increasing entry into domestic markets including foreign competitors. This should weaken the current account, in part through increased capital inflows before equilibrating mechanisms gradually set in. Indeed, in the medium-term less *regulation of networks* improves the current account balance; in particular, deregulating *telecom* and *electricity* markets increases the current account balance two to three years after the reforms are implemented. This result is mirrored in an increase in non-commodity exports, which gets increasingly larger over the medium-term projection horizon (years 2, 3, 4).

Table 1. Direct Impact on the Current Account: Summary of Main Results

	Year 1	Year 2	Year 3	Year 4	Year 5
Financial sector					
Banking	–**	–	–	–	+
Interest rate controls	–	–	–*	–*	–
Directed credit/reserve requirements	–	–	–	–	+
Privatization	–	+	+	+	+
Banking Supervision	–	+	–	+	+
Security Markets	+	+**	+**	+***	+**
Openness					
Mean tariff rate	–	–*	–***	–**	–**
Regulatory trade barriers	–	–	+	–	–
Restrictions on current account transactions	+	+	+	–	–
Capital flows restrictions	–*	+	+	–	–
Institutions					
Legal System & Property Rights	–*	–**	–	–	–
Protection of property rights	–	–	+	–	–
Product market regulation					
Business regulations	–*	–	–	–	–
Product: telecom and electricity	–	+**	+	+*	+
Product: telecom	+	+**	+**	+	–*
Product: electricity	–	+	+	+	+*
Infrastructure					
Electricity production capacity	+	+	+	+	–
Telephone lines	–	–	–	–	–
Roads density	–	–	+	+	–
Labor					
Hiring and firing regulations	–	–	–	–	–
Centralized collective bargaining	–	+	+	+	+
R&D					
Basic R&D spending	+	+	+	+*	+**

Note: Table shows the sign on the lagged structural indicator. *, **, *** indicate that coefficients are significant at 10, 5 and 1 percent levels respectively. All regressions include country and time fixed effects and cluster standard errors on country.

Infrastructure: Improvements in infrastructure have no significant impact on the current account. Increasing *electricity production capacity*, however, does increase non-commodity exports starting in the second year, with gains plateauing by the fourth year.

Institutions: Improvements in the institutional environment, specifically in the *legal system* and *property rights*, are associated with a weaker current account balance in the short-term. This may be due to a safer institutional environment both raising investment (including investment related imports) and lowering incentives for precautionary savings. This result is in line with EBA findings, where an improvement in the institutional environment is associated with a weakening of the current account (IMF 2012, Annex 4).

Financial sector: Deregulating domestic financial and capital markets can stimulate the entry of foreign capital with associated upward pressures on the exchange rate, downward pressures on the interest rate, and a weakening current account. In our data, *banking sector reform* is associated with a deterioration in the current account balance one year after implementation. In particular, reducing *interest rate controls* (which should lead to upward pressure on the exchange rate) deteriorates the current account over the medium term. This impact is reflected in an increase in imports (and a decrease in exports) throughout most of the projection horizon. If imports are investment goods, higher capital accumulation could lead to better productivity and competitiveness, which would strengthen the current account in the medium to long-term. This effect, however, is not observed over the medium-term. *Securities market* development improves the current account after two years, with effects increasing in outer years. This result is somewhat counterintuitive, as a more developed securities market could be expected to attract capital inflows and therefore deteriorate the current account balance.

Openness: Trade reform and capital account liberalization do not improve the current account balance. The link between capital account liberalization and the current account is not straightforward as effects work through both trade and financial flows. In theory, lowering capital flow restrictions should lead to stronger net inflows and an appreciating exchange rate that would weaken, all else equal, the current account. Lowering *capital account restrictions on non-residents* deteriorates the current account in the short and increasingly in the medium-term, with the impact through the financial account. As expected, lifting *restrictions on FDI* increases imports. Lowering trade barriers, specifically decreasing *import tariffs* deteriorates the current account. The mechanism works through an increase in imports which negatively impacts the current account in the short and medium-term.

The next section investigates several extensions relating to large reform episodes, phase of economic cycle, and export basket composition.

D. Extensions

Large Reform Episodes

In the first extension, we estimate the impact of only large reform episodes on external adjustment. Large reform episodes are better identified, given the difficulties involved in measuring incremental reforms based on small changes in available policy indicators. In addition, focusing on large episodes allows us to treat them as a shock and estimate impulse response functions using a dynamic specification. We identify a large reform episode as changes in reforms that are larger than two standard deviations. The episode takes the value 1, if the calculated as the year-on-year change in the reform index is larger than two standard deviations and zero otherwise.

We find that even large reform episodes are not associated with changes in the current account balance. However, we do find that that large reforms – in particular product market regulation (in energy, transport and communication and the policy environment for investment), capital controls, and labor markets are associated with a positive impact on exports.

Table 2. Effect of Reform on the Current Account, Large Reform Episodes

	Current account to GDP					Non-commodity exports to GDP					Imports to GDP				
	(Y1)	(Y2)	(Y3)	(Y4)	(Y5)	(Y1)	(Y2)	(Y3)	(Y4)	(Y5)	(Y1)	(Y2)	(Y3)	(Y4)	(Y5)
Trade reform															
Number of tariffs	-3.902***	-4.074*	-4.528*	-2.697	-1.014	0.512	1.735	1.248	2.43	1.135	4.021**	4.711**	3.27	3.931	3.915
	(1.375)	(2.149)	(2.367)	(2.311)	(2.159)	(1.087)	(1.163)	(1.422)	(1.813)	(1.642)	(1.946)	(2.354)	(3.670)	(2.643)	(2.570)
Capital account restrictions (Quinn-Ito)	-3.52**	-4.376	-1.275	-2.523	0.731	0.883	2.987*	4.935*	6.234**	6.629***	-0.9	1.279	6.358	4.851	5.23
	(1.117)	(2.936)	(2.594)	(2.608)	(2.682)	(1.607)	(1.579)	(2.314)	(2.302)	(2.147)	(2.901)	(2.806)	(6.823)	(3.294)	(3.198)
Product market															
Regulation in energy, transport & com.	-0.198	-0.017	-0.569	-0.343	0.221	0.616*	1.079*	0.712	0.487	0.648	1.235***	2.032***	1.976**	1.381	0.984
	(0.441)	(0.582)	(0.637)	(0.718)	(0.727)	(0.370)	(0.553)	(0.681)	(0.773)	(0.836)	(0.476)	(0.680)	(0.780)	(0.860)	(0.907)
Policy environment for foreign investment	1.867	0.303	-1.393	-0.274	0.095	1.430**	1.436*	2.112**	1.151	1.591	0.016	1.902	3.991**	3.159*	2.461
	(1.138)	(1.552)	(1.450)	(1.493)	(1.464)	(0.623)	(0.818)	(0.965)	(1.054)	(1.131)	(1.301)	(1.544)	(1.770)	(1.861)	(1.913)
Labor market reform															
Collective bargaining	0.258	0.163	-0.044	-0.519	-0.129	1.638	1.866	2.336	1.790	1.172	0.789	1.082	0.683	1.126	0.647
	(0.624)	(0.764)	(0.833)	(0.817)	(0.804)	(0.508)	(0.723)	(0.867)	(0.997)	(1.123)	(0.707)	(0.931)	(1.052)	(1.120)	(1.140)

Note: The table shows regressions of the change in the current account, non-commodity exports and imports in percent of GDP on dummies for large reform episodes for year 1(Y1) through 5 (Y5). Standard errors in parentheses are robust and clustered by country. *, **, *** indicate that coefficients are significant at 10, 5 and 1 percent levels respectively.

Reform Interactions

In the second and third extensions, we test the interaction between reforms and the current account, conditional on (i) business cycle phase at the time of reforms and (ii) commodity exporter status of the country. The effects of reforms may be affected by the state of the cycle. Conditional on all remaining equal across countries, the path of the current account in the aftermath of reform implementation could be different in good times or in times of crisis. Similarly, the response of the current account—and especially exports—to reforms could depend on the structure of the export basket. An export basket dominated by commodities, and particularly fuel, may not be sensitive to reforms. As an example, oil export output may not depend on local infrastructure if it has its own network of roads and port infrastructure.

We augment the baseline LP model to include these two different interactions. The state of the business cycle is captured by a dummy variable taking the value 1 whenever the output gap is lower than -0.5 percent of potential output, and 0 otherwise. Data for advanced and emerging markets are from the IMF's WEO database. The output gap for LICs is calculated as the deviation of actual output from trend GDP, computed using a standard Hodrick-Prescott filter. In our second test, we interact the share of commodities in total exports with our reform shock. The specification is as follows:

$$y_{i,t+h} = (\beta_{1h} + \beta_{2h}I_{i,t})R_{i,t} + \theta_h I_{i,t} + \mu_h(L)e_{i,t+h-1} + X'_{i,t-1}\varphi_h + u_i + \lambda_t + \epsilon_{i,t+h}$$

$I_{i,t}$ is a dummy variable capturing periods of economic slack and defined as follows:

$$I_{i,t} = \mathbf{1}[\text{Output gap} < -0.5]$$

The coefficients of interest are β_{1h} and $(\beta_{1h} + \beta_{2h})$. They measure the association of reforms with cumulative changes in the current account, imports and exports to GDP at each horizon in good and bad times, respectively. The interaction with commodity dependence is specified in the same way, except we use a continuous variable (share in total exports) to avoid using arbitrary thresholds to label countries as commodity exporters. The model is again estimated using the LP method with corrected standard errors.

Table 3. Effect of Reform on the Current Account, Accounting for Economic Cycle
Dependent variable: Deviation in current account relative to pre-reform year

	Year 1	Year 2	Year 3	Year 4	Year 5
Banking, no slack	-3.657 (0.568)	-14.653* (1.856)	-18.358** (2.453)	-14.698** (2.556)	-16.362*** (3.278)
Banking sector, slack	1.188 (0.151)	10.731 (1.148)	19.505** (2.173)	13.906* (1.722)	18.921*** (2.815)
Observations	364	364	364	364	364
Countries	65	65	65	65	65
R ²	0.169	0.208	0.318	0.311	0.274
Business entry, slack	2.197 (0.954)	6.353** (2.106)	3.509** (2.185)	-4.847** (2.468)	6.446*** (3.043)
Observations	98	98	98	98	98
Countries	48	48	48	48	48
R ²	0.917	0.944	0.967	0.918	0.918
Telecom regulation, no slack	14.988 (1.259)	39.619*** (3.154)	43.202*** (4.381)	33.971*** (4.472)	37.254** (2.659)
Telecom regulation, slack	-13.422 (1.128)	-37.317*** (2.976)	-37.319*** (4.043)	-25.238*** (3.416)	-31.887** (2.564)
Observations	100	100	100	100	100
Countries	56	56	56	56	56
R ²	0.888	0.929	0.957	0.967	0.918

Note: Standard errors in parentheses are robust and clustered by country. *, **, *** indicate that coefficients are significant at 10, 5 and 1 percent levels respectively. All regressions include country and time fixed effects.

Evidence on interaction effects is mixed. Table 3 shows that the impact of reforms in financial and product markets is affected by the cyclical position of the economy. More specifically, the effect of structural reforms (banking sector reform and lower entry barriers) launched during bad times is positive and statistically significant. In contrast, lower regulation of networks (telecom, in particular) deteriorates the current account in periods of slack, with the result possibly driven by lower exports which are also seen to worsen. Results on the interaction with the share of commodity exports are similarly weak, with only interactions on banking sector reform and network reforms significant (Table 4). Here, the

higher the share of commodity exports is associated with larger deteriorations in the current account from reforms.⁸

Table 4. Effect of Reform on the Current Account, Accounting for High Commodity Shares in Exports
Dependent variable: Deviation in current account relative to pre-reform year

	Year 1	Year 2	Year 3	Year 4	Year 5
Banking	2.277 (0.667)	5.847 (1.288)	4.202 (0.868)	-8.749* (1.672)	1.882 (0.450)
Banking (high commodity share)	-18.512 (1.442)	-46.907*** (2.814)	-42.494** (2.457)	2.474 (0.168)	-28.845*** (2.828)
Observations	426	426	426	426	426
Countries	81	81	81	81	81
R ²	0.219	0.287	0.358	0.330	0.340
Legal system and property rights	-3.809* (1.684)	-4.801* (1.837)	-4.596* (1.732)	-4.255 (1.584)	-4.896* (1.665)
Legal system and property rights (high comr)	11.880 (1.316)	12.655 (1.231)	10.366 (0.985)	9.181 (0.895)	12.790 (1.202)
Observations	1,295	1,295	1,295	1,294	1,293
Countries	106	106	106	106	106
R ²	0.563	0.550	0.517	0.489	0.506
Business regulation	-1.084 (1.303)	-1.952* (1.680)	-1.780 (1.378)	-2.431* (1.803)	-2.876** (2.057)
Business regulation (high commodity share)	3.643 (0.683)	6.022 (0.825)	5.466 (0.609)	8.362 (0.953)	11.686 (1.251)
Observations	468	468	467	466	466
Countries	92	92	92	91	91
R ²	0.187	0.288	0.247	0.215	0.225

Note: Standard errors in parentheses are robust and clustered by country. *, **, *** indicate that coefficients are significant at 10, 5 and 1 percent levels respectively. All regressions include country and time fixed effects.

III. INDIRECT IMPACT ON EXTERNAL RESILIENCE

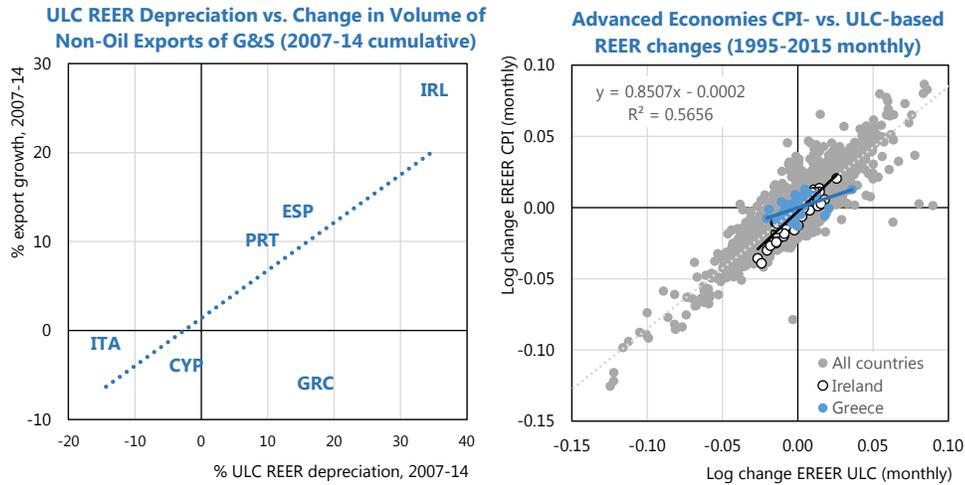
A. Motivation

Expenditure-switching policies – achieved through a correction in the real exchange rate – are a key ingredient of macroeconomic adjustment programs. A real devaluation, whether achieved through a nominal depreciation or internal deflation, raises the relative price of tradables vis-à-vis non-tradables, thus improving external balance by reducing consumption of tradables and simultaneously shifting resources to the tradable sector. It is well

⁸ Interaction impacts on exports are somewhat more promising (results available upon request). Countries that have a higher share of commodity exports see a lower export increase with product market reform (electricity regulation, reduction in entry barriers) and labor market reform than those with a more diversified export base. The interaction coefficients of reform and the business cycle and also share of commodities in total exports on imports are insignificant, suggesting import demand is somewhat inelastic.

documented that most of the adjustment comes from consumption and imports compression.⁹ However, the promise of a stronger tradable sector down the road is often seen as the silver lining of such adjustment programs. The same logic applies when the devaluation is triggered by an exogenous event, such as a term-of-trade shock in the case of a commodity exporter or a capital outflow caused by contagion in the case of an emerging market with an open capital account. A quick response of the tradable sector to a change in the real exchange rate can mitigate the shock, thus contributing to economic stability.

Figure 1. Export and REER Developments in Euro Area Periphery Countries



Countries vary in their success to boost exports on the back of a real devaluation. The varied experience of Euro Area deficit countries during and following the global financial crisis is a notable recent example. The left chart in Figure 1 shows that Greece saw a much smaller export dividend to its devaluation – as measured by unit labor cost (ULC) – than other countries in this group. Some explanations put forward for this disconnect include differences in trading partners (e.g., Ireland’s stronger ties with the healthier, at the time, US and UK economies) and differences in the export basket (e.g., Greece’s services are dominated by shipping, which collapsed during the GFC). However, the right chart in the figure supports an alternative explanation: cheap labor did not result in improved competitiveness.¹⁰ Using monthly data, we see that a given reduction in unit labor translated into a smaller CPI REER reduction than expected for an advanced economy. In Greece, a 1 percent ULC real depreciation is associated with a 0.35 depreciation in the CPI REER, compared to 0.85 for the average Advanced Economy.¹¹ IMF (2015a) concludes that “the benefits of lower labor costs for competitiveness [were] blunted by limited adjustment in producer prices and supply response because of barriers to new entry”.

⁹ IMF (2015a), Tressel et al. (2014).

¹⁰ See Tressel et al. (2014) for details.

¹¹ Chart also highlights in black the individual observations for Ireland, which exhibits a slope of 0.99.

The example above highlights the importance of product markets – ease of entry in particular – for a real devaluation to successfully spur exports. However, the argument can be broadened: facing a change in the real effective exchange rate, an economy with fewer frictions should be able to reallocate resources faster towards tradable activities and – within tradable activities – towards higher-productivity industries and firms. *Labor and product market reforms* remove impediments to the allocation of resources to the new equilibrium. A *sound financial sector* facilitates this reallocation by channeling the resources needed to finance the adjustment. *Strong legal systems* can mitigate risks associated with the transition, which would otherwise lead to underinvestment. *Trade openness* ensures inputs needed by new industries are readily available, and human capital and infrastructure *endowments* can reduce bottlenecks. Overall, a country with better structural indicators should exhibit a higher export response to movements in the exchange rate. The question is which reforms are more likely to affect the export response to exchange rate movements and how the response differs by country groups.

In what follows, we analyze the impact of structural indicators on the exports' response to REER movements using cross-country panel regressions. This allows for a robust estimation of the slope of the regression line in the left chart of Figure 1, which represents the percentage change in exports in response to a one percent change in the REER (e.g., around 0.5 in the figure). This slope – the elasticity of exports with respect to the REER – denotes the sensitivity of exports to movements in the exchange rate. Multivariate regression analysis allows controlling for some other factors that can influence this relationship, such as the pattern of trading partners. The hypothesis is that the slope (elasticity) should increase as structural indicators improve, i.e., countries with better structural indicators should exhibit a higher export response to a given REER depreciation. Since different structural indicators are likely to be binding across economic structures, we also expect different types of indicators to matter across income groups.

B. Econometric Specification

We follow the general setup used by Eichengreen and Gupta (2013) for estimating the elasticity of exports with respect to the real effective exchange rate:

$$\Delta \log X_{it} = \beta_1 \Delta \log REER_{it} + \beta'_A Z_{it} + \omega_i + \eta_t + \varepsilon_{it} \quad (1)$$

where X is real exports, Z_{it} is a $1 \times k$ vector of other factors affecting exports (Eichengreen and Gupta limit their controls to lagged GDP per capita), ω is a country dummy and η is a time dummy. β_1 represents the estimated export elasticity with respect to the REER. For presentation purposes, we flip the sign of the first difference of the REER. Thus, a depreciation enters the regression with a positive sign, and the expected sign on β_1 is thus positive. We also introduce several changes to obtain the following specification:

$$\Delta \log X_{it} = \beta_1 \Delta \log REER_{it-1} + \beta_2 \Delta \log REER_{it-1} \times S_{it-1} + \beta_3 S_{it-1} + \beta'_A Z_{it} + \omega_i + \eta_t + \varepsilon_{it} \quad (2)$$

First and foremost, we introduce the lagged level of a structural indicator (S_{it-1}) and its interaction with REER depreciation in order to estimate the differentiated elasticity at different values of the structural indicator, with the overall elasticity computed as $\beta_1 + \beta_2 S_{it-1}$.

Second, we use fairly narrow measures of exports as dependent variable. We focus on manufactured goods and services exports. The use of manufactured exports, as opposed to all goods exports, is determined by the desire to abstract from commodities, for which domestic price competitiveness play a relatively minor role (as the share of domestically-priced inputs is relatively low). As for services exports, Eichengreen and Gupta have already shown that they are more susceptible to exchange rate movements, and therefore more likely to exhibit measurably different responses as a function of structural indicators. The use of narrow measures of exports diminish concerns about reverse causality as manufacturing exports and services exports separately represent small shares of total current account flows (around 18 and 12 percent respectively for non-LICs). Therefore, their potential to have a significant impact on the REER is correspondingly smaller. This is an important factor behind using the REER on the right-hand side in this section, unlike in the previous one (which operated with much broader current account components).

Third, we lag the REER variable by one period, to further minimize reverse causality concerns. In any event, the reverse causality link would only tend to attenuate the results. An exogenous positive shock to exports should appreciate the exchange rate, thus dampening the measured correlation between depreciation and export growth.

Fourth, we use nominal measures of exports, as opposed to deflating all export prices by the US CPI. Although standard practice in the trade literature, this step is superfluous in a setup with time effects, as dollar inflation is captured by period dummies.

Fifth, we expand the set of controls. We introduce a country-specific deflator of goods export prices (when dependent variable is manufactured services) to proxy for changing price conditions on world markets, and we use the export-weighted real GDP growth in trading partners to control for external demand effects.

Finally, the use of lagged REER motivates the use of averaged data over shorter periods – three years instead of five used by Eichengreen and Gupta and other studies.

C. Results

Benchmark results

Our benchmark regressions estimate export elasticities with respect to the REER without accounting for structural indicators. For brevity, Table 5 presents only regressions with manufacturing exports as the dependent variable.

Table 5. Benchmark Regressions for Manufacturing Exports

	All countries			Non-LICs			Advanced Economies			Emerging Markets			LICs		
	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	(10)	(11)	(12)	(13)	(14)	(15)
Lagged log change REER	0.141** (0.0593)	0.153** (0.0683)	0.135 (0.0818)	0.11 (0.0881)	0.193** (0.0734)	0.214*** (0.0752)	0.359*** (0.0645)	0.343*** (0.0714)	0.348*** (0.0735)	0.0697 (0.0999)	0.167* (0.0937)	0.180* (0.0984)	0.160* (0.0776)	0.187** (0.0823)	0.156 (0.0952)
Log change partner GDP		15.21** (6.841)	14.39** (7.028)		9.620** (3.873)	9.257** (3.899)		4.024 (4.168)	3.983 (4.135)		11.90** (5.553)	11.54** (5.483)		10.33 (21.25)	10.08 (21.6)
Log change export deflator		-0.173 (0.147)	-0.187 (0.153)		0.0198 (0.0903)	0.0242 (0.0906)		0.179** (0.0652)	0.175** (0.0662)		-0.0125 (0.115)	0.00246 (0.118)		-0.679 (0.448)	-0.68 (0.455)
Lagged GDP/capita, PPP			-0.0034 (0.00371)			0.00079 (0.002)			-0.005 (0.0137)			0.00058 (0.00213)			-0.0208 (0.0132)
Observations	665	628	619	543	512	506	221	210	210	322	302	296	122	116	113
Countries	81	79	79	62	61	61	23	23	23	39	38	38	19	18	18
R ²	0.142	0.164	0.160	0.219	0.247	0.254	0.671	0.690	0.690	0.163	0.199	0.206	0.227	0.233	0.227

Note: Standard errors in parentheses are robust and clustered by country. *, **, *** indicate that coefficients are significant at 10, 5 and 1 percent levels respectively. All regressions include country and time fixed effects.

These results corroborate a number of empirical findings in the recent literature. Some of these are attributable to all countries: the estimated elasticity of exports with respect to the real exchange rate is broadly in line with estimates in IMF (2015c), and exports are highly dependent on partner growth.

Heterogeneity across country groups is also in line with the literature. First, export elasticities exhibited by emerging markets (EMs) are lower than those for advanced economies (AEs), and the exchange rate has a lower predictive power (comparing the R² in equations 7 and 10). This is compatible with the theoretical argument and empirical findings that participation in global value chains – relatively more important in EM export industries – tends to attenuate the price effect on exports.¹² Emerging markets also exhibit a higher elasticity with respect to export partner growth, which is in line with the Cubeddu et al. (2014) finding that GDP growth in EMs is more dependent on partner growth than AEs. We find that, unlike AEs, EMs exports exhibit no response to changes in the export deflator—another difference that can be traced to the prevalence of global value chains in their export industries.¹³

Results for Low Income Countries (LICs) should be interpreted with greater care. LICs exhibit the expected sign for the exchange rate. However, LICs suffer from data limitations, constraining the set of usable countries to less than twenty, and the number of observations to barely above one hundred. Second, manufactured exports generally constitute a small subset of LICs' export baskets. This means, among other things, that the WEO-derived export deflator is a highly imperfect proxy for the price of manufactured exports.

¹² Exports by country in a global value chain incorporate a relatively high share of imported inputs. When the exchange rate depreciates, the price of those imported imports rises as well, therefore muting the competitiveness effect. The impact of global chain participation on trade elasticities is explored in, among others, Ahmed et al. (2015), Amity et al. (2014), Cheng et al. (2015), IMF (2015c).

¹³ Ollivaud et al. (2015) find that the elasticity of the terms of trade to the exchange rate is weaker in economies with a higher share of foreign value added in gross exports.

Introducing Structural Reforms

We now augment the benchmark regressions above with two more terms: the lagged level of structural reform and its interaction with the REER. We focus on the same set of structural indicators as IMF (2015b), and test them one by one.

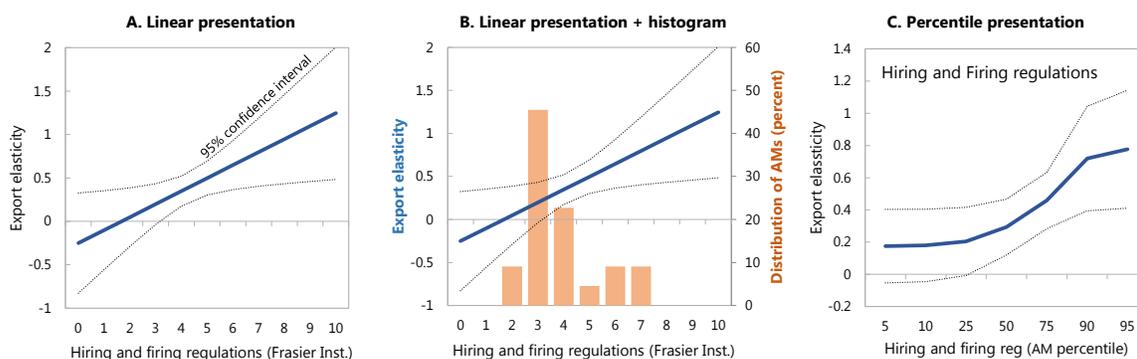
Table 6 presents a subset of results for advanced economies. The dependent variable is the same across all regressions – manufacturing exports. What changes is the structural indicator used in the second and third rows (banking in equation 1, security markets in equation 2, etc.). The table shows that several types of structural reforms are associated with higher export elasticities at standard levels of significance: security markets, legal systems and property rights, business regulation and labor market regulation.

Table 6. Manufacturing Exports Fixed Effects Regressions for Advanced Economies

	Security Markets	Average tariff rate	Regulatory trade barriers	Legal System & Property Rights	Business regulations	Hiring and firing regulations	Percentage tertiary edu
	(1)	(2)	(3)	(4)	(5)	(6)	(7)
Lagged log change REER	-0.635* (0.355)	-1.322 (2.408)	-0.268 (0.490)	-1.150* (0.659)	-0.0846 (0.168)	-0.261 (0.276)	0.0896 (0.185)
Lagged structural indicator	0.0119 (0.0204)	0.0300 (0.0577)	0.0125 (0.00834)	0.00439 (0.00569)	0.00812 (0.00510)	-0.00230 (0.00648)	-0.00270** (0.00113)
Lagged log change REER * Lagged structural indicator	1.008** (0.368)	1.838 (2.667)	0.0897 (0.0650)	0.187** (0.0805)	0.0775** (0.0330)	0.146** (0.0606)	0.0111* (0.00548)
Log change partner GDP	8.536** (3.574)	6.889 (4.028)	1.096 (2.953)	3.954 (4.084)	1.715 (2.556)	3.396 (3.429)	3.489 (3.546)
Log change export deflator	0.177** (0.0740)	0.183** (0.0681)	0.318* (0.161)	0.187*** (0.0641)	0.237* (0.138)	0.207** (0.0826)	0.188** (0.0708)
Observations	184	187	108	210	129	149	210
Countries	21	22	23	23	23	23	23
R ²	0.723	0.704	0.732	0.697	0.698	0.636	0.706

Note: Standard errors in parentheses are robust and clustered by country. *, **, *** indicate that coefficients are significant at 10, 5 and 1 percent levels respectively. All regressions include country and time fixed effects.

The above tabular presentation is not conducive to gauging the impact on the elasticity associated with a specific improvement in a given structural indicator. We propose a novel (to the best of our knowledge) and parsimonious presentation of marginal effects.

Figure 2. Linear vs. Percentile Presentation of Marginal Effects

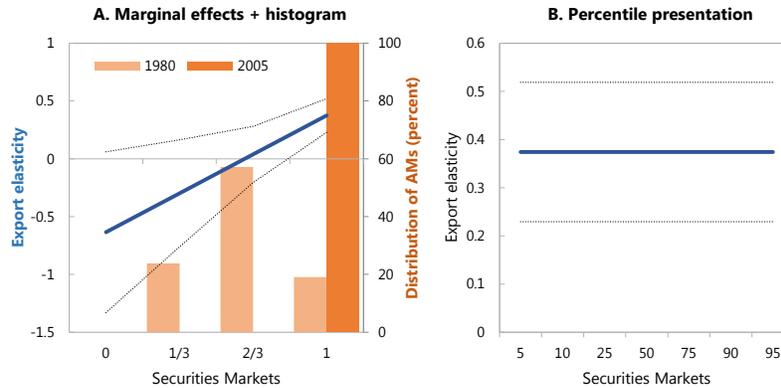
In chart A of Figure 2, we start with a standard graphic interpretation, where the intercept is given by the coefficient on the “lagged log change in REER” and the slope – by its interaction with the structural indicator; the hiring and firing regulations from the Frasier Institute in this example. This chart shows that moving from 1 to 8 on the scale is associated with the increase in elasticity from nil to 1. However, this information is of limited use without knowing the current distribution of countries across the scale – we add the relevant histogram in chart B. Finally, in chart C, we combine the two series by replacing the linear horizontal axis with common percentile benchmarks (5, 10, 25, 50, 75, 90 and 95), which – given the usual bell-shaped distribution of countries across the index scale – transforms the straight line into an S-shaped curve. From chart C, it is easy to read that, for example, moving from the 25th to 75th percentile on the hiring and firing regulations index is associated with an increase of the export elasticity from 0.2 to nearly 0.5.

This presentation has multiple advantages. First, it helps compare impact of structural indicators measured on different scales.¹⁴ Second, the approach allows for comparing countries against the relevant benchmark group – Figure 2 only compares AEs. Third, for policy purposes, the absolute value of the indicator is generally less relevant than benchmarking, which is why country rankings is often the preferred method for presenting such datasets (e.g., World Bank’s Doing Business Indicators). Finally, the approach helps address at least one aspect of the perennial issue of economic vs. statistical significance – a variable may be statistically significant, but it may hold little policy value. Note that the percentiles are calculated based on the most recent distribution (the last five-year period for which data is available). It helps, in particular, to show that although the export REER elasticity exhibits a statistically significant relationship with some structural indicators, there is little (if any) room for further improvement on account of these indicators. For example, equation 2 in Table 6 shows that security markets are associated with higher export elasticities. However, this result is based on a regression that incorporates historical data going back to 1973, when advanced economies differed significantly in the level of

¹⁴ Normalizing all indicators to a single scale also helps (e.g., min-max normalization or z-score transformation), but it is less transparent than the method proposed here.

development (most scoring lower than currently). However, all AEs converged to 1 (the indicator's maximum value) by 1992, reflected in the horizontal marginal effect line.

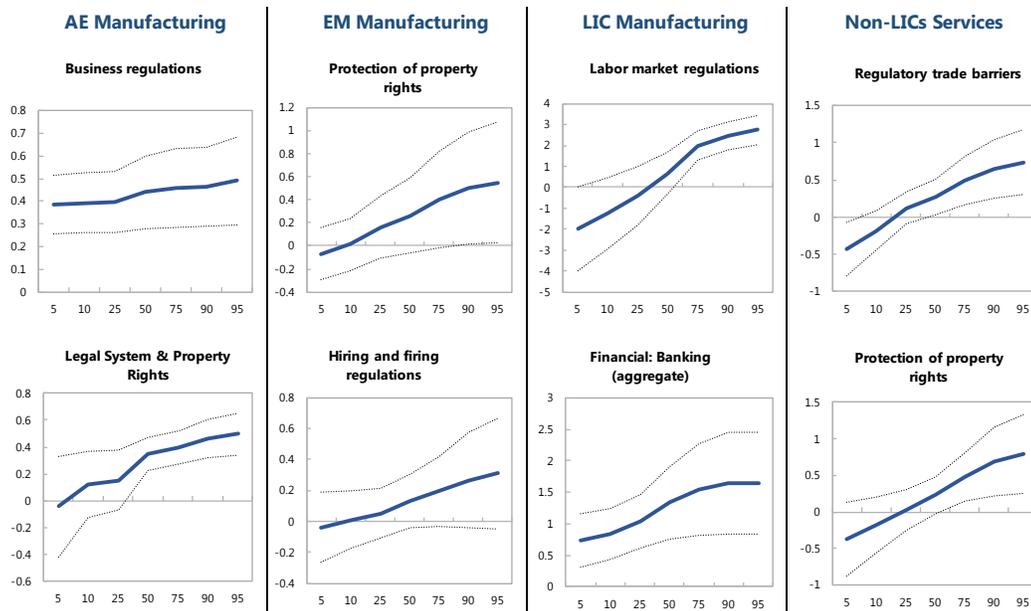
Figure 3. Marginal Effects for Securities Markets



Main Results

The specific reforms that matter differ across income groups. Figure 4 offers selected highlights, and Table 7 summarizes the sign and statistical significance of various structural indicators. Full regression results are presented in Table A4–Table A8, and the full set of marginal effects in Figure A1–Figure A5.

Figure 4. Highlights of Main Results



In *advanced economies*, labor and business regulations are the primary facilitators of the manufactured exports' response to REER movements. As discussed above, historically, securities markets were also an important facilitator of reallocation of resources to the tradable sector following depreciation episodes. However, as all AEs have developed

sufficiently strong securities markets, their further development is unlikely to improve the resilience of the economy any further. We also find a positive and significant result on the share of population with tertiary education, which is an important factor of production in the export basket of a typical AE.

Institutional indicators are important in *emerging markets*, which is consistent with the prominent role played by cross-border supply chains, which rely heavily on a strong contracting environment. There is also a strong correlation with the share of population with secondary education, a factor of production more dominant in the export basket of a typical EM.

In *low income countries*, labor and banking sector regulations have a strong effect on export elasticities. However, as discussed above, the sample of LICs is limited, and manufacturing currently exports play a relatively smaller role in their export baskets, so these results should be treated with more caution.

Table 7. Indirect Impact: Summary of Main Results

	Manufacturing				Services	
	All	Non-LIC	AE	EM	LIC	Non-LIC
Financial sector						
Banking	+	-	+	-	+	+
Security Markets	+	-	+	-	+	+
Openness						
Tariff Rates (average)	-	-	+	-	+	+
Regulatory trade barriers	-*	+	+	-	-	+
Institutions						
Protection of property rights	-	+	+	+	-	+
Legal enforcement of contracts	+	+	-	+	+	+
Product market regulation						
Business regulations	-	+	+	+	-	+
Product: telecom and electricity	-	-*	+	-	+	+
Labor						
Hiring and firing regulations	+	+	+	+	+	-
Centralized collective bargaining	+	+	+	+	+	-
Human capital and R&D						
Percentage of secondary	+	+	-	+	+	-
Percentage of tertiary	-	+	+	-	-*	-
Basic R&D spending	+	+	+	-		-

Note: Table shows the sign on the interaction term between the lagged log change in REER and the lagged structural indicator. *, **, *** indicate that coefficients are significant at 10, 5 and 1 percent levels respectively. All regressions include country and time fixed effects.

The table also presents results for *services* exports using Balance of Payments data for AMs and EMs. We find that services exhibit strong responses to REER movements in the presence of flexible financial sectors, trade openness, strong legal systems, and property rights.

Table A9 presents extended results for a larger set of 24 variables, the most notable additions being indicators of infrastructure endowment.¹⁵ Here, we find that the positive link between structural reforms and REER export elasticities is most consistently established in the case of advanced economies – of the 24 structural variables tested in the wider set, 22 have the expected sign and seven are significant at least at the 10 percent level. For comparison, only seven structural indicators produce the expected positive sign in the case of emerging markets, although only one of the negative signs (restrictions on current account transactions) shows significance at the 10 percent level. LICs results are more in line with expectations – most indicators exhibit the expected sign. However, they show a statistically significant negative correlation between infrastructure (electricity generation capacity and phone lines) and manufacturing export elasticity.¹⁶

D. Extensions and Robustness

Robustness checks include alternative measures of real exchange rates, annual data, and sensitivity to additional controls.

Alternative REER measures

The main results presented above are based on real depreciation derived from changes in the CPI-based REER. We now investigated two alternative measures of real exchange rates: the unit labor cost (ULC) based REER and the PPP REER, derived from Penn World Tables. As ULC data are available for a relatively small set of advanced and emerging economies, we only compared results for the non-LIC countries. Table A10 presents summary results on the sign and significance of the interaction term.

ULC REER results are even stronger than those based on CPI REER, especially with respect to labor market structural indicators. This can be expected, as ULC REER captures only those variations in price competitiveness that are determined domestically, and so are more susceptible to respond to internal structural conditions. On the other hand, changes in CPI REERs also reflect price changes in imported inputs, less likely to be influenced by the domestic structural environment. The ULC results do show, however, an unexpectedly and unexplainably strong negative impact of secondary education. The PPP-based results are similar to the main CPI-based results, with labor market flexibility showing a positive correlation with export response. Overall, the results confirm that the strongest link between structural indicators and REER export elasticities is found in labor market regulations.

¹⁵ Although these are not indicators of structural reforms per se, one generally expect that better infrastructure constraints should be conducive to the reallocation of resources across sectors.

¹⁶ It would not be surprising to find no relationship in the case of infrastructure. OECD input-output tables show that industries in the tradable sectors do not appear to be systematically more intensive in the use of utilities than non-tradable ones, so there is no additional pressure on infrastructure associated with the reallocation. However, this still does not explain the negative strong relationship found in the case of LICs.

Annual results

The main results include data averaged over three years and, to minimize endogeneity concerns, the change in REER is lagged by one period. This means that a regression on the period average for $t-2$ through t is affected by REER data as old as $t-8$. Generally, this is not an issue, as reallocation of resources across sectors and industries is a gradual process unlikely to be completed in a single year. However, existing exporters can respond to exchange rate changes immediately by reoptimizing the use of inputs, a process that can also be affected by structural conditions. Table A11 therefore presents summary results for annual data.

As expected, the results are weaker for annual data. However, strong legal systems and labor market flexibility retain their importance across country groups in the case of manufacturing exports, while results for services exports are not affected much. One unanticipated result is the strong negative short-term effect of human capital endowment, particularly in advanced economies. There is also a negative effect between R&D expenditure and short-term export price elasticities. Both findings can be explained by “pricing to market” practices in industries characterized by monopolistic competition, which are, generally, more R&D-intensive and employ a more educated labor force. Pricing to market can also explain the strong negative correlation found for centralized and collective bargaining: large manufacturing industries (e.g., automotive) are more likely to price to market and to have a significant share of unionized labor. However, as pricing to market is a short-term strategy – in the face of persistent REER movements exporters do ultimately adjust prices – these negative findings dissipate when analysis uses data averaged over three years.

Export basket composition as alternative explanation

One alternative explanation of the main results is that the differences in measured elasticities are in fact due to the composition of the export basket, and that good structural reforms are merely a reflection of diversification. The main set of results does not support this explanation, as we find large heterogeneities across reforms, which cannot be readily explained by the diversification hypothesis. Moreover, the focus on manufactured goods – as opposed to all goods exports – further homogenizes the types of goods compared across countries. Still, to test this alternative explanation, we augment the benchmark regressions with the Economic Complexity Index proposed by Hidalgo and Hausmann (2009).¹⁷ The index is the latest attempt in a strand of work synthesizing the sophistication of a country’s

¹⁷ Results using the diversification index from the IMF Diversification Toolkit (IMF (2014a) and IMF (2014b)) are identical and available upon request. We focus on ECI as it is generally a better predictor of growth outcomes; see for example Chapter 5 in IMF (2015d). ECI’s advantage is that in addition to characterizing the diversity of the country’s export basket, it also characterizes how “special” are the goods in the basket (determined indirectly from how many countries export that same good).

tradable goods sector from the analysis of the disaggregated export basket.¹⁸ Table A12 shows that ECI has no effect on measured elasticities, as the interaction term between lagged ECI and lagged change in REER is not statistically significant. For EMs, the sign is in fact “wrong” – higher complexity is associated with lower elasticities.¹⁹ As complexity does not appear to influence REER export elasticities directly, it is unlikely to exert that impact indirectly, via structural reforms.²⁰

IV. CONCLUSIONS AND POLICY IMPLICATIONS

Our results call into question the time frame over which we can expect improvements in the current account from structural reforms. Even for large reform episodes (those larger than two standard deviations and those in the 5th percentile of top reforms), we do not find overwhelming improvements in the current account balance in the short run. Over longer time horizons (3 to 5 years), the data provide some evidence that securities market development improves the current account, as do reforms in the telecom and electricity sectors. Not surprisingly, positive effects of research and development spending materialize on current account only in the longer term (4–5 years). Reforms have a stronger positive impact on exports. In particular, business regulation and better infrastructure are associated with a longer-term export response. These effects on the current account, however, are not strong due to the concomitant increase in imports. A stronger positive impact of reform on the current account may materialize beyond the 5-year horizon, but it is difficult to get robust results beyond the medium-term. We would need to account for reform reversals, and empirically the dynamic specification performs poorly in the long run.

We do, however, find that several structural indicators exhibit strong correlation with the elasticity of exports with respect to the real exchange rate. The types of structural reforms that are most likely to affect the responsiveness of exports to devaluations vary across country groups. Manufacturing exports in advanced economies are most susceptible to the presence of flexible labor and product market regulations. Emerging markets respond most to legal and institutional reforms. Low-income countries are also likely to respond to labor market flexibility. Elasticities for services exports are most susceptible to financial and trade reforms. Short-term effects – measured on annual data – paint a similar picture, although results are generally weaker. Overall, the strongest result pertains to labor market reforms,

¹⁸ Indices developed as part of related work include the EXPY by Hausmann et al. (2007) and the location within product space by Hausmann and Klinger (2006).

¹⁹ This result is also likely to be driven to the importance of supply value chains (which, as was discussed earlier, depress export elasticities) in the production of more sophisticated goods in emerging markets.

²⁰ Adding ECI into main results is complicated by the introduction of triple interaction effects (*change in REER* × *ECI* × *structural indicator*) plus all bivariate combinations, which reduce degrees of freedom and complicates interpretation of results.

which appear to be most conducive to reallocating resources to the tradable sector in the event of a real depreciation.

All results presented here are symmetrical. If manufacturing exports are likely to increase more in response to a real depreciation in the presence of flexible markets (AEs) or strong institutions (EMs), the same structural reforms will trigger a larger contraction of the tradable sector in the case of an appreciation.²¹ However, this is no argument against structural reforms. Equilibrium appreciations are generally responses to good news (e.g., a positive terms-of-trade shock), so an economy facing a real appreciation should be capable to compensate workers in affected industries. For that to happen, of course, the economy needs a well-functioning and well-targeted safety net. However, an appreciation can also take the economy away from equilibrium, for example if fueled by excessive capital inflows financing the unchecked growth in domestic credit. In such a case, flexible labor markets can in fact precipitate a sub-optimal downsizing of the tradable sector, which may later find it difficult to return to the previous size following the bust of the credit bubble. These examples underline that structural reforms should be undertaken while ensuring that the additional flexibility goes hand in hand with a safety net to compensate those affected by the shocks, as well as a regulatory framework to ensure that that this flexibility does not translate into a buildup of vulnerabilities.

Overall, our results paint a strong argument in favor of complementing macroeconomic adjustment programs with structural reforms. While expenditure-switching and expenditure-reducing policies operate through both import and export channels, the general experience has been that imports play the dominant role in the adjustment. We show that structural reforms can help shift the external adjustment mix toward export growth. Moreover, structural reforms not only help deal with external imbalances at present, but also with any shocks the country faces down the road. Thus, in addition to helping boost growth, structural reforms can improve the resilience of the economy.

²¹ Attempts to estimate the impact of structural reforms on export elasticities separately for appreciation and depreciation observations did not result in statistically significant differences.

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ANNEX 1. DATA SOURCES

Indicator	Source	Years	Countries
Macroeconomic Indicators			
Current Account	IMF WEO	1960-2014	192
Exports of Goods and Services	IMF WEO	1960-2014	192
Imports of Goods and Services	IMF WEO	1960-2014	192
Manufacturing exports	World Bank WDI	1960-2013	182
Services exports	World Bank WDI	1960-2013	99
GDP per capita, constant PPP \$	IMF WEO	1960-2013	192
CPI REER	IMF IFS	1979-2013	95
ULC REER	IMF IFS	1992-2013	18
PPP REER	Penn World Tables	1960-2010	183
Deflator of exports of goods	IMF WEO	1960-2013	177
Trading partner GDP growth	Derived from IMF WEO & DOT	1960-2013	174
Banking, debt and currency crises	Laeven and Valencia (2013)	1970-2011	116
Structural indicators			
Financial sector			
Banking	Abiad et al. (2008)	1973-2005	87
Interest rate controls	Abiad et al. (2008)	1973-2005	87
Directed credit/reserve requirements	Abiad et al. (2008)	1973-2005	87
Privatization	Abiad et al. (2008)	1973-2005	87
Banking Supervision	Abiad et al. (2008)	1973-2005	87
Security Markets	Abiad et al. (2008)	1973-2005	87
Openness			
Tariff Rates (average)	Prati et al. (2012)	1960-2006	134
Regulatory trade barriers	Fraser Institute	1995-2011	143
Restrictions on current account transactions	Quinn et al. (2011)	1960-2006	114
Restrictions on capital account transactions	Quinn et al. (2011)	1960-2006	114
Institutions			
Legal System & Property Rights	Fraser Institute	1970-2011	143
Protection of property rights	Fraser Institute	1995-2011	143
Legal enforcement of contracts	Fraser Institute	2002-2011	143
Product market regulation			
Business regulations	Fraser Institute	1995-2011	143
Product: telecom and electricity	OECD	1970-2003	107
Infrastructure			
Electricity production capacity	World Bank WDI	1960-2012	135
Telephone lines	World Bank WDI	1960-2013	188
Roads density	World Bank WDI	1960-2010	182
Labor			
Labor market regulations	Fraser Institute / WEF GCR	1970-2011	143
Hiring and firing regulations	Fraser Institute / WEF GCR	1990-2011	135
Centralized collective bargaining	Fraser Institute / WEF GCR	1970-2011	135
Human capital and R&D			
Percentage of secondary	World Bank WDI	1970-2010	140
Percentage of tertiary	World Bank WDI	1970-2010	140
Basic R&D spending	OECD	1970-2010	35

Table A1. Effect of Reform on Current Account/GDP, baseline results

	Year 1	Year 2	Year 3	Year 4	Year 5
Banking sector reform	-5.449** (2.376)	-3.003 (1.042)	-3.444 (1.159)	-1.478 (0.426)	1.475 (0.399)
Observations	495	495	495	495	495
Countries	84	84	84	84	84
R ²	0.155	0.241	0.313	0.319	0.271
Securities market development	2.604 (0.408)	21.257** (2.146)	16.219** (2.356)	25.997*** (3.495)	18.362** (2.373)
Observations	121	121	121	121	121
Countries	73	73	73	73	73
R ²	0.807	0.755	0.754	0.710	0.725
Mean tariff rates	-0.468 (1.179)	-0.891* (1.896)	-1.737*** (3.021)	-1.394** (2.135)	-1.232** (2.088)
Observations	1,530	1,530	1,530	1,530	1,530
Countries	109	109	109	109	109
R ²	0.259	0.305	0.281	0.272	0.452
Regulatory trade barriers	-0.228 (0.415)	-0.649 (0.730)	0.374 (0.402)	-0.270 (0.267)	-0.904 (0.963)
Observations	541	541	540	540	539
Countries	108	108	108	108	107
R ²	0.157	0.190	0.117	0.078	0.132
Current account restrictions	1.139 (0.607)	3.355 (1.212)	3.515 (1.217)	-0.144 (0.050)	-4.420 (1.484)
Observations	400	400	400	400	400
Countries	93	93	93	93	93
R ²	0.419	0.329	0.322	0.408	0.393
Capital account restrictions	-4.787 (1.750)	1.956 (0.480)	0.745 (0.153)	-2.873 (0.679)	-2.474 (0.571)
Observations	148	148	148	148	148
Countries	72	72	72	72	72
R ²	0.683	0.624	0.648	0.655	0.604
Legal system & Property rights	-0.785 (1.768)	-1.304 (2.034)	-1.451 (1.515)	-0.380 (0.481)	-1.763 (1.036)
Observations	1,542	1,542	1,541	1,540	1,540
Countries	115	115	115	115	115
R ²	0.062	0.120	0.110	0.087	0.044
Protection of property rights	-0.211 (0.424)	-0.596 (0.939)	0.226 (0.346)	-0.230 (0.340)	-0.734 (1.456)
Observations	486	486	485	485	485
Countries	101	101	100	100	100
R ²	0.184	0.190	0.149	0.108	0.161
Business regulation	-1.041 (1.882)	-1.777 (1.323)	-1.556 (1.290)	-1.381 (1.126)	-1.320 (1.079)
Observations	455	455	454	454	454
Countries	94	94	93	93	93
R ²	0.155	0.229	0.156	0.145	0.194

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Table A1. Effect of Reform on Current Account/GDP, baseline results (continued)

	Year 1	Year 2	Year 3	Year 4	Year 5
Product market regulation	-4.107 (0.334)	-18.402 (1.344)	-21.831 (1.447)	-5.160 (0.349)	3.774 (0.244)
Observations	81	81	81	81	81
Countries	15	15	15	15	15
R ²	0.534	0.625	0.661	0.610	0.694
Telecom and electricity regulation	-2.510 (1.046)	4.530 (2.139)	3.813 (1.123)	4.472 (1.704)	4.264 (1.225)
Observations	197	197	197	197	197
Countries	82	82	82	82	82
R ²	0.462	0.523	0.517	0.584	0.396
Infrastructure electricity	0.535 (0.211)	3.885 (1.229)	1.902 (0.487)	0.537 (0.143)	-0.175 (0.049)
Observations	2,240	2,240	2,240	2,239	2,238
Countries	107	107	107	107	107
R ²	0.073	0.070	0.085	0.069	0.053
Infrastructure telecom	-5.563 (1.321)	-2.526 (0.912)	-3.600 (0.863)	-2.119 (0.529)	-3.152 (0.728)
Observations	2,786	2,786	2,785	2,784	2,783
Countries	129	129	129	129	129
R ²	0.184	0.255	0.241	0.272	0.306
Infrastructure roads	-1.206 (0.343)	-6.626 (1.122)	1.074 (0.188)	1.338 (0.199)	-4.308 (1.047)
Observations	685	685	684	683	682
Countries	112	112	112	112	112
R ²	0.155	0.272	0.247	0.274	0.255
Hiring and firing regulation	-0.252 (0.531)	-0.125 (0.197)	-0.334 (0.449)	-0.854 (1.028)	-0.016 (0.024)
Observations	358	358	358	358	358
Countries	98	98	98	98	98
R ²	0.250	0.330	0.305	0.279	0.337
Collective bargaining	-0.527 (1.008)	0.161 (0.221)	0.378 (0.363)	0.580 (0.600)	1.151 (1.222)
Observations	411	411	411	411	411
Countries	95	95	95	95	95
R ²	0.088	0.215	0.198	0.264	0.329
Research and development spending	19.839 (1.186)	17.182 (1.224)	11.836 (0.807)	40.486 (1.953)	62.149 (2.585)
Observations	323	323	323	323	323
Countries	32	32	32	32	32
R ²	0.198	0.236	0.267	0.291	0.364

Note: Standard errors in parentheses are robust and clustered by country. *, **, *** indicate that coefficients are significant at 10, 5 and 1 percent levels respectively. All regressions include country and time fixed effects.

Table A2. Effect of Reform on Exports of Goods and Services/GDP, baseline results

	Year 1	Year 2	Year 3	Year 4	Year 5
Banking sector reform	2.498 (1.147)	1.193 (0.335)	2.982 (0.677)	5.322 (0.901)	9.719 (1.447)
Observations	409	406	403	401	399
Countries	81	79	79	79	79
R ²	0.228	0.214	0.235	0.255	0.298
Mean tariff rates	0.111 (0.451)	0.235 (0.719)	0.301 (0.807)	-0.005 (0.011)	-0.325 (0.604)
Observations	1,431	1,414	1,376	1,309	1,234
Countries	112	111	109	108	108
R ²	0.142	0.183	0.148	0.139	0.124
Regulatory trade barriers	0.152 (0.283)	-0.034 (0.046)	0.081 (0.094)	0.598 (0.572)	0.457 (0.408)
Observations	712	699	655	611	557
Countries	110	109	105	104	100
R ²	0.175	0.226	0.212	0.222	0.195
Current account restrictions	3.271 (1.460)	1.209 (0.525)	3.348 (1.423)	2.839 (1.297)	3.502 (1.283)
Observations	287	282	275	271	268
Countries	82	81	80	80	78
R ²	0.332	0.373	0.410	0.419	0.415
Capital account restrictions	-0.263 (0.843)	-0.357 (0.741)	-0.391 (0.753)	-0.776 (1.213)	-0.908 (1.630)
Observations	518	512	499	486	469
Countries	91	91	89	85	84
R ²	0.178	0.200	0.195	0.214	0.285
Legal system and property rights	-0.656 (1.533)	0.051 (0.083)	0.551 (0.594)	0.286 (0.261)	0.940 (0.778)
Observations	1,391	1,366	1,293	1,236	1,184
Countries	117	115	112	110	107
R ²	0.092	0.112	0.109	0.115	0.127
Protection of property rights	-0.060 (0.236)	-0.162 (0.391)	-0.596 (1.304)	-0.706 (1.185)	-0.666 (1.281)
Observations	603	593	541	495	476
Countries	106	105	101	98	97
R ²	0.184	0.214	0.207	0.259	0.255
Business regulation	-0.789 (1.401)	0.387 (0.322)	0.030 (0.024)	-1.168 (1.239)	-1.411 (1.363)
Observations	589	579	527	507	468
Countries	106	104	98	95	90
R ²	0.184	0.197	0.221	0.275	0.320
Telecom and electricity regulation	4.143 (3.113)	5.981 (2.700)	7.166 (2.435)	5.876 (2.039)	6.561 (2.290)
Observations	172	170	169	167	166
Countries	73	73	72	71	70
R ²	0.470	0.452	0.428	0.450	0.486

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Table A2. Effect of Reform on Exports of Goods and Services/GDP, baseline results (continued)

	Year 1	Year 2	Year 3	Year 4	Year 5
Electricity infrastructure	1.630 (1.282)	3.378 (2.179)	5.288 (2.259)	6.701 (1.931)	5.156 (1.459)
Observations	2,027	1,980	1,892	1,790	1,725
Countries	111	111	111	110	107
R ²	0.096	0.100	0.092	0.101	0.108
Telecom infrastructure	1.061 (0.973)	1.875 (1.041)	3.622 (1.546)	2.322 (0.782)	2.197 (0.573)
Observations	2,257	2,195	2,102	2,016	1,930
Countries	135	132	132	130	126
R ²	0.090	0.087	0.091	0.097	0.112
Road infrastructure	3.717 (1.051)	-1.976 (0.486)	0.545 (0.110)	5.562 (0.974)	5.659 (0.959)
Observations	628	614	602	559	517
Countries	103	99	98	92	90
R ²	0.234	0.213	0.230	0.201	0.175
Hiring and firing regulations	-0.348 (1.164)	-0.060 (0.124)	-0.147 (0.213)	0.914 (1.151)	1.047 (1.424)
Observations	569	555	494	439	388
Countries	106	104	100	96	95
R ²	0.200	0.224	0.235	0.268	0.296
Collective bargaining	-0.297 (0.846)	-0.243 (0.310)	-0.791 (1.163)	-1.196 (1.482)	-1.360 (1.168)
Observations	582	575	524	482	439
Countries	105	104	99	97	93
R ²	0.236	0.237	0.242	0.258	0.266
Research and development spending	-11.168 (1.070)	-10.365 (0.852)	-2.755 (0.125)	2.558 (0.118)	35.225 (1.400)
Observations	392	392	377	364	341
Countries	34	34	34	34	34
R ²	0.331	0.251	0.227	0.256	0.283

Note: Standard errors in parentheses are robust and clustered by country. *, **, *** indicate that coefficients are significant at 10, 5 and 1 percent levels respectively. All regressions include country and time fixed effects.

Table A3. Effect of Reform on Imports of Goods and Services/GDP, baseline results

	Year 1	Year 2	Year 3	Year 4	Year 5
Banking sector reform	0.781 (0.225)	4.990 (0.875)	7.486 (1.143)	8.781 (1.146)	9.902 (1.170)
Observations	455	455	455	455	455
Countries	83	83	83	83	83
R ²	0.221	0.239	0.218	0.274	0.313
Mean tariff rates	-0.010 (0.036)	0.214 (0.450)	0.568 (1.014)	0.883* (1.666)	0.584 (0.807)
Observations	1,596	1,595	1,595	1,594	1,594
Countries	125	125	125	125	125
R ²	0.180	0.228	0.240	0.232	0.247
Regulatory trade barriers	0.211 (0.409)	0.780 (1.178)	1.333 (1.570)	0.350 (0.418)	1.018 (1.208)
Observations	798	798	797	796	795
Countries	127	127	127	127	127
R ²	0.260	0.352	0.357	0.320	0.314
Current account restrictions	2.766 (0.676)	-3.847 (1.057)	-3.104 (0.717)	2.070 (0.450)	8.808* (1.946)
Observations	371	371	371	371	371
Countries	85	85	85	85	85
R ²	0.451	0.349	0.399	0.427	0.419
Capital account restrictions	-0.209 (0.375)	-0.398 (0.622)	-0.473 (0.710)	-0.828 (0.945)	-0.868 (1.260)
Observations	567	566	566	566	565
Countries	110	110	110	110	110
R ²	0.651	0.462	0.579	0.551	0.539
Legal system and property rights	-0.865 (1.354)	-0.689 (0.745)	-0.754 (0.652)	-1.563 (1.228)	-2.878 (2.284)
Observations	1,667	1,667	1,667	1,666	1,664
Countries	132	132	132	132	132
R ²	0.146	0.193	0.201	0.212	0.214
Protection of property rights	-0.210 (0.550)	0.357 (0.666)	-0.022 (0.033)	0.218 (0.311)	0.304 (0.555)
Observations	669	669	669	667	667
Countries	118	118	118	117	117
R ²	0.209	0.343	0.341	0.332	0.292
Business regulation	0.352 (0.444)	2.054 (1.698)	2.484 (1.622)	2.108 (1.712)	2.948 (2.287)
Observations	642	642	641	640	639
Countries	118	118	118	117	117
R ²	0.275	0.341	0.328	0.325	0.384

(continued on next page)

Table A3. Effect of Reform on Imports of Goods and Services/GDP, baseline results (continued)

	Year 1	Year 2	Year 3	Year 4	Year 5
Telecom and electricity regulation	-1.545 (0.775)	0.390 (0.112)	2.303 (0.565)	3.743 (0.914)	3.678 (0.936)
Observations	206	206	206	206	206
Countries	84	84	84	84	84
R ²	0.556	0.517	0.483	0.457	0.465
Electricity infrastructure	1.444 (0.930)	0.834 (0.509)	-0.405 (0.204)	1.112 (0.419)	1.982 (0.798)
Observations	2,328	2,327	2,326	2,325	2,323
Countries	117	117	117	117	117
R ²	0.123	0.127	0.112	0.128	0.138
Telecom infrastructure	0.720 (0.344)	4.536 (1.313)	3.468 (1.186)	4.160 (1.108)	1.917 (0.584)
Observations	2,991	2,990	2,989	2,988	2,987
Countries	150	150	150	150	150
R ²	0.192	0.121	0.152	0.184	0.177
Road infrastructure	-1.395 (0.400)	-6.123 (1.425)	-2.496 (0.596)	-7.077 (1.304)	-0.123 (0.031)
Observations	799	798	797	796	794
Countries	121	121	121	121	121
R ²	0.221	0.254	0.371	0.472	0.474
Hiring and firing regulations	0.077 (0.156)	-0.034 (0.053)	-0.487 (0.655)	-0.709 (0.787)	-0.091 (0.095)
Observations	625	624	624	623	622
Countries	117	116	116	116	116
R ²	0.285	0.333	0.355	0.304	0.329
Collective bargaining	0.055 (0.102)	0.216 (0.293)	-0.370 (0.393)	-1.467 (1.389)	-0.156 (0.157)
Observations	640	639	638	636	635
Countries	118	118	117	117	117
R ²	0.331	0.341	0.325	0.305	0.309
Research and development spending	-8.481 (0.694)	-20.054 (1.259)	-24.302 (1.498)	-2.681 (0.153)	7.293 (0.346)
Observations	385	385	385	385	385
Countries	34	34	34	34	34
R ²	0.489	0.465	0.452	0.425	0.417

Note: Standard errors in parentheses are robust and clustered by country. *, **, *** indicate that coefficients are significant at 10, 5 and 1 percent levels respectively. All regressions include country and time fixed effects.

Table A4. Manufacturing Exports Country and Time Fixed Effects Regressions for Advanced Economies and Emerging Markets (Non-LICs)

	Banking (1)	Security Markets (2)	Average tariff rate (3)	Regulatory trade barriers (4)	Legal System & Property Rights (5)	Protection of property rights (6)	Legal enforcement of contracts (7)	Business regulations (8)	Product: telecom and electricity (9)	Labor market regulations (10)	Hiring and firing regulations (11)	Centralized collective bargaining (12)	Percentage secondary edu (13)	Percentage tertiary edu (14)
Lagged log change REER	0.224 (0.261)	0.270 (0.215)	0.495 (0.351)	0.0969 (0.222)	0.315 (0.251)	-0.321* (0.186)	-0.621 (0.547)	-0.191 (0.279)	0.266** (0.117)	0.139 (0.275)	-0.142 (0.182)	-0.176 (0.212)	-0.132 (0.229)	0.197 (0.146)
Lagged structural indicator	-0.0181 (0.0364)	-0.00610 (0.0203)	0.00305 (0.0540)	0.00280 (0.00977)	0.00251 (0.00773)	0.00341 (0.0101)	-0.00259 (0.00441)	0.00420 (0.00629)	0.0127 (0.0175)	-0.0168 (0.0300)	0.0217*** (0.00654)	0.0158** (0.00606)	0.000180 (0.000698)	-0.00115 (0.00137)
Lagged log change REER * Lagged structural indicator	-0.0955 (0.356)	-0.165 (0.271)	-0.405 (0.458)	0.00714 (0.0371)	-0.0111 (0.0378)	0.0946*** (0.0309)	0.183 (0.111)	0.0659 (0.0495)	-0.498* (0.278)	-0.0424 (0.170)	0.0632 (0.0403)	0.0751 (0.0469)	0.00882* (0.00491)	0.00105 (0.00672)
Log change partner GDP	11.88** (4.910)	11.88** (4.859)	11.19** (4.946)	8.169* (4.341)	8.828** (3.827)	7.391* (4.158)	13.91** (5.947)	8.095** (3.432)	15.39*** (2.616)	6.490 (4.474)	10.71*** (2.764)	8.156** (3.385)	9.677** (3.976)	9.791** (4.143)
Log change export deflator	0.114 (0.0883)	0.114 (0.0891)	0.0828 (0.114)	0.158 (0.140)	0.0626 (0.108)	0.188 (0.140)	-0.0754 (0.221)	0.0861 (0.138)	0.131 (0.0830)	0.0927 (0.137)	0.122 (0.0990)	0.205 (0.128)	0.00503 (0.0889)	0.00424 (0.0847)
Observations	387	387	426	256	485	253	174	295	314	328	380	321	497	497
Countries	49	49	57	60	60	59	60	60	46	61	60	59	59	59
R ²	0.286	0.287	0.255	0.431	0.256	0.460	0.559	0.415	0.426	0.160	0.497	0.459	0.260	0.256

Note: Standard errors in parentheses are robust and clustered by country. *, **, *** indicate that coefficients are significant at 10, 5 and 1 percent levels respectively. All regressions include country and time fixed effects.

Table A5. Manufacturing Exports Country and Time Fixed Effects Regressions for Advanced Economies

	Banking (1)	Security Markets (2)	Average tariff rate (3)	Regulatory trade barriers (4)	Legal System & Property Rights (5)	Protection of property rights (6)	Legal enforcement of contracts (7)	Business regulations (8)	Product: telecom and electricity (9)	Labor market regulations (10)	Hiring and firing regulations (11)	Centralized collective bargaining (12)	Percentage secondary edu (13)	Percentage tertiary edu (14)
Lagged log change REER	-0.0569 (0.445)	-0.635* (0.355)	-1.322 (2.408)	-0.268 (0.490)	-1.150* (0.659)	-0.119 (0.689)	1.184 (0.992)	-0.0846 (0.168)	0.223 (0.134)	-0.199 (0.294)	-0.261 (0.276)	0.151 (0.328)	0.466 (0.318)	0.0896 (0.185)
Lagged structural indicator	0.00495 (0.0223)	0.0119 (0.0204)	0.0300 (0.0577)	0.0125 (0.00834)	0.00439 (0.00569)	0.00383 (0.00634)	-0.0103* (0.00535)	0.00812 (0.00510)	0.0105 (0.0111)	0.00680 (0.00457)	-0.00230 (0.00648)	0.000818 (0.00534)	0.000341 (0.000259)	-0.00270** (0.00113)
Lagged log change REER * Lagged structural indicator	0.480 (0.563)	1.008** (0.368)	1.838 (2.667)	0.0897 (0.0650)	0.187** (0.0805)	0.0784 (0.0939)	-0.101 (0.146)	0.0775** (0.0330)	0.296 (0.328)	0.0825* (0.0448)	0.146** (0.0606)	0.0285 (0.0462)	-0.00251 (0.00643)	0.0111* (0.00548)
Log change partner GDP	8.331** (3.433)	8.536** (3.574)	6.889 (4.028)	1.096 (2.953)	3.954 (4.084)	1.950 (3.260)	4.550 (7.537)	1.715 (2.556)	10.32*** (3.530)	6.135** (2.633)	3.396 (3.429)	6.211* (3.164)	4.008 (4.079)	3.489 (3.546)
Log change export deflator	0.174** (0.0681)	0.177** (0.0740)	0.183** (0.0681)	0.318* (0.161)	0.187*** (0.0641)	0.372* (0.183)	0.199 (0.232)	0.237* (0.138)	0.156** (0.0698)	0.162** (0.0733)	0.207** (0.0826)	0.153** (0.0644)	0.182** (0.0697)	0.188** (0.0708)
Observations	184	184	187	108	210	108	67	129	163	206	149	209	210	210
Countries	21	21	22	23	23	23	23	23	21	23	23	23	23	23
R ²	0.718	0.723	0.704	0.732	0.697	0.724	0.821	0.698	0.701	0.717	0.636	0.709	0.691	0.706

Note: Standard errors in parentheses are robust and clustered by country. *, **, *** indicate that coefficients are significant at 10, 5 and 1 percent levels respectively. All regressions include country and time fixed effects.

Table A6. Manufacturing Exports Fixed Effects Regressions for Emerging Markets

	Banking (1)	Security Markets (2)	Average tariff rate (3)	Regulatory trade barriers (4)	Legal System & Property Rights (5)	Protection of property rights (6)	Legal enforcement of contracts (7)	Business regulations (8)	Product: telecom and electricity (9)	Labor market regulations (10)	Hiring and firing regulations (11)	Centralized collective bargaining (12)	Percentage secondary edu (13)	Percentage tertiary edu (14)
Lagged log change REER	0.152 (0.320)	0.207 (0.217)	0.566 (0.415)	0.137 (0.334)	0.320 (0.347)	0.320 (0.347)	-0.447** (0.210)	-0.228 (0.426)	0.242 (0.181)	0.255 (0.547)	-0.297 (0.279)	-0.402 (0.376)	-0.303 (0.258)	0.205 (0.177)
Lagged structural indicator	0.00421 (0.0866)	0.0220 (0.0318)	0.0102 (0.0719)	0.00835 (0.0152)	0.00536 (0.00832)	0.00536 (0.00832)	0.0103 (0.0175)	0.0139 (0.0111)	0.0180 (0.0366)	0.0254** (0.00943)	0.0230*** (0.00740)	0.0181 (0.0138)	0.000891 (0.00193)	-0.00162 (0.00294)
Lagged log change REER * Lagged structural indicator	-0.133 (0.435)	-0.254 (0.317)	-0.556 (0.600)	-0.00630 (0.0601)	-0.0160 (0.0596)	-0.0160 (0.0596)	0.132** (0.0553)	0.0729 (0.0902)	-0.581 (0.342)	-0.0262 (0.125)	0.0913 (0.0648)	0.0753 (0.0651)	0.0126** (0.00574)	-0.00218 (0.00921)
Log change partner GDP	14.86** (7.036)	14.68** (7.101)	13.51* (7.161)	11.60* (6.524)	11.40** (5.614)	11.40** (5.614)	10.77* (6.004)	13.64** (5.413)	17.19*** (3.830)	15.31*** (5.282)	11.58** (4.908)	12.63** (4.790)	12.39** (5.893)	12.79** (6.041)
Log change export deflator	0.113 (0.112)	0.117 (0.123)	0.0553 (0.150)	0.101 (0.147)	0.0187 (0.145)	0.0187 (0.145)	0.168 (0.149)	0.0219 (0.175)	0.131 (0.137)	0.0645 (0.167)	0.203 (0.169)	0.119 (0.130)	-0.0188 (0.117)	-0.0129 (0.111)
Observations	203	203	239	148	275	275	145	166	151	174	172	185	287	287
Countries	28	28	35	37	37	37	36	37	25	37	36	36	36	36
R ²	0.236	0.237	0.211	0.405	0.209	0.209	0.436	0.381	0.359	0.439	0.468	0.490	0.219	0.212

Note: Standard errors in parentheses are robust and clustered by country. *, **, *** indicate that coefficients are significant at 10, 5 and 1 percent levels respectively. All regressions include country and time fixed effects.

Table A7. Manufacturing Exports Fixed Effects Regressions for Low-Income Countries

	Banking (1)	Security Markets (2)	Average tariff rate (3)	Regulatory trade barriers (4)	Legal System & Property Rights (5)	Protection of property rights (6)	Legal enforcement of contracts (7)	Business regulations (8)	Product: telecom and electricity (9)	Labor market regulations (10)	Hiring and firing regulations (11)	Centralized collective bargaining (12)	Percentage secondary edu (13)	Percentage tertiary edu (14)
Lagged log change REER	0.235 (0.379)	0.455 (0.459)	0.108 (1.662)	2.876 (1.900)	-0.859 (1.223)	3.909** (1.319)	-0.497 (3.904)	5.448** (2.197)	0.848** (0.296)	-5.461*** (1.770)	-5.819** (1.864)	-2.204 (3.216)	0.0732 (0.151)	1.615** (0.751)
Lagged structural indicator	0.759** (0.244)	0.381* (0.184)	-1.424* (0.800)	-0.0342 (0.0323)	-0.0250 (0.0341)	-0.0102 (0.0893)	-0.000749 (0.0459)	-0.0458 (0.0700)	-0.125 (0.184)	-0.0749 (0.0820)	-0.0595 (0.0516)	-0.102** (0.0416)	0.0244** (0.00973)	-0.0130 (0.0251)
Lagged log change REER * Lagged structural indicator	1.506* (0.728)	0.926 (0.647)	1.908 (2.966)	-0.267 (0.447)	0.573 (0.390)	-0.651 (0.446)	0.272 (0.922)	-0.795 (0.554)	3.007 (1.709)	1.011*** (0.223)	1.157*** (0.347)	0.506 (0.501)	0.00510 (0.00856)	-0.149* (0.0739)
Log change partner GDP	-28.37* (13.16)	-20.86* (10.35)	-18.93 (25.55)	-21.45 (21.81)	-10.03 (11.44)	-49.98 (40.64)	-45.45 (30.81)	-28.79 (21.81)	19.49 (13.08)	-15.15 (15.15)	-16.46 (47.80)	13.41 (56.20)	12.01 (20.54)	21.48 (23.27)
Log change export deflator	-0.312 (0.902)	-0.335 (0.781)	-0.503 (0.375)	-0.621 (0.392)	-0.348 (0.326)	-0.723** (0.324)	-0.395 (0.537)	-0.422 (0.449)	-0.237 (0.316)	-0.768* (0.394)	-1.287 (0.736)	-0.934* (0.424)	-0.584 (0.480)	-0.567 (0.421)
Observations	41	41	76	39	87	33	37	39	66	39	30	30	107	107
Countries	6	6	14	13	14	11	13	13	14	13	11	11	16	16
R ²	0.670	0.625	0.466	0.392	0.388	0.584	0.202	0.410	0.537	0.471	0.720	0.583	0.221	0.239

Note: Standard errors in parentheses are robust and clustered by country. *, **, *** indicate that coefficients are significant at 10, 5 and 1 percent levels respectively. All regressions include country and time fixed effects.

Table A8. Services Exports Fixed Effects Regressions for Advanced Economies and Emerging Markets (Non-LICs)

	Banking (1)	Security Markets (2)	Average tariff rate (3)	Regulatory trade barriers (4)	Legal System & Property Rights (5)	Protection of property rights (6)	Legal enforcement of contracts (7)	Business regulations (8)	Product: telecom and electricity (9)	Labor market regulations (10)	Hiring and firing regulations (11)	Centralized collective bargaining (12)	Percentage secondary edu (13)	Percentage tertiary edu (14)
Lagged log change REER	-0.412 (0.292)	-0.450* (0.253)	-1.016*** (0.364)	-1.935*** (0.592)	-0.227 (0.351)	-0.982** (0.488)	-1.078** (0.493)	-1.102** (0.469)	0.0456 (0.209)	0.581 (0.448)	0.586 (0.401)	0.879 (0.933)	0.158 (0.210)	0.00277 (0.134)
Lagged structural indicator	0.0593 (0.0541)	-0.0148 (0.0393)	-0.0892 (0.0602)	0.0139 (0.0107)	0.0131** (0.00608)	0.00154 (0.00756)	0.0114 (0.00981)	0.00663 (0.0131)	0.00280 (0.0289)	-0.00624 (0.00727)	0.00144 (0.00807)	-0.00474 (0.00513)	0.000403 (0.000689)	-0.00155 (0.00207)
Lagged log change REER * Lagged structural indicator	0.914** (0.378)	0.876*** (0.283)	1.437** (0.618)	0.320*** (0.0927)	0.0427 (0.0738)	0.205** (0.0822)	0.208** (0.0927)	0.212** (0.0870)	0.147 (0.398)	-0.105 (0.0926)	-0.134 (0.0993)	-0.116 (0.156)	-0.00529 (0.00644)	-0.00312 (0.0110)
Log change partner GDP	12.12** (4.729)	12.74** (4.925)	12.75** (4.998)	8.627* (4.691)	9.958** (3.991)	12.15* (6.537)	6.263 (6.861)	15.69*** (5.788)	13.74 (9.159)	15.22** (6.326)	17.73** (6.911)	14.07** (6.685)	10.49** (4.372)	10.17** (4.645)
Log change export deflator	0.127 (0.249)	0.152 (0.257)	0.0965 (0.224)	0.473*** (0.167)	0.307 (0.215)	0.472** (0.201)	0.0496 (0.373)	0.251 (0.221)	0.472** (0.199)	0.371* (0.192)	0.270 (0.165)	0.458** (0.182)	0.344* (0.194)	0.331* (0.193)
Observations	341	341	375	231	437	227	158	266	276	342	286	355	454	454
Countries	44	44	51	54	54	53	54	54	41	54	53	53	54	54
R ²	0.276	0.276	0.267	0.501	0.249	0.466	0.439	0.394	0.313	0.356	0.387	0.348	0.252	0.251

Note: Standard errors in parentheses are robust and clustered by country. *, **, *** indicate that coefficients are significant at 10, 5 and 1 percent levels respectively. All regressions include country and time fixed effects.

Table A9. Summary Results for Expanded Set of Structural Variables

	Manufacturing				Services
	NonLIC	AM	EM	LIC	Non-LIC
Financial sector					
Banking	–	+	–	+*	+**
Interest rate controls	–	+	–	+**	+
Directed credit/reserve requirements	–	+*	–	+	+***
Privatization	–	+	–	+	+
Banking Supervision	+	+	+	+**	+*
Security Markets	–	+**	–	+	+***
Openness					
Tariff Rates (average)	–	+	–	+	+**
Regulatory trade barriers	+	+	–	–	+***
Restrictions on current account transactions	– [*]	+	– [*]	+	+*
Restrictions on capital account transactions	–	+	–	+	+*
Institutions					
Legal System & Property Rights	–	+**	–	+	+
Protection of property rights	+***	+	+**	–	+**
Legal enforcement of contracts	+	–	+	+	+**
Product market regulation					
Business regulations	+	+**	+	–	+**
Product: telecom and electricity	– [*]	+	–	+	+
Infrastructure					
Electricity production capacity	+	+	–	– ^{***}	+
Telephone lines	+	+	–	– ^{***}	+
Roads density	–	+	–	+	+
Labor					
Labor market regulations	+	+*	–	+***	–
Hiring and firing regulations	+	+**	+	+***	–
Centralized collective bargaining	+	+	+	+	–
Human capital and R&D					
Percentage of secondary	+*	–	+**	+	–
Percentage of tertiary	+	+*	–	– [*]	–
Basic R&D spending	+	+	–		–

Note: Table shows the sign on the interaction term between the lagged log change in REER and the lagged structural indicator. *, **, *** indicate that coefficients are significant at 10, 5 and 1 percent levels respectively. All regressions include country and time fixed effects.

Table A10. Summary of Results Using Alternative Measures of REER, Non-LICs only

	Manufacturing			Services		
	CPI	ULC	PPP	CPI	ULC	PPP
Financial sector						
Banking	-	+	-	++	++	-
Security Markets	-	+	-	+++	+++	-
Openness						
Tariff Rates (average)	-	+	-	++	+++	-
Regulatory trade barriers	+	+	-	+++	+	++
Institutions						
Protection of property rights	+++	+	+	++	+	++
Legal enforcement of contracts	+	+	+	++	+	+
Product market regulation						
Business regulations	+	+	-	++	+	+
Product: telecom and electricity	-*	-	-	+	+	-
Labor						
Hiring and firing regulations	+	++	++	-	-	-
Centralized collective bargaining	+	++	+	-	+	-
Human capital and R&D						
Percentage of secondary	+	---	+	-	-	-
Percentage of tertiary	+	+	+	-	+	-
Basic R&D spending	+	-*	-	-	---	-

Note: Table shows the sign on the interaction term between the lagged log change in REER and the lagged structural indicator. *, **, *** indicate that coefficients are significant at 10, 5 and 1 percent levels respectively. All regressions include country and time fixed effects.

The "CPI" column presents main results (identical to Table 7) for easy comparison.

Table A11. Summary of Results Using Annual Data

	Manufacturing exports								Services			
	All countries		Non-LICs		AEs		EMs		LICs		Non-LICs	
	1 year	3 years	1 year	3 years	1 year	3 years	1 year	3 years	1 year	3 years	1 year	3 years
Financial sector												
Banking	-*	+	-	-	+	+	-	-	-	+	-**	+**
Security Markets	-	+	-	-	-	+**	+	-	+	+	-	+***
Openness												
Tariff Rates (average)	-*	-	-	-	+	+	-	-	-*	+	+	+**
Regulatory trade barriers	-	-*	+	+	-	+	+	-	-	-	+	+***
Institutions												
Protection of property rights	+	-	+	+***	-**	+	+	+**	+	-	+**	+**
Legal enforcement of contracts	-	+	+***	+	-	-	+***	+	-	+	+**	+**
Product market regulation												
Business regulations	+	-	+	+	+	+**	+	+	+	-	+	+**
Product: telecom and electricity	-	-	-	-*	-	+	-	-	-	+	+	+
Labor												
Hiring and firing regulations	+	+***	+***	+	+	+**	+***	+	+	+***	+	-
Centralized collective bargaining	+	+	+	+	-**	+	+	+	+	+	-	-
Human capital and R&D												
Percentage of secondary	+	+	-	+	-**	-	+	+**	-	+	-***	-
Percentage of tertiary	-	-	-	+	-*	+	-	-	-	-*	-***	-
Basic R&D spending	-*	+	-*	+	-***	+	-***	-			+	-

Note: Table shows the sign on the interaction term between the lagged log change in REER and the lagged structural indicator. *, **, *** indicate that coefficients are significant at 10, 5 and 1 percent levels respectively. All regressions include country and time fixed effects.

The “3 year” column presents main results (identical to Table 7) for easy comparison.

Table A12. Baseline Regressions with ECI for Manufacturing Exports

	Non-LICs			Advanced Economies			Emerging Markets		
	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)
Lagged log change REER	0.181*** (0.0666)	0.191*** (0.0699)	0.209*** (0.0742)	0.336*** (0.0814)	0.330** (0.143)	0.331** (0.144)	0.152* (0.0862)	0.114 (0.0898)	0.117 (0.101)
Log change partner GDP	9.344** (3.641)	9.571** (3.676)	9.245** (3.704)	7.864** (2.837)	7.862** (2.851)	7.838** (2.833)	9.774* (5.227)	10.32* (5.305)	10.06* (5.267)
Log change export deflator	0.0394 (0.0921)	0.0390 (0.0917)	0.0472 (0.0913)	0.162* (0.0890)	0.162* (0.0895)	0.162* (0.0902)	0.0223 (0.115)	0.00919 (0.117)	0.0218 (0.120)
Lagged ECI	-0.0378* (0.0201)	-0.0372* (0.0201)	-0.0370* (0.0199)	-0.0126 (0.0248)	-0.0126 (0.0249)	-0.0122 (0.0234)	-0.0403 (0.0244)	-0.0378 (0.0244)	-0.0383 (0.0243)
Lagged ECI * Lagged log change REER		-0.0810 (0.0851)	-0.0806 (0.0852)		0.00356 (0.0672)	0.00386 (0.0664)		-0.257* (0.152)	-0.259 (0.155)
Lagged GDP/capita, PPP			0.00148 (0.00241)			-0.000998 (0.0114)			0.00162 (0.00280)
Observations	494	494	488	202	202	202	292	292	286
Countries	58	58	58	21	21	21	37	37	37
R ²	0.258	0.260	0.267	0.709	0.709	0.709	0.201	0.209	0.217

Note: Standard errors in parentheses are robust and clustered by country. *, **, *** indicate that coefficients are significant at 10, 5 and 1 percent levels respectively. All regressions include country and time fixed effects.

Figure A1. Elasticity of Manufacturing Exports w.r.t. REER. Non-LICs

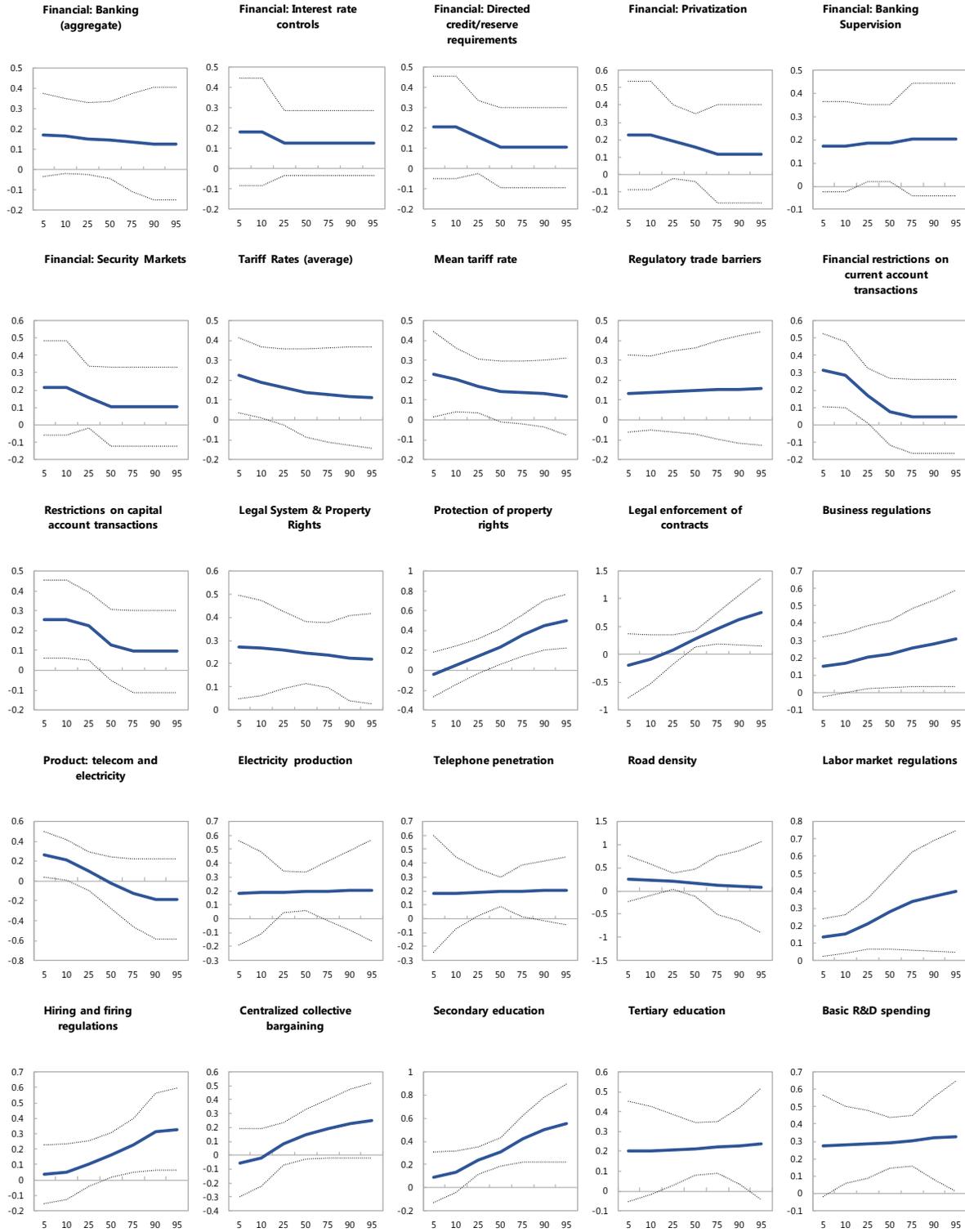


Figure A2. Elasticity of Manufacturing Exports w.r.t. REER. Advanced Economies

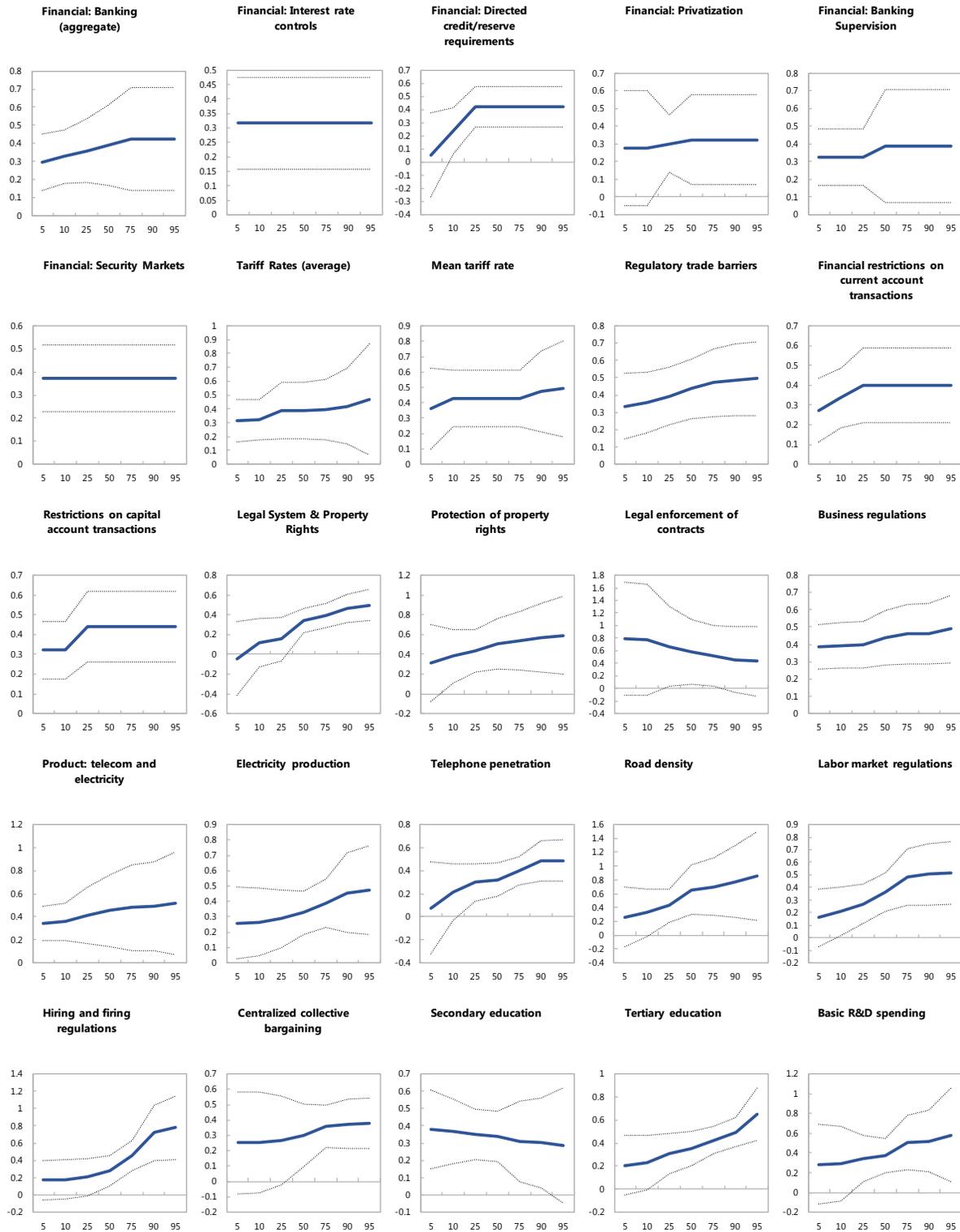


Figure A3. Elasticity of Manufacturing Exports w.r.t. REER. Emerging Markets

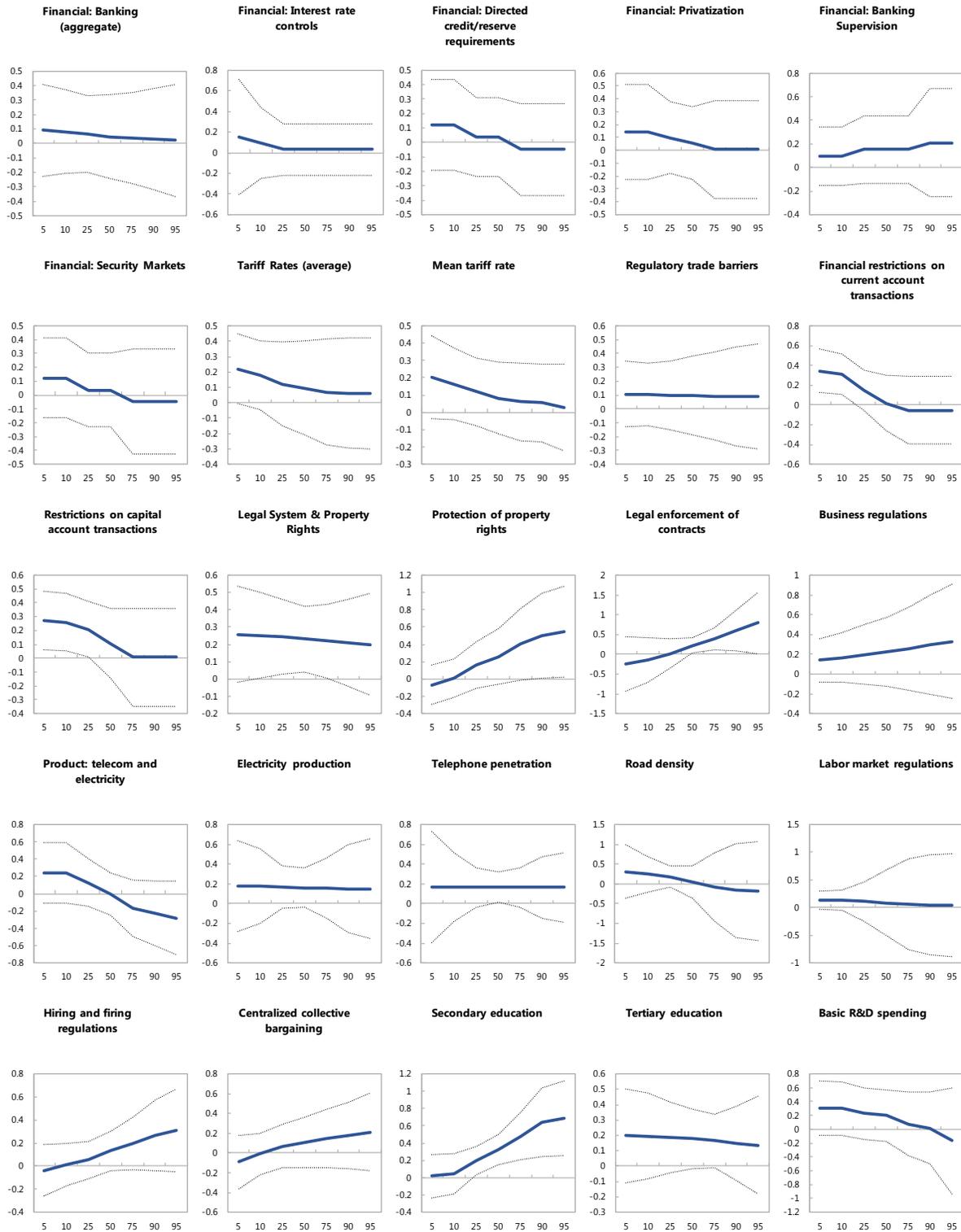


Figure A4. Elasticity of Manufacturing Exports w.r.t. REER. Low Income Countries

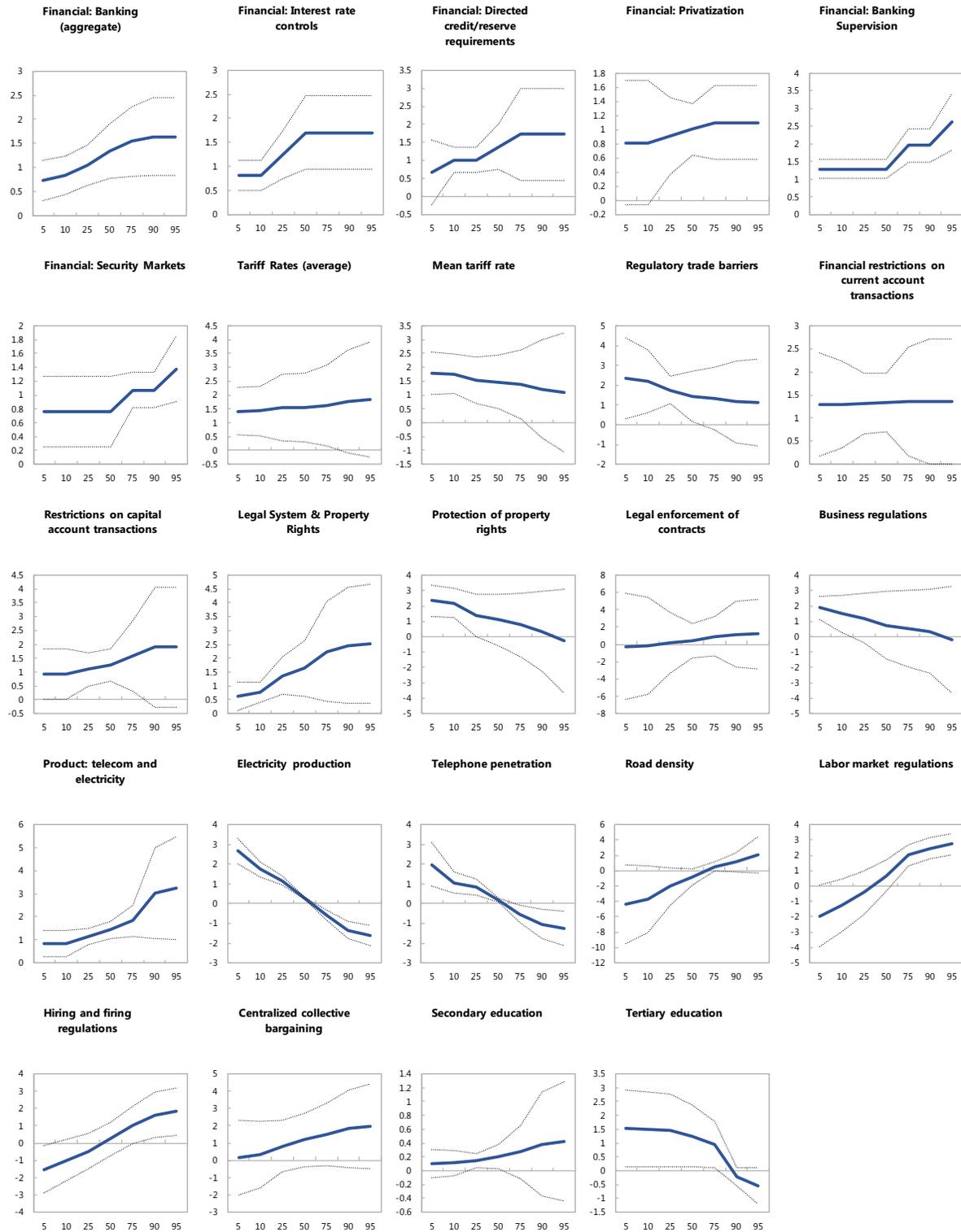


Figure A5. Elasticity of Services Exports w.r.t. REER. Non-LICs

