

External Cyclicalities in the Face of Aggregate Demand Shocks: Pros and Cons across Developed and Developing Countries

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ABSTRACT

Using data for a sample of advanced and developing countries, the paper studies variation in the effects of aggregate demand shocks on the external sector and underlying components and distinguishes between the effects of expansionary and contractionary shocks. The aim is to study the determinants and implications of cyclicalities across representative countries in each group. The composite evidence points to high degree of cyclicalities in many countries. Based on time-series correlations, there is a stronger cyclical co-movement between the trade and current account balances across advanced countries, compared to developing countries. Further, fluctuations in the financial balance are dependent on developments in exports in many developing countries. The determinants of external vulnerability vary with macroeconomic indicators. The evidence points to higher vulnerability of the external balance with respect to higher trend inflation across developing countries. In addition, constraints on capacity in developing countries could risk external stability as trend growth increases across countries. Government spending is an important determinant of external stability in developing countries, reflecting the adverse implications of higher government spending and a widening fiscal deficit on debt sustainability and external financial flows. Further, private consumption is a key driver of aggregate uncertainty and cyclical fluctuations in the external balances across developing countries.

Keywords: *Cyclicalities, demand shocks, financing, crowding out, supply constraints, developing and advanced countries.*

1. INTRODUCTION

Cyclical downturns could have adverse effects on the trade and financial balances of the balance of payments. External balances are determined by exports and imports, which primarily determine the trade and current account balances. Further, the financial external balance is primarily determined by FDI and portfolio flows. It is expected that trade and external balances vary with the business cycle. During booms, exports and imports may increase. The net effect on the trade and current account balances will depend on the relative elasticity of exports and imports to the business cycle.

Further, it is likely that financial inflows increase in response to improved economic conditions.

Demand elasticities or constraints on the supply side may differentiate the expansionary and contractionary effects of shocks to aggregate demand.

Further, macroeconomic policies could exacerbate (pro-cyclical) or mitigate (counter-cyclical) the effects of aggregate demand shocks on the macro economy. The aim of this research is to study variation in the effects of aggregate demand shocks on the external balances and major underlying components and distinguish between the effects of expansionary and contractionary shocks. Higher inflation is likely to undermine competitiveness and the prospect of improved external balances during an economic boom. In contrast, spending on investment contributes to capacity building and eases constraints on the supply side. Hence, investment spending stimulates real output with little inflationary effects. Through this channel, the external balances are likely to improve during economic booms.

Macroeconomic policies could further help external competitiveness if targeting higher growth and less inflation.

The data under investigation are for a sample of 29 advanced countries and 19 developing countries between 1963 and 2013. Estimation coefficients will measure the effects of fluctuations in aggregate demand on export growth, import growth, the trade balance, the current account balance, FDI flows, portfolio flows and the financial balance. The evidence will inform policy makers on how to capitalize on external openness to stimulate the economy and ensure the best results for economic performance and external stability, without unduly exacerbating macroeconomic imbalances and subsequent adverse effects on the economy.

The composite evidence points to high degree of cyclicalities in the underlying components of external balances in many countries. The correlation between the trade and current account balances is stronger across advanced countries, compared to developing countries. In addition to the trade balance, other components of the current account balance are equally important to external stability in many developing countries. Fluctuations in the financial balance are dependent on developments in exports in many developing countries, signifying the need for external financing. The determinants of cyclicalities in external stability also provide sharp contrasts across the two country groups. The evidence points to higher vulnerability of the external balance with respect to higher trend inflation across developing countries. In addition, constraints on capacity in developing countries could risk external stability as trend growth increases across countries. Government spending is an important determinant of external stability in developing countries, reflecting the adverse implications of higher government spending and a widening fiscal deficit on debt

sustainability and external financial flows. Further, private consumption is a key driver of aggregate uncertainty and cyclical fluctuations in the external balances across developing countries.

The remainder of the paper is organized as follows. Section II provides theoretical background.

Section III describes the empirical methodology. Section IV discusses the implications of the time-series evidence.

Section V analyzes co-movements in the cyclical responses of macro variables to aggregate demand shocks across the groups of developing and advanced countries.

Section VI analyzes determinants of cyclicality in the external balances and underlying components across the two country groups. Section VII offers a summary and conclusion

2. THE ASYMMETRIC EFFECTS OF AGGREGATE DEMAND SHOCKS

The empirical investigation will separate shocks to aggregate demand into positive and negative components to study possible asymmetric effects on the macro-economy over the business cycle. This section outlines the theoretical arguments regarding the determinants of asymmetry in the face of variation in aggregate demand.

Asymmetric cyclical fluctuations may be a function of conditions on the demand and/or supply-side of the economy (Kandil, 1995, 1996, 1998, and 1999; Karras, 1996a, b; Apergis et al., 2005). To illustrate, consider the following reduced-form equation:

$$Dv_t = \sum_{i=0}^{\infty} \beta_{pv}^d \text{posd}_{t-i} + \sum_{i=0}^{\infty} \beta_{nv}^d \text{negd}_{t-i}, v = x, i \quad (1)$$

$D(\cdot)$ is the first-difference operator. The log of exports is denoted by x where denotes the log value of imports. Aggregate demand shocks comprise distributed lags of positive and negative shocks, posd_{t-j} and negd_{t-j} . The difference between β_{pv}^d and β_{nv}^d measures asymmetry in each variable's response to the specific shocks underlying aggregate demand. The β parameters vary in response to two factors:

- The size of aggregate demand shifts in the face of the specific underlying shock; and/or
- Conditions on the supply side that determine capacity constraints and price flexibility in the face of aggregate demand shifts.

2.1 Demand-Side Asymmetry

The size of the aggregate demand shift may be different with respect to the specific underlying expansionary and contractionary shocks.

Two factors determine the size of aggregate demand shifts with respect to the underlying shocks. First, binding liquidity constraints may differentiate the effects of demand shocks on financial markets. Access to credit is necessary to finance higher spending. Given the limited supply of available loanable funds above maximum capacity, an increase in spending raises the interest rate.

An increase in the cost of borrowing counters demand expansion in the face of a stimulus policy.¹ Constraints on capacity in the labor and product markets increase crowding out and the probability of asymmetry in demand shifts in the face of equal underlying expansionary and contractionary shocks.

2.2 Supply-Side Asymmetry

Conditions on the supply side in the labor and/or product markets may differentiate the slope of the aggregate supply curve in the face of expansionary and contractionary demand shifts. New Keynesian theoretical models have focused on market imperfections towards an explanation of a kinked-supply curve. The source of asymmetry has varied between sticky-wage and sticky-price explanations of business cycles.

Sticky-wage models have traced sources of cyclical fluctuations to conditions in the labor market (see, e.g., Gray (1978)). Implicit or explicit labor contracts may offer an explanation of sticky wages. Given nominal wage rigidity, an unanticipated increase in price, in response to a positive demand shock decreases the real wage and increases the output supplied in the short-run.

Conditions in the labor market may differentiate, however, upward and downward nominal wage flexibility in the face of expansionary and contractionary demand

¹ The unfolding debt crisis in Europe provides a clear illustration of how the increase in government spending financed by higher cost of borrowing results in a ballooning deficit that demands ever increasing risk premium. The end result is unsustainable public finances that undermine the effectiveness of government spending to stimulate growth and crowd out private activity. As government debt builds up with fiscal expansions, Miller et. al. (1990) argues that the monetary risk of default or increasing inflation risk will reinforce crowding out effects through interest rates. This explanation was advocated in view of the evidence of expansionary fiscal contractions, see, e.g., Giavazzi and Pagano (1990), and Alesina and Perotti (1995). In this environment, the risk on external stability is higher in light of higher deficit, higher cost of borrowing and higher inflation.

shocks.² Implicit or explicit contractual wage agreements may establish that nominal wage flexibility is asymmetric.

Asymmetric nominal wage flexibility may be the result of institutional settings which differentiate wage and salary negotiations in the upward and downward directions.³ Alternatively, the asymmetric flexibility of nominal wages may be an endogenous response to aggregate uncertainty.⁴

More upward flexibility of the nominal wage to positive demand shocks prompts instantaneous increase of wages. The upward flexibility of the nominal wage moderates the increase in output growth in the face of expansionary demand shocks. Consequently, higher demand will be reflected in a higher cost of the output produced and, in turn, higher prices. In contrast, if nominal wages are more downwardly rigid, relative to prices, the real wage increases. Higher real wage increases the cost of the output produced, exacerbating output contraction and moderating price deflation. Accordingly, asymmetric nominal wage adjustment implies a steeper supply curve in the face of expansionary demand shifts, compared to contractionary shifts.

Sticky-price explanations have isolated output fluctuations in the short-run from conditions in the labor market.⁵ Menu costs limit the frequency of adjusting prices over time. These are the costs involved in implementing and announcing a price change. Given price rigidity, firms resort to adjusting output in the short-run in response to unanticipated demand shifts. Conditions in the product market may establish, however, that prices adjust asymmetrically in the face of demand shocks.⁶

² See, e.g., Kandil (2002a, b).

³ During boom periods, cost of living adjustments may be specified to guarantee workers an upward adjustment of wages to keep up with inflation. In contrast, firms may be reluctant to take aggressive measures towards adjusting nominal wages in the downward direction during recessionary periods. This is because the search and training cost of hiring new workers to accommodate a future rise in demand may actually exceed the perceived loss of retaining workers at wages that exceed the marginal physical product of labor during recessionary periods.

⁴ Models of the variety of Gray (1978) have emphasized the dependency of the degree of indexation on the variability of stochastic disturbances. In a situation where positive and negative shocks are not equally variable, agents' incentives for the optimal degree of indexation would be asymmetric.

⁵ See, e.g., Ball et al. (1988).

⁶ See, e.g., Ball and Mankiw (1994).

Positive trend inflation plays a key role in introducing asymmetries. Inflation causes firms' relative prices to decline automatically between adjustments. This requires greater adjustment of firms' desired price in the face of positive shocks, compared to negative shocks.

When a firm wants a lower relative price in the face of negative demand shocks, inflation does much of the work, decreasing the need to pay the menu costs to adjust prices. By contrast, a positive demand shock means that the desired relative price increases while actual price is falling on account of high trend inflation, creating a large gap between desired and actual prices. As a result, positive shocks are more likely to induce a larger price adjustment, compared to negative shocks.

Asymmetric price adjustment implies that shifts in aggregate demand have asymmetric effects on output.

Since prices are sticky downward, a fall in aggregate demand is absorbed in output contraction. Higher upward flexibility of prices moderates the output increase in response to expansionary demand shocks. Accordingly, asymmetric price adjustment implies a steeper supply curve in the face of expansionary demand shifts, compared to contractionary shifts.

3. EMPIRICAL FRAMEWORK

The empirical model comprises reduced-form equations explaining export growth and import growth as well as the change in financial flows, FDI and portfolio flows. The trend component of the series is the domain of real growth factors that vary with labor, capital and technology. The results indicate that this component is non-stationary.⁷ To account for non-stationarity, empirical models are estimated in first-differenced form.

Fluctuations in the estimated dependent variables are attributed to a variety of shocks impinging on the economic system.

Assume aggregate demand shocks are distributed symmetrically around an anticipated steady-state average of growth over time. This trend is consistent with capacity utilization in the economy and varies with agents' forecasts of the determinants of aggregate demand in equilibrium. Shocks to aggregate demand develop randomly around the forecasted trend and determine cyclicity in output growth and price inflation.

⁷ The test follows the suggestions of Nelson and Plosser (1982). Based on tabulation provided by Dickey and Fuller (1981), the dependent variables in the empirical model are non-stationary in level and stationary in first-difference. Nonetheless, there is no evidence of joint co-integration between the non-stationary dependent variable and explanatory variables. Hence, the empirical model does not account for an error correction term on the right hand side of the equation.

Aggregate demand varies with the major determinants of public and private spending: government spending on consumption, private consumption, and investment. To account for interaction with the rest of the world, the model specification also includes the exchange rate.

Accordingly, the empirical model is specified as follows:

$$Dx_t = \beta_{0y} + \beta_{1y}E_{t-1}Dd_t + \beta_{2y}E_{t-1}Dh_t + \beta_{3yp}posd_t + \beta_{3yn}negd_t + \beta_{4yp}posh_t + \beta_{4yn}negh_t + \eta_{xt} \quad (2)$$

$$Di_t = \beta_{0p} + \beta_{1p}E_{t-1}Dd_t + \beta_{2p}E_{t-1}Dh_t + \beta_{3pp}posd_t + \beta_{3pn}negd_t + \beta_{4pp}posh_t + \beta_{4pn}negh_t + \eta_{it} \quad (3)$$

$D(\cdot)$ is the first-difference operator. Real export growth is denoted by Dx_t , while Di_t denotes import growth. $E(\cdot)$ is the expected value of a given variable at time t , based on information available to agents at time $t-1$.⁸ EDd_t denotes anticipated growth of aggregate demand. Anticipated demand growth and currency movement determines planned demand for exports and imports and, therefore, production and consumption plans. Expansionary and contractionary shocks to aggregate demand are approximated by $posd_t$ and $negd_t$. Random shocks may have asymmetric effects as producers and consumers may behave differently with respect to unforeseen developments, both domestically and externally.

Country-specific aggregate demand shocks provide a composite measure of a variety of shocks impinging on the economic system. However, to capture specific channels of openness to trade and financial flows, the empirical model accounts for a specific measure of external competitiveness. The exchange rate measures the real price of the domestic currency relative to a weighted average of currencies for major trading partners. An increase indicates anticipated currency appreciation, EDh_t . Positive shocks to the exchange rate, $posh_t$, are unexpected appreciation of the domestic currency.

Similarly, $negh_t$ approximates unexpected depreciation of the domestic currency. The terms η_{yt} , and η_{pt} are random unexplained residuals with zero mean and constant variance.

⁸ By construction, anticipated changes of variables on the right hand-side of the empirical models are function of lagged variables in the economic system, which capture persistence in adjustments over time. Having accounted for this persistence, only contemporaneous shocks appear in the model.

Expansionary aggregate demand shocks increase demand and income. The resulting increase in money demand raises the interest rate with crowding out effects on aggregate demand. If the net result is positive, expansionary demand shocks increase price inflation and output growth. Through the income channel, economic expansions are likely to have a positive effect on consumption and, therefore, import growth. The effects on investment spending will depend on the relative effects of demand expansion on income and the interest rate. If the income channel dominates investment demand increases during economic expansion. Higher investment is likely to induce higher increase in exports and imports.

Structural parameters determine the net effects of currency fluctuations on output and price.⁹ Several channels are involved that affect export competitiveness and the cost of intermediate imports for production. The relative strengths of these channels determine the net effects on the external balance.

To measure fluctuations in external balances in response to aggregate macroeconomic fluctuations, the empirical models in (2) and (3) are replicated to estimate the change in the trade balance, $Dtbal$, the change in the current account balance, DCA , the change in portfolio financial flows, $DPOR$, the change in FDI flows, $DFDI$, and the change in the financial balance, $DFBAL$.

Details of the estimation procedure and the approach followed to construct empirical proxies for explanatory variables are available in Appendix A.¹⁰

4. TIME-SERIES RESULTS

Tables A1 and A2 of the appendix summarize the results of estimating the empirical models in (1) and (2).¹¹ The models are estimated using individual country time-series data to provide evidence of cyclicity or lack thereof which will inform further analysis of variation across countries.¹²

The models are estimated for export growth, and import growth. In addition, the results from replicating the

⁹ For a detailed theoretical illustration, see Kandil and Mirzaie (2002).

¹⁰ The empirical models are estimated using annual data. The effects of aggregate demand shocks on the economy usually involve longer transmission lag that is better captured using annual data. Quarterly data are not adequately available to estimate the model using distributed lags.

¹¹ The evidence summarizes variables' responses to aggregate demand shocks. Other detailed estimates are available upon request.

¹² Pooling the time-series data disguises country-specific evidence which contradicts the objectives of the empirical investigation.

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empirical models for the trade balance, the current account balance, portfolio flows, FDI flows and the financial balance are also reported. The evidence distinguishes between cyclical responses during booms and recessions which will set the stage for further analysis of asymmetry in the cross-section regressions regarding co-movements in cyclicalities across economic variables and the major determinants of this cyclicalities.

4.1 Time-Series Evidence: Developing Countries,

Table A1 of the appendix presents the evidence of cyclicalities in the external balance and underlying components. Countries are able to capitalize on developments in the business cycle to mobilize exports.

During an economic boom, an increase in aggregate demand stimulates export growth in 11 countries. During a cyclical downturn a decrease in aggregate demand triggers a reduction in export growth in 9 countries.

Import growth also varies closely with cyclicalities in aggregate demand. Expansionary aggregate demand shocks stimulate import growth in 6 countries. During cyclical downturn, contractionary demand shocks decrease import growth in 6 countries.

The trade balance could be fluctuating with aggregate demand conditions, reflecting cyclicalities in exports and imports. An expansionary shock to aggregate demand improves the trade balance in 1 country. The reduction in aggregate demand worsens the trade balance in 1 country. The limited pervasive support to fluctuations in the trade balance with cyclicalities in aggregate demand indicates offsetting channels on imports and exports in many countries.

Fluctuations in the current account balance may also vary with aggregate demand conditions, although with limited statistical significance. An increase in aggregate demand improves the current account balance in 1 country. A slowdown in aggregate demand worsens the current account balance in 2 countries.

FDI flows could also vary with cyclicalities in aggregate demand, although with limited statistical significance. An increase in aggregate demand may improve the outlook for investment return, inducing more FDI inflows. In support of this hypothesis is the increase in FDI flows in one country, where a booming economy attracts FDI flows into the energy sector. Similarly, a slowdown in aggregate demand decreases FDI flows in four countries.

Portfolio capital flows may also be dependent on domestic economic conditions. An increase in aggregate demand stimulates demand for credit and increases the cost of borrowing, attracting capital inflows in one country. The limited statistically significant evidence does not provide strong support to fluctuations in portfolio

capital flows or the financial balance with cyclicalities in aggregate demand.

4.2 Across Advanced Countries

Table A2 of the appendix presents the evidence of cyclicalities in external balances and underlying components. The impact of demand fluctuations on export growth appears to be more pervasive across advanced countries, compared to developing countries. Export growth increases with aggregate demand shocks during economic booms in 13 countries. Similarly, export growth slows down with contractionary shocks to aggregate demand in 14 countries.

Imports also vary with the business cycle in many advanced countries. Expansionary demand shocks stimulate import growth in nine countries. Contractionary demand shocks slowdown import growth in 19 countries.

The evidence attests to the importance of demand fluctuations to cyclicalities in import growth, which appears more responsive during a cyclical downturn.

The limited significance and mixed directions attest to offsetting channels of aggregate demand fluctuations on the trade balance in many advanced countries. The trade balance improves significantly during periods of economic expansion in six countries. Similarly, deterioration in the trade balance during cyclical downturns is limited to three countries. Offsetting channels also render the effects of cyclical fluctuations on the current account balance mostly insignificant. The current account balance improves significantly in three countries during economic expansions and decreases significantly in one country during cyclical downturns.

There is no significant evidence of cyclicalities in FDI flows during economic booms. Demand contraction slows down FDI in one country only. The limited significant evidence isolates FDI flows from cyclicalities in economic conditions, attesting to robust structural return on FDI that appears to be guiding flows over time.

The significant evidence is also limited regarding fluctuations in portfolio flows with the business cycle. No significant increase in portfolio flows is evident during economic booms. The reduction in portfolio flows is significant during recessions in three countries. The evidence further confirms robust structural return on portfolio flows in advanced countries.

The financial balance improves significantly during cyclical booms in three countries. Deterioration in the financial balance is significant during cyclical downturns in five countries. The limited significant evidence is consistent with the pervasive a-cyclical responses of FDI and portfolio flows in the majority of countries under investigation.

5. CO-MOVEMENT BETWEEN TIME-SERIES RESPONSES

Having reviewed cyclical with respect to aggregate demand shocks, the analysis turns to an evaluation of co-movement in the cyclical responses across variables based on significant correlation coefficients. Correlations will establish the transmission channels of cyclical across the macro economy and possible asymmetry in these channels over the business cycle. Tables 1A and 1B present co-movements in cyclical during booms and recessions across developing countries where Tables 2A and 2B present the evidence across advanced countries.

5.1 Across Developing Countries

During a boom, the correlation between the cyclical responses of FDI flows and portfolio flows are negative and significant. Countries that attract more FDI flows are usually less attractive for hot portfolio inflows.

FDI flows are attracted to an environment that is conducive to private activity. In contrast, portfolio inflows may be attracted to sovereign lending where fiscal dominance crowds out private incentives. Hence, these flows appear to be competing, rather than complementary.

During a boom, a wider current account deficit is financed by inflows in the financial account, as evident by the negative and significant correlation coefficient. More inflows help improve the financial balance and complement a wider deficit in the current account.

Countries that are able to sustain high current account deficit do capitalize on their ability to attract capital inflows and provide financing in the financial balance.

During a downturn, exports and imports move together, reflecting the high import content of exports.

The reduction in imports improves the current account balance, as evident by the negative correlation coefficient. Variation in FDI appears to be independent of fluctuations in exports and imports, as evident by the negative and statistically significant correlation coefficients.

5.2 Across Advanced Countries

During a boom, countries that attract higher FDI flows attract less portfolio inflows, as evident by the negative and statistically significant correlation coefficient. This evidence reinforces the previous finding across developing countries. Countries that boost private incentives are in a better position to attract FDI flows. In contrast, countries that have higher fiscal deficit are typically targets for higher portfolio inflows.

During a boom, the trade balance improves in response to higher export growth, as evident by the positive and significant correlation coefficient. Higher portfolio inflows help finance a wider trade deficit, as

evident by the negative and statistically significant correlation coefficient. Improvement in the trade balance helps solidify improvement in the current account balance, as evident by the positive and significant correlation coefficient. As financial inflows are financing a wider trade deficit, they vary negatively with export shocks. Similarly, both the trade and current account balances vary negatively and significantly with the financial account balance.

During a downturn, a slowdown in aggregate demand correlates with simultaneous reduction in FDI and portfolio capital flows, as evident by the positive and significant correlation. The reduction in exports during downturns necessitates higher portfolio capital inflows to finance a higher current account deficit, as evident by the negative and significant correlation coefficient. The evidence is further reinforced by the negative correlations between the financial balance and deterioration in the trade and current account balances during cyclical downturns. A wider trade and current account deficits are financed via higher inflows that sustain improvement in the financial balance.

6. CROSS-COUNTRY ANALYSIS

Having analyzed cyclical responses and co-movements across variables during business cycles, the analysis turns to determinants of cyclical across advanced and developing countries. The evidence will establish how indicators of the macro economy may determine the cyclical responses and possible asymmetry in the relationship during booms and recessions.

6.1 The Impact of Trend and Variability of Price Inflation on Cyclical

Table 3A summarizes the impacts of higher trend or variability of inflation on the cyclical responses to aggregate demand shocks during booms and recessions across developing countries. Table 3B summarizes the evidence across advanced countries.

6.1.1 Across Developing Countries

During economic booms, higher trend inflation reduces the size of the cyclical response of FDI flows and the financial balance to expansionary demand shocks.

High trend inflation is not conducive to financial inflows as it increases uncertainty and erodes the real value of financial returns. The evidence remains robust in the face of high inflation variability.

During downturns, high trend inflation increases the cyclical response (reduction) of imports. High trend inflation stimulates, in general, higher imports in search for a cheaper alternative to high domestic prices.

Consistently, imports respond more elastically to a cyclical downturn as trend inflation increases across countries. Further, higher inflation variability results in an improved current account balance, reflecting significant reduction of imports during cyclical downturns.

6.1.2 Across Advanced Countries

During economic booms, high trend inflation increases the cyclical response of the trade balance and the current account balance to expansionary aggregate demand shocks. High trend inflation could be an indication of a surge in economic activity and exports, improving external balances.

During downturns, higher variability of inflation renders exports more resilient (increasing). Variability of inflation signals high probability of a quick reversal in the business cycle. Producers may prefer hoarding larger inventory in anticipation of a quick pickup in demand for exports.

6.2 The Impact of Trend and Variability of Real Growth on Cyclical

Table 4A presents the evidence of the effects of the trend and variability of real growth on the cyclical response to aggregate demand shocks across developing countries. Table 4B presents the evidence across advanced countries.

6.2.1 Across Developing Countries

Higher trend growth has a negative significant effect on the response of FDI and the financial balance to expansionary demand shocks. The implication is high trend growth signals near capacity limitation which reduces incentives to expand FDI and attract financial inflows during economic expansions. The evidence remains robust with respect to higher variability of growth. Further, higher variability of growth has a positive significant effect on the cyclical response of the current account balance to demand shocks. Higher variability of growth is consistent with improvement in the current account balance during expansions.

During downturns, higher trend growth increases the resilience of the current account balance. Higher trend and variability of growth increase the probability of a quick reversal in the cycle, which block decisions to slow production that could lead to a wider current account deficit during cyclical downturns.

6.2.2 Across Advanced Countries

Trend growth does not have a significant effect on the response of economic variables to aggregate demand shocks during a boom. During a downturn, higher trend and variability of growth have a negative significant effect on the response of imports to cyclical downturns. Growth stimulates higher demand for imports. Accordingly, countries that experience higher growth over time are more reluctant to slowdown the demand for imports during recessions in anticipation of a quick reversal of the cycle.

6.3 The Impact of Trend and Variability of Government Spending on Cyclical

Table 5A presents the evidence of the effects of the trend and variability of government spending on the cyclical responses of components of the external balances

to aggregate demand shocks across developing countries. Table 5B presents the evidence across advanced countries.

6.3.1 Across Developing Countries

During economic booms, higher trend growth of government spending has a positive significant effect on the response of the current account balance to expansionary demand shocks. The implication is higher trend growth of government spending helps sustain higher exports, increasing the probability of improved current account balance during cyclical upturns. Nonetheless, higher trend and variability of government spending have a negative significant effect on the cyclical response of FDI flows to expansionary demand shocks. The implication is higher government spending signals concerns about the cost of financing a wider fiscal deficit which appears to be slowing FDI flows during a boom.

During a downturn, higher trend and variability of government spending have a negative significant effect on the cyclical response of the current account balance to contractionary demand shocks. Higher government spending helps sustain economic activity, averting deterioration in the current account balance during cyclical downturns.

6.3.2 Across Advanced Countries

There is no evidence of significant effect of higher growth and variability of government spending on fluctuations of the external balances of advanced countries during booms and recessions.

6.4 The Impact of Trend and Variability of Private Consumption Growth on Cyclical

Table 6A presents the evidence of the effects of the trends and variability of private consumption growth on the cyclical responses of external balances to aggregate demand shocks across developing countries. Table 6B presents the evidence across advanced countries.

6.4.1 Across Developing Countries

Higher trend and variability of private consumption have a positive significant effect on the cyclical response of the current account balance to expansionary demand shocks. Private consumption helps support economic activity with a positive effect on the current account position during cyclical booms.

Nonetheless, higher trend and variability of consumption growth have a negative significant effect (reduction) on the response of FDI flows to expansionary demand shocks. Higher consumption growth increases inflationary expectations with a negative effect on the countries' ability to attract more FDI flows during economic booms. The evidence remains robust regarding the impact of the variability of consumption growth on cyclical responses of the current and financial flows.

During a downturn, higher trend consumption growth has a negative significant effect on the current account balance. The implication is trend consumption

growth helps sustain economic activity, increasing the resilience of the external balance during cyclical downturns. During a downturn, agents expect a quick reversal of economic conditions in light of robust trends, increasing the resilience of the current account balance.

The evidence is robust with respect to higher variability of consumption growth. In contrast, higher variability of consumption increases the cyclicity of FDI flows (reduction) during cyclical downturns. The implication is FDI is more responsive to cyclical slowdown where consumption growth is highly variable, as the latter increases concerns about rising inflation and risks to sustainability.

6.4.2 Across Advanced Countries

During economic booms, high variability of consumption has a negative significant effect on the response of portfolio flows to expansionary demand shocks. The implication is higher variability of consumption increases uncertainty with adverse effect on portfolio flows to advanced countries.

During a downturn, higher variability of consumption increases the resilience of imports, FDI and portfolio flows to a slowdown in demand conditions. The implication is higher variability of consumption increases the probability of a quick reversal in the cycle and, therefore, resilience of key components of the external balance to cyclical downturns.

6.5 The Impact of Trend and Variability of Private Investment Growth on Cyclical Fluctuations

Table 7A presents the evidence regarding the impact of trend and variability of private investment growth across developing countries. Table 7B presents the evidence across advanced countries.

6.5.1 Across Developing Countries

During economic booms, higher trend growth of private investment has a negative significant effect on import growth during economic expansion. The implication is trend investment growth does not support higher growth of imports across countries. During cyclical downturns, trend growth of private investment accelerates the reduction in imports with respect to a slowdown in demand. Asymmetry indicates a risk-averse strategy. High trend investment indicates less commitment to higher imports during booms and a fast reversal of commitments during downturns.

6.5.2 Across Advanced Countries

During economic booms, higher trend investment growth accelerates improvement in the current account balance with respect to expansionary demand shocks. The implication is higher investment helps boost the external position, improving the current account balance during an economic boom. However, the financial position of the external balance deteriorates where trend investment is high. As returns on investment decrease with higher trends, financial inflows are slowing during

economic booms. The evidence is robust with respect to high investment variability, further reinforcing the decline in returns on more variable investment growth.

During downturns, higher trend investment growth has a negative significant effect on the response of the current account balance to a slowdown in aggregate demand. The implications are high trend investment growth helps increase the resilience of the current account balance during cyclical downturns. The evidence reinforces the positive role of trend investment in stimulating economic activity and improving external stability. Hence, higher investment growth renders the current account balance more resilient during cyclical downturns.

7. CONCLUSION

The paper has focused on analyzing the time-series cyclical responses of key components of external balances with a goal to identify the degree of cyclicity in the face of aggregate demand shocks. In addition, the analysis studies co-movements among the cyclical responses in the balance of payments and the determinants and implications of cyclicity. The objective is to draw contrast between binding constraints and the implications of external cyclicity across samples of developing and advanced countries with a view towards drawing policy implications to maximize the returns on openness to trade and financial flows and ease capacity constraints.

A summary of the time-series evidence indicates that developing countries, in general, are able to capitalize on developments in the business cycle to mobilize exports. Import growth also varies closely with cyclicity in aggregate demand. The limited pervasive support to fluctuations in the trade balance with cyclicity in aggregate demand indicates offsetting channels on imports and exports in many developing countries.

Fluctuations in the current account balance may also vary with aggregate demand conditions, although with limited statistical significance. FDI flows could also vary with cyclicity in aggregate demand, although with limited statistical significance. Further, the limited statistically significant evidence does not provide strong support to fluctuations in portfolio capital flows or the financial balance with cyclicity in aggregate demand in many developing countries.

The impact of demand fluctuations on export growth appears to be more pervasive across advanced countries, compared to developing countries. Imports also vary with the business cycle in many advanced countries.

The limited significance and mixed directions attest to offsetting channels of aggregate demand fluctuations on the trade balance in many advanced countries. Offsetting channels also render the effects of cyclical fluctuations on the current account balance mostly insignificant. The limited significant evidence isolates FDI flows from cyclicity in economic

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conditions, attesting to robust structural return on FDI that appears to be guiding flows to advanced countries over time. The significant evidence is also limited regarding fluctuations in portfolio flows with the business cycle.

The limited cyclical evidence is consistent with pervasive a-cyclical responses of FDI and portfolio flows in the majority of advanced countries under investigation.

Across developing and advanced country groups, the evidence is robust regarding the negative correlations between FDI and portfolio flows, ruling out their complementarities. Across both country groups, the evidence supports the notion that a wider current account deficit is financed via higher financial inflows.

Higher export growth appears to be a major driver of improvement in the trade balance during economic booms across advanced countries. In contrast, portfolio inflows are a major complement of financing a wider current account deficit across developing countries.

Underlying the difference in the evidence between the two country groups is the degree of positive correlation between the trade and current account balances across developing and advanced countries.

While the correlation coefficient is positive across the two country groups, it is only significant across advanced countries. The implication is other components of the current account balance (e.g., remittances and the services balance) play a bigger role in differentiating the current account balance from the trade balance in developing countries. In contrast, these components appear to be less pronounced across advanced countries, establishing a closer association between the trade and current account balances. The correlation between export growth and the financial balance is negative across developing and advanced country groups but significant only across the latter group. The evidence further attests to the importance of exports to drive the external position across advanced countries. Higher exports are consistent with less financial inflows and, therefore, deterioration in the financial balance across advanced countries.

Across developing countries, trend inflation is a signal of higher uncertainty that discourages financial flows, while inducing higher imports. Hence, trend inflation poses serious threat to external stability in developing countries. In contrast, trend inflation is a signal of higher growth that reflects positively on external stability in advanced countries. The difference in the evidence points to higher vulnerability of the external balance with respect to a higher trend inflation in developing countries.

Across developing countries, higher growth helps sustain improvement in the current account balance during booms and recessions. However, high trend growth could pose the risk of reaching capacity limitation, slowing down financial flows in the face of decreasing

returns to scale. In contrast, high trend growth is mostly affecting the resilience of import growth in advanced countries. The difference points to larger constraints on capacity in developing countries that could risk external stability as trend growth increases across countries.

Government spending is an important determinant of external stability in developing countries as it determines the cyclical responses of external flows during booms and recessions. In contrast, government spending is not an important determinant of external stability in advanced countries, signaling less concern about fiscal sustainability attributed to higher spending on the widening deficit and higher public debt.

Trend and variability of consumption play a bigger role in determining cyclical fluctuations of external balances across developing countries. Private consumption is a key driver of aggregate uncertainty and cyclical fluctuations in developing countries. In general, higher trend and variability of consumption increase uncertainty with adverse effects on financial flows to developing countries. Higher variability of consumption spending increases resilience during cyclical downturns, which is evident in developing and advanced countries.

The evidence signifies the importance of consumption to sustain demand growth and maintain external stability.

Imports are the main channel through which investment growth determines external stability in developing countries. While the evidence attests to the high import content of investment in developing countries, the cyclical nature of investment may trigger asymmetric responses of imports to avoid risk.

Specifically, imports may not go up significantly during a boom and prove to be resilient during a downturn the higher trend investment growth across countries.

Across advanced countries, investment growth reinforces the positive effects on the current account balance and its resilience during cyclical downturns. The evidence attests to a broader channel through which investment impacts external stability in advanced countries. However, binding capacity constraints decrease return on investment, limiting scope to attract more financial inflows the higher is trend investment across countries.

For policy implications, developing countries should establish priorities to contain cyclical fluctuations that weigh in adversely on external stability. Equally important is to address structural bottlenecks that hamper the inflows of financial investments over time. Reform of public finances is crucial to improve confidence and contain vulnerability. Robust consumption and investment spending help sustain viable economic conditions.

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However, priorities should be focused on addressing capacity constraints that accelerate inflationary pressures with adverse effects on external stability.

managing domestic cyclicity to hedge against external vulnerability and ensures sustainable external balances, aided by robust financial inflows.

External stability in advanced countries appears less vulnerable to cyclicity of aggregate demand. However, capacity constraints appear to pose a binding constraint that limits returns on investment and slows down financial flows. Priorities should be focused on addressing structural bottlenecks to address capacity limitations and ensure robust financial flows for external stability.

Across the samples of developing and advanced countries, the evidence attests to the importance of

Table 1A. Co-movements between Cyclical Fluctuations in External Balances and Underlying Components across Developing Countries during Booms

Correlation between	DEXPpos	DIMPpos	DFDIpos	DPORpos	DTBALpos	DCApos	DFBALpos
DIMPpos	0.15 (0.54)						
DFDIpos	-0.04 (0.87)	-0.078 (0.76)					
DPORpos	0.07 (0.78)	0.14 (0.58)	-0.44* (0.071)				
DTBALpos	-0.091 (0.72)	0.091 (0.72)	-0.35 (0.15)	-0.092 (0.72)			
DCApos	-0.019 (0.94)	-0.38 (0.14)	-0.11 (0.68)	-0.56* (0.018)	0.12 (0.66)		
DFBALpos	-0.17 (0.53)	0.32 (0.25)	0.32 (0.25)	0.58* (0.024)	-0.012 (0.97)	-0.93* (0.0001)	

Table 1B. Co-movements between Cyclical Fluctuations in External Balances and Underlying Components across Developing Countries during Recessions

Correlation between	DEXPneg	DIMPneg	DFDIneg	DPORneg	DTBALneg	DCAneg	DFBALneg
DIMPneg	0.62* (0.0065)						
DFDIneg	-0.45** (0.06)	-0.66* (0.0028)					
DPORneg	0.23 (0.35)	0.17 (0.50)	0.17 (0.49)				
DTBALneg	-0.051 (0.84)	-0.17 (0.50)	0.007 (0.98)	0.06 (0.81)			
DCAneg	-0.25 (0.32)	-0.49* (0.039)	0.32 (0.19)	-0.32 (0.19)	0.016 (0.95)		
DFBALneg	-0.025 (0.92)	0.21 (0.41)	-0.05 (0.84)	-0.21 (0.39)	-0.23 (0.36)	-0.086 (0.74)	

Table 2A. Co-movements between Cyclical Fluctuations in External Balances and Underlying Components across Advanced Countries during Booms

Correlation between	DEXPpos	DIMPpos	DFDIpos	DPORpos	DTBALpos	DCApos	DFBALpos
DIMPpos	-0.12 (0.58)						
DFDIpos	-0.26 (0.23)	-0.033 (0.87)					
DPORpos	0.26 (0.21)	0.060 (0.77)	-0.90* (0.0001)				
DTBALpos	0.38** (0.078)	-0.19 (0.37)	0.21 (0.34)	-0.76* (0.0001)			
DCApos	0.26 (0.23)	-0.19 (0.37)	0.071 (0.74)	-0.21 (0.32)	0.97* (0.0001)		
DFBALpos	-0.56* (0.0073)	0.10 (0.64)	-0.0096 (0.97)	0.18 (0.40)	-0.80* (0.0001)	-0.82* (0.0001)	

Table 2B. Co-movements between Cyclical Fluctuations in External Balances and Underlying Components across Advanced Countries during Recessions

Correlation between	DEXPneg	DIMPneg	DFDIneg	DPORneg	DTBALneg	DCAneg	DFBALneg
DIMPneg	0.085 (0.69)						
DFDIneg	0.20 (0.34)	0.077 (0.71)					
DPORneg	0.13 (0.52)	0.08 (0.70)	0.87* (0.0001)				
DTBALneg	0.15 (0.46)	-0.11 (0.61)	-0.013 (0.95)	-0.10 (0.63)			
DCAneg	0.17 (0.43)	-0.098 (0.65)	0.08 (0.71)	0.027 (0.90)	0.25 (0.23)		
DFBALneg	-0.39* (0.55)	0.059 (0.78)	-0.056 (0.79)	0.14 (0.51)	-0.65* (0.0004)	-0.43* (0.035)	

Notes:

Correlations are between positive shocks to DIMP, import growth; DFDI, growth of FDI; DPOR, growth of portfolio flows; DTBAL, change in trade balance, DCA, change in current account, DFBAL, change in financial balance.

Correlations range between -1 and 1 where zero indicates no correlation.

Probability of zero correlation is in parentheses where * and ** denote significance at the five and ten percent levels of statistical error.

Table 3A: Significant Impacts of Trend or Variability of Inflation on Cyclical Responses of Key Macro Variables across Developing Countries

Dependent Variables	Developing Countries		Dependent Variables	Advanced Countries	
	During Trend Inflation	Booms or Inflation Variability		During Trend Inflation	Recessions or Inflation Variability
DEXP	n/s	n/s	DEXP	n/s	n/s
DIMP	n/s	n/s	DIMP	4.55** (1.90)	n/s
DTBAL	n/s	n/s	DTBAL	n/s	n/s
DCA	n/s	n/s	DCA	n/s	-23.4* (-2.30)
DFDI	-53.19** (-1.91)	-13.58* (-2.01)	DFDI	n/s	n/s
DPOR	n/s	n/s	DPOR	n/s	n/s
DFBAL	-55.5* (-2.89)	-15.98* (-11.70)	DFBAL	n/s	n/s

Table 3B: Significant Impacts of Trend or Variability of Inflation on Cyclical Responses of Key Macro Variables across Advanced Countries

Dependent Variables	Advanced Countries		Dependent Variables	Developing Countries	
	During Trend Inflation	Booms or Inflation Variability		During Trend Inflation	Recessions or Inflation Variability
DEXP	n/s	n/s	DEXP	n/s	-3.61* (-2.39)
DIMP	n/s	n/s	DIMP	n/s	n/s
DTBAL	776.9* (2.27)	n/s	DTBAL	n/s	n/s
DCA	522.3** (1.92)	n/s	DCA	n/s	n/s
DFDI	n/s	n/s	DFDI	n/s	n/s
DPOR	n/s	n/s	DPOR	n/s	n/s
DFBAL	n/s	n/s	DFBAL	n/s	n/s

Notes:

DEXP, export growth; DIMP, import growth; DTBAL, change in trade balance; DCA, change in current account, DFDI, change in foreign investment, DPOR, change in portfolio flows and DFBAL, change in financial balance.
n/s: not statistically significant.

Reported significant coefficients are from cross-country regressions that regress the dependent variable on trend inflation or inflation variability.
Trend is time-series average and variability is the standard deviation of inflation.

t-statistics are in parentheses and * and ** denote significance at the five and ten percent levels of statistical error.

Table 4A: Significant Impacts of Trend or Variability of Real Output Growth on Cyclical Responses of Key Macro Variables across Developing Countries

Dependent Variables	Developing Countries		Dependent Variables	Advanced Countries	
	During Trend Growth	Booms or Growth Variability		During Trend Growth	Recessions or Growth Variability
DEXP	n/s	n/s	DEXP	n/s	n/s
DIMP	n/s	n/s	DIMP	n/s	n/s
DTBAL	n/s	n/s	DTBAL	n/s	n/s
DCA	n/s	8.69** (1.81)	DCA	-49.7* (-2.24)	-19.14* (-2.51)
DFDI	-29.3* (-2.03)	-10.54** (-1.90)	DFDI	n/s	n/s
DPOR	n/s	n/s	DPOR	n/s	n/s
DFBAL	-34.1* (-9.34)	-12.77* (-15.26)	DFBAL	n/s	n/s

Table 4B: Significant Impacts of Trend or Variability of Real Output Growth on Cyclical Responses of Key Macro Variables across Advanced Countries

Dependent Variables	Advanced Countries		Dependent Variables	Developing Countries	
	During Trend Growth	Booms or Growth Variability		During Trend Growth	Recessions or Growth Variability
DEXP	n/s	n/s	DEXP	n/s	n/s
DIMP	n/s	n/s	DIMP	-43.55* (-2.37)	-49.13* (-4.70)
DTBAL	n/s	n/s	DTBAL	n/s	n/s
DCA	n/s	n/s	DCA	n/s	n/s
DFDI	n/s	n/s	DFDI	n/s	n/s
DPOR	n/s	n/s	DPOR	n/s	n/s
DFBAL	n/s	n/s	DFBAL	n/s	n/s

Notes:

DEXP, export growth; DIMP, import growth; DTBAL, change in trade balance; DCA, change in current account, DFDI, change in foreign investment, DPOR, change in portfolio flows and DFBAL, change in financial balance.
n/s: not statistically significant.

Reported significant coefficients are from cross-country regressions that regress the dependent variable on trend growth or growth variability.
Trend is time-series average and variability is the standard deviation of growth.

t-statistics are in parentheses and * and ** denote significance at the five and ten percent levels of statistical error.

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Table 5A: Significant Impacts of Trend or Variability of Growth in Government Spending on Cyclical Responses of Key Macro Variables across Developing Countries

Dependent Variables	Booms		Dependent Variables	Recessions	
	During Trend Growth	or Growth Variability		During Trend Growth	or Growth Variability
DEXP	n/s	n/s	DEXP	n/s	n/s
DIMP	n/s	n/s	DIMP	n/s	n/s
DTBAL	n/s	n/s	DTBAL	n/s	n/s
DCA	15.84** (1.80)	n/s	DCA	-34.95* (-2.49)	-29.99* (-2.24)
DFDI	-19.44** (-1.93)	-19.02* (-2.47)	DFDI	n/s	n/s
DPOR	n/s	n/s	DPOR	n/s	n/s
DFBAL	-23.4* (-14.54)	-20.35* (-7.16)	DFBAL	n/s	n/s

Table 5B: Significant Impacts of Trend or Variability of Growth in Government Spending on Cyclical Responses of Key Macro Variables across Advanced Countries

Dependent Variables	Booms		Dependent Variables	Recessions	
	During Trend Growth	or Growth Variability		During Trend Growth	or Growth Variability
DEXP	n/s	n/s	DEXP	n/s	n/s
DIMP	n/s	n/s	DIMP	n/s	n/s
DTBAL	n/s	n/s	DTBAL	n/s	n/s
DCA	n/s	n/s	DCA	n/s	n/s
DFDI	n/s	n/s	DFDI	n/s	n/s
DPOR	n/s	n/s	DPOR	n/s	n/s
DFBAL	n/s	n/s	DFBAL	n/s	n/s

Notes:

DEXP, export growth; DIMP, import growth; DTBAL, change in trade balance; DCA, change in current account, DFDI, change in foreign investment, DPOR, change in portfolio flows and DFBAL, change in financial balance
n/s: not statistically significant.

Reported significant coefficients are from cross-country regressions that regress the dependent variable on trend growth or growth variability.
Trend is time-series average and variability is the standard deviation of growth.

t-statistics are in parentheses and * and ** denote significance at the five and ten percent levels of statistical error.

Table 6A: Significant Impacts of Trend or Variability of Growth in Private Consumption on Cyclical Responses of Key Macro Variables across Developing Countries

Dependent Variables	Booms		Dependent Variables	Recessions	
	During Trend Growth	or Growth Variability		During Trend Growth	or Growth Variability
DEXP	n/s	n/s	DEXP	n/s	n/s
DIMP	n/s	n/s	DIMP	n/s	n/s
DTBAL	n/s	n/s	DTBAL	n/s	n/s
DCA	20.7* (2.65)	12.7* (2.79)	DCA	-43.7* (-3.89)	-26.7* (-4.15)
DFDI	-21.09* (-1.79)	-12.62** (-1.75)	DFDI	n/s	18.68** (1.67)
DPOR	-41.01* (-2.02)	-25.14* (-2.09)	DPOR	n/s	n/s
DFBAL	-25.9* (-8.12)	-15.58* (-7.44)	DFBAL	n/s	n/s

Table 6B: Significant Impacts of Trend or Variability of Growth in Private Consumption on Cyclical Responses of Key Macro Variables across Advanced Countries

Dependent Variables	Booms		Dependent Variables	Recessions	
	During Trend Growth	or Growth Variability		During Trend Growth	or Growth Variability
DEXP	n/s	n/s	DEXP	n/s	n/s
DIMP	n/s	n/s	DIMP	n/s	-4.20* (-3.30)
DTBAL	n/s	n/s	DTBAL	n/s	n/s
DCA	n/s	n/s	DCA	n/s	n/s
DFDI	n/s	n/s	DFDI	n/s	-442.6* (-2.06)
DPOR	n/s	-1386.11** (-1.69)	DPOR	n/s	-1275.9** (-1.78)
DFBAL	n/s	n/s	DFBAL	n/s	n/s

Notes:

DEXP, export growth; DIMP, import growth; DTBAL, change in trade balance; DCA, change in current account, DFDI, change in foreign investment, DPOR, change in portfolio flows and DFBAL, change in financial balance.
n/s: not statistically significant.

Reported significant coefficients are from cross-country regressions that regress the dependent variable on trend growth or growth variability.
Trend is time-series average and variability is the standard deviation of growth.

t-statistics are in parentheses and * and ** denote significance at the five and ten percent levels of statistical error.

Table 7A: Significant Impacts of Trend or Variability of Growth in Private Investment on Cyclical Responses of Key Macro Variables across Developing Countries

Dependent Variables	During Trend Growth	Booms or Growth Variability	Dependent Variables	During Trend Growth	Recessions or Growth Variability
DEXP	n/s	n/s	DEXP	n/s	n/s
DIMP	-16.38* (-2.92)	n/s	DIMP	6.39* (2.38)	n/s
DTBAL	n/s	n/s	DTBAL	n/s	n/s
DCA	n/s	n/s	DCA	n/s	n/s
DFDI	n/s	n/s	DFDI	n/s	n/s
DPOR	n/s	n/s	DPOR	n/s	n/s
DFBAL	n/s	n/s	DFBAL	n/s	n/s

Table 7B: Significant Impacts of Trend or Variability of Growth in Private Investment on Cyclical Responses of Key Macro Variables across Advanced Countries

Dependent Variables	During Trend Growth	Booms or Growth Variability	Dependent Variables	During Trend Growth	Recessions or Growth Variability
DEXP	n/s	n/s	DEXP	n/s	n/s
DIMP	n/s	n/s	DIMP	n/s	n/s
DTBAL	n/s	n/s	DTBAL	n/s	n/s
DCA	23.70** (1.80)	n/s	DCA	-52.01* (-2.44)	-32.12* (-2.13)
DFDI	-28.94** (-1.91)	-19.61* (-2.11)	DFDI	n/s	n/s
DPOR	-52.81** (-1.88)	-32.68** (-1.70)	DPOR	n/s	n/s
DFBAL	-34.09* (-6.66)	-20.31* (-3.34)	DFBAL	n/s	n/s

Notes:

DEXP, export growth; DIMP, import growth; DTBAL, change in trade balance; DCA, change in current account, DFDI, change in foreign investment, DPOR, change in portfolio flows and DFBAL, change in financial balance.

n/s: not statistically significant.

Reported significant coefficients are from cross-country regressions that regress the dependent variable on trend inflation or inflation variability. Trend is time-series average and variability is the standard deviation of inflation.

t-statistics are in parentheses and * and ** denote significance at the five and ten percent levels of statistical error.

Table A1: The Effects of Aggregate Demand Shocks on External Balances and Underlying Components in Developing Countries

Country	DEXP		DIMP		DTBAL		DCA		DFDI		DPOR		DFBAL	
	posn	negn	posn	negn	posn	negn	posn	negn	posn	negn	posn	negn	posn	negn
Argentina	0.94* (2.36)	1.16* (1.97)	2.06* (3.09)	0.25 (0.25)	-0.023** (-1.73)	0.013 (0.65)	-15.31 (-1.16)	12.24 (0.63)	-10.01 (-0.62)	-3.52 (-0.15)	-1.01 (-0.06)	-8.04 (-0.31)	16.82 (1.41)	-12.02 (-0.68)
Brazil	0.71* (6.02)	1.16* (7.43)	0.68* (5.18)	1.53* (8.85)	0.039 (1.65)	-0.087* (-2.76)	14.8 (0.88)	-36.4 (-1.65)	-10.03 (-0.99)	24.7** (1.86)	-18.45 (-0.79)	25.69 (0.84)	-19.6* (-1.97)	37.5* (2.86)
Chile	0.98* (2.00)	0.49 (0.91)	0.67 (1.28)	1.72* (2.98)	1.44 (0.22)	-3.77 (-0.52)	6.26 (0.53)	-15.9 (-1.21)	2.45 (0.15)	-3.21 (-0.18)	-8.95 (-0.49)	29.3 (1.46)	-2.7 (-0.21)	13.29 (0.95)
Egypt	0.77 (0.68)	-0.50 (-0.30)	-0.64 (-0.82)	-0.27 (-0.23)	0.046 (1.31)	-0.02 (-0.38)	2.11 (0.18)	-5.99 (-0.34)	-0.82 (-0.23)	11.62* (2.14)	23.7 (0.63)	24.66 (0.44)	3.37 (0.14)	29.26 (0.83)
India	0.40* (1.96)	0.045 (0.13)	1.73* (1.96)	-0.49 (-0.33)	0.05 (0.04)	-3.36** (-1.69)	-8.10 (-0.32)	7.15 (1.11)	0.62 (0.03)	-15.34 (-0.44)	20.54 (0.32)	-66.83 (-0.62)	-2.39 (-0.07)	139.4* (2.52)
Indonesia	1.41* (2.10)	1.09* (2.12)	0.41 (0.56)	0.92 (1.64)	-16.91 (-0.20)	24.43 (0.38)	0.015 (0.00)	-5.00 (-0.30)	17.6 (1.63)	2.6 (0.32)	0.028 (0.00)	12.76 (0.54)	0.65 (0.02)	-2.95 (-0.12)
Kenya	3.14 (1.05)	0.86 (0.45)	3.06 (1.31)	1.75 (1.19)	-0.11 (-0.18)	-0.20 (-0.56)	-2.39 (-0.29)	-3.85 (-0.75)	0.96 (0.71)	-0.63 (-0.73)	4.90 (0.55)	3.53 (0.63)	4.24 (0.53)	3.43 (0.68)
Malaysia	1.49* (2.10)	1.65* (4.60)	0.84 (0.70)	2.06 (3.41)	-0.039 (-0.27)	0.036 (0.49)	32.3 (0.68)	-15.2 (-0.63)	-1.67 (-0.18)	9.12** (1.88)	14.39 (0.19)	-19.2 (-0.51)	-71.8 (-1.26)	39.9 (1.38)
Mexico	0.95* (4.03)	1.51* (6.49)	0.42** (1.75)	1.81* (7.67)	0.013 (0.10)	0.043 (0.36)	13.29 (0.64)	9.26 (0.45)	8.98 (0.56)	-3.77 (-0.24)	38.9 (1.44)	-42.9 (-1.62)	...	...
Nigeria	1.29** (1.92)	2.05* (2.20)	1.68* (2.80)	0.50 (0.60)	-0.86 (-0.90)	2.29** (1.71)	-4.42 (-0.56)	19.8** (1.80)	0.55 (0.62)	-1.88 (-1.51)	-7.66* (-2.44)	-1.69 (-0.39)	-1.33 (-0.18)	-16.9 (-1.68)
Philippines	1.26** (1.86)	0.61 (0.43)	-0.58 (-0.88)	2.38** (1.71)	0.54 (0.63)	-0.48 (-0.26)	24.7 (1.09)	-6.38 (-0.13)	-0.21 (-0.05)	8.11 (0.83)	-17.16 (-1.15)	51.86 (1.64)	-20.14 (-0.94)	-10.13 (-0.22)
Rwanda	1.94 (1.24)	0.051 (0.06)	-0.16 (-0.14)	-1.00 (-1.67)	0.0085 (0.12)	0.083 (2.15)	0.21 (0.70)	-0.22 (-1.34)	0.036 (1.03)	0.035** (1.86)	-0.30* (-2.20)	0.082 (1.10)	-0.58 (-1.64)	0.28 (1.46)
Saudi Arabia	1.40* (2.99)	3.10* (5.96)	-0.58 (-0.85)	2.36* (3.14)	0.34* (2.00)	0.22 (1.17)	40.9 (0.93)	4.82 (0.10)	-0.28 (-0.20)	1.34 (0.87)	-13.5 (-0.33)	69.3 (1.52)	-46.3 (-1.01)	7.71 (0.15)
South Africa	0.53 (0.14)	3.77 (1.12)	-0.10 (-0.81)	5.80 (1.63)	0.062 (0.29)	-0.09 (-0.52)	8.04 (0.26)	-40.8 (-1.50)	30.10 (0.22)	-55.4 (-0.46)	-37.9 (-0.43)	24.02 (0.31)	-21.2 (-0.43)	64.7 (1.49)
Sudan	0.48 (0.57)	0.43 (0.43)	-0.34 (-0.39)	1.25 (1.19)	0.081 (0.32)	-0.062 (-0.20)	0.28 (0.39)	0.38 (0.46)	-0.10 (-0.15)	0.076 (0.09)	0.37 (0.35)	-0.96 (-0.77)	0.99 (0.51)	-0.60 (-0.26)
Tanzania	0.39 (0.48)	0.44 (0.19)	-0.19 (-0.26)	1.76 (0.87)	0.82 (1.07)	-2.35 (1.10)	1.41** (1.82)	-5.86* (-2.69)	-0.30 (-0.71)	0.81 (0.69)	-0.93 (-1.24)	2.74 (1.30)	...	...
Turkey	0.37 (0.56)	2.42* (3.79)	1.53* (2.62)	1.59* (2.87)	-7612.4 (-0.35)	28604.7 (1.39)	-39.16* (-1.95)	36.45** (1.90)	-5.62 (-1.05)	3.53 (0.69)	66.15* (2.85)	-47.17* (-2.14)	39.7 (1.45)	-16.6 (-0.64)
Venezuela	1.47* (2.87)	2.34* (2.58)	0.96 (1.29)	0.37 (0.28)	-4.07 (-0.40)	11.38 (0.63)	1.99 (0.11)	54.27 (1.68)	6.17** (1.84)	4.54 (0.76)	-7.48 (-0.66)	-14.67 (-0.73)	-3.60 (-0.20)	-51.65 (-1.63)

Notes:

Coefficients measure the cyclical responses to expansionary and contractionary aggregate demand shocks (posn, negn) based on the estimation of the empirical model in (1).

DEXP, export growth; DIMP, import growth; DTBAL, change in trade balance; DCA, change in current account; DFDI, change in foreign investment; DPOR, change in portfolio flows and DFBAL, change in financial balance.

t-statistics are in brackets, where * and ** denote statistical significance.

Table A2: The Effects of Aggregate Demand Shocks on External Balances and Underlying Components in Developing Countries

Country	DEXP		DIMP		DTBAL		DCA		DFDI		DPOR		DFBAL	
	posn	negn	posn	negn	posn	negn	posn	negn	posn	negn	posn	negn	posn	negn
Australia	3.98* (2.27)	-1.20 (-0.93)	-0.60 (-0.31)	3.01* (2.09)	413.4* (2.61)	-374.4* (-3.20)	316.9* (2.56)	-253.5* (-2.77)	-77.6 (-0.71)	-10.1 (-0.13)	-341.2** (-1.91)	185.5 (1.23)	-334.9* (-2.66)	202.7* (2.18)
Austria	0.63 (0.42)	2.05 (1.31)	0.30 (0.20)	2.26 (1.41)	14.5 (0.48)	-14.5 (-0.46)	66.5 (1.00)	-55.3 (-0.79)	-53.6 (-0.59)	74.3 (0.78)	-54.8 (-0.36)	86.5 (0.54)	-24.4 (-0.19)	-24.4 (-0.19)
Belgium	3.44* (2.14)	3.13** (1.78)	2.96* (1.73)	3.54** (1.89)	78.23* (2.17)	-57.4 (-1.46)	31.86 (0.60)	-48.4 (-0.83)	161.7 (0.62)	10.5 (0.04)	17.41 (0.14)	66.4 (0.50)	2.97 (0.04)	72.13 (0.83)
Canada	0.84 (0.63)	1.74* (1.96)	-0.74 (-0.57)	2.99* (3.46)	379.5** (1.75)	-103.6 (-0.72)	263.9 (1.61)	-112.9 (-1.04)	216.6 (1.09)	209.8 (1.58)	-122.8 (-0.60)	134.6 (1.00)	-131.4 (-0.54)	109.81 (0.68)
China	1.15* (2.64)	0.84* (2.45)	1.12* (2.12)	0.87* (2.10)	12.3 (0.05)	-167.9 (-0.85)	7.51 (0.23)	-29.87 (-1.17)	7.60 (0.16)	6.24 (0.17)	-61.72 (-0.88)	95.3** (1.73)	18.9 (0.60)	-8.82 (-0.36)
Cyprus	1.26* (1.69)	1.68* (3.66)	3.57* (2.39)	0.32 (0.35)	-5.50* (-2.26)	2.82* (2.18)	-10.85* (1.88)	6.15* (-2.12)	0.22 (0.27)	-0.18 (-0.36)	-0.58 (-0.07)	-3.49 (-0.71)	8.54** (1.88)	-5.88* (-2.12)
Denmark	1.28 (0.94)	1.23 (0.64)	1.87 (1.51)	2.15 (1.22)	-55.6 (-0.14)	-187.8 (-0.33)	-66.17 (-1.16)	-5.62 (-0.07)	68.9 (0.76)	-67.13 (-0.52)	-128.1 (-0.62)	483.5 (1.65)	66.3 (0.81)	213.13** (1.83)
Finland	1.72** (1.78)	1.70* (2.96)	1.78* (2.37)	1.59* (3.57)	-28.8 (-1.35)	6.37 (0.50)	15.69 (0.46)	8.14 (0.46)	-147.3* (-2.25)	-55.8 (-1.44)	13.7 (0.23)	16.98 (0.48)	-14.11 (-0.62)	19.37 (0.72)
France	3.71** (1.67)	0.012 (0.01)	5.76* (2.41)	-0.38 (-0.18)	624.4 (-1.57)	269.1 (0.75)	-1,099.1* (-2.22)	-677.1 (-0.28)	-1207.7 (-0.52)	515.5 (0.25)	364.3 (0.48)	12.20 (0.02)	773.8 (1.00)	-308.9 (-0.44)
Germany	-2.32* (-2.59)	6.24* (3.47)	0.43 (0.45)	5.86* (3.07)	-982.6* (-2.84)	-5.94 (-0.01)	-706.4* (-2.73)	-783.9 (-1.51)	-490.2 (-0.34)	444.9 (0.15)	831.84 (1.17)	-346.3 (-0.24)	1,033.7** (1.69)	-153.9 (-0.13)
Greece	-0.58 (-0.47)	1.22 (1.01)	0.50 (0.81)	1.99* (3.25)	-4.36 (-0.37)	-5.6 (-0.48)	21.5 (0.87)	-19.1 (-0.78)	-2.11 (-0.12)	7.99 (0.46)	80.5 (0.81)	-92.6 (-0.94)	-25.3 (-0.66)	28.5 (0.75)
Iceland	2.70* (4.86)	0.58 (1.60)	1.19 (1.54)	1.51* (2.96)	-18.2 (-0.13)	-180.17** (-1.93)	1.60 (0.72)	-2.86* (-1.95)	0.39 (0.42)	-0.23 (-0.37)	-1.15 (-0.47)	2.40 (1.51)	-1.37 (-0.66)	2.30 (1.68)
Ireland	1.06 (1.44)	0.91 (1.53)	1.22 (1.57)	1.04 (1.68)	-13.6 (-0.41)	49.4** (1.87)	-7.55 (-0.64)	0.05 (0.01)	73.3 (0.59)	122.13 (1.23)	63.7 (0.70)	-27.6 (-0.38)	56.64 (0.77)	-23.76 (-0.40)
Israel	1.38 (1.34)	0.42 (0.49)	0.18 (0.38)	0.96* (2.94)	57.3 (1.33)	8.61 (0.28)	0.58 (0.09)	-7.53 (-1.35)	6.77 (1.45)	-0.96 (-0.26)	0.94 (0.06)	25.56** (1.89)	25.4** (1.93)	0.79 (0.08)
Italy	6.70* (2.97)	0.16 (0.19)	3.58 (1.02)	0.66 (0.50)	604.2 (0.86)	-136.2 (-0.52)	901.1 (0.96)	-162.4 (-0.46)	189.2 (0.56)	-57.8 (-0.46)	-379.7 (-0.37)	433.5 (1.12)	-1207.8 (-1.14)	307.7 (0.78)
Japan	2.53 (1.56)	2.02 (1.61)	1.69 (1.36)	5.18* (5.40)	4073.9 (0.43)	-1844.1 (-1.15)	137.14 (0.21)	-700.32 (-1.36)	-299.4 (-0.88)	-178.5 (-0.67)	-1243 (-0.93)	443.5 (0.43)	-278.6 (-0.28)	165.9 (0.22)
Korea	1.32 (0.65)	0.92 (0.67)	0.89 (0.69)	1.013 (1.16)	-31973.8 (-0.15)	31401.4 (0.22)	97.17 (0.38)	-24.8 (0.18)	18.9 (0.47)	-16.18 (-0.60)	121.08 (0.47)	126.2 (0.73)	-68.9 (-0.41)	14.8 (0.13)
Luxemburg	1.44* (1.88)	2.04* (3.21)	1.087 (1.06)	1.71* (2.22)	5.64 (0.56)	12.8 (1.54)	-9.51 (-0.73)	9.7 (0.90)	...	...	9.51 (0.73)	-9.70 (-0.90)	9.51 (0.73)	-9.7 (-0.90)
The Netherlands	6.02* (3.47)	2.92* (3.44)	5.05* (2.95)	3.11* (3.70)	200.9** (1.81)	4.35 (0.08)	-137.9 (-0.47)	-60.5 (-0.43)	-304.3 (-0.75)	181.6 (0.91)	72.01 (0.21)	43.9 (0.26)	...	...
New Zealand	2.68* (2.19)	0.16 (0.31)	-0.34 (-0.21)	1.45* (2.09)	61.7 (1.49)	-16.6 (-0.92)	18.4 (0.75)	-10.2 (-0.95)	-3.45 (-0.07)	10.04 (0.44)	-86.9 (-1.47)	60.02* (2.33)	3.9 (-0.06)	8.3 (0.27)
Norway	1.78* (3.05)	3.20* (5.12)	-0.69 (-1.14)	1.00 (1.60)	1555.7* (5.80)	713.2* (2.49)	159.01* (3.98)	75.3** (1.76)	-33.6 (-1.23)	-47.3 (-1.61)	-85.2 (-1.05)	8.08 (0.09)	-117.8** (-1.69)	-56.7 (-0.76)
Portugal	1.84** (1.38)	2.19* (2.71)	-5.41* (-4.03)	4.9* (6.03)	87.3* (2.16)	-72.18* (-2.95)	66.04 (1.08)	-27.8 (-0.75)	15.28 (0.37)	-14.9 (-0.60)	-115.4 (-0.95)	8.45 (0.11)	-116.07** (-1.92)	74.6* (2.04)
Singapore	0.036 (0.07)	1.66* (7.04)	0.074 (0.12)	1.76* (6.02)	-18.4 (-0.33)	-16.9 (-0.65)	-22.3 (-0.63)	-0.67 (-0.04)	31.99 (1.13)	27.08* (2.02)	55.6 (0.68)	63.15 (1.65)	45.97 (0.77)	19.4 (0.69)
Sweden	1.18 (0.84)	1.60* (2.65)	0.72 (0.50)	1.77* (2.87)	-122.3 (-0.22)	23.0 (0.10)	-33.74 (-0.38)	44.5 (1.15)	-125.2 (-0.18)	-108.3 (-0.36)	169.6 (0.44)	-34.5 (-0.21)	205.9 (0.69)	-1117.7 (-0.92)
Spain	1.38 (0.80)	1.12 (1.15)	5.17* (2.33)	1.89 (1.50)	16.18 (0.08)	-199.4** (-1.84)	56.3 (0.19)	-303.2** (-1.85)	-99.7 (-0.20)	136.34 (0.49)	35.16 (0.03)	267.52 (0.44)	20.2 (0.07)	370.8* (2.16)
Switzerland	0.74 (1.01)	1.87* (2.88)	2.42* (1.97)	1.67 (1.54)	-174.9 (-1.63)	25.17 (0.26)	-49.5 (-0.31)	58.7 (0.42)	-183.3 (-0.85)	-156.4 (-0.82)	-270.0 (-0.66)	-196.2 (-0.54)	-116.4 (-0.32)	-159.7 (-0.50)
Taiwan	0.71 (0.64)	1.51* (2.60)	0.16 (0.13)	2.04* (3.06)	1330.5 (0.89)	-2311.9* (-2.96)	-75.1* (-2.04)	16.4 (1.10)	-9.28 (-0.40)	-6.12 (-0.51)	39.43 (0.22)	-28.84 (-0.31)	30.13 (0.44)	61.09* (1.68)
U.K.	2.36 (1.40)	-1.19 (-0.82)	0.24 (0.16)	2.67* (2.04)	284.3 (1.63)	-453.4* (-3.01)	-624.5* (-2.12)	14.9 (0.50)	-915.02 (-0.59)	489.2 (0.37)	556.3 (1.21)	74.47 (0.19)	124.6 (0.31)	363.6 (1.05)
U.S.	3.33 (1.48)	2.13 (1.61)	3.53* (2.20)	2.73* (2.91)	...	...	...	...	-935.4 (-0.50)	757.5 (0.51)	2054.9 (0.85)	1981.7 (1.40)	...	...

Notes:

Coefficients measure the cyclical responses to expansionary and contractionary aggregate demand shocks (posn, negn) based on the estimation of the empirical model in (1).

DEXP, export growth; DIMP, import growth; DTBAL, change in trade balance; DCA, change in current account; DFDI, change in foreign investment; DPOR, change in portfolio flows and DFBAL, change in financial balance. t-statistics are in brackets, where * and ** denote statistical significance.

APPENDIX A

Econometric Methodology

The surprise terms that enter models (1) through (3) are unobservable, necessitating the construction of empirical proxies before estimation can take place. Thus, the empirical models include equations that describe the process generating the change in aggregate demand, and the exchange rate. The predictive values of these equations are the proxies for agents' expectations of the change in these variables.

Obtaining the proxy for agents' forecasts follows the results of the endogeneity test suggested by Engle (1982). Given evidence of endogeneity, variables in the forecast equations are based on the results of a formal causality test. To identify variables in the forecast equation, the paper builds on identification rules in new Keynesian models (see, e.g., Clarida, Gali, and Gertler (1999) or Boschen and Weise (2001)). Hence, agents' forecasts are approximated using two lags of the change in the short-term interest rate and two lags of the change in the log-value of real output, the price level, government spending, the money supply, the exchange rate, and the energy price. Given evidence of structural break, dummy variables enter the forecast equations, as necessary.

Having accounted for structural dummies in the forecast equations, the estimated reduced form models are structurally stable. The choice of two lags is determined by data availability and the common belief that prolonged adjustment may take up to 24 months in the economic system. The paper's evidence is robust with respect to variation in the forecast and/or lags of variables in the model.

Surprises that enter the empirical models are then formed by subtracting agents' forecasts from the actual growth in each variable. By construction, these surprises are purely random and orthogonal to right-hand side variables. The positive and negative components of shocks are defined for joint estimation, following the suggestions of Cover (1992), as follows:

$$negs_t = -\frac{1}{2}\{abs(Dss_t) - Dss_t\}$$

$$poss_t = \frac{1}{2}\{abs(Dss_t) + Dss_t\} \quad s = d, g, m, h$$

Where Dds_t , Dgs_t , Dms_t , and Dhs_t are the shocks to the change in aggregate demand, government spending, the money supply, and the exchange rate. The terms $negs_t$ and $poss_t$ are the negative and positive components of each shock.

To obtain efficient estimates and ensure correct inferences (i.e., to obtain consistent variance estimates), the empirical models in (1) and (2) are estimated jointly

with the equations that determine proxy variables following the suggestions in Pagan (1984, 1986) using 3SLS. Building on the work of Beaudry and Saito (1998), the instruments list for estimation includes two lags of the change in the interest rate and two lags of the change in the log value of real output, the price level, government spending, the money supply, the exchange rate and the energy price. The paper's evidence is robust with respect to variation in the instruments list or the lag length.

The results of Engle's (1982) test for serial correlation in simultaneous-equation models are consistent with the presence of first-order autoregressive errors in some models. To correct for serial correlation, it is assumed that the error term follows an AR(1) process.

To filter out serial correlation, the estimated model is transformed through the filter $(1 - \rho L)$ where ρ is the estimate of the serial correlation parameter and L is the lag operator such that $LX_t = X_{t-1}$. The estimated residuals from the transformed models have zero mean and are serially independent, attesting to the quality of estimated coefficients in the empirical models.

APPENDIX B

Data Sources

1. Real Output: Gross domestic product, constant prices, $W914NGDP_R$, WEO.
2. Aggregate Demand: Gross domestic product, current prices, $W914NGDP$, WEO.
3. Price: Gross domestic product deflator, $W914NGDP_D$, WEO.
4. Government Spending: Public consumption expenditure, current prices, $W914NCG$, WEO, or government consumption, $61291F..ZF...$, IFTSTSUB.
5. Exchange Rate: real effective exchange rate, INS.
6. Monetary Base: Reserve money, $W914FMB$, WEO.
7. Consumption: Private consumption expenditure, current prices, $W311NFIP$, WEO.
8. Investment: Gross private fixed capital formation, current prices, $W311NFIP$, WEO.
9. Imports: Imports of goods and services, current prices, $W213NM$, WEO.
10. Exports: Exports of goods and services, current prices, $W513NX$, WEO.
11. Money: the sum of currency outside banks and private sector demand deposits, $91434..ZF...$, IFTSTSUB.
12. Interest Rate: representatives of short-term interest rate. Deposit rate, $21360L..ZF...$, IFTSTSUB. Lending rate, $21360P..ZF...$,

IFTSTSUB.

All annual series are from World Economic Outlook, Information Notice System (INS), or International Financial Statistics, available on tape from the International Monetary Fund.

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