

External factors and monetary policy: Indian evidence

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1. Introduction

Two decades ago, when the Indian economy was less open and only moderately integrated with the global economy, monetary policy had a relatively simple task in assessing growth and inflation. Since then, with significant trade and capital account openness, the domestic economy has become considerably more integrated with the global economy and domestic financial markets reflect global developments very quickly. The transmission channels through which global factors impact the domestic economy and financial markets are numerous and complex. In India, it appears that all four channels of transmission (the trade, financial, commodity price and expectations channels) operated and adversely affected real activity during the recent global crisis. However, the strengths of the different channels of transmission varied. Given this, monetary policy had to carefully gauge global risks so as to inform its assessment of the growth and inflation outlook.

The concerns of monetary policy about external developments or shocks revolve around the objectives of ensuring price and output stability, and also financial stability to the extent it affects price and output stability. Output stability concerns may emanate from the impact of external shocks on the domestic economy mainly through the trade and financial channels. The intensity of impact would to a large extent depend on reliance on external demand (trade) as a driver of growth, the degree of cyclicity of certain export-dependent sectors and the dependence on external savings to finance growth. Price stability would be affected mainly through commodity price shocks and the import intensity of the production process, and through exchange rate developments. The financial stability objective may be impacted by the degree of openness of the financial sector, the asset-liability mix, volatility in capital flows with sudden stops and reversals, and foreign inflows leading to overshooting of domestic asset prices such as equities and real estate. This paper sets out briefly why monetary policy has become more sensitive to global developments and the key challenges from global factors for monetary management.

2. How globalised and integrated is the Indian economy?

Before examining how monetary policy formulation in India has been shaped by external factors, it is pertinent to understand how and to what extent the Indian economy is integrated with the global economy. The globalisation process in India was reinforced during the 1990s and 2000s due to several important developments.

First, despite the dominance of domestic demand, the role of trade in conditioning the growth process in India has become important over time. Trade openness increased substantially, with the trade/GDP ratio doubling during the last decade. Second, services, which were largely considered non-tradable, became increasingly tradable mainly due to offshoring led

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by rapid innovations in information technology, labelled as information technology-enabled services (ITES) and business process outsourcing (BPO). A significant boost to global integration thus came through rapid growth in India's international trade in services in the 2000s, enabled by the expansion in information technology that facilitated the cross-border delivery of services. Third, the trade channel of global integration has been, concomitantly, supported by workers' remittances, in both the unskilled and skilled market segments.

Fourth, the economy became more open to external capital flows. The gross capital account/GDP ratio witnessed a more than threefold increase during the period. Progressive liberalisation of the capital account was initiated in the 1990s and continued through the 2000s, contributing to the process of financial integration. The financial channel emerged as a dominant factor with gross capital flows (inflows plus outflows) rising to nearly 50% of GDP in 2009–10 from an average of about 5% in the 1980s (Table 1). Fifth, higher capital account openness also strengthened the integration of domestic markets with global markets, as reflected in the stronger correlations of equity and commodity prices with their global counterparts. These developments also facilitated the role of expectations in transmitting global shocks to the domestic economy. Sixth, even in commodity-producing sectors, global integration also occurred through prices and not necessarily through physical trade, as global price movements have an important expectations impact on domestic prices.

Table 1
Openness indicators of the Indian economy
(In percentages of GDP)

	Goods trade	Services trade	Gross current account	Gross capital account	Gross current and capital account
1970s	10.0	1.3	12.7	4.2	16.9
1980s	12.7	2.5	17.2	5.4	22.6
1990s	18.8	4.1	26.8	15.1	41.9
2000s	29.7	9.7	45.4	33.8	79.2

Source: Reserve Bank of India, *Handbook of Statistics on Indian Economy and Monograph on India's Balance of Payments*.

With increased global integration, the Indian economy has been subject to greater influence of global business cycles. The degree of co-movement between the Indian and global business cycles has significantly increased since the liberalisation of Indian economy (Figures 1a and 1b). The correlation between the cyclical component of the index of industrial production (IIP) of the advanced economies and that of India rose to 0.62 during the period 1993–2010 from 0.18 in during 1970–92. The greater cyclical synchronisation of the business cycle during recent periods is indicative of the growing global integration of the Indian economy.

Figure 1a

Business cycles of advanced economies and India: 1970–92

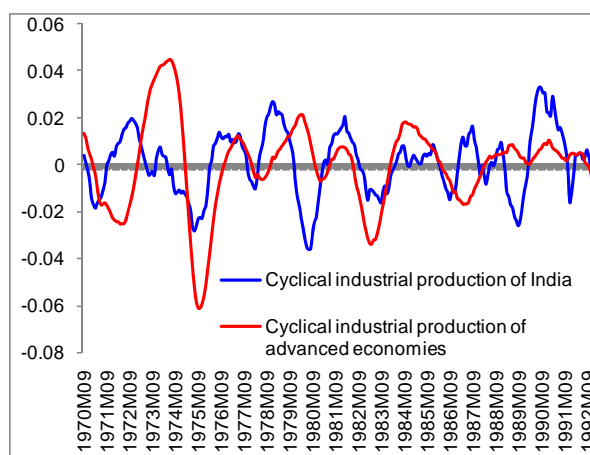
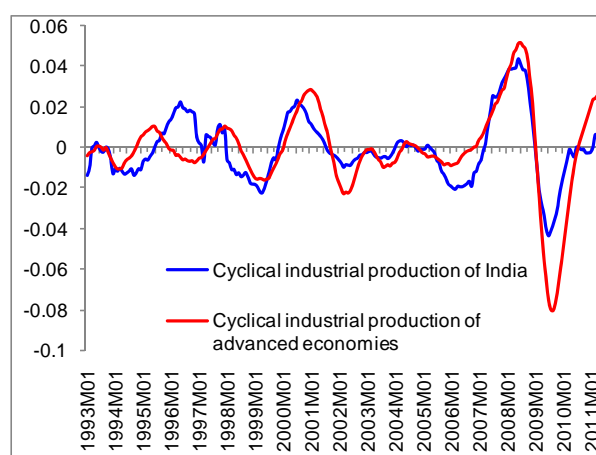


Figure 1b

Business cycles of advanced economies and India: 1993–2010



India's financial integration with the world has been as deep as, if not deeper than, its trade globalisation (Subbarao (2010)). The deceleration in India's growth associated with the current global slowdown is also testimony to the increased global integration of the domestic economy. Besides the synchronisation of trade cycles, the financial channel to integration has also become prominent during the recent period. A causal analysis between the cyclical component of Indian (BSE) and US stock prices (S&P 500 Index and Nasdaq index) empirically validates the influence of global stock price movements on domestic stock prices (Table 2).

Table 2

Causality between the Indian and US stock prices

Sample period: January 1993–December 2010

Null hypothesis	F-statistic	Result
Δ BSE index does not Granger cause Δ Nasdaq	0.23	Accept
Δ Nasdaq does not Granger cause Δ BSE index	8.00 ^{***}	Reject
Δ BSE index does not Granger cause Δ S&P 500	0.94	Accept
Δ S&P 500 does not Granger cause Δ BSE index	7.37 ^{***}	Reject

*** Significant at the 1% level. Variables are seasonally adjusted.

These shifts in the degree of synchronisation of the Indian trade and business cycles with the global cycles and increased correlation of financial asset prices in the past two decades indicate that India cannot remain impervious to the global shocks. Empirically, it has been established that financial channels have assumed a more dominant role in transmitting the global shocks. Monetary policy thus has to take due account of risks arising from external factors in its assessment of the inflation and growth outlook.

3. Capital flows, exchange rates and financial stability

An external stability objective of monetary policy entails minimising the risks associated with financing a current account deficit with volatile capital inflows, which may disrupt economic activity. Volatile and excessive capital flows have the potential to destabilise the exchange rate and may have implications for domestic liquidity and asset price volatility. Sharp appreciation of the exchange rate, regardless of fundamentals, adversely impacts the relative global competitiveness of low value added manufactured exports of small and medium-sized enterprises (SMEs), akin to Dutch disease. As the Reserve Bank is concerned not only about output and price stability but also financial stability, it attaches paramount importance to ensuring stability of the financial markets and institutions against adverse external shocks.

Since the initiation of the reform process in the early 1990s, India has encouraged all major forms of capital flows, though with caution from the viewpoint of macroeconomic stability. There have been occasional sharp swings (Figure 2a), which have engendered appropriate policy responses. These include changes in reserve requirements for financial entities, variations in the pace and sequencing of the reform measures and revisions in conditions governing the end use of external funds. A widening current account deficit (CAD) in India amidst volatile capital flows has also raised concerns about its sustainable financing and the impact of such flows on domestic asset prices. Portfolio inflows are closely associated with movements in stock prices (Figure 2b). There is, however, a bidirectional causal relationship between the two, indicating that they reinforce each other. Nevertheless, the role of capital flows in an asset price build-up cannot be ignored. While excessive volatility in the exchange rate induced by volatile capital flows poses problems for exporters and importers in making assessments about their future business decisions, capital flow-induced volatility in asset prices may adversely affect the investment climate and have an adverse impact on growth.

Figure 2a

Capital flows to India (net)

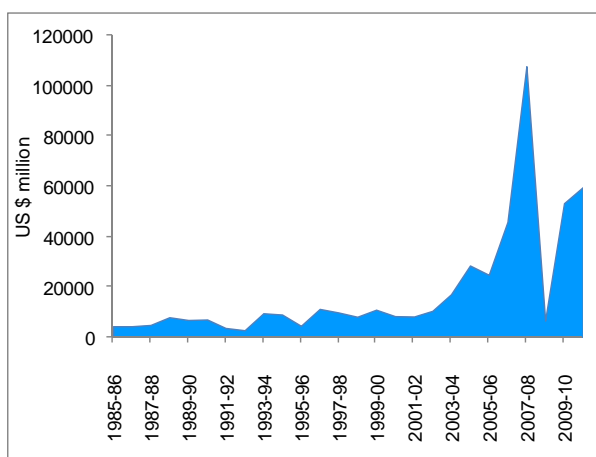
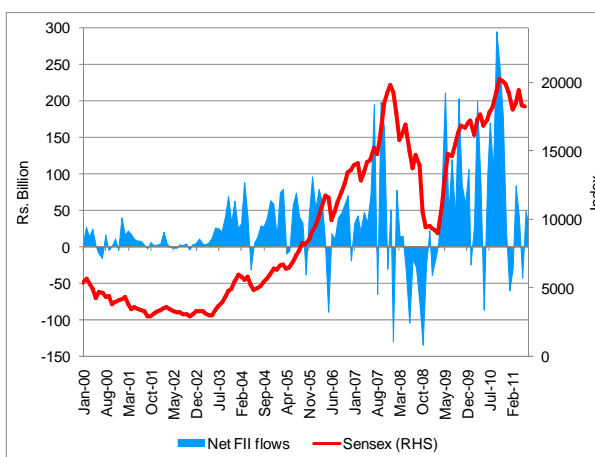


Figure 2b

FII inflows and stock prices in India



FII = foreign institutional investors.

There are both long-term and short-term issues in relation to the central bank's role in external management. Should the exchange rate be a policy instrument for long-term growth? Are the choices and trade-offs different between large and small economies? These are important questions in the current global economic debate. However, in the immediate aftermath of the crisis, a major concern has emerged with respect to the possibility of large capital inflows into emerging market economies (EMEs). This reflects the unevenness of the strength of the recovery in advanced economies and EMEs and the attempts by the former to find ways to continue to provide stimulus. EMEs are worried that a surge would destabilise

their domestic economies through exchange rate appreciation or excess liquidity in a situation where central banks are fighting with demand pressures.

What should central banks be doing to deal with this situation? While the justification for capital controls is subject to several conditions, clearly, many countries that do not meet all those conditions would be equally tempted to use controls as a way of protecting themselves against the threats to stability from volatile capital flows and exchange rates and domestic liquidity conditions. Is this an argument for capital controls? One may agree with this to a limited extent, reflecting the conditions during the crisis and how different groups of countries have emerged from it. However, the specific conditions, both domestic and global, that would determine the desirability of capital controls for specific countries need to be thought through (Gokarn (2010b)).

Intervention to manage the exchange rate is another way in which a central bank may contribute to external stability. From a short-term perspective, the decision to intervene in order to avoid destabilising both exporting and import-competing domestic producers needs to be viewed in the overall context of domestic conditions. Masaaki Shirakawa, Governor, Bank of Japan, argues that in a situation in which policy rates are already at the zero boundary, exchange rate appreciation, which helps dampen inflationary pressures, would allow the low interest rate scenario to persist, thereby raising the risks of an asset price bubble (Shirakawa (2010)).

The Reserve Bank's policy on exchange rates has been articulated as broadly non-interventionist, except when confronted with excessively volatile, lumpy or disruptive flows. This is an approach consistent with the notions of "flexibility" or "constrained discretion" used in the context of boundary conditions for traditional approaches to monetary policy. Essentially, these are conditions that would presumably trigger some deviation from normal policy if abnormal circumstances were to arise. What would constitute abnormal conditions, of course, cannot be explicitly indicated but will presumably be defined by specific circumstances in which actions are taken.

From the standpoint of financial stability, shocks to domestic asset prices led by uneven capital flows (ie sudden spurts and sporadic reversals) become a concern for central banks. Such pressures on asset prices can cause capital losses for entities which have large exposure to such assets and can be a source of instability. In India, however, these adverse spillovers of volatile capital flows are minimised through prudential sectoral exposure limits on bank lending, risk weights and provisioning norms.

4. Pass-through of global shocks to domestic inflation in India

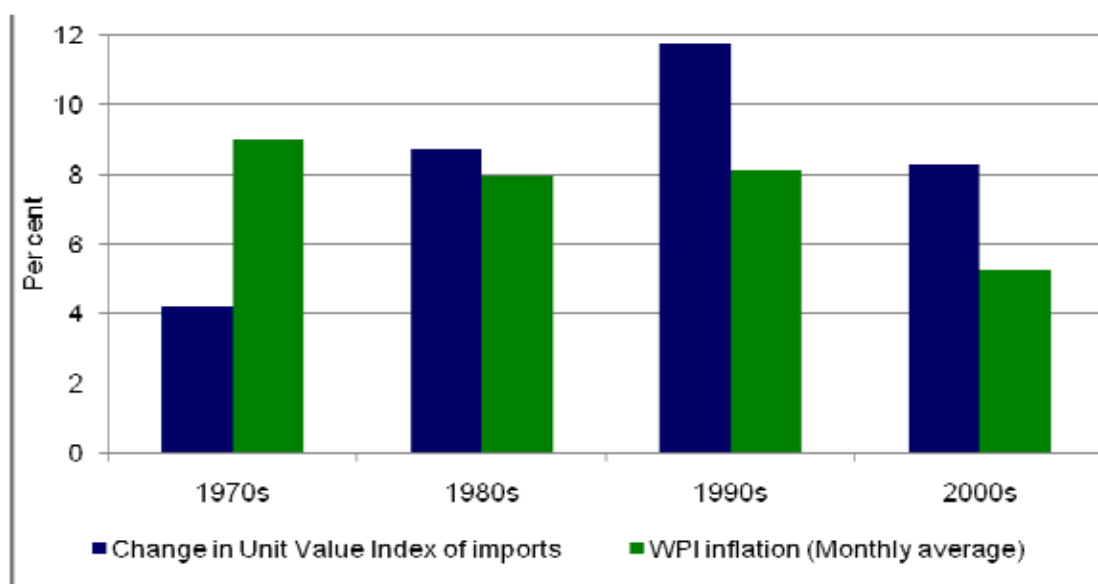
External shocks to domestic prices can come mainly through two channels: commodity prices and the exchange rate. The pass-through takes place in two stages. First, export prices of trading partners at global and regional levels percolate to import prices of India. Second, changes in import prices affect costs of production and domestic supply of goods and services, thus affecting aggregate domestic inflation measured by producers' prices, which, in India, are represented by wholesale prices. The most direct impact of global prices on the domestic economy comes through the prices of primary commodities.

The impact of exchange rate movements on prices of imported commodities depends on the extent to which the exchange rates are transmitted to import prices denominated in the domestic currency. The literature suggests that some of the important determinants of pass-through are low global inflation and its lower volatility, the volatility of the exchange rate, the share of imports in domestic consumption, the trade/GDP ratio, the composition of imports, the invoicing pattern of trade, and tariffs and quantitative restrictions. Various empirical estimates of the exchange rate pass-through to domestic prices in India suggest that a 10 per cent change in the exchange rate could lead to a change in domestic prices in the

range of 1–2 per cent in the long run (RBI (2004); Khundrakpam (2007); Mihaljek and Klau (2008)).

It is evident that, except in the 1970s, India's import price inflation remained higher than domestic inflation through the 1980s to the 2000s (Figure 3). Higher imported inflation during the 2000s was mainly led by the categories “crude materials”, “mineral fuels, lubricants”, “animal and vegetable oil, fats and waxes” and “chemicals and related products”, underscoring the role of global commodity price shocks in domestic inflation process. Higher imported inflation relative to domestic inflation, particularly since the 1990s, thus suggests the following. First, global commodity price shocks have become more dominant, particularly mineral oil and metals, led by rising demand from the emerging market economies. Second, the pass-through of imported input prices may have been limited due to either the public policy interventions or the ability of producers of final consumption goods to absorb the rising costs by improving productivity in the usage of such inputs or by adjusting profit margins in the face of higher market competition, both internal and external.

Figure 3
Imported and domestic inflation in India



The results from causal analysis reveal that in agricultural commodities such as rice, soybean oil, sugar, tea and cotton, global prices cause changes in domestic prices. Since in this bivariate analysis we are not controlling for domestic production shocks or expectations, the results imply that apart from domestic production, external supply shocks play an important role in the evolution of prices of such agricultural commodities in India. In the case of wheat and peanut oil, the causality is found to be reverse, implying that domestic prices significantly influence the movement in global prices (Table 3).

Table 3

Causal relationship between global and domestic prices of agricultural commodities

Sample period: January 1994–March 2011

Null hypothesis:	F-statistic	Null hypothesis rejected	Lag (months)
Changes in world rice prices do not Granger cause changes in rice prices in India	2.57 ^{***}	Yes	8
Changes in rice prices in India do not Granger cause changes in world rice prices	0.44	No	
Changes in world wheat prices do not Granger cause changes in wheat prices in India	0.34	No	3
Changes in wheat prices in India do not Granger cause changes in world wheat prices	3.93 ^{***}	Yes	
Changes in world maize prices do not Granger cause changes in maize prices in India	1.39	No	4
Changes in maize prices in India do not Granger cause changes in world maize prices	0.73	No	
Changes in world groundnut oil prices do not Granger cause changes in groundnut oil prices in India	0.27	No	1
Changes in groundnut oil prices in India do not Granger cause changes in world groundnut oil prices	3.90 ^{**}	Yes	
Changes in world soybean oil prices do not Granger cause changes in soybean oil prices in India	2.01 ^{**}	Yes	9
Changes in soybean oil prices in India do not Granger cause changes in world soybean oil prices	0.87	No	
Changes in world sugar prices do not Granger cause changes in sugar prices in India	2.08 ^{**}	Yes	6
Changes in sugar prices in India do not Granger cause changes in world sugar prices	0.32	No	
Changes in world tea prices do not Granger cause changes in tea prices in India	3.26 ^{**}	Yes	2
Changes in tea prices in India do not Granger cause changes in world tea prices	0.98	No	
Changes in world cotton prices do not Granger cause changes in cotton prices in India	6.12 ^{***}	Yes	3
Changes in cotton prices in India do not Granger cause changes in world cotton prices	0.47	No	

***, **, * = significant at the 1%, 5% and 10% level, respectively.

Test results from Granger causality in the case of non-agricultural commodities also provide some important insights into the impact of global shocks on the inflation process in India. There is significant causality from global crude oil prices to domestic prices of petroleum with a six-month lag. The lag in the transmission can be attributed mainly to an administered price mechanism, which does not allow an immediate pass-through of global price changes to

domestic price changes. Apart from oil, there is evidence of significant causality from world prices to domestic prices in commodities such as coal, iron ore and aluminium, which are important inputs for the manufacturing sector and can potentially cause shocks to manufactured product price inflation (Table 4).

Table 4
Causal relationship between global and domestic prices of non-agricultural commodities

Sample period: January 1994–March 2011

Null hypothesis:	F-statistic	Null hypothesis rejected	Lag (months)
Changes in world oil prices do not Granger cause changes in oil prices in India	8.96 ^{***}	Yes	6
Changes in oil prices in India do not Granger cause changes in world oil prices	1.96 [*]	Yes	
Changes in world coal prices do not Granger cause changes in coal prices in India	3.46 ^{**}	Yes	2
Changes in coal prices in India do not Granger cause changes in world coal prices	0.01	No	
Changes in world iron ore prices do not Granger cause changes in iron ore prices in India	8.96 ^{***}	Yes	1
Changes in iron ore prices in India do not Granger cause changes in world iron ore prices	0.13	No	
Changes in world aluminium prices do not Granger cause changes in aluminium prices in India	18.17 ^{***}	Yes	1
Changes in aluminium prices in India do not Granger cause changes in world aluminium prices	0.93	No	
Changes in world copper prices do not Granger cause changes in copper prices in India	0.45	No	4
Changes in copper prices in India do not Granger cause changes in world copper prices	0.16	No	
Changes in world silver prices do not Granger cause changes in silver prices in India	2.31 ^{**}	Yes	5
Changes in silver prices in India do not Granger cause changes in world silver prices	2.83 ^{**}	Yes	
Changes in world urea prices do not Granger cause changes in urea prices in India	1.00	No	13
Changes in urea prices in India do not Granger cause changes in world urea prices	1.73 [*]	Yes	

***, **, * = significant at the 1%, 5% and 10% level, respectively.

An analysis of two broad global commodity price cycles – 2002 to early 2009 and the current one beginning April 2009 – suggests that the pass-through of global commodity prices to domestic prices does not seem to be complete (Table 5). Pass-through seems to be higher in the case of metals as compared with food items. This could be attributed to several factors. First, there are restrictions on trade in food grains. Second, food grain prices may be

conditioned more by domestic supply conditions and low dependence on imports to meet domestic demand. Third, there is a larger dependence on imports for minerals and metals and strong procyclicality in prices such commodities. Fourth, due to trading in minerals and metals on both domestic and global exchanges, prices of such commodities seem to be more correlated with global prices as compared with agricultural commodities, where a number of regulatory restrictions are in place. Thus, risks to domestic inflation from external shocks seem to emanate more from mineral and metal prices, which generally exhibit strong procyclical movement.

Table 5
Increase in international and domestic commodity prices
(Year-on-year average, in per cent)

Commodities	2002:04–2008:08		2008:09–2009:03		2009:04–2011:05	
	World	India	World	India	World	India
Minerals and metals						
Aluminium	11.8	5.2	–31.5	–0.4	10.5	–2.8
Coal	33.4	5.1	7.8	4.6	9.6	6.6
Copper	32.5	2.1	–45.0	0.0	31.9	5.5
Gold	19.8	16.1	1.9	24.2	22.9	22.6
Iron ore	26.5	55.7	48.3	29.1	57.9	26.7
Petroleum	28.7	9.7	–34.0	8.1	16.2	7.0
Silver	24.0	20.0	–25.0	–3.6	40.5	40.7
Urea	32.4	0.8	–0.6	0.0	–4.0	4.3
Agricultural commodities						
Cotton	10.7	6.2	–18.1	21.0	54.5	22.3
Edible oil groundnut	24.7	9.9	–2.4	–4.9	–3.0	6.9
Edible oil soybean	15.8	10.2	19.6	3.7	7.5	2.1
Maize	17.1	5.7	–4.3	12.3	13.8	14.0
Rice	24.4	2.7	55.7	13.3	–13.3	9.1
Sugar	13.2	1.9	12.9	17.1	38.0	21.4
Tea	6.0	5.4	16.2	47.4	9.6	7.8
Wheat	20.7	4.6	–34.0	5.4	7.3	6.5

Source: IMF, *International Financial Statistics*.

Despite the incomplete pass-through of international price shocks to domestic prices in India, there could be potential pressures arising from global demand-supply imbalances in certain commodities. Moderation in the projected global stocks of cereals and non-cereals for 2010–11 suggests that global price pressures on these commodities may persist, which may then impact on the domestic inflation outlook (Table 6).

Table 6
Global commodity stock position
(Ending stocks in million metric tons)

	2008–09	2009–10	2010–11 ¹	2011–12 ²
Wheat	167	198	190	182
Coarse grains	194	195	157	149
Rice	92	94	96	96
Cotton ³	61	44	44	51
Oilseeds	57	71	76	71
Oil meals	6	8	8	8
Vegetable oils	14	13	11	10
Corn		144	121	116

¹ Estimated. ² Projected. ³ In million 480 lb bales.

Source: US Department of Agriculture, *World Demand and Supply Estimates*.

Energy became a significant external risk to domestic inflation in India during the 1970s, following the first oil shock, and has persisted in its contribution since then. One of the fundamental drivers of high oil prices is increasing demand in EMEs, whose rising affluence is resulting in the relatively rapid growth of energy-intensive activities. As relatively low-cost reserves of fossil fuels are exhausted, rising global demand is being met by exploiting higher-cost sources. The cost differential between petroleum and alternative sources makes such sources viable even at their relatively high costs. Steadily rising costs of production, in turn, exert inflationary pressures on the global economy, which hits those economies hardest whose energy intensity is increasing most rapidly (Gokarn (2010a)). In recent years, the prices of petroleum, as well as other commodities, are perceived to have been further impacted by their emergence as an attractive asset class. However, as significant as the contribution of this factor may have been for price increases, the underlying fundamentals (demand-supply) are what will continue to drive prices in the coming years. While demand-driven inflation shocks can be avoided by prudent monetary and fiscal policies, the vulnerability of the domestic price process to supply shocks emanating from international commodity prices is likely to persist.

5. Conclusion

Over the past two decades, financial linkages have become stronger, resulting in a higher degree of business cycle co-movement, which has also led to faster transmission of shocks across countries. In India, too, trade openness has significantly increased, along with higher capital account openness, which is reflected in greater synchronisation of domestic business cycles with those of advanced and other emerging market economies. Further, among the trade and financial channels, the latter seems to be more significant during the recent period in transmitting the effects of global developments to the domestic economy, evident in the faster and significant impact on domestic asset prices. Concomitantly, with the growing global integration of domestic financial markets, regulatory and prudential policies have to ensure that domestic financial markets and market participants are in a position to absorb unanticipated and large shocks that can emanate from global developments so that the financial stability objective is not compromised.

While larger capital flows in the past reflected higher growth differentials, strong domestic macroeconomic fundamentals, growing investor confidence and liberalisation of the capital account, there have also been associated costs in terms of the inherent volatility of portfolio flows and their implications for exchange rate volatility, asset price pressures and domestic liquidity management. Although some countries have had recourse to direct capital controls in the form of variants of Tobin taxes to overcome these challenges, the Indian approach so far has been to abstain from such measures. Nevertheless, risks from volatile flows remain an important concern in India.

Another important manifestation of the globalisation of monetary policy is challenges faced in maintaining price stability due to global supply shocks. Empirical tests suggest that there is a significant causal effect from global commodity prices to domestic prices in India. This imparts some degree of exogeneity to the price formation process. It is often believed that monetary policy cannot do much about supply shocks such as rising food and energy prices, which may be true to some extent. Nevertheless, monetary policy in India is concerned about global commodity price shocks, given their spillover effects on core inflation through input cost increases and wage-price spirals, which could ultimately unsettle inflation expectations and lead to generalised price pressures. The trend in imported inflation for India indicates that it remained above domestic inflation, mainly due to elevated price pressures from minerals, fuel, edible oil and chemical products. Given the tight global demand-supply balance in most commodities, global developments may have a significant impact on domestic prices. Monetary policy thus has to be vigilant against global price shocks to safeguard domestic price stability.

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