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Box
Article

Global Slack as a Determinant of Inflation¹

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HIGHLIGHTS

- Global slack² has been an important determinant of inflation in Asia-Pacific economies. However, its influence on inflation has waned after 1990 as the effects of global commodity prices and the exchange rate become more dominant.
- Globalisation, through increased trade and offshoring of production processes, has contributed towards weakening the relationship between domestic slack and inflation.
- The considerable influence on domestic inflation dynamics from factors associated with globalisation implies that these factors can provide relevant information to central banks when developing monetary policy and communication strategies. This has been the approach adopted by Bank Negara Malaysia, given its broader consideration of factors affecting the domestic economy, consistent with its inflation-anchoring framework.

Introduction

The standard Phillips curve relationship implies that the rapid increase in domestic utilisation of labour and capital would lead to resource shortages that generate upward pressure on inflation³. Over the past decades, many have documented a weaker response of domestic inflation to domestic resource utilisation – a phenomenon widely dubbed as the flattening of the Phillips curve⁴. The most recent experience of this was evident in the unexpectedly low inflation especially in the advanced economies, despite the narrowing of domestic slack that followed the economic recovery from the financial crisis of 2007-08.

In explaining this phenomenon, one popular view among economic commentators and policymakers is that, the global factors associated with globalisation are playing a larger role, compared to domestic factors, in determining domestic inflation processes (Carney, 2017). In particular, globalisation – through the integration of product, labour and capital markets across economies – has offered opportunities for countries to access a greater amount of cheaper and more efficient inputs as well as final goods and services across national borders. The low inflation in the last decade has been attributed to the considerable amount of resources available at the global level, known as global slack.

This article looks into the influence of the factors associated with globalisation on inflation dynamics in the Asia-Pacific economies, by addressing two questions:

- How does global slack influence domestic inflation?
- Which features of globalisation are dominant in affecting domestic inflation dynamics?

¹ A technical version is forthcoming in the Bank Negara Malaysia Working Paper series.

² Global slack, or also commonly known as global output gap, reflects the extent to which global resources such as labour and capital, are utilised. It is defined as the relation between worldwide demand and global productive capacity (Milani, 2009).

³ The original wage Phillips curve traces the relationship between unemployment and wage growth. The lower the unemployment rate, the faster the wage rise. The price Phillips Curve generalises the relationship at the economy level, and traces the relationship between inflation and domestic slack.

⁴ See, for example, Blanchard, Cerutti, and Summers (2015).

A. In theory, global slack could have both direct and indirect effects on domestic inflation

The traditional view is that global slack has always affected inflation in indirect ways through other inflation determinants (European Central Bank, 2017). Global slack would have a direct impact on inflation if it directly influences the pricing decision of producers. An indirect impact occurs when global slack affects other inflation determinants (such as global commodity prices and exchange rate) that influence the pricing decision. Figure 1 shows a stylised representation of the channels through which global slack can influence domestic inflation.

Consider, for instance, the strong global economic upturn that PR China experienced prior to 2008. To meet the stronger demand for goods and services, producers in PR China ramped up production, thereby increasing the utilisation of their labour and capital. Higher resource utilisation in PR China eventually worked its way to higher inflation in other countries through three indirect channels:

- i. **Global prices of commodity and intermediate inputs.** More intense production activity in PR China raised demand for imported raw commodities and intermediate inputs. The higher demand drove up the global prices of these inputs, some of which were imported for use in production in other countries.
- ii. **Exchange rate.** Cross-border capital and financial flows that accompanied the increased cross-border flows of goods and services affected exchange rates. Countries with weaker exchange rates faced higher import prices, which passed through to higher inflation.
- iii. **Domestic slack through net exports.** The economic strength in PR China also led to rising imports by PR China, which encouraged exporters in other countries to ramp up their own production and resource utilisation to meet PR China's demand for goods and services. The higher domestic resource utilisation in those countries, in turn, generated upward pressure on their respective domestic inflation.

Figure 1: Indirect and direct channels through which global slack can affect domestic inflation



Notes: The dashed arrows reflect the indirect impact from global slack to inflation, the solid arrows reflect the direct impact on inflation.

Source: Adapted from the European Central Bank's illustration of drivers of inflation in ECB Economic Bulletin 4 / 2017

A more recent view is that globalisation has strengthened the direct impact from global slack to domestic inflation, and weakened the response of inflation to domestic slack. In theory, the direct impact works through three channels:

- i. **Stronger competition from a larger global marketplace** makes domestic producers more attuned to global demand conditions in order to maintain market share.
- ii. **Greater capital and labour mobility** reduce the sensitivity of capital costs and wages to domestic demand conditions, and correspondingly increase the exposure to demand conditions in countries from where capital and labour are sourced⁵.
- iii. **Fragmentation and offshoring of production processes (global value chain, GVC)** make inflation more sensitive to the demand conditions of countries involved in the production chain.

An example based on the production of T-shirts to illustrate the channels through which a decrease in global slack can influence the domestic inflation of T-shirts

This section illustrates the channels through which global slack could have influence on domestic inflation using a simple example based on the production of cotton T-shirts in Malaysia. In this example, assume that global demand conditions are strong such that there is an increase in demand for cotton T-shirts. To cater to the stronger demand, T-shirt producers worldwide would respond by producing more T-shirts and increasing resource utilisation at a rapid pace. The increase in resource utilisation worldwide would have the following indirect impact on inflation of T-shirts in Malaysia:

- i. To meet the increase in the production of T-shirts, producers worldwide would demand for more cotton as inputs. Given a fixed supply of cotton globally, this would push up the global cotton price and raise the costs of imported cotton for Malaysian producers.
- ii. The increase in worldwide demand for T-shirts, along with higher global cotton price, may also push up prices of imported T-shirts for Malaysian T-shirt importers.
- iii. Changes in global demand conditions and commodity prices may have influence on the ringgit exchange rate. An appreciating ringgit exchange rate, for example, would make it less costly for Malaysian producers to import inputs and finished goods.
- iv. If Malaysian T-shirt producers also benefit from stronger worldwide demand for their T-shirts, they may respond by increasing the production volume. If the production volume increases beyond their capacity such that it becomes costlier to produce an additional T-shirt, producers may decide to raise domestic prices.

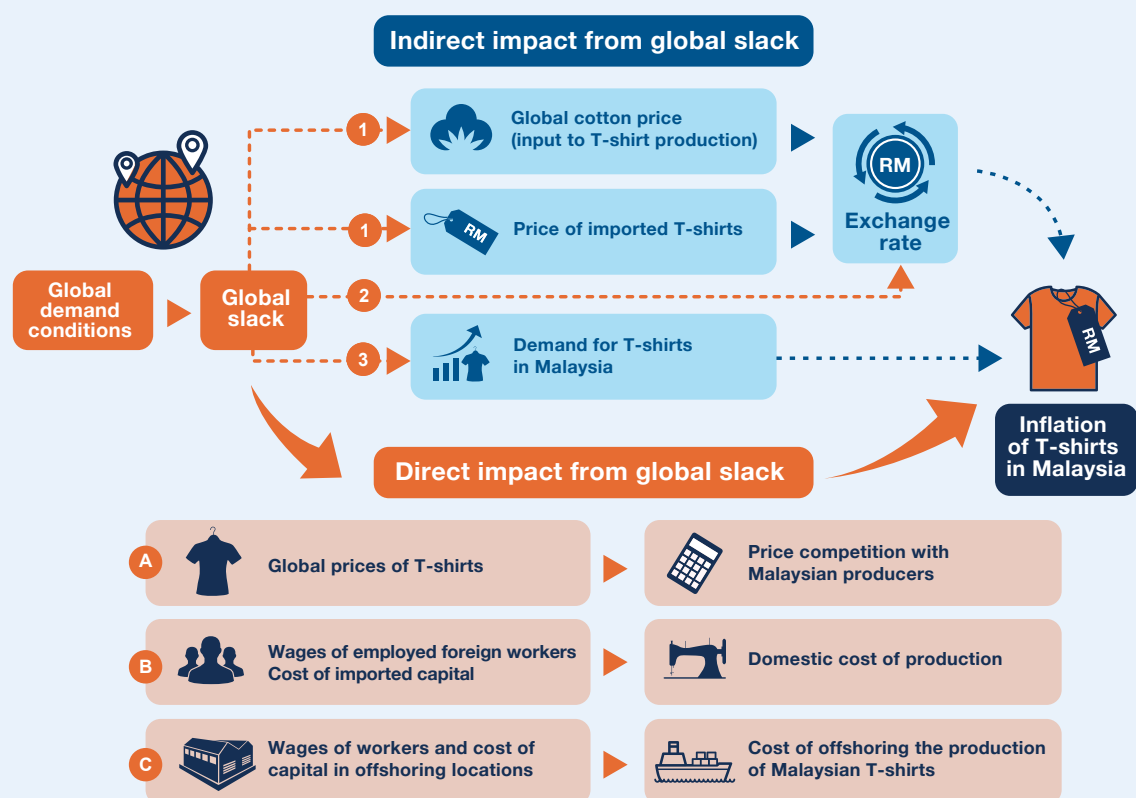
At the same time, the rapid increase in resource utilisation worldwide to produce T-shirts could also have a more direct impact on domestic inflation of T-shirts:

- i. A drawdown on resources in some countries could raise the cost of domestic production for their local T-shirt producers, and affect their pricing decisions. Given stronger competition between T-shirt producers worldwide amid market integration, the pricing decision by these foreign T-shirt producers could directly affect the pricing decision of Malaysian producers.

⁵ For example, competition for jobs with fellow domestic workers and also those abroad makes it harder for domestic workers to demand for higher wages in response to tighter domestic labour conditions.

- ii. Malaysian producers may be employing foreign workers and importing machinery from abroad to produce T-shirts. As a result, insufficient workers or machinery in countries from which these inputs are sourced could directly affect input costs for these producers.
- iii. Alternatively, Malaysian T-shirt producers could outsource some parts of the production process or the entire process to other countries (offshoring), and would thus utilise their labour and capital to produce T-shirts to be sold in Malaysia. In this case, T-shirt prices would be more sensitive to the wages and capital costs in the country to which the production is outsourced, and would in turn, be affected by the extent of slack in those countries.

Figure A: Indirect and direct channels through which global slack can affect the domestic inflation of T-shirts



Notes: The dashed arrows reflect the indirect impact from global slack to inflation, the solid arrows reflect the direct impact on inflation.

Source: Bank Negara Malaysia

B. The empirical evidence on the relevance of global slack is mixed

Despite the popular view that global slack has a greater influence on domestic inflation, the empirical evidence on this is not conclusive. The seminal paper by Borio and Filardo (2007) for instance, finds support for the importance of global slack on domestic inflation for fifteen advanced economies. They thus argue for a more global-centric approach in thinking about the inflation process, rather than a country-centric one. On the other hand, several others, including Calza (2008), Ihrig, Kamin, Lindner and Marquez (2010), and Martinez-Garcia and Wynne (2012), find that globalisation has a limited impact on the inflation dynamics of advanced economies. While contrasting findings may reflect the different empirical approaches, the difficulty in establishing a consistent finding is compounded by the uncertainties surrounding the slack measures and the challenges in combining country-level economic slack into a composite measure of global slack⁶.

Several major central banks also find little support for the relevance of global slack. Using data through early 2017, Federal Reserve Board staff find that global slack does not appear to exert an appreciable direct effect on domestic inflation in the US and most other advanced economies (Yellen, 2017). The European Central Bank also finds limited support for including measures of global slack and of the integration in global value chains in explaining inflation in the euro area (European Central Bank, 2017).

C. Global slack has been an important determinant of inflation in Asia-Pacific

The current literature on this line of research has mainly focused on the experiences of advanced economies. To add a new perspective to studies on this topic, this article looks into the relationship between global slack and domestic inflation for 13 Asia-Pacific economies^{7,8}.

Figure 2 summarises the results for Asia-Pacific economies based on the empirical estimation using annual data between 1970 and 2015.

- Domestic slack is positively associated with inflation, but its correlation has trended downward after 1990, consistent with common findings in other economies.
- Global slack has been an important determinant of domestic inflation for Asia-Pacific economies. In fact, the correlation between inflation and global slack is stronger than the correlation with domestic slack.
- Global commodity prices and exchange rate are key determinants of domestic inflation.

As corroborating evidence on the impact of globalisation on inflation, the timeline of the change in inflation dynamics is also of interest. Some observers have suggested that the dependency of inflation on global slack has become more dominant since the early 1990s, when globalisation was increasing at a rapid pace (Borio and Filardo, 2007).

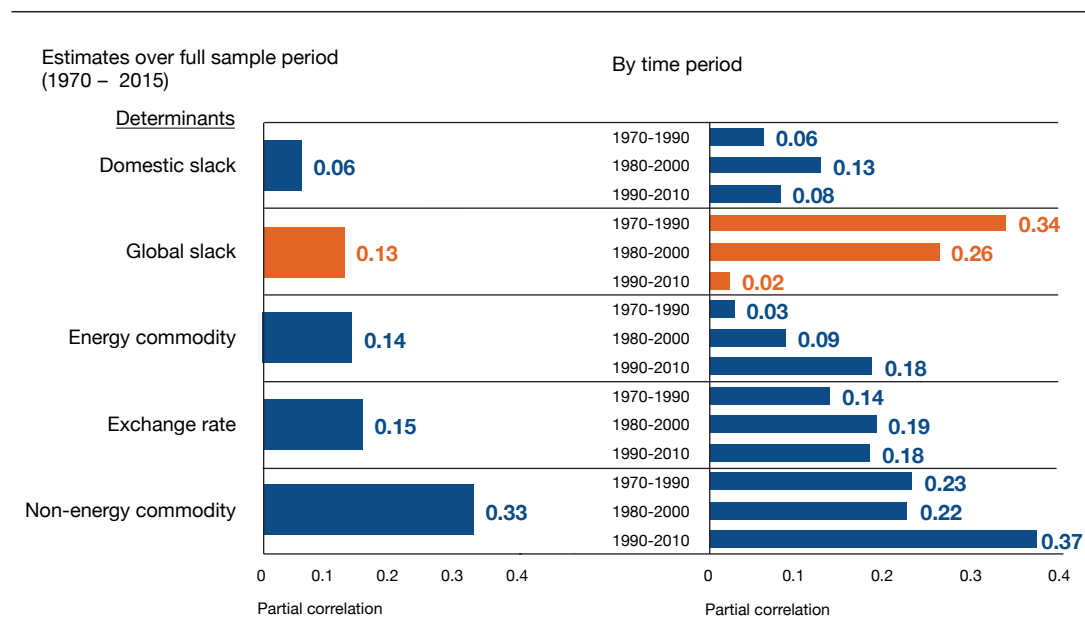
However, Asia-Pacific economies exhibit different results. The direct impact of global slack appears to have gotten weaker over time, although we cannot rule out the possibility that global slack may exert a stronger indirect impact on inflation through global commodity prices and exchange rate. Specifically, the correlation between global slack and domestic inflation was stronger before 1990, and has since waned. Instead, other global factors, such as global commodity prices and exchange rate, have become more dominant in explaining inflation⁹.

⁶ See Gerlach (2011) and Tanaka and Young (2008) for further discussion on the uncertainties surrounding the slack measure.

⁷ The analysis is undertaken by first estimating a version of the hybrid New Keynesian Phillips Curve (NKPC) model with only domestic slack. Next, an extension of the model that includes a measure of global slack is included. Countries included in this study are PR China, Japan, Thailand, Vietnam, Singapore, Korea, Philippines, Indonesia, Hong Kong, India, Malaysia, Australia and New Zealand.

⁸ The standard version of the Phillips curve always includes a term for inflation expectations. However, data limitations restricted our ability to develop a good proxy for inflation expectations for the purpose of our estimation.

⁹ This development could be explained partly by the greater reliance on commodities for the production of goods and services.

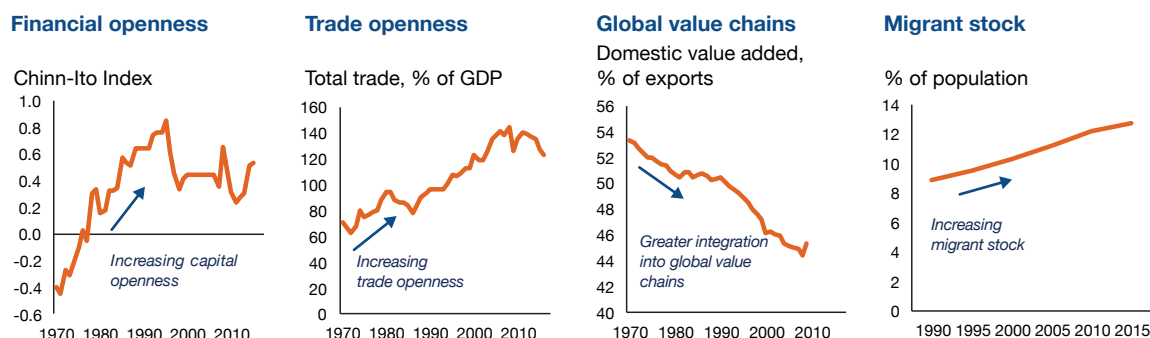
Figure 2: Partial correlation between inflation and its determinants

Source: Bank Negara Malaysia estimates

The weaker direct impact of global slack on inflation may come as a surprise if globalisation is perceived to have accelerated only later in the 1990s. For Asia-Pacific economies, significant increases in financial openness, trade openness, and integration into the global value chains, have been evident since 1970 (Figure 3).

The specific channels through which the forces of globalisation have altered domestic inflation dynamics warrant particular attention. We investigate four features of globalisation, which form the direct channels through which global slack has a direct influence on inflation. These four are (1) financial openness; (2) trade openness; (3) integration in global value chains (GVC); and (4) migrant stock. Intuitively, the more dominant channels would have reduced the correlation between domestic slack and inflation more significantly¹⁰. Our analysis shows that trade openness and GVC appear to have noticeably reduced the correlation between inflation and domestic slack, while the impact of financial openness and migrant stock appear to be small and not statistically significant. The results suggest that the dominant channels through which global slack has a more direct impact on domestic inflation in Asia-Pacific economies are stronger competition from a larger global marketplace (Channel A in Figure 1) and offshoring of production processes (Channel C).

¹⁰ We interact both domestic and global slack with measures of financial openness, trade openness, integration into global value chains, and migrant stock. A positive interaction term for domestic slack, for example, suggests that the relationship between inflation and domestic slack is stronger given the feature of globalisation, while a negative interaction term would suggest a weaker relationship. The empirical setup will be detailed in the forthcoming working paper.

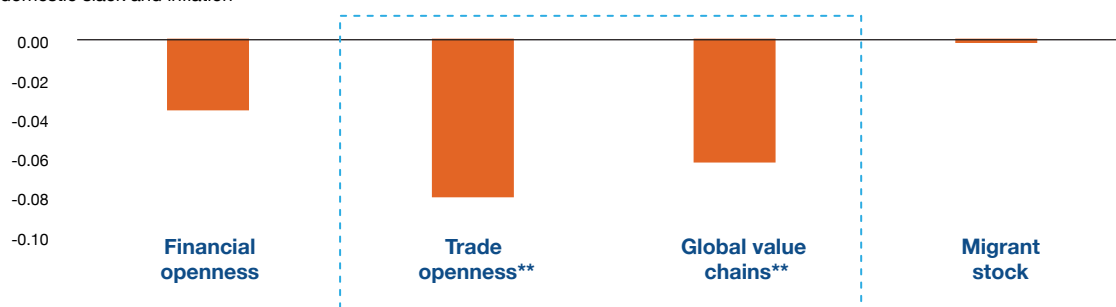
Figure 3: Features of globalisation for Asia-Pacific economies

Notes and sources:

1. Financial openness is proxied by the Chinn-Ito index, which is an index measuring a country's degree of capital account openness. Source: Chinn and Ito (2006).
2. Trade openness is measured as the sum of exports and imports of goods and services, as a share of gross domestic product (GDP). Source: World Bank and OECD national accounts data.
3. One measure of global value chain is the domestic value-added share of exports, which is the value-added content in the country of origin's exports divided by total gross exports. For a country that is more integrated into the global value chain, the measured level of domestic value-added would be relatively lower. Intuitively, a higher degree of production fragmentation would imply that each country's value-added in the supply chain would be smaller. Source: Johnson and Noguera (2017) database.
4. International migrant stock is the share of foreign-born population in total population in a country. A higher share would indicate a larger potential labour supply, above what can be offered by the local population. Source: United Nations Population Division, Trends in Total Migrant Stock: 2008 Revision.

Figure 4: Impact of the features of globalisation on the relationship between domestic slack and inflation in Asia-Pacific economies

Change in the partial correlation between domestic slack and inflation



Note: ** signifies statistical significance at the 5% level.

Source: Bank Negara Malaysia estimates

Conclusion

In summary, the evidence in this article points to a considerable impact from factors associated with globalisation on inflation dynamics in Asia-Pacific economies. This implies that these factors have the potential to provide relevant information to central banks, and should not be ignored when developing monetary policy strategy. Moreover, a weaker response of inflation to domestic demand – i.e. a flatter Phillips curve – makes it more difficult to manage inflation using just traditional demand management tools, and may warrant the deployment of additional policy tools. To that end, structural policies can play a complementary role to ensure a stable macroeconomic environment amid the transitions that take place following globalisation. This has been the approach adopted by Bank Negara Malaysia, given its broader consideration of factors affecting the domestic economy, consistent with its inflation-anchoring framework.

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