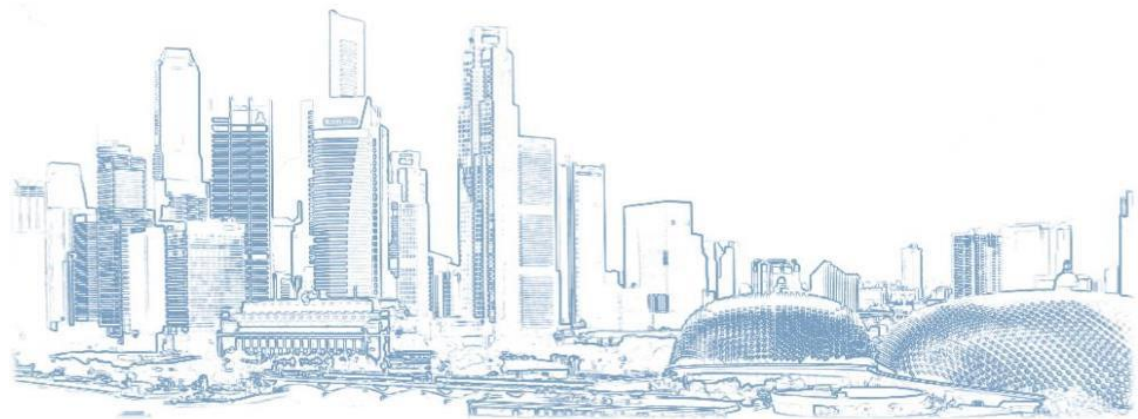


# Economics Explorer Series

Monetary Authority of Singapore

# 2



## The issue of **INFLATION**

How to measure it, what causes it, what its costs are, and how it is related to economic growth and globalisation.

## What is inflation?

*“I don’t believe this. The price of chicken went up by more than 10% last month, and yet the newspapers reported that inflation was only 1%!”*

It’s not unusual to overhear such complaints at the supermarket, yet did the newspapers really get it wrong? Actually, there is nothing wrong with the news, nor with the price tags at the supermarket. Inflation is defined as an increase in the overall level of prices in the economy. The term “overall” is important in the definition. It refers to inflation as a rise in the average price of all the items that we buy, and not only of one item or a certain category of items. Nonetheless, there have been instances when the increase in the price of one item was so significant that it pushed up the overall price level. An example of this was the sharp increases in global oil prices in 2007–2008, which resulted in high inflation in many countries around the world, including Singapore.

But why is inflation of concern to every one of us? Why do most central banks seem to be preoccupied with managing inflation as a major — if not the sole — priority of their monetary policy? The answer lies with the undesirable economic and social consequences of inflation. Over the last three decades or so, theoretical and empirical arguments have been advanced to show that excessive rates of inflation, whether too low or too high, are detrimental to long-run economic growth. An environment of low and stable inflation, in comparison, is thought to be essential for sustainable economic growth. By “sustainable economic growth”, we mean steady economic growth year after year, and not the boom-bust cycles typically associated with high-inflation countries, in which rapid economic growth alternates with deep recessions and financial instability.

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## How is inflation measured?

In Singapore, as in many countries, the most common measure of inflation is the annual percentage change in the Consumer Price Index (CPI). The CPI does not measure the costs of everything in the economy, but the cost of a fixed basket of goods and services commonly consumed by resident households. A measure based on consumer prices seems the most relevant since everyone, regardless of his or her profile, is a consumer.

### *How is the CPI compiled in Singapore?*

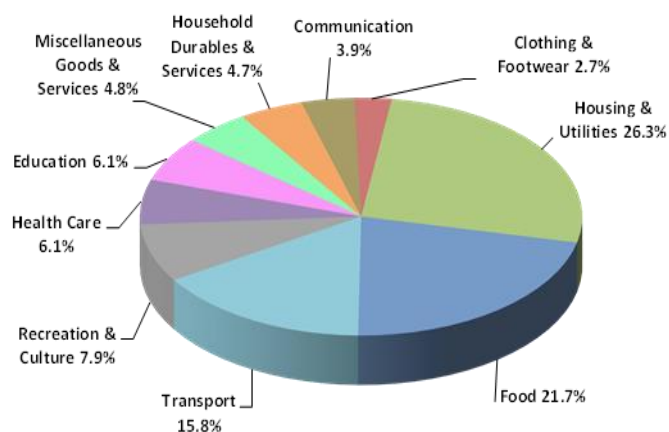
The CPI is compiled by the Department of Statistics (DOS) on a monthly basis. The types of goods and services included in the CPI and their respective weights are updated once in five years. This composition is in turn derived from the average consumption patterns of households, as collated by the Household Expenditure Survey, conducted every five years.

In the latest CPI basket (2014), there are ten broad categories of goods and services: housing & utilities, food, transport, recreation & culture, health care, education, miscellaneous goods & services, household durables & services, communication and clothing & footwear. (Figure 1) Each category has finer groupings, which include items such as prices of hawker food, books, cars, clothes and holiday tours as well as MRT fares, water tariffs, mobile phone subscription charges, and medical consultation fees. The CPI does not include non-consumption items such as purchases of financial assets (e.g., shares and bonds). The purchase price of new houses and apartments is also excluded because, in providing accommodation for households over an extended period of time, they are considered capital goods. Instead, this accommodation cost is approximated or 'imputed' from rental values. In other words, it is the price of housing *services* that is captured in the CPI, to approximate what homeowners would have to pay as if they were tenants in their homes.<sup>1</sup> DOS compiles a CPI series that excludes imputed rentals on owner-occupied accommodation.<sup>2</sup> It is an additional indicator to track prices that are reflective of households' actual expenditures as changes in imputed rentals on owner-occupied accommodation have no direct impact on the monthly cash outlay of homeowners.

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<sup>1</sup> House prices represent the discounted stream of value provided over a long period while rentals measure the cost of housing services on a per period basis.

<sup>2</sup> Accommodation in the Housing & Utilities category of the CPI comprises "rented and owner-occupied accommodation", as well as "housing maintenance & repairs".

**Figure 1: CPI Categories by Weights (2014)**

Source: Singapore Department of Statistics

In compiling the monthly CPI, DOS collects price data on the consumption items from a wide range of retail outlets and service providers, through postal/email surveys, from websites or from field interviews. In 2016, DOS incorporated the use of web-crawling technology to extract price information from websites in a more efficient and timely manner. In general, outlets or providers that are commonly patronised by households are selected. Prices of regulated items such as public transport fares and utility charges are obtained from the relevant government agencies. The frequency of price collection depends on the price behaviour of a given good and service. Prices of perishable food items, for example, are surveyed every week as they are more volatile. For those items with more stable prices such as public transport fares, utility charges, school fees and service & conservancy charges for HDB flats, prices are collected monthly, quarterly, half-yearly, or as and when there are changes. Around 6,600 brands or varieties from 4,200 outlets are covered in the latest CPI basket.

The overall CPI is then computed by combining the price indices for different items according to their weights in the basket. Thus, price changes in items with larger weights will have a greater impact on the CPI than those with smaller weights.

## Measurement Biases in CPI Inflation

The CPI has proven to be a reliable and widely accepted yardstick of price changes in many countries. Nonetheless, all price indices have their shortcomings, and the CPI is no exception. As the CPI is compiled based on the collective inflation experience, it does not correspond exactly to the personal experience of any particular household since every household's spending pattern is unique. This results in **compositional bias**. To better reflect the inflation experiences of different groups of households in Singapore, DOS compiles additional CPI series by income groups i.e. lowest 20%, middle 60% and highest 20% income half yearly. For example, compared to the highest 20% income group, the CPI for the lowest 20% is more heavily weighted towards housing & utilities, food and healthcare, and less towards transport, recreation & culture, and education. In addition, for a particular item sold at various retail outlets, since the CPI is meant to capture the change in the general price level, it does not reflect price adjustments by a specific retailer or service provider. While prices may have risen substantially in a particular outlet, they could have increased more moderately, held stable or even declined in other outlets.

As the quantities of the various items in the basket are fixed, there is also a **substitution bias** in the measurement of the CPI since, in reality, consumers tend to buy less of an item whose price has risen and more of a cheaper substitute. This causes inflation to be over-estimated, a problem which is alleviated to some extent through the revision of the CPI weights every five years.

Finally, there is **quality change/new product bias**. At times, the prices of goods and services rise because the quality of the items consumed has improved, and hence, the extent of price increases may be overstated in the CPI. Price adjustments for new products or brands with better quality are typically not reflected in the CPI due to the difficulty in quantifying the price effects arising from quality change. Nevertheless, DOS assesses price changes arising from quality differences where such information is available and reflects them in the CPI appropriately. In view of the rising share of services in the economy and the inherent difficulty in measuring quality improvements and the value of new services, there could be other types of biases, although the combined magnitude of their impact is uncertain.

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### What causes inflation?

In a market economy such as Singapore, most prices are determined by the interaction of demand and supply in the marketplace. As such, economists generally attribute the causes of inflation to either demand or supply factors, with different implications for the conduct of monetary policy.

#### Supply-side Factors

Supply-side factors refer to the associated price changes that result from shifts in the potential output of the economy. These shifts can be classified into three types.

First, those that have only a passing effect on both prices and inflation; and second, those that have a permanent effect on prices but a temporary impact on inflation. An example of the first is a poor harvest due to bad weather. An illustration of the

second is the introduction of a value-added tax on the goods and services we buy. In either case, central bankers would typically allow the effects of these one-off shocks on inflation to pass through to consumers because they reflect, respectively, a genuine scarcity which consumers must confront, and a policy intent which should not be counteracted. There is, however, a third type of supply-side shock, which has a permanent effect on both prices and inflation. For example, when there is technological progress, the economy's productive capacity is raised. In this case, the central bank may take into account the permanent impact on inflation in adjusting its policy measures.

In recent years, supply-side developments associated with digitalisation and other technological innovations appear to be having an effect on global inflation outcomes. An important example of this is the dramatic rise in e-commerce, which has led to intensifying competition between traditional brick-and-mortar stores and online retailers, thus exerting downward pressure on retail prices. Moreover, the impact of disruptive new technologies such as ride-hailing and accommodation booking platforms such as Uber and Airbnb, respectively, has been to lower prices for consumers. These developments should be viewed favourably as they enable producers to provide goods and services more cheaply, thus passing on the cost savings to consumers and resulting in an improvement in the standard of living.

Hence, sector-specific price declines could reflect the efficient adjustment of relative price levels, signalling the need for a reallocation of resources to more profitable sectors. More generally, it is nearly always the case that prices of some goods and services will be falling while others are rising at any given time, reflecting changing product scarcities.

## [Demand-side Factors](#)

Demand-induced inflation occurs when aggregate demand rises faster than aggregate supply, which results in upward price pressure. In many instances, this is caused by large increases in the money supply — “too much money chasing after too few goods” — due to the central bank printing money to finance persistent government budget deficits. In small, open economies, such as Singapore, demand pressures can also come from abroad. For example, when there is a large increase in export demand, manufacturers will have to hire more workers

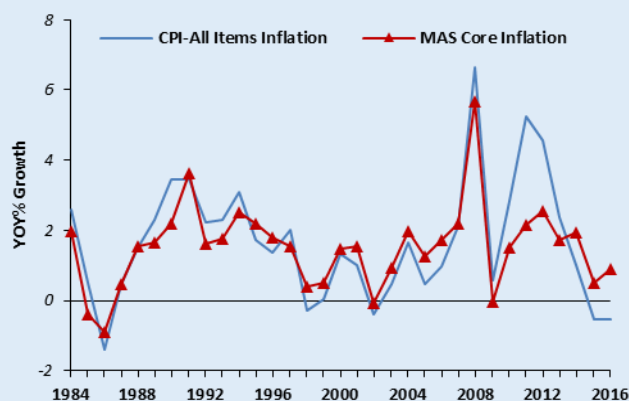
to produce the extra output and as they compete for Singapore’s limited pool of workers, wages will be bid up and this could lead to higher prices in the broader economy as firms pass on some of the extra cost. Even worse, if workers react to the rise in prices by asking for further wage increases, a vicious cycle of price and wage inflation can result, as happened in many advanced economies in the 1970s. Such an inflationary mind-set can be hard to reverse once expectations get fixed in people’s minds, and it is this type of persistent and self-reinforcing inflation that central bankers are particularly concerned about.

## Measures of Underlying Inflation

When dealing with inflation, central banks are more concerned with the underlying trend in prices caused by demand pressures from production capacity constraints and inflationary expectations, and tend to disregard temporary fluctuations in inflation due to supply shocks. However, distinguishing between supply-induced temporary changes in inflation and demand-induced persistent or underlying changes in inflation is easier in theory than in practice. For this reason, most central banks do not just look at “headline” CPI inflation, which is what we have been discussing so far, but also monitor other measures of inflation. Many countries use a measure of “core inflation” which excludes the prices of items such as energy and food because these are volatile and monetary policy need not respond to temporary fluctuations in them.

In Singapore, MAS monitors and analyses both headline CPI inflation (known as “CPI All-Items Inflation”) and a measure of core inflation (“MAS Core Inflation”). MAS Core Inflation is a better measure of underlying price pressures in the economy. It excludes private road transport and accommodation costs, which are subject to short-term fluctuations. These items also do not affect the day-to-day outlay of most Singaporean households. Core inflation is the measure MAS monitors most closely, among a range of indicators. While the headline and core inflation measures can diverge significantly in the short term, both measures of inflation generally track each other quite closely and tend to converge in the longer run. (Figure 2) (For more information, please refer to MAS Staff Paper No. 51: “A Review of the Core Inflation Measure for Singapore”, August 2011.)

**Figure 2: CPI-All Items Inflation and MAS Core Inflation**



Source: MAS and Singapore Department of Statistics

## What are the costs of inflation?

Once inflation rises above a certain level, there will be costs, and the higher the inflation rate, the greater the costs are likely to be. However, an assessment of these costs depends crucially on whether the price rises are anticipated or not.

### Anticipated Inflation

#### *Shoe Leather Costs of Inflation*

The first anticipated cost of inflation is what economists call “shoe leather costs”, which refers to the time and effort wasted as people try to minimise their holdings of cash. Since inflation reduces the value of money, people do not want to hold large amounts of cash but will convert their income-earning assets such as savings deposits into cash only when necessary. This requires people to make more frequent trips to the bank or automated teller machines, and in the process wear out the soles of their shoes — hence the term “shoe-leather costs”.

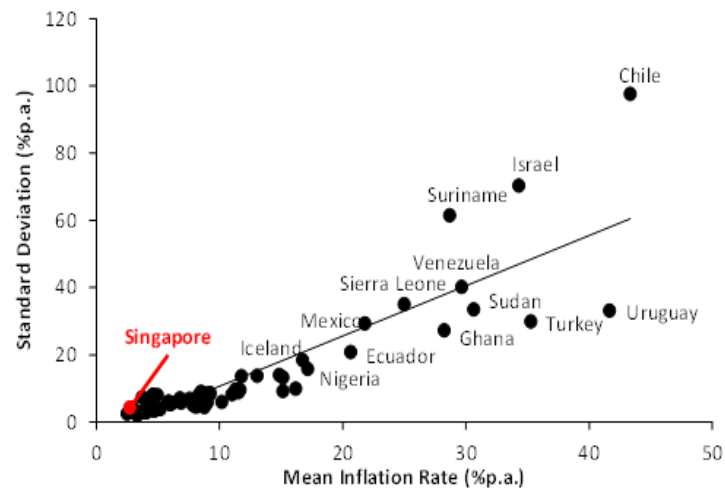
#### *Menu Costs of Inflation*

Another cost of inflation even when it is perfectly anticipated is the costs of constantly revising price lists. When inflation is high, firms and restaurants have to frequently adjust the prices of the goods or services that they sell. As a result, they incur costs in reprinting and re-issuing their product catalogues, price tags and menus — hence the term “menu costs”.

### Unanticipated Inflation

Much more significant costs of inflation arise when it cannot be anticipated. Empirical evidence has shown that countries with high inflation also tend to experience greater variability in inflation. (Figure 3) It appears easier to stabilise inflation at low levels possibly because this creates a virtuous cycle of low inflation leading to low inflationary expectations, and vice versa.



**Figure 3: Inflation and Its Variability, 1965–2016**

Source: International Monetary Fund (IMF)

### *Resource Misallocation*

In a market economy, prices provide important signals to producers to guide their output decisions. For example, when a producer sees that the price of his product has increased faster than the prices of other goods and services, he would infer that the demand for his product has risen much more than the demand for other goods and services. As a result, he would devote more resources to produce a larger quantity of that product. It is through this price mechanism that the market efficiently allocates the economy's resources to their most productive uses. Unexpected inflation, however, makes it difficult to distinguish between changes in the price of a specific product and changes in the overall price level. As such, the producer could mistake a rise in the overall price level for an increase in the price of his own product, and hence erroneously devote more resources to produce it. This misallocation of resources, if widespread, would result in lower economic growth.

Moreover, when households are unsure of the future value of their savings due to uncertain inflation, they will have less incentive to save. As a result, the economy will end up with a lower level of savings. In addition, when firms are uncertain about the future prices of their products and the return on their investments, they will be less willing to take risks and invest, especially in long-term projects. Instead, households and firms may become pre-occupied with short-term, unproductive investments such as in property, which are perceived to yield more attractive returns in an inflationary environment. If they

borrow to finance their investment, this could lead to asset price bubbles and debt default when prices decline.

#### *Arbitrary Income and Wealth Redistribution*

Another important socio-economic cost of unexpected inflation is its distributional consequences. Inflation redistributes income and wealth among the population in a way that has nothing to do with either merit or need. This is because most contractual agreements are specified in nominal, and not in inflation-adjusted terms. For example, when inflation turns out to be higher than expected, borrowers would benefit at the expense of lenders, as the real or inflation-adjusted value of debt and interest repaid will be less than the amount expected at the beginning of the loan period. Likewise, employers would gain at the expense of employees, as wages – which are fixed for a specified period – are not adjusted for higher inflation during the term of the contract.

#### *Wage-Price Spiral*

Finally, inflation can also feed on itself. When workers observe that the prices of goods and services have risen, they will ask for higher wages to maintain their purchasing power and if employers accede to this demand, they will have to charge higher prices for their goods and services in order to cover the higher wage cost. If this then leads to further wage demands and price increases, the result is a wage-price spiral, which is very difficult to reverse.

## Hyperinflation Stories

Hyperinflations are episodes of extremely high inflation, generally defined as more than 50% per month. This is equivalent to a compounded annual rate of 13,000%! While such episodes might seem like freak events, they are unfortunately not rare in modern times. During a hyperinflationary period, people may shift away from using the local currency to a more stable foreign currency, usually the US\$, hence giving rise to a phenomenon called the “dollarisation” of the economy. They may also hoard goods, such as food and other daily essentials.

The following are some snippets on hyperinflation and the pain it inflicts on a country and its people.

#### *Money Cheaper Than Wood*

During Germany’s hyperinflation period in the 1920s, the value of its currency fell so much that people started using money, in place of firewood, for fuel.

*Record Inflation*

The all-time high inflation appears to have occurred in Hungary between August 1945 and July 1946, when prices rose by approximately 1027 times. During the peak month, prices tripled every day, on average.

*Fares Not Enough*

In the Christmas of 1989, people in Brazil were unable to make long-distance journeys by bus. Fares set at the start of the month were no longer enough to cover costs by then, so buses were left in the garage, leaving passengers stranded.

*Worthless Coins*

In 1994, the central bank in Russia decided to withdraw all kopek coins after they were made worthless by hyperinflation.

*Beer at a 100 Billion Dollars*

In 2008, the official inflation rate in Zimbabwe was over two million percent (unofficially over ten million percent) so in July, the government issued a new 100 billion Zimbabwean dollar note. However, this was not even sufficient to purchase a bottle of beer.

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## Inflation and economic growth

How large are the costs of inflation to the overall economy? Cross-country studies on inflation and economic growth over the last three decades have, in general, concluded that there is a significant negative relationship between inflation and GDP growth among countries experiencing high, double-digit rates of inflation. In other words, for these countries, the higher their rate of inflation, the lower the rate of economic growth.

For example, Robert Barro of Harvard University estimated that a 10% point per year increase in inflation would reduce real per capita GDP growth by 0.2–0.3% point per annum, particularly for countries with inflation averaging above 15% per year.<sup>3</sup> Another study by Stanley Fischer also supports the general conclusion that high inflation is bad for growth, as it adversely affects the allocation of resources.<sup>4</sup> Using data on countries that experienced periods of very high inflation, his study found that real GDP per capita fell on average by 1.6% per annum during episodes of very high inflation, but rose by 1.4% during years of low inflation. Similarly, a World Bank study of 127 countries from 1960 and 1992 found that a loss of output growth was

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<sup>3</sup> Barro, Robert. 1995. "Inflation and Economic Growth", *Bank of England Quarterly Bulletin*, 35(2): 166–176.

<sup>4</sup> Fischer, Stanley et al. 2002. "Modern Hyper- and High Inflation", *Journal of Economic Literature*, 40(3): 837–880.

incurred at inflation rates higher than 20% per year.<sup>5</sup> The study found the inflation threshold to be at about 40% per annum, above which a country was likely to go into a high-inflation, low-growth crisis.

In contrast, there is no conclusive evidence on the negative relationship between inflation and growth at low rates of inflation, such as those currently experienced by many countries. There is also no evidence of a significant positive association between inflation and growth at low inflation rates. In other words, the once-held notion of a trade-off between a bit more inflation and slightly higher growth or employment, while evident in the short run, has not stood the test of time empirically. More significantly, the most striking result of the World Bank study was that inflation has a tendency to ratchet upward. These results are also relevant in the context of more recent discussion about the optimal inflation rate for central banks to target. In view of the persistence of low inflation outcomes in recent years, some economists have suggested raising the inflation target from the norm of 2%. However, raising the target when a central bank may lack the tools to achieve it can damage credibility and set back the effectiveness of monetary policy. In addition, inflation expectations can become unanchored if the volatility of inflation rises alongside the targeted inflation rate.

Notwithstanding these findings, Martin Feldstein has shown for the US that the interaction between taxes and inflation can impose a large cost on the economy, even at very low rates of inflation.<sup>6</sup> He estimated that reducing the inflation rate by 2% points, for example from 3% to 1% per year, would raise the level of real GDP by 1% every year into the future.

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<sup>5</sup> Bruno, Michael and Easterly, William. 1995. "Inflation Crises and Long-Run Growth", mimeo, World Bank.

<sup>6</sup> Feldstein, Martin. 1997. "The Costs and Benefits of Going from Low Inflation to Price Stability", in Christina Romer and David Romer, eds, *Reducing Inflation: Motivation and Strategy*, p123–166, University of Chicago Press.

## What about Deflation?

While high inflation is not desirable, deflation can be harmful as well. Deflation is defined as a generalised and sustained decline in prices, which is widespread and broad-based in most, if not all, goods and services in the economy.

Historical episodes of deflation – such as during the Great Depression in the 1930s – are usually associated with prolonged economic recession, which occurs because of too little spending and investment, as households and businesses delay their purchases and investments in anticipation of further price decreases. A downward spiral results, as depressed demand forces businesses to slash the prices of their goods and services further, leading to even lower demand and output. Deflation also increases the real burden of debt, leading to bankruptcies and possibly bank failures if the financial system is already fragile.

In the aftermath of the Global Financial Crisis (GFC), for example, there were concerns over the effects of disinflation or deflation interacting with over-indebtedness in the industrialised economies, as outlined decades before by Irving Fisher.<sup>7</sup> In Fisher's deflation scenarios, debt liquidation leads to distress selling and a contraction of bank deposits. This causes a fall in the price level and corporate profits as well as a contraction in output, trade and employment, precipitating bankruptcies. The resulting loss of confidence leads to the hoarding of money, pushing up real interest rates, which then sparks off another round of debt liquidation. Fisher was of the view that this was the reason for the Great Depression in the 1930s. Fortunately, however, Fisher's deflation scenario did not materialise after the GFC as inflation subsequently picked up in the advanced economies.

In less severe downturns, price inflation typically also falls or turns negative for short periods, as prices adjust to the fall in aggregate demand. This has the effect of buffering the adverse impact of the sharp fall in GDP, thus aiding the economic recovery process. In Singapore, inflation was negative following the recessions in 1985–86, 1998–99 and 2001–02 and 2009.

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## Inflation and globalisation

Global inflation has moderated significantly over the past decade, falling sharply from an average of about 20% in the first half of the 1990s to around 4% since then.<sup>8</sup>

While the drop in inflation could be attributed to factors such as improved central banking institutions, practices and policies, as well as an increased awareness of the costs of inflation, there is growing evidence that globalisation also played a key role. For instance, Borio and Filardo found that global factors, as measured by the global output gap, had an important and rising

<sup>7</sup> Fisher, Irving, 1933. "The Debt-Deflation Theory of Great Depressions", *Econometrica*, 1(4): 337–357.

<sup>8</sup> *International Financial Statistics*, International Monetary Fund.

impact on domestic inflation in the advanced countries.<sup>9</sup> In the same vein, an MAS study showed that regional factors had played a larger role in explaining inflation in the Asian economies.<sup>10</sup> The rising prominence of regional inflation drivers can be explained by several developments, including the greater synchronisation of business cycles within Asia, the prevalence of common commodity price shocks in the past decade, and the emergence of intra-regional production networks.

Globalisation is generally believed to have moderated world inflation through the entry of low-cost economies into global trade and production networks. Their participation directly reduced the cost of imports across the world and indirectly introduced competition in domestic markets, thus spurring productivity growth. Facilitated by advances in information and communications technology (ICT), the rise of global value chains (GVCs) in particular has led to greater synchronisation of producer price inflation across countries, thus increasing the sensitivity of domestic inflation to global inflationary pressures. Global commodity price cycles could also have been accentuated by the increased demand from emerging markets. This not only results in the stronger influence of external shocks but also a higher degree of co-movement in inflation rates globally.

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## Singapore's inflation experience

Since independence in 1965, Singapore has achieved relatively high economic growth and low inflation. Between 1965 and 2016, Singapore's real GDP growth averaged 7.6% per year. Robust economic growth was not achieved at the expense of high inflation, with CPI-All Items Inflation of 2.7% per annum during this period while MAS Core Inflation averaged 1.4% between 1984 and 2016.<sup>11</sup> This compares with inflation of 22.6% per annum in emerging and developing countries, and 4.5% per annum in advanced economies since 1969.

While Singapore's headline inflation averaged a moderate 1.5% in 2000–2009, it picked up to 2.1% per annum and also became more volatile in the most recent period of 2010–2016, as measured by the 0.4% point increase in the standard deviation

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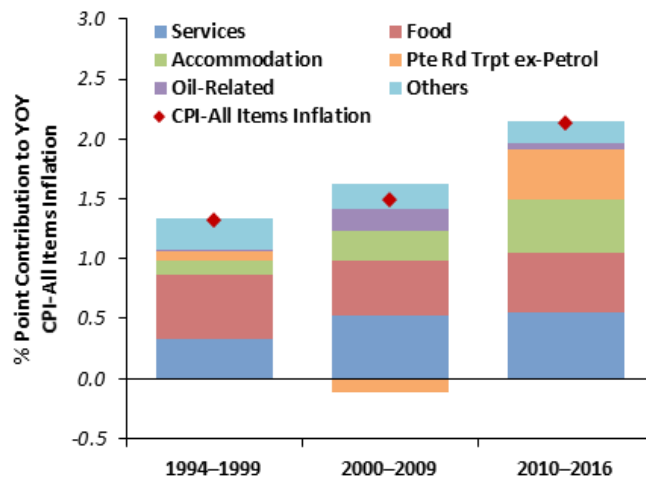
<sup>9</sup> Borio, C and A Filardo, 2007. "Globalisation and inflation: new cross-country evidence on the global determinants of domestic inflation", *BIS Working Papers*, Number 227, May.

<sup>10</sup> MAS *Macroeconomic Review*, October 2012.

<sup>11</sup> The MAS Core Inflation measure was first introduced as MAS Underlying Inflation in 1984.

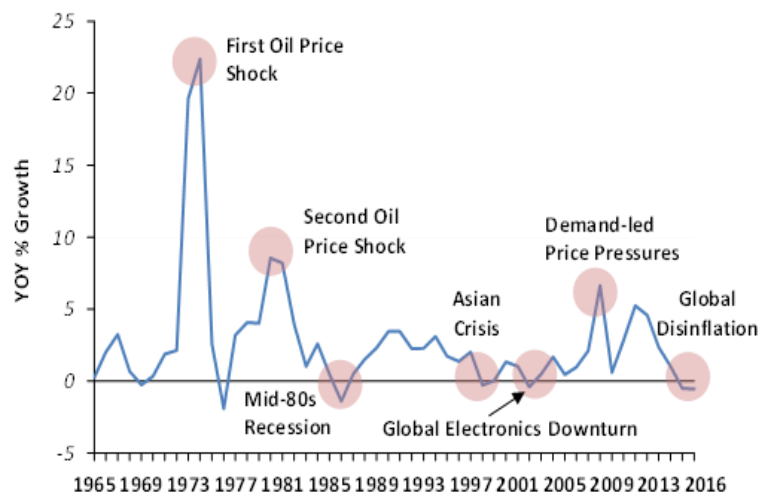
of annual inflation. Consumer prices were buffeted by fluctuations in global food and oil prices, which in turn were driven by supply disruptions arising from extreme weather conditions and heightened geopolitical risks in the oil-producing regions, respectively. Over the years, the cost of private road transportation saw significant changes, in part due to the government's policies on regulating motor vehicle population growth and car financing. Similarly, property prices and residential rents rose sharply after the GFC and moderated from late 2013 following a slew of macroprudential measures introduced by the government. (Figure 4) MAS Core Inflation, in comparison, was relatively more stable, averaging 1.4% since the measure was introduced in 1984.

**Figure 4: Contribution to CPI-All Items Inflation**



Source: MAS Estimates

In the following pages, we highlight seven major episodes of Singapore's experience with inflation and the monetary policy measures taken in response. (Figure 5) The episodes of negative inflation were generally associated with weak overall economic conditions or recessions. Downward price pressures were mainly concentrated in sentiment-sensitive industries and segments exposed to external price shocks. This reflects certain unique features of the Singapore economy, such as the structure of specific markets (e.g. the vehicle quota system) and the large share of imports in domestic consumption.

**Figure 5: Singapore's CPI-All Items Inflation, 1965–2016**

Source: MAS and Singapore Department of Statistics

### Dealing with Stagflation: 1973–74

When the first oil crisis hit in late 1973 with a quadrupling of oil prices, Singapore's imported inflation surged and CPI-All Items Inflation rose to nearly 30% in the first half of 1974. At the time, the global economy was headed for a slowdown. Singapore faced the prospect of stagflation: a combination of high inflation and low growth. In response, monetary policy was aimed at curbing inflation as MAS imposed credit ceilings on banks and finance companies, together with selective credit guidelines. With inflation moderating in the second half of 1974, monetary policy was gradually eased to support growth. The economy avoided recession and managed to grow by 4.6% in 1975, while inflation was 2.6%.

### Second Oil Price Shock and Advent of Exchange Rate-Centred Monetary Policy: 1980–82

In 1980, CPI-All Items Inflation accelerated to 8.5%, primarily due to the second oil price shock and a concomitant rise in world commodity prices. Another contributing factor was the rapid pace of domestic wage increases that began in 1979. Capital inflows were also large in 1980, adding to inflationary pressures. Monetary policy was tightened accordingly, and in 1981, MAS shifted the focus of monetary policy to managing the exchange rate, instead of the money supply or interest rates. By allowing the exchange rate to appreciate amid the inflationary environment of the early 1980s, MAS was able to prevent the



kind of import price pass-through that occurred during the first oil shock in 1973–74. Inflation in Singapore came in about 6% per annum during 1981–82, well below the advanced countries' average of nearly 10%. In 1983, domestic inflation eased further to 1.0%, as global inflation receded and the Singapore dollar continued to appreciate.

### Recession and Recovery: 1985–87

In 1985, Singapore experienced its first post-independence economic recession. In response, the government implemented a package of cost and tax-cutting measures to help restore Singapore's international competitiveness and boost exports. In particular, a 15%-point reduction in the rate of employers' contribution to the Central Provident Fund (CPF), coupled with a two-year wage restraint policy, helped bring down unit labour costs. This, together with the decline in inflationary pressures from abroad, allowed MAS to ease exchange rate policy during 1986–87, thereby lending support to the government's efforts to revive the economy. Accordingly, GDP growth rebounded strongly to 10.8% in 1987 and 11.1% in 1988, while CPI-All Items Inflation remained subdued at 0.5% and 1.5%, respectively.

### Asian Financial Crisis: 1997–98

The Asian Financial Crisis was precipitated by the sharp devaluation of the Thai baht in July 1997. Despite its sound economic fundamentals, the Singapore economy was not spared from the ensuing "contagion" and spillover effects due to its high degree of financial and trade openness. Singapore's real GDP fell by 2.2% in 1998, from an average growth rate of 9.1% in the previous five years. In the same year, the CPI contracted by 0.3%. In the absence of inflationary pressures, MAS' exchange rate policy was eased in 1998, which cushioned the rapidly decelerating economy from the adverse impact of the crisis, without undermining confidence in the Singapore dollar. The more accommodative monetary policy stance also reinforced the government's S\$2 billion off-budget stimulus package and S\$10.5 billion worth of cost-cutting measures to facilitate the recovery of the economy.

### Global Electronics Downturn and SARS: 2001–03

After recovering in 1999, the Singapore economy was further buffeted by a series of negative shocks at the beginning of the 2000s. A sharp and protracted downturn in the global electronics cycle caused domestic real GDP to contract by 1.0% in 2001 and CPI-All Items Inflation to fall to -0.4% in 2002. MAS responded by setting the rate of appreciation of the S\$ nominal effective exchange rate (NEER) policy band to zero percent in July 2001.<sup>12</sup> The band was widened in October 2001 in an off-cycle move to allow greater flexibility in managing the exchange rate following the September 11 terrorist attacks. It was then re-centred down in January 2002 as downside risks remained and restored to a narrower width amid lower volatility in market and economic conditions. The Singapore economy was subsequently hit by the outbreak of SARS in Q2 2003. With CPI-All Items Inflation falling to 0.1%, and inflationary pressures expected to stay subdued, MAS re-centred the policy band downwards again at the level of the S\$NEER prevailing in July 2003. The neutral policy stance was maintained until early April 2004 to facilitate continued economic recovery. Amidst these developments, the government set up the Economic Review Committee (ERC), which recommended a set of strategies to deal with the immediate challenges, as well as to restructure the Singapore economy for the long term.

### Demand-led Price Pressures and the Global Financial Crisis: 2007–09

The Singapore economy entered a phase of robust GDP growth of close to 9% per annum in 2006–2008, alongside a prospering global economy. Consequently, domestic supply-side constraints emerged, as evidenced by sharp increases in wages and rentals. On the external front, global oil, food and other commodity markets experienced a boom, on the back of strong demand from China and other emerging economies. Coupled with the one-off effect from the GST hike, CPI-All Items inflation accelerated in the second half of 2007 to 6.6% in 2008, the highest since the oil price shock in the early 1980s. These developments prompted MAS to steepen the pace of appreciation of the S\$NEER policy band in October 2007 to anchor inflation expectations. The policy band was then re-

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<sup>12</sup> Refer to the Economics Explorer on “Monetary Policy and the Economy” for more details on the exchange rate-based monetary policy framework in Singapore.

centred upwards in April 2008, amidst continuing external and domestic cost pressures, although monetary policy was subsequently eased in October after the collapse of Lehman Brothers triggered the GFC. At the same time, the government introduced a host of targeted measures to relieve wage and price pressures, including facilitating the re-entry of resident workers into the labour market to meet strong demand and releasing transitional office sites and vacant state properties for office use. Inflation subsequently eased in 2009 in the aftermath of the global recession.

### Global Disinflation: 2015–16

Disinflationary pressures were evident in the major economies in 2015–2016, due to the hesitant and uneven recovery in the global economy following the financial crisis. This was significantly exacerbated by the sharp declines in global oil prices that took place in late 2014 and 2015. Singapore's CPI All-Items Inflation was negative for a total of seven consecutive quarters from Q1 2015 to Q3 2016, the longest stretch of negative inflation recorded in its history. Apart from the global oil glut, other supply factors were at work, including a large number of residential properties coming onstream and an increase in Certificate of Entitlement (COE) quotas for motor vehicles. Government subsidies for healthcare costs introduced under the Pioneer Generation Package (PGP) and for pre-school education costs further held down the pace of increase in overall prices during this period. As a result, MAS Core Inflation remained subdued at an average of 0.7% in 2015–2016. To ensure medium-term price stability, MAS undertook several measured adjustments to the monetary policy stance. It reduced the slope of the policy band in an off-cycle move in January 2015, in line with lower imported inflationary pressures following the collapse in global oil prices. The rate of appreciation of the S\$NEER policy band was further reduced slightly in October 2015 and set at zero percent in April 2016 in view of the subdued economic outlook and price pressures. This policy was maintained in 2017 even though core inflation was expected to recover to 1.5% that year, as demand-driven inflationary pressures were restrained and the turnaround in inflation was instead largely driven by a pickup in global oil prices.

## Economics Explorer Series

The *Economics Explorer Series* aims to provide an accessible introduction to inflation and monetary policy.

1. The Monetary Authority of Singapore
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3. Monetary Policy and the Economy

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