

## 2.1 Labour Market Conditions

### Employment Growth was Uneven

#### Services accounted for the bulk of new job creation in 2010 ...

Total employment expanded strongly by 115,900 in 2010, or more than three times the increase in 2009.<sup>1</sup> (Chart 2.1)

Reflecting the economic upturn, the services sectors added significantly to employment growth. In particular, business services and community, social & personal services (CSP), which includes the IRs, accounted for almost half of the total job gains in 2010.

Meanwhile, job creation in construction was modest as several large-scale building projects neared completion and fewer new projects came on-stream.

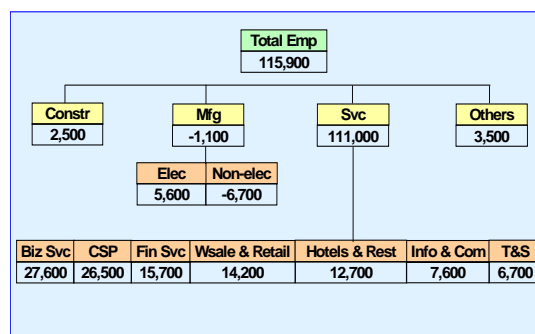
Manufacturing employment fell slightly as the transport equipment segment shed another 9,900 workers in 2010 on account of weak order books. This was partially offset by the turnaround in the electronics segment, which expanded employment for the first time in three years in tandem with the global pickup in IT demand.

As a result of the mixed labour market conditions, EPG's Employment Diffusion Index declined sharply from 87.0 in Q1 2010 to 57.4 in Q4, despite the robust job gains. (Chart 2.2)

#### ... due to both cyclical and structural factors.

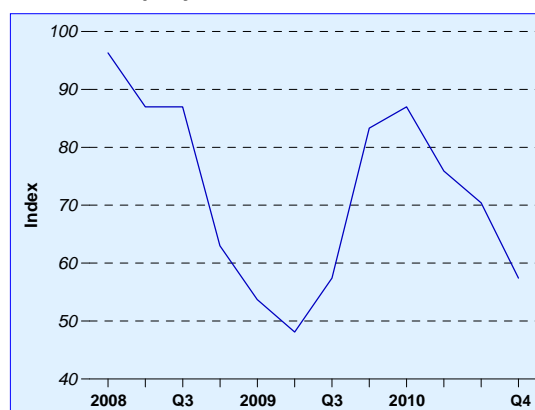
Adopting the methodology in Groshen and Potter (2003)<sup>2</sup> to analyse the labour market, new job creation in services was found to be driven by a combination of cyclical and structural, or industry-specific, factors.<sup>3</sup>

Chart 2.1  
Employment Changes by Sector in 2010



Note: Business Services comprise Real Estate & Leasing Services, Professional Services and Administrative & Support Services.

Chart 2.2  
Employment Diffusion Index



Source: EPG, MAS estimates

Note: The index is equal to 100 when all industries are increasing employment and zero when all are decreasing employment. A reading of 50 indicates that an equal number of industries are increasing and decreasing employment.

<sup>1</sup> The economy continued to register net job gains during the downturn of 2008-09.

<sup>2</sup> Groshen, E L and Potter, S (2003), "Has Structural Changes Contributed to a Jobless Recovery?", *Federal Reserve Bank of New York Current Issues in Economics and Finance*, Vol. 9(8).

<sup>3</sup> Sectors for which employment growth was lower than for the overall economy during the recent downturn and recovery experienced "structural job losses", while those that expanded employment faster over the cycle enjoyed "structural job gains". Also, sectors with stronger job creation during the upturn and a stronger contraction during the downturn were "procyclical", while those that experienced the reverse were "countercyclical".

Job growth in the financial services sector, for example, was found to be more procyclical. That is, financial services saw slower employment growth relative to the overall economy during the contraction, but relatively faster employment gains during the expansion. This partly reflected the concentration of hiring in the wealth advisory and financial intermediation services, which are significantly influenced by the performance of financial markets and regional growth. (Chart 2.3)

In comparison, for health & social services, other CSP<sup>4</sup>, hotels & restaurants and business services, job growth was stronger than in the overall economy during the recent recession and recovery. Structural factors appeared to have underpinned employment growth in these sectors.<sup>5</sup> In particular, the tourism-related sectors increased headcount in response to the record number of visitors to Singapore and the opening of the two IRs.

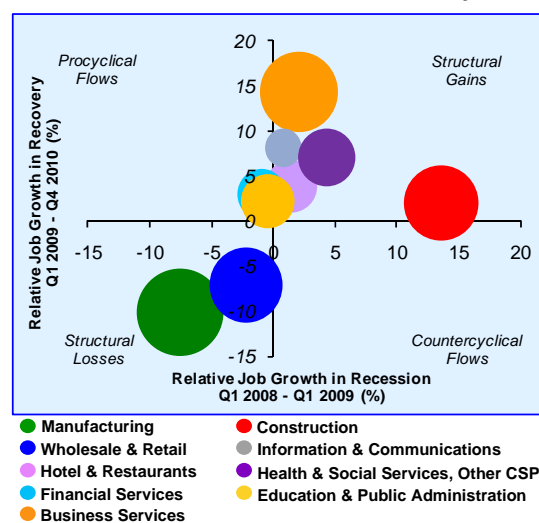
Conversely, weaker job creation in wholesale & retail trade and manufacturing relative to the broader economy probably reflected a shift towards higher value-added activities or productivity-driven growth.

#### **Demand for labour was met by an increase in resident labour force participation and foreigners.**

The job gains in 2010 were shared equally between foreigners and residents. (Chart 2.4) Compared to the more stable resident employment, foreign employment has historically been the swing factor, rising strongly when the economy was booming and vice versa. Last year, foreign employment gains were 59,700 after declining slightly during the downturn in 2009.

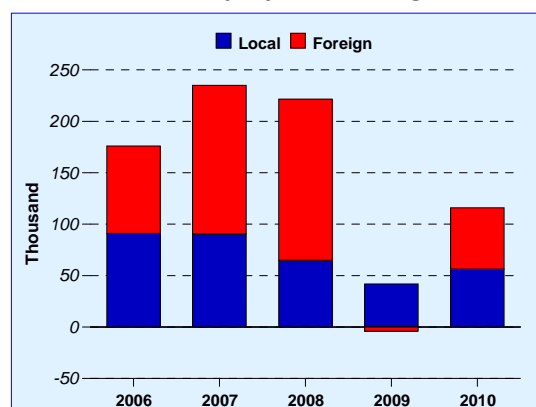
The buoyant job market last year also encouraged more residents to re-enter the labour force, while structural factors, such as the extended retirement age and a more educated profile among older workers, ensured that more people remained in the workforce. As a result, the resident labour force participation rate (LFPR) rose to a record high of 66.2% in 2010. (Chart 2.5)

**Chart 2.3**  
**Employment Growth by Sector**  
**Relative to the Overall Economy**

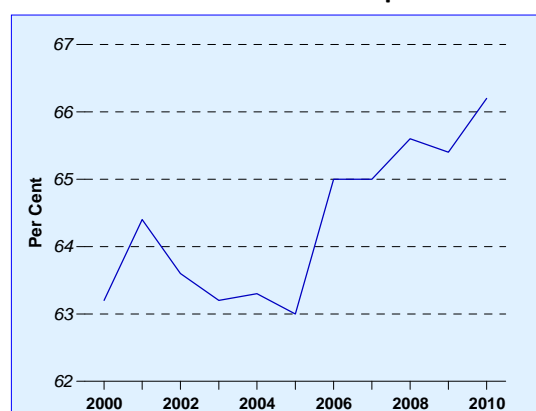


Note: Size of the bubble reflects employment share in Q4 2010.

**Chart 2.4**  
**Total Employment Change**



**Chart 2.5**  
**Resident Labour Force Participation Rate**



<sup>4</sup> CSP includes education & public administration, health & social services, domestic services and other CSP. Jobs in the IRs fall under other CSP.

<sup>5</sup> This was also the case for the construction sector where employment increased quite strongly over the cycle due to the buoyant property market and the acceleration in infrastructure development.

### The domestic labour market remained tight, resulting in higher wage growth.

Notwithstanding the higher LFPR, the resident unemployment rate edged down from 3.2% in H1 2010 to 3.1% in H2, an indication of tightness in the domestic labour market.

This resulted in wage growth accelerating or remaining high in most sectors in H2 2010. (Chart 2.6) For the whole of 2010, nominal wages grew by 5.6%, above the 2000-09 average of 3.3%. Nominal wage growth in CSP and financial services, in particular, were at their highest in the last decade.

### Meanwhile, labour productivity growth reached a record high.

The strong growth in wages also came on the back of record labour productivity growth of 10.7% in 2010. However, these productivity gains largely reflected the sharp recovery in output, which is typical for an economy emerging from a cyclical downturn. Using the Hodrick-Prescott filter, it is clear that productivity growth was driven by a strong cyclical pickup over the past year, even as the underlying trend has been stable. (Chart 2.7)

Indeed, a shift-share analysis shows that the bulk of the productivity gains in 2010 were due to the trade-related sectors, namely manufacturing and wholesale & retail trade, which experienced a very strong cyclical rebound in activity. For the rest of the economy, productivity gains were mostly weak. (Chart 2.8)

Chart 2.6  
Nominal Wage Growth by Industry

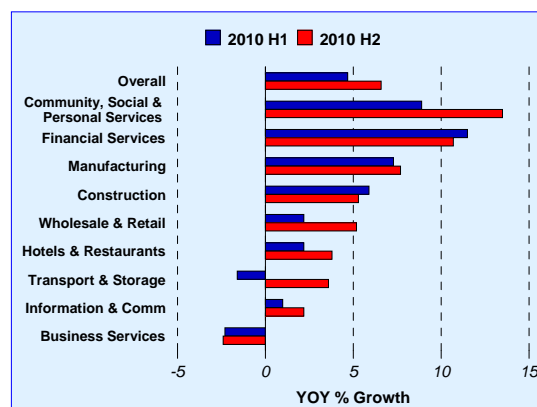
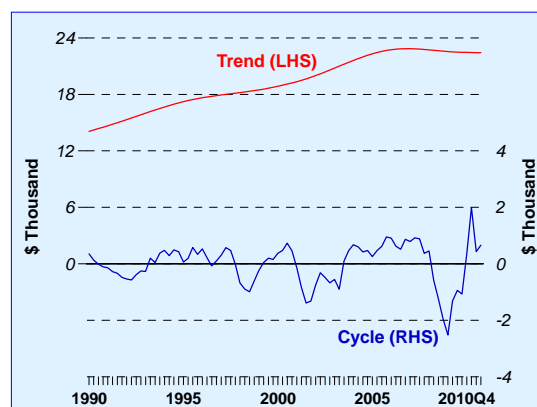
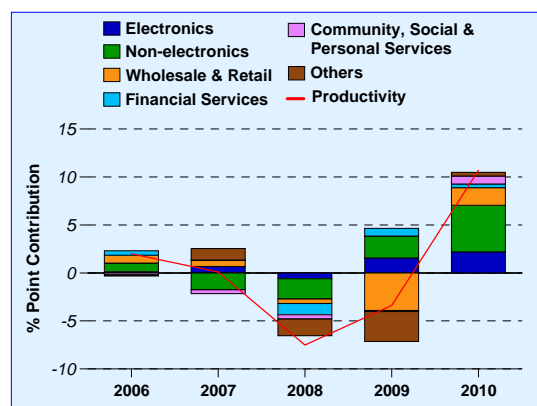


Chart 2.7  
Labour Productivity Trend and Cycle



Source: EPG, MAS estimates

Chart 2.8  
Contribution to Productivity Growth



Source: EPG, MAS estimates

## 2.2 Consumer Price Developments

### Inflation Increased in line with Robust Growth

#### CPI inflation rose in 2010 ...

Headline CPI inflation rose over the course of 2010 in tandem with robust economic growth. It reached 4.0% in Q4 and averaged 2.8% for the whole year, which was much higher than the 0.6% recorded in 2009. (Chart 2.9) Price increases were largely driven by cars and oil-related items, while costs of accommodation and services also added to inflationary pressures in the second half of the year. (Chart 2.10)

MAS Core Inflation, which excludes the costs of accommodation and private road transport, also rose from 0.1% in Q1 2010 to 2.2% in Q3 before easing slightly to 2.1% in Q4 on account of cuts in electricity tariffs. (Chart 2.9) It averaged 1.5% for the whole year, after coming in flat in 2009. MAS Core Inflation is examined in more detail in Box B at the end of this chapter.

#### ... and increased further in Q1 2011.

In Q1 2011, CPI inflation rose further to 5.2% as sharp increases in car prices and accommodation costs were compounded by low base effects. MAS Core Inflation, however, continued to ease to 1.9% due to weaker services inflation.

#### Strong sequential price increases were driven largely by cars and accommodation ...

On a sequential basis, the CPI rose faster than its ten-year historical average throughout 2010 and into 2011. (Chart 2.11) In particular, the spike in Q1 2011 was comparable in magnitude to the average rate of increase in 2007-08.

However, sequential price increases this time round were less broad-based, driven largely by cars and accommodation. (Chart 2.12) In fact, MAS Core Inflation, which excludes these two items, rose at a more moderate pace, largely in line with its ten-year average.

Chart 2.9  
Headline CPI and MAS Core Inflation

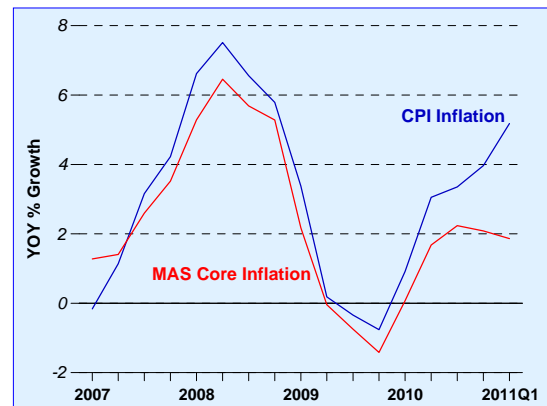
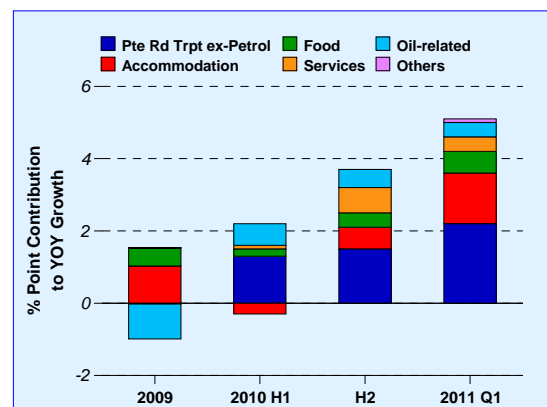
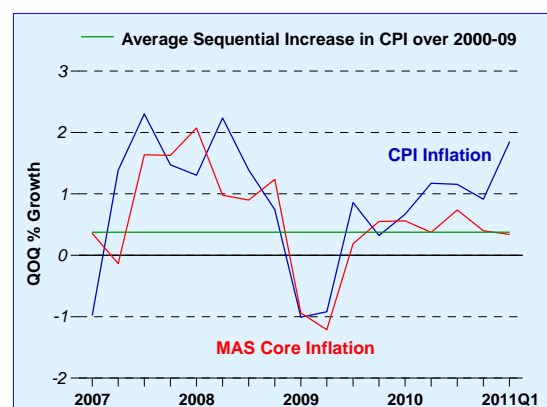


Chart 2.10  
Contribution to CPI Inflation



Source: EPG, MAS estimates

Chart 2.11  
Sequential Increase in CPI and MAS Core Inflation



---

**... mainly due to reductions in the COE quota ...**


---

Following the 33% reduction in the quota for Apr-Jul 2010, COE premiums surged to about \$37,000 in April 2010, more than double the level at end-2009. (Chart 2.13)

COE premiums stayed elevated in subsequent months, but rose by a further 24% in Q4 as buyers rushed to purchase cars in time for Chinese New Year and ahead of an anticipated cut in COE quota in February 2011. As a result, the contribution from private road transport costs, excluding petrol, to CPI inflation jumped from about 1.4% points in 2010 to 2.2% points in Q1 2011.

---

**... and tight rental markets respectively.**


---

Prices of other domestic non-tradable items such as accommodation and services also rose throughout 2010 and into early 2011.

Accommodation costs, in particular, increased by an average of 2.3% on a q-o-q basis from Q3 2010, more than double the recent five-year average of 1.0%. (Chart 2.14) This was a consequence of the strong growth in demand for rental properties in the private residential and HDB segments.<sup>6</sup> Despite the higher-than-average number of completions in 2010, private residential property vacancy rates largely trended downwards to 4.9% in Q1 2011, compared to the five-year average of 6.5%.

Coupled with the low base at the end of 2009 and into early 2010 when rentals fell, accommodation costs switched from being a net drag on CPI inflation in Q2 2010 to a net contributor (1.4% points) in Q1 2011.

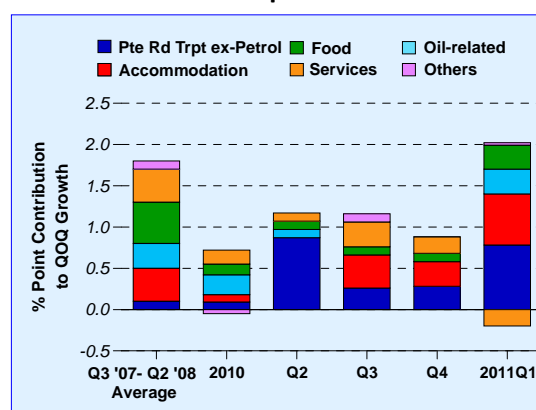
---

**Services inflation rose in 2010 because of firm demand and higher labour costs.**


---

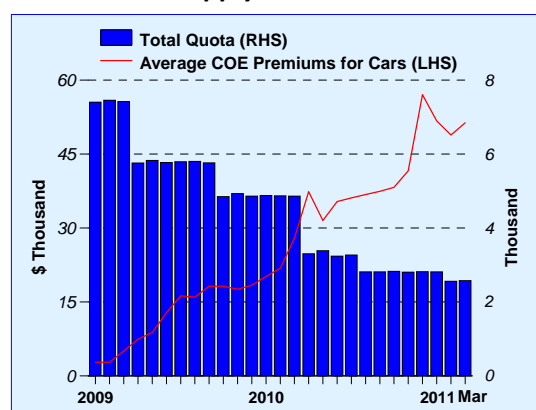
Firm consumer demand amidst rapid economic growth led to a pickup in services inflation. For example, the cost of holiday travel, which fell by 2.8% in 2009, rebounded by 3.5% in 2010.

**Chart 2.12**  
Contribution to Sequential CPI Inflation

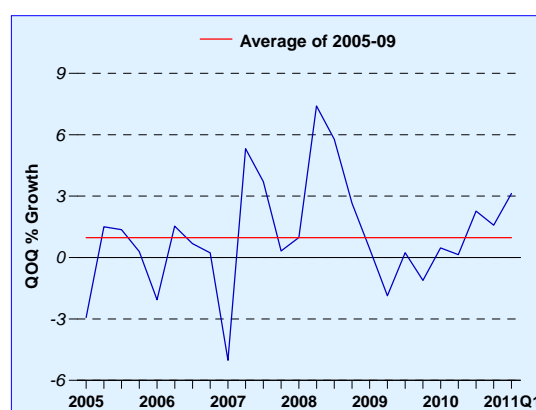


Source: EPG, MAS estimates

**Chart 2.13**  
COE Supply and Premiums



**Chart 2.14**  
Sequential Increase in CPI Accommodation Costs



<sup>6</sup> Residential property rentals are used in the computation of the cost of rented accommodation and the imputed cost of owner-occupied housing in the CPI.

Most education and healthcare institutions also raised prices in 2010 and early 2011 on the back of increases in labour costs. Indeed, the tight labour market and the resultant acceleration in wage growth drove up the Unit Services Cost Index, EPG's measure of cost conditions in the services industry, by about 8% y-o-y in Q4 2010.

On the whole, however, the pass-through of wages to services costs has been relatively modest. While nominal wage growth in 2010 was comparable to the average in 2007 and 2008, services inflation was much lower. (Chart 2.15) This could be due to greater competition among service providers and only moderate increases in commercial rentals thus far. (Chart 2.16)

---

**Prices of oil-related items rose faster recently,  
in line with global oil prices.**

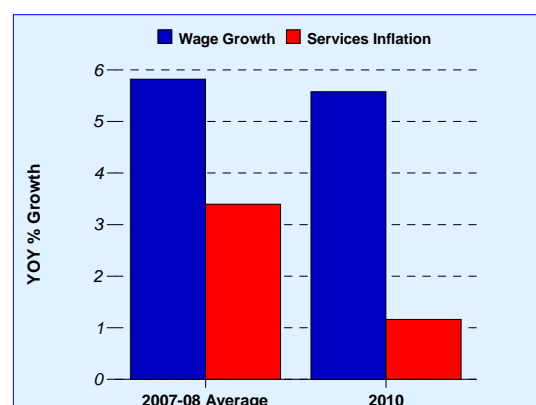
---

Global oil prices, based on the West Texas Intermediate (WTI) benchmark, rose from US\$78 per barrel in January 2010 to US\$84 in April. After edging down to US\$74 in May and staying at that level in subsequent months, prices resumed their climb from October to almost US\$90 by the end of 2010 and into early 2011. (Chart 2.17) The increase in Q4 was largely the result of the colder-than-usual winter in the northern hemisphere and firmer economic recovery in the US.

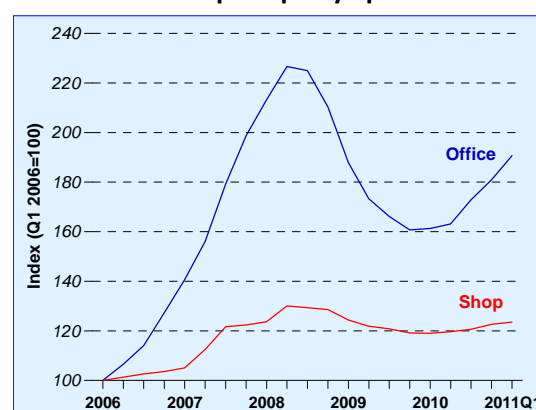
More recently, WTI oil prices spiked to a two-and-a-half year high of US\$105 in March, driven by political unrest in the MENA region. In particular, concerns mounted as the civil war in Libya resulted in a near-complete halt in its crude oil production.

Mirroring movements in global oil prices, petrol pump prices were raised modestly for most of 2010. However, pump prices have increased more substantially since December 2010 given the step-up in oil prices. Electricity tariffs were similarly revised upwards slightly in Q1-Q3 2010 and cut in Q4, before being raised again in Q1 this year.

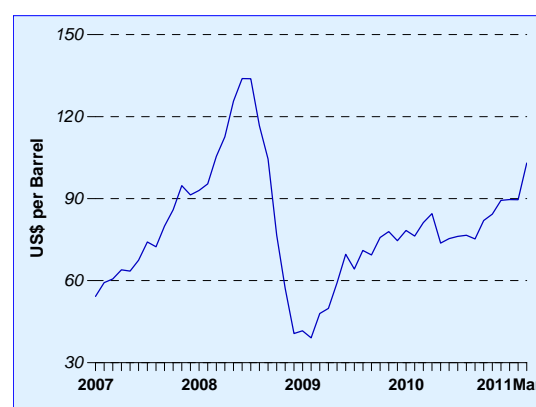
**Chart 2.15**  
**Overall Nominal Wage Growth  
and Services Inflation**



**Chart 2.16**  
**Office and Shop Property Space Rentals**



**Chart 2.17**  
**WTI Oil Prices**



Source: Bloomberg

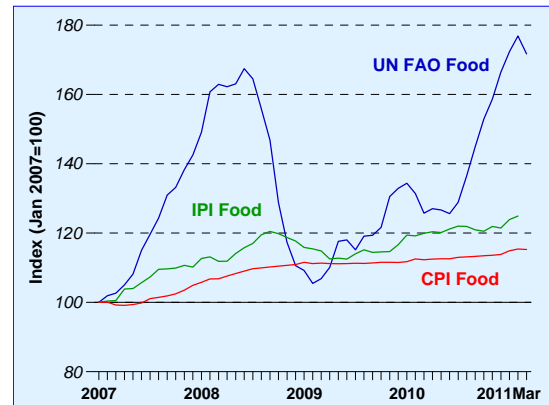
**Domestic food price inflation, while rising, has been more benign than increases in global food prices.**

Global food prices stayed generally stable in the first half of 2010. However, they have surged by close to 40% since then due to a spate of supply disruptions caused by the La Niña weather phenomenon as well as a recovery in global demand. (Chart 2.18)

Nonetheless, prices of imported food in Singapore were up by a moderate 4.1% y-o-y in December 2010 and another 2.9% in Jan-Feb 2011. Consumer food prices rose even more slowly, by 1.4% in 2010 and by 1.4% sequentially in Q1 2011.

The more modest increases in imported and consumer food prices is the result of a confluence of factors, including the stronger S\$ and competitive pressures in the food industry. In particular, the 9% appreciation of the S\$ against the US\$ in 2010 filtered out some of the impact of higher global food prices on domestic prices. In addition, apart from maintaining diversification of food import sources, government agencies have worked with food companies following the 2007-08 food crisis to enter into upstream sourcing of food products, engage in longer-term price contracts and increase food stockpiles to guard against food price volatility. Major supermarket vendors have also actively sought to expand their range of house-brand products in order to keep prices low.

**Chart 2.18**  
**Food Price Indices**





**Box B****The MAS Core Inflation Measure for Singapore**

For the past two decades, MAS has closely monitored MAS Core Inflation, which is the CPI less the costs of accommodation and private road transport.<sup>1/</sup> In this box, we examine the effectiveness of the MAS Core Inflation measure as a gauge of underlying price developments in the Singapore economy.

***The Concept of Core Inflation***

The literature identifies two characteristics of the core inflation measure. First, core inflation should reflect **persistent** rather than temporary price movements. This is particularly relevant for monetary policy, which affects inflation with long and variable lags and is therefore not meant to address short-term fluctuations in prices. Second, core inflation should only capture **generalised** price movements. Changes due to sector-specific influences, such as idiosyncratic supply shocks that affect only relative prices, or non-market influences, such as government price controls, should be ignored.

Hence, core inflation provides information as to whether the headline inflation rate has drifted to a new level in the presence of persistent and generalised price shocks. It is, therefore, a useful input in the formulation of monetary policy.

***Re-examining the MAS Core Inflation measure***

Although there are many empirical approaches to capture core inflation, an exclusion-based measure appears to be the most useful in Singapore's context, as it is transparent, easily understood and can be forecasted and disclosed in a timely manner. Indeed, almost all the major central banks adopt some form of exclusion measure as their official core inflation indicator.

Exclusion-based measures of core inflation typically remove the prices of items which are (i) volatile and largely determined by supply disturbances, notably food and energy; or (ii) influenced by changes in administrative policies, such as tobacco products. For instance, the US Federal Open Market Committee forecasts changes in the core personal consumption expenditure deflator which excludes food and energy, while the European Central Bank publishes five measures of core inflation that exclude combinations of items which are either associated with supply disturbances or changes in administrative policy. The Bank of Canada excludes the eight most volatile items in the CPI basket and adjusts for the effects of changes in indirect taxes on the remaining components of the CPI.

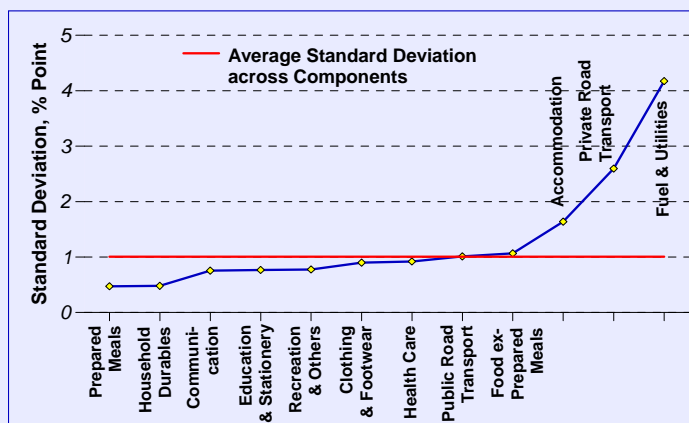
In Singapore's case, given our high degree of reliance on imported food and energy products, it would not be appropriate to exclude these items in the core inflation measure. Not only do food and energy products take up a substantial weight in the CPI basket at 27%, our exchange rate-centred monetary policy also has a direct bearing on their prices. Instead, MAS Core Inflation excludes the costs of accommodation and private road transport as these are significantly influenced by administrative policies and are volatile.

Accommodation costs are subject to the influence of government rebates on HDB rentals and Service & Conservancy Charges (S&CC). Private road transport costs, in comparison, are largely driven by motor vehicle policy, notably the Vehicle Quota System. Indeed, the cost of the Certificate of Entitlement (COE), together with import duties, typically account for more than half the cost of a vehicle. Thus, the disbursement of HDB rebates in certain months of the year and changes in motor vehicle policy have made the costs of accommodation and private road transport to be among the most volatile in the CPI basket. (Chart B1)

<sup>1/</sup> MAS Core Inflation was previously known as MAS underlying inflation. It was renamed recently to bring it in line with international norms.

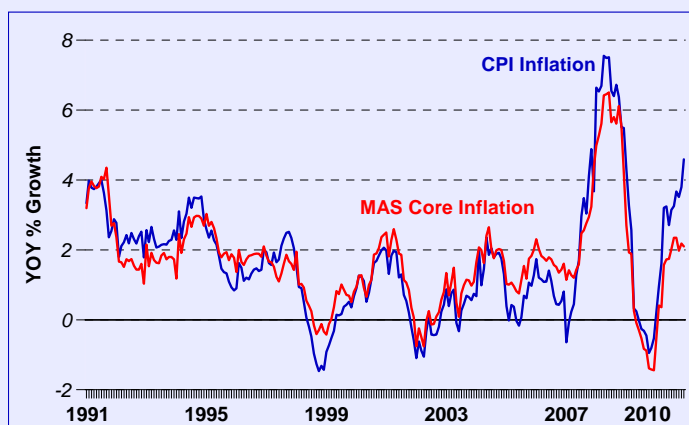


**Chart B1**  
Quarterly CPI Price Volatility, 1991-2010<sup>2/</sup>



To this end, the MAS Core Inflation measure has served its purpose reasonably well, being less volatile than headline CPI inflation, while tracking it closely over time. (Chart B2) Table B1 shows the lower volatility in the MAS Core Inflation measure, as reflected in a lower standard deviation over the period 1991-2010.

**Chart B2**  
CPI Inflation and MAS Core Inflation<sup>3/</sup>



**Table B1**  
Comparison of CPI Inflation and MAS Core Inflation, 1991-2010

	Overall CPI	MAS Core Inflation
Standard deviation of monthly inflation rate, % point	1.73	1.38
Average annual inflation rate, %	1.69	1.71

<sup>2/</sup> The standard deviation of quarterly sequential price changes of CPI components was used to capture price volatility.

<sup>3/</sup> An extended historical series for MAS Core Inflation is provided in Table 9 in the Statistical Appendix.

### MAS Core Inflation as a Gauge of Trend Inflation

To further establish whether the MAS Core Inflation measure is a good indicator of trend inflation, statistical tests were performed based on the work of Marques *et al.* (2003).<sup>4/</sup>

According to Marques *et al.* (2003), trend inflation should have the following properties:

- The trend and headline inflation rates should evolve on the same path in the long run. This means that both trend and headline inflation are non-stationary processes and are co-integrated with a unitary coefficient.
- The headline inflation rate should converge to the trend inflation rate. Thus, in equation (1) where the first difference of *headline inflation* is the dependent variable, the adjustment coefficient of the error correction term ( $\beta_1$ ) should be negative and statistically significant.

$$\Delta\pi_t = \alpha + \beta_1(\pi_{t-1} - \pi_{t-1}^{trend}) + \sum_{i=1}^k \Delta\pi_{t-i} + \varepsilon_{1t} \quad (1)$$

- The trend inflation rate should not converge to the headline inflation rate, implying that trend inflation can be considered to be exogenous. This means the adjustment coefficient of the error correction term ( $\beta_2$ ) in equation (2), where the first difference of *trend inflation* is the dependent variable, should be statistically insignificant.

$$\Delta\pi_t^{trend} = \alpha + \beta_2(\pi_{t-1} - \pi_{t-1}^{trend}) + \sum_{i=1}^k \Delta\pi_{t-i}^{trend} + \varepsilon_{2t} \quad (2)$$

Using the Augmented Dickey-Fuller test and the Engle-Granger residual-based test procedure, we found that MAS Core Inflation and CPI inflation are indeed co-integrated with a unitary coefficient. In addition, the conditions in (b) and (c) were met using the MAS Core Inflation measure as the trend inflation term in equations (1) and (2). Notably, the adjustment coefficient on the error correction term in equation (1) is negative and statistically significant, while it is statistically insignificant in equation (2). (Table B2) Together, these findings suggest that MAS Core Inflation is a good gauge of trend inflation.

**Table B2**  
Error Correction Model for testing MAS Core Inflation as trend inflation

	Equation (1)	Equation (2)
Dependent Variable	$\Delta\pi_t$	$\Delta\pi_t^{trend}$
Coefficient on $(\pi_{t-1} - \pi_{t-1}^{trend})$ (Adjustment Coefficient)	-0.110* (-2.281)	0.047 (1.229)

The t-statistics are in parentheses.

\* Statistically significant at the 5% level.

<sup>4/</sup>

A more extensive analysis of the MAS Core Inflation measure will be released shortly in an MAS Staff Paper.

**Sum-up**

While most central banks remove food and energy prices in their core inflation measures, MAS Core Inflation excludes the costs of accommodation and private road transport on the grounds that these items are significantly influenced by administrative policies and are volatile. These exclusions are also appropriate given Singapore's exchange rate-centred monetary policy regime. Moreover, empirical analysis confirms that MAS Core Inflation is a good indicator of trend inflation, one of the most important attributes expected of a robust core inflation measure.

**Reference**

Marques, C R, Neves, P D and Sarmento, L M (2003), "Evaluating Core Inflation Indicators", *Economic Modelling*, Vol. 20 (4), pp. 765-775.