Asia-Pacific
Economic Cooperation

Advancing Free Trade
for Asia-Pacific **Prosperity**

APEC Economic Trends Analysis

Innovate for a Better Future with Sustainable Growth

APEC Policy Support Unit
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HIGHLIGHTS

APEC economic recovery is proceeding but at varying speeds

- Economic recovery in Industrialized and Newly Industrialized Economies (NIEs) in the APEC region has started to gain traction since the second half of 2013. Collectively, GDP growth in Industrialized APEC economies advanced from 1.1% (y-o-y) in Q1 2013 to 2.6% in Q4 2013. At the same time, APEC NIEs saw growth shifting from 1.5% in Q1 2013 to a 3.7% in the last quarter of 2013.
- The strengthening pace in APEC Industrialized economies and NIEs has helped to tone up APEC growth. After registering a soft growth of 3.4% in Q1 2013, APEC growth has gradually accelerated in subsequent quarters and ended the year with a 4.1% growth. The regional economic improvement was also aided by the solid advancement of China's economy which grew by 7.7% last year.
- However, activity in other Emerging and Developing APEC economies (EM&Ds) was held back on the difficult backdrop of rising financial tensions and slower trade. In some economies, domestic demand, which has been the main engine of growth in the past few years, has faltered.

Economic growth is expected to accelerate in 2014 and 2015

- APEC GDP is poised for faster expansion, from 4.2% in 2014 to 4.4% in 2015, up from 3.7% in 2013. Despite the recurrent financial turmoil in the first few months of this year, APEC Industrialized and NIEs started 2014 on a relatively firm footing. The spill-over impact was more noticeable among developing APEC economies but economic activities in these economies have also started to stabilize.
- The recovery speed is likely to vary across APEC economies. Investors remain sensitive to movements in the direction and the scale of large economies' monetary policy changes. The growth gap between developing and advanced economies is expected to lessen as the latter group consolidates. A narrowing of the growth gap and interest rate differentials will inevitably result in some degree of portfolio investment reallocation.
- Although investors appear to scrutinize economies with weaker fundamentals, in the absence of any policy responses, there is likely to be some degree of contagion.

The weaker-than-expected performance in the past few years places APEC growth on a lower projected growth path

- The 2008-09 Global Financial Crisis (GFC) and its legacy has had a tremendous impact on APEC growth. Over the six-year period between 2008 and 2013, APEC GDP expanded at an average rate of 3.4% per annum, 1.3 percentage points lower than the 4.7% average annual growth rate seen in the six-year period immediately prior to the crisis.

- Additionally, APEC economic performance in the past few years has been more subdued than expected. In early 2013, it was forecast that APEC would achieve a 2013 economic growth rate of 4.1%. However, APEC output actually expanded by 3.7%, producing USD 90 billion less than the amount of output that had been originally expected.
- This weaker-than-expected economic performance has effectively placed APEC growth on a lower medium-term growth path. The latest forecasts for the APEC region have a projection of 4.4% annual average growth rate between 2014 and 2018, a marked downward shift from a 4.9% per annum average growth rate for the same period being forecast in the IMF April 2013 WEO report. This indicates that in the absence of any policy measures the APEC region will see roughly USD 4,000 billion less output over the period between 2014 and 2018 than the amount earlier projected.
- One of the attributing factors to the subdued APEC economic performance in recent years has been the uneven recovery of APEC exports. The 2008-09 GFC created an overreaching structural condition of global demand shortage. APEC exports contracted by 20.8% in 2008 and its recovery has been halted since late 2011. In 2013, the values of APEC merchandise goods exports contracted 1.9%.
- While it is now more than five years since the GFC, the contribution of exports to the regional economy is still below the pre-crisis peak. In 2013, exports accounted for 20.2% of APEC GDP, lower than the ratio of 21.4% of GDP in 2008. While global trade is expected to pick up, the pace is likely to remain unsteady.

Enhancing competitiveness to pave the way towards a higher path of prosperity

- Labor productivity in the APEC region enjoyed rapid growth in the years preceding to the 2008-09 GFC. However, on average, output per worker in APEC has been relatively lower than that of the rest of the world.
- Regional labor productivity masks vast differences across APEC economies, with the United States having the world's highest output per worker. The productivity gap between the APEC region's lead and developing APEC economies is generally significant.
- Unfortunately, labor productivity in the APEC region as a whole was impacted by the 2008-09 GFC. Most the APEC slowdown in labor productivity growth can be attributed to the sharp drop of Total Factor Productivity (TFP) growth – an indicator of technology advances.
- TFP growth in the APEC region contributed to 0.5 percentage points to APEC GDP growth in the 6-years post 2008-09 GFC. In comparison, between 2002 and 2007, TFP growth contributed to a significant 1.8 percentage points to the average growth rate seen in this period. Increased investment in capital, both in Information and Communication Technology (ICT) and other non-ICT capital, has helped to avert the slowdown in output per worker growth.
- In today's tightening fiscal environment, the role of the government to maneuver much of the capital deepening may be restrained. In the short to medium term, APEC

needs to mobilize private savings into productive capital investment in order to sustain the current momentum of capital input expansion.

- As capital inputs cannot be added indefinitely, improving the efficiency of capital resources through the advancement of technological progress is vitally important to sustainably improve APEC labor productivity and output.

Policies need to be carefully crafted to achieve healthy employment growth and strong labor productivity growth

- The GFC has also adversely affected the labor market in the APEC region with employment growth coming to a virtual standstill in the middle of the crisis. Although the pace has since picked up, employment is still growing at a much reduced rate compared to the way it was in any year between 1980 and 2007.
- The labor market in Industrialized APEC economies has been severely affected. Collectively, there were 7.35 million jobs lost in these economies from 2007 to 2010. The labor markets in Emerging and Developing APEC economies weathered the GFC relatively better. During the most recent downturn, there was a tendency for firms in APEC NIEs and developing economies to sacrifice some productivity and profitability while companies in industrialized APEC economies responded by laying off workers.
- In today's increasingly competitive world, the drive of firms to increase profitability and efficiency often comes at the expense of employment. Some job losses are likely to be permanent as during the process of restructuring operations, many companies automate tasks or redesign processes towards fewer labor inputs.
- Achieving strong employment growth in an environment of relentlessly pursuing efficiency is only possible if governments succeed in creating an environment in which firms are incentivized to pursue innovation as an integral part of enhancing productivity.
- Technological innovation will result in new markets for new products, thereby creating new jobs. However, innovations will alter the structure of labor demand, i.e. favoring skilled workers at the expense of unskilled ones.
- The success of raising labor productivity while at the same time ensuring robust and sustainable job creation depends critically on the ability to design a flexible labor market as well a comprehensive strategy to develop a workforce of tomorrow.

Innovate for a better APEC future with sustainable growth

- APEC governments have increasingly placed emphasis on encouraging innovation as a means to promote increased productivity and higher standards of living. As host of APEC 2014, China has specified "**promoting innovative development, economic reform and growth**" as one of the three top priorities for APEC work agenda this year.
- Across APEC, there are economies that lead global innovation efforts while others have performed less well. Over the 10-year period from 2002 to 2011, 76.7% of

patent registrations in APEC were filed in high-income APEC economies. Among developing APEC economies, China has seen significant increases in the numbers of patent registrations, surpassing the United States in 2011. However, patent applications per 10,000 population in developing APEC economies are generally fewer than that of high-income APEC economies.

- Data on Research and Development (R&D) spending shows a similar pattern. The APEC region accounted for roughly 60% of the world's total R&D spending in 2011. However, investments in developing economies captured only a small portion (an equivalent of 16%) of the region's total R&D expenditure. Among developing APEC economies, the spurt in China's R&D investment was most notable. Notwithstanding this improvement, China's R&D to GDP ratio, which was 1.84% in 2011, is still lower than the average R&D to GDP ratio in high-income economies.
- The division seen in R&D spending among high-income and developing APEC economies broadly mirrors the global trend. From 1996 to 2011, high-income economies contributed to 87.4% of global R&D expenditure. The GFC, however, caused a sharp slowdown in R&D investments in these economies. While there have been increased efforts in developing economies, there is an urgent need to prompt up the appetite for R&D in developed economies. At the same time, there is still room for developing economies to strengthen their innovative capacity.

The role for APEC

- In 2012, APEC established the Policy Partnership on Science, Technology and Innovation (PPSTI) to support the development of science and technology cooperation and effective innovation policy in APEC economies. A recent focus of the PPSTI has been on reinforcing policy measures to develop and secure human resources which aim to support science and technological innovation.
- It is important that APEC devotes attention to encourage enhanced mobility of skilled workers across borders. Concurrently, economies need to strengthen the environments to train and nurture scientists in order to prevent the loss of local talents to foreign innovation centers.
- APEC should also actively address regulatory barriers that impact private investment in R&D, including the removal of administrative burdens on start-up firms as well as broader barriers to competition. These priorities fit well with the work agenda of the Economic Committee whose aim is to remove structural and regulatory obstacles that inhibit cross-border trade and investment and create behind-the-border barriers to doing business.
- Other areas that APEC can focus on include ensuring a well-functioning intellectual property rights system that provides for effective legal protection for inventions. Capacity building on the role of fiscal and taxation instruments to private R&D is also imperative.

I. Trends and short-term outlook for the global economy

A. The external economic environment

Global economic activity showed encouraging signs of strengthening towards the second half of 2013. Most encouraging was the nascent recovery recorded in the Euro area. In the final quarter of 2013, the region registered 0.5% growth, ending seven consecutive quarters of negative growth. Although unemployment remained high, it appeared to have peaked and began to move downwards. These improved economic conditions can be partly attributed to a gradual improvement in competitiveness in some economies of the Euro area, as reflected by an abatement in unit labor costs.

There was cautious optimism that the UK's economic recovery had at last arrived. Aided by reduced uncertainty and easing credit conditions, households started to reduce their rate of savings and to lift spending. This revival in household spending played a major role in the 1.9% growth rate seen in the UK in 2013, marking its strongest performance in six years.

Stronger than expected growth rates in some advanced economies, as well as reduced volatility in the financial markets towards the end of 2013, prompted the International Monetary Fund (IMF) to revise its growth forecasts. In the January 2014 World Economic Outlook Update, world output growth was forecast to accelerate from 3.0% in 2013 to 3.7% in 2014, rising to 3.9% in 2015. These forecasts are the first upward revisions to global growth projections, after several rounds of downgrading.

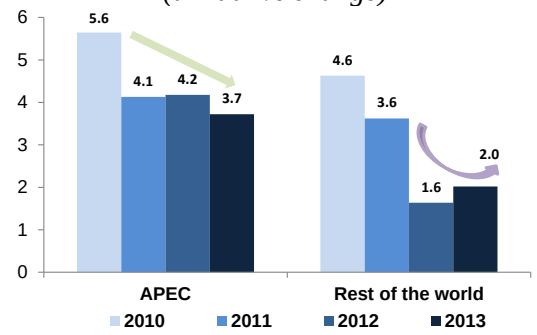
B. APEC in 2013 and implications for short-term outlook

APEC growth was softer in 2013 on slower exports

The APEC region registered slower growth in 2013 compared to 2012. APEC GDP is estimated to have expanded by 3.7% in 2013, down from the 4.2% growth seen in the previous year (Figure 1). This is in contrast to the trend seen in the rest of the world where GDP growth moved to 2.0% in 2013, from 1.6% growth in 2012. One of the factors attributed to this more subdued APEC economic performance was the uneven recovery of APEC exports.

Figure 1: APEC GDP versus the rest of the world

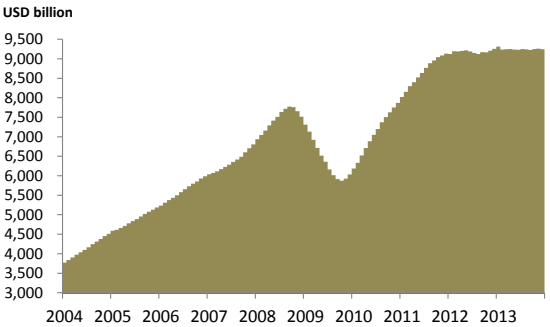
(annual % change)



Source: Thomson Reuters, IMF and APEC PSU

Figure 2: Values of APEC merchandise exports

(USD billion, annualized current prices)



Source: Thomson Reuters & APEC PSU

APEC merchandise exports, in nominal USD terms, contracted by 1.9% in 2013[1], extending a weakness seen since 2011 (Figure 2). The pick-up in some advanced economies failed to jump-start a demand for APEC goods, with the contraction of APEC exports to the Euro area intensifying throughout 2013. From January to November 2013, the value of APEC shipments to the Euro area fell by 2.9% in comparison to the same period in 2012, as the pro-longed weak economic growth in the region has compressed income and reduced demand for imported goods. With APEC demand for goods from Europe remaining relatively strong, the trade balance between APEC and the Euro area has deteriorated in recent years.

In 2008, APEC recorded a trade surplus of USD 144.8 billion against the Euro area. Since then the APEC/Euro area trade balance has gradually narrowed and registered a deficit of USD 5.4 billion in 2012, for the first time since 2005 (Figure 3). From January to November 2013, the trade deficit between APEC and the Euro area widened to almost USD 52 billion.

Exports to other markets were also subdued in 2013 (Figure 4). In the year to November 2013, exports to other non-APEC markets (excluding the Euro area) dipped by 0.5% (y-o-y). Intra-APEC fared better but was also weak. The values of intra-APEC trade grew marginally at 2.5% in the year to November 2013, down from a 4.7% expansion in 2012.

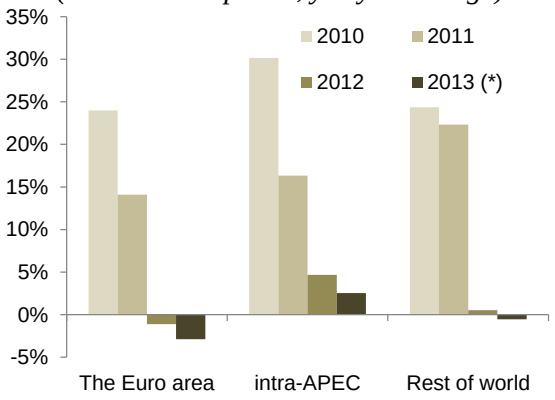
Figure 3: Trade balance[2] between APEC and the Euro area

(USD billion, current prices)

Source: IMF Direction of Trade Statistics

Figure 4: The values of APEC merchandise exports to different trading partners

(current USD prices, y-o-y % change)



Source: IMF Direction of Trade Statistics
(*) For 2013, the figure is calculated for the period between January and November

The sluggish performance of APEC exports in recent years has had a profound impact on APEC growth. Many APEC economies have pursued an export-led growth paradigm in the past few decades, resulting in a rise in the value of exports to total GDP (Figure 5). Over the period 1992 to 2007, the value of APEC's merchandise exports rose from 11.9% of GDP to over 20% of GDP. This rate of expansion was most pronounced in the early 2000s when the value of APEC exports rose by a compound annual average growth rate (CAGR) of 14% per annum (p.a.), in comparison with the

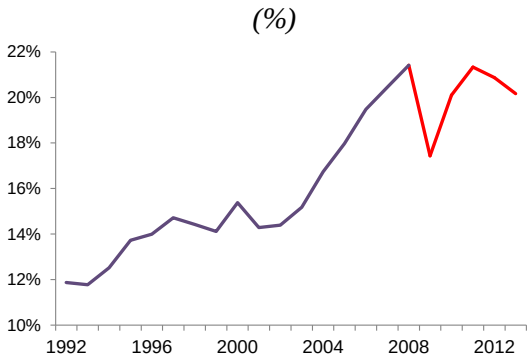
[1] Preliminary estimates for 19 APEC economies, excluding Brunei Darussalam and Papua New Guinea.

[2] For 2013, the trade balance was for the period between January to October 2013

CAGR rate of 9% p.a. over the period between 1992 and 2000.

The 2008-09 Global Financial Crisis (GFC) created an overreaching structural condition of global demand shortage. The rapid expansion of APEC trade was brought to a halt by the GFC with the values of APEC exports contracting by 20.3% in 2008. More than five years since then, the contribution of exports to APEC economies is still below the pre-crisis peak. In 2013, exports accounted for 20.2% of APEC GDP, lower than the ratio of 21.4% of GDP in 2008.

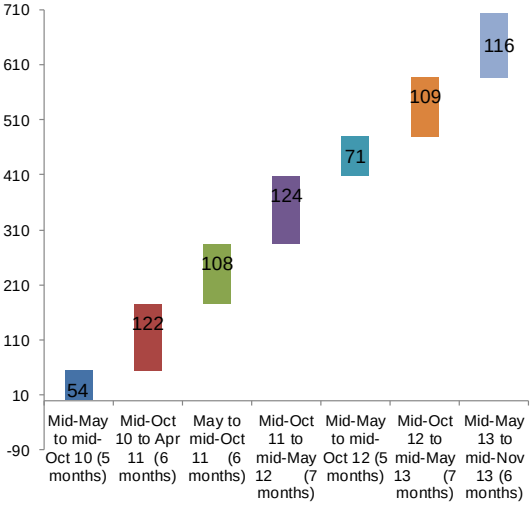
Figure 5: Evolution of APEC exports to GDP ratio



Source: Thomson Reuters, IMF & APEC PSU

Subdued global demand has prompted some economies to put into place measures that have had the potential to restrict trade, thereby exacerbating the overall trade slowdown. In its most recent report on G20 trade measures, the WTO found that there had been an acceleration in the imposition of new trade restrictive measures between mid-May 2013 to mid-November 2013 (Figure 6). During this period, G20 members implemented 116 new trade restrictive measures, up from 109 measures recorded during the seven-month period between mid-October 2012 and mid-May 2013. Of particular concern is that these new impositions have added to the existing large stock of trade restrictive measures which have been implemented since the GFC. Cumulatively, these new trade restrictions are affecting around 3.9% of world merchandise imports.

Figure 6: Imposed trade restrictive measures by G-20 members



Source: WTO, "Reports on G-20 trade measures, 18 December 2013

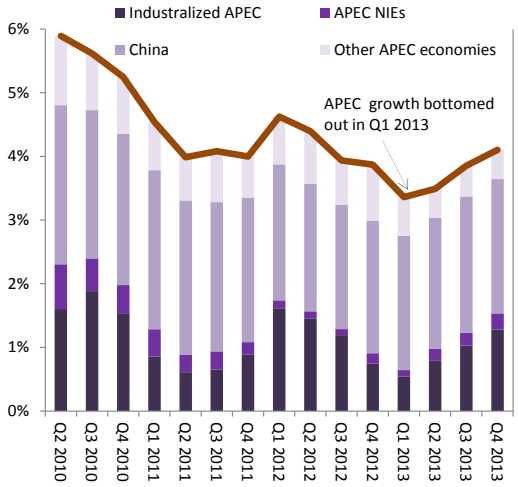
But an accelerating trend was observed in the APEC region in the second half of 2013

Despite the softer growth registered for 2013, the evolution of APEC quarterly growth provides for some cautious optimism. After registering a soft growth of 3.4% in Q1 2013, APEC growth has gradually accelerated in subsequent quarters and ended the year with 4.1% growth in Q4, signaling that the APEC economy is now on a path of recovery (Figure 7). Contributing significantly to the increased growth speed in the APEC region in 2013 was the recovery of APEC Industrialized[3] and Newly Industrialized Economies (NIEs)[4], despite the fact that contributions from Emerging and Developing Economies (EM&Ds) were lower (Box 1).

[3] Industrialized APEC economies include Australia; Canada; Japan; New Zealand and the United States.
[4] Newly Industrialized APEC economies include Hong Kong, China; Korea; Singapore and Chinese Taipei

Figure 7: Contribution to APEC growth[5]

(in percentage points)



Source: Thomson Reuters, Consensus Forecasts[6], IMF and APEC PSU

In the United States, the economy picked up pace over the course of 2013 with a growth rate in Q4 (2.5% y-o-y) that was almost double the rate recorded in Q1 (1.3% y-o-y). Consumer spending achieved stable growth throughout 2013, withstanding the effects of fiscal stimulus withdrawals and the uncertainty caused by a temporary government shutdown in October last year. Improvements in the labor market have also helped to sustain the gradual recovery of consumption.

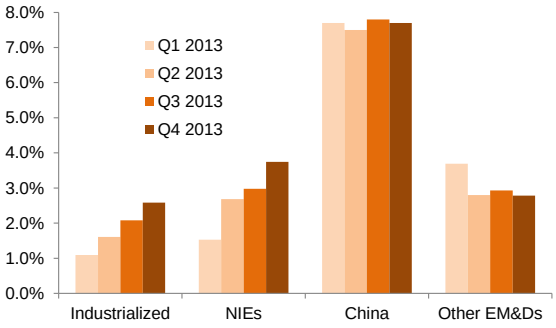
Similarly in Japan, economic activity has benefited from the government's newly implemented three-pillar economic growth strategy, known as "Abenomics"[7]. Although the expansion of 0.2% (q-o-q) in the final quarter was weaker than expected, the economy registered an overall growth of 1.5% in 2013, almost double the average growth rate of 0.8% per annum in the past decade. There has been a broad-based improvement across private and public demand as well as exports.

Box 1: Shifting contributions to APEC growth in 2013

Collectively, GDP growth in Industrialized APEC economies accelerated from 1.1% (y-o-y) in Q1 2013 to 2.6% in Q4 2014 (Figure 8). Meanwhile APEC NIEs saw growth shifting from 1.5% in Q1 2013 to a 3.7% in the last quarter of the year. This has resulted in a marked shift in their contribution to APEC growth (Figure 9). In Q1 2013, Industrialized APEC and APEC NIEs contributed to 16.1% and 3.1% respectively, to the total APEC growth rate. By the end of 2013, their contributions doubled, with APEC Industrialized accounting for 30% of APEC growth while APEC NIEs contributed 6.2%.

Figure 8: Evolution of output expansion in APEC in 2013

(GDP, y-o-y % change)



Source: Thomson Reuters, Consensus Forecasts, IMF and APEC PSU

The strengthening pace in APEC towards the end of 2013 was also aided by the stable advancement of China's economy. China's GDP grew by 7.7% in 2013, with a slightly faster pace in the second half compared to the first half of the year. Although its contribution to APEC growth has diminished from 62.8% in Q1 2013 to 51.6% in Q4, China still remains the largest contributor by a considerable margin.

[5] The calculation of quarterly APEC GDP growth excludes Brunei Darussalam; Papua New Guinea and Viet Nam due to unavailable data. The 18 APEC economies included here account for 99.2% of APEC GDP (in Purchasing Parity Power terms).

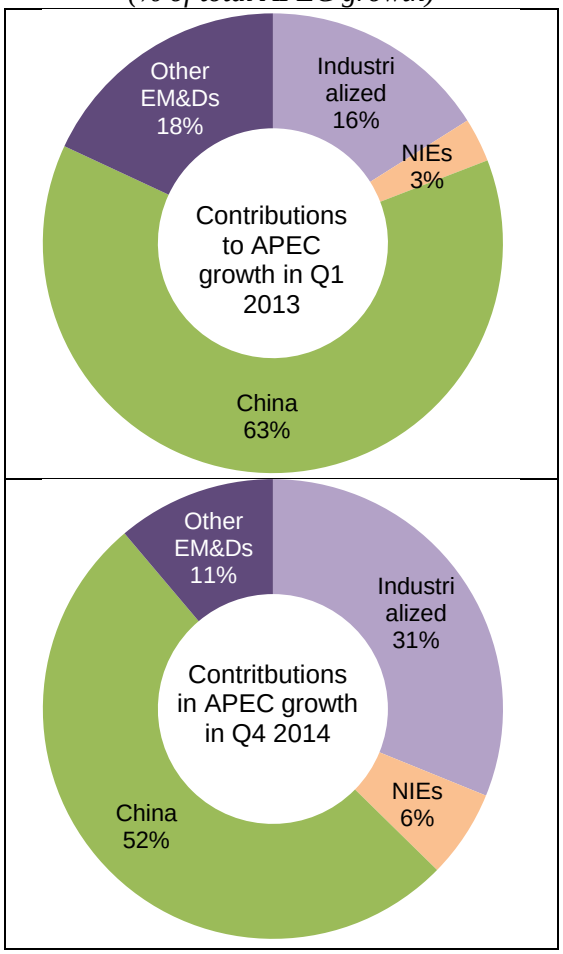
[6] For Russia, Q4 GDP growth was estimated using Consensus Forecasts.

[7] More detailed discussion on the "Abenomics" can be found on the October 2013 APEC Economic Trends Analysis report.

On the other hand, activity in other emerging and developing APEC economies grew at a reduced speed in the second half of 2013, after a strong start in Q1 2013. As a group, GDP growth for developing and emerging APEC, excluding China, decelerated from a 5.3% (y-o-y) growth in the last quarter of 2012 to 2.8% (y-o-y) in last year's final quarter.

Figure 9: Shifting contributions to APEC growth in 2013

(% of total APEC growth)



Source: Thomson Reuters, Consensus Forecasts, IMF and APEC PSU

APEC economies in Latin America have seen a rapid slowing in growth. In Q2 2013, Mexico's economy contracted by 0.7% over Q1 2013, the first contraction in four years, based on weak demand for non-petroleum exports and a drop in remittances. Although the economy has since stabilized, the expansion rate of 1.3% registered in 2013 is a marked slowdown from the 3.7% growth in 2012. In Chile, economic growth fell from 5.6% in 2012 to 4.1% in 2013. The key contribution to the decelerating growth was the reduced rate of investment as seen in several energy projects postponing their plans for expansion. Private consumption in Chile has also lost strength in 2013, mostly due to the moderate growth of employment and real wages.

The same trend was observed in some APEC emerging and developing economies in Southeast Asia, with the Philippines being the notable exception. The Philippines' economy continued to perform strongly in 2012 with GDP growing by 6.8%. The economy expanded by 7.2% in 2013, notwithstanding the adverse effects from Typhoon Haiyan in November that partly reined in the expansion of capital formation and consumer spending.

The strong performance in some large industrialized economies in late 2013 sets the stage for higher growth expectations for APEC

Growth in the APEC region is expected to increase to 4.2% in 2014 and 4.4% in 2015. Driving most of this improved performance is an expected firmer economic recovery in the United States and Japan. The economy of the United States is projected to expand by 2.8% this year, advancing to 3.0% in 2015. In Japan, growth is forecast to accelerate to 1.7% in 2014, although moderating to 1.0% in 2015. Developments in the first few months of this year broadly suggest that these economies are continuing to pick up the strong pace seen late last year.

In the United States, although some high frequency data in the first few months of this year has been below market expectations, this is due to some temporary factors – i.e. adjustments to the inventory cycle and a particularly harsh winter. Over

the course of this year, the recovery for the US economy is expected to firm up on stronger consumer spending and business investment. It is expected that household spending in particular will be bolstered by a continuing improvement in the labor market while a resilient housing recovery will result in a moderate pickup in investment.

On the production side, the PMI reading for the US manufacturing sector stood at 57.1 in February, up from 53.7 in January, signaling the strongest improvement in business in 45 months. The strong pickup in output and new business is particularly encouraging as it has important implications for new job creation. The February employment report showed that the US economy had created another 175,000 non-farm jobs. This strong record helps to ensure that the slower-than-expected job creation in the previous months was only due to temporary factors such as bad weather. Another positive development in the February employment report was the pickup in wages with the annual growth rate of hourly wages showing a notable uptick of 2.5%.

In Japan, although the widening of trade deficits had contributed to lower-than-expected GDP growth in Q4 2013, the domestic economy continues to show signs of strengthening. Manufacturing output rose sharply in the first two months of 2014. The Markit/JMMA PMI reading for Japan was 56.6 in January and 55.5 in February this year, remaining close to the all-time high of 57.0. This suggests that the manufacturing sector in Japan is now expanding at a stronger pace than the average rate seen in the past decade. It is expected that this momentum will be sustained over the course of 2014. In particular, the weaker currency will continue to support Japanese exports and lead to an overall improvement in business sentiment.

Expectations for near term growth are also lifted for other high-income APEC economies but headwinds remain

Since the publication of the APEC Economic Trends Analysis report in October 2013, near-term growth expectations for other high-income APEC economies have been upgraded. This improved outlook reflects in part the stronger outturn of growth towards the end of 2013 in these economies. The economies of Canada; Hong Kong, China; Korea; and Chinese Taipei were supported by improved private consumption while Singapore benefited from strong government expenditure.

In New Zealand, GDP was estimated to increase solidly at 2.5% in 2013. The strong momentum of the New Zealand economy is partly attributed to a surge in the construction sector as a result of post-Canterbury earthquake reconstruction, as well increased residential investment in some main cities, including Auckland. The New Zealand economy is projected to continue growing in the near term with the construction sector remaining a key driver of growth.

It is expected that global trade, which has been subdued in recent years, will be firmer this year on the relatively improved momentum in advanced economies and the continued strength of China's economy. For many smaller and open APEC economies, the improvement in trade will provide the necessary impetus to place growth on a stronger footing. In Singapore, for example, the good performance of the manufacturing sector in the first two months of this year was partially attributed to an expansion in new export orders.

The nascent gain in global trade, however, may not be sufficient to guarantee a sustained and strong recovery. In recent years, in the wake of sluggish global trade,

domestic demand has been the main driver in many APEC economies. However, this domestic engine of growth appears to have lost some of its steam, as evident in the February PMI readings across many APEC economies. These suggest that notwithstanding the pick-up in export orders, businesses are still cautious about expanding production in the face of sluggish domestic demand. In Chinese Taipei, the rate of growth in manufacturing eased to a three-month low in February, despite the firming up of new exports orders[8]. A similar trend was observed in Korea's manufacturing sector where production declined fractionally, due mainly to poor sales in the domestic market[9].

Growth expectations for emerging and developing APEC economies continue to diverge, however

Among emerging and developing APEC economies, the growth path has become more divergent. China's rate of expansion in the near term is forecast to be lower than recent years as the government implements structural economic reforms to encourage a more efficient allocation of resources and promote household consumption. Notwithstanding this moderation, China's growth is expected to remain solid, at 7.5% in 2014 and 7.3% in 2015. Growth in China will continue to be a major driver of APEC's economic expansion in the near term.

For other APEC emerging and developing economies, although economic activities are projected to be gradually firmer throughout 2014, the pace is less optimistic than previously expected. So far this year, a myriad of factors are making it challenging for some economies to gain traction. One of the most influential factors is the recurrent turmoil in the financial markets. In February this year, the VIX index spiked to levels not seen since late 2012. The sharp and unexpected devaluations of the Argentine Peso came to force as the primary trigger, although some other factors specific to domestic economies were also at play.

Initially, emerging and developing markets bore most of the brunt of the volatility seen in the financial markets. According to the World Bank, gross capital flows[10] to developing economies fell to USD 13.9 billion in February, the lowest monthly level since April 2009. Economies with weak current account balances and high external financial needs, including South Africa and Turkey, were most affected. However, given the increasing integration of the global economy, spill-over effects impacting on APEC economies were inevitable.

In particular, most APEC equity markets experienced a generalized correction in January – February 2014 (Figure 10). With only a few exceptions, by the end of February, equity prices in the APEC region were lower in comparison with the peaks in 2013. The extent of equity price corrections was generally larger amongst emerging and developing APEC economies, down over 20% in Russia and Peru.

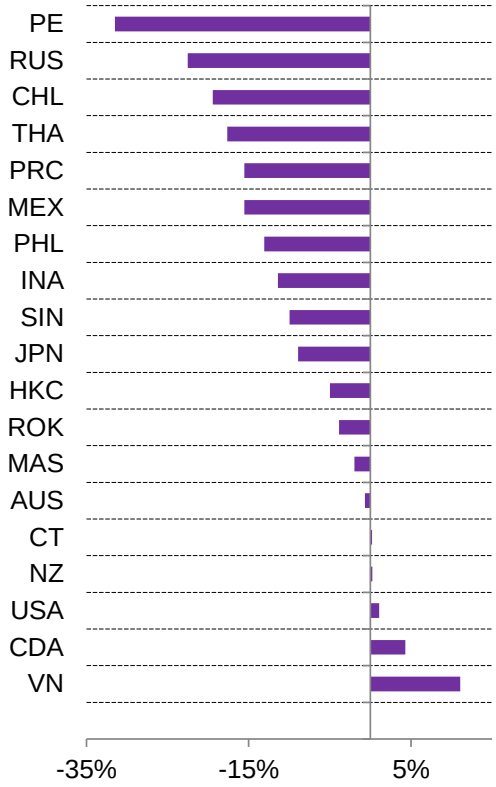
The currency markets also felt the impact of the reallocation of investors' portfolios (Figure 11). The USD has appreciated sharply across a broad basket of currencies. For some APEC economies, the recent depreciation of the currencies also reflected newly implemented policies. For example, the depreciation of the Japanese Yen was influenced partly by monetary stimulus measures implemented since 2013.

[8] HSBC Taiwan Manufacturing PMI report, February 2014

[9] HSBC South Korea Manufacturing PMI, February 2014.

[10] Include international bond issuance, cross-border syndicated bank loans and equity placements.

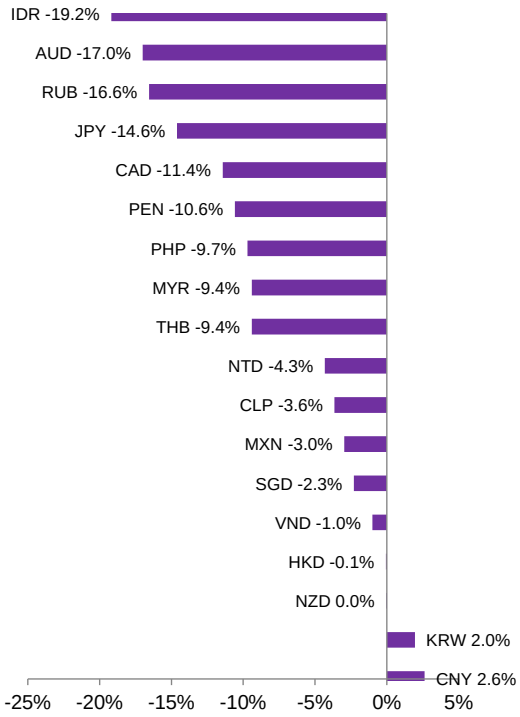
Figure 10: Equity prices in APEC markets
(% change from the peak in 2013 and end of February 2014)



Source: Thomson Reuters and APEC PSU

To an extent, the decline in the values of some APEC currencies vis-à-vis the USD can help to enhance export competiveness and thus improve the balance on the goods and services component of the current account. However, currency depreciation of a large magnitude can also put upward pressure on the rate of inflation, thus eroding consumer purchasing power. Together with losses in the financial markets which lower household wealth, high inflation rates can also adversely affect domestic consumption.

Figure 11: The values of APEC currencies against the USD
(% change over the period between January 2013 and February 2014)



Source: Thomson Reuters and APEC PSU

In Russia, for example, equity prices by the end of February 2014 have lost about 23% from their 2013 peak. In addition, the depreciation in Russian Rubles has made it harder for policy makers to combat a persistent high inflation rate, which has stayed above 6% since September 2012. Losses in wealth and lower purchasing power have effectively curtailed consumer spending, a key engine of Russia's economic growth in recent years. As the slowdown in investment in Russia has yet to show signs of abating, reduced private spending is affecting the growth outlook. In the January 2014 WEO update, Russia is projected to expand its economy by 2.0% and 2.5% in 2014 and 2015, respectively, representing a sharp downward revision of a full percentage point for each year from earlier projection[11].

[11] IMF World Economic Outlook, October 2013.

II. Re-igniting growth: a case for economic restructuring

Thus far, there is evidence that a tentative recovery is finally emerging in the APEC region. With the economy of the Euro area on the mend, the risks of spill-over effects from a re-intensification of the Euro area crisis, which was the upmost concern last year, have abated significantly.

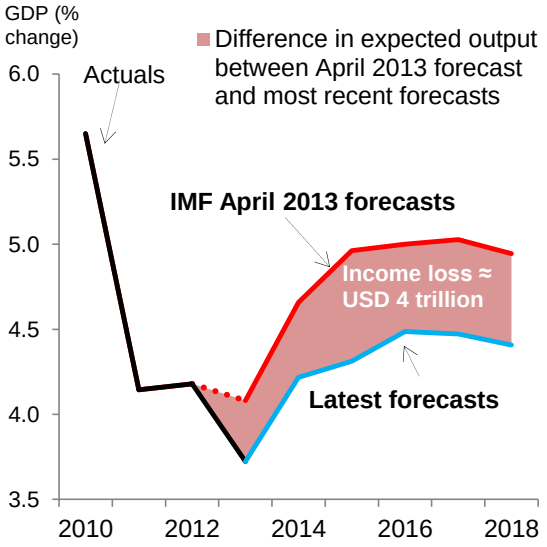
However, the pace of recovery in 2014 remains uneven. Much of the cause for optimism rests on improving economic conditions in a few large advanced economies. Volatility in the financial markets remains as the key downside external risk facing the APEC region. While the gradual withdrawal of the asset purchase program by the U.S. Federal Reserve did not appear to be the primary reason for the most recent restiveness in the financial markets, it is a continuing cause for concern. Markets are likely to continue to be sensitive to movements in the direction and the scale of large advanced economies' monetary policy changes.

Emerging and developing economies are relatively more vulnerable to the normalization of global interest rates. In the past few years, the growth performance of these economies has outpaced the rest of the world. Although that trend is likely to continue in the near future, the gap in growth performance between developing and advanced economies is expected to lessen as the latter group consolidates. A narrowing growth gap and narrowing interest rate differentials will inevitably result in some degree of portfolio investment reallocation. Although investors appear to scrutinize economies with weaker fundamentals, there likely exists some degree of contagion.

The existence of these imminent threats means that in 2014 APEC will continue to be preoccupied with maintaining macroeconomic stability, thus constraining governments from pursuing other economic goals. Furthermore, the 2008-09 GFC and its aftermath have left notable structural challenges to the region's future economic growth.

Weaker than expected economic performance has placed APEC on a lower projected growth path

Figure 12: Forecasts for APEC GDP growth



Source: IMF and APEC PSU.

The 2008-09 GFC and its legacy has had a significant impact on APEC growth in the past few years. Over the six-year period between 2008 and 2013, APEC GDP expanded at an average rate of 3.4% per annum, 1.3 percentage points lower than the 4.7% average annual growth rate seen in the six-year period immediately prior to the crisis. Economic performance in the APEC region has been considerably lower than expected (Figure 12). For example, in early 2013, it was expected that APEC would achieve a growth rate of 4.1% in 2013[12]. However, the actual growth rate for 2013 reached only 3.7%. This lower growth suggests that in 2013 APEC

[12] IMF World Economic Outlook, April 2013.

achieved an output that was USD 90 billion less than the amount that had been forecast.

The weaker-than-expected economic performance in the past six years has effectively placed the APEC economy on a lower medium-term growth path. Information gathered from the latest IMF reports[13] indicates that the APEC economy is projected to grow at an average annual rate of 4.4% between 2014 and 2018. This represents a marked downward shift in growth forecasts of APEC output expansion. In particular, in early 2013, the IMF had forecast an average annual growth rate of 4.9% for the APEC region from 2014 to 2018. Under the current forecast, APEC GDP over the projection period between 2014 and 2018 will be around USD 4 trillion lower than the amount projected earlier.

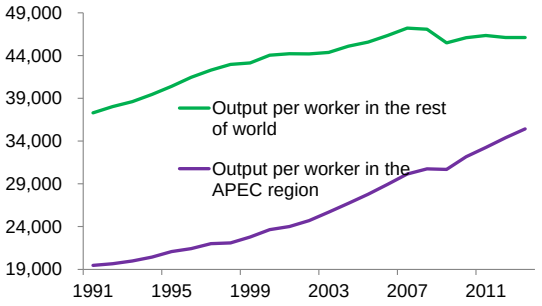
APEC is now at a critical juncture in which safeguarding growth against short-term shocks is no longer sufficient. Policies are required to bring about sustainable, equitable and higher medium-term economic growth. Strategically important to APEC's future economic success is the ability to enhance the region's competitiveness through achieving higher labor productivity.

There exist large gaps in APEC labor productivity

Labor productivity in the APEC region has enjoyed relatively high growth in the past two decades, vis-à-vis the rest of the world. However, despite this rapid rise in labor productivity, on average, output per worker in APEC has been relatively lower than that of the rest of world (Figure 13). In 2013, on average, a worker in APEC produced USD 35,426 worth of output – which is only around 77% of the average USD 46,119 being produced by a worker in the rest of the world[14].

Figure 13: APEC labor productivity in comparison with the rest of the world

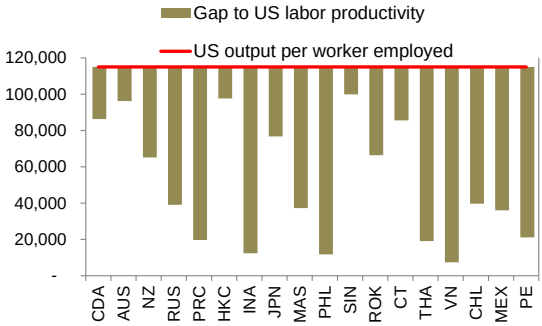
(in 2012 USD)



Source: The Conference Board Total Economic Database and APEC PSU

Figure 14: Gap to US labor productivity, 2013 figures

(in 2012 USD)



Source: The Conference Board Total Economic Database and APEC PSU

Regional labor productivity masks vast differences across APEC economies. In 2013, the United States had the world's highest productivity, with a worker on average producing almost USD 150,000. The gap in labor productivity vis-à-vis the US output per worker is larger among developing APEC economies (Figure 14). This disparity suggests that despite the faster growth rate in productivity among emerging and developing APEC economies, there is still substantial room to push the current productivity frontier to

[13] Calculations of APEC GDP growth forecasts for 2015 to 2018 were based on the IMF October 2013 WEO report. In January 2014, the IMF published the WEO update which was used to calculate APEC GDP growth forecasts for 2014 and 2014.

[14] The estimates for the rest of the world exclude Africa due to data unavailability.

a higher level. Improving the ability of a worker to produce more goods and services with fewer inputs would allow for higher standard of living, with wages often rising as a result of higher productivity.

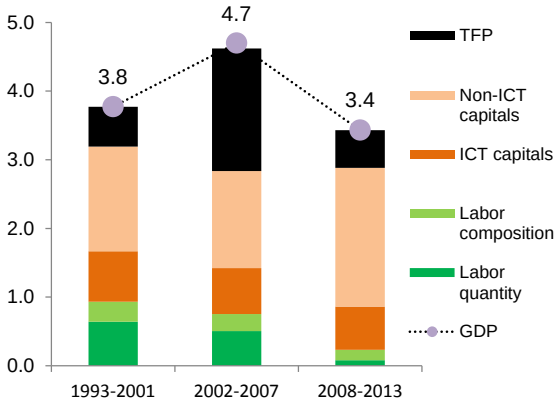
Labor productivity growth has faltered substantially in recent years

Unfortunately, the progress in closing the divergence in labor productivity between the APEC region and the rest of world was disrupted by the 2008-09 GFC. Between 2002 and 2007, labor productivity across APEC, measured as output per person employed, was growing at an annual average rate of 4.1%. In the middle of the GFC in 2009, labor productivity in APEC fell by 0.2%, the first contraction since 1982. Despite some recovery since then, the expansion of labor productivity in the APEC region in the past three years has continued to be below its pre-crisis peak.

The slowing growth of labor productivity or output per worker can be influenced by two factors: a deceleration in capital deepening and/or a reduced rate of technological progress. As seen in figure 15, in comparison with the period between 2002 and 2007, there has been a marked deepening in the accumulation of capital inputs in the APEC region since 2008, i.e. increases of Information and Communication Technology (ICT) assets and other non-ICT capitals[15]. Together, the accumulation of ICT and non-ICT assets contributed to 2.65 percentage points on average to APEC growth over the period between 2008 and 2013. This contribution is 27% more than the average 2.08 percentage point contribution seen during the period 2002 to 2007.

Figure 15: Since 2008, there has been a deceleration in Total Factor Productivity (TFP) and labor input growth

(Contributions to APEC growth[16], percentage points, period average)



Source: The Conference Board Total Economic Database & APEC PSU

However, at the same time there has been a marked decline in Total Factor Productivity (TFP)[17] – an indicator of technological process. TFP growth in the APEC region contributed to 0.5 percentage points to APEC GDP growth in the post 2008-09 GFC. In comparison, between 2002 and 2007, TFP growth contributed to a significant 1.8 percentage points to average growth rate seen in this period.

The deceleration in TFP growth in recent years was synchronized across all APEC economies (Figure 16). The rate of TFP slowdown appeared to be most intense among industrialized APEC economies as well APEC EM&Ds in the Americas and Southeast Asia. The growth of TFP

[15] ICT assets may include computers, communications equipment and software while non-ICT assets include machinery and equipment, transport equipment, residential buildings and infrastructure

[16] Due to data unavailability, the calculation of APEC growth in this chart excludes Brunei Darussalam and Papua New Guinea. Aggregate APEC GDP growth is calculated using weighted Purchasing-Power-Parity.

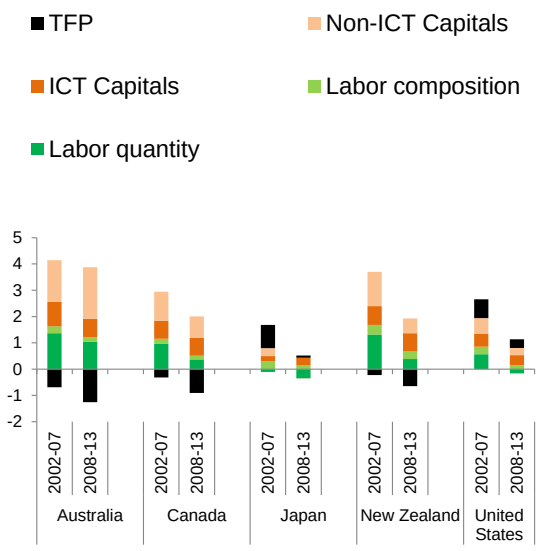
[17] In this paper, Total Factor Productivity (TFP) refers the portion of real output growth which is not accounted for by increases in inputs of labor (i.e. quantity of labor and the composition of labor) and capital (ICT and other capital). TFP growth is a measure of the gains in the efficiency of production, i.e. it can be interpreted as a measure of technology progress. However, its measurement can be affected by other cyclical factors such as capacity utilization and business cycles.

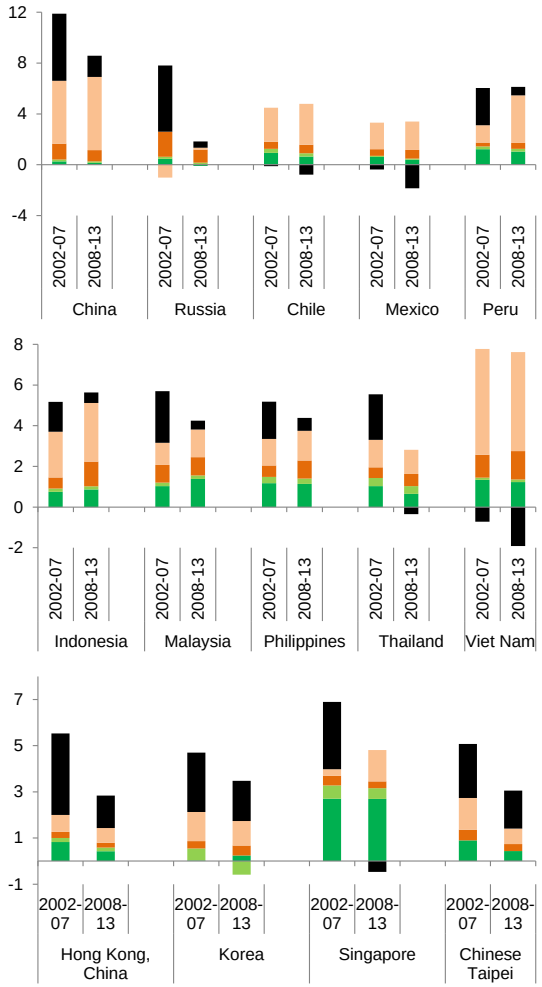
among APEC NIEs in Asia, however, has held up relatively well since the crisis. In some economies – including Australia; Canada; Chile; Mexico; New Zealand; and Viet Nam – TFP has not been playing a positive role even in the period prior to the 2008-09 GFC. In these economies, growth in the past decade has been predominantly driven by capital investment.

Across APEC economies, the contribution of capital deepening to growth has been highest in Viet Nam. The values of ICT assets have been increasing at an annual average growth rate of 24% per annum while investments in non-ICT assets have been growing steadily at 11.4% per annum over the past two decades. As such, capital formation on average has accounted for more than 93% of Viet Nam's growth since 2000. However, much of this capital deepening has not yet translated into an improved TFP. TFP growth in Viet Nam has been negative since 1997 and the GFC has exacerbated this trend.

Figure 16: Contributions of different factors to GDP growth of selected APEC economies[18]

(percentage points, period average)





Source: The Conference Board Total Economic Database[19] & APEC PSU

The sharp fall in employment growth is another cause for concern

The GFC has also adversely affected the labor market in the APEC region. As seen in Figure 15, the contribution of labor to APEC growth has diminished since 2008, relative to the preceding six years. Since 2008, labor inputs (including changes in labor quantity and in labor composition) contributed on average 0.23 percentage points (per annum) to the GDP growth rate, less than one-third of the contribution of 0.75 percentage points during 2002-2007. Most of deceleration in labor inputs

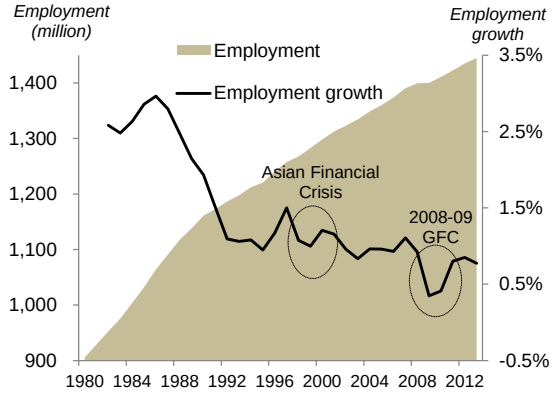
[18] Due to data unavailability, this analysis excludes Brunei Darussalam and Papua New Guinea.

[19] The analysis of the contributions of different factors of production to GDP is based on Conference Board Total Economic Database. Estimates from other sources may provide different results due to different methodologies.

in the APEC region has stemmed from a reduced expansion of labor quantity with employment growth slowing to a near standstill in 2008.

Indeed, the drop in APEC employment growth in the GFC was much more acute than it was during the 1997-1998 Asian Financial Crisis (Figure 17). Although the pace has since picked up, employment is still increasing at a much reduced rate compared to the way it was in any year between 1980 and 2007.

Figure 17: Evolution of employment in APEC[20]



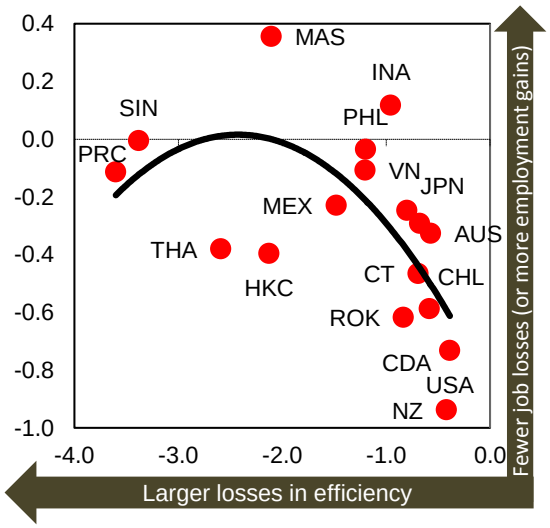
Source: The Conference Board Total Economy Database & APEC PSU

The labor market in industrialized APEC economies has been most affected. Collectively, 7.35 million jobs were lost in these economies over 2007-2010. The unemployment rate for this group of economies rose from 4.7% in 2007 to a high of 8.8% in 2010. In these economies, the contribution of labor composition, which broadly captures a mix of skill levels according to educational attainment, has also deteriorated in the post-crisis period.

The labor markets in emerging and developing APEC economies weathered the GFC relatively well in comparison. Indonesia; Malaysia; the Philippines and Singapore were able to maintain or raise the contribution of labor inputs in the post crisis period. In Singapore, for example, labor has contributed most substantially to output growth in the past decade (in percentage points) and its contribution was able to remain at roughly the same level in the post-crisis period. TFP growth in Singapore, however, fell sharply, suggesting a trade-off between efficiency growth and labor quantity.

Figure 18: The trade-off between TFP growth and employment growth in recession time[21]

(changes in the contributions of TFP and labor quantity to GDP growth over the two periods 2002-2007 and 2008 and 2013, percentage points)



Source: The Conference Board Total Economic Database & APEC PSU

A close examination of the relationship between the contribution of labor quantity and TFP across APEC economies reveals a general trend that employment levels fell proportionately less rapidly in economies experiencing larger short-run reductions in productivity (Figure 18). During the most recent cyclical downturn, there was a tendency for firms in APEC NIEs and developing economies to sacrifice some productivity and profitability but at the

[20] Employment growth in APEC is the two-year moving average of changes in APEC employment.

[21] The fitted trend in this chart is the result of the polynomial regression that shows the relationship between changes in TFP growth and changes in labor quantity growth.

same time hoarding labor while companies in industrialized APEC economies responded by laying off workers.

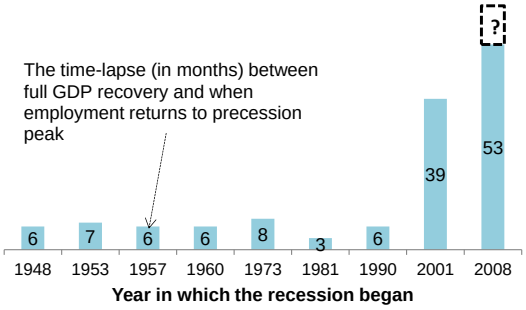
III. Policy implications: the twin tasks of boosting competitiveness while preserving healthy employment growth

The 2008-09 GFC created new policy challenges for the APEC region. Among these is a need for the APEC region to restore the rapid growth of labor productivity in an effort to continuously enhance the APEC region's competitiveness. Since 2008, increased capital accumulation has helped to avert the rapid decline in output per worker, an indicator of labor productivity. Some new capital assets were brought about from government fiscal stimulus measures implemented in response to the GFC and its aftermath. In many APEC economies, fiscal stimulus packages were unprecedented in terms of size and coverage. A substantial number of these measures were dedicated to infrastructure projects that increased capital stock. In China, for example, 86% of the fiscal stimulus package announced in November 2008 – equivalent to USD 586 billion or 13.3% of GDP – was allocated to infrastructure projects.

In today's tightening fiscal environment, the role of government to maneuver much of the capital deepening may be restrained. In the short to medium term, this momentum can only be sustained if APEC can mobilize private savings into productive capital investments. It should be noted that in the longer term, increases in capital input – without increasing its efficiency – will result in diminishing returns. Furthermore, the quantity of capital input cannot be increased indefinitely. Therefore, improving the efficiency of capital resources, by continuing to advance technological progress, is vitally important to sustainably improve APEC labor productivity and output.

With more than a million workers still out of work as a direct result of the 2008-09 recession, APEC is also facing pressure to revive the job market. Economic recovery is a prerequisite to bringing back the demand for labor but that in itself may not be sufficient. Without adequate policy responses, labor recovery often lags behind economic recovery. In some economies, the time-lapse between economic recovery and full employment has become longer in the past few recessions (Figure 19).

Figure 19: The time lag between economic recovery in the U.S. and a full recovery in employment has been increasing



Source: McKinsey Global Institute, Thomson Reuters and APEC PSU

Given the serious social and economic consequences arising from unemployment, policies should be implemented both to create new job opportunities and also to facilitate unemployed labor transitioning back to the workplace. As many of these workers possess experience and skill-sets that can be costly to replace or train, re-employing retrenched labor would represent a cost effective strategy in raising productivity levels in an economy.

The ability to raise labor productivity but at the same time ensuring robust and sustainable job creation can be a

complicated task. If policies are not carefully calibrated, gains in labor productivity can result in job losses or at least constrain the demand for labor. This is particularly the case if efficiency gains were to arise only from the augmentation of labor-saving machinery and equipment. More efficient utilization of resources may also result in some degree of employment-productivity trade-off as technological advances enable more output to be produced with fewer workers.

In this increasingly competitive world, the drive of firms to increase profitability and efficiency often comes at the expense of employment. In a market survey conducted by McKinsey Global Institute in March 2011[22], 65% of the responses from US companies indicated that they had made structural changes to increase productivity and reduce head counts during 2008 and 2010. Some of these job losses are likely to be permanent as many of these companies restructured their operations to automate tasks or redesign processes towards fewer labor inputs.

Achieving strong employment growth in an environment of relentless pursuit for efficiency is possible, however. In particular, governments need to create an environment in which firms are incentivized to pursue innovation as an integral part of enhancing productivity. Technological innovations will result in new markets for new products, thereby creating new jobs. It should be noted that technological change can affect the structure of labor demand, favoring skilled workers at the expense of unskilled workers. Where there are rigid wage differentials between skilled and unskilled labor, and the labor force is slow to respond to changing skill requirements, technological advancements can in fact lead to higher structural employment.

[22] McKinsey Global Institute (2011). "An economy that works: Job creation and America's future". June 2011.

Therefore, the design of a flexible labor market is the first step needed to mitigate the productivity-employment trade off. In the longer run, a more effective strategy is to develop a workforce of tomorrow that is highly adaptable to new technological changes. Educational and training institutions need to equip students with skills that match future employment opportunities. It is also helpful for students and job-seekers to gain knowledge of the most up-to-date trends in the job market. In this regard, developing a database of jobs, requirements and salaries would be helpful for jobseekers to gain insights into emerging trends in labor demand.

IV. Promoting productivity and the role for APEC

Strategies to improve economy-wide productivity are complex and there is certainly no one-size-fits-all solution. Indeed, individual APEC economies are at different stages of development and have different production efficiency frontiers. Potential productivity growth rates may also differ substantially across sectors. Traditionally, for example, some economists share the view of Adam Smith (1937)[23] that the improvement of the productivity powers of agriculture cannot keep pace with the improvement in manufacturing. This notion has been challenged in modern agriculture. The establishment of a large scale system for international agricultural research has resulted in higher rates of technical progress in agriculture, vis-à-vis manufacturing. More recently, the increased use of ICT technology has led to a new wave of high efficiency gains in services. This suggests that while manufacturing had contributed to a large portion of technology progress, especially

[23] Smith, Adam (1937). "The wealth of nations". First Modern Library Edition.

in the first few decades after 1950, this position is changing over time.

The heterogeneity in the optimal efficiency gains across sectors has important policy implications. In particular, the crafting of an effective policy framework for productivity enhancement needs to be grounded in a thorough understanding of the fundamental differences between industries and the factors that continuously shape their optimal production productivity frontiers. Governments need to take into account individual economy strengths and competitive advantages in developing strategies to raise the aggregate productivity level. Many APEC governments have already embedded productivity plans as an integral part in the economy's growth strategies. The focus of this section is therefore on the role of APEC in promoting the region's productivity growth.

Innovate for a better future with sustainable growth

APEC governments have been increasingly placing an emphasis on encouraging innovation as a means to promote increased productivity and higher standards of living. As host of APEC 2014, China has specified "**promoting innovative development, economic reform and growth**" as one of the priorities of the APEC work agenda, alongside with "**advancing regional economic integration**" and "**strengthening comprehensive connectivity and infrastructure development**". The priority of promoting innovative development is appropriate given the central role of innovation in enabling technological advances that are necessary to attain and retain the region's competitive edge.

The significance of innovation in contributing to productivity gains which have raised world living standards can be traced back to the Industrial Revolution. Revolutionary discoveries such as electrification or the internal combustion engine have radically transformed economies around the world. Many aspects of the modern life, from communication to healthcare, have intrinsically benefited from advances in technology.

Within APEC, there are economies that lead global innovation efforts while others have performed less well

If patent applications are an indicator for innovation, the APEC region has been leading the world in introducing new inventions. Since 1995, more than 80% of the world's patent applications have been filed by APEC economies and the proportion has been steadily increasing over time. The number of patent applications varies markedly across APEC economies. Indeed, a majority of patent counts was concentrated in a few APEC economies.

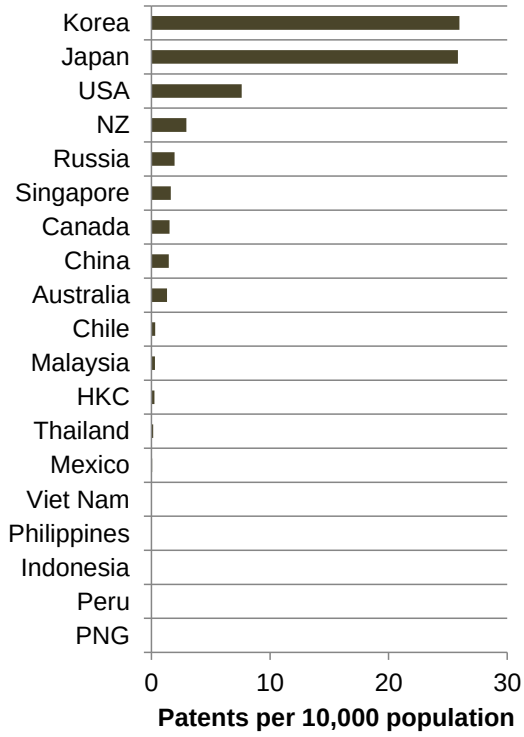
The United States, in particular, has played an important role in new innovative products. US patent applications have accounted for 26% of the world's total patent applications over the past 10 years. Japan has also been contributing to the large proportion of the world's patent counts, even though the numbers have been declining in recent years.

Among the most notable trends in the past few years is the rapid growth in patent applications in China. In 1999, residents and non-residents in China applied for more than 50,000 patents. Since then, the number of applications has increased ten-fold. In 2011 China had the highest number of registrations in the world, surpassing US patent registrations. Based on the size of the economy, there is a division in innovation efforts between high-income and developing APEC economies, however. Patent applications

per 10,000 population in developing APEC economies are generally fewer than high-income APEC economies (Figure 20).

Figure 20: Patent applications across APEC economies[24]

(per 10,000 populations in 2011)



Source: World Development Indicators and APEC PSU

It should be noted that patent counts, while being a widely quoted measure of innovative output, can also be misleading as only a few are associated with valuable inventions and most relate to inventions of little value. Furthermore, some sectors such as pharmaceuticals and instruments make heavier use of patents than others. Some innovative companies may not patent an invention as the procedure is often deemed as costly. Firms may also utilize other venues to protect inventions such as trade secrecy or technical know-how. Therefore, patent applications can overestimate or underestimate innovative efforts in an economy. On one end of the spectrum, the high number of patents in an economy may be driven by the high concentration of sectors that make heavy use of patents. At the other end of the spectrum, an economy with low patent registrations may be innovative but has more firms in sectors that do not make use of the patent system.

Trends in Research and Development (R&D) expenditure also show divisions

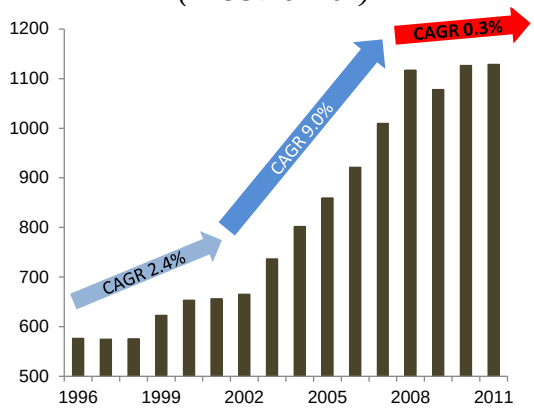
Researchers often use R&D expenditure in conjunction with patent counts as a measure of innovation process. A large body of research has demonstrated a positive and strong relationship between R&D expenditure and the growth of output or Total Factor Productivity. The story underlying the patterns of R&D expenditure is broadly similar to patent applications. The APEC region as a whole has accounted for roughly 60% of world's R&D spending. High-income APEC economies accounted for 84% of total R&D spending in APEC. Among developing APEC economies, there has been increased efforts in R&D investment in China. In 1997, China's R&D expenditure was USD 6.14 billion. By 2011, it had increased to USD 134.5. However, the ratio of R&D to GDP in China, which was 1.84% in 2011, is still lower than the average R&D to GDP ratio in high-income economies.

[24] Data on patent applications for Chinese Taipei is not available from the World Bank World Development Indicators. However, according to the statistics being released by Chinese Taipei's Intellectual Property Office (TIPO) and Chinese Taipei's Ministry of the Interior, there were 52,221 patent applications in Chinese Taipei in 2011. This translates into 22.5 patents per 10,000 population.

Figure 21: Evolution of R&D expenditure in high-income economies

(as % of GDP)

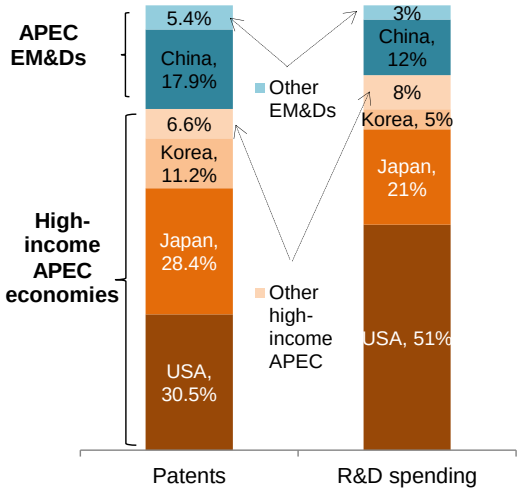
(in USD billion)



Source: World Bank World Development Indicators

The division seen in R&D spending among high-income and developing APEC economies broadly mirrors the global trend. As a group, R&D spending in emerging and developing economies has been lower than that in high-income economies. Over the period between 2000 and 2010, middle income economies spent on average 0.8% of GDP per annum on R&D investment, which is roughly about one-third of the ratio of R&D expenditure to GDP in high-income economies. Unfortunately, R&D expenditure in the latter group of economies was affected by the recent global financial crisis. In 2011, the ratio of R&D expenditure to GDP in high-come economies fell by 8.5% from the peak seen in 2009 (Figure 21).

Figure 22: Patent applications (during 2002 to 2011) and R&D spending (in 2011) in APEC[25]



Source: World Development Indicators and APEC PSU

Information gathered from patent applications and R&D spending indicates that the bulk of global innovation activities have traditionally taken place in higher income economies (Figure 22). R&D investment in high-income economies has led to improved technologies and production skills that eventually have been disseminated worldwide, playing a crucial role in increasing global productivity. If the decelerating growth in R&D spending in high-income economies were to continue in the future, this implies that the international spillovers from such research would be curtailed to an extent, negatively impacting future gains in global productivity. While there has been an increase in the aptitude for innovation in developing APEC economies in recent years, there is still room for further progress.

[25] In this chart, other high-income APEC economies include Australia; Canada; Hong Kong, China; New Zealand and Singapore. Other EM&Ds include Chile; Indonesia; Malaysia; Mexico; Peru; the Philippines; Russia; Thailand and Viet Nam. Brunei Darussalam; Papua New Guinea and Chinese Taipei are excluded due to incomplete data.

Promoting innovation: the role for APEC

In recognition of the central role of innovation to the region's economic growth, APEC established the Policy Partnership on Science, Technology and Innovation (PPSTI) in 2012. The main role of the PPSTI is to support the development of science and technology cooperation and effective innovation policy in APEC economies. Some priority areas of the APEC PPSTI include:

- fostering an enabling environment for innovation;
- developing innovation policy frameworks;
- strengthening collaboration among APEC members;
- developing science, research and technology cooperation; and
- supporting infrastructure for commercialization of ideas.

A recent focus of the PPSTI has been to reinforce policy measures to develop and secure human resources which are able to support science and technological innovation. Despite efforts being actively made in APEC to raise capabilities to innovate, some economies are facing shortages of highly qualified scientists, engineers and other technical experts who are capable of carrying out formal R&D. Even in economies where there are sufficient supplies of talent, there is still a need for researchers with global perspectives and experience. Indeed, the international mobility of skilled labor has played an important role in the diffusion of technology advances around the globe. Empirical studies by Hunt and Gauthier-Loiselle (2008) and Downie (2010) show that skilled migrants and cultural diversity have exerted enormous beneficial impact for innovation in the host economy[26]. Therefore, it is important that APEC devotes attention towards encouraging enhanced mobility of skilled workers across borders. Concurrently, in order to prevent the loss of locally trained scientists, economies need to strengthen their environments to train and nurture skilled workers.

Given its cross-cutting nature, many aspects of innovation promotion can be covered by a wide variety of committees and sub-fora within APEC. There is also scope for policies to enhance the business environment. APEC is also actively involved in improving the business environment among its members. Currently, the Economic Committee of APEC is examining best practices in regulatory reforms to promote innovation in the region. Going forward, through the Ease of Doing Business (EoDB) Action Plan, members of the Economic Committee may consider playing an active role in addressing regulatory barriers that impact private sector investment in R&D, including the removals of administrative burdens on start-up firms as well as broader barriers to competition.

APEC can also play an important role to promote the setting and enforcing of appropriate rules. Foremost in the innovation context is a well-functioning intellectual property rights system that ensures effective legal protection for inventions. APEC's Intellectual Property Rights Experts Group (IPEG) could include a specific focus on intellectual property rights that allows limited, short-run grants of exclusive rights to catalyze inventive activity.

[26] Hunt, Jennifer & Gauthier-Loiselle, Marjolaine (2010). "How much does immigration boost innovation". *American Economic Association*, Vol, 2(2), pages 31-56; and
Downie, Michelle (2010). "Immigrants as innovators: Boosting Canada's global competitiveness". The Conference Board of Canada. October 2010.

Aside from strengthening the environment to enhance innovation, there is scope for public finance policies to subsidize innovation-related research. Most directly, governments can use fiscal and taxation instruments to promote the development and dissemination of new technology. These can include earmarked taxes; R&D subsidies, tax exemptions and other fiscal arrangements. However, the complexity of designing tax credits for R&D investment, for example, can deter many economies from adopting such a scheme. Capacity building to address this issue is imperative and APEC could take a more active role to specifically address this challenge.