Rebalancing Economic Growth: Financing Innovation in Health

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Rebalancing Economic Growth: Financing Innovation in Health

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Peter Sheehan
APEC LSIF Co-Chair (Academic)
Director, Centre for Strategic Economic Studies,
Victoria University, Melbourne

Outline of presentation

Distinguish three types of imbalance
  — Trade and savings/investment
  — Energy use and the environment
  — Underinvestment in welfare-improving services
Illustrate the latter two for the case of China
Note the links of health investment to all three
The returns to investment in health innovation
  — The APEC LISF study
Financing innovation in health – why is there underinvestment in innovative health services?
Conclusion
What is unbalanced growth, or an unbalanced economy?

What is unbalanced growth (unbalanced economy)?
- Different sectors grow at different rates, and the differential growth rates have adverse welfare implications
- The shares of different sectors are such as to have adverse welfare implications.

The implication is that there is an alternative pattern of growth (structure of the economy) that is feasible and would generate higher welfare

In a market based model, this implies that:
- Market failures lead to the economic structure producing higher welfare not being achieved, or
- Distortionary policies are at work, or both.

Types of unbalanced growth

Three types of imbalance are evident in some APEC economies:
- In savings and investment, reflected in the current account
- In energy use and environmental outcomes: the pattern of growth contributes to unsustainable energy use and pollution
- In the provision and access to welfare-improving services: an export oriented and/or heavy industry bias leads to low investment in education, health and other community services

These imbalances are linked, but in complex ways
- The savings/investment imbalance reflects too low a level of consumption, perhaps especially on services
- If the high investment is in energy-intensive industries it leads to adverse energy and environmental outcomes
- In this case, increased spending on social and community services would ease both imbalances
The case of China – the three forms of imbalance

- Each of the three forms are evident in China since 2001 – here we illustrate the energy and services (health) imbalances
- ‘A Three Handed Approach’ (Blanchard and Giavassi 2005)
  - Lower private savings
  - Increased services, especially health
  - Revalued currency
- Did not address the energy intensity issues

Structural imbalance and energy use in China

Between 1979 and 2001 China’s energy use per unit of GDP fell by 70%, because of falling energy use within industries
Since 2001 it has risen by about 4%; total energy use has risen by about 12% per annum. This is not sustainable.
Over 2002-09 a shift to more energy intensive industries has contributed to a 11% rise in overall intensity, partly offset by falling within-industries intensities (-7%)
This shift can be seen in the growth of steel production, and in the growth of five energy intensive industries
  - Five industries (petroleum, chemicals, non-metallic minerals and ferrous and non-ferrous metals) account for 10.5% of GDP and 45% of energy use.
Contributions to change in aggregate energy use per unit of GDP, China, 2002-2009: contribution of structural and intensity factors

Annual growth rates in GDP and steel production, China, 1993-2010 (est), (%)
Rising health challenges in China – limited resources

China has achieved massive improvements in health over the last 40-50 years, particularly through attacking infectious diseases.

But new challenges are emerging:

- The rate of infectious diseases has risen again since 1996, especially through AIDS, sexually transmitted disease and TB
- Death rates from cancer and diseases of the heart and lung are rising, and will be pushed further by smoking and hypertension
- China’s population is beginning to age rapidly

Limited resources are available to address these issues, eg

- China spent 4.4% of GDP on health in 2007, down from 4.9% in 2002, with only 0.9% from government budgets
- Only 2.5% of Chinese employed in units are in health, by comparison with 10-12% in developed economies
Prime age population, (persons aged 25-54 years) China, Japan and Korea

Note: *Right-hand scale (RHS) 10 times left-hand scale (LHS).

Employment in health: share in total employment, six OECD countries, 1970-2007 (%)

<table>
<thead>
<tr>
<th>Category</th>
<th>Number (million)</th>
<th>Share (%)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Mining</td>
<td>9.1</td>
<td>3.6</td>
</tr>
<tr>
<td>Manufacturing</td>
<td>104.3</td>
<td>38.2</td>
</tr>
<tr>
<td>Construction (and EGW)</td>
<td>43.1</td>
<td>15.8</td>
</tr>
<tr>
<td>Transport and communication</td>
<td>14.0</td>
<td>5.1</td>
</tr>
<tr>
<td>Wholesale and retail trade</td>
<td>18.9</td>
<td>6.9</td>
</tr>
<tr>
<td>Education</td>
<td>17.2</td>
<td>6.3</td>
</tr>
<tr>
<td><strong>Health</strong></td>
<td><strong>6.8</strong></td>
<td><strong>2.5</strong></td>
</tr>
<tr>
<td>Culture, sports and entertainment</td>
<td>1.9</td>
<td>0.7</td>
</tr>
<tr>
<td>Public management</td>
<td>22.3</td>
<td>8.2</td>
</tr>
<tr>
<td>Other services</td>
<td>35.5</td>
<td>12.7</td>
</tr>
<tr>
<td><strong>Total</strong></td>
<td><strong>273.1</strong></td>
<td><strong>100</strong></td>
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Centre for Strategic Economic Studies
Addressing these imbalances in China: The financial crisis and structural change

A major focus of the Chinese Government is to address these imbalances in terms of energy use and health
   — for 11th Five Year Plan (2006-2010), a target for a 20% reduction in energy intensity (40-45% reduction in CO₂ intensity for 2005-20 at Copenhagen); many supporting policies
   — major health reform in 2009, with US$125 billion program

Achieving major change is proving difficult:
   — the response to the financial crisis boosted the old economy
   — change is reliant on local governments (eg 60% of health reform funding), which have limited financial resources

But these issues remain at the heart of China’s planning for the 12th Five Year Plan (2011-2015)
Why are the imbalances so hard to correct?

Many APEC developing economies face major health issues
— population ageing starting to become a reality
— DALYs lost from chronic disease will rise sharply
— some communicable diseases are also starting to rise again

Massive knowledge resources are now available
— growing knowledge of prevention strategies
— existing and emerging vaccines, drugs and other technologies
— global experience with health systems and financing methods

Why then is it difficult to marshall resources for health? To finance health innovation?
— one partial reason is that health is seen as spending by governments, rather than investment by the community

Financing innovation in health – the APEC LSIF study

Given these concerns the APEC Life Sciences Innovation Forum initiated a study on the returns to investment in health innovation
— To examine the costs and benefits of a major investment in health innovation in APEC developing economies, and in specific economies
— Innovation broadly defined
— Initially focused on chronic diseases, but being extended to communicable diseases
— Being undertaken by CSES and the Institute of Population Studies, Peking University

Summarise some initial results below
Increased investment in health innovation

- Innovation in health: discovering or applying ideas new to the organisation/region in risk detection, prevention, treatment and cure
  — required in all elements of the health system
  — must be directed to the real health needs of the country (not technology push)
  — for all countries involves drawing on global knowledge
  — is always embedded in a broader economic and social context
  — involves many different forms of innovation
  — is a major driver of growth and welfare

Increased investment in health innovation in APEC developing economies: three scenarios

- We define three scenarios for investment in health innovation, specified by health outcomes
  — a constant mortality rate scenario, in which investment in innovation is just sufficient to hold age and cause specific death rates to their 2002 level (in the face of worsening risk factors)
  — an ongoing innovation scenario, in which innovation is sufficient to achieve the health outcomes in the last WHO burden of disease projections, and
  — an enhanced innovation scenario, in which age and cause specific mortality rates are reduced by 1% per annum relative to the WHO projection rates.
Overall study methodology

- The overall approach used in modeling the impact, benefits and costs of these scenarios, for APEC developing economies, is as follows:
  - A simple population model is used to estimate the impact on deaths and DALYs, using WHO parameters where possible
  - Three types of health benefits from greater investment in innovation are assessed
  - A range of estimates of the cost of innovation in each scenario is developed, in the light of the extensive studies of the cost of specific innovations undertaken in the UN/WHO Disease Control Project
  - Estimated benefits are compared against likely costs

Source: Estimates of the authors, based on unpublished data provided by Dr Colin Mathers of WHO.
Five benefits arising from these health outcomes

- Five benefits from improved health outcomes have been identified in the literature
  - The value to the individual of an additional year of disease free life
  - The lower treatment costs arising from lower levels of chronic disease
  - The impact on productivity and GDP of a healthier population, and a larger and healthier workforce
  - The improvement in government budgets, from higher taxes and lower health costs, and
  - The dynamic effects on growth, as higher spending on innovation and prospects of a healthier population drive increased economic activity
- Only the first three have been modeled to date

Measuring the benefits: key methodological issues

- The value of a DALY saved
  - A very conservative valuation of average GDP per capita costs has been adopted
- Estimation of lower treatment costs
  - Treatment costs per DALY by disease for the region have been estimated, using regional health spending proportioned across disease using Australian data and other information
  - Treatment costs rise over time, as more disease is treated by more sophisticated methods (three assumptions are used)
- Labor force and productivity effects
  - Age specific assumptions are made about the impact of higher population on labor force
  - US research on the impact of chronic disease on productivity while working
Assessing the cost of increased investment

- Many studies are available on the cost on particular health innovations, expressed in terms of cost per DALY avoided
- These have been assembled and reviewed in the UN/WHO Disease Control Project, and are summarised in the paper
- Many innovations are available at less than US$1000 per DALY, and a wide range at less than US$2500 per DALY, while some have higher costs
- Any realistic program of investment will involve a range of lower and higher cost innovations
- A range of cases for the average cost of innovations is used, going from US$1000 to US$7500 per DALY saved
- These costs are assumed to increase by 2% per annum in real terms

The costs and benefits of increased investment in health innovation in APEC developing economies

- The results imply very high returns to increased investment in health innovation, with benefits many times cost
- For the enhanced scenario and the central cases (costs of US$2500 per DALY and elasticity of 1.0)
  - costs are about US$300 billion by 2030, or 0.5% of GDP
  - total benefits are US$4500 billion by 2030, or 8% of GDP
  - that is, benefits are about 16 times estimated costs
  - the direct economic benefits, excluding individual benefits, are nearly 8 times estimated costs
- These results are preliminary, and vary across cases, but the finding of very high returns seems to be robust.
Table 8. Overall benefits of increased innovation, enhanced innovation scenario relative to constant mortality rates scenario, 2010 to 2030, APEC developing economies

<table>
<thead>
<tr>
<th></th>
<th>2020</th>
<th>2030</th>
<th>2020</th>
<th>2030</th>
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<tbody>
<tr>
<td></td>
<td>(US$b 2005 prices) (share of GDP, %)</td>
<td></td>
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<tr>
<td>Innovation Costs</td>
<td>182</td>
<td>296</td>
<td>0.54</td>
<td>0.52</td>
</tr>
<tr>
<td>Economic benefits</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Reduction in treatment costs</td>
<td>248</td>
<td>639</td>
<td>0.74</td>
<td>1.13</td>
</tr>
<tr>
<td>Labour force and productivity</td>
<td>536</td>
<td>1530</td>
<td>1.57</td>
<td>2.68</td>
</tr>
<tr>
<td>Individual health benefits</td>
<td>910</td>
<td>2403</td>
<td>2.71</td>
<td>4.24</td>
</tr>
<tr>
<td>Total innovation benefits</td>
<td>1694</td>
<td>4572</td>
<td>5.02</td>
<td>8.05</td>
</tr>
</tbody>
</table>

Source: Estimates of the authors.

The next steps: extend and improve the underlying model and analysis

1. Improved modelling of the three forms of health benefit
2. Quantification of other two forms of health benefit
3. Closer specification and quantification of innovation costs
4. Include estimates of infrastructure costs
5. Develop the time dimension; calculate rates of return
6. Extend to communicable as well as chronic diseases
7. More systematic sensitivity analysis
Financing greater investment in health innovation I

Why is it so difficult to finance greater investment in health innovation in developing economies?

- The problem is demonstrable
- The knowledge and other means are available
- There seem likely to be high social returns

A social investment problem under uncertainty

- Costs now, returns delayed; seen as another form of spending
- Incidence of benefits diffuse and uncertain
- Funders cannot readily appropriate the social benefits
- More familiar and tangible forms of investment take precedence

Financing greater investment in health innovation II

The problem is not one of public versus private sectors:

- Both sectors must be involved (eg Chinese Taipei’s publicly funded universal insurance scheme with strong private delivery)
- Government must take the lead in marshalling resources

The task is for the community to marshal, through many potentially different methods, the financial and human resources to finance increased investment, to meet the challenges and to reap the returns

A task fit for the Senior Finance Officials of APEC!