Unpicking New Zealand’s Productivity Paradox

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Chief Economist
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The New Zealand Productivity Paradox

- Fundamentals good
- Outcomes poor

<table>
<thead>
<tr>
<th>Country</th>
<th>Overall GDP per capita gap predicted by the framework (in %)</th>
<th>Observed GDP per capita gap in 2009 (in %)</th>
<th>Deviation observed from predicted GDP per capita gap (in percentage points)</th>
</tr>
</thead>
<tbody>
<tr>
<td>AUS</td>
<td>23.0</td>
<td>10.3</td>
<td>-12.7</td>
</tr>
<tr>
<td>AUT</td>
<td>-7.1</td>
<td>5.7</td>
<td>12.8</td>
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<tr>
<td>BEL</td>
<td>-14.3</td>
<td>-1.5</td>
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<tr>
<td>CAN</td>
<td>12.3</td>
<td>5.3</td>
<td>-6.9</td>
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<td>CHE</td>
<td>0.4</td>
<td>13.0</td>
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<tr>
<td>DEU</td>
<td>-1.6</td>
<td>-2.2</td>
<td>-0.7</td>
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<tr>
<td>DNK</td>
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<tr>
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<td>28.3</td>
<td>7.2</td>
</tr>
<tr>
<td>Average</td>
<td></td>
<td></td>
<td>1.9</td>
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</table>

What underlies the paradox?

• Better fundamentals would help

• OECD study suggests real problem is elsewhere
  – Basing policy just on fundamentals unlikely to succeed

• To understand what is going wrong, need to know:
  – how economic growth occurs
  – what affects it

• Next
  – how growth occurs
Innovation and Economic Growth

• At the heart of economic growth is successful innovation by businesses

• Successful innovation
  – Creation & dispersion of something new & valued
    • New or improved product, process, method of organising etc
  – Involves novel application of ideas and knowledge

• A successful innovation creates value
  \[\begin{align*}
    \text{Reduces costs} \\
    \text{or} \\
    \text{Consumers pay more} \\
  \end{align*}\]
  – Increase in real income & output
Innovation and Economic Growth

• Series of innovations

  → series of increases in output
  i.e. → economic growth

Economic growth results from a series of one-off innovations that are refined and dispersed over time

• Number, variety & sophistication of products continually increases

• “Evolutionary tree” of product variety
Innovation Builds on Innovation

- Each innovation:
  - Builds on existing knowledge and capabilities
  - Creates
    - new knowledge
    - changed economic structure
    - new capabilities

*Competing Technologies, increasing returns, and lock in by historical events, Arthur, B, 1987, Economic Journal*

- Higher foundation
  - e.g. transistor (1954), chip (1969), PC (1975), internet

- Spillovers and market failures ubiquitous

- Possibility of multiple market equilibria

*The fall and rise of development economics, Krugman, P, 1994*
Impact of Business Environment

• Innovation and growth driven by creative destruction
  – Firms innovate to overcome competition
  – More successful firms attract resources and grow
  – Less successful firms shrink and exit

• Both “within” and “between” lead to productivity growth
  – 3/4 from reallocation, 1/3 of this from entry and exit
  – UK: 60% from exporters; 91% of non-exporters contribution from exit
    Department of Business Innovation and Skills 2011, International Trade and Investment - the Economic Rationale for Government Support

• New microeconomic evidence shows how
  What Do We Learn From Schumpeterian Growth Theory? Aghion, Akcigit and Howitt, 2013
Competition and Innovation

- Wide productivity dispersion between firms even within narrowly defined industries

- Increased competition:
  - Increases innovation
  - Increases creative destruction
  - Reduces prices
  - Cuts productivity dispersion off from bottom & so narrows it

- i.e., Competition increases productivity growth

*Market Structure and Productivity: A Concrete Example*
Syverson, Chad. 2004

*Competition and Innovation: An Inverted U Relationship*
Aghion, Bloom, Blundell, Griffith, Howitt, NBER Working Paper No. 9269
Impact of Business Environment

- Rate of innovation and way businesses develop depend on the business environment
  - Incentives (including competition)
  - Capabilities
  - Access to information and inputs
  - Uncertainty


The growth you get depends on the business environment that you provide

- So need a business environment that promotes
  - Competition → creative destruction
  - Supporting institutions
  - Flexibility in product and input markets – lets resources move
  - Trade
Trade and Economic Growth

- Trade can promote economic growth

- “…any successful economic development strategy must ultimately raise the share of international trade in GDP” - Harrison and Rodriguez-Clare
  

- One estimate – 1% increase in trade share raises income by 2%
  
  *Does Trade Cause Growth? Frenkel and Romer 1999*

- Even more important for a small country
  – Less scope to trade with itself

- Why?
Trade and Economic Growth

• Both exporting and importing improve growth

1. Exporting:
   – Static gains
     • Standard story
       – Comparative advantage
       – Specialisation
     • Restructure towards exporters - more productive
   – Dynamic gains
     • Increases competitive pressures
       – Have to innovate
     • Successful small countries not scaled down big countries
       – Specialise
       – Create an ecosystem of related and supporting industries
         – a national innovation system


   – Intensifies competition
   – Allows exploitation of spillovers and increasing returns
Trade and Economic Growth

- Exporting involves specialisation, spillovers and increasing returns
  - Learning effects & spillovers from exporting and innovation
    - Learning by doing and watching
    - Increase with:
      - number of related firms
      - number of related innovators
  - Markets get thicker, improving matching
  - Complementary capabilities (e.g. laws, organisations) emerge
  - Increasing returns:
    - to entering exporting (fixed costs)
    - to ideas and so innovation
    - from thicker markets
    - from complementary capabilities
Trade and Economic Growth

2. Imports also increase competition and creative destruction
   – More competitive firms innovate to see off importeds
   – Less competitive firms shrink and exit
     • Releases resources for use in other industries

• Competition flows through to non-tradables

• Clear evidence of within-industry increase in productivity
  *What Determines Productivity? Syverson (2010)*

• NB – with trade, as with innovation, externalities and increasing returns pervasive – e.g.,
  – Firms prefer less competition
  – Creation of exporting ecosystem
Trade and Economic Growth

- So trade increases within industry productivity
- What happens to aggregate productivity?
  - Depends on what happens to the released resources
- Different experiences:

Table 3: Decomposition of productivity growth, unweighted averages, 1990-2005

<table>
<thead>
<tr>
<th></th>
<th>labor productivity growth</th>
<th>component due to:</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td></td>
<td>&quot;within&quot;</td>
</tr>
<tr>
<td>LAC</td>
<td>1.35%</td>
<td>2.24%</td>
</tr>
<tr>
<td>AFRICA</td>
<td>0.86%</td>
<td>2.13%</td>
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<tr>
<td>ASIA</td>
<td>3.87%</td>
<td>3.31%</td>
</tr>
<tr>
<td>HI</td>
<td>1.46%</td>
<td>1.54%</td>
</tr>
</tbody>
</table>

Difference: 2.5%  1.5%
No change
“Most of this [adverse restructuring] … took place during the 1990s, under the Argentine experiment with hyper-openness.”

McMillan and Rodrik

Openness associated with:

- restructuring *away from* higher productivity sectors
- *Shrinking* export share
NZ more like Latin America than High Income Countries

NZ more like Latin America than High Income Countries

- Internationally, adverse restructuring associated with:
  - rigid labour markets
  - focus on primary exports
  - over-valuation

  *Globalisation, Structural Change and Productivity Growth* McMillan and Rodrik 2011

- NZ has:
  - Flexible labour markets  
  - Focus on primary sector ✓
  - Overvalued exchange rate ✓

  *Exchange rate valuation and its impact on the real economy* Enzo Cassino and David Oxley, 2013
  - Reflected in rising NIIP
  - Symptom of an underlying imbalance

- “…strong [but not conclusive] evidence that real exchange rate overvaluation lowers growth”
  ibid
Substantial Impact on Per Capita Incomes

NZ’s per capita income would have been $\frac{1}{3}$ closer to OECD 24 mean, not falling
Impact of business environment

• NZ economy is open and flexible
  – Allows resources to flow

• But business environment has created adverse restructuring

• It has also had an impact on the level of trade
Trade is very low

GDP and Trade Share for OECD Countries

Size and Distance, Trade and Competition

• We know why
  – NZ is geographically remote
    *Does Trade Cause Growth?* Frenkel and Romer 1999
  – RER cycle
  – Makes exporting from and to NZ harder

• Low trade still a problem
  – Means don’t get benefits of trade (competition, specialisation, eco-system, spillovers etc)

• NZ already on back foot - small size and dispersed
• Low trade compounds the problem
• How big a problem?
NZ within sector productivity dispersion

- Productivity dispersion between firms, even in narrowly defined industries
- Competition cuts off bottom of dispersion, narrows it


- Measure: Productivity of firm at 90th percentile / firm at 10th percentile
  - NZ average 9.1, less in traded goods
  
  *Explaining Productivity Distribution in New Zealand Industries: The effects of input quality on firm productivity differences*, Devine, Doan and Stevens
  
  - cf Denmark 1.6 to 3.5
    
    *Wage and Productivity Dispersion: Labor Quality or Rent Sharing?*, Bagger, Christensen and Mortensen 2010
NZ within sector productivity dispersion

• Typically, competition
  – increases creative destruction
  – means worst performers can’t survive
  – narrows productivity dispersion
  – increases productivity and growth

• Not true for NZ
  – Some world-class firms
  – Some much worse
NZ within sector productivity dispersion

- Reflected in a middling performance on wide range of performance indicators

  Economic Development Indicators 2011, MED, Treasury and Statistics New Zealand

- E.g. Low average management capability
  - Typical
  - Probably reflects wide dispersion

- How important?

Source: Ministry of Economic Development (2010), Management Matters in New Zealand – How does manufacturing measure up? Exhibit 18 – Operations management score by country, Exhibit 20 – Performance management score by country, Exhibit 22 – People management score by country

Published in Economic Development Indicators 2011
NZ within sector productivity dispersion

• Potential impact substantial
  – If India and China had USA dispersion, TFP would be about 50% higher

• Back of the envelope experiment
  – What happens if cut off bottom of NZ productivity distribution to have the same P90/P10 as Denmark?
  – Substantial productivity increase
  – Clearly not definitive
  – But suggestive

• Suggests if increased trade and competition, could get
  – substantial one-off productivity gains (tighter dispersion)
  – faster productivity growth (more innovation)
Policy Implications

• NZ has good framework settings for average OECD country

• But not an average OECD country
  – Small, sparsely populated and distant

• Small countries not scaled big countries
  – Successful ones are specialised


• Can’t assume big country policy settings will be enough
To recap

• Innovation central to economic growth
• Innovation
  – builds on existing knowledge and capabilities
  – creates new knowledge and capabilities
• Rate of innovation & way businesses develop depends on business environment
• Competition between firms:
  – fosters innovation
  – promotes creative destruction
  – narrows the productivity dispersion
  – raise productivity and productivity growth
• Non-convexities, spillovers and market failures are ubiquitous
To recap

- For a small country, trade is critical to growth
  - Increases competition NZ producers face overseas and in NZ
  - Allows specialisation:
    - Comparative advantage
    - Creation of ecosystem
    - Increases spillovers, competition, learning by doing, returns to scale, etc
- NZ has low trade and unfavourable real exchange rate
- Result is:
  - Restructuring to low productivity & low productivity growth sectors
  - Wide productivity dispersion
- Amelioration likely to improve productivity & productivity growth
- Suggests business environment should favour trade and competition
90th percentile
<table>
<thead>
<tr>
<th>Abbreviation</th>
<th>Industry</th>
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<tbody>
<tr>
<td>AgForFish</td>
<td>Agriculture, Forestry and Fishing</td>
</tr>
<tr>
<td>Min</td>
<td>Mining</td>
</tr>
<tr>
<td>Manu</td>
<td>Manufacturing</td>
</tr>
<tr>
<td>EGW</td>
<td>Electricity, Gas, Water and Waste Services</td>
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<tr>
<td>Constr</td>
<td>Construction</td>
</tr>
<tr>
<td>WhoTrade</td>
<td>Wholesale trade</td>
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<tr>
<td>Retail</td>
<td>Retail Trade</td>
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<td>AccFood</td>
<td>Accommodation and Food Services</td>
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<tr>
<td>Trans</td>
<td>Transport, Postal and Warehousing</td>
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<tr>
<td>InforTel</td>
<td>Information Media and Telecommunications</td>
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<tr>
<td>FinInsu</td>
<td>Financial and Insurance Services</td>
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<tr>
<td>Property</td>
<td>Rental, Hiring and Real Estate Services</td>
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<td>ProSciTech</td>
<td>Professional, Scientific and Technical Services</td>
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<td>AdmSupp</td>
<td>Administrative and Support Services</td>
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<tr>
<td>ArtRec</td>
<td>Arts &amp; Recreation</td>
</tr>
<tr>
<td>OtherSer</td>
<td>Other Services</td>
</tr>
</tbody>
</table>
Distance hasn’t limited access to technology

NZ as quick to adopt new technologies as high income countries

Extensive Margin Component of TFP and Income per capita
Traditional vs New Growth Economics

**Traditional economics**
- Allocating scarce resources of labour and capital
- Perfect information
- Diminishing marginal returns to economy
- Stable equilibrium
- Prices efficiently set and unfettered price auction is efficient
- Competitive markets
- Government defines and enforces property rights
- Taxes not too high and minimum distortion

**New growth theories**
- Ideas are not scarce
- Market failures and information problems on-going
- Increasing marginal returns to economy from new knowledge
- Processes of dis-equilibrium/ on-going creation-destruction
- No perfect prices. Social and private benefits diverge (2 to 5x)
- Monopolistic firms driven by incentives or rents to innovate
- Markets underinvest in knowledge as non-rival and only partly excludable leads to externalities.
- Wide range of non-market and market institutions important
- Support technological change / basic research/ education/ patents/ dynamic efficiency / new practices/ rules
- Learning-by-doing and tacit knowledge is collective hard-to-replicate asset
- How good is economy at adapting these collective assets? Managing ex-ante risk / uncertainty?
- Mechanisms for clustering (agglomeration) and location decisions of firms
“inter-sectoral productivity gaps are clearly a feature of underdevelopment. They are widest for the poorest countries in our sample and tend to diminish as a result of sustained economic growth”
Labour productivity by sector

There is a wide variation in labour productivity between sectors; the majority of workers are employed in lower labour productivity sectors.

Sector employment (total hours paid) vs sector GDP (real) per hour paid
NZ$; 2010

<table>
<thead>
<tr>
<th>Sector</th>
<th>GDP per Hour Paid</th>
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</thead>
<tbody>
<tr>
<td>Petroleum &amp; minerals</td>
<td>$333.35</td>
</tr>
<tr>
<td>Utilities</td>
<td>$204.20</td>
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<tr>
<td>Property, rental &amp; hiring services</td>
<td>$167.84</td>
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<tr>
<td>Finance &amp; insurance</td>
<td>$108.34</td>
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<td>Chemicals, plastics &amp; refining</td>
<td>$108.12</td>
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<tr>
<td>Media &amp; telecommunications</td>
<td>$87.20</td>
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<tr>
<td>Food &amp; beverage</td>
<td>$54.21</td>
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<td>Arts &amp; recreation</td>
<td>$50.64</td>
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<tr>
<td>Construction</td>
<td>$34.28</td>
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<tr>
<td>Administration &amp; other services</td>
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<tr>
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<td>Agriculture, forestry &amp; fishing</td>
<td>$39.22</td>
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<tr>
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<tr>
<td>Other manufacturing</td>
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Different sectors have different dynamics and structures. A wide variation in labour productivity is to be expected. Some sectors need lots of physical capital (e.g. machines) and others – like shops and restaurants – need lots of labour.

Measured sector average = $48.39

Note: data for government administration, education, health, ICT, high technology manufacturing and knowledge intensive services are not measured.

Source: Statistics New Zealand, National Accounts - Productivity Input Series year ended March 2012 (2012)