A Missing Page in Latin American Structural Reforms: A Strategic Approach to Natural Resource Exports and Diversification for Growth

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Latin America: Mediocre Growth Rates Over Recent Decades

(Percentage, GDP per capita)

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<tbody>
<tr>
<td>World</td>
<td>1.90</td>
<td>3.35</td>
<td>2.05</td>
<td>1.26</td>
<td>1.22</td>
<td>1.62</td>
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<td>Developed countries</td>
<td>2.62</td>
<td>4.25</td>
<td>2.86</td>
<td>2.21</td>
<td>1.79</td>
<td>1.70</td>
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<td>South East Asia</td>
<td>5.04</td>
<td>1.62</td>
<td>5.01</td>
<td>5.93</td>
<td>6.53</td>
<td>6.48</td>
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<tr>
<td>Latin America</td>
<td>1.54</td>
<td>2.45</td>
<td>3.11</td>
<td>-0.28</td>
<td>1.32</td>
<td>0.77</td>
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<tr>
<td>Subsahara Africa</td>
<td>0.55</td>
<td>2.01</td>
<td>1.17</td>
<td>-0.73</td>
<td>-0.57</td>
<td>1.49</td>
</tr>
</tbody>
</table>

ECLAC based on IMF/WB data
Latin America diverges while East Asia converges

EAST ASIA AND LATIN AMERICA PER CAPITA INCOME
Percentage of U.S. per capita GDP, in PPP

Source: Data from Maddison (2007)
A recent pick-up in LAC growth…

GDP PER CAPITA GROWTH RATES

(Percentages)

Source: ECLAC
...but less than in many other developing countries

PER CAPITA GDP GROWTH RATE BY SUB-REGION

Source: ECLAC
The role of exports in growth

- An old debate, but one that is especially relevant for Latin America
- Since the late 1960s export-led growth has contributed to the *catching up* of some developing countries, especially in S.E. Asia.
- Hence a controversial hypothesis has become relatively mainstream, e.g., Krugman (1986); Bhagwati (1988); Dornbusch (1992).
LAC share of total world exports increased slightly over the last 15 years... but after a sharp decline.
Latin America, East Asian and Chinese share in world trade

WORLD TRADE
(percentage share of world exports, selected years)

Source: WTO
Diversification of exports also matters


- Growth benefits of promoting export diversification:
  - Portfolio effect
  - Increases domestic constituency for structural reform policies (essential to pursue successful export diversification)
  - Proxy for a more diversified economy

- The link of increasing diversification with development appears important at levels of per capita income like those observed in Latin America (Imbs and Wacziarg, 2003); CAF (2007).
LAC countries have levels of per capita GDP corresponding to the downward sloping part of the curve.

Although with variations across countries, in the last 20 years LAC has diversified its export basket...

LAC: CONCENTRATION OF EXPORT BASKET
(HERFINDAHL HIRSCHMAN INDEX, 1986-89 vs. 1999-2002)

Note: HHI = 1 (totally concentrated)

Source: ECLAC
...and was able to reduce terms-of-trade volatility...

LATIN AMERICA: DIVERSIFICATION OF THE EXPORT BASKET AND TERMS-OF-TRADE VOLATILITY

Note: diversification measured as (1-IHH)
Source: Machinea and Vera (2006)
Besides the value and diversification “what” a country exports matters too

- More growth effects from exports associated with knowledge and high productivity:

- More growth effects when exports rooted in linkages with the rest of the domestic economy.
“What” a country exports matters too too
(1980-2002)

Source: Ocampo and Parra (2006)
“What” a country exports matters too

SPECIALIZATION VS. GROWTH: 1980-2002

Gains or losses in market share in 1980-2002

Source: Ocampo and Parra (2006)
Commodity exporters are at the center of a major debate

- There exist various studies that show that economies intensive in natural resources correlate with lower rates of growth: e.g., Sachs and Warner (1995); Auty (2001, 2005); Ross (1999); Gelb (1988); Leite and Weidemann (1999); Fasano (2000).

- But recent studies are more optimistic. They generate empirical evidence of growth and industrialization in economies based on natural resources (Blomstrom and Kokko 2003; Wright 2001; De Ferranti, Perry, Lederman and Maloney 2002, Bonaglia and Fukasaku 2003; Lederman et. al, 2006).

- Stijns (2005) finds that abundance of natural resources generates positive and negative forces for growth and the balance depends on how the resources are produced, accumulation, and channels for local absorption of knowledge.
The downside risks of natural resources

Commodity exports may contribute less to growth:

- Less diversification in the production structure (high productivity in natural resources creates a Dutch disease)
Risks of Dutch Disease?

LATIN AMERICA AND THE CARIBBEAN: REAL EFFECTIVE EXCHANGE RATE
(October 2006 compared to October 2003 and to the 1990s)

Compared to the average for 1990-99
Compared to October 2003

Source: ECLAC
Risks of Dutch Disease?

Source: ECLAC
The downside risks of natural resources

Commodity exports may contribute less to growth:

- Less diversification in the production structure (high productivity in natural resources creates a Dutch disease)
- Prices are more volatile
- Deterioration of terms of trade, although this appears to be changing (China and India).
- Difficulty in building linkages because of enclaves and remoteness from population centers (especially in the case of mining)
- Negative impact on income distribution
- Historically, less incentives for innovation
  - Less necessity to differentiate products
  - Less technologies available to innovate in processes to lower costs

BUT, this has changed over time (more opportunities for product differentiation, the higher profile of biotechnology, etc.).
What has happened in LA in terms of technological intensity?

STRUCTURE OF EXPORTS BY TECHNOLOGICAL INTENSITY

(a) Latin America and the Caribbean

(b) Central America

(c) Mexico

(d) South America

High-technology manufactures
Mid-technology manufactures
Low-technology manufactures
Natural-resource-based manufactures
Commodities

Source: ECLAC
Within South America, the case of Brazil stands out.

LATIN AMERICA (SELECTED COUNTRIES): ENGINEERING/KNOWLEDGE INTENSIVE SECTORS IN TOTAL MANUFACTURING VALUE ADDED, 1970-2003

However, higher technological content has not always been associated with higher growth in LAC and the fastest-growing countries have not necessarily been the ones whose export pattern has changed

(1985-2004)

<table>
<thead>
<tr>
<th>Increase in goods with high- and mid-technological content as a percentage of total exports.</th>
<th>&gt; 10 percentage points</th>
<th>&lt; 10 percentage points</th>
</tr>
</thead>
<tbody>
<tr>
<td>Growth in per capita GDP (annualized)</td>
<td>&gt; 1.5%</td>
<td>Costa Rica, Dom. Republic</td>
</tr>
<tr>
<td></td>
<td>&lt; 1.5%</td>
<td>Brazil, Colombia, Mexico</td>
</tr>
</tbody>
</table>

Source: Updated from Machinea and Vera (2006)
What explains the difference with the evidence at a global level?

- Exports of high technology are important to foster growth if there are local capabilities.
- But not if they are only the result of a final assembly of multinational companies without linkages with the domestic economy.
However, is it the only road? Successful countries with abundant natural resources do not exhibit a clear export pattern.
Nordic countries: Structure of exports by technological intensity

(a) Finland

(b) Norway

(c) Sweden

Source: ECLAC
One of the largest differences appears to lie in innovation (resources and efficiency)

<table>
<thead>
<tr>
<th></th>
<th>Patents granted by USPTO</th>
<th>Patents granted by USPTO per million inhabitants</th>
<th>Total Spending on R&amp;D as a % of GDP</th>
<th>Business R&amp;D spending as a % of total spending</th>
<th>Effectiveness of R&amp;D spending (cost per patent in US$ millions)</th>
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<td>Argentina</td>
<td>70</td>
<td>1.8</td>
<td>0.4</td>
<td>29</td>
<td>7.6</td>
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<tr>
<td>Brazil</td>
<td>180</td>
<td>1.0</td>
<td>1.1</td>
<td>40</td>
<td>25.8</td>
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<td>Chile</td>
<td>15</td>
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<td>Colombia</td>
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<td>0.2</td>
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<td>Mexico</td>
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<td>23152</td>
<td>153</td>
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<td>Australia</td>
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<td>74</td>
<td>7.4</td>
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<td>63</td>
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<td>10.6</td>
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<td>China</td>
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<td>0.3</td>
<td>1.1</td>
<td>62</td>
<td>43.9</td>
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<td>Republic of Korea</td>
<td>4132</td>
<td>86</td>
<td>3.0</td>
<td>76</td>
<td>3.9</td>
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Note: refers to 2003 or latest year available
Source: World Bank Knowledge Assessment Methodology (KAM) and World Investment Report (2005)
LAC countries have a long way to go in improving human capital quality.
LAC countries have a long way to go in improving human capital quality

AVERAGE SCORE IN STANDARD INTERNATIONAL MATHS TEST
(PISA project, 2003)
And nowadays innovation can take place on low tech manufactures and on natural resources

- Developed countries exhibit a higher capacity to innovate (in a broad sense) in manufactures based on natural resources or low technology.

- This capacity is reflected in the higher unit value at which developed countries export these products (differentiation by design, branding, packaging, quality, speed to market, etc.). Results in forthcoming study.
Percentage difference in unit values for selected natural resource base and low technology manufactures (LAC country vs. developed country average. Six digits)

**Argentina**

- Fixed vegetable oils, soft, crude refined or purified
- Leather
- Meat and edible meat offal, fresh, chilled or frozen
- Fruit and nuts, fresh, dried

**Brazil**

- Meat and edible meat offal, fresh, chilled or frozen
- Sugar and honey
- Coffee and coffee substitutes
- Footwear
- Pulp and waste paper
- Aluminium

Source: forthcoming study
Developed countries exhibit a higher capacity to innovate (in a broad sense) in manufactures based on natural resources or low technology.

This capacity is reflected in the higher unit value at which developed countries export these products.

There are more opportunities for product differentiation related to natural resources and a higher profile of biotechnology (compared with Prebisch’s time).

Hence there is a window of opportunity that Latin America should take advantage of. (what are the alternatives?)

And nowadays innovation can take place on low tech manufactures and on natural resources
There are various restrictions to follow similar strategies to those that several countries have applied in the past.

- More open economies
- More rules at multinational and bilateral levels
- More competition for fiscal revenues (social policies)
- There are large technological clusters in Europe, Asia and the US; therefore there are less niches (high and medium technology) or the resources needed are beyond LAC capacities.
OECD Experience is illustrative of potential of commodity exporters

- Several countries have been and/or are still reliant on exports based on primary commodities: Australia, New Zealand, Norway, Finland and Sweden.

- Compared to Latin America:
  - Roughly similar X participation of raw and processed materials in total X.
  - Lower goods’ export concentration (and hence less vulnerability) than most of LAC
    - Note: considerably more diversification if services were accounted for.
  - X market share has suffered much less erosion
  - Per capita X are between 6 and 18 times higher.
  - Per capita income is between 3 and 6 times higher.
Elements in OECD commodity exporters’ success

- Structural reforms (e.g., Australia and New Zealand)
- Open and stable economy
- Better income distribution
- Better quality of education
- Government capacity
  - Fiscal space
  - Dedicated technical professional bureaucracy
- Adding knowledge and technology to natural resource production processes to:
  - Raise productivity and lower costs.
  - Generate clusters of new competitive indigenous activities, products and services.
    - Import substitution
    - Exports
  - Raise capacity further to globalize and export by exploiting opportunities for direct investments abroad.
However, the development of technological, innovation and export capacities is not entirely a market phenomenon

- Areas subject to market failures, e.g.:
  - Uncertainty
  - Information
  - Coordination
  - Price distortions
  - Appropriation
Since there are market failures there is a role for public policy interventions (how)

- Long term adaptive strategies in S&T for innovation/adaptation as well as export development.
  - Assessing global positioning now and in the future
  - Identification of binding constraints (macro, micro, meso)
  - Strengthening government support capacities
  - Enterprise development
- Coordination
  - Public-private sectors
  - Domestic and foreign firms
  - Business-academia-research centers
- Develop strong and credible mechanisms/institutions
- Incentives for new private sector knowledge-based activities
  - Horizontal
  - Vertical
- Public Accountability
Latin America needs to adopt a more strategic approach

- Develop long term strategies to enhance export-oriented FDI attraction, local enterprise development, innovation and export diversification and upgrading.

- Develop articulated public-private alliances (national and regional) for the development of those strategies and related support instruments.
  - Maximize forward-looking global strategic market information and perspectives.
  - Consensus building for effective and sustainable public interventions.
  - Checks and balances, transparency and accountability
Latin America needs to adopt a more strategic approach

- Need to study current Latin American practices and public-private articulation.
- Can learn first principles for public-private alliance construction and effective operational and governance aspects from experience of successful exporters:
  - East Asia
  - EU and North America
  - Oceania
- Insights on successful extra-regional experiences can stimulate more/better home grown public-private initiatives in Latin America.
Latin America needs to adopt a more strategic approach.

This is a current area of research at ECLAC. . . . patience, more to come, and Thank You!!!
A Missing Page in Latin American Structural Reforms: A Strategic Approach to Natural Resource Exports and Diversification for Growth

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THE EXAMPLE OF AUSTRALIA
Australia is an example of a natural resource exporter that has been organizing a coherent national social mechanism to:

- Develop a forward-looking national innovation strategy (basic and applied) to compete and upgrade exports.
- Foster public-private collaboration
- Provide incentives horizontally and vertically
Merchandise exports composition similar to LACs but diversification in services

Figure 3: Australia's exports of services 2003

(a) Recorded trade basis.
Axis scales for exports & imports may be different.
Australia Greenfield FDI outward projects

(Number of projects)

The current strategy

Australia National Strategy
Back ing Australia’s Ability - Building our Future through Science and Innovation

The Council
Prime Minister
Minister for Education, Science and Training
Minister for Industry, Tourism and Resources
Minister for Health and Ageing
Minister for Communications, Information Technology and the Arts
Minister for Agriculture, Fisheries and Forestry

A$ 5.3 billion 5 year package
✔ Strengthening Australia’s Ability to Generate Ideas and Undertake Research
✔ Accelerating the Commercialisation of Ideas and productivity growth
✔ Developing and Retaining Skills
## Commercialisation
- R&D Start
- R&D Start reprioritisation
- Innovation Access Programme - Industry
- Innovation Access Programme reprioritisation
- Biotechnology Innovation Fund
- Commercial Ready Programme
- COMET
- Biotechnology World Class Centre of Excellence
- National Stem Cell Centre (a)
- Cooperative Research Centres (CRC) Programme (b)
- Pre-Seed Fund (c)
- Information Technology Online (ITOL)
- Building on IT Strengths (BITS) Incubators (d)
- New Industries Development Programme (MIDP) Mark II
- New Industries Development Programme III

## Research and Development
- ARC National Competitive Grants Programme (a)
- Research Infrastructure Block Grants
- Systemic Infrastructure Initiative
- Major National Research Facilities Programme (e)
- National Collaborative Research Infrastructure Strategy
- Innovation Access Programme - International Science and Technology
- International Science Linkages
- Developing Quality and Accessibility Frameworks for Publicly Funded Research
- Regional Protection Funding (d)
- CSIRO National Flagships Initiative (d)
- Health and Medical Research - overhead infrastructure support
- Building on IT Strengths (BITS) Advanced Network (d)
- ICT Centre of Excellence (a)
- R&D Tax Concession (f)
- R&D Tax Concession
- Research Support for Counter-Terrorism (a)

## Skills Development
- Questacon - Smart Moves
- Questacon - Raising Science Awareness
- National Innovation Awareness Strategy
- Science Connections Programme
- Science, Maths and Technology in Government Schools
- Fostering Scientific, Mathematical, Technological Skills and Innovation
- 2000 Additional Targeted University Places (b)
- Boosting Innovation, Science, Mathematics and Technology Teaching
- Online Curriculum Content
- PELS (i)
- Attracting ICT Workers
- National Biotechnology Strategy and Biotechnology Australia (d)
Mapping of R&D public and private sector interaction

Backing Australia``s Ability-Building our Future through Science and Innovation
National Research Priorities (NRP) Standing Committee

CSIRO, the Commonwealth Scientific and Industrial Research Organisation, Australia``s national science agency

15 Research and Development Corporations
RDC programmes
Rural Industries-Government
Public private partnership

57 Cooperative Research Centres (CRC)
Enterprises – Multinational Corporations-Research Centers – Universities-Government
Public private partnership

- Universities
- Other Public and private Centers of Excellence

Other Public Agencies

National, Regional and sectoral Federations, national and sub national government initiatives, Private associations - Private Research Institutes
Public private partnership
These R&D corporations for rural industries include large and small firms in 15 production chains.

The public-private sector board, administrators and advisory committees of each RDC establish priorities, contract investigators and distribute research findings to associates on upgrading products and processes.

File and defend intellectual property rights.

Financed by contributions from the public sector and obligatory quotas for associated firms.
Cooperative Research Centres (CRC) Programme

- Private – academy and public sector association
- These centers are limited liability corporations directed by a board made up of representatives of local business, multinational firms with investment in Australia, labor, universities and research centers.
- The R&D programs supported by the centers have a duration of 7 years (can be extended)
- The programs are in manufacture and service sectors and aim to articulate firms with academia for innovation.
- The centers are financed by the government and voluntary contributions from associated firms.
Commonwealth Scientific and Industrial Research Organisation (CSIRO)

- This government agency is one of the most prestigious scientific research centers in the world.
- Collaborates with RDC, CRC, universities, etc.
- Employs more than 6,500 investigators.
- The institution follows selected priority national mandates for research that are currently grouped into 6 strategic areas:
  - light metals
  - preventive care
  - ocean resources
  - water
  - food products for the future
  - energy
Other public agencies involved in Backing Australia’s Ability

- **Ausindustry – Department of Industry, Tourism and Resources**
  Commercialization of innovations
- **Department of Communications, Information Technology and the Arts – ICT Industry Development Incubators**
- **New Industries Development Programme**
  **Food and Agriculture Business**
  **Department of Agriculture, Fisheries and Forestry**

- **Pharmaceuticals and Biotechnology Branch**
  **Department of Industry, Tourism and Resources**

  - **ICT World Class Centre of Excellence Programme**
  - **National ICT Australia (NICTA)**

- The Australian Nuclear Science and Technology Organisation (ANSTO)