Accessing knowhow for development

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Center for International Development
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Growth has slowed down

Annual Growth Rates and Five-Year Moving Average

Post-war growth acceleration 2010-12
Slowdown 2013-16

Note: GDP per capita as measured in constant 2010 US$. Data sources: World Development Indicators through 2015 & predicted value for 2016 based on CBSL projections.
Export growth has been very slow

Off the charts:
Vietnam: 12,000!
China: 2,700

Exports growth has been very slow
Leading to recurrent balance of payments crises

Year

Trade deficit in goods and services (% of GDP)
Real GDP growth (annual %)

Sources: WDI; IMF Press Releases
Why no export growth? No new exports

New export products, 2000-2015

<table>
<thead>
<tr>
<th>Country</th>
<th>Value of new export products</th>
<th>Number of new export products</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Per capita (USD)</td>
<td>Total value (USD billions)</td>
</tr>
<tr>
<td>Vietnam</td>
<td>545</td>
<td>50.4</td>
</tr>
<tr>
<td>Thailand</td>
<td>326</td>
<td>21.8</td>
</tr>
<tr>
<td>China</td>
<td>245</td>
<td>331.6</td>
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<tr>
<td>Malaysia</td>
<td>149</td>
<td>4.7</td>
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<tr>
<td>Costa Rica</td>
<td>139</td>
<td>0.7</td>
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<tr>
<td>Philippines</td>
<td>12</td>
<td>1.2</td>
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<tr>
<td>Sri Lanka</td>
<td>5</td>
<td>0.1</td>
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<tr>
<td>Indonesia</td>
<td>3</td>
<td>0.8</td>
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</tbody>
</table>

Source: CID calculations, based on COMTRADE data
Countries often first diversify into garments, followed by electronics and then machinery.
Over time, the market share of garments tends to peak as growth in other industries picks up.
...but sometimes countries get stuck in the garments phase
…this is what has happened in Sri Lanka

![Graph showing market share trends in Garments and Textiles, Electronics, and Machinery in Sri Lanka over the years. The graph highlights a significant rise in Garments and Textiles market share from 1960 to 2020.](image-url)
Immigration is very low

Number of nationals per immigrant in selected countries

FDI has been very low

Sri Lanka has seen little FDI over last 20 years.

And no sustained increase in FDI after the conflict.
Are these things related?

• Low GDP growth
• Low export growth
• Balance of payments problems
• Low transformation of the export basket
• Low immigration
• Low FDI
What is the secret of growth?
AN INQUIRY

INTO THE

NATURE AND CAUSES

OF THE

WEALTH OF NATIONS.

By ADAM SMITH, L.L.D. F.R.S.

WITH

A LIFE OF THE AUTHOR.

AND

A VIEW OF THE DOCTRINE OF SMITH, COMPARED WITH THAT OF THE FRENCH ECONOMISTS; WITH A METHOD OF FACILITATING THE STUDY OF HIS WORKS; FROM THE FRENCH OF M. GARNIER.

IN THREE VOLUMES.

VOL. I.

LONDON:

PRINTED FOR J. MAYNARD, PANTON STREET, HAYMARKET; AND F. ZINKE, 448, STRAND.

1811.
According to the latest World Development Indicators

- GDP per capita at purchasing power parity in the world is:
  - Burundi 777
  - Ethiopia 1,734
  - Bangladesh 3,335
  - India 6,571
  - Sri Lanka 12,552
  - Panama 23,009
  - Canada 44,644
  - Singapore 87,832
Lift (force)

From Wikipedia, the free encyclopedia

For other uses, see Lift (disambiguation).

A fluid flowing past the surface of a body exerts a force on it. Lift is the component of this force that is perpendicular to the oncoming flow direction. It contrasts with the drag force, which is the component of the surface force parallel to the flow direction. If the fluid is air, the force is called an aerodynamic force. In water, it is called a hydrodynamic force.

Contents

1 Overview
2 Simplified physical explanations of lift on an airfoil
   2.1 Flow deflection and Newton's laws
      2.1.1 Limitations of deflection/turning
   2.2 Increased flow speed and Bernoulli's principle
      2.2.1 Conservation of mass
      2.2.2 Limitations of explanations based on Bernoulli's principle
3 Basic attributes of lift
   3.1 Pressure differences
   3.2 Angle of attack
   3.3 Airfoil shape
   3.4 Air speed and density
   3.5 Lift coefficient
   3.6 Pressure integration
4 A more comprehensive physical explanation
   4.1 Lift involves action and reaction at the airfoil surface and is felt as a pressure difference
   4.2 The airfoil affects the flow over a wide area around it
   4.3 The pressure differences and the changes in flow speed and direction support each other in a mutual interaction
5 The understanding of lift as a physical phenomenon
6 Mathematical theories of lift
   6.1 Navier-Stokes (NS) equations
   6.2 Reynolds-Averaged Navier-Stokes (RANS) equations
   6.3 Inviscid-flow equations (Euler or potential)
   6.4 Linearized potential flow
   6.5 Circulation and the Kutta-Joukowski theorem
   6.6 Momentum balance in lifting flows
7 Lift of three-dimensional wings
8 Viscous effects: Profile drag and stalling
What do you do when your tooth hurts?
What do you do when your tooth hurts?

Search the web and fix it yourself?
What do you do when your tooth hurts?

Search the web and fix it yourself? ...or look for a dentist
Division of knowledge now
Who has more knowhow?
The Theory of Economic Development...
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Diversification and ubiquity - 2009

The graph illustrates the relationship between diversification (Number of products exported) and how common the products exported are (Number of countries exporting similar product-mix). The x-axis represents diversification, while the y-axis shows the number of countries exporting similar products. The graph is divided into categories of non-diversified and diversified countries, further categorized by whether they produce common or uncommon products. The mean values for diversified countries producing common products and diversified countries producing uncommon products are indicated, with a lower mean for the latter. The country codes (e.g., TUV, MNP) correspond to specific countries.
It also works within countries: Chile
...Turkey

Diversity and average ubiquity of Turkey's cities

k0 (diversification)
Mexican states

Average ubiqity of industrial composition ($k_{c,1}$)

Diversity of industrial composition ($k_{c,0}$)

[Graph showing the relationship between average ubiquity and diversity of industrial composition across Mexican states]
Colombian departments

Average Ubiquity vs. Diversity
2012 - Total Wages

Country Diversity

av_ubq  Fitted values
And Districts in Sri Lanka

Diversification vs. Ubiquity
Complements, not substitutes

• Like tea and sugar or like tea and coffee
• Anesthesiologists working alone
How does knowhow move?
Diffusion of industries

Moving knowledge into brains is hard work...
It is much easier to move brains: 
Diffusion through mobility
Different mechanisms of diffusion

- Labor mobility between firms
- Immigration
- Diaspora networks
- Foreign Direct Investment
- All of these have one thing in common: human mobility
Example 1: DETROIT

All successful car firms in Detroit came out of Olds Motor Works
Example 2: SILICON VALLEY

Silicon Valley consists almost exclusively of Fairchild Semiconductor renegades.
Structural Change

Photo Credit: Lear 21 at English Wikipedia
Collapse of East German manufacturing

-60%

Re-industrialization

Source: Statistisches Bundesamt: 20 Jahre Deutsche Einheit
Reindustrialization of East Germany
The workforce of manufacturing pioneers in the East

Share of workers hired from West Germany

15%
Reindustrialization of East Germany

The workforce of manufacturing pioneers in the East

Share of workers hired from West Germany

- Inexperienced: 15%
- Experienced: 78%
II. Diffusion of knowhow between firms across countries

Example 3: The garment exports of Bangladesh (Klepper and Mostafa, 2011)
Bangladesh

What did Bangladesh export between 1962 and 2010?

http://www.atlas.cid.harvard.edu/
1979: Desh sends 126 Bangladeshi workers for a 6 month intensive training in Korea
1988: 56 spin-off companies by Desh workers
Bangladesh

What did Bangladesh export between 1962 and 2010?

http://www.atlas.cid.harvard.edu/
Bangladesh

What did Bangladesh export between 1962 and 2010?

http://www.atlas.cid.harvard.edu/
Migration and return-migration
The tricks that other countries use to attract knowhow

- The Silicon Valley does not pretend to build excellence with domestic talent only.
Foreign expertise through immigration

• Singapore: 46% of population is foreign born;
• Hong Kong: 40% of population is foreign born.
Many companies in SL were started by immigrants, or with connections made while living abroad.
Accessing the expertise of your diaspora

- **Bangalore and Hyderabad**: Indian diaspora networks help spur strong home tech base.
Knowhow inflow through FDI

- **Vietnam**: 25 years of +6% FDI inflows as a share of GDP.
5% of Albanian labor force

Ljubica Nedelkoska & Ricardo Hausmann: Albanian return migration in the Greek crisis
So Albanian unemployment is up and wages are down?

Panama: One of the top ten fastest growing economies between 2005-2015

Gross domestic product per capita (constant US$ 2005)

*2010-2014 growth rate
Source: World Development Indicators, own calculations
Panama: Growth has been driven by a modern exportable service sector.
Panama:
The modern service sector is skill-intensive

![Panama: The modern service sector is skill-intensive](image)

**Workers with college diploma**

<table>
<thead>
<tr>
<th>Industry</th>
<th>% of workers with college diploma</th>
</tr>
</thead>
<tbody>
<tr>
<td>Professional, scientific act.</td>
<td>61.0</td>
</tr>
<tr>
<td>Education</td>
<td>57.8</td>
</tr>
<tr>
<td>Finance and insurance</td>
<td>57.5</td>
</tr>
<tr>
<td>Info and Communications</td>
<td>52.8</td>
</tr>
<tr>
<td>Real estate</td>
<td>44.9</td>
</tr>
<tr>
<td>Health Services</td>
<td>44.3</td>
</tr>
<tr>
<td>Electricity, gas</td>
<td>37.5</td>
</tr>
<tr>
<td>Public administration</td>
<td>36.6</td>
</tr>
<tr>
<td>Artistic activities</td>
<td>31.1</td>
</tr>
<tr>
<td>Logistics</td>
<td>23.0</td>
</tr>
<tr>
<td>Trade</td>
<td>22.0</td>
</tr>
<tr>
<td>Other services</td>
<td>22.0</td>
</tr>
<tr>
<td>Administrative services</td>
<td>18.8</td>
</tr>
<tr>
<td>Mining</td>
<td>18.6</td>
</tr>
<tr>
<td>Water supply</td>
<td>17.5</td>
</tr>
<tr>
<td>Hotels and restaurants</td>
<td>16.2</td>
</tr>
<tr>
<td>Manufacturing</td>
<td>16.2</td>
</tr>
<tr>
<td>Construction</td>
<td>13.1</td>
</tr>
<tr>
<td>Households as employers</td>
<td>11.8</td>
</tr>
<tr>
<td>Agriculture</td>
<td>5.8</td>
</tr>
<tr>
<td>Extraterritorial organizations</td>
<td>2.8</td>
</tr>
<tr>
<td><strong>Total</strong></td>
<td><strong>60.0</strong></td>
</tr>
</tbody>
</table>

Ley de Sede de Empresas Multinacionales (Law 44) attracted more than 120 regional headquarters.

Special Economic Zones

Panamá-Pacífico Industrial Park (2007)

Ciudad del Saber Technology Park (2000)
Immigration regulations keep know-how locked into MNC and SEZ and prevent the diffusion of know-how and technology spillovers

### Restrictions to potential Immigrants

- 27 occupations legally restricted to immigrants
- List of 50 countries considered national security concerns subject to ("Authorized visa")
- 10% cap of foreigners in the payroll (out of the SEZ and MNC)

### Restrictions to Knowledge diffusion

- Years spent on MNCs under Law 44 and SEZ do not count for residence purposes
- Visas revoked the moment the expat ceases to work in the MNC
- Expats dependents do not have work permit
- Firms moving on from innovation to commercialization risk being expelled from City of Knowledge
Panama wants to be like Hong-Kong and Singapore, but seems unwilling to support the levels of immigration of these countries.
High wage-premiums to foreigners across all industries/professions indicate that talent is one of the most binding constraints to growth.

Wage-premium to foreign workers

Source: Own calculations based on Population Census 2010 (INEC)
Restrictions to high-skilled immigrants and knowledge diffusion are not helping the Panamanian workers

Immigrants flows and Panamanian wages

Change in wages of Panamanian workers associated to an increase of 10 pp in the stock of immigrants

- Total Panamanian labor force
- Low-skilled Panamanian workers
- High-skilled Panamanian workers
Example: Can Sri Lanka grow its ICT sector by itself?
Sri Lanka’s ICT sector is not large

- Sri Lanka’s share of ICT services exports in GDP is only about 1%;
- Singapore, Hong Kong and India, all managed to grow their ICT exports by accessing knowhow from abroad.

Sri Lanka pays low wages in the sector

- Wages in the sector are low because the sector is kept small and uncompetitive.


Note: Compensation includes base salary plus benefits, tax, and bonuses; estimates are used when data is not available.
Although IT professionals earn high wage premiums in Sri Lanka ...

- Despite wages of IT professionals being low in international comparison, they are high compared to other professionals in Sri Lanka;

- This, together with high employment rates of students from IT majors in Sri Lanka suggests that IT professionals are in short supply.

Wage premiums by occupation in Sri Lanka

https://srilanka.growthlab.cid.harvard.edu/blog/does-sri-lankan-economy-need-more-university-graduates
The University System produces few STEM graduates

- We estimate that it would take another decade for the university system to significantly expand the offer for STEM students.

**Numbers of STEM Bachelor's degree graduates in 2015**

<table>
<thead>
<tr>
<th>Field</th>
<th>Graduates</th>
</tr>
</thead>
<tbody>
<tr>
<td>Engineering</td>
<td>1,340</td>
</tr>
<tr>
<td>Computer Sc.</td>
<td>1,040</td>
</tr>
<tr>
<td>Science</td>
<td>2,710</td>
</tr>
</tbody>
</table>

Source: University Grants Commission Sri Lanka  
Note: Includes Universities and HEIs established under the Universities Act

Recent STEM Graduates (2016) in other countries:

- China: 4.7m
- India: 2.6m
- Indonesia: 206,000

Sri Lanka is a net exporter of STEM workers

- In spite of low numbers of STEM graduates ...
- On average, 23% of the Engineering and Science graduates and 20% of the Computer Science graduates leave Sri Lanka each year to work aboard;
- The low inflow of foreign STEM workers to Sri Lanka does not compensate for the outflow.

Inflows and outflows of Sri Lankan STEM workers

How attracting foreign workers can help grow the sector, grow wages, and discourage outflows
Employment multipliers play important role

• For each new job created in the IT sector, 4 other local jobs are created outside the sector
  – through supplier (input-output) linkages;
  – through spending on local services.

• Every foreign-born worker in the United States with a U.S. STEM degree creates 2.62 jobs for U.S.-born workers
High tech jobs breed more high tech jobs

- High-tech companies prefer to cluster near other high-tech companies.
Still, hiring foreign professionals in Sri Lanka is difficult

• As foreign (BOI) investor you can hire foreign professionals, but:
  • Spouses are not allowed to work (at least not without ministerial permission);
  • Cannot choose a different company in Sri Lanka;
  • Cannot aspire permanent residence, let alone citizenship.

• As non-BOI company, it is much harder
Comparative study findings
What can Sri Lanka learn from the immigration systems of other countries in the region?

- CID Harvard conducted a comparative study, reviewing the immigration regimes of six countries in Southeast Asia and the Pacific: Malaysia, Hong Kong, Singapore, Indonesia, Thailand, and Vietnam.
- Main findings:
  - Immigration reform should be a part of an overall effort to attract knowhow, talent, skills, and diversified FDI.
  - Countries can and do use immigration policies as an active tool to attract the workers, investors and entrepreneurs that the economy needs to grow and thrive.
  - More economically advanced countries have more sophisticated immigration systems: they allow for more nuanced distinctions of visa categories, and have transitioned from systems that strictly authorize the entry of foreign workers, talent, and capital, to systems that promote their entry.
Singapore: A role model for Sri Lanka?

• Singapore’s immigration system embraces a number of organizing principles that Sri Lanka could “borrow” for its own system.

• For workers:
  – Variety of employment visa categories (from unskilled and semi-skilled foreign workers to visas for trainees, managers and professionals);
  – Dependents’ permits allowing dependents to seek employment;
  – Path to permanent residency and citizenship;

• For investors/employers:
  – Investor visas
  – Entrepreneur visa

• For talent:
  – Start-up talent work permit (enhanced EntrePass scheme)*
Some recommendations resulting from the comparative study

• **Streamlining and simplifying procedures.**

• **More visa categories.** Visas for investor, entrepreneur, talent, innovators, professionals, artists/performers, training

• **Path to Permanent residence.** Not only for former Sri Lankans

• **Dependents’ rights.** Allow dependents to live freely, enroll in educational institutions, and work
How to move forward?

• Sri Lanka may have the talent and the people for the current economy, but does it have the talent and the people for the economy it wants to have?

• To get there, Sri Lanka will need to open up for more inflow of foreign know-how the way all prosperous countries have done already. This means more FDI, more return diaspora and higher inflow of foreign workers.

• Sri Lanka can use the current reform: Immigration Reform, BOI’s Investment Promotion Strategy to expand its access to foreign knowhow.
Thank you!!