Symposium on Technology, Innovation and Inclusive Growth

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former Head of the Israeli High Education System
former Chair of the National Economic Council

OECD
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Science, Technology and Innovation (STI) for inclusive growth

- **Recent growth record**: not much “trickle down” nor effective redistribution => high inequality.

  *hence aim at,*

- **Inclusive growth**: increase pie while **reducing inequality**

- Harness **STI** for **inclusive growth**: want innovation and its benefits **widely distributed** across sectors and occupations,

  *but instead,*

- **STI concentrated** in few sectors and regions, **and**

- **Educational gaps** interact with STI to increase inequality

*Can policy make a difference?!!*
Policies for inclusive growth

Take unconventional approach (not the “Arrow-Solow...”) – focus on people rather than on techs:

1. **Upgrade** large, growing occupations

2. Promote **human-enhancing** innovations

3. Improve **access** to digitized quasi-public goods

*Have far reaching implications!*
US civilian labor force 2014-24  
source: BLS – projections for 2024

<table>
<thead>
<tr>
<th>Age</th>
<th>2014</th>
<th>2024</th>
<th>change</th>
<th>% change</th>
</tr>
</thead>
<tbody>
<tr>
<td>Total</td>
<td>156</td>
<td>164</td>
<td>+8</td>
<td>+5%</td>
</tr>
<tr>
<td>16 - 24</td>
<td>21</td>
<td>18</td>
<td>-3</td>
<td>-13%</td>
</tr>
<tr>
<td>25 - 54</td>
<td>101</td>
<td>105</td>
<td>+4</td>
<td>+4%</td>
</tr>
<tr>
<td>55 +</td>
<td>34</td>
<td>41</td>
<td>+7</td>
<td>+20%</td>
</tr>
</tbody>
</table>

Slow growth of labor force in coming decade, dramatic change in age composition!
<table>
<thead>
<tr>
<th>Sector</th>
<th>2014</th>
<th>2024</th>
<th>change</th>
<th>Percentage growth</th>
</tr>
</thead>
<tbody>
<tr>
<td>Goods producing</td>
<td>19</td>
<td>19</td>
<td>~</td>
<td>~0%</td>
</tr>
<tr>
<td>Services</td>
<td>121</td>
<td>130</td>
<td>+ 9.3</td>
<td>+7%</td>
</tr>
<tr>
<td>of which Health care &amp; social assistance</td>
<td>18 (14%)</td>
<td>22 (14%)</td>
<td>+ 3.8</td>
<td>+20%</td>
</tr>
<tr>
<td>Other</td>
<td>10</td>
<td>11</td>
<td>+ 0.5</td>
<td>+1</td>
</tr>
<tr>
<td>Total</td>
<td>151</td>
<td>160</td>
<td>+ 9.8</td>
<td>+6%</td>
</tr>
</tbody>
</table>
Educational requirements and wages of growing occupations

- Of 15 occupations with largest *absolute* growth 2014-24:
  - 5 in **health and personal care** (personal care aides, home health aides, home health nurses, etc.) 1.6 million new jobs!
  - 11 **no formal educational** credential or **high school** diploma
  - 11 with wages *lower* than median ($35,540)

  - Home health aides: **350,000** new jobs, **no educational** credential, wage **$21K**

- Of 15 occupations with largest *percentage* growth 2014-24:
  - 9 in health and personal care, just **220K new jobs**, plus
  - 10 **Bachelor’s degree** or higher, or some college
  - 11 with wages **higher** than median ($35,540)

- Of 10 highest paying occupations, **9 in medicine** (the 10th: CEOs)
Inclusive growth – how to go about it?

- For **inclusive growth**: upgrade large, growing **occupations**

- All in services, most in **health and personal care** (HPC)

- Growth in **HPC** mostly driven by demand:
  - increased **longevity** & population **aging**
  - high **demand elasticity** for health care and “quality of life”
  - **health insurance reform** increases access

- At present most occupations in HPC: require **little training** and educational requirements, very **low wages**

**focus on workers & occupations, rather than on technologies or sectors**
Upgrading occupations for inclusive growth: 
Policy steps

Not the classic “do more” - more R&D, more “hot fields”, more college degrees,

but instead,

- **Professionalization** of large, growing occupations, particularly in **health and education** (quasi public goods)

- Design **comprehensive policies** for them, derive job and training requirements

- Provide for **tertiary education** and **academic** infrastructure

- **Expose** newly empowered & trained workers to **STI** – they (and others) will seek there opportunities to **innovate**!
Upgrading occupations for inclusive growth: history-dependent

Pay, content of occupations depend upon history, state of the art, policy:

- **Physicians**, surgeons and apothecaries:
  - until early 19th century: low pay and status among “trades”
  - gradual improvement as discipline *more scientific*
  - huge jump up since 2nd WW

- **Nurses**:
  - by 1946 wages just 1/3 of female workers in garment industry!
  - The *Nurse Training Act of 1964* upgraded curriculum, required academic degrees. *Salaries went up*, more *specialization* and administrative roles for nurses.
  - Since then: medical *innovation* further improved status and pay
Upgrading occupations for inclusive growth: example: early childhood education (ECE)

- **ECE** – birth to age 6, most important birth to age 3:
  - Still family homecare (unpriced), nannies, private child care
  - Very low pay, little EDU required – call it the “diaper care”

- Large volume of research: most important development stage, determines future of individual, “equality of opportunity”

- Key for early detection & effective treatment of conditions - learning disabilities, “spectrum”, ADD/ADHD; expensive in short run, big benefits later

- Need professionalization of ECE – training, certification etc. Then deploy STI (e.g. cloud applications to detect conditions) - need policy!!!

- Very similar for elderly care
Upgrading occupations for inclusive growth: 
Policy sum-up

Inclusive growth requires,

- Upgrade people and occupations, what they do and need to know

- Focus on quality of services provided, not on quantity – but hard to measure, not necessarily shows up as growth!

- Harness STI to serve those purposes
Policies for inclusive growth II: promote human enhancing innovations - HEI

- HEI: innovations that **magnify, enhance and extend** sensory, analytical and problem solving capabilities (not “input saving”)

  **Examples of HEI’s:**

- **In medicine:** AI applications for diagnostics; new imaging devices for minimally invasive surgery – **better doctors!**
- **In education:** AI to track individual progress of pupils, tailor tasks to foster their development – **better teachers!**
- HEI’s can unleash newly found **human creativity**

- Many innovations do the opposite – see Walmart: turn workers into **unthinking automatons**, TFP up but more inequality, "exclusive” growth!

**HEI’s can be great equalizers, within and between occupations!**
Lots of **benefits from innovation & digitization** from access to unpriced “quasi public goods” privately provided – search, networks such as Google, Facebook, WhatsApp, etc.

**Access is great equalizer** => make them **universally available** (more equality with same income distribution, like public parks...),

**Access key for widely distributed innovation opportunities**

**Access** services using digital platforms e.g. telemedicine, **MOOCs**

Render geographic and socio-economic **location less important** to access benefits
Policy for inclusive growth: yes, but what kind of “growth”?

- de-emphasize GDP growth as measured, turning irrelevant!
- same with inequality just of income: issue not just how to distribute more equally given goods and services, but equity in participation!
- Focus instead on wellbeing, happiness, satisfaction human development, sense of purpose, fulfillment, quality of life.
- Equity in access to the possibility of enjoying human enhancement innovations.
Thanks!

We live in a rapidly changing world, hence to innovate is to survive...
Employment in services 2014-24
source: BLS – projections for 2024

<table>
<thead>
<tr>
<th>Sector</th>
<th>2014</th>
<th>2024</th>
<th>change</th>
<th>% change</th>
</tr>
</thead>
<tbody>
<tr>
<td>Health care &amp; social assistance</td>
<td>18</td>
<td>22</td>
<td>3.8</td>
<td>20%</td>
</tr>
<tr>
<td>Professional and business</td>
<td>19</td>
<td>21</td>
<td>1.9</td>
<td>10%</td>
</tr>
<tr>
<td>State and local government</td>
<td>19</td>
<td>20</td>
<td>0.8</td>
<td>4%</td>
</tr>
<tr>
<td>Retail trade</td>
<td>15</td>
<td>16</td>
<td>0.7</td>
<td>5%</td>
</tr>
<tr>
<td>Leisure &amp; hospitality</td>
<td>15</td>
<td>16</td>
<td>1.0</td>
<td>6%</td>
</tr>
<tr>
<td><strong>Total top 5</strong></td>
<td><strong>86</strong></td>
<td><strong>95</strong></td>
<td><strong>+9.0</strong></td>
<td><strong>10%</strong></td>
</tr>
<tr>
<td></td>
<td>(71%)</td>
<td>(73%)</td>
<td>(97%)</td>
<td></td>
</tr>
<tr>
<td>All services</td>
<td>121</td>
<td>130</td>
<td>+9.3</td>
<td>+7%</td>
</tr>
</tbody>
</table>

Health care & social assistance: largest and fastest growing sector - 14% of total!
### Occupations with largest absolute growth 2014-2024 (thousands)

<table>
<thead>
<tr>
<th>Occupation</th>
<th>2014</th>
<th>2024</th>
<th>change</th>
<th>% change</th>
</tr>
</thead>
<tbody>
<tr>
<td>Personal care aides</td>
<td>1,770</td>
<td>2,230</td>
<td>460</td>
<td>+26%</td>
</tr>
<tr>
<td>Registered nurses</td>
<td>2,750</td>
<td>3,190</td>
<td>440</td>
<td>+16%</td>
</tr>
<tr>
<td>Home health aides</td>
<td>910</td>
<td>105</td>
<td>348</td>
<td>+38%</td>
</tr>
<tr>
<td>Food preparation &amp; serving</td>
<td>3,160</td>
<td>3,500</td>
<td>344</td>
<td>+11%</td>
</tr>
<tr>
<td>Retail salespersons</td>
<td>4,630</td>
<td>4,940</td>
<td>314</td>
<td>+7%</td>
</tr>
</tbody>
</table>

### Occupations with largest percentage growth 2014-2024

<table>
<thead>
<tr>
<th>Occupation</th>
<th>2014</th>
<th>2024</th>
<th>change</th>
<th>% change</th>
</tr>
</thead>
<tbody>
<tr>
<td>Occupational therapy assistants</td>
<td>33</td>
<td>47</td>
<td>14</td>
<td>43%</td>
</tr>
<tr>
<td>Physical therapy assistants</td>
<td>79</td>
<td>111</td>
<td>32</td>
<td>41%</td>
</tr>
<tr>
<td>Physical therapists aides</td>
<td>50</td>
<td>70</td>
<td>20</td>
<td>39%</td>
</tr>
<tr>
<td>Home health aides</td>
<td>910</td>
<td>105</td>
<td>348</td>
<td>38%</td>
</tr>
<tr>
<td>Nurse practitioners</td>
<td>127</td>
<td>172</td>
<td>45</td>
<td>35%</td>
</tr>
</tbody>
</table>

*With more than 1/10000 of labor workforce in services*