Gender Inequality, Economic Development and the Knowledge Economy
This presentation was prepared by
Derek H. C. Chen and Aimilios Chatzinikolaou
The Knowledge for Development (K4D) Program
The World Bank Institute
The World Bank

The views, interpretations, findings and conclusions contained in this presentation do not necessarily represent the views of the World Bank, its Executive Directors or the countries they represent.
Acknowledgements

This presentation draws upon material from various key references that include


Overview

• Gender Inequality and Economic Development

• Gender Inequality and Human Development

• Gender Inequality around the World

• Gender Inequality and the Knowledge Economy

• ICTs and Gender Inequality
Gender Inequality and Economic Development
Gender Inequality and Economic Development

Positive Correlation between Literacy Ratio and GDP per capita

\[
\text{GDP per capita} = -7335.84 + 159.10 \times \text{Literacy Ratio}
\]

\[\text{(coefficients: } -3.03 \text{ (3.03)} \text{ (5.72)}\text{)}\]

GDP per capita in year 2000

Ratio of Female to Male Literacy Rates in year 2000 (%)
Gender Inequality and Economic Development

Positive Correlation between Student Ratio and GDP per capita

GDP per capita = -30744.4 + 419.73 Student Ratio

(-3.46) (4.59)
Gender Inequality and Economic Development

• Main channels through which gender inequality affects economic development
  ▪ Selection-Distortion Effect
  ▪ Environment Effects
  ▪ Demographic Transition Effects
  ▪ Better Governance and Institutions
Selection-Distortion and Environment Effects

Gender Inequality in Education

- Boys with lower innate abilities get educated
- Less Educated Mothers - Less intellectually stimulating environment
- Less life-long learning at the household level

Lower quality of students
Lower Quality Labor Force

Gender Inequality in Employment

- Lower TFP Growth
- Marginal Product of Capital Decreases
- Less Investment

Lower Economic Growth

Knowledge for Development Program 2004
Selection-Distortion Effects

• Assume similar distribution of innate abilities for male and females
• Gender inequality in education leads to less able boys getting educated
• Average quality of students is lower
• Together with gender inequality in employment, lower quality of labor force results
• Labor force is less productive and innovative, which results in lower total factor productivity
• At the same time, the marginal product of capital falls, which results in a decline in the investment rate.
• Lower rate of economic growth results
Environment Effects

• Gender inequality in education – less female education at each level of male education
  – Less-educated mothers provide environments that are less intellectually stimulating
  – Resulting in a lower quality of students

• Equally educated siblings and couples tend to strengthen each other’s educational success and life-long learning
  – Gender inequality in education tends to result in less life-long learning
Demographic Transition Effects

Gender Equality in Education

Education attainment of women increases

Lower fertility – less children

Aggregate Savings Increases

Relative size of the working-age population increases

Marginal Product of Capital Increases

More Investment

Higher per-capita Income

Knowledge for Development Program 2004
Demographic Transition Effects

- Fertility tends to decline with female education
- With gender equality, fertility tends to decline
- With less children and a smaller youth and total dependency burden, aggregate savings.
- Slowdown in fertility will eventually result in a relatively large working-age population
- Marginal product of capital increases
- Investment rate increases
- More labor and capital results in a higher level of income per capita.
Better Governance and Institutions

• Women’s participation in public office tend to be associated with
  – Cleaner businesses and government
  – Less corruption

• Better governance and institutions tend to be associated with higher rates of economic growth
Governance and Institutions

Corruption Index vs. Index of women’s economic and social rights

Source: World Bank, 2001

Knowledge for Development Program 2004
Gender Inequality and Human Development
Gender Inequality and Human Development

Higher Maternal Education

Greater Control over Financial Resources by Women

Lower Infant Malnutrition and Mortality
Lower Child Malnutrition and Mortality
Gender Inequality and Human Development

Evidence

• Thomas (1990)
  – Impact of unearned income on child survival was 20 times greater if the income was brought in by the mother than if it was brought in by the father.

• Demographic and Health Surveys
  – Data from than 40 developing countries
  – Mortality rate of children under 5 is lower in households where mothers have some primary schooling than in households where they have no schooling
Gender Inequality and Human Development

• Kirk and Pillet (1998)
  – Study over 25 developing countries
  – One to three years of maternal schooling would reduce child mortality by about 15 percent, whereas similar increases in paternal schooling would only achieve only a 6 percent reduction

• Smith and Haddad (2000)
  – Data from 63 countries
  – Gains in women’s education made the single largest contribution to declines in malnutrition in 1970-1995, accounting for 43 percent of the total decline
Gender Inequality and Human Development

Women’s Education Significantly Reduces Malnutrition

Estimated percentage contribution to malnutrition, 1970-95


Knowledge for Development Program 2004
Gender Inequality and Human Development

Child Immunization Rates Rise with Mother’s Education

Share of children 12-23 months who have been immunized, by mother's educational level

- **East Asia and Pacific**
  - No education
  - Primary education
  - Secondary education or higher

- **Latin America and Caribbean**
  - No education
  - Primary education
  - Secondary education or higher

- **Middle East and North Africa**
  - No education
  - Primary education
  - Secondary education or higher

- **South Asia**
  - No education
  - Primary education
  - Secondary education or higher

- **Sub-Saharan Africa**
  - No education
  - Primary education
  - Secondary education or higher

Note: All regional values are population-weighted averages. Source: World Bank, 2001
Gender Inequality and Human Development

Urban Adult HIV Prevalence Rate

Gap between male and female literacy rates (% points)

Source: World Bank, 2001

Knowledge for Development Program 2004
Gender Inequality and Human Development

• Greater control of income by women also tends to lower child mortality

• Increases in household income tends to reduce child mortality risks, but the marginal impact is greater if the income is allocated by the mother

• The marginal effect of female income
  – 20 times larger for child survival
  – 8 times as large for weight-for-height measures
  – 4 times as large for height-for-age measures
Gender Inequality in the World
Gender Inequality in the World

In No Region of the World are Women and Men Equal in Legal, Social or Economic Rights

- OECD
- Sub-Saharan Africa
- South Asia
- Middle East and North Africa
- Latin America and Caribbean
- Eastern Europe and Central Asia
- East Asia and Pacific

Index of gender equality


Knowledge for Development Program 2004
Gender Inequality in the World

Ratio of Female to Male Literacy Rates

Knowledge for Development Program 2004
Gender Inequality in the World

Ratio of Female to Male Youth Literacy Rates

Knowledge for Development Program 2004
## Gender Inequality in the World

### Ratio of Girls to Boys in Primary and Secondary Education (%)

<table>
<thead>
<tr>
<th></th>
<th></th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td>World</td>
<td>84</td>
<td>92</td>
</tr>
<tr>
<td>High income</td>
<td>96</td>
<td>101</td>
</tr>
<tr>
<td>High income: OECD</td>
<td>96</td>
<td>101</td>
</tr>
<tr>
<td>East Asia &amp; Pacific</td>
<td>85</td>
<td>97</td>
</tr>
<tr>
<td>Latin America &amp; Caribbean</td>
<td>102</td>
<td></td>
</tr>
<tr>
<td>South Asia</td>
<td>68</td>
<td>79</td>
</tr>
<tr>
<td>Sub-Saharan Africa</td>
<td>79</td>
<td>82</td>
</tr>
<tr>
<td>Middle East &amp; North Africa</td>
<td>81</td>
<td>92</td>
</tr>
</tbody>
</table>

Knowledge for Development Program 2004
Gender Inequality in the World

Ratio of Female to Male Gross Primary Enrollment Rates

Knowledge for Development Program 2004
Gender Inequality in the World

Ratio of Female to Male Gross Secondary Enrollment Rates

Knowledge for Development Program 2004
Gender Inequality in the World

Ratio of Female to Male Gross Tertiary Enrollment Rates

Knowledge for Development Program 2004
Gender Inequality in the World

Female Labor Force

(% of total labor force)

World	High income	East Asia & Pacific	Europe & Central Asia	Latin America & Caribbean	South Asia	Sub-Saharan Africa	Middle East & North Africa

1990	1996	2002

Knowledge for Development Program 2004
Gender Inequality in the World

Female Representation in Parliament Continues to be Low

- OECD
- Sub-Saharan Africa
- South East Asia
- Middle East and North Africa
- Latin America and Caribbean
- Eastern Europe and Central Asia
- East Asia and Pacific


Knowledge for Development Program 2004
Gender Inequality in MENA

Middle East and North Africa (most recent)

Gender Development Index

School enrollment, tertiary, female (% gross)
Females in Labor force (% of total labor force)

School enrollment, secondary, female (% gross)
Seats in Parliament held by women (as % of total)

Females Literacy Rate (% of females ages 15 and above)
Gender Inequality in G7 & Western Europe

Knowledge for Development Program 2004
Gender Inequality in EA and ECA

Knowledge for Development Program 2004
Gender Inequality in LAC & South Asia

Knowledge for Development Program 2004
Gender Inequality and the Knowledge Economy
Knowledge Economy Framework

Knowledge Economy

Economy in which knowledge is the engine of growth

Four Pillars of the Knowledge Economy

- Economic incentive and institutional regime that provides incentives for the efficient use of existing and new knowledge and the flourishing of entrepreneurship
- Educated, creative and skilled people
- Dynamic information infrastructure
- Effective national innovation system
K4D Program’s KAM Methodology 2004

• Knowledge Assessment Methodology (KAM): 76 structural/qualitative variables to benchmark performance on 4 pillars

• Variables normalized from 0 (worst) to 10 (best) for 121 countries


• Multiple modes offering wide range of graphic representations and functionalities (1995 - Most Recent, comparison options)

• Aggregate Knowledge Economy Index (KEI) – average of performance in 4 pillars – KI

• Weighted and unweighted version – Innovation Variables
Knowledge Economy Index

Knowledge for Development Program 2004
KE Index with Gender Variables

Knowledge Economy Index (using Gender variables)

Knowledge for Development Program 2004
ICT and Gender Inequality
ICT

World Bank Group defines ICT as consisting of hardware, software, networks, media for collection, storage, processing transmission, presentation of information (voice, data, text, images)

OECD defines ICT sectors as a combination of manufacturing and service industries that capture, transmit and display data and information electronically.

ICT can play an important role in economic development
  By providing new and more efficient methods of production
  By improving the delivery of government services
  By facilitating management and transfer of knowledge
# ICT

## OECD Definition of ICT-producing Industries

The ICT-producing sector includes the following industries according to the International Standard Industry Classification (ISIC) Revision 3:

### Manufacturing

<table>
<thead>
<tr>
<th>Code</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>3000</td>
<td>Manufacture of office, accounting and computing machinery</td>
</tr>
<tr>
<td>3130</td>
<td>Manufacture of insulated wire and cable</td>
</tr>
<tr>
<td>3210</td>
<td>Manufacture of electronic valves and tubes and other electronic components</td>
</tr>
<tr>
<td>3220</td>
<td>Manufacture of television and radio transmitters and apparatus for line telephony and line telegraphy</td>
</tr>
<tr>
<td>3230</td>
<td>Manufacture of television and radio receivers, sound or video recording or reproducing apparatus, and associated goods</td>
</tr>
<tr>
<td>3312</td>
<td>Manufacture of instruments and appliances for measuring, checking, testing, navigating and other purposes, except industrial process control equipment</td>
</tr>
<tr>
<td>3313</td>
<td>Manufacture of industrial process control equipment</td>
</tr>
</tbody>
</table>

### Services - goods related

<table>
<thead>
<tr>
<th>Code</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>5150</td>
<td>Wholesale of machinery, equipment and supplies</td>
</tr>
<tr>
<td>7123</td>
<td>Renting of office machinery and equipment (including computers)</td>
</tr>
</tbody>
</table>

### Services - intangible

<table>
<thead>
<tr>
<th>Code</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>6420</td>
<td>Telecommunications</td>
</tr>
<tr>
<td>7200</td>
<td>Computer and related activities</td>
</tr>
</tbody>
</table>

"Knowledge for Development Program 2004"
ICT and Gender Inequality

Channels via which ICT can improve gender in equality

– Influencing public opinion on gender equality
– Increasing women’s education
– Allowing more economic opportunities for women
ICT and Gender Inequality

Influencing Public Opinion on Gender Equality

– ICT increases flow of knowledge and information
– Increases exposures of customs, norms and practices from other cultures and societies
– Raises the awareness and informs the constituency of gender inequality issues
– Increases pressure on policymakers to include gender as an important component of their social and economic policies
ICT and Gender Inequality

Increasing Women’s Education

– Lack of schooling coupled with gender biases that dictate domestic roles for women tend to perpetuate gender disparities

– ICT allow women to obtain and update their skills for equal participation in the knowledge economy
  
  • Increasing access through distance learning
  • Broadening the availability of quality educational materials
  • Efficiency and Effectiveness of Educational Administration
Increasing Economic Opportunities for Women

– ICTs allow women to telecommute and hence they are able to work and interact with men without face-to-face contact and even without being in the same place

– ICTs allow micro and small enterprises (MSE), which are dominated by women to compete in the marketplace
ICT and Gender Inequality

Econometric Estimation

– empirically determine the effects of ICTs on gender inequality in education and employment

– estimated panel regressions with country fixed-effects

– dependent variables: measures of gender inequality

– independent variables: measures of ICT and control variables

– broadest coverage include 94 countries for the years 1985 to 2000
### ICT and Gender Inequality in Education

**Dependent Variable: Ratio of Female to Male Students**

<table>
<thead>
<tr>
<th>Independent Variables</th>
<th>Reg 1.1</th>
<th>Reg 1.2</th>
<th>Reg 1.3</th>
<th>Reg 1.4</th>
<th>Reg 1.5</th>
</tr>
</thead>
<tbody>
<tr>
<td>Lagged Log (Trend RGDP per capita)</td>
<td>4.9185</td>
<td>10.5198</td>
<td>3.6664</td>
<td>7.0667</td>
<td>7.3444</td>
</tr>
<tr>
<td>Youth Sex Ratio</td>
<td>1.9005***</td>
<td>1.7384***</td>
<td>1.3304***</td>
<td>1.7965***</td>
<td>1.7976**</td>
</tr>
<tr>
<td>Education Variables</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Lagged Average Years of School</td>
<td>6.6108***</td>
<td>4.5668*</td>
<td>1.7151</td>
<td>6.4211***</td>
<td>7.0171***</td>
</tr>
<tr>
<td>Lag Public Education Expenditure per capita</td>
<td>-0.0010</td>
<td>0.0011</td>
<td>0.0002</td>
<td>0.0032***</td>
<td>0.0032***</td>
</tr>
<tr>
<td>ICT Variables</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Lagged Computers (per 1,000 persons)</td>
<td></td>
<td></td>
<td></td>
<td>0.0094***</td>
<td></td>
</tr>
<tr>
<td>Lagged Log (Internet Users) (per 1,000 persons)</td>
<td></td>
<td></td>
<td>0.4165***</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Lagged Log (Phones) (per 1,000 persons)</td>
<td></td>
<td></td>
<td></td>
<td>3.6693***</td>
<td></td>
</tr>
<tr>
<td>Lagged Log (ICT Expenditure) (% of GDP)</td>
<td></td>
<td></td>
<td></td>
<td>3.6432***</td>
<td></td>
</tr>
<tr>
<td>Lagged Log (ICT Expenditure per capita)</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td>1.6479**</td>
</tr>
</tbody>
</table>

**Notes:**
- ***p < 0.01
- **p < 0.05
ICT and Gender Inequality in Education

Main Empirical Findings

– ICT availability /density when measured by number of
  • personal computers per 1,000 persons
  • Internet users per 1,000 persons
  • telephones per 1,000 persons
  • ICT expenditure / GDP
  • ICT expenditure per capita

– All have statistically significant positive effects on gender equality in education

– General Education when measured by the average years of schooling also has significant positive effects
ICT and Gender Inequality in Employment
Dependent Variable: Ratio of Female to Male Labor Activity Rates

<table>
<thead>
<tr>
<th>Independent Variables</th>
<th>Reg 2.1</th>
<th>Reg 2.2</th>
<th>Reg 2.3</th>
<th>Reg 2.4</th>
<th>Reg 2.5</th>
</tr>
</thead>
<tbody>
<tr>
<td>Lagged Log (RGDP per capita)</td>
<td>2.0962</td>
<td>5.0638***</td>
<td>1.6812</td>
<td>5.1645***</td>
<td>3.3407**</td>
</tr>
<tr>
<td>Lagged Urbanization Ratio</td>
<td>-0.0578</td>
<td>0.0893</td>
<td>-0.0231</td>
<td>0.0133</td>
<td>0.0563</td>
</tr>
<tr>
<td>Unemployment Rate</td>
<td>-0.0498*</td>
<td>-0.0116</td>
<td>0.0004</td>
<td>0.0087</td>
<td>0.0375</td>
</tr>
<tr>
<td>Education Variables</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Lagged Average Years of School</td>
<td>2.3179***</td>
<td>2.1607***</td>
<td>3.4054***</td>
<td>3.3438***</td>
<td>3.0423***</td>
</tr>
<tr>
<td>Lagged Ratio of Average Years of School</td>
<td>0.0271</td>
<td>0.0762**</td>
<td>0.1282***</td>
<td>0.0854*</td>
<td>0.0798*</td>
</tr>
<tr>
<td>ICT Variables</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Lagged Log (Computers) (per 1,000 persons)</td>
<td>1.4548***</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Lagged Log (Internet Users) (per 1,000 persons)</td>
<td></td>
<td>0.1817***</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Lagged Phones (per 1,000 persons)</td>
<td></td>
<td></td>
<td>0.0048***</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Lagged ICT Expenditure (% of GDP)</td>
<td></td>
<td></td>
<td></td>
<td>0.1286*</td>
<td></td>
</tr>
<tr>
<td>Lagged (ICT Expenditure per capita)</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td>0.0015*</td>
</tr>
</tbody>
</table>

*** p < 0.01, ** p < 0.05, * p < 0.1
ICT and Gender Inequality in Employment

Main Empirical Findings

– ICT availability /density and General Education have statistically significant positive effects on gender equality in employment

In addition

– Gender inequality in education when measured by the ratio female to male average years of schooling
– tends to have positive effects on gender inequality in employment
ICT, Gender Inequality and Economic Development

- Increasing ICT Infrastructure
  - More Gender Equality in Education
  - More Gender Equality in Employment
  - Higher Level of Economic Development
References:


References:


Knowledge for Development Program 2004