

Data Appendix for:

Global Productivity

Trends, Drivers, and Policies

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APPENDIX

Cross-Country Database of Productivity

The database contains three productivity variables: labor productivity levels, labor productivity growth rates, and total factor productivity (TFP) growth rates for up to 172 countries for 1980-2018. In addition, the database contains the contribution of capital deepening to the labor productivity growth rate. This appendix describes the data sources, variable definitions, aggregation approaches and their country coverage in detail.

Measures of productivity

Measures. Data are available for labor productivity levels, labor productivity growth rates, total factor productivity (TFP) growth rates, and the contribution of capital deepening to labor productivity growth. The frequency of the database is annual. Data sources include the International Monetary Fund's (IMF's) International Financial Statistics, Federal Reserve Economic Data (FRED), Federal Reserve Bank of Atlanta database, Penn World Table 9.1, The Conference Board, and The World Bank's World Development Indicators database. For the former Union of Soviet Socialist Republics (U.S.S.R.), the data for capital stock, GDP, and employment data are from Easterly and Fischer (1994) for the historical data before the collapse of the Union of Soviet Socialist Republics (U.S.S.R.) in 1991.

Country coverage. Labor productivity levels and growth rates data are available on an unbalanced basis for 172 countries during 1980-2018, including 35 advanced economies and 137 emerging market and developing economies (EMDEs). The growth accounting decomposition into the contributions of the capital stock and TFP to labor productivity growth rates are available for 129 countries, consisting of 35 advanced economies and 94 EMDEs. A complete (balanced) data set for all three productivity measures is available for 86 countries for 1980-2018, including 29 advanced economies and 57 emerging markets and developing countries (EMDEs). Table A.1 provides a breakdown of the number of countries with data available for every year of the period indicated in the column title.

Labor productivity levels and growth rates. Labor productivity levels are measured as real GDP in US dollars measured in 2010 prices and exchange rates, divided by employment. GDP data are drawn primarily from The World Bank's World Development Indicator database and extended to earlier time periods using the Penn World Table 9.1. GDP data for China is taken from Federal Reserve Bank of Atlanta database and the Penn World Table 9.1. GDP data for the United States is taken from The World Bank's World Development Indicators and FRED (Database maintained by the Federal Reserve Bank of St. Louis). The exchange rate used to convert data measured in local currency to U.S. dollars is drawn from the IMF's International Financial Statistics database (IFS). Exchange rates from the Penn World Table 9.1 are used where IFS data is unavailable.

Employment data are primarily drawn from The Conference Board's Total Economy Database. Where employment data is not available from The Conference Board, the World Development Indicator database is used, which is based on estimates from the International Labour Organization (ILO) and National Accounts.

Total factor productivity (TFP) growth rates. Human capital-adjusted TFP growth rates are calculated as a residual of labor productivity growth by subtracting the contribution of human capital and capital deepening to labor productivity growth. The human capital contribution uses data from the Penn World Table 9.0, augmented to 2018 using the Barro and Lee (2013) database and estimates from Cohen and Leker (2014) of average years of schooling. These estimates follow the methodology of PWT 9.1 and use the same rates of returns to schooling, drawn from Psacharopoulos (1994).

References

Barro, Robert J. and Jong-Wha Lee (2013), "A new data set of educational attainment in the world, 1950-2010." *Journal of Development Economics* 104: 184–198

Cohen, Daniel and Laura Leker (2014), "Health and Education: Another Look with the Proper Data", mimeo Paris School of Economics.

Psacharopoulos, George (1994), "Returns to investment in education: A global update." *World Development* 22(9): 1325–1343.

TABLE A.1 Number of countries with available productivity data

| | Number of countries with data available | | | | | |
|--|---|--------------------------------|------------------|------|------|------|
| | Any year during 1980-2018 | Every year during 1980-2018 | Every year since | | | |
| | | | 1980 | 1990 | 2000 | 2010 |
| Labor productivity levels | | | | | | |
| Total | 172 | 141 | 144 | 165 | 167 | 167 |
| Advanced economies | 35 | 29 | 29 | 35 | 35 | 35 |
| EMDES | 148 | 112 | 115 | 130 | 132 | 132 |
| Labor productivity growth rates | | | | | | |
| Total | 171 | 109 | 144 | 165 | 167 | 167 |
| Advanced economies | 35 | 29 | 29 | 35 | 35 | 35 |
| EMDEs | 136 | 80 | 115 | 130 | 132 | 132 |
| TFP growth rates | | | | | | |
| Total | 129 | 86 | 102 | 122 | 126 | 126 |
| Advanced economies | 35 | 29 | 29 | 35 | 35 | 35 |
| EMDEs | 94 | 57 | 73 | 87 | 91 | 91 |
| Capital stock contribution | | | | | | |
| Total | 129 | 96 | 116 | 128 | 128 | 128 |
| Advanced economies | 35 | 32 | 32 | 35 | 35 | 35 |
| EMDEs | 94 | 64 | 84 | 93 | 93 | 93 |

Country classification

Country groups. *Advanced economies:* Australia; Austria; Belgium; Canada; Cyprus; Czech Republic; Denmark; Estonia; Finland; France; Germany; Greece; Hong Kong SAR, China; Iceland; Ireland; Israel; Italy; Japan; Korea, Rep.; Latvia; Lithuania; Luxembourg; Malta; Netherlands; New Zealand; Norway; Portugal; Singapore; Slovak Republic; Slovenia; Spain; Sweden; Switzerland; United Kingdom; United States.

Emerging market and developing economies: Afghanistan; Albania; Algeria; Angola; Antigua and Barbuda; Argentina; Armenia; Azerbaijan; Bahamas, The; Bahrain; Bangladesh; Belarus; Belize; Benin; Bhutan; Bolivia; Bosnia and Herzegovina; Botswana; Brazil; Bulgaria; Burkina Faso; Burundi; Cabo Verde; Cambodia; Cameroon; Central African Republic; Chad; Chile; China; Colombia; Comoros; Congo, Dem. Rep.; Congo, Rep.; Costa Rica; Côte d'Ivoire; Croatia; Dominican Republic; Ecuador; Egypt, Arab Rep.; El Salvador; Equatorial Guinea; Eritrea; Eswatini; Ethiopia; Fiji; Gabon; Gambia, The; Georgia; Ghana; Grenada; Guatemala; Guinea; Guinea-Bissau; Guyana; Haiti; Honduras; Hungary; India; Indonesia; Iran, Islamic Rep.; Iraq; Jamaica; Jordan; Kazakhstan; Kenya; Kiribati; Kuwait; Kyrgyz Republic; Lao PDR; Lebanon; Lesotho; Liberia; Madagascar; Malawi; Malaysia; Maldives; Mali; Mauritania; Mauritius; Mexico; Micronesia, Fed. Sts.; Moldova; Mongolia; Montenegro; Morocco; Mozambique; Myanmar; Namibia; Nepal; Nicaragua; Niger; Nigeria; North Macedonia; Oman; Pakistan; Panama; Papua New Guinea; Paraguay; Peru; Philippines; Poland; Qatar; Romania; Russian Federation; Rwanda; Samoa; São Tomé and Príncipe; Saudi Arabia; Senegal; Serbia; Seychelles; Sierra Leone; Solomon Islands; South Africa; Sri Lanka; St. Lucia; St. Vincent and the Grenadines; Sudan; Suriname; Tajikistan; Tanzania; Thailand; Timor-Leste; Togo; Tonga; Tunisia; Turkey; Turkmenistan; Uganda; Ukraine; United Arab Emirates; Uruguay; Uzbekistan; Vanuatu; Vietnam; Zambia; Zimbabwe.

TABLE A.2 Lists of country with time coverage where data are available

| Country | Time period where labor productivity is available | Time period where TFP is available | Time period where capital stock is available |
|--------------------------|---|------------------------------------|--|
| Afghanistan | 2002-2018 | ... | ... |
| Albania | 1980-2018 | 1980-2018 | 1980-2018 |
| Algeria | 1980-2018 | ... | ... |
| Angola | 1980-2018 | 1980-2018 | 1980-2018 |
| Antigua and Barbuda | 1991-2001 | ... | ... |
| Argentina | 1980-2018 | 1980-2018 | 1980-2018 |
| Armenia | 1990-2018 | 1991-2018 | 1980-2018 |
| Australia | 1980-2018 | 1980-2018 | 1980-2018 |
| Austria | 1980-2018 | 1980-2018 | 1980-2018 |
| Azerbaijan | 1990-2018 | 1991-2018 | 1980-2018 |
| Bahamas, The | 1980-2018 | 1991-2018 | 1980-2017 |
| Bahrain | 1980-2018 | 1980-2018 | 1980-2018 |
| Bangladesh | 1980-2018 | ... | ... |
| Belarus | 1990-2018 | 1991-2018 | 1980-2018 |
| Belgium | 1980-2018 | 1980-2018 | 1980-2018 |
| Belize | 1980-2018 | ... | ... |
| Benin | 1980-2018 | 1981-2018 | 1981-2018 |
| Bhutan | 1980-2018 | ... | ... |
| Bolivia | 1980-2018 | 1980-2018 | 1980-2018 |
| Bosnia and Herzegovina | 1990-2018 | 2001-2018 | 1995-2018 |
| Botswana | 1980-2018 | 1981-2018 | 1981-2018 |
| Brazil | 1980-2018 | 1980-2018 | 1980-2018 |
| Bulgaria | 1980-2018 | 1980-2018 | 1980-2018 |
| Burkina Faso | 1980-2018 | 1980-2018 | 1980-2018 |
| Burundi | 1980-2018 | 1981-2018 | 1981-2018 |
| Cabo Verde | 1980-2018 | 2000-2018 | 1981-2018 |
| Cambodia | 1980-2018 | ... | ... |
| Cameroon | 1980-2018 | 1980-2018 | 1980-2018 |
| Canada | 1980-2018 | 1980-2018 | 1980-2018 |
| Central African Republic | 1980-2018 | 1981-2018 | 1981-2018 |
| Chad | 1980-2018 | 1991-2018 | 1981-2018 |
| Chile | 1980-2018 | 1980-2018 | 1980-2018 |
| China | 1980-2018 | 1980-2018 | 1980-2018 |
| Colombia | 1980-2018 | 1980-2018 | 1980-2018 |
| Comoros | 1980-2018 | ... | ... |
| Congo, Dem. Rep. | 1980-2018 | ... | ... |
| Congo, Rep. | 1980-2018 | ... | ... |
| Costa Rica | 1980-2018 | 1980-2018 | 1980-2018 |
| Côte d'Ivoire | 1980-2018 | 1980-2018 | 1980-2018 |
| Croatia | 1990-2018 | 1995-2018 | 1995-2018 |
| Cyprus | 1980-2018 | 1980-2018 | 1980-2018 |
| Czech Republic | 1990-2018 | 1995-2018 | 1995-2018 |
| Denmark | 1980-2018 | 1980-2018 | 1980-2018 |
| Dominican Republic | 1980-2018 | 1980-2018 | 1980-2018 |
| Ecuador | 1980-2018 | 1980-2018 | 1980-2018 |
| Egypt, Arab Rep. | 1980-2018 | 1980-2018 | 1980-2018 |
| El Salvador | 1980-2018 | ... | ... |

TABLE A.2 Lists of country with time coverage where data are available

| Country | Time period where labor productivity is available | Time period where TFP is available | Time period where capital stock is available |
|----------------------|---|------------------------------------|--|
| Equatorial Guinea | 1980-2018 | ... | ... |
| Eritrea | 1992-2011 | ... | ... |
| Estonia | 1990-2018 | 1991-2018 | 1980-2018 |
| Eswatini | 1980-2018 | 1981-2018 | 1981-2018 |
| Ethiopia | 1980-2018 | ... | ... |
| Fiji | 1980-2018 | 1981-2018 | 1981-2018 |
| Finland | 1980-2018 | 1980-2018 | 1980-2018 |
| France | 1980-2018 | 1980-2018 | 1980-2018 |
| Gabon | 1980-2018 | 1981-2018 | 1981-2018 |
| Gambia, The | 1980-2018 | ... | ... |
| Georgia | 1980-2018 | 1991-2018 | 1980-2018 |
| Germany | 1980-2018 | 1980-2018 | 1980-2018 |
| Ghana | 1980-2018 | ... | ... |
| Greece | 1980-2018 | 1980-2018 | 1980-2018 |
| Grenada | 1988-2015 | ... | ... |
| Guatemala | 1980-2018 | 1980-2018 | 1980-2018 |
| Guinea | 1980-2018 | 1991-2018 | 1981-2018 |
| Guinea-Bissau | 1980-2018 | ... | ... |
| Guyana | 1987-2018 | ... | ... |
| Haiti | 1980-2018 | ... | ... |
| Honduras | 1980-2018 | 1980-2018 | 1980-2018 |
| Hong Kong SAR, China | 1980-2018 | 1980-2018 | 1980-2018 |
| Hungary | 1980-2018 | 1980-2018 | 1980-2018 |
| Iceland | 1980-2018 | 1980-2018 | 1980-2018 |
| India | 1980-2018 | 1980-2018 | 1980-2018 |
| Indonesia | 1980-2018 | 1980-2018 | 1980-2018 |
| Iran, Islamic Rep. | 1980-2018 | 1980-2018 | 1980-2018 |
| Iraq | 1980-2018 | 1980-2018 | 1980-2018 |
| Ireland | 1980-2018 | 1980-2018 | 1980-2018 |
| Israel | 1980-2018 | 1980-2018 | 1980-2018 |
| Italy | 1980-2018 | 1980-2018 | 1980-2018 |
| Jamaica | 1980-2018 | 1980-2018 | 1980-2018 |
| Japan | 1980-2018 | 1980-2018 | 1980-2018 |
| Jordan | 1980-2018 | 1980-2018 | 1980-2018 |
| Kazakhstan | 1990-2018 | 1991-2018 | 1980-2018 |
| Kenya | 1980-2018 | 1980-2018 | 1980-2018 |
| Kiribati | 2000-2015 | ... | ... |
| Korea, Rep. | 1980-2018 | 1980-2018 | 1980-2018 |
| Kuwait | 1980-2018 | 1980-2018 | 1980-2018 |
| Kyrgyz Republic | 1980-2018 | 1980-2018 | 1980-2018 |
| Lao PDR | 1980-2018 | 1981-2018 | 1981-2018 |
| Latvia | 1990-2018 | 1991-2018 | 1980-2018 |
| Lebanon | 1980-2018 | 1991-2018 | 1981-2018 |
| Lesotho | 1980-2018 | 1981-2018 | 1981-2018 |
| Liberia | 1980-2018 | ... | ... |
| Lithuania | 1990-2018 | 1991-2018 | 1980-2018 |

TABLE A.2 Lists of country with time coverage where data are available

| Country | Time period where labor productivity is available | Time period where TFP is available | Time period where capital stock is available |
|-----------------------|---|------------------------------------|--|
| Luxembourg | 1980-2018 | 1980-2018 | 1980-2018 |
| Madagascar | 1980-2018 | ... | ... |
| Malawi | 1980-2018 | ... | ... |
| Malaysia | 1980-2018 | 1980-2018 | 1980-2018 |
| Maldives | 1980-2018 | ... | ... |
| Mali | 1980-2018 | ... | ... |
| Malta | 1980-2018 | 1980-2018 | 1980-2018 |
| Mauritania | 1980-2018 | 1980-2018 | 1980-2018 |
| Mauritius | 1980-2018 | 1981-2018 | 1981-2018 |
| Mexico | 1980-2018 | 1980-2018 | 1980-2018 |
| Micronesia, Fed. Sts. | 2014-2014 | ... | ... |
| Moldova | 1990-2018 | 1991-2018 | 1980-2018 |
| Mongolia | 1980-2018 | 1981-2018 | 1981-2018 |
| Montenegro | 1990-2018 | 2004-2018 | 1991-2018 |
| Morocco | 1980-2018 | 1980-2018 | 1980-2018 |
| Mozambique | 1980-2018 | 1980-2018 | 1980-2018 |
| Myanmar | 1980-2018 | ... | ... |
| Namibia | 1980-2018 | 1981-2018 | 1981-2018 |
| Nepal | 1980-2018 | ... | ... |
| Netherlands | 1980-2018 | 1980-2018 | 1980-2018 |
| New Zealand | 1980-2018 | 1980-2018 | 1980-2018 |
| Nicaragua | 1980-2018 | 1981-2018 | 1981-2018 |
| Niger | 1980-2018 | 1980-2018 | 1980-2018 |
| Nigeria | 1980-2018 | 1980-2018 | 1980-2018 |
| North Macedonia | 1990-2018 | 2001-2018 | 1995-2018 |
| Norway | 1980-2018 | 1980-2018 | 1980-2018 |
| Oman | 1980-2018 | 1991-2018 | 1980-2018 |
| Pakistan | 1980-2018 | ... | ... |
| Panama | 1980-2018 | 1980-2018 | 1980-2018 |
| Papua New Guinea | 1991-2018 | ... | ... |
| Paraguay | 1980-2018 | 1980-2018 | 1980-2018 |
| Peru | 1980-2018 | 1980-2018 | 1980-2018 |
| Philippines | 1980-2018 | 1980-2018 | 1980-2018 |
| Poland | 1980-2018 | 1980-2018 | 1980-2018 |
| Portugal | 1980-2018 | 1980-2018 | 1980-2018 |
| Qatar | 1980-2018 | 1980-2018 | 1980-2018 |
| Romania | 1980-2018 | 1980-2018 | 1980-2018 |
| Russian Federation | 1980-2018 | 1980-2018 | 1980-2018 |
| Rwanda | 1980-2018 | 1981-2018 | 1981-2018 |
| Samoa | 1982-2018 | ... | ... |
| São Tomé and Príncipe | 1980-2018 | 1991-2017 | 1981-2017 |
| Saudi Arabia | 1980-2018 | 1980-2018 | 1980-2018 |
| Senegal | 1980-2018 | 1980-2018 | 1980-2018 |
| Serbia | 1990-2018 | 1995-2018 | 1995-2018 |
| Seychelles | 1992-2018 | ... | ... |
| Sierra Leone | 1980-2018 | 1981-2018 | 1981-2018 |
| Singapore | 1980-2018 | 1980-2018 | 1980-2018 |

TABLE A.2 Lists of country with time coverage where data are available

| Country | Time period where labor productivity is available | Time period where TFP is available | Time period where capital stock is available |
|--------------------------------|---|------------------------------------|--|
| Slovak Republic | 1990-2018 | 1995-2018 | 1995-2018 |
| Slovenia | 1990-2018 | 1995-2018 | 1995-2018 |
| Solomon Islands | 1991-2018 | ... | ... |
| South Africa | 1980-2018 | 1980-2018 | 1980-2018 |
| Spain | 1980-2018 | 1980-2018 | 1980-2018 |
| Sri Lanka | 1980-2018 | 1980-2018 | 1980-2018 |
| St. Lucia | 1980-2018 | ... | ... |
| St. Vincent and the Grenadines | 1980-2018 | ... | ... |
| Sudan | 1980-2018 | 1980-2018 | 1980-2018 |
| Suriname | 1980-2018 | 1991-2017 | 1980-2017 |
| Sweden | 1980-2018 | 1980-2018 | 1980-2018 |
| Switzerland | 1980-2018 | 1980-2018 | 1980-2018 |
| Tajikistan | 1980-2018 | 1980-2018 | 1980-2018 |
| Tanzania | 1980-2018 | 1980-2018 | 1980-2018 |
| Thailand | 1980-2018 | 1980-2018 | 1980-2018 |
| Timor-Leste | 2000-2018 | ... | ... |
| Togo | 1980-2018 | 1981-2018 | 1981-2018 |
| Tonga | 1984-2018 | ... | ... |
| Tunisia | 1980-2018 | 1980-2018 | 1980-2018 |
| Turkey | 1980-2018 | 1980-2018 | 1980-2018 |
| Turkmenistan | 1990-2018 | 2001-2017 | 1991-2017 |
| Uganda | 1980-2018 | ... | ... |
| Ukraine | 1980-2018 | 1980-2018 | 1980-2018 |
| United Arab Emirates | 1980-2018 | ... | ... |
| United Kingdom | 1980-2018 | 1980-2018 | 1980-2018 |
| United States | 1980-2018 | 1980-2018 | 1980-2018 |
| Uruguay | 1980-2018 | 1980-2018 | 1980-2018 |
| Uzbekistan | 1980-2018 | 1991-2018 | 1991-2018 |
| Vanuatu | 1991-2018 | ... | ... |
| Vietnam | 1980-2018 | ... | ... |
| Zambia | 1980-2018 | ... | ... |
| Zimbabwe | 1980-2018 | 1980-2018 | 1980-2018 |

Note: ... = Data are not available for the specific country.