# **Supplementary Online Appendix to**

# **“What Drives Successful Economic Diversification in Resource-Rich Countries?”**

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Table S1: Measurement of variables and data sources

|  |  |
| --- | --- |
| **Variable** | **Description & source** |
|  | **A. Measures of resource wealth** |
| *Share of resources in exports (ResExp)* | Indicates the percentage share of resource exports (minerals, ores, and fuels) in total merchandise exports. Our benchmark data is taken from the World Bank’s World Development Indicators database. For a few countries that were not sufficiently covered by this database or the data appeared unreliable, we calculated the share of resource exports in total merchandise exports from the disaggregated (4-digit level product codes) COMTRADE database. Our classification of resource-rich countries is based on a minimum 25% of resource shares in exports in the years 1971-1980. Following previous research (IMF, 2012), we classify Iraq and Botswana as resource rich although we did not have resource export data for these countries in the 1970s. |
| *Share of resource rents in GDP (ResGDP)* | Share of resource rents in GDP measures resource rents from oil, natural gas, minerals, and coal, expressed as a percentage of GDP. Minerals included in the calculation are tin, gold, lead, zinc, iron, copper, nickel, silver, bauxite, and phosphate. Rents are calculated as the difference between the value of resource production at the year’s world price, and the total cost of extracting those resources. Data is taken from the World Bank’s Adjusted Net Savings database. For analysis we use average values from 1976-1980. |
| *Resource rents per person (ResPC)* | The measurement of resource rents and the data source is as described above. Resource rents per capita are calculated by dividing total rents by total population. For analysis we use average values from 1976-1980. |
| *Share of resources and agriculture in exports (ResAgrExp)* | Indicates the percentage share of resource exports (minerals, ores and fuels) and agricultural commodities in total merchandise exports. The variable is measured by augmenting the resource share of exports (ResExp) by agricultural export data taken from the World Bank’s World Development Indicators database. Average data over the years 1971-1980 is used. |
| *Share of agricultural commodities in exports (AgrExp)* | Indicates the percentage share of agricultural commodities in total merchandise exports. The variable is measured using average data over the years 1971-1980, and data is taken from the World Bank’s World Development Indicators database. |
|  | **B. Measures of diversification** |
| *GDP per capita (GDP pc)* | GDP per capita (i.e. per working population) in PPP prices was taken from the Penn World Tables (Feenstra, Inklaar, and Timmer, 2015). |
| *Manufacturing value added (ManVA)* | This refers to manufacturing value added (ISIC divisions 15-37) in constant prices and is taken from World Development Indicators database. |
| *Services value added (ServVA)* | This refers to services value added (ISIC divisions 50-99) in constant prices and is taken from World Development Indicators database. |
| *Manufacturing exports (ManExp)* | Data for manufacturing exports was taken from WTO's annual exports series, and then converted to constant prices. Disaggregated export series for case study countries was taken from the UN’s COMTRADE database. |
| *Service exports (ServExp)* | Service export data is taken from the IMF’s World Trade in Services database (1970-2014) and then converted to constant prices (see Loungani et al, 2017). |
|  | **C. Competitive capabilities** |
| *(1) Human development index (HDI)* | The (HDI) is a summary measure of average achievement in three key dimensions of human development: life expectancy, knowledge and education, and standard of living. The HDI is the geometric mean of normalized indices for each of the three dimensions.  Data for 1991-2014 is taken from the United Nations Development Program (UNDP) website. |
| *(2) Human capital index (HCI)* | This index of human capital per worker is taken from the Penn World Tables. The index is constructed using data for average years of schooling, and an assumed rate of return for  primary, secondary, and tertiary education (see Feenstra, Inklaar, and Timmer, 2015). |
| *(3) Tertiary education*  *enrollment (TERT)* | The percentage of adults who are registered at tertiary educational institutions. Data is taken from the UN’s statistics database. |
| *(4) Public capital stock per parson (INFR)* | Data for public capital or infrastructure is calculated as general government investment (gross fixed capital formation), in billions of constant 2011 international dollars is taken from the IMF’s *Investment and Capital Stock Dataset* (IMF, 2017). |
| *(5) Research & development expenditure as share of GDP (R&D)* | Gloss domestic expenditures on research and development (R&D) as a percentage of GDP. It includes both capital and current expenditures in the four main sectors: Business enterprise, Government, Higher education, and Private non-profit. R&D covers basic research, applied research, and experimental development. Data is taken from the UN’s statistics database. |
| *(6) Patent application per capital (PATENT)* | Measures aggregate resident and non-resident patent applications filed through the Patent Cooperation Treaty procedure or with a national patent office, divided by total population. Data is taken from the World Development Indicators database, which reconciles and compiles data sources from the World Intellectual Property Organization (WIPO). Per capita measures are computed by dividing total application by population size. |
| *(7) Private sector credit (CRED)* | Indicates the amount of financial resources provided to the private sector by domestic financial institutions as a percentage of GDP. Data is taken from the World Development Indicators database. |
| *(8) New firm entry per capita (ENTRY)* | Reports the number new firm registrations per 1,000 people aged 15-64. Data is from the World Development Indicators database. |
| *(9) Entrepreneurship support (ENTP)* | Measures the extent to which a country’s policies and economic context is supportive for entrepreneurship. This indicator is an average of various indicators capturing entrepreneurial financing availability, the presence of favorable public policies and programs, the favorability of tax policies, the quality of entrepreneurial training, and the level of national research and development that can support business development. Data is taken from the Global Entrepreneurship Monitor database  (https://www.gemconsortium.org/data). |

Table S2: Non-resource average growth rates across countries

|  |  |  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- | --- | --- |
| ***Resource measures (1971-1980)*** | | | | ***GDP pc*** | ***Average per capita growth rates (1981-2014)*** | | | | |
|  | ***ResExp*** | ***ResGDP*** | ***ResPC*** | ***GDP pc*** | ***ManVA*** | ***ManExp*** | ***ServVA*** | ***ServExp*** |
| ***Group I: Extremely resource-rich countries (resource share of exports > 85%)*** | | | | | | | | | |
| OMN | 95 | 47 | 11,674 | 62,932 | 1.7 | 10.9 | 6.3 | 4.7 | 14.4 |
| SUR | 88 | 15 | 1,466 | 28,039 | 1.4 | 4.6 | 5.9 | 4.9 | 1.4 |
| NGA | 90 | 28 | 874 | 8,139 | 0.6 | 4.3 | 14.6 | 6.1 | -0.3 |
| SAU | 99 | 50 | 43,520 | 86,930 | -0.8 | 3.9 | 10.1 | 2.6 | -1.1 |
| IRN | 94 | 23 | 4,268 | 30,767 | 4.5 | 3.3 | 9.0 | 2.4 | 2.4 |
| VEN | 97 | 18 | 3,346 | 28,480 | 0.3 | 3.3 | 3.7 | 3.7 | 1.0 |
| BHR | 85 | 19 | 9,315 | 52,355 | 1.0 | 2.7 | 6.0 | 3.6 | 2.7 |
| BOL | 87 | 6 | 276 | 7,861 | 1.9 | 2.1 | 4.8 | 2.9 | 6.2 |
| KWT | 91 | 38 | 34,321 | 103,509 | 0.1 | 1.8† | 0.4 | 1.2† | 2.2 |
| TTO | 87 | 20 | 3,133 | 43,188 | 0.1 | 1.7 | 8.7 | 3.3 | 8.2 |
| GAB | 87 | 39 | 9,508 | 42,029 | 1.2 | 1.4 | 1.5 | 2.4 | -5.7 |
| QAT | 88 | 53 | 90,820 | 111,715 | 1.1 | 1.1 | 6.9 | 4.9 | 17.1† |
| ARE | 89 | 33 | 62,483 | 177,905 | -4.0 | 1.0 | 9.6 | 1.6 |  |
| DZA | 93 | 21 | 2,159 | 45,430 | -1.0 | 0.8 | 6.7 | 3.7 | 4.2 |
| ZMB | 98 | 12 | 339 | 6,181 | 2.9 | 0.2 | 13.4 | 4.2 | 2.4 |
| IRQ |  | 48 | 6,036 | 27,518 | 1.7 | -1.2 | -6.0 | 2.5 | 27.3† |
| ***Average*** | ***91*** | ***28*** | ***18,500*** | ***55,697*** | ***0.7*** | ***2.9*** | ***7.2*** | ***3.5*** | ***3.9*** |
| ***Group II: Highly resource-rich countries (resource share of exports: 51%-85%)*** | | | | | | | | | |
| LAO | 76 |  |  | 4,946 | 4.7 | 9.3 | 20.3† | 11.8 | 11.4 |
| IDN | 67 | 19 | 507 | 10,412 | 3.6 | 8.6 | 12.7 | 8.0 | 10.6 |
| PER | 55 | 7 | 472 | 14,120 | 1.6 | 5.7 | 6.0 | 5.8 | 4.3 |
| BWA |  | 3 | 89 | 23,418 | 3.9 | 5.7 | 6.3 | 7.4 | 5.8 |
| CHL | 76 | 9 | 600 | 31,030 | 2.1 | 3.0 | 9.5 | 5.3 | 5.6 |
| MRT | 83 | 13 | 386 | 12,343 | 1.0 | 2.7 | 34.6 | 2.7 | 2.2 |
| COG | 69 | 28 | 1,142 | 8,083 | 1.5 | 2.7 | 19.8 | 2.1 | 2.6 |
| TGO | 72 | 3 | 50 | 3,395 | -1.0 | 1.0 | 4.7 | 0.9 | 2.0 |
| COD | 69 | 4 | 79 | 3,049 | -1.1 | 0.1 |  | -0.1 | 3.8 |
| LBR | 71 | 21 | 301 | 1,978 | -0.4 | -1.4 | -53.5† | 1.0 | 6.6 |
| SYR | 68 | 10 | 428 | 10,555 | 1.9 | -6.4 | 5.8 | 1.1 | 6.6 |
| AGO | 53 |  |  | 11,185 | 3.1 | -6.7 | 3.7 | -4.7 | 6.2 |
| NER | 55 |  |  | 2,438 | -1.3 |  | 4.2 |  | 0.6 |
| ***Average*** | ***68*** | ***11*** | ***396*** | ***9,461*** | ***1.3*** | ***1.7*** | ***6.2*** | ***3.1*** | ***5.2*** |
| ***Group III: Moderately resource rich (resource share of exports 25% - 50%)*** | | | | | | | | | |
| EGY | 34 | 16 | 567 | 18,262 | 4.9 | 6.4 | 9.5 | 6.3 | 4.3 |
| MYS | 27 | 9 | 593 | 30,117 | 2.7 | 5.9 | 10.3 | 8.3 | 8.3 |
| TUN | 49 | 9 | 460 | 27,279 | 1.9 | 4.4 | 6.6 | 4.5 | 3.1 |
| NOR | 31 | 4 | 1,566 | 91,313 | 3.1 | 4.1 | 4.3 | 6.0 | 4.9 |
| JOR | 36 | 1 | 38 | 27,858 | 1.6 | 3.9 | 5.0 | 2.4 | 1.7 |
| MAR | 44 | 2 | 65 | 17,151 | 1.6 | 3.6 | 8.2 | 4.2 | 7.8 |
| MEX | 32 | 5 | 612 | 33,212 | -0.3 | 2.7 | 10.6 | 3.6 | 2.1 |
| ECU | 47 | 6 | 429 | 18,336 | 1.1 | 2.3 | 7.2 | 2.4 | 3.5 |
| AUS | 29 | 5 | 1,240 | 73,285 | 1.4 | 2.0 | 5.1 | 5.6 | 6.4 |
| SEN | 26 | 1 | 11 | 6,190 | 0.7 | 1.8 | 3.0 | 1.9 | 0.8 |
| PAN | 28 |  |  | 27,607 | 1.9 | 1.8 | 16.0 | 4.8 | 5.4 |
| JAM | 30 | 10 | 610 | 14,493 | 1.1 | 1.0 | 0.7 | 5.0 | 4.7 |
| CAN | 26 | 6 | 1,547 | 69,656 | 1.2 | -0.4† | 4.5 | 3.6† | 5.8 |
| ***Average*** | ***34*** | ***6*** | ***595*** | ***34,981*** | ***1.8*** | ***3.0*** | ***7.0*** | ***4.5*** | ***4.5*** |
| ***Grand Average*** | ***66*** | ***16*** | ***7,611*** | ***35,094*** | ***1.2*** | ***2.6*** | ***6.8*** | ***3.7*** | ***4.5*** |

*Notes*: The definition and measurement of variables is provided in Table S1. The ranking of countries and the selection of best diversifiers is based on per capita average manufacturing growth rate in 1981-2014. GDP per capita and its growth rate are measured in PPP prices that are comparable across countries, while the remaining variables are measured in constant prices comparable over time. Sectoral value added and export growth rates are calculated using data for value added and export revenues per person (national population). † These growth rates are calculated using data covering less than ten years.

*Source*: Based on data from multiple sources.

Table S3.1: Correlation results using a measure of resource dependence including agricultural exports (1971-1980)

|  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- |
|  | ***(1)*** | ***(2)*** | ***(3)*** | ***(4)*** | ***(5)*** |
|  | ***Resources (% of exports)*** | ***Resource rents (% of GDP)*** | ***Resource rents per capita (log)*** | ***Resource & agriculture (% of exports)*** | ***Agriculture (% of exports)*** |
| 1. Resources (% of exports) | 1.00 |  |  |  |  |
|  |  |  |  |  |  |
| 2. Resource rents (% of GDP) | 0.67 | 1.00 |  |  |  |
|  | (0.00) |  |  |  |  |
| 3. Resource rents per capita (log) | 0.54 | 0.79 | 1.00 |  |  |
|  | (0.00) | (0.00) |  |  |  |
| 4. Resource & agric (% of exports) | 0.92 | 0.68 | 0.56 | 1.00 |  |
|  | (0.00) | (0.00) | (0.00) |  |  |
| 5. Agriculture (% of exports) | -0.26 | -0.05 | -0.06 | 0.10 | 1.00 |
|  | (0.11) | (0.75) | (0.73) | (0.53) |  |
| 6. GDP per capita (log) | 0.05 | 0.40 | 0.66 | -0.04 | -0.26 |
|  | (0.77) | (0.01) | (0.00) | (0.80) | (0.10) |
| 7. GDP per capita growth | -0.22 | -0.16 | -0.11 | -0.05 | 0.49 |
|  | (0.17) | (0.34) | (0.49) | (0.76) | (0.00) |
| 8. Manuf. value added growth | 0.04 | 0.06 | 0.04 | 0.12 | 0.26 |
|  | (0.82) | (0.73) | (0.82) | (0.48) | (0.11) |
| 9. Manuf. export growth | 0.05 | -0.09 | -0.03 | 0.01 | -0.02 |
|  | (0.76) | (0.58) | (0.88) | (0.95) | (0.91) |
| 10. Service value added growth | -0.14 | -0.14 | -0.06 | 0.02 | 0.51 |
|  | (0.40) | (0.40) | (0.73) | (0.92) | (0.00) |
| 11. Service export growth | -0.05 | 0.34 | 0.21 | 0.04 | 0.30 |
|  | (0.74) | (0.03) | (0.19) | (0.80) | (0.06) |

*Notes*: Correlations are based on a sample of 42 countries whose share of resources in exports was more than 25%. The figures outside parentheses are pair-wise Pearson correlation coefficients, and those within parentheses indicate their p-values.

*Source*: Authors’ calculations based on data from multiple sources.

Table S3.2: Correlation results using a measure of resource dependence including agricultural exports (1971-1980), including resource-rich and resource-poor countries

|  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- |
|  | ***(1)*** | ***(2)*** | ***(3)*** | ***(4)*** | ***(5)*** |
|  | ***Resources (% of exports)*** | ***Resource rents (% of GDP)*** | ***Resource rents per capita (log)*** | ***Resource & agriculture (% of exports)*** | ***Agriculture (% of exports)*** |
| 1. Resources (% of exports) | 1.00 |  |  |  |  |
|  |  |  |  |  |  |
| 2. Resource rents (% of GDP) | 0.80 | 1.00 |  |  |  |
|  | (0.00) |  |  |  |  |
| 3. Resource rents per capita (log) | 0.72 | 0.77 | 1.00 |  |  |
|  | (0.00) | (0.00) |  |  |  |
| 4. Resource & agric (% of exports) | 0.92 | 0.76 | 0.63 | 1.00 |  |
|  | (0.00) | (0.00) | (0.00) |  |  |
| 5. Agriculture (% of exports) | -0.24 | -0.17 | -0.32 | 0.16 | 1.00 |
|  | (0.01) | (0.08) | (0.00) | (0.09) |  |
| 6. GDP per capita (log) | 0.10 | 0.25 | 0.49 | -0.08 | -0.40 |
|  | (0.27) | (0.01) | (0.00) | (0.43) | (0.00) |
| 7. GDP per capita growth | -0.20 | -0.16 | -0.13 | -0.16 | 0.24 |
|  | (0.03) | (0.08) | (0.18) | (0.09) | (0.01) |
| 8. Manuf. value added growth | -0.11 | -0.06 | -0.12 | -0.02 | 0.21 |
|  | (0.25) | (0.56) | (0.21) | (0.83) | (0.03) |
| 9. Manuf. export growth | 0.01 | 0.02 | 0.10 | 0.02 | 0.05 |
|  | (0.90) | (0.80) | (0.30) | (0.84) | (0.59) |
| 10. Service value added growth | -0.22 | -0.15 | -0.11 | -0.17 | 0.20 |
|  | (0.02) | (0.12) | (0.25) | (0.07) | (0.04) |
| 11. Service export growth | -0.21 | 0.12 | 0.07 | -0.21 | 0.09 |
|  | (0.02) | (0.20) | (0.48) | (0.03) | (0.37) |

*Note*: Correlations are based on a sample of 121 countries. The sample includes all countries for which we have resource data at the beginning of the period (1970s), and excludes small island states. GDP per capita is an average value from 1981-2014. The figures outside parentheses are pair-wise Pearson correlation coefficients, and those within parentheses indicate their p-values.

*Source*: Authors’ calculations based on data from multiple sources.

Table S4.1: Correlation between resource wealth (1970s) and competitive capabilities (1981-2014)

|  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- |
|  | ***(1) Resources (% of exports)*** | ***(2) Resource rents (% of GDP)*** | ***(3) Resource rents per capita (log)*** | ***(4) Resource & agriculture (% of exports)*** | ***(5) Agriculture (% of exports)*** |
| ***Human capital development*** |  |  |  |  |  |
| 1. Human development index | -0.09 | 0.22 | 0.57 | -0.13 | -0.14 |
|  | (0.57) | (0.17) | (0.00) | (0.41) | (0.38) |
| 2. Human capital index | -0.30 | -0.13 | 0.27 | -0.30 | -0.02 |
|  | (0.06) | (0.43) | (0.11) | (0.07) | (0.89) |
| 3. Tertiary enrollment rate | -0.37 | -0.29 | 0.02 | -0.36 | 0.02 |
|  | (0.02) | (0.07) | (0.88) | (0.02) | (0.90) |
| ***Public & intellectual capital*** |  |  |  |  |  |
| 4. Public capital per capita (log) | 0.25 | 0.52 | 0.73 | 0.16 | -0.25 |
|  | (0.13) | (0.00) | (0.00) | (0.32) | (0.12) |
| 5. R&D expenditure (% of GDP) | -0.52 | -0.29 | 0.01 | -0.45 | 0.11 |
|  | (0.00) | (0.10) | (0.95) | (0.01) | (0.53) |
| 6. Patent application pc (log) | -0.43 | -0.22 | 0.15 | -0.42 | 0.09 |
|  | (0.02) | (0.22) | (0.42) | (0.02) | (0.63) |
| ***Business capacity development*** |  |  |  |  |  |
| 7. Private sector credit (% GDP) | -0.44 | -0.23 | 0.05 | -0.41 | 0.03 |
|  | (0.00) | (0.16) | (0.74) | (0.01) | (0.84) |
| 8. Entrepreneurship support | -0.13 | 0.14 | 0.24 | -0.12 | 0.08 |
|  | (0.48) | (0.47) | (0.20) | (0.54) | (0.68) |
| 9. Firm entry rate | -0.00 | 0.09 | 0.34 | -0.01 | -0.06 |
|  | (0.99) | (0.64) | (0.06) | (0.94) | (0.73) |

*Note*: Correlations are based on a sample of 42 countries whose share of resources in exports was more than 25%. The figures outside parentheses are pair-wise Pearson correlation coefficients, and those within parentheses indicate their p-values.

*Source*: Authors’ calculations based on data from multiple sources.

Table S4.2: Correlation between resource wealth (1970s) and competitive capabilities (1981-2014), including resource rich and poor countries

|  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- |
|  | ***(1) Resources (% of exports)*** | ***(2) Resource rents (% of GDP)*** | ***(3) Resource rents per capita (log)*** | ***(4) Resource & agriculture (% of exports)*** | ***(5) Agriculture (% of exports)*** |
| ***Human capital development*** |  |  |  |  |  |
| 1. Human development index | 0.01 | 0.11 | 0.38 | -0.17 | -0.39 |
|  | (0.91) | (0.24) | (0.00) | (0.07) | (0.00) |
| 2. Human capital index | -0.14 | -0.10 | 0.22 | -0.27 | -0.34 |
|  | (0.15) | (0.30) | (0.02) | (0.01) | (0.00) |
| 3. Tertiary enrollment rate | -0.11 | -0.10 | 0.26 | -0.22 | -0.21 |
|  | (0.24) | (0.28) | (0.00) | (0.02) | (0.02) |
| ***Public & intellectual capital*** |  |  |  |  |  |
| 4. Public capital per capita (log) | 0.20 | 0.34 | 0.48 | 0.05 | -0.39 |
|  | (0.03) | (0.00) | (0.00) | (0.63) | (0.00) |
| 5. R&D expenditure (% of GDP) | -0.31 | -0.26 | -0.08 | -0.38 | -0.14 |
|  | (0.00) | (0.01) | (0.45) | (0.00) | (0.21) |
| 6. Patent application pc (log) | -0.16 | -0.15 | -0.01 | -0.22 | -0.10 |
|  | (0.10) | (0.13) | (0.92) | (0.03) | (0.31) |
| ***Business capacity development*** |  |  |  |  |  |
| 7. Private sector credit (% GDP) | -0.24 | -0.18 | 0.05 | -0.37 | -0.28 |
|  | (0.01) | (0.05) | (0.57) | (0.00) | (0.00) |
| 8. Entrepreneurship support | -0.18 | -0.05 | -0.06 | -0.18 | 0.05 |
|  | (0.11) | (0.65) | (0.58) | (0.12) | (0.65) |
| 9. Firm entry rate | -0.10 | -0.02 | 0.08 | -0.13 | -0.12 |
|  | (0.37) | (0.86) | (0.44) | (0.24) | (0.26) |

*Note*: Correlations are based on a sample of 121 countries. The sample includes all countries for which we have resource data at the beginning of the period (1970s), and excludes small island states. The figures outside parentheses are pair-wise Pearson correlation coefficients, and those within parentheses indicate their p-values.

*Source*: Authors’ calculations based on data from multiple sources.

Table S5: Competitive capabilities in resource-rich countries (average values 1981-2014)

|  |  |  |  |  |  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- |
|  | ResExp | ManVA | SerVA | HDI | HCI | TERT | INFR | R&D | PATENT | CREDIT | ENTP | ENTRY |
|  |  |  |  |  |  |  |  |  |  |  |  |  |
| ***Group I: Extremely resource-rich countries (resource share of exports > 85%)*** | | | | | | | |  |  |  |  |  |
| OMN | 95 | 10.9 | 4.7 | 0.77 |  | 1.5 | 47,936 | 0.17 |  | 33 |  | 1.2 |
| SUR | 88 | 4.6 | 4.9 | 0.70 |  | 1.4 | 6,526 |  |  | 26 | 2.4 | 1.0 |
| NGA | 90 | 4.3 | 6.1 | 0.49 | 1.4 | 0.9 | 2,976 | 0.21 | 5 | 15 | 2.1 | 0.7 |
| SAU | 99 | 3.9 | 2.6 | 0.76 | 2.2 | 3.1 | 43,890 | 0.06 | 39 | 27 | 2.3 | 0.4 |
| IRN | 94 | 3.3 | 2.4 | 0.68 | 1.7 | 5.2 | 23,352 | 0.50 | 57 | 32 | 1.9 |  |
| VEN | 97 | 3.3 | 3.7 | 0.70 | 2.1 | 5.3 | 26,524 | . | 93 | 27 | 2.0 |  |
| BHR | 85 | 2.7 | 3.6 | 0.79 | 2.2 | 2.4 | 41,144 | 0.12 | 103 | 48 |  |  |
| BOL | 87 | 2.1 | 2.9 | 0.61 | 2.4 | 5.7 | 2,783 | 0.32 | 17 | 40 | 2.1 | 0.5 |
| KWT | 91 | 1.8 | 1.2 | 0.77 | 2.0 | 2.2 | 47,284 | 0.18 |  | 60 | 2.2 |  |
| TTO | 87 | 1.7 | 3.3 | 0.73 | 2.7 | 1.0 | 53,686 | 0.10 | 133 | 41 | 2.3 |  |
| GAB | 87 | 1.4 | 2.4 | 0.65 | 2.0 | 1.0 | 18,321 | 0.53 |  | 13 |  | 4.0 |
| QAT | 88 | 1.1 | 4.9 | 0.81 | 2.2 | 1.6 | 51,540 | 0.40 | 150 | 39 | 2.9 | 1.8 |
| ARE | 89 | 1.0 | 1.6 | 0.80 | 2.3 | 1.0 | 133,130 | 0.56 | 164 | 41 | 3.0 | 21.1 |
| DZA | 93 | 0.8 | 3.7 | 0.66 | 1.7 | 3.1 | 10,837 | 0.22 | 13 | 27 | 2.9 | 0.5 |
| ZMB | 98 | 0.2 | 4.2 | 0.47 | 2.0 | 0.3 | 10,133 | 0.06 | 6 | 11 | 2.3 | 1.1 |
| LBY | 100 |  |  | 0.73 |  | 5.3 | . |  | 8 | 19 | 2.0 |  |
| IRQ |  | -1.2 | 2.5 | 0.61 | 1.8 | 2.1 | 10,061 | 0.06 | 13 | 4 |  | 2.7 |
| ***Average*** | ***91*** | ***2.9*** | ***3.5*** | ***0.69*** | ***2.1*** | ***2.4*** | ***34,671*** | ***0.26*** | ***71*** | ***32*** | ***2.4*** | ***3.2*** |
| ***Group II: Highly resource-rich countries (resource share of exports: 51%-85%)*** | | | | | | | |  |  |  |  |  |
| LAO | 76 | 9.3 | 11.8 | 0.49 | 1.6 | 1.2 | 1,680 | 0.04 |  | 8 |  | 0.2 |
| IDN | 67 | 8.6 | 8.0 | 0.61 | 2.1 | 2.0 | 2,259 | 0.09 | 16 | 31 | 2.7 | 0.3 |
| PER | 55 | 5.7 | 5.8 | 0.68 | 2.4 | 5.0 | 3,426 | 0.12 | 28 | 20 | 2.2 | 3.3 |
| CHL | 76 | 3.0 | 5.3 | 0.78 | 2.8 | 5.1 | 2,808 | 0.37 | 131 | 72 | 2.5 | 5.4 |
| MRT | 83 | 2.7 | 2.7 | 0.45 | 1.5 | 0.6 | 1,064 |  |  | 28 |  | 0.3 |
| COG | 69 | 2.7 | 2.1 | 0.52 | 1.9 | 0.9 | 2,900 |  | 19 | 12 |  |  |
| TGO | 72 | 1.0 | 0.9 | 0.43 | 1.6 | 0.7 | 1,787 | 0.25 |  | 22 |  | 0.1 |
| COD | 69 | 0.1 | -0.1 | 0.36 | 1.5 | 0.6 | 46 | 0.15 | 3 | 3 |  | 0.0 |
| LBR | 71 | -1.4 | 1.0 | 0.39 | 1.5 | 1.8 | 1,133 |  | 13 | 6 |  | 0.0 |
| SYR | 68 | -6.4 | 1.1 | 0.60 | 2.0 | 3.6 | 2,492 |  | 11 | 9 | 1.9 | 0.0 |
| AGO | 53 | -6.7 | -4.7 | 0.46 | 1.3 | 0.4 | 9,535 |  | 0 | 12 | 2.2 |  |
| NER | 55 |  |  | 0.28 | 1.1 | 0.1 | 713 |  |  | 10 |  | 0.0 |
| BWA |  | 5.7 | 7.4 | 0.62 | 2.3 | 1.6 | 10,100 | 0.36 | 12 | 18 | 2.6 | 11.0 |
| ***Average*** | ***68*** | ***1.7*** | ***3.1*** | ***0.51*** | ***1.8*** | ***1.8*** | ***2,487*** | ***0.17*** | ***28*** | ***19*** | ***2.3*** | ***1.0*** |
|  |  |  |  |  |  |  |  |  |  |  |  |  |
|  |  |  |  |  |  |  |  |  |  |  |  |  |
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|  |  |  |  |  |  |  |  |  |  |  |  |  |
| ---continued--- | | | | | | | | | | | | |
|  | ResExp | ManVA | SerVA | HDI\* | HCI | TERT | INFR | R&D | PATENT | CREDIT | ENTP | ENTRY |
| ***Group III: Moderately resource rich (resource share of exports 25% - 50%)*** | | | | | | | |  |  |  |  |  |
| EGY | 34 | 6.4 | 6.3 | 0.62 | 1.9 | 4.0 | 2,882 | 0.38 | 19 | 36 | 1.9 |  |
| MYS | 27 | 5.9 | 8.3 | 0.73 | 2.5 | 3.0 | 13,007 | 0.87 | 195 | 108 | 2.9 | 2.3 |
| TUN | 49 | 4.4 | 4.5 | 0.66 | 1.8 | 2.8 | 8,011 | 0.63 | 31 | 64 | 2.7 | 1.4 |
| NOR | 31 | 4.1 | 6.0 | 0.91 | 3.3 | 5.8 | 27,378 | 1.21 | 1076 | 82 | 2.6 | 7.0 |
| JOR | 36 | 3.9 | 2.4 | 0.71 | 2.3 | 4.7 | 6,298 | 0.49 | 47 | 69 | 2.4 | 0.8 |
| MAR | 44 | 3.6 | 4.2 | 0.55 | 1.5 | 1.8 | 2,732 | 0.54 | 20 | 42 | 2.1 | 1.4 |
| MEX | 32 | 2.7 | 3.6 | 0.71 | 2.3 | 3.2 | 15,458 | 0.37 | 101 | 20 | 2.5 | 0.5 |
| ECU | 47 | 2.3 | 2.4 | 0.69 | 2.4 | 4.8 | 9,848 | 0.17 | 28 | 20 | 2.2 |  |
| AUS | 29 | 2.0 | 5.6 | 0.91 | 3.4 | 6.5 | 10,739 | 1.64 | 1108 | 83 | 2.5 | 12.2 |
| SEN | 26 | 1.8 | 1.9 | 0.41 | 1.3 | 0.8 | 1,061 | 0.46 |  | 25 | 2.2 | 0.3 |
| PAN | 28 | 1.8 | 4.8 | 0.73 | 2.5 | 5.0 | 3,123 | 0.21 | 59 | 68 | 2.4 | 0.6 |
| JAM | 30 | 1.0 | 5.0 | 0.70 | 2.4 | 2.6 |  | 0.07 | 36 | 26 | 2.3 | 1.2 |
| CAN | 26 | -0.4 | 3.6 | 0.88 | 3.4 | 8.4 | 18,772 | 1.63 | 1079 | 108 | 2.9 | 0.1 |
| PNG | 46 |  |  | 0.44 |  | 0.4 |  |  | 8 | 20 |  |  |
| GUY | 40 |  |  | 0.60 |  | 1.3 |  |  | 17 | 40 |  |  |
| ***Average*** | ***35*** | ***3.0*** | ***4.5*** | ***0.68*** | ***2.4*** | ***3.7*** | ***9,942*** | ***0.67*** | ***273*** | ***54*** | ***2.4*** | ***2.5*** |
| ***Grand Average*** | ***65*** | ***2.6*** | ***3.8*** | ***0.64*** | ***2.1*** | ***2.7*** | ***16,814*** | ***0.40*** | ***135*** | ***35*** | ***2.4*** | ***2.5*** |

*Notes*: ResExp indicates the 1970s average export share of resources, and ManVA and ServVA indicate the average growth rate of manufacturing and services value added per capita respectively. The acronyms for the development variables are as follows: Human development index (HDI); Human capital index (HCI); Tertiary education enrollment rate (TERT); Infrastructure stock per parson (INFR); Research and development expenditure as share of GDP (R&D); Patent application per capital (PATENT); Private sector credit (CRED); Firm entry per capita (ENTRY); and Entrepreneurship support (ENTP). Average values for HDI are based on data from 1991-2014 since the index was not available for earlier years. The measurement and data source of variables is given in Table S1.

*Source*: Based on data from multiple sources.

**Online Supplementary Appendix Figures**

**Oman**

*Figure S1*: Oil and gas production per capita among selected countries with greater diversification performance

*Source*: Ross and Mahdavi (2015)

*Figure S2*: Oil and gas production per capita among selected countries with greater diversification performance

*Source*: Ross and Mahdavi (2015)

*Figure S3*: Changes in the economic structure of Oman

*Note*: Industry includes mining and quarrying, manufacturing, construction and electricity and water services.

*Source*: World Development Indicators database

*Figure* *S4:* The evolution of major export commodities of Oman

*Source*: UN’s COMTRADE database

**Laos**

*Figure S5*: Changes in the economic structure of Laos

*Note*: The world Development Indicators database does not provide data of the years prior to 1989. Industry includes mining and quarrying, manufacturing, construction and electricity and water services.

*Source*: World Development Indicators database

*Figure S6:* The evolution of major export commodities of Laos

*Source*: UN’s COMTRADE database

**Indonesia**

*Figure S7*: Changes in the economic structure of Indonesia

*Note*: Industry includes mining and quarrying, manufacturing, construction and electricity and water services.

*Source*: World Development Indicators database (data availability is limited to the period after 1985)

*Figure S8*: The evolution of major export commodities of Indonesia

*Source*: UN’s COMTRADE database

*Note:* The export group *‘other’* includes all export items contributing to less than 5% of total exports.