The Worldbank\_panel.xlsx file contains data from 2015 to 2018 for 90 countries.

Variables:

| Name | Short Description | Long description |
| --- | --- | --- |
| v1 | Air transport, freight (million ton-km) | Air freight is the volume of freight, express, and diplomatic bags carried on each flight stage (operation of an aircraft from takeoff to its next landing), measured in metric tons times kilometers traveled. |
| v2 | Air transport, passengers carried | Air passengers carried include both domestic and international aircraft passengers of air carriers registered in the country. |
| v3 | Air transport, registered carrier departures worldwide | Registered carrier departures worldwide are domestic takeoffs and takeoffs abroad of air carriers registered in the country. |
| v4 | Container port traffic (TEU: 20 foot equivalent units) | Port container traffic measures the flow of containers from land to sea transport modes, and vice versa, in twenty-foot equivalent units (TEUs), a standard-size container. Data refer to coastal shipping as well as international journeys. Transshipment traffic is counted as two lifts at the intermediate port (once to off-load and again as an outbound lift) and includes empty units. |
| v5 | Fixed broadband subscriptions | Fixed broadband subscriptions refers to fixed subscriptions to high-speed access to the public Internet (a TCP/IP connection), at downstream speeds equal to, or greater than, 256 kbit/s. This includes cable modem, DSL, fiber-to-the-home/building, other fixed (wired)-broadband subscriptions, satellite broadband and terrestrial fixed wireless broadband. This total is measured irrespective of the method of payment. It excludes subscriptions that have access to data communications (including the Internet) via mobile-cellular networks. It should include fixed WiMAX and any other fixed wireless technologies. It includes both residential subscriptions and subscriptions for organizations. |
| v6 | Fixed broadband subscriptions (per 100 people) | Fixed broadband subscriptions refers to fixed subscriptions to high-speed access to the public Internet (a TCP/IP connection), at downstream speeds equal to, or greater than, 256 kbit/s. This includes cable modem, DSL, fiber-to-the-home/building, other fixed (wired)-broadband subscriptions, satellite broadband and terrestrial fixed wireless broadband. This total is measured irrespective of the method of payment. It excludes subscriptions that have access to data communications (including the Internet) via mobile-cellular networks. It should include fixed WiMAX and any other fixed wireless technologies. It includes both residential subscriptions and subscriptions for organizations. |
| v7 | Fixed telephone subscriptions | Fixed telephone subscriptions refers to the sum of active number of analogue fixed telephone lines, voice-over-IP (VoIP) subscriptions, fixed wireless local loop (WLL) subscriptions, ISDN voice-channel equivalents and fixed public payphones. |
| v8 | Fixed telephone subscriptions (per 100 people) | Fixed telephone subscriptions refers to the sum of active number of analogue fixed telephone lines, voice-over-IP (VoIP) subscriptions, fixed wireless local loop (WLL) subscriptions, ISDN voice-channel equivalents and fixed public payphones. |
| v9 | High-technology exports (% of manufactured exports) | High-technology exports are products with high R&D intensity, such as in aerospace, computers, pharmaceuticals, scientific instruments, and electrical machinery. |
| v10 | High-technology exports (current US$) | High-technology exports are products with high R&D intensity, such as aerospace, computers, pharmaceuticals, scientific instruments, and electrical machinery. Data are in current U.S. dollars. |
| v11 | ICT goods exports (% of total goods exports) | Information and communication technology goods exports include computers and peripheral equipment, communication equipment, consumer electronic equipment, electronic components, and other information and technology goods (miscellaneous). |
| v12 | ICT goods imports (% total goods imports) | Information and communication technology goods imports include computers and peripheral equipment, communication equipment, consumer electronic equipment, electronic components, and other information and technology goods (miscellaneous). |
| v13 | ICT service exports (% of service exports, BoP) | Information and communication technology service exports include computer and communications services (telecommunications and postal and courier services) and information services (computer data and news-related service transactions). |
| v14 | ICT service exports (BoP, current US$) | Information and communication technology service exports include computer and communications services (telecommunications and postal and courier services) and information services (computer data and news-related service transactions). Data are in current U.S. dollars. |
| v15 | Individuals using the Internet (% of population) | Internet users are individuals who have used the Internet (from any location) in the last 3 months. The Internet can be used via a computer, mobile phone, personal digital assistant, games machine, digital TV etc. |
| v16 | Industrial design applications, nonresident, by count | Industrial design applications are applications to register an industrial design with a national or regional Intellectual Property (IP) offices and designations received by relevant offices through the Hague System. Industrial designs are applied to a wide variety of industrial products and handicrafts. They refer to the ornamental or aesthetic aspects of a useful article, including compositions of lines or colors or any three-dimensional forms that give a special appearance to a product or handicraft. The holder of a registered industrial design has exclusive rights against unauthorized copying or imitation of the design by third parties. Industrial design registrations are valid for a limited period. The term of protection is usually 15 years for most jurisdictions. However, differences in legislation do exist, notably in China (which provides for a 10-year term from the application date). Non-resident application refers to an application filed with the IP office of or acting on behalf of a state or jurisdiction in which the first-named applicant in the application is not domiciled. Design count is used to render application data for industrial applications across offices comparable, as some offices follow a single-class/single-design filing system while other have a multiple class/design filing system. |
| v17 | Industrial design applications, resident, by count | Industrial design applications are applications to register an industrial design with a national or regional Intellectual Property (IP) offices and designations received by relevant offices through the Hague System. Industrial designs are applied to a wide variety of industrial products and handicrafts. They refer to the ornamental or aesthetic aspects of a useful article, including compositions of lines or colors or any three-dimensional forms that give a special appearance to a product or handicraft. The holder of a registered industrial design has exclusive rights against unauthorized copying or imitation of the design by third parties. Industrial design registrations are valid for a limited period. The term of protection is usually 15 years for most jurisdictions. However, differences in legislation do exist, notably in China (which provides for a 10-year term from the application date). Resident application refers to an application filed with the IP office of or acting on behalf of the state or jurisdiction in which the first-named applicant in the application has residence. Design count is used to render application data for industrial applications across offices comparable, as some offices follow a single-class/single-design filing system while other have a multiple class/design filing system. |
| v18 | Mobile cellular subscriptions | Mobile cellular telephone subscriptions are subscriptions to a public mobile telephone service that provide access to the PSTN using cellular technology. The indicator includes (and is split into) the number of postpaid subscriptions, and the number of active prepaid accounts (i.e. that have been used during the last three months). The indicator applies to all mobile cellular subscriptions that offer voice communications. It excludes subscriptions via data cards or USB modems, subscriptions to public mobile data services, private trunked mobile radio, telepoint, radio paging and telemetry services. |
| v19 | Mobile cellular subscriptions (per 100 people) | Mobile cellular telephone subscriptions are subscriptions to a public mobile telephone service that provide access to the PSTN using cellular technology. The indicator includes (and is split into) the number of postpaid subscriptions, and the number of active prepaid accounts (i.e. that have been used during the last three months). The indicator applies to all mobile cellular subscriptions that offer voice communications. It excludes subscriptions via data cards or USB modems, subscriptions to public mobile data services, private trunked mobile radio, telepoint, radio paging and telemetry services. |
| v20 | Patent applications, nonresidents | Patent applications are worldwide patent applications filed through the Patent Cooperation Treaty procedure or with a national patent office for exclusive rights for an invention--a product or process that provides a new way of doing something or offers a new technical solution to a problem. A patent provides protection for the invention to the owner of the patent for a limited period, generally 20 years. |
| v21 | Patent applications, residents | Patent applications are worldwide patent applications filed through the Patent Cooperation Treaty procedure or with a national patent office for exclusive rights for an invention--a product or process that provides a new way of doing something or offers a new technical solution to a problem. A patent provides protection for the invention to the owner of the patent for a limited period, generally 20 years. |
| v22 | Scientific and technical journal articles | Scientific and technical journal articles refer to the number of scientific and engineering articles published in the following fields: physics, biology, chemistry, mathematics, clinical medicine, biomedical research, engineering and technology, and earth and space sciences. |
| v23 | Secure Internet servers | The number of distinct, publicly-trusted TLS/SSL certificates found in the Netcraft Secure Server Survey. |
| v24 | Secure Internet servers (per 1 million people) | The number of distinct, publicly-trusted TLS/SSL certificates found in the Netcraft Secure Server Survey. |
| v25 | Trademark applications, direct nonresident | Trademark applications filed are applications to register a trademark with a national or regional Intellectual Property (IP) office. A trademark is a distinctive sign which identifies certain goods or services as those produced or provided by a specific person or enterprise. A trademark provides protection to the owner of the mark by ensuring the exclusive right to use it to identify goods or services, or to authorize another to use it in return for payment. The period of protection varies, but a trademark can be renewed indefinitely beyond the time limit on payment of additional fees. Direct nonresident trademark applications are those filed by applicants from abroad directly at a given national IP office. |
| v26 | Trademark applications, direct resident | Trademark applications filed are applications to register a trademark with a national or regional Intellectual Property (IP) office. A trademark is a distinctive sign which identifies certain goods or services as those produced or provided by a specific person or enterprise. A trademark provides protection to the owner of the mark by ensuring the exclusive right to use it to identify goods or services, or to authorize another to use it in return for payment. The period of protection varies, but a trademark can be renewed indefinitely beyond the time limit on payment of additional fees. Direct resident trademark applications are those filed by domestic applicants directly at a given national IP office. |
| v27 | Trademark applications, nonresident, by count | Trademark applications filed are applications to register a trademark with a national or regional Intellectual Property (IP) offices and designations received by relevant offices through the Madrid System. A trademark is a distinctive sign which identifies certain goods or services as those produced or provided by a specific person or enterprise. A trademark provides protection to the owner of the mark by ensuring the exclusive right to use it to identify goods or services, or to authorize another to use it in return for payment. The period of protection varies, but a trademark can be renewed indefinitely beyond the time limit on payment of additional fees. Non-resident application refers to an application filed with the IP office of or acting on behalf of a state or jurisdiction in which the first-named applicant in the application is not domiciled. Class count is used to render application data for trademark applications across offices comparable, as some offices follow a single-class/single-design filing system while other have a multiple class/design filing system. |
| v28 | Trademark applications, resident, by count | Trademark applications filed are applications to register a trademark with a national or regional Intellectual Property (IP) offices and designations received by relevant offices through the Madrid System. A trademark is a distinctive sign which identifies certain goods or services as those produced or provided by a specific person or enterprise. A trademark provides protection to the owner of the mark by ensuring the exclusive right to use it to identify goods or services, or to authorize another to use it in return for payment. The period of protection varies, but a trademark can be renewed indefinitely beyond the time limit on payment of additional fees. Resident application refers to an application filed with the IP office of or acting on behalf of the state or jurisdiction in which the first-named applicant in the application has residence. Class count is used to render application data for trademark applications across offices comparable, as some offices follow a single-class/single-design filing system while other have a multiple class/design filing system. |
| v29 | Trademark applications, total | Trademark applications filed are applications to register a trademark with a national or regional Intellectual Property (IP) office. A trademark is a distinctive sign which identifies certain goods or services as those produced or provided by a specific person or enterprise. A trademark provides protection to the owner of the mark by ensuring the exclusive right to use it to identify goods or services, or to authorize another to use it in return for payment. The period of protection varies, but a trademark can be renewed indefinitely beyond the time limit on payment of additional fees. |
| v30 | GDP per capita (constant 2015 US$) | GDP per capita is gross domestic product divided by midyear population. GDP is the sum of gross value added by all resident producers in the economy plus any product taxes and minus any subsidies not included in the value of the products. It is calculated without making deductions for depreciation of fabricated assets or for depletion and degradation of natural resources. Data are in constant 2015 U.S. dollars. |
| v31 | Gross domestic savings (% of GDP) | Gross domestic savings are calculated as GDP less final consumption expenditure (total consumption). |
| v32 | Households and NPISHs final consumption expenditure (% of GDP) | Household final consumption expenditure (formerly private consumption) is the market value of all goods and services, including durable products (such as cars, washing machines, and home computers), purchased by households. It excludes purchases of dwellings but includes imputed rent for owner-occupied dwellings. It also includes payments and fees to governments to obtain permits and licenses. Here, household consumption expenditure includes the expenditures of nonprofit institutions serving households, even when reported separately by the country. This item also includes any statistical discrepancy in the use of resources relative to the supply of resources. |
| v33 | General government final consumption expenditure (% of GDP) | General government final consumption expenditure (formerly general government consumption) includes all government current expenditures for purchases of goods and services (including compensation of employees). It also includes most expenditures on national defense and security, but excludes government military expenditures that are part of government capital formation. |
| v34 | Exports of goods and services (% of GDP) | Exports of goods and services represent the value of all goods and other market services provided to the rest of the world. They include the value of merchandise, freight, insurance, transport, travel, royalties, license fees, and other services, such as communication, construction, financial, information, business, personal, and government services. They exclude compensation of employees and investment income (formerly called factor services) and transfer payments. |
| v35 | Imports of goods and services (% of GDP) | Imports of goods and services represent the value of all goods and other market services received from the rest of the world. They include the value of merchandise, freight, insurance, transport, travel, royalties, license fees, and other services, such as communication, construction, financial, information, business, personal, and government services. They exclude compensation of employees and investment income (formerly called factor services) and transfer payments. |
| v36 | Current health expenditure (% of GDP) | Level of current health expenditure expressed as a percentage of GDP. Estimates of current health expenditures include healthcare goods and services consumed during each year. This indicator does not include capital health expenditures such as buildings, machinery, IT and stocks of vaccines for emergency or outbreaks. |
| v37 | Mortality rate, under-5 (per 1,000 live births) | Under-five mortality rate is the probability per 1,000 that a newborn baby will die before reaching age five, if subject to age-specific mortality rates of the specified year. |
| v38 | Life expectancy at birth, total (years) | Life expectancy at birth indicates the number of years a newborn infant would live if prevailing patterns of mortality at the time of its birth were to stay the same throughout its life. |

Please consider the following tasks.

* Select a dependent variable and at least 7 independent variables (you can select more). Please note that there are variables that evaluate the same indicator but are calculated differently. Please don't include them in the model at the same time.
* Formulate hypotheses about the existence of relationships between the dependent and independent variables.
* Conduct descriptive data analysis.
* Conduct tests to select one of three models: pulled regression model, model with fixed effects, and model with random effects. Choose the right model and justify your choice.
* Describe the resulting model as a whole.
* Describe in detail the relationships between the dependent variable and each predictor.
* Draw conclusions from the analysis.

Please send the Jupyter Notebook with comments and answers to amelikyan@hse. The task should be done **individually**.The deadline for submitting the task is **20 May 14:00**.