

Input and output tables

Input-Output Tables (IODs) describe the sales and purchase relationships between manufacturers and consumers within an economy. They can either show flows of final and intermediate goods and services defined according to industry output (industry × industrial tables) or according to product product product (product × product tables). The OECD database of harmonised national IODs has industry × industrial approach. This allows for better integration with collections of statistics compiled according to industrial activity such as R&D expenditure, employment, foreign direct investment and energy consumption. The OECD IOT database is a very useful empirical tool for economic research and structural analysis at international level, as it highlights inter-industrial links covering all economic sectors. The latest set of OECD harmonised national input-output tables show matrices of inter-industrial flows of goods and services (produced domestically and imported, see Figure 1) at current prices (USD million) for all OECD countries and 28 non-EU economies (including all G20 countries) covering the years 2005-2015 (see coverage, as well as the main data sources used for the IOT). The following information can be found in the OECD. State Harmonised national input-output tables and Leontief inverse matrices Import content in the export indicator (see Figure 2) The tables are closely related to the OECD Inter-Country Input Output (ICIO) Tables, where the diagonal blocks represent

domestic transaction flows of intermediates and services across industries, while the off-diagonal blocks represent the country-based flows of intermediates via exports and imports. ICIO is the main source of production of the value-added trade indicators (TiVA). Figure 1, Format of the OECD harmonised national input-output tables Figure 2. Import content of exports, as a % of total export Related OECD databases for industrial analysis CO2 contained in the International Trade Inter-Country Input-Output Tables (ICIO) STAN Database for Structural Analysis (STAN) STAN Bilateral Trade by Industry and End-Use (BTDIxE) STAN Analytical Business Enterprise Research & amp; Development Database (ANBERD) Suggestions or queries may be sent to stan.contact@oecd.org, referring to OECD Input Output in the title of your message. Direct access to other editions 2015 edition (ISIC Rev.3) 2002 edition (ISIC Rev.3) 1995 edition (ISIC Rev.2) Supply and Use Tables (SUT) are matrices by product and industry showing how domestic production and services are used for consumption in production and final use (consumption, gross capital formation and export). The usage table also contains information on value-added components (remuneration of other net taxes on production, consumption of fixed capital, net surplus of production). What is is Tables? Input-output tables (IOT) are product-by-product or industry-by-industry matrices that combine both supply and use in a single table with identical classification of products or industries used on both rows and columns. There are these analytical tables that are derived from supply and use tables. Input-output modeling helps for economic impact analysis and can answer questions like: What happens to job growth when income tax is increased on businesses? How much does industrial production react when the price of petrol rises? Supply and usage tables together with input-output tables provide a thorough basis for various economic analyses. These tables provide detailed information for a given year on production activities, supply and demand of goods and services, consumption in production, primary raw materials and foreign trade. Among other things, you will find: The structure of the production costs and the value added generated in the production process; Interdependencies of the industrial sector; flows of goods and services produced in the national economy Flows of goods and services with the rest of the world. Supply, use and input output tables distinguish between 64 products and 64 industries. This article is about the economic model. See Input/Output to view the computer interface. Part of a series on Economics Index Outline Category HistoryBranches Classification History Economic stream economy Microeconomy Macroeconomy Macroeconomy Applied economics Mathematical economy Jel classification codes Concepts Theory Techniques Economic systems Economic growth Market National accounting Action Experimental economics Game theory Operations Middle Income Trap By application Agriculture Behavioral Business demographic development Digitization Organic Education Engineering Environment Evolutionary Economic geography Financial geography Economic Industrial education Economic Resources Organizational Resources Economic Planning Economic Policy Public Economy Public/Social Choice Regional Rural Service Socio-economic sociology Economic statistics Urban Welfare Welfare Economy Notable economists François Quesnay Adam Smith David Ricardo Thomas Robert Malthus John Stuart School School Karl Peters Michael Stanley Jevons Léon Walras Alfred Marshall Marshall Irving John Maynard Keynes Arthur Cecil Pigou John Hicks Wassily Leontief Paul Samuelson several Lister Economists Publications (journals) Glossary of Economics Business portal an input-output model is a quantitative economic model interdependence between different sectors; a national economy or different regional economies. [1] Wassily Leontief (1906-1999) is credited with developing this type of analysis and earned the Nobel Prize in Economics for his development of this model. [1] Origin's Francois Quesnay had developed a cruder version of this technique called Tableau économique, and Léon Walras's work Elements of Pure Economics on general equilibrium theory was also a precursor, generalizing Leontief's seminal concept. [2] Alexander Bogdanov has been credited with originating in the concept in a report delivered to the All Russia Conference of the Scientific Organisation for Working and Production Processes in January 1921. [3] This approach was also developed by L. N. Kritsman and T.F. Remington, who claimed that their work provided a link between Quesnay's tableau économigue and the subsequent contributions of Vladimir Groman and Vladimir Bazarov to Gosplan's method of material balance planning. [3] Wassily Leontief's work on the input output model was influenced by the works of classical economists Karl Marx and Jean Charles Léonard de Sismondi. Karl Marx's finances gave an early draft of a set of tables in which the economy consisted of two interconnected departments. [4] Leontief was the first to use a matrix representation of a national (or regional) economy. Fundamental diversion The model shows the relationship between industry within an economy that shows how production from one industrial sector can become an input to another industrial sector. In the industry-based matrix, column entries typically represent input to an industry sector, while row entries represent output from a given sector. This format therefore shows how dependent each sector is on all other sectors, both as a customer of output from other sectors and as a supplier of inputs. Each column in the input output array shows the monetary value of inputs for each sector, and each row represents the value of each sector's output. Say we have an economy with n {\displaystyle n} sectors. Each sector produces x in {\displaystyle x {i}} units of a single homogeneous good. Suppose the sector j {\displaystyle j} th needs in j {\displaystyle a {ij}} units from sector in {\displaystyle i} to produce 1 unit. Moreover, it is assumed that each sector sells part of its production to other sectors (intermediate production) and part of its production to consumers (final production or final demand). Call the final demand of the sector in {\displaystyle i} th sector d in {\displaystyle d $\{i\}$. Then we can type x i = one in 1 x 1 + one in 2 x 2 + ... + one in n x n + d in , {\displaystyle x $\{i\}=a \{i1\}x \{1\} mean:a \{i2\}x \{2\}+ (dots + a \{in\}x \{n\}+d \{i\}, for the total output equals is the total output equa$ intermediate output plus final output. If we leave A {\displaystyle A} the matrix with coefficients a j {\displaystyle x} be the vector for total output, d {\displaystyle d} will be the vector for final demand, so that our expression of the economy becomes x = A x + d {\displaystyle x} be x=Ax+d}, which after rewriting becomes (I – A) x = d {\displaystyle (I-A)x=d}. If matrix I – A {\displaystyle I-A} is invertable, then this is a linear system of equations with a unique solution, and so given some final demand vector the required output can be found. Additionally, if matrix I – A {\displaystyle I-A} is invertable, then this is a linear system of equations with a unique solution, and so given some final demand vector the required output can be found. Additionally, if matrix I – A {\displaystyle I-A} is invertable, then this is a linear system of equations with a unique solution, and so given some final demand vector the required output can be found. Additionally, if matrix I – A {\displaystyle I-A} is invertable, then this is a linear system of equations with a unique solution, and so given some final demand vector the required output can be found. A} is all positive (known as the Hawkins-Simon condition).[5] the required output vector x {\displaystyle x} is non-negative. Example Consider an economy with two items, A and B. The matrix of coefficients and the final demand is specified by A = (0.5 0.2 0.4 0.1) and d = (7 4). {\displaystyle x} A=\left({\begin{array}{cc}0.5&0.2\\0.4&0.1\end{array}}\right){\text{ and }}d=\left({begin{array}{c}7\\4\end{array}\\right).} Intuitively, this is similar to finding the amount of output each sector needs to produce, as we want 7 units of good A and 4 units of good B. Then solves the system of linear equations derived above giving us x = ((I - A) - 1 d = (19.19 12.97). {\displaystyle x=(I-A)^{-1}d=\left({\begin{array}}\right).} Further research There is extensive literature on these models. There is hawkins-simon condition of producibility. There has been research on the division of clusters of industrial flows and the study of constellations of industries. A great deal of empirical work has been done to identify coefficients and data have been published for the national economy as well as for the regions. The Leontief system may be extended to include a model of general equilibrium; It provides a method of degradation work done at a macro level. Regional multipliers While national input-output tables are commonly created by countries' statistics agencies, officially published regional input-output tables are rare. Therefore, economists often use location guotients to create regional multipliers based on national data. [6] This techniques, and none is universally superior across all use-cases. [7] Introduction to transport is implicit in the concept of industry flows. It is explicitly recognized when transport is identified as an industry - how much is bought from transport to produce. However, this is not very satisfactory because transport to produce of the industry and capacity constraints on regional production. Also the recipient of goods generally pays freight costs, and often transport data is lost because transport costs are treated as part of the price of the goods. Walter Isard and his student, Leon Moses, were quick to see the spatial economy and the consequences of input output, and began working in this area in the 1950s to develop a concept of interregional input output. Take a region versus the world matter. We want to know something about interregional commodity flows, then introduce a column in the table heading export, and we introduce an import row. Table: Addition of economic activities related to export and import transactions 1 2 Z Exports Final demand total output 1 2 Z Imports A more satisfactory approach would be to bind the regions together at industrial transactions within the region and intersectoral internal transactions. The problem here is that the table is growing fast. Input output is conceptually simple. It has succeeded in extending it to an equilibrium model in the national economy by means of high-quality data. Someone who wants to do the work of input-output systems must deal skillfully with industry classification, data estimates, and invert very large, poorly conditioned matrices. Moreover, changes in relative prices are not immediately addressed by this model approach alone. Input-output accounts are part of a more flexible form of modeling, computational general equilibrium models. Two further difficulties are of interest to transport work. There is the question of replacing one input with another, and there is the question of the stability of the coefficient as production increases or decreases. These are interrelated issues. They are related to the nature of regional production functions. Useful, since the input-output model is basically linear, lends itself to quick calculation as well as flexibility in calculating the effects of changes in demand. Input-output models for different regions can also be linked together to examine the effects of interregional trade, and additional columns can be added to the table to perform environmentally enhanced input-output analysis (EEIOA). For example, information on fossil fuel inputs to each sector can be used to investigate flows of embodied carbon in and between different economies. The structure of the input output model has been incorporated into the national accounts of many developed countries and as such can be used to calculate important measures such as national GDP. The input-output economic planning. A significant use of input-output analysis is to measure the economic impact of events as well as public investment or programs, as evidenced by implan and regional Input-Output Modeling System. It is also used to identify economically related industrial clusters and also so-called key or target industries which is most likely to increase the internal coherence of a By linking industrial production to satellite accounts that formulate energy consumption, wastewater production, space requirements, etc., input-output analysts have expanded the approaches used for a wide range of applications. Input output and socialist planning The Input output model is one of the most important conceptual models for a socialist planned economy. This model involves a direct determination of the physical quantities to be produced in each industry, which are used to develop a coherent economic plan for resource allocation. This planning method contrasts with price-oriented Long-model socialism and Soviet material balance planning. [8] In the Soviet Union's economy, planning was carried out using the material balances method until the country's dissolution. The method of material balance was first developed in the 1930s during the Soviet Union's rapid industrialization drive. Input-output planning was never adopted because the material balancing system had been anchored in the Soviet economy, and input-output planning was avoided for ideological reasons. As a result, the benefits of consistent and detailed planning through input-output analysis were never realized in the Soviet type of economies. [9] Measuring input-output tables The mathematics in input-output economics is straightforward, but the data requirements are enormous because the costs and revenues for each branch of economic activity must be represented. As a result, not all countries collect the necessary data and data quality varies, although the un has set a set of standards for data collection through its National Accounting System (SNA):[10] the latest standard is SNA 2008. Because the data collection and preparation process for the input output accounts is necessarily work and computer intensive, input output tables are often published long after the year in which the data was collected — typically as much as 5-7 years later. In addition, the economic snapshot that the benchmark version of the tables contains of the cross-section of the economy, typically only once a year, is taken at best. But many developed countries estimate input-output accounts annually and with much greater recency. This is because while most applications of input-output analysis focus on matrix sets of inter-industry exchanges, the actual focus of the analysis seen from most national statistical offices is the benchmarking of gross domestic product. Input-output tables are therefore an instrumental part of the national accounts. As suggested above, the basic input output table only reports intermediates and services exchanged between industrial inputs of the industry as payments for labor; business taxes dividends, interest and rents allowances for capital consumption (depreciation) other property income (e.g. profits) and purchases from foreign suppliers (imports). At national level, although not imports when added together, this is called gross domestic product with origin or gross domestic product by industry. Another range of column vectors called final demand or gross product consumed. This shows columns of spending by households, governments, changes in industry stocks, and industries on investments, as well as net exports. (See also gross domestic product. In any case, by applying the results of an economic census that asks for sales, payrolls, and material/equipment/service inputs of each company, statistical offices returned in estimates of industry-level profits and investments using the input-output matrix as a kind of doubleaccounting framework. Input-output analysis versus consistency analysis Despite the clear ability of the input-output model to portray and analyze dependence on one industry or sector on another, Leontief and others never managed to introduce the full spectrum of dependency relationships into a market economy. In 2003, Mohammad Gani, a student of Leontief, introduced consistency analysis in his book Foundations of Economic Science, which formally resembles the input-output table but explores the dependency relationships with respect to payments and intermediation relationships. Consistency analysis examines the consistency of buyers' and sellers' plans by breaking down the input output table into four matrices, each for a different type of tender. It integrates micro and macro-economics into one model and deals with money in a value-free way. It deals with the flow of funds through the movement of goods. See also Man-made metabolism Computable general equilibrium Economic base analysis Economic planning EIOLCA Environmentally enhanced input-output analysis Gross output Linear programming Industrial metabolism Industrial organization IPO model Material balance planning Material flow analysis Net output Shift-share analysis Social metabolism References ^ a b Thijs Ten Raa, Input-Output Economics: Theory and Applications: Featuring Asian Economies, World Scientific, 2009 Walras, L. (1874). Éléments d'économie politique pure, ou théorie de la richesse sociale [Elements of Pure Economics, or The Theory of Social Wealth]. ^ a ^ a century of Belykh, A.A. 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