

U.S. investment data by asset and industry, Sources and Methods

Two main sources are used to construct the dataset on investment by asset and industry for the U.S. The first is the BEA 1997 Capital Flow Table (CFT), showing the use of different types of investment goods by 123 NAICS industries in 1997.¹ The second source is the BEA Detailed Data for Fixed Assets (DFA) with time series on purchases of different types of investment goods by 63 NAICS industries for the period 1901-2004.² The DFA records investment on an ownership basis, while the CFT is on a user basis. In addition, data on government investment is taken from the National Income and Product Accounts (NIPA Table 5.8.5).

In the final dataset, investment by using industry is reported. This has the advantage that it allows for a better understanding of what types of capital an industry uses in its production process, such as the intensity of ICT use. A drawback is that it introduces an inconsistency in the production account by counting the rental costs of leased capital both as lease payments (part of intermediate inputs) and as capital compensation. However, in most industries, lease payments make up only a minor part of intermediate inputs, with an average share of 2.4 percent in 2004 and in only two industries, lease payments make up more than 5 percent of intermediate inputs.³ Furthermore, results from the investment survey in the Netherlands for 2000 suggest that operational leases make up only around 6 percent of total investment (once investment is measured by using industry). A more thorough investigation of how best to account for lease payments would be useful, but for the moment, the change from an ownership to a use basis is not likely to pose major problems.

Both the CFT and DFA data show enough asset detail to distinguish the 6 assets in the database, namely computers, communication equipment, software, non-IT equipment, non-residential structures and transport equipment.⁴ The CFT data is simply

¹ <http://www.bea.gov/bea/newsrel/flow1997.xls>.

² <http://www.bea.gov/bea/dn/FA2004/Details/Index.html>.

³ Those industries are rail transportation and oil and gas extraction. For the latter industry, this most likely covers oil royalties instead of payments for fixed assets.

⁴ Data on residential investment is also distinguished, but not used in growth accounting to focus on firm production, so those investment flows are omitted.

summed, as is the DFA data at current prices. The investment price indices in the DFA data are aggregated across assets using a Törnqvist procedure:

$$\Delta \ln P^{t,t-1} = \sum_i \frac{1}{2} \left(\frac{y_i^t}{\sum_i y_i^t} + \frac{y_i^{t-1}}{\sum_i y_i^{t-1}} \right) \Delta \ln P_i^{t,t-1}, \quad (1)$$

where P_i is the price index of asset i and y_i is the investment of each industry in asset i . So in words, the price change of the aggregate asset from year $t-1$ to year t is equal to the weighted average price change of the detailed assets, where the weights are equal to the average share in investment over the two years of each of these detailed assets.

One further adjustment has to be made with regards to the Management of Companies industry (NAICS 55). For the most part, this industry covers the output and employment of firm headquarters. Under the ISIC classification (and the previous U.S. SIC87 classification), such activities are included in the industries to which they provide headquarters services. So for example, the headquarters of Wal-Mart would be included as part of retail trade under ISIC but as part of management of companies under NAICS. The 1997 Benchmark Use table is used to determine intermediate deliveries from management of companies to all other industries. The investment of the management of companies industry is then allocated to other industries based on these deliveries.⁵

As discussed before, investment in this database is reported by industry of use, not industry of ownership. For 1997 the CFT gives the distribution of investment by industry and asset. The trends in investment by industry and asset from the DFA data are then used to estimate investment for all other years in the 1901-2004 period. The DFA data then provide the control totals for private investment by asset for each year, since that dataset represents the most recent revisions to the NIPA and the most current source material. In the next step, government investment is added, under the assumption that the investment in equipment and software has the same asset distribution as overall private investment. Finally, investment is aggregated across NAICS industries to the required level of the detail in the same fashion as before for the aggregation across assets.

⁵ Not all investment is redistributed as part of the services of this industry is also exported.