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NEW MEASURES OF THE U.S. ECONOMY

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The Information Age has revolutionized how we shop, travel and entertain ourselves—and yet in many ways we know less today about how this creates value in the economy than we did three decades ago.

That's because our main gauge of economic growth, Gross Domestic Product, doesn't capture much of the value created by "information goods." Current research by MIT professor Erik Brynjolfsson, Adam Saunders, and Avi Gannamaneni shows why GDP underestimates the value of digital goods and proposes methods to account for what's missing that will be the basis for future work.[1] GDP limitations were also discussed in the 2009 book, Wired for Innovation, and in earlier research reports.

Just how bad is the problem? According to the research team,The Bureau of Economic Analysis, which tabulates GDP, calculates the information sector accounts for the same share of the U.S. economy as it did 30 years ago—between four and five percent. That hardly seems possible at a time when consumers and businesses have access to a vast and growing storehouse of information, apps and other online tools.

The researchers report that the root of the problem is prices. GDP mainly focuses on the market value of goods and services. That made sense when economists developed the measure, during the Great Depression of the 1930s, when the world was mainly concerned with how many tons of steel or bushels of corn were produced. But digital products like Wikipedia, Google, Facebook and YouTube—by their nature—are often free. That makes them virtually invisible in terms of consumer purchases, though not in terms of value delivered.

FINDING THE BOUNDARY

There are two theoretical issues the reseachers must tackle in order to include digital goods and services in GDP. The first is the "production boundary"—the line between those human activities that should be considered when adding up the total production of the economy and those that ought to be excluded from it because they're just part of everyday life. If you buy a cup of coffee at a cafe, the sale clearly falls within the boundary. But if the same barista who whipped up the java at the store makes a cup at home for himself or his family, it's outside the boundary. Many things are like this. Tidying up your home or cooking a meal is outside the boundary; hiring someone to do either of those for you falls within.

Excluding digital goods from the production boundary is especially problematic in cases where consumers can swap free digital goods for market goods. Consider newspapers. As consumers shift to free online news sources, GDP decreases—because nobody is handing over money at the newsstand for a bundle of paper. Ironically, GDP goes down even if people are consuming more information than they were before.[2]

IN THIS RESEARCH BRIEF

- The digital economy churns out goods and services largely missed in calculations of Gross Domestic Product.
- The problem with digital goods is that they're mostly free—while GDP measures things with market prices.
- There is a theoretical basis for including free goods in GDP.
- "Conjoint analysis" could offer a way to attach value to digital goods.

[1] Erik Brynjolfsson and Adam Saunders, "New Measures of the U.S. Economy," MIT IDE Research Project, 2016

[2] Erik Brynjolfsson and Avi Gannamaneni, "Measuring Changes in Consumer Surplus in the Digital Economy," MIT IDE Research Project, 2016

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The second issue identified by the researchers is more daunting: Even if the government wants to include something in GDP, they often leave it out if they can't get a clear picture of its value. For example, illegal drugs have prices—but since the transactions of drug dealers are by necessity done in the shadows, the government has no reliable way to measure them, so they're excluded.

And yet, it's also not the case that the government only counts things with price tags. There's a host of items counted in GDP which are not subject to market transactions or have no price. The government gets around that hurdle by "imputing" their value—usually by comparing the good or service in question to something with similar characteristics that does have a market price. This makes up a big chunk of our existing GDP measure: Almost one out of every six dollars of GDP were imputed in 2014.

IMPUTING PRICES

Government services are one example. If the city cleans the sidewalk in front of your house—you don't pay directly for it—but it's value can be calculated by comparing it to what it would cost to hire someone to do it. Or take housing. The largest imputation in GDP is for owner-occupied housing. The government imputes the value of that housing—which for the sake of simplicity is assumed to be owned outright—by comparing it to what people pay when they rent a similar home.

The key point is that there is precedent to include free goods and services in GDP. The researchers just need to find a way to impute its value.

To be sure, digital goods are not the only area where GDP has failed to keep pace with a fast-moving economy. The Nobel laureate economist most closely associated with the development of GDP—Simon Kuznets—noted early on that it does a poor job measuring the service sector due to the lack of good data and the more amorphous nature of jobs that don't create tangible goods, such as lawyers or college professors. The shortcoming has become a major concern of the Bureau of Economic Analysis, since services have grown to account for the lion's share of the economy.

Three decades ago, few worried about whether digital goods were counted in GDP, because there were so few of them. The reseachers believe that with the amount of digital data being generated nearly doubling every year, it's become too large to ignore.[3]

EXPERIMENTING WITH SATELLITES

The government regularly updates how it calculates GDP to include new things—and often starts with "satellite" accounts that allow them to experiment on gathering and analyzing information about a slice of the economy not previously part of GDP. In the latest round, in 2013, the government added a new category of private fixed investment as part of GDP called "intellectual property products," which includes research and development, artistic originals, and software.

Wrangling over these definitions is part of a larger debate going on among economists and policymakers over whether GDP gives an accurate picture of all the economy's productive activity—or even a useful measure of human wellbeing. For instance, some argue a better measure of well-being is consumption—rather than production. That would expand the measure to include those lattes made at home and would also naturally extend to free digital goods that allow people to consume new products, often at zero cost.

Even things included in GDP often get undercounted. For example, the measure does capture the money government spends on fixed investments—like building a road—but doesn't include returns on government-funded R&D. That's a huge gap. One estimate notes that while the federal government invested roughly $5.6 billion in the Human Genome Project, in 2010 dollars, the returns have already totaled nearly $800 billion—with more to come. That's just one estimate, but it highlights how the return on government investment is often far greater than the zero it currently counts for in GDP.

EFFORTS TO ATTACH VALUE

There are a variety of ways to value digital goods, but

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[3] Erik Brynjolfsson and Adam Saunders, "Wired for Innovation: How IT is Reshaping the Economy," MIT Press, 2009

each has its own weaknesses. the researchers have tried estimating the value of internet access, for instance, but that doesn't in any way address the growing value of the digital goods themselves. Others have tried gauging their value based on advertising revenue, but that means ignoring digital goods that are subsidized or not supported in any way by ads—and even for those that are, advertising revenues can be completely unrelated to the value of the associated content.

Another technique is to compare free digital goods to similar products that do have a price. A free news site, for example, would be valued based on the price of a news site with a paywall. But it's hard to find a parallel for many digital goods and services. There are no products similar to a Google search that charges users. Yet another method is to estimate what it costs to produce digital goods. The problem with that is that many digital goods and services are produced by free labor, such as the millions of people who write Wikipedia articles. In order to use that approach, the government would have to assume the value of those articles is roughly equal to the hypothetical wages that would be needed to create and edit the pages.

A MORE DIRECT APPROACH

In light of the difficulties with all these approaches, the research team is exploring a more direct approach—choice experiments and, specifically a technique called "conjoint analysis." This is a tool often used by marketers who want to find out how buyers make tradeoffs among competing products and suppliers. The idea of the reseachers is to use this to determine how people value different features or functions of various free goods. Subjects for this research could be recruited through online tools—in which case the cost per subject stays low and results can be gathered from hundreds of subjects within an hour.

A key challenge will be getting consumers to attach value to goods and services that they perceive as available for free or at very low price. There is some evidence that low prices make consumers perceive the value of goods and services lower.

If the researchers are able to study the full extent of the information economy, they could potentially identify hundreds of billions of dollars in benefits that are not measured in current GDP statistics. This measure could offer the added benefit of identifying which cities, industries, products and services are generating the largest share of this previously hidden value, and whether growth is slowing or accelerating. The team could also finally test whether the information sector has held steady at four or five percent of the economy for the last 30 years—or if it has actually vastly grown once all of its free output is included.

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