Moving beyond the balance-sheet economy

> ***Economists typically treat the national, regional and global economies as one large balance-sheet. But digital is different***

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In 2016 the United States exported to Europe US$598bn worth of goods and services, and imported $698bn of goods and services. Minus some statistical discrepancies, European countries recorded the inverse flow of imports and exports.

For the past century, economists and policymakers have relied on this 'balance-sheet' approach to economics to guide their decisions. One country's exports are reported as another country's imports. One company's production shows up elsewhere in the economy as consumption, or investment, or inventories. The output of the world is the sum of the outputs of the individual countries.

The balance-sheet approach to the economy is well-suited to the physical world. Go back 100 years, and the economies of industrialised countries were composed of physical objects that we could easily count: millions of cases of canned American corn; millions of hectolitres of French wine; millions of metric tonnes of German coal; thousands of long tonnes of British steel ingots. These were tangible and real economic outputs.

In the 1930s and 1940s policymakers needed to get a picture of the whole economy, including the growing service sector. Economists extended the balance-sheet approach by using flows of money—sales, purchases, income,

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investment—as indicators of economic activity. These flows of money were added together to get gross national product, or GNP (which later became gross domestic product, or GDP). To simplify, the output of the economy was the sum of consumer spending, plus business investment, plus government spending on goods and services, plus net exports.

This adding-up process underlies the way that economists think about not just national economies, but the global economy as well. When Eurostat publishes its figures for the output of the European Union, or the International Monetary Fund calculates the output of the world economy, those organisations are adding together the output, calculated in monetary terms, of individual countries.

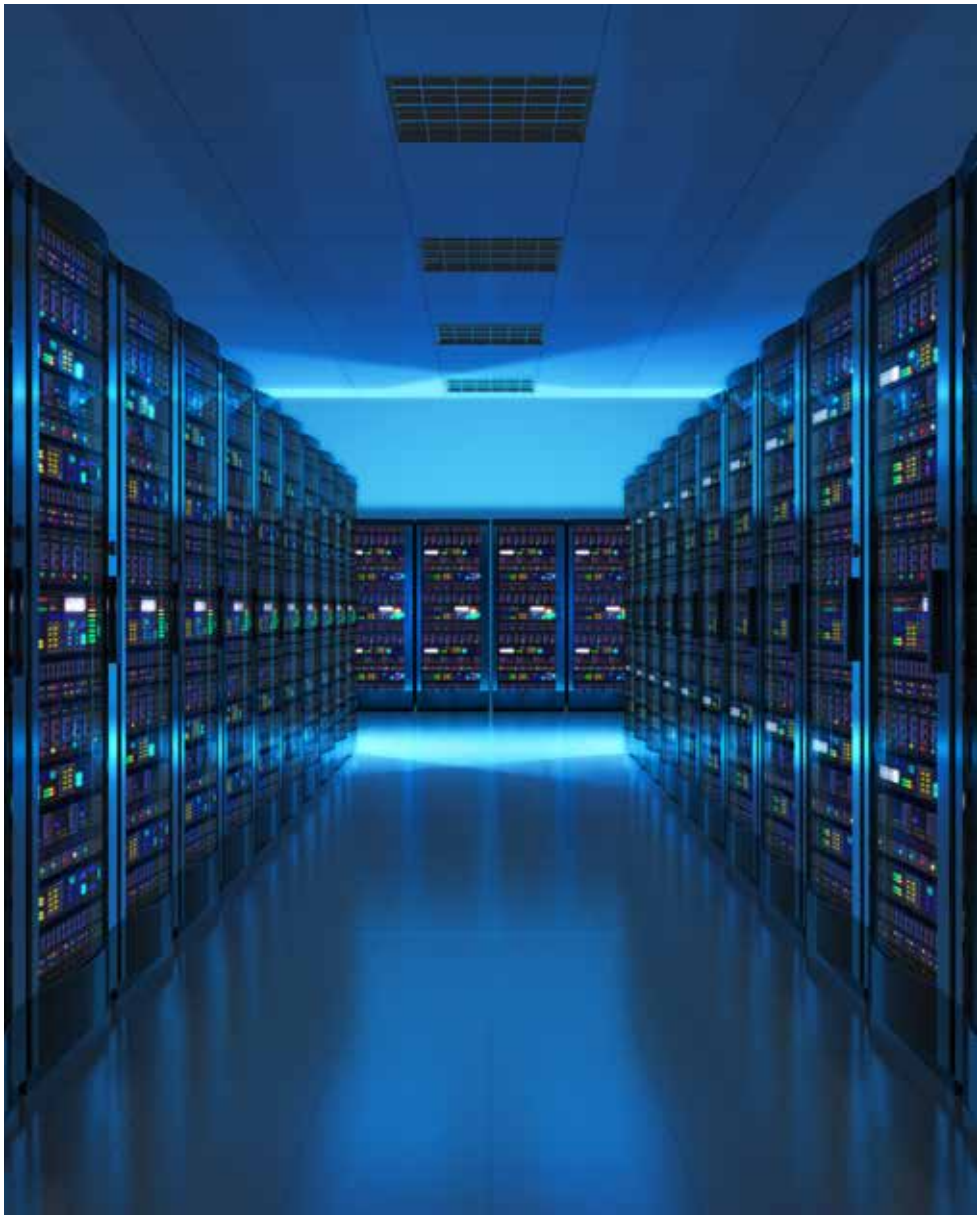
In an important sense, economists typically treat the national, regional and global economies as one large balance-sheet. By assumption, production of goods and services has to balance with the various uses of those goods and services in the public and private sectors.

But digital is different. As data becomes more important to the global economy, it increasingly bends (and perhaps breaks) the assumptions underlying the balance-sheet view of the economy. For one, many important services in the data-driven economy are not matched by a monetary transaction. Consumers don't pay to use Facebook or Google Search, for example. Wikipedia is free to use, as are many mobile applications. Erik Brynjolfsson and Andrew McAfee write that "the gap between what we measure and what we value grows every time we gain access to a new good or service that never existed before, or when existing goods become free as they so often due when they are digitized".[1]

Compare, for example, mailing a letter versus sending an email. If you send five identical letters to five recipients, each letter requires a stamp, physically attached to the envelope. But the transmission of an email from a sender to five recipients does not necessarily leave a monetary footprint at all. An email from Washington to Brussels may pass through several different internet service providers (ISPs) en route to its destination. Each of the ISPs has to decode the address to pass it on to the next stage of the email's journey. But often no money changes hands, since the largest ISPs – known as Tier 1 providers – typically exchange data traffic through 'settlement-free peering', which involve no payments.[2] As a result, we cannot use monetary transactions as a guide to economic activity.

1 Erik Brynjolfsson and Andrew McAfee. 2014.'Beyond GDP: How Our Current Metrics Mismeasure the Digital Economy'

2 Accounting rules generally do not require telecom companies to report settlement-free peering as a paired income/expense barter item.



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But the increased importance of data poses an even more fundamental challenge to the balance-sheet view of the economy. Remember that data is non-rival. That means unlike cars or homes, data can be duplicated and shared at a relatively low cost, so the production of data does not have to be balanced with the uses of that data.

To give the simplest example, a program to teach coding can be developed once and duplicated and shared as many times as there are potential students. Similarly, information on how to produce a refrigerator or a computer can be summarised, duplicated and shared at a very low marginal cost. Google Maps, a resource which is costly to produce and maintain, can be used by multiple people across the world simultaneously.

In his widely-cited 2016 report on the UK statistical system, Sir Charles Bean writes: "Once in digital form, data can be copied many times, often at essentially zero cost, while ownership rights might often not apply. Therefore, imputing the value of databases from their costs is likely to understate the true value of the data to all its users. Moreover, new and more valuable databases can often be created by merging or recombining existing data sources."[3]

So it is wrong to think of data like oil, where there is only a limited supply laid down millions of years ago. Instead, data proliferates at an exponential rate. And data generated in one country can be duplicated and shared with other countries. What matters is not so much the access to the data, but whether a person or country has the capability of using it.

If we are to understand the global economy – and especially if we are to understand the fundamental connections between the United States and Europe – the balance-sheet concepts of production, consumption and trade need to be augmented. We measure output of goods and services, but we don't measure the data created and how it is put to use. We measure how much consumers spend, but not how the value of their time changes. We measure the flows of goods and services between the two regions, but we don't measure the duplication and sharing of intangibles, and how effectively they are used.

The issue of measuring the value of cross-border

3 Bean, Charles. 2016. 'Independent Review of UK Economic Statistics.' https://www.gov.uk/government/publications/independent-review-of-uk-economic-statistics-final-report

flows of data has received much attention in recent years. The United States International Trade Commission (USITC) undertook a comprehensive effort to measure and evaluate the economic impact of digital trade. The McKinsey Global Institute has explored the economic impact of cross-border data flows. The US Bureau of Economic Analysis (BEA) reports on trade in ICT services and potentially ICT-enabled services.

Yet many unanswered questions remain. First, an unknown but potentially large proportion of cross-border data flows do not show up in the export and import statistics because they do not leave a monetary footprint. In the US the BEA tracks service sector exports and imports by surveying companies. They are asked if they have paid money to or received money from foreign persons for services or use of intellectual property. If no money changes hands, the BEA does not record exports or imports, even if the data crosses national borders. For example, even if millions of people use a free game app (such as Pokemon Go) with a server in a different country, there is no trade recorded.

Even when money changes hands, cross-border data flows typically do not fit neatly into export-import national income categories. The fundamental (simplified) national income account identity is:

gross domestic purchases = gross domestic product – exports + imports

But since data can be duplicated at a relatively low cost, it's not clear whether the 'export' of data reduces the amount of output available to be used domestically.

We might consider the fundamental economic operations of cross-border data flows to be duplication and sharing rather than exports and imports. Then we would talk about 'global connections' rather than 'global trade'. This approach would also require rethinking the meaning of global GDP, since it would no longer be enough to simply add up the GDP of individual countries.

Indeed, the lack of good data on the economic value of cross-border data flows increases the odds of mistakes in trade policy, tax policy and macroeconomic policy. For example, trade negotiators are more likely to focus on better-measured industries, such as agriculture, because so many of the benefits of cross-border data flows are unmeasured. Tax policy changes to increase short-term revenues from cross-border data flows may do long-term damage that is not recognised because of a lack of measurement.

How does digital reframe the way we think about consumption and living standards? First, in the digital age we use online services – email, search, social media, apps – that are provided for free, while saving us time. Valuing those is difficult.

But that's only part of the story. In the US, our recent research shows that digital industries – such as online businesses, finance and professional services – make up only about 30%

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of the economy.[4] Physical industries, such as manufacturing, transportation and healthcare, still make up 70% of the economy.

Yet increasingly the products being provided by the physical industries are taking on a digital dimension. Take e-commerce: it turns out that consumers don't simply want to order goods online – they want immediate or near-immediate delivery. Speed of response is essential.

That's why Amazon and other retailers are building hundreds of 'fulfillment centres' in the US and around the world, close enough to consumers to offer next-day delivery. In the US, the growth of e-commerce and 'fulfillment centres' has added roughly 400,000 jobs from December 2007 to May 2017, more than enough to balance out the 76,000 full-time-equivalent jobs lost in brick-and-mortar retail.[5]

How can e-commerce be creating jobs? The key is that the ability to order online and have items delivered rapidly is saving consumers the time it takes to drive or walk to the store, shop and return. This time – which in the US roughly accounts for more than four hours per week per person – is not measured as part of GDP. But if it were measured, we'd see that the productivity gains from e-commerce are a win-win-win for consumers, workers and the environment: less time spent shopping for consumers, more and better-paid jobs for workers, and less impact on the environment, as the car parks full of cars at shopping malls, each with one or two packages, are replaced by a much smaller number of delivery trucks carrying many items.

More and more, the data-driven economy will place a great value on time, and the quality of time. That will inevitably lead us to treat leisure and life expectancy as an essential dimension of living standards. In the US this shift is starting to happen, as economists have realised that the rise in death rates for certain groups played a big role in the 2016 presidential election.[6] Indicators such as life expectancy can be monetised and included as part of output, which would very much change how we compared different countries.

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4 Michael Mandel and Bret Swanson. 2017. 'The Coming Productivity Boom.' http://www.progressivepolicy.org/wp-content/uploads/2017/05/TCC-Productivity-Boom.pdf

5 Michael Mandel, May 2017, 'Update on ecommerce and brick-and-mortar retail jobs,' http://www.progressivepolicy.org/blog/update-ecommerce-brick-mortar-retail-jobs/

6 Joel Achenbach and Dan Keating. 2017. 'New research identifies a 'sea of despair' among white, working-class Americans' - Washington Post, 23 March 2017

Despite the rise of the data-driven economy, both the US and Europe share the problem of slowing productivity growth. In 2015 the OECD published a massive analysis entitled 'The Future of Productivity'.[7] The study's main finding was that "the main source of the productivity slowdown is not so much a slowing of innovation by the most globally advanced firms, but rather a slowing of the pace at which innovations spread throughout the economy: a breakdown of the diffusion machine."

In other words, the data or information about how to boost productivity is available, but just not being used widely enough. What matters is not simply productivity, but absorption. Absorption is not a concept that is familiar in the traditional balance-sheet economy. In the conventional view, a national or regional economy has a certain amount of resources available, which are either being used or not used. Economies reach their potential when their resources are fully used.

In today's world we have a near-limitless capacity to duplicate and share data. Factory plans can be easily reproduced, and cloud computing capacity can be easily accessed no matter where you are located. But it turns out that some countries are better than others at absorbing the information and making use of it. The OECD report enumerates several different ways a country or a region can improve its ability to make use of global data. These include:

- Extending global connections via trade, foreign direct investment, participation in global value chains, and the international mobility of skilled labour
- Experimenting with new technologies and business models
- Increasing flexibility and allowing labour, capital and skills to flow to the most productive firms
- Creating the capability to make the best use of new technologies by investing in R&D, education and skills, and organisational know-how

Duplication, sharing and absorption mean that Europe and the US could share in the production of knowledge, boosting growth rates on both sides of the Atlantic. One could specialise in creating new manufacturing techniques, and the other in creating new forms of biotech. By combining efforts, their ability to boost output could go up exponentially.

But we must also provide some somber historical context. The driving forces for developing the national income accounts were first the Great Depression, and then the Second World War. During the 1930s, economists had made progress in developing standards for GNP, wrote James Lacey, but "it took a policy requirement (the requirement for economic information during world war) to push the

7 OECD. 2015. 'The Future of Productivity.' https://www.oecd.org/eco/growth/OECD-2015-The-future-of-productivity-book.pdf

U.S. government to develop an authoritative, consensus-based statistical measurement."[8]

Using the new methods of adding up the economy, economists were able to make two significant contributions to war planning in 1941. First, they told policymakers that the initial timetable for military production was far too optimistic. "They could concoct all the planes they liked for a 1943 invasion," notes Lacey, "but the economists could have told them in 1941 that the forces they planned for would not be there."

But the new-found economic science of adding up the economy also told policymakers that they could produce the planes and tanks needed without forcing excessively high sacrifices on American families.

In the digital era, we must seriously consider whether our current GDP statistics will be equally useful for us in the case of an emergency. In the digital era, are we ready to mobilise economically for a major upheaval such as cyber war, military conflict, a major epidemic or a sudden impact from climate change? Do we accurately know the true capabilities and chokepoints of the national, regional and global economies in the digital era? Answering these questions will help us prepare better for our digital future.

8 Lacey, Jim. 2011. 'Keep from All Thoughtful Men: How U.S. Economists Won World War II,' Naval Institute Press.