

General Discussion: Understanding Weak Capital Investment: The Role of Market Concentration and Intangibles

Chair: Kristin J. Forbes

Mr. Furman: I want to make four points. One is really welcome the way the second panel has shifted discussion toward the sectoral because I think the idea that this one grand unified theory of the economy as a whole as opposed to each sector has a different story to tell, I think is right. I think as Thomas Philippon pointed out in his comments, most of the sectors in the U.S. economy are shielded from foreign competition either because they're services or something like airlines, which are enormously protected in terms of trade. I think some of John Van Reenen's points from this morning about trade increase in competition are limited to a subset of the economy.

I think, picking up on something Thomas said, broadening the conversation from antitrust to all the ways in which we inhibit competition is important. In the health sector for example, when you reimburse doctors more when they're consolidated with the hospital than when they're operating on their own, you're going to get more consolidations. That's reimbursement has changed in Medicare in that direction; that's not an antitrust policy. IP I think is particularly important in that regard, where it's both gotten stricter and more of the economy is in IP intensive sectors. So I think that's another way the competition has been reduced.

In terms of how big a deal it is, I think this paper opens up something that says it might be more important than what Glenn Hubbard said, which was a comment I think based just on prices. This is starting to say it affects investment, could affect R&D, could affect innovation, productivity, growth. Maybe at lunch we'll hear about how hospital mergers would affect wages. That doesn't show up as efficiency; it shows up at distribution, but it's something we might care about. I think it might be a bigger deal than we might have traditionally thought.

And that gets to the last point and this is picking up on something Valerie Ramey said. We're uncertain about all of this; is that an argument for inaction? Or with monetary policy, as we heard from Chairman Powell, you can reverse yourself and go back and do a little bit more. Once Google has bought DeepMind, you can't undo that merger. I think there is a very large cost of waiting that has to be weighed against the cost of acting under uncertainty, and I think that might lead to us wanting to act a little bit more knowing we can always allow the merger later. We can't unallow it very easily later.

Mr. Henry: First, thank you Jan Eberly and Nicolas Crouzet for a very interesting paper. I want to make a quick observation/question, which underscores some points made earlier. If there has been increased reallocation of output from low- to high-productivity firms and these sort of superstar effects, why is it that aggregate productivity has been stagnant? I think Thomas pointed to some very interesting potential explanations, which is this kind of race between scale and excludability. It's particularly interesting if you look at the graphs on page 9 of Jan's handout. In the high-tech sector and the consumer sector there clearly are increases of productivity. The question becomes, is it just that these sectors are still too small where their reallocation isn't large enough to actually translate into overall aggregate productivity gains? And how do we think about, to Thomas' point, whether these superstar firms are drawing in the resources and are incentivized to actually increase output to drive overall productivity gains? Or, are they just trying to essentially hold on to monopoly rents? I think these are unanswered questions, but it's a puzzle and I would welcome any thoughts that Jan and Nicolas have as to what

the explanation is for the lack of aggregate productivity gains given the underlying sectoral gains.

Ms. Evans: I have two comments. The first is related to the observation about the relationship between investment in intangible capital and concentration. And it has to do with the fact that this investment in intangible capital by certain firms, the benefits of that, are potentially disseminated throughout the economy. I'll give a couple of examples. Amazon SageMaker, Azure Machine Learning Studio—those are platforms that have been built on intangible capital that have algorithms, machine learning, all types of things that then enable firms throughout the economy to go and very inexpensively take advantage of these algorithms. Oftentimes, the inability to find workers able to build the initial algorithms is what impedes firms from doing so. But the fact that those things are available has a huge potential productivity benefit throughout the economy.

Second example. I don't know if anyone's been to the Amazon Go store in Seattle. That's the store where you just walk in, swipe your smartphone, put things in your bag and walk out. That's all it is. Now what is behind that technology? It's a lot of hardware—but it is also algorithms. And if Amazon decides to license those algorithms to other firms, that potentially disseminates throughout the economy. I think we need to think beyond just what's going on within that specific industry and with concentration there, and think about what are the potential effects throughout the economy of that investment in intangible capital.

My second comment/question is related to compute in the cloud rather than on premises. . For example, Amazon Web Services (AWS), Azure, Google Cloud. So my question is, how does that show up in the investment data? Also, how do software as a service, PC as a service, other “as a service.” How do they show up in the investment data?

Ms. Lund: I want to pick up on two points. One on data, but I'm going to take a different view than Carolyn Evans. One of the sources of intangible value for firms that we're seeing is that the biggest companies get a lot more data, use big data analytics and then can hone their products and marketing strategies. You see it in

consumer-facing businesses where the larger you are, the more nuanced you can become in your marketing strategy, your store layout, etc. Then you'll see it even more, we believe, going forward with machine learning and artificial intelligence. So I think John Deere bought Blue River because lots of people can design an optical computing device that can distinguish between a corn plant and a weed. But by getting there first, John Deere is feeding the experience of farmers into the Blue River algorithm and refining it. So there may be a big first-mover advantage to data in that point. Overall, I think the data component may create intangible capital and economies of scale and enable firms to get market power by being first, rather than being shared with the cloud.

And the second source of intangibles I think would be interesting to dive into is the power of brands, and this gets into consumers' tastes. So think about the brand of Nike or Starbucks. There's no software there. There's no real R&D. There may be some data analytics about what consumers like, but there seems to be around the world something that I would hypothesize is a little bit of a homogenization of tastes. Or maybe it's just knowing what you're going to get. But the fact is Nike and Starbucks have giant markups on their products and are gaining scale. So there's something about changing consumer tastes that even outside the United States seems to appeal to these very large consumer goods companies. And that development of brand would come through marketing expenditures, not through goodwill. This is mainly internally generated, not through acquisition of other firms. So unfortunately, it's hard to measure although there are industry benchmarks of, for instance, what companies are spending on marketing and advertising, etc., that maybe you could use.

Productivity. The big conundrum of why has it been so slow if we believe all these good things are happening at the firm level. And again I'm wondering what role consumer demand has played. So over the last 10 years, of course, we've had weaker than expected or desired growth in the United States and Europe, and this may be why you see less exit of the less-productive firms, even as the more-productive firms are pulling ahead. And it may influence measured productivity

as well, as sales have been relatively stagnate and firms don't want to expand given uncertainties about aggregate demand.

Ms. Eberly: Thanks very much for those questions and also to Thomas for his comments. There's been a really productive conversation between a number of researchers working in this area as you can tell, and I think we've all benefited from each other's work.

Let me weave some of Thomas' points into the questions from the audience. One is about measurement of intangibles because it's very haphazardly measured in the data. Probably the acquired part of intangibles is the better-measured part because there's a specific transaction. And much of the goodwill, as Thomas pointed out, arises in those transactions. But not to pick on Amazon, but just to be clear: in the accounting data, the titles of things are a very poor indicator of what's actually in them. So goodwill is not goodwill, that is, good as we understand it in language. Amazon says in their 10K that the goodwill of acquired companies is primarily related to improvements in technology, performance and functionality, as well as sales growth from future products; and it goes on to say, and certain intangible assets that do not qualify for separate recognition. It's clear that intangibles are explicitly part of goodwill.

Going to comments from Carolyn Evans and Susan Lund's very useful suggestions, Carolyn's point about whether some technologies are then disseminated throughout the industry is related to something Pat Bajari said this morning about how technologies end up being used by others. And that's a really interesting counterpoint to the observation that was made, that if productivity is to increase, what you need is for the larger firms with intangible capital to be absorbing more resources, because that provides another mechanism for that productivity to disperse throughout the economy. I think own versus industry growth is an important point to make and a useful distinction.

Susan's point about data and the first-mover advantage—actually, several of the things you said are very much about the excludability property of intangibles. Being the first mover makes you more likely to be able to exclude rivals. Brand has a very similar flavor to it. We've

tried to do some work in this area, differentiating different types of intangibles. So brand, for example, to see if it's more closely correlated with markups than with productivity increases. I think there's some preliminary evidence there, but we need to work on it some more. And Nico, you wanted to say something about Europe?

Mr. Crouzet: Yes, very briefly about Europe. I wanted to come back to Thomas' point that one of the key differences between Europe and the United States is how competition enforcement is conducted, and the difference might account for the different trends in concentration across the two economic areas. As it turns out, there's also a big difference in intangible investment between the United States and Europe. There's great data by Corrado, Haskell, Jona-Lasinio and Iommi. They created a database called Intan Invest that tries to measure intangible investment more broadly outside the United States. It has all the issues with measurement that we recognize we have in our own data, but the cross-country comparison is really interesting. In Europe, the three most intangible-intensive economies are Sweden, Finland and the U.K. These economies have intangible investment rates that are comparable to their physical investment rates, about 12 percent annually. And that's the same situation as the United States. So, the United States is as intangible intensive as the most intangible intensive European economies. On the other end of the spectrum, you have Spain and Italy where intangible investment is about a third of physical investment and where their share of intangible capital as a fraction of the total by estimates is still very low. So overall, the average in the United States and Europe is somewhere between Italy and Finland, and so way below what's going on in the United States. We think that's also an interesting difference. We haven't exported in detail, but it's potentially another source of variation that could help us figure out what exactly intangibles have affected concentration.

One more thing. I want to connect with Carolyn and Peter, who both alluded to the effects of intangible investment on productivity growth, or the lack thereof. If we think the benefits of these intangible investments are disseminated through the economy from first movers to other firms, the hypothesis for the low productivity growth would be that this dissemination has not completely occurred yet. This will

take a while to show up in measures of productivity across firms. The hypothesis would be that this gap that John emphasized in his talk might shrink over the next few years as these technologies disseminate.

Mr. Kohn: An observation and question. The observation is on monetary policy. If the cost of capital channel is muted, less elastic, then interest rates are going to have to fluctuate over a wider range, and the effects of monetary policy will be carried through other channels—exchange rates and wealth for example, and exchange rates affecting the trade balance, so bigger swings in trade balance and larger deficits as the Fed tightens; and of course, the wealth channel, bigger changes in asset prices including stock prices. This may have implications both for the number of encounters at the effective lower bound, and also I think for financial stability if asset prices are going to have to fluctuate over a wider range. That's my observation.

My question is on this measurement issue. So Jan and Nic show that this helped to explain the absent capital. I wonder whether this implied anything about GDP? Is this helping to show that the GDP really has been higher or is this just a relocation within measured GDP? It seems to me that intangibles should show up on the income side, in compensation or profits. But I don't know where it would be on the GDP side. So I wonder whether this is contributing to the slow growth in productivity, mismeasurement of GDP, or whether it's just statistical discrepancy was growing or not? I couldn't reconcile these.

Mr. Ferguson: A couple of questions in the measurement reign as well. One is we've been going through a long period of what appears to be a mergers and acquisitions (M&A) boom, a lot of people have associated that with relatively low interest rates. But Jan, perhaps what you're suggesting is the amount of IP in the economy has increased, and a way to acquire it is through M&A activity. So, comment on that thought. Secondly, associated with that, and you've already touched on it a little bit. Goodwill is simply the residual between the price that an acquirer pays or arguably overpays versus the tangibles. And so again, it puts me in mind of thinking about this M&A boom and whether those who have been in the acquiring business have been systematically overpaying, driving to the perception of an increase in intangibles that may or may not be there.

Another question I had is, what does all this mean for us in consumers? And just another kind of measurement problem. So if I think about the intangibles built into things like a smartphone, the fact that I can now do much more with my Google Pixel phone because of its AI capabilities and what's true with the first element of smartphones, seems to me totally tied to some of John's points about measurement, consumer welfare, etc. I'd be curious what the panel thinks about that set of issues and what all that means about measurement, mismeasurement, indeed whether or not GDP is right as Don Kohn has suggested, whether or not productivity is right. And ultimately, are we as consumers better off or worse off overall because there's much more data and we are therefore able to do much more with old technologies.

Mr. Lane: This is my observation, and it comes back to management as well, which I think various people said this morning that intangibles, because you can scale it up, can be rolled out around the world. And some of the McGrattan and Prescott papers have a nice framework for thinking about why intellectual property capital essentially is very internationally mobile and also essentially free to replicate in every country you operate in. But also, the fact that you can allocate in a kind of fairly free way across all of your subsidiaries means the measure of GDP, profits, productivity is heavily influenced by the location of the intellectual property (IP) assets because you can combine IP in one country with contract manufacturing in another country, and so really when we think about all these measurement issues, ideally we should have a global measurement device, which we don't. Because doing it nation by nation just seems not very helpful.

Now this clearly differs across industries. I think for pharmaceuticals in particular, this seems to be a big effect on U.S. productivity because so much of the IP is elsewhere. I can't think where it might be, but it's not in the United States. And equally, there are many other examples. So I think moving to more across-the-board cooperation in measurement would be good, and of course not just in national accounts. It affects the financial accounts as well because the financing of this add to the balance of payments and so on and

creates all sorts of issues, which myself and Hyun Song Shin, who's here also, we worked on this for the Bank for International Settlements *Quarterly Review* back in March where we give lots of examples of different pathologies in the balance of payments from this issue. So that's just an observation.

Ms. Eberly: These are really interesting and thought-provoking questions. Let me start with Don's point. Let me reverse the order. Intangibles, so the Bureau of Economic Analysis expansion of their investment data to include IP and software does go into GDP. But to the extent that we think there's a broader category of intangibles that is not included in GDP, then that would be mismeasurement and that would open up a gap. To the extent that these are measured in GDI because the income shows up, then that would open up a gap between GDP and GDI.

For productivity measurement, let me point out that people who work in this literature have thought a bit about this, and in steady state there's an argument that intangibles could be a wash - in the sense that you add them to investment and that adds to GDP. But then in total factor productivity they would also be in the capital stock, in steady state, which goes in the other direction. It's arguable that with all of the technological change, we might not be in steady state, and so the investment effect could be larger than what's measured in the capital stock currently, and so it could have an effect on productivity, even if you could get better measures of both the numerator and the denominator in the productivity measures. The zero lower bound point you made, it could actually be worse than that, in the sense that the other thing we mentioned in the paper is that the more asset price effects that you get from physical capital, and which add to the monetary policy transmission mechanism, you tend also not to get with intangible capital because it's not collateralizable. That would worsen the effect that you note.

Going to Philip Lane's point about intellectual property across countries—so there are many disadvantages to using Compustat data which John Haltiwanger will enumerate at length, but one advantage of Compustat is getting the balance sheet data so we have a measure of intangibles. The other is that you can get data that's consolidated

across countries, which for these very large firms, as you point out, is quite important. In the Compustat data, that placement of intellectual property across countries is not a problem. If we were just using the national accounts data, then it would be a big concern.

Mr. Crouzet: Yeah, just a couple of points on measurement. You mentioned goodwill. Without getting too much into the weeds of intangible accounting, which is not necessarily exciting topic for this audience, there's two ways intangibles are accounted for in a firm's balance sheet. One is goodwill. Another is what's called identifiable intangibles. Those are specific intangible assets like patterns, customer lists, things like that, that firms recognize when they acquire another firm and book specifically separately from goodwill. And those in our data account for 40 percent of the total stock of intangibles; goodwill is 60 percent. So it's not quite true that all of the data is goodwill.

The second point you're making is why we worry about the mismeasurements, in particular we worry about overvaluation. Here, we totally agree with you in the paper. We have an instrumental variable approach to address that. But I think your deeper point is that most of what we're thinking about is the change in intangible intensity, the change in measurable capital stock. For that to be driven by valuations purely, you would have to have a story where mispricing has been getting worse, and consistently so, over the past 25 years. We think that this sort of phenomenon might be possible in the short run. But we're focusing on long-run trends, which the mismeasurement story probably can't explain.

Mr. Philippon: Let's go back to policy. I think that one thing that is very clear is that there is a lot of uncertainty in the data, with the interpretation of the trends that we see, and you cannot wait for this uncertainty to be resolved before you act in terms of policy. So it might be useful to think about areas of policy where what you want to do doesn't really depend on this uncertainty. To me, the case for trying to lower barriers to entry and make the U.S. economy more competitive is very strong for the simple reason that it does not depend on our interpretation of the data. We might disagree on the meaning of intangibles, on whether these are always good or sometimes bad. But that does not really matter. I haven't seen any

empirical paper or any empirical research suggesting that competition is bad for innovation and productivity growth.

We know that in theory it can be ambiguous because if you go to the extreme of not protecting anything, then the incentive to innovate is lower. But I think we are very far from that corner. I think every paper we have is clearly suggesting that we are on the side of the curve where if we had more competition in the United States today you would have more innovation and lower prices. Like, you would not have a lower investment rate. All these industries look like this. There's more than enough cash to finance all the investment. There's not enough incentive to invest or to innovate. The policy implication that the United States would benefit from having freer markets and more entry, I think is independent of the uncertainty.

And the other policy that I also feel would be good irrespective of the uncertainty in the data is with respect to data, actually. It's very hard for me to imagine a world in which within the next five years you don't need to take a stand on data ownership because this intangible investment is very important. When you start to break it down, there's one piece that's always going to be there which is the data, data about your clients. And then who owns the data. And you might disagree with what Europe tried to do with GDPR, but the idea that you can just ignore the issue and not regulate this, I think that's ludicrous. You're going to have to make a decision on that at some point. So you might as well start thinking about it.

