EP.1 - Productivity Puzzles Transcript

Why does productivity matter?

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Professor Bart van Ark: Why does productivity matter? How can it make us better off? Why has productivity growth slowed down? And can more productivity help us to recover faster from the COVID-19 crisis? We are going to find out. Welcome to *Productivity Puzzles*.

Hello and welcome to the first inaugural episode of *Productivity Puzzles* - a brand new series of podcasts on productivity brought to you by The Productivity Institute and sponsored by Capita. I'm Bart van Ark and I'm a Professor of Productivity Studies at The University of Manchester and the director of The Productivity Institute, a UK-wide research body on all things productivity in the UK and beyond.

So for this first episode, we thought it would be a good idea to make it a bit of a crash course Productivity 101 by asking ourselves 'Why is productivity so important and how can we sustain it?' And to bring all of that together in 40 minutes, we are fortunate to be joined by three panellists who have thought about these issues a lot, but from very different perspectives.

And of whom I also know that can explain things in plain and simple English. So first of all, Dame Kate Barker is a leading economist and was the chief economic advisor at the Confederation of British Industry and a member of the monetary policy committee at the Bank of England. Currently, she's chair of the university superannuation scheme.

And important for today's conversation, she is chair of the governing council of our own Productivity Institute. Kate, welcome to this podcast. You've been going around this topic for much of your career and it seems you're not letting it go. So it's still very prominent in your thinking.

Dame Kate Barker Absolutely. And that's because we feel that one of the reasons that people are discontented and unhappy is that their incomes haven't been growing very quickly and they're bound to grow slowly if we can't get productivity up. So it's absolutely core politically as well as economically.

Professor Bart van Ark So that's great. We're going to dive a little bit more to that right in a minute. Then our second panellist today is Professor Nick Crafts and he is the chair of The Productivity Institute's steering advisory committee. Nick is a Professor in Economic History at the University of Sussex and has done path-breaking work at the London School of Economics and the University of Warwick on understanding the impact of the industrial revolution on Britain's economy.

And from that derived many insights on what makes a country, a productive place. So Nick, having learned so much from history and the industrial revolution, how much of this can we actually take forward? And what kind of lessons does it teach us today?

Professor Nick Crafts I think looking at the industrial revolution reminds us that right at the heart of productivity growth is technological progress. Before the industrial revolution that was at best, very slow.

The move during the industrial revolution to an economy which could drive technology forward was the basis for a sustained increase in living standards which started in the early 19th century.

Professor Bart van Ark All right. And we go on to talk a little bit more about the lessons learned from history for the UK productivity slowdown and the possible recovery. And last but not least, we're joined by Andy Haldane, who's chief economist at the Bank of England, and also a member of the bank's monetary policy committee and among his many roles, he has just been appointed as honorary professor at our own Institute's headquarters, the Alliance Manchester Business School.

So congratulations with that Andy. Andy has been instrumental in making productivity a top policy priority here in the UK and has contributed to the debate in many ways. So I wonder after having talked about this for so many years Andy, have you made some good progress in the debate on productivity here in the UK?

Andy Haldane Well, thank you, Bart. And thank you for your thanks on joining the gang at The University of Manchester. I think we have. I think productivity has become, since the global financial crisis, one of, if not the signature economic policy issue. I think we've thrown the kitchen sink at understanding it somewhat better by looking at it through a historical lens and sometimes through a business lens.

Where we've made less progress so far is in alighting on some policy solutions to that puzzle, I'd say.

Professor Bart van Ark And that's what we're going to talk about, for sure also during this podcast, so let's dive right away into it. And I think as I mentioned, we should start pretty basic here and explain to our audience what productivity is and why it matters.

We're all economists on this podcast. So you all know, for us the term sometimes speaks for itself, but we know that the perception of why productivity matters may differ quite a bit, depending on whether you're a data scientist in the biotech industry or a cashier in a retail shop or a financial specialist in the City of London or a policymaker of a development agency up in the Highlands.

So, Kate, let me start with you. How would you explain what productivity is so that it is easy to understand and for people to get our arms around it.

Dame Kate Barker: I think you're right to start here Bart, because I'm always often surprised by how even business people don't really understand productivity in the way that economists do. And certainly normal people, people who aren't economists don't really understand it. People think of it as a term that means they have to work harder. And that's completely wrong. Really it should mean that they have to work less hard, but have more ability to consume. And two ways in which you can think about it:

If you look back into the 1950s, to buy a very standard washing machine would, in today's money, have cost you 1,500 pounds. Now, today you can find fancy washing machines that cost nearly that much, but you can get ones that are much better than 1950s ones for very much less money.

Second way in which I think is really important is, we do need to help push up our output per capita. If you push up our output per capita, we also push up the tax take. Now we don't like paying tax, but goodness me, do we want to have the things that we pay for with our taxes? Do we want to have a better health service? Do we want to have a better public transport system? Of course we do. And if we can't get our productivity up, those things are much more difficult.

Professor Bart van Ark So Andy, you are all day surrounded by economists, some of the smartest in the country. Do you really have a good feel we understand what productivity is?

Andy Haldane I think we've got a better understanding by dint of the work that's been put in over the past 10, 15 years to understand it somewhat better.

Kate's right. It's a concept that leaves most people cold, whether that's individuals or businesses, people have very different perceptions of what it actually means. For me, it's really about your "value added". Your value added as an individual in the workplace. Your value added as the business or your value added as a nation today.

I think all three levels, we have made progress in understanding, not just what this thing is, but what the key factors are driving it over time, across individuals and across businesses. So progress. Yes. But do we have a singular or simple solution for those puzzles? Not yet.

Professor Bart van Ark Right. So, Nick. You know, obviously productivity is something like output over inputs.

We, understand that, but again, to make it sort of practical and easy to understand, I remembered a well known economist, Arnold Harberger once said it's about real cost reductions. And maybe you can explain that a little bit to us what that means, because that's, I think when you talk about cost reductions, I think it becomes a little bit clearer for business leaders. But what are real cost reductions?

Professor Nick Crafts Well, if we think about the idea of productivity as the amount of output, which is made, let's say per worker employed, if productivity improves, we need fewer workers to make the same output. Those workers are paid wages. As we need fewer of those labour inputs, the total wage bill would go down.

Costs go down. So I think we can think of that as real cost reduction. Interestingly of course the issue then is what happens when those workers, fewer of them are needed, to make one particular unit of output. I think that depends on how responsive the market is to the fall in prices that we'd expect to see as those costs go down.

'How elastic is the demand?' might be the phrase that one would touch on. If in the end, fewer workers are needed in total, then the issue for society is when those workers are displaced, how well does the labour market do in finding them some other job?

Professor Bart van Ark Yeah, and that's going to be a very important topic when we talk about the impact of technology, for example, and you know, the impact that has on people's jobs.

Okay. So a lot to talk about here, but let's move on a little bit because one of the reasons that we're talking so much about it is because productivity has slowed down so much in the last sort of 15 years or so. We have seen productivity ongoing in terms of growing slower and slower. And that's not just something in the UK.

That's true for most advanced economies in the last seven or eight years, perhaps even in many emerging markets that we have seen this happening. And it's that slow down, which is the main reason why this podcast is called *Productivity Puzzles*. So let's focus a little bit on the generic explanation that helps us understand that slow down, we'll focus a little bit more about specific issues for the UK later.

Janet Yellen (United States secretary of the Treasury) is told to have said once that productivity slowdown, or the reason for the productivity slowdown, is really a death by a thousand cuts. You know, there's so many explanations, so many reasons for it.

So maybe Nick, the best thing to start is perhaps to tell ourselves what kind of myths are there about productivity slowdown that is not the reason before we go into what the possible reasons might be for that slow down. Well,

Professor Nick Crafts I have one in particular in mind, and that is that it's all a measurement problem.

I think we do under-estimate the rate of productivity growth. But I think we were doing that in the late 1990s, almost as much perhaps as today. So although I do take the point that there are some measurement issues, I don't think that they, by any means, account for the whole of the productivity slowdown, or necessarily very much - that's probably a topic for another day, it's a bit arcane. So do you want me to go on and give you a reason?

Professor Bart van Ark Yeah, give me the one or two on the top of your list.

Professor Nick Crafts Ok, so the one or two on the top of my list are that there is something here happening to technological progress. We went through a surge of productivity improvement associated with the diffusion - the invention and diffusion of ICT (Information and Communications Technology). The ICT contribution to productivity growth, I think has slowed. I'm personally optimistic that in due course things like a AI and robotics will take over that driving role. But I think at the moment, there's an element of being in the interregnum between the two. It takes time too, typically, for these big new productivities to have their productivity impact, so to speak.

And one more. If we're thinking about the American economy, where I think this is best documented, I think there has been what they tend to call a slowdown in business dynamism. There are fewer new firms, there's less competition. There's perhaps more regulation. All those are things which have been getting in the way, I suspect, of productivity improvement.

And paradoxically, we used to think of the United States as **the** competitive economy in the world, hugely competitive product markets and so on. Actually probably they no longer are. And that matters to all of us because a lot of the technology that we get, a lot of the productivity improvement that we get comes essentially from imitating, borrowing from the Americans.

Professor Bart van Ark Yeah. So Andy, let's take that first issue Nick just mentioned, the diffusion of technology. It seems to take long time, and it's a matter of time. You talked about this before, making this distinction between technology absorption - so, you know, it's just spreading the technology across the economy - and then technology penetration, which is the speed by which, you know, companies actually pick up on the technology.

You know, where do you think we stand in this respect with sort of the digital technology that we're talking about? It seems to happen, sort of, diffused very rapidly, but are companies getting more successful in implementing it in their business models?

Andy Haldane: Well, first of all, I think Nick's characterisation of where we might be, the kind of interregnum, I think it was words he used, I think it's a very nice way of capturing it. We've seen similar such of those in the past, in the mid 19th century - Engels' pause. We saw it during the eighties and nineties, at which point we were asking, where is the ICT revolution in the productivity numbers? And then it suddenly appeared. It could be we're at a similar point now where we've got diminishing returns from, if you like the third industrial revolution, but the full breadth of the fourth industrial revolution, that's robotics and AI and the like, as Nick mentioned, have yet to fully come on stream. So I think that's a plausible account for what is happening across many advanced economies, but it's not just, I think a question of the technological frontier, perhaps not moving as fast or as far as it was a decade or two ago.

I think it's also the case that the pace of technological trickle-down or diffusion, in the words you used, has also slowed as well. And it isn't just from technologies. If you look into the body corporate across the UK or other advanced economies, what you find there is a long and lengthening tail of companies who aren't really availing themselves of some fairly basic technologies.

That could be e-commerce of various types, it could be CRM systems, it could be laptops, actually, telephony and the number of firms that are being left behind, has, if anything, been increasing over time. The rate of that technological trickle-down has been slowing over time and it could be that's linked closely to something else that Nick mentioned, which is evidence of declining rates of business dynamism across many of our advanced economies.

So I do think this story of both a slower rate of movement in the frontier but as importantly, a slower rate of diffusion down to the tail has been important in why we are where we are.

Professor Bart van Ark So, Kate there is a completely different explanation, frankly, and that is it's not so much about the technology, obviously that plays a role, but there's another issue.

And that is that productivity in advanced countries just tends to grow more slowly because we're more wealthy, ageing societies. And in those kinds of societies we consume more services and other side of things that don't really show very rapid productivity growth. So couldn't it just be that it is just the reality of a richer country is that it just becomes less productive.

Dame Kate Barker Unsure whether I would agree with that in the sense that if you look at where the slowdown in productivity has happened in the UK, some of the evidence suggests that actually the areas that have slowed down the most have been in manufacturing.

Whereas service productivity growth, which is admittedly slower, has carried on. So I don't think that can explain a slowdown. When I think about explanations for a slowdown - although I agree with Nick about the fact that you can think of technologies perhaps as coming in waves and we're in a bit of one of those shallows you get between waves at the moment.

But I also think changes in the way the labour market works have been quite important. So we look at the labour market we have today, and we're very pleased about the labour market we have today. It's very flexible, very easy to bring people in. There's a very good supply of labour, of people in the labour market but individuals don't have much power. If you add that to a sense of uncertainty that I think has prevailed in the developed world since the global financial crisis, that's not an environment in which companies are going to invest. Labour is cheap and they're worried about the future. So they probably are not producing at the productivity frontier.

Professor Bart van Ark Right. So we're going to take a little bit more of a deep dive into this, when we're going to talk about sort of the specific reasons for the slowdown in the UK, it seems to have been larger than the slowdown across the average of all the advanced economies. But before we do that, we're going to take a quick break where you'll hear an update on what else is going on at The Productivity Institute.

And we'll be back to you very quickly.

Professor Bart van Ark Welcome back to my discussion with Kate Barker, Nick Crafts, and Andy Haldane on why productivity matters. So let's zoom in a little bit now on the UK, because not only has productivity in the UK slowed, but it seems to have slowed faster than elsewhere.

And that has caused a rising gap in productivity between the UK and other advanced economies in Europe and the United States. And we need to understand why that is and what it is in specific in a

UK context that we can do about it. So, Nick, let me again, start with you here because the historical perspective really matters here.

How should we see the UK slowdown beyond the fast slowdown that we see elsewhere? How should we see that current episode in a historical perspective?

Professor Nick Crafts Well, the research I've done suggests that this slowdown is unprecedented. And seriously unprecedented. Look at the sort of numbers we have - productivity at the end, just before the pandemic, was about 20% lower than what you would have expected had the trend growth in productivity prior to the financial crisis continued over the intervening period. The nearest, similar decline that I can see would be the end of the European golden age in the 1970s, but that would only have been about half as severe. In the Great Depression, the equivalent decline was about a quarter as severe.

So this is a very severe decrease bounce away from what you might reasonably have expected previously. I think the UK is exposed to all those things we were talking about earlier, including incidentally, I fear the loss of dynamism. I think the UK increasingly has worries about competition in the economy as the CMA (Competitions and Markets Authority) pointed out last year.

But for the UK, I think we should add the financial crisis was pretty severe and it was a severe blow and did quite a lot to the allocation of resources in the economy. And productivity performance does turn on technology, but it also turns on how well workers are allocated across the economy. And I think we have to say the UK, for a long time now, has had a relatively low level of investment and business investment has been a real worry in the recent past.

I think Kate put her finger on that just before the break. This is a period of severe uncertainty and not a point at which business wants to commit to lots of sunk costs too readily. What's the source of uncertainty? While in the recent past, it's not just the travails of the financial crisis, but it's the quite severe impact that Brexit has had.

Getting Brexit done may in due course sort that out, but we've been through a few years where business has clearly been very worried. The contrast with the 1930s is quite astonishing. The UK went through the crisis of leaving the gold standard in 1931, but had a new settled policy regime from 1932.

And after that recovery was very strong. So, I suspect the uncertainty argument and the big drag on business investment is a distinct UK feature.

Professor Bart van Ark To what extent can that also be extrapolated to human capital, education and skills? Right? There's a lot of debate here in the UK, that, you know, skills is an issue. We're doing great on higher education, at least, you know, historically we've been doing great on it, but that particularly when it comes to the medium level skills, the UK keeps falling behind. Would you add that also as a reason why the UK is facing larger headwinds, but also why has that not always been a problem because in the 1990s, for example, we've been doing pretty OK in the UK.

Professor Nick Crafts Well, it does seem to me, the UK has a problem there, but as you say, it's been a problem for a long time, and that long time is much of the post-war period.

The UK has generated over those years, relatively few workers with intermediate skills. When we look at things like adult numeracy and literacy, we compare very badly with many of our peer group and things have been getting slightly worse, not better in successive cohorts. What I'm not convinced is that's a big reason for the recent slowdown.

I think it's a continuing problem. And if I do, what the literature might call a growth accounting exercise, I notice that through most of the 2010s, the contribution of improved labour quality to labour productivity growth has remained quite strong.

Professor Bart van Ark Andy, in some of your writing and talking about the productivity problem, you introduced this term "Hub-No-Spokes" model. And you alluded to that earlier when you said, you know, large firms are doing OK, but it's the diffusion to those smaller firms; that is a problem.

So do you still believe that the issue is primarily with the laggards. Or do you also begin to think that increasingly the issue might've been with the leaders - has the balance between laggards and leaders changed and is it changing in the right direction?

Andy Haldane Well, the truth is we have a larger fraction of very high productivity companies in the UK than would be the case in Germany, France, or the US, so it's not clear to me that the problem comes at the top end of productivity distribution. We, as a nation, do pretty well when it comes to high-tech, high-performance, hyper-activity companies. What then accounts for our, anywhere between a quarter and a third productivity gap, with those same countries, well, the answer does lie in that long, lower tail of laggards. There is a bunch of reasons why that might be. But that increasingly bifurcated pattern among companies is mirrored in an increasingly bifurcated pattern when it comes to worker skills and indeed, an increasingly bifurcated pattern when it comes to regional disparities in performance. For me, those are three sides of the self same coin - that we have companies on the productivity high road and the low road, with the two roads diverging over time.

That is mirrored in the set of workers, some of whom - let's call them the graduates - are on the skills high road. The lower half are on the skills low road. And then we have regions, some of whom are charging ahead on the high roads, and others who are stuck on the low road. And those are really mirror image problems over another because the high performance companies - guess what? - tend to employ the high-skilled workers and tend to locate themselves in the high performing regions.

So for me, the issues spatially, skills-wise and productivity-wise are very closely interlinked and is a pattern of bifurcation over time that goes a long way arithmetically for explaining why the UK is distinctive in retrospect.

Professor Bart van Ark So, one question of one concern of course, is that people not have is that Brexit may actually impact at higher end of the productivity distribution, that larger companies who are typically globally exposed, actually suffer more from Brexit.

Is there any evidence to you that is happening or is it a concern that perhaps is not quite justified?

Andy Haldane Well, there's lots of historical evidence that would speak to a very close link between business size, business open to external competition. Foreign ownership and productivity - you know, on average in the UK, externally oriented companies have productivity 50% higher than that of domestically-focused companies and foreign-owned companies have productivity twice that of UK-owned companies.

So the link between openness and productivity, I think is well-established historically. It's too early in the Brexit process, I think, to be saying that evidence is yet clear in the numbers we have. But, we'd have to buck the laws of economic gravity, I think, to think that Brexit, to the extent that limits openness, will not have some knock on negative implications for productivity and that certainly baked into some of our forecasts.

Professor Bart van Ark Kate, Andy already mentioned this issue of regional distributions and I know that you're very passionate about this topic. Because frankly, that's one of the big issues that we're seeing in the UK is that the distribution, or the disparity better said, between regions and even within regions is so high in the case of the UK, at a very granular level sometimes.

So, what in your view is the main causes of these very large disparities that we say you see in the UK? And to what extent do you think that's a problem in terms of trying to get productivity back in terms of recovery?

Dame Kate Barker Well, Andy's already touched on this in a way that there is a link and places move into cyclical decline.

So people often know, I was brought up in Stoke-on-Trent and when I was a child, Stoke had pretty much full employment. People worked in three industries - coal mining, steel production and production of pottery. All that was then swept away and there was no real ability to replace any of those industries.

So anybody with reasonable skills, indeed myself, moved away - we didn't stay in Stoke. The public realm became worse and worse - it was never great to be honest, because none of those were hugely high-paying industries - and it became worse and worse and less attractive for anyone to go. There used to be a time when it was very difficult to get good doctors to go to Stoke because the public realm was so poor.

And then of course, people sought. People buy houses there because they're relatively cheap and they can only afford a house that's cheap because they have low skills and you have to work very hard. Some of the work that we did with the Industrial Strategy Council when Andy and I were there, was about just how many interventions you have to have at once.

How much collaboration, how much work with industry and how much continuity you have to have over a long period to help somewhere to catch up. But the important thing about helping somewhere to catch up is you have to get the people to catch up as well as the place to catch up. And that is not easy. It's really difficult.

And I think I'd sum this up by saying that one thing we often say when we have industrial change, for example, the closure of the mines as well: “it's fine because we can always compensate the losers”.

But the truth is we make a really rubbish job of compensating losers. Certainly as far as place is concerned.

Professor Bart van Ark Right, so let's talk a little, but now about what we can do about it, because it seems to me that particularly in the regional issues, I haven't looked at this now for a while at The Productivity Institute, there's no shortage of policy initiatives across the UK. They're bright, very bright people with great ideas. I see lots of great initiatives happening in different places in the UK, but it feels fragmented. It feels not linked up. We have not joined up, if you like. So what is it in the policy arena that we need to do Andy to really begin to bring together a comprehensive policy range of activities that also speaks to the specificities of specific regions that we're looking at.

Andy Haldane Well, you're right, Bart. The UK hasn't lacked for industrial policies or industrial strategies since the Second World War, but we may well be a world leader when it came to counting the number of them that we've had. And there, of course, lies the clue. That those policies have lacked longevity, they've chopped and changed over time, which pretty much preordains failure of course, because we're talking about long-term structural issues, which you need to commit to in the long term if you're going to have any chance of solving them.

And closely related is the question of scale. But often we're very good at dreaming up clever initiatives, but not really accompanying them with a fat enough amount of financing to really make inroads into the scale of the problem that we're dealing with.

If there were a third dimension where I think we've crept up policy wise, is that we haven't really joined the dots in the different components of policy. You know, as we said earlier on, you mentioned the Janet Yellen quote, we really need all parts of the innovation ecosystem to be functioning well to hope for it to deliver, then be able to join up the different components of policy, whether it's investment or infrastructure or innovation or skills or education, to have any hope of solving this problem durably.

I think all on all three fronts, whether it's longevity of our policies or the scale of those policies or something strategically that joins those policies together, we have been found wanting repeatedly for at least the last 70 years and counting. And that’s been a non-trivial contributor to the productivity problems we’ve been discussing today.

Bart van Ark So Kate, you've been around some of these groups that really try to change policy in this space, you know, whether it's infrastructure or technology or things like that.

So where would you now put your bat in terms of policy priority in order to get productivity back on the agenda? Where do you think the biggest gain is to be made in the next few years?

Dame Kate Barker In policy terms, I guess I would support policies that really try and move the needle in places. I do think places just punch below their weight and people in those places punch below their abilities.

I'm certainly not convinced everybody who ends up in a place that isn't very good completely lacks skills but just to reiterate to what Andy has just said, it's going to take time. The idea that we are going to turn productivity around quickly is a bit of an illusion.

If we look back at the Labor government that came in 97, they really made it a big priority. They worked incredibly hard at trying to move productivity, but actually the evidence is that it hardly shifted at all, but even 0.1 or 0.2 a year, it's just an enormously great achievement if you look back on it from 20 years.

Professor Bart van Ark Nick, finally, you know, from a historical perspective, what policy regime would you now really favour most in order to get productivity growth back on track.

Professor Nick Crafts At the regional level, I do think human capital is by far the most important component of the story, but I'd also be wanting to think that the UK could develop what we might call a portfolio of successful cities.

I came from a location similar to Kate, Mansfield - coal mining and hosiery. I don't think Mansfield has got a future, to be honest, but I do think Nottingham has an excellent future and it's connecting those workers from Mansfield into the Nottingham labour market that I would want to achieve. That involves connectivity, the right infrastructure at the local level, of course, but it also involves re-training, it involves active labour market policies. And the one thing I don't think we should fall into, and there's a big danger of it in my view, as we start to be in control of our own state aid and subsidies is trying to protect old jobs.

We should certainly protect the worker and do the best we can to help the worker move to a more productive activity. But trying simply to protect jobs is a route to productivity failure.

Professor Bart van Ark Yeah, that seems to be an important piece of advice when we talk about what levelling up really means and how we want to make that happen is to know it cannot all stay as it was. It’s making the transition towards that kind of new environment, a more productive environment, easier.

That's probably where the focus should be. So we need to wrap up - 40 minutes just goes in no time. So I'd like to end on something we're actually going to talk about in the next episode of this podcast, we're going to speak with the McKinsey Global Institute folks about a report they just put out on the productivity projections for the post COVID period.

They are actually trying to make a prediction. And they say there is a potential to actually achieve additional productivity growth of about a one percentage point above the trend of the past decade. So in the UK where the trend has been about half a percent, it could actually become one and a half percent.

So, I'm not going to ask you finally, how you think how probable that is? You know, the McKinsey report itself is in fact saying it's going to be a heavy lift, but what I would ask you, just in one sentence, if the UK would achieve to push up productivity growth from say, half a percent to one and a half percent per year in the next couple of years, how would you qualify such an outcome?

What would you think that means iIf that would happen in the next couple of years, if we go from half to one and a half percent? Kate:

Dame Kate Barker On one level, you'd say it’s absolutely tremendous. On another level, you'd go back to what Nick talked about and say, it's only made up half the gap of what we think we lost after the global financial crisis.

Professor Bart van Ark Nick:

Professor Nick Crafts I would use that old English expression “absolutely marvellous”, which implies that it would be wonderful, but it's incredibly unlikely.

Professor Bart van Ark Right. Andy:

Andy Haldane Well, my work will be done Bart so I could probably retire a happy man then. But, what I would say is however improbable, that outcome is possible. And we are, to some significant extent, the master of our own destiny on this front for the policies that we set and the way we go about it.

And life after the pandemic? There are definitely opportunities there for us to rethink how we work, rethink how we do business, to rethink where we do work and where we do business. And of all of those could, if carefully managed to, deliver some of those benefits we all wish for

Professor Bart van Ark Yeah, well, that's a really optimistic note to end on and also a good advertisement for the next podcast, where you can hear more about how McKinsey thinks that we can achieve that.

Interestingly, they find it in some interesting, unexpected sectors of the economy. For example, in healthcare, they expect that actually productivity growth could grow considerably fast. And that's a very large sector of the economy in a non-market sector where we quite often don't look for these kinds of advantages. But anyway, that's for the next upcoming episode. For today, this was a lot to do, a really great Productivity 101, by touching on some of the key issues.

And indeed we'll have more opportunities and I hope we will have more opportunities with each of you to discuss these things in a lot more detail. So thanks very much for joining us, Kate Barker, Andy Haldane and Nick Crafts. As I said, in our next episode, we're going to talk about productivity post COVID 19.

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And this was me again, Bart van Ark from The Productivity Institute. Thanks for listening and stay productive.