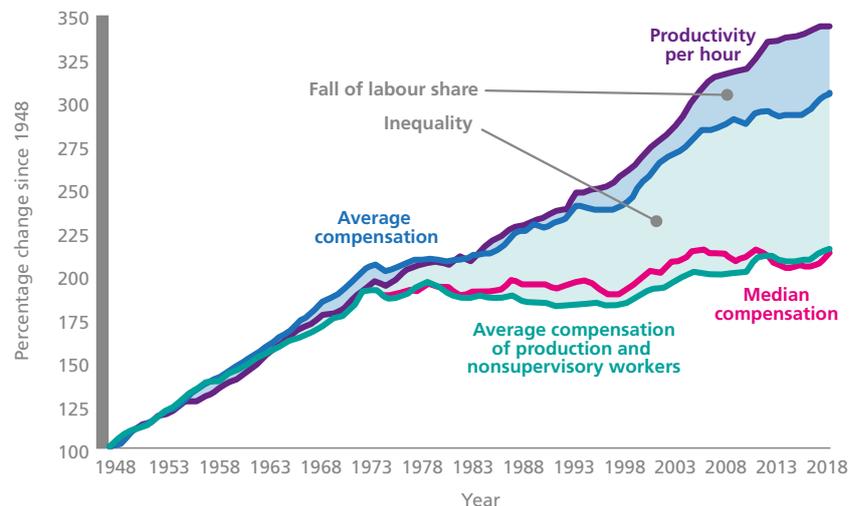


Innovation policy to restore American prosperity

The new US administration has the opportunity to reset an economic model that has failed to deliver prosperity for millions of Americans for decades. **John Van Reenen** calls for a Grand Innovation Challenge Fund – federal funding for research and development to fuel technological innovation and raise productivity growth.

Faster technological innovation boosts productivity growth – but the private sector will not do enough R&D on its own

Figure 1:
Slow US productivity growth and even slower median wage growth



Source: MIT Work of the Future Final Report (2020). Productivity is total economy real output per hour. Average compensation is total economy real compensation per hour, deflated by CPI-U-RS.

The tasks facing President Joe Biden and the new US administration are formidable. But there is also an exciting opportunity to reset the model that has failed to deliver inclusive prosperity to the American middle classes.

To my mind, the major long-run problem is stagnant wage growth for the typical US worker, as shown by the pink line in Figure 1. Median hourly wages have barely risen in real terms for nearly four decades – and, for less educated men, they have actually fallen. As a result, generations of Americans feel they will be no better or even worse off than their parents.

These are the structural economic conditions that fuelled the rise of populism and helped sweep Donald Trump to power four years ago. We need to craft policies and institutions to help return to sustainable wage growth.

But why has pay been so poor? The direct causes are easy to identify:

- First, productivity growth slowed down after the 1970s, and has been particularly weak since the global financial crisis of 2007-09.
- Second, as our research shows, workers have seen an ever-smaller share of this more slowly growing economic pie (Autor et al, 2020). This fall of the labour share means that the growth of productivity (GDP

per hour – the purple line) has outstripped the growth of pay (hourly compensation – the blue line).

- Third, the inefficiency of the US healthcare system means a larger and larger share of compensation gets eaten up by healthcare insurance, leaving less in workers' pay packets.
- Finally, the inequality of wages between workers has also risen tremendously, so the median wage has not kept up with the mean.

Here, I focus on policies to raise productivity growth, the first part of the fundamental problem, building on a Hamilton Project proposal I released last

year, arguing for a step change in federal funding for technological innovation – a Grand Innovation Challenge Fund (Van Reenen, 2020).

Why focus on growth? Of course, we also need policies for redistribution such as a substantial increase in the minimum wage and the earned income tax credit (EITC), a massive increase in skills and training and an overhaul of the tax system. But policy change will require some minimum degree of bipartisanship. It is easier to get a coalition around growth policies than for pure redistribution.

Further, many growth policies are also good for tackling inequality directly, as I will mention below.

Greater investment in research will not be solved by the private sector alone

The good news is that we have abundant empirical evidence that faster technological innovation boosts productivity growth. The bad news is that we also know that the private sector will not provide enough research and development (R&D) if left to itself.

This is primarily because of ‘knowledge spillovers’ – the firms who perform R&D only capture a small fraction of its ultimate benefits. This means that firms have insufficient incentives to invest in innovation from society’s point of view, especially more basic R&D, which has fewer clear commercial applications. In recent co-authored work, we find that the social returns to a dollar of R&D are about three times the benefits of the private returns (Lucking et al, 2020).

Much of federal R&D goes on basic, high-spillover research. But as Figure 2 shows, the sad truth is that government-funded research has collapsed as a proportion of national income. It has fallen from almost 1.9% in the mid-1960s to under 0.7% today. Moreover, although business-funded R&D has increased, the fraction of this spent on basic research has also dwindled (Arora et al, 2017).

We need a Grand Innovation Challenge Fund

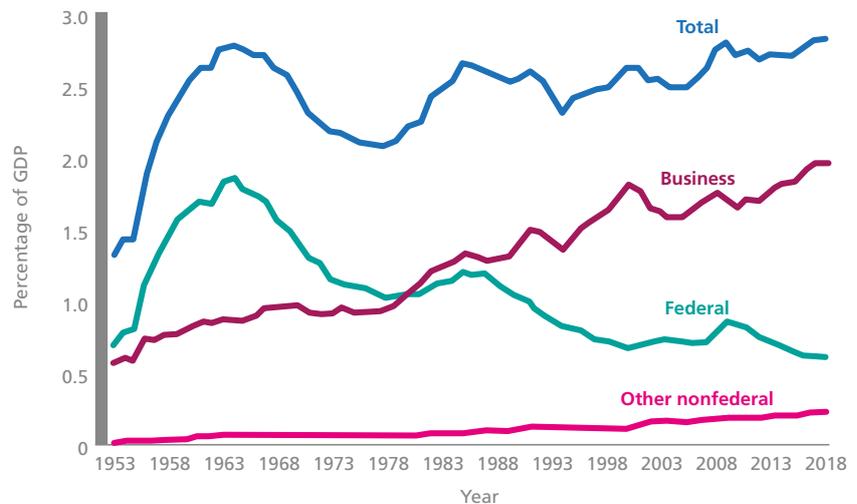
My Hamilton proposal suggests an ambition to increase federal funding for innovation gradually by about 0.5% of GDP or about \$100 billion. This is large, but it bridges less than half the gap with the mid-1960s.

More important than the exact amount is which innovation policies are chosen. In recent work, my colleagues and I surveyed the deep reservoir of empirical evidence accumulated in recent years on such policies (Bloom et al, 2019).

The evidence shows that when well designed, R&D tax incentives have positive effects on innovation, as do direct grants through agencies such as the National Institutes of Health and the Department of Defense. Forward commitments and prizes have also proven to be successful – for example, on vaccines. I would put about half of the funds there.

The downside of these ‘demand-side’ policies is that they may drive up the cost of R&D. Therefore, they need backing up

Figure 2: US R&D source of funds, 1953-2018

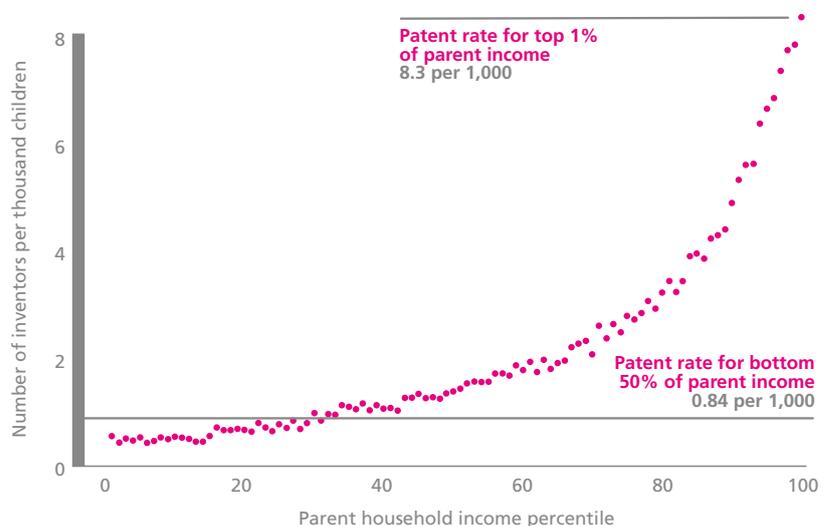


Source: National Science Board 2018.

Note: R&D spending is categorised by funder rather than performer. Other nonfederal funders include, but are not limited to, higher education, nonfederal government and other nonprofit organisations.

Supply-side policies are needed to increase the quantity and quality of potential inventors

Figure 3: Lost Einsteins? Children born to the richest 1% of parents are ten times more likely to grow up to be inventors than kids born to the bottom 50%



Source: Bell et al (2019)

with strong 'supply-side' policies to increase the quantity and quality of potential inventors.

Here are at least three effective supply-side policies. First, boost the size of the science, technology, engineering and mathematics (STEM) workforce through more resources for studying science and pursuing a STEM career.

Second, increased skilled immigration is a no-brainer. This has the advantage of being cheap and quick to implement. So, although political unpopular in some quarters, immigration is worth fighting for.

Finally, America loses many talented potential inventors because kids from low-income backgrounds, minorities and women often face huge barriers to becoming innovators. My colleagues and I have labelled this the 'lost Einstein' or 'lost Marie Curie' effect (Bell et al, 2018) – see Figure 3.

For example, children whose parents were in the richest 1% of the income distribution were ten times as likely to grow up to be inventors as kids in the bottom 50%. Only a small minority of this gap can be explained by early ability on things like test scores in mathematics. A lot more is to do with the fact that growing up in a poor neighbourhood means that you are often not exposed even to the possibility of becoming an inventor or entrepreneur.

Supply-side policies to find the lost Einsteins and Marie Curies are not only a matter of social justice. By boosting the supply side, we reduce both inequality and improve growth prospects.

There is no quick fix to this, but there are many possibilities: developing 'gifted

and talented' programmes in schools focused on disadvantaged kids who show early promise; restoring the National Science and Mathematics Access to Retain Talent (SMART) student grants – \$10,000 per year for underrepresented minorities to study STEM at college; and supporting initiatives by pioneering foundations such as Conrad and Lemelson. All need more rigorous evaluation, but all show promise.

Is a Grand Innovation Challenge affordable after Covid-19?

Many people will say that with the costs of Covid-19, we can't afford to spend so much on innovation. But the real question is can we afford not to? Borrowing to invest in innovation has an excellent social return on investment.

The Innovation Fund is only one part of a portfolio of policies to deal with the malaise. Other policies towards productivity such as investing in infrastructure, skills and management are also important.

History teaches that crises can be moments of great political and social change. We are at such a historical juncture when the reset button can be hit on the model of growth. After the Second World War, the West reinvented itself; we realised our deep interdependence and the necessity of investing substantially in what Vannevar Bush called (in 1945) the endless frontier of science.

The challenges of security, health and the environment are no less pressing now than they were then. We need an equally ambitious response.

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Further reading

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John Van Reenen (2020) 'Innovation Policies to Boost Productivity', The Hamilton Project.



Government borrowing to invest in innovation has an excellent social return on investment