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**Article**

## Productivity and growth in Europe: Editor's introduction

EIB Papers

**Provided in Cooperation with:**

European Investment Bank (EIB), Luxembourg

*Suggested Citation:* Strauss, Hubert (2011) : Productivity and growth in Europe: Editor's introduction, EIB Papers, ISSN 0257-7755, European Investment Bank (EIB), Luxembourg, Vol. 16, Iss. 1, pp. 8-16

This Version is available at:

<https://hdl.handle.net/10419/54665>

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## ABSTRACT

*I summarize the main results and policy insights from the 2011 EIB Conference on “Productivity and Long-Term Growth Potential in Europe”. Europe’s need for productivity growth has become more pressing against the backdrop of huge government debt and a beginning slowdown in labour supply. The contributors to the EIB Conference and this volume suggest that governments should embrace domestic and international competition by dismantling anti-competitive product market regulations, especially in services. Private and public R&D should feature high on the policy agenda, but their effectiveness should be enhanced by removing overly protective elements of the patent system. Education attainment and quality as well as life-long learning should be fostered and more emphasis put on an ICT-literate workforce. Productivity-enhancing resource reallocation may further require lower employment protection and stronger incentives for regional and sectoral mobility. Finally, Europe faces large broadband investment needs, calling for a predictable network regulation framework and targeted public support to broadband roll-out to less profitable areas.*

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# Productivity and growth in Europe: Editor's introduction

It has been said for a long time that the European Union needs higher GDP growth in order to shoulder the costs of demographic ageing and climate change and to remain an attractive production location for European and international companies. The economic and financial crisis and the stretch it has meant for government finances have made this need even more urgent. Fostering GDP growth in Europe essentially boils down to increasing labour productivity growth. Especially now that the population at working age is growing more and more slowly and will soon start shrinking in several EU countries, GDP growth is about how to make the remaining European workforce more productive.



**Hubert Strauss**

Against this backdrop, the 2011 *EIB Conference in Economics and Finance*, held in Luxembourg in October on the topic of “Productivity and Long-Term Growth Potential in Europe: ICT, the e-Economy and Economic Dynamism”, was a timely event even though European governments completed another Euro area crisis summit at the very same moment. Organised by the EIB Economics Department, the one-day event brought together academics, policy makers and companies at the headquarters of the European Investment Bank to discuss productivity and Europe’s long-term growth potential. The conference tried to cover the most important issues from a European policy perspective, thereby taking a deliberately long-term view and looking beyond cyclical ups and downs. This volume of the *EIB Papers* compiles the contributions made to the conference.

Public-policy interventions to stimulate long-term growth and/or productivity are often given the summary label “structural reform”. Structural reform in Europe has been a *leitmotif* of growth-related policy reports by the European Commission and international organizations, central banks and academics. It encompasses all policy measures to increase an economy’s supply of goods and services and the efficiency of their production. Such measures may pursue quite varied objectives, all part of a greater growth mosaic, for example:

- Fostering incentives to work and to accumulate capital;
- Upgrading the quality of factors of production such as worker skills and technology embedded in machines, computers, vehicles and buildings;
- Improving multi-factor productivity (MFP), *i.e.* the efficiency in combining capital and labour; and
- Ensuring the economy’s ability to reallocate resources from declining to rising industries and, more broadly, to exit from unprofitable undertakings and embark on new activities (creative destruction).

Growth differences between firms, sectors and countries tend to widen in times of disruptive technical change, in particular when new technologies bring sweeping changes to most or all sectors of the economy. Information and communication technologies (ICT) and the Internet are the most recent new general-purpose technologies. Depending on the institutions and policies in place, some countries are faster in taking up a new general-purpose technology and reaping the associated benefits while others resist change and may see their productivity growth peter out. ICT infrastructure is a key enabler of the e-economy and of the ICT-induced organisational innovation that propels productivity growth, not least in services. This is why, after a general part on growth policies in Europe, the *EIB Conference* took stock of ICT and the e-economy and their links to productivity and growth.

This introduction – rather than tackling the vast literature on economic growth – provides a non-technical summary of the articles of Volume 16 of the *EIB Papers* and the presentations made at the *EIB Conference*. It first reviews some empirical evidence on the composition and major determinants of

productivity growth. Section 2 discusses structural policies to boost productivity growth. Section 3 asks how the economic and financial crisis of 2008 has changed the perception of growth policies and socio-economic models in Europe. Section 4 then turns the spotlights on the productivity-enhancing role of ICT and the e-economy, paying due attention to the associated infrastructure needs, which play centre-stage in the activities of the EIB. Finally, Section 5 recaps the main policy insights.

## 1. Productivity growth in Europe

In his scene-setting article, **Kristian Uppenberg** illustrates the composition of GDP growth in the US, the EU and its member countries for the past three decades, presenting a breakdown of average GDP growth rates both into contributions from economic sectors (manufacturing, market services, social services etc.) and into the respective contributions of employment and labour productivity. Distinguishing sub-periods, his analysis thus illustrates how different sectors in different countries have grown at different speeds and to what extent their output growth came at the back of additional jobs in the sector (as opposed to boosting the productivity of existing workers).

*In the 2000s, market services accounted for two thirds of the US-EU productivity growth gap as EU services growth came with disappointingly low productivity advances.*

Three main findings are worth highlighting. First, contrary to the ambitions of the Lisbon strategy, the EU has seen its labour productivity growth fall even further behind that of the US in the past decade. Second, referring to the sectoral breakdown, productivity growth has been high in manufacturing, higher than growth in output, and was thus accompanied by a secular decline in the sector's share in total employment (down to about 15 percent on average in the 2000s). By contrast, market services have seen their share in employment increase over time and now employ between 40 and 50 percent of the workforce in advanced economies. In the decade preceding the crisis, output growth in market services consisted of a healthy combination of productivity and employment increases in the US and in a few EU countries. In the major parts of the EU, however, growth in services was heavily dependent on employment and came with disappointingly low productivity advances. In the 2000s, market services accounted for two thirds of the US-EU productivity growth gap, manufacturing for the remaining third. Given the growing relative size of the sector, market services' poor productivity record has increasingly become a drag on overall growth performance of the EU economy.

Third, a few EU countries have nonetheless eschewed productivity growth stagnation, offering insights to peer EU countries with less dynamic track records. High-growth countries typically share many features lacking in low-growth countries. In particular, they tend to rank high on indicators linked to innovation as well as to trade openness and international connectedness. The articles following Uppenberg's look at these issues in turn.

**Catherine Duverger** and **Bruno van Pottelsberghe** look at research and development (R&D) from various funding sources and find that business R&D, public R&D and R&D performed abroad are indeed positively correlated with advances in productive efficiency as measured by MFP growth. Just how much R&D contributes to productivity varies quite widely across countries and is shown to depend on the set-up of science and innovation policies. For one thing, higher-education R&D is found to be growth-enhancing whereas R&D in government agencies is not, likely reflecting different incentives and different socio-economic objectives. For another, the characteristics of the patent system matter. Business R&D has larger productivity effects in countries where businesses rely to a greater extent on high-quality patents. By contrast, more patent-friendly policies (easier enforcement and fewer restrictions on patent holders) – while desirable for individual patent holders – reduce the productivity effects of business R&D.

Turning to internationalization, international production sharing has been increasingly recognized as being part of the growth success story of advanced and emerging economies alike. **Carlo Altomonte** and **Gianmarco Ottaviano** add to the growing body of evidence on the links between firms'

international activities (exporting, importing, outsourcing and Foreign Direct Investment (FDI)) and their “competitiveness”, best expressed by firm-level MFP. With a dataset covering 15,000 European firms, they show that international production sharing is indeed associated with stronger competitiveness – both at the firm and at the industry level.

The *EIB Conference* saw a lively debate on the direction of causality between internationalization and competitiveness: Does internationalization make firms more competitive or is it that more productive firms are better able to participate in international production sharing? What sounds like an academic question is in fact decisive for devising the right public policies. While the authors’ empirical results do not give a direct answer, the paper provides a careful literature discussion. At the *firm* level, increases in productivity increase the likelihood of becoming internationally (more) active and not the other way around. Firms are not born international. To become exporters, firms already need to be quite productive, and selectivity increases further as internationalization options become more and more complex, culminating in FDI and active outsourcing strategies. True, FDI and outsourcing hold the promise of conquering new markets and increasing profits, but these are risky and costly undertakings, so only the very best succeed in them. By contrast, there seems to be surprisingly little evidence of “learning by exporting”.

These findings are compatible with studies showing trade policy reforms to boost MFP growth at the *country* and *industry* levels. When a relatively closed economy opens up to international trade and FDI, capital and labour are moved (“reallocated”) from less to more productive firms as the weakest firms shut down in the face of foreign competition; the best firms seize international opportunities, increase world market shares and grow; and firms with intermediate MFP survive without growing because they are confined to the domestic market.

Altomonte and Ottaviano find that an industry’s involvement in international production sharing is stronger the higher the average MFP level of firms in that industry, but the connection is weaker when the dispersion of MFP across firms is larger. These results can be read through the “lens of selection” and reallocation just described: the internationalization-induced reallocation of resources from exiting under-performers towards high-performing firms raises average productivity in the industry and lowers productivity dispersion. As heterogeneity is reduced, the scope for reallocation gradually shrinks, and the positive impact of additional international exposure on industry competitiveness weakens.

The policy conclusion of these original findings is that public policies should foster healthy industry dynamics rather than aiming at internationalization *per se* (e.g. by offering targeted tax credits to exporters). Policies that stimulate stiff domestic competition or remove barriers to such competition are better suited to prepare firms to going international. Increasing international activities by firms could then be seen as an indicator of how successful these domestic policies are. This conclusion prepares the ground for the discussion of policies to boost productivity growth.

## **2. Policies to boost productivity growth: industry-level and firm-level evidence**

Among the determinants of productive efficiency, one hot candidate is product market regulation. **Jens Arnold, Giuseppe Nicoletti and Stefano Scarpetta** provide a survey of recent empirical findings on the growth effects of anti-competitive product market regulations from the macro, sector and firm perspectives. While the relationship is rather complex, the bottom line of this literature is that product market regulations hamper productivity growth by impairing efficiency-enhancing resource reallocation.

Unlike in the case of MFP and internationalization, causality can be readily established here as running from the stance of regulation to productivity growth since product market regulations are subject to deliberate policy changes. What springs to mind immediately in the EU context is the unfinished

***Opening up to international competition leads to growth of the fittest firms and exit of the weakest, boosting average industry competitiveness.***

business in establishing a veritable single market for services. That being said, the richness of the OECD regulation indicators on which the empirical results are based offers a panoply of quite precise pointers to growth-friendly product market reforms.

Among the wealth of interesting results reported by the authors, a few are particularly critical from a European policy perspective. As far as the effects of regulations on the regulated sector itself are concerned, barriers to firm entry and entrepreneurship have the most damaging effects on economic performance and aggregate incomes. Further, regulation appears to have stronger negative effects in ICT-intensive sectors than in other sectors, reflecting the higher pace of innovation in these sectors and their greater reliance on market entrants to bring about productivity-enhancing changes.

***Anticompetitive service regulations cause spill-over damage to other sectors, especially to ICT-intensive client sectors.***

However, the authors insist that bad regulation does not just affect firms in the regulated sector but also causes spill-over damage to other sectors. When taking into account intersectoral regulation impacts, ICT-intensive sectors, again, are shown to suffer more as they tend to use regulated services such as energy, telecom and business services more intensively. These regulation impacts also help explain why manufacturing industries enjoy lower productivity growth in countries with heavily regulated service sectors.

Finally, when looking at the firm-level evidence on the efficiency of resource allocation, the authors show that product market regulations explain part of the cross-country and cross-industry differences in long-term MFP growth.

Efficiency of resource allocation plays centre-stage in **John Haltiwanger's** article, which takes a firm level perspective and analyzes the effects of firm dynamics on productivity growth. Static allocative efficiency implies that the most productive firms tend to be the largest firms. Similarly, dynamic allocative efficiency means that resources are moved from less to more productive businesses. In countries with high allocative efficiency (notably the US), the more productive firms, on average, are larger and tend to expand, while less productive firms are smaller and more likely to exit ("up or out" dynamics). Such reallocation is productivity enhancing at the aggregate level. As market entry implies new goods or services, meeting latent consumer demand, and newcomers often produce with a newer and technologically more up-to-date capital stock, the entry and growth of new firms is an important contributor to productivity. Policies should therefore encourage start-ups and market entry rather than protecting incumbents.

Informative measures of static and dynamic allocative efficiency are the correlation between firms' MFP and firm size and that between MFP growth and firm growth, respectively. Haltiwanger shows that static allocative efficiency is highest in the US and somewhat lower in other advanced countries (e.g. in the EU-15) with less market-friendly regulatory settings. Increases over time in the correlation between MFP and firm size indicate whether the resource reallocation process is moving in the right direction. For example, the new EU member states – but also China – have seen increases in static allocative efficiency, albeit to levels that still leave considerable room for further improvement.

A number of policy conditions need to be in place to make reallocation of capital and labour work without excessive adjustment costs, suggesting that piecemeal market reforms do not work. In a non-exhaustive list, Haltiwanger points to labour market flexibility; well-specified property rights and strong rule of law; bankruptcy regulations that do not discourage start-ups, even by "second-chance" entrepreneurs; and well-developed, high-performing infrastructure networks.

He also discusses the role of financial markets in providing sufficient funds to new high-growth businesses. Some of the financing channels that work well in good times break down in severe financial

crises, justifying public intervention. Right now, policy makers are facing a daunting trade-off between actively cushioning the most severe effects of the crisis (mass layoffs, insolvencies etc.) and preserving the potential for productivity-enhancing reallocation in the long run.

Indeed, the possibility that the depth of the economic and financial crisis could have deteriorated even the long-term growth outlook in advanced economies has been discussed in policy circles. Given these exceptional times, even a conference focusing on the long run cannot do without asking how the crisis may affect our thinking on economic policies for the medium and longer term.

### **3. Has the crisis changed the perception of growth policies and socio-economic models in Europe?**

The presentation by **André Sapir** from Bruegel, the Brussels-based EU policy think-tank, is unfortunately not represented in this volume. His presentation, which sparked a very lively discussion at the *EIB Conference*, looked at how economic policy can be shaped to make the economic wheels spin again.<sup>1</sup> To this end, one first needs to look back at the past decade.

In fact, the crisis has made Europe's well-known long-term challenges such as demographic ageing, accelerated technological change, globalisation, and climate change more acute. The challenges have by no means gone away. Europe's response to these challenges was the Lisbon Strategy with its central aim of transforming the EU into a fast-growing, innovation-based society. The Strategy was supposed to guide member countries' structural policies from 2000-2010 but largely failed on most of its targets.

As a result, the economic and financial crisis and the ensuing "Great Recession" hit a largely unreformed Europe that, on top, had not used the good times to consolidate general government budgets enough to pre-fund the long-term challenges, let alone to fight a deep and drawn-out recession. Now the immediate danger is that of a vicious circle of weak – or negative – GDP growth raising public-debt-to-GDP ratios, forcing radical consolidation measures that further dampen short-term prospects for aggregate demand.

The broader question is that of the sustainability of Europe's socio-economic model. Several models co-exist in Europe, which Sapir had assessed in past work along a two-dimensional scale of efficiency and equity. At one end of the spectrum, the Nordic countries seem able to reconcile a high degree of economic efficiency with a high degree of equity. At the other end, the Southern EU member states have been struggling with comparatively low levels of efficiency and social justice.

Not surprisingly, the Nordics have weathered the economic and financial crisis best so far. For example, between 2004 and 2010, the general government debt-to-GDP ratio has not increased in the Nordics whereas it increased dangerously in the Southern EU member countries from generally already high levels. Assessed against this – admittedly partial – indicator, the Anglo-Saxon countries, whose public-debt-to-GDP ratio doubled to 82 percent, look more fragile than most observers thought before.

The need for reform is greatest in the Southern EU member states. They had used the introduction of the Euro as an excuse not to reform rather than as an impetus for reform. Artificially low interest rates and the possibility to build up large external debt positions gave an extra lease of life to a socio-economic model that was already under pressure 15 years ago due to increased competition from emerging Asia and Central and Eastern Europe. The South is facing a twin problem of high external (and public) debt and low competitiveness. The latter finds its reflection in a dismal productivity growth record during the 2000s.

*The Great Recession hit a largely unreformed Europe that had not used the good times to prepare for its long-term challenges.*

<sup>1</sup> Sapir's slides are available at [http://www.eib.org/attachments/general/events/luxembourg\\_27102011\\_04\\_sapir.pdf](http://www.eib.org/attachments/general/events/luxembourg_27102011_04_sapir.pdf)

**Completing the Single Market, reforming competition and financial-sector regulations and a more effective use of EU funds would help EU countries to grow out of the crisis.**

Drilling down to the structural weaknesses, southern EU countries saw sectorally unbalanced and unsustainable growth as the surge in aggregate demand mainly benefited the construction sector and domestic services, leading to a boom-bust cycle in low-skilled employment. Moreover, the southern members are characterized by low openness to foreign trade, business-unfriendly product market regulations and extremely small average firm size. Small firm size and strong “insider” protection make it particularly difficult to stimulate innovation and technological upgrading.

While all member states have to address their structural weaknesses to jump-start growth in productivity, the EU can also help by further pushing the Single Market into hitherto protected sectors and by reforming and better enforcing competition policy and financial regulation. Moreover, EU financial resources should be used more efficiently.

Given the central role devoted to the policy implications of the research presented, the *EIB Conference* featured **Richard Cawley** from the European Commission as a discussant to put the presentations by Nicoletti, Haltiwanger and Sapir into perspective. Reinforcing their messages, Cawley stressed it was not too late to undertake supply-side reforms, and that countries had much to gain in the process. He reported on policy reform simulations by the EU Commission showing that fiercer product market competition, lower entry barriers, a higher share of high-skilled workers and public R&D support would all boost MFP growth. Yet, the strongest effects are to be expected from slashing barriers to market entry. A version of this simulation had been presented at the 2009 *EIB Conference* on R&D and innovation.<sup>2</sup>

#### **4. ICT and the e-economy**

Zooming in on ICT and the e-economy, the articles of Issue 2 of Volume 16 look at the macro-sectoral links between ICT and productivity; Europe’s broadband infrastructure needs; and on how ICT is reshaping and re-pacing innovation.

**Hubert Strauss** and **Besik Samkharadze** prepare the ground by providing empirical evidence on the ICT-productivity link. ICT investment accounts for a substantial share of the US productivity acceleration in the late-1990s. In the EU, the growth contribution from ICT capital deepening was notably smaller. They point out that productivity gains greatly rely on complementary investment in human capital and intangible assets, leading to productivity-enhancing product and process innovation. In the US, and to a lesser extent also in Europe, labour productivity growth continued after 2001 despite declining ICT investment. Growth was propelled instead by efficiency gains (MFP), partly as a result of lagged gains from past ICT investments.

**Jussi Hätönen** discusses the ability of ultra-high-speed Internet to serve as infrastructure for entirely new digital products, services and modes of delivery. Europe has high basic-broadband penetration but is lagging behind other developed economies in the availability and use of very fast broadband. This could be worrying because large economic gains from broadband are materialising, and similarly large gains from ultra-high-speed networks are expected. To propel Europe into the high-speed Internet age, the European Commission launched the Digital Agenda for Europe, one of seven flagship initiatives in support of the Europe 2020 strategy for smart, sustainable and inclusive growth. The Digital Agenda sets ambitious coverage targets for the EU, for example Internet connections of 30 Mbits per second for all EU households by 2020 and connections at 100 Mbps for half of them.

<sup>2</sup> McMorrow, K. and Röger, W. (2009). “R&D capital and economic growth: The empirical evidence”. *EIB Papers*, (14:1), pp. 94-119.



However, large gains for society do not automatically mean profits for network owners. Up-front costs are high – meeting the Digital Agenda targets in a meaningful way would cost as much as EUR 200bn – while revenues will be drawn-out and subject to uncertainties in consumer demand (actual use may fall short of coverage), regulation (how much may owners collect in fees from network-using competitors?) and technology (could the fibre network be obsolete before it is amortised?).

Analyzing the financing gap, Hätönen concludes that market-based financing is estimated to cover up to 60 percent of the total. While connecting urban areas at a low cost per user is profitable, it is hard to see universal high-speed fixed-line broadband being fully rolled out to rural areas and being exclusively privately financed. EU countries do not currently have the fiscal space to cover all of the balance with outright subsidies. Nevertheless, public policy has an important role to play in various respects. First, telecom regulators need to commit to a long-term policy that is fair to investors and competitors alike, creating a predictable investment climate. Second, grant money should target areas where private investors are unlikely to go. Finally, promotional lenders such as the EIB can contribute by providing long-term finance at advantageous terms and bringing additional private finance on board.

While fibre-based communication infrastructure is technologically new, most of the public-policy issues involved are not. The provision of a universal broadband network may be compared to that of other infrastructure such as highway (or electricity) networks: putting in place the network (grid) is expensive but letting additional users in comes at close-to-zero marginal cost up to the point of saturation. If high-speed broadband is likely to provide welfare gains (e.g. higher productivity, new products and services) in excess of total costs, as Hätönen documents, the claim for public support for broadband can be based on efficiency grounds as well as obvious spatial-equity considerations. Beyond economic-policy problems, various infrastructure policies also share engineering concerns. Hätönen reports that rolling out broadband together with road construction work would increase the cost of the latter by merely 1 percent, calling for coordination between transport and telecommunication planners.

Finally, **Erik Brynjolfsson** sheds light on the economic effects of ICT and the e-economy. Against the backdrop of the revival in US productivity growth since the mid-1990s and the wave of ICT investment that accompanied it, he summarizes the three ways that ICT raises productivity growth: by enhancing ICT equipment (e.g. faster computers); by catalyzing organizational change; and, most importantly, by transforming the innovation process itself.

How is digitisation transforming innovation? The author describes a four-pronged sequence of mutually reinforcing innovative activities: (i) improved measurement of economic activity in real time; (ii) faster and cheaper business experimentation (Internet firms conducting and evaluating controlled experiments within hours); (iii) sharing new insights widely and quickly; and (iv) replicating new products and processes immediately, thereby scaling production up to all outlets/customers. The emerging sequence – experiment, measure, share and replicate – is seen as a new kind of R&D. The lower cost of innovation and up-scaling intensifies Schumpeterian competition, with incumbents constantly challenged by new entrants.

The often disruptive changes brought about by the e-economy are so substantial that a number of areas need to adjust. Specifically, Brynjolfsson mentions public policies in the fields of education, migration, infrastructure, product market regulation and innovation, but also corporate governance and incentive systems.

***Private finance might cover only 60 percent of the estimated EUR 200bn investment needed to bring fast Internet connections to the whole EU by 2020.***

**Fully exploiting current ICT alone would greatly boost productivity, and ICT keeps advancing quickly.**

As is characteristic for times of technological revolutions, the period since 1995 has seen growing dispersion in firm performance as some firms were fast adopters of new technologies while others stayed behind. The observation is particularly valid in ICT-intensive sectors. This suggests many firms are still far from exploiting the full potential of current ICT capabilities, leaving room for productivity advances from adopting best ICT practice.

## **5. Main policy insights**

To some extent, policy makers and politicians have done a disservice to urgent growth policies by “hiding” behind the catch-all term “structural reform”. As this summary of Volume 16 of the *EIB Papers* has shown, such reforms may call for politically unpalatable actions that shake up the economy and hit at vested interests, such as

- Pulling down barriers to market entry to make room for newcomers and foreign rivals, implying exit of some existing firms and temporary job losses;
- Encouraging reallocation of resources (capital and labour) towards more productive uses, which may require geographical and sectoral mobility, less employment protection, and stronger work incentives;
- Fostering attainment levels and quality in education and stepping up life-long learning to help people cope with faster technological change;
- Pushing the pace of technological change through R&D – including by a better balance between legitimate intellectual property protection and the anti-competitive use of patents – and accelerating the diffusion of ICT and innovation; and
- Cutting wasteful subsidies and other government expenditure to create space for targeted public support to broadband infrastructure investment, which would allow exploiting the potential of the e-economy more fully.

However, given how much is at stake, EU governments should consider whether the short-term pain would not pale in the face of the historical achievement of a dynamic single market with high sustainable growth. Indeed, which rate of economic growth the EU economy is able to sustain will make a tremendous difference for living standards in the future. Take a simple numerical example. If GDP per capita grew at 2.5 percent per year on average, Europeans would become twice as rich essentially within a generation (28 years). If GDP per capita grew at 1.5 percent, doubling it would take almost half a century. Yet, in economic model simulations, it is not uncommon to find growth-boosting effects of up to a full percentage point from comprehensive supply-side reforms.