The Potential Impact of Pro-competitive Regulatory Reforms on Productivity and Growth in Canada

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Abstract

This article explores how regulations that restrict competition in key Canadian non-manufacturing sectors such as energy, transport, trade, and professional services have contributed to the country's long-standing productivity gap with the United States. Using international data on anticompetitive regulations and productivity from 15 countries and a large number of industries over the 1996-2021 period, the study finds that regulation in these upstream sectors, which supply essential inputs to the rest of the economy, plays a role in shaping overall productivity performance. Taking results causally, a thought experiment suggests that if Canada were to implement an ambitious reform effort aimed at adopting best international practices in regulating these four sectors, GDP per capita could rise in the long term by between 6.5 and 10 percent, depending on the range of reforms implemented. Gains would originate from procompetitive reforms in all sectors, with the largest ones coming from the professional services and retail distribution. Overall, the findings highlight the major economic benefits Canada could reap from implementing a deeper and swifter pro-competitive reform agenda than in the past.

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The Canadian economy stopped converging to US productivity levels in the mid-1970s, when its relative productivity level reached a plateau, and started diverging in the subsequent period and until recently. The average growth rate of output per hour worked fell well behind the United States during the ICT revolution of the 1990s, with the gap persisting in this century. Overall, labour productivity growth declined from an average of 2.3 per cent per year over the previous four decades to only 0.9 per cent per year in the 2000s, a rate close to that of the Euro Area (EA). Labour productivity levels, which were half way between the EA and the United States in the 1970s, aligned with those of the EA more recently, suffering a 20 per cent gap relative to the United States.

The persistent slowdown in Canadian productivity has been more pronounced than the global trend, and especially more severe than in the United States, where productivity continued to grow at roughly twice the Canadian pace, accentuating the divergence between the growth trajectories of the two closely interconnected economies. Given that productivity is the principal engine of GDP per capita growth, this deceleration has led to disappointing gains in living standards, as reflected in a widening gap in GDP per capita relative to the United States.

This divergence has attracted considerable scholarly attention, prompting investigations into its magnitude and root causes (Baldwin and Gu, 2007; Rao *et al.*, 2008; OECD, 2016; Sharpe and Uguccioni, 2017). Small average firm size (Leung *et al.*, 2008; Baldwin *et al.*, 2014), changes in industry composition (Almon and Tang, 2011; Tang, 2017) and low innovative effort (Ranasinghe, 2017) were among the structural sources of productivity weakness that were identified in past studies. However, causes that are directly related to public policy are of particular interest to decision-makers. For instance, OECD (2025) points to R&D incentives as an area for policy intervention as well as measures to ease persisting barriers to competition in Canadian markets.

Indeed, both past and recent work has related the disappointing Canadian productivity performance to weak competitive pressures and distortions due to restrictive product market policies. For instance, Conway and Nicoletti (2007) point to regulations weakening competitive pressures in the non-manufacturing industries, suggesting that these may have curbed the adoption, diffusion and efficient use of information and communication technologies. Their estimates indicate that pro-competitive reforms could have boosted productivity growth rates by between 0.5 to 1 percentage point per year, both directly in ICT-producing industries and indirectly in the rest of the economy via cheaper and better intermediate inputs. More recently, Gu and Willox (2018, 2023) have argued that limited competition in the information and cultural services sector has curbed aggregate productivity growth and Chen and Tombe (2024) have attributed about half of the widening productivity gap between Canada and the United States to rising resource misallocation due to market distortions partly reflecting policy-induced barriers to interprovincial mobility of labour and capital. Ab Iorwerth and Rosell (2018) estimated the potential long

run GDP per capita gains from aligning Canadian FDI regulations on those of the United States at a maximum of over 5 percent.

In this context, this article examines whether weak competitive pressures in certain non-manufacturing sectors of the Canadian economy contributed to the aggregate productivity slowdown, by propagating throughout the economy and potentially hindering Canada's ability to fully benefit from the digital transition. The possibility that changes in performance in one part of the economy may have broader effects in the aggregate has been widely acknowledged in economic research.[2] An abundant literature is also devoted to the effects of market regulation on productivity and growth (for a survey, see Campos *et al.*, 2025).

This study looks at how regulations restricting competition in a subset of industries that are key providers of intermediate inputs to the rest of the economy (henceforth called "upstream sectors") can influence aggregate productivity developments.[3] Building on earlier research (Conway and Nicoletti, 2007; Bourlès *et al.*, 2013; Cette *et al.*, 2016;...), the article looks at a set of sectors that play a pivotal aggregate role because their services are widely used in all areas of economic activity. These upstream sectors include: energy, transport, communications, retail and wholesale distribution referred to as trade, and the professional services. Together, these sectors' output represents 30 per cent of the Canadian GDP and 40 per cent of intermediate inputs used in other sectors of the economy.[4] Hence, competitive conditions that affect market power in these upstream sectors quickly and extensively propagate their effects throughout the economy via input-output relationships.

To measure competitive conditions in these upstream sectors we leverage a new vintage of comparative indicators of policies and regulations that affect barriers to entry and restrictions to business conduct in regulated sectors. The policy indicators are an extension of the OECD's product market regulation indicators, which we map approximately into the upstream non-manufacturing sectors covered by our analysis. Due to significant changes in the methodology of the OECD indicators in 2018, we have revised their design and values in collaboration with the OECD to enable consistent tracking of the evolution of regulations over the period from 1995 to 2023. This required a simplification

2 For instance, Gabaix (2011), di Giovanni *et al.* (2014) and Giroud and Mueller (2019) explore the aggregate effects of changes in the performance of large firms; Barrot and Sauvagnat (2016), Caliendo *et al.* (2018) and Stumpner (2019) trace the aggregate effects of regional performances; and Jones (2011), Acemoglu *et al.* (2012) and Carvalho and Gabaix (2013) point to the aggregate effects originating from specific industries.

3 We measure this influence using direct I-O relationships to be consistent with previous research in this area. An interesting alternative would be to use Leontief inverses instead, which take into account the complete set of supply chains relationships in the economy.

4 This is computed as the ratio of the value of intermediate inputs sourced from these non-manufacturing sectors over the total value of intermediate inputs consumed by all other sectors of the economy. These figures are derived from the OECD Input-Output Tables and the StatCan Database in 2015. The precise classification of sectors is provided in Table A2 in the online appendix available at https://csls.ca/ipm/49/Comp_App.pdf

of the indicators' structure, also reducing the amount of regulatory information contained in each indicator relative to the more complete coverage of the most recent vintage of the OECD indicators.[5]

As in Cette *et al.* (2016), the analytical framework relates industry-level productivity to capital intensity and other drivers (proxied by a full set of fixed effects), including prominently the knock-on effects of regulations in upstream sectors on all other sectors of the economy. Estimates are provided for both hourly labour productivity and total factor productivity (TFP) and are based on cross-country, industry-level data covering 15 OECD countries and 19 sectors over the past 25 years. This approach allows to evaluate the potential contribution of procompetitive regulatory reforms in upstream sectors to Canada's future productivity and GDP growth.

The time-consistent OECD regulatory policy indicators reveal that, relative to peer countries, Canada has lagged in implementing ambitious pro-competitive reforms in most of the key non-manufacturing sectors covered by the analysis. While Canada's pro-competitive stance was better than average in the 1990s, subsequent reform efforts have been more limited than elsewhere especially in this century, considerably worsening Canada's relative position. The sectors currently characterized by subpar regulatory approaches account for a significant share of intermediate inputs across the economy, including in high-tech manufacturing and ICT industries that are vital to digital-era growth.

Taking our results causally, a thought experiment based on our estimates suggests that insufficient reform in these areas could explain a large part of the over 20 per cent shortfall in Canadian productivity relative to the United States currently observed, with the greatest impact arising from weak competition in network industries (communications, energy and transport) professional services and retail distribution. Simulations using our coefficient estimates suggest that instantly and simultaneously aligning Canada's non-manufacturing regulations with international best practices – which would represent an extremely ambitious reform agenda – could increase aggregate labour productivity in the very long term by a maximum of 10 per cent. Assuming that this maximum effect of reforms would fully unwind over two decades, the current Canada-US GDP per capita gap could have been reduced by more than one third if such reforms had been implemented at the beginning of this century, all else equal. Sector-specific analysis attributes shares of this potential overall gain to improvements of 1 per cent, 4.5 per cent and 4.5 per cent from reforms in network, retail distribution, and professional services, respectively.

Were Canada to align instead its regulations on those of the United States – which would represent a less ambitious reform agenda – the maximum gains would

5 For a precise definition of what is specifically captured by these regulations, a comparison to the 2023 vintage and the mapping from regulations to sectors please refer to Table A3 in the online appendix. The resulting consistent time-series for energy, transport and communication is already available on the OECD website. The corresponding series for retail distribution and professional services will also be available shortly on the OECD PMR website.

be smaller, about 5 per cent, and a sizeable gap would remain, requiring reforms elsewhere in the economy. The latter gains are comparable to those obtained by Ab Iorwerth and Rosell (2018), who performed a similar experiment focusing on the easing of FDI restrictions.

This maximum effect of reforms is partly driven by the assumption that retail regulations are representative of regulations affecting the broader "Retail, wholesale and vehicle repair" sector, a standard assumption required by data limitations.[6] Scenario analysis based on alternative estimates controlling for this approximation suggests that lower bound long-term gains from reforms (excluding retail) are still very significant. Reforms would raise Canadian GDP by 6.5 per cent, with most of the gains coming from the easing of regulations in the professional services.

If the regulations in the upstream sectors covered by the analysis are a reflection of (or related to) broader sectoral regulatory approaches, our estimates could capture the effects on productivity of these broader approaches as well. For instance, data limitations preclude coverage of changes in sectoral FDI restrictions and accurate account of sectoral barriers to internal trade, which were shown to be significant in previous research. Thus, we cannot exclude that our estimates and scenario analysis may also reflect changes in such broader regulatory settings. If so, properly accounting for such changes could reduce the impact of reforming the narrower set of regulations on which our analysis is focusing.[7]

Our results survive changes in model specification, several robustness checks and, as discussed extensively in later sections, are likely to be little affected by endogeneity bias that could occur if sectoral productivity performances were to influence regulatory policies, implying reverse causality. The main potential source of such bias is eliminated by ignoring the potential effects of sectoral regulations on the productivity of regulated sectors themselves.[8] Other possible sources of endogeneity would be either very unlikely to occur (e.g. low productivity downstream sectors lobbying for more regulation in upstream sectors) or biasing our estimates downwards (e.g. low productivity downstream sectors lobbying for upstream deregulation). Remaining endogeneity issues that could bias estimates upwards (e.g. high productivity downstream sectors lobbying for deregulation of upstream sectors) are partly accounted for by fixed effects and partly compensated by the possible downward bias induced by other omitted effects, such as the positive effects of deregulation on capital intensity (on this see Alesina *et al.*, 2005).

Still, the precision of our estimates and productivity scenarios could be affected by

6 The OECD indicators do not cover regulations in wholesale trade and vehicle repair and such sectoral detail is not available in the harmonized OECD input-output tables. Therefore, the assumption is standard in this line of research (see for instance Bourlès *et al.*, 2013 and Barone and Cingano, 2011).

7 We thank an anonymous referee for alerting us of this possibility.

8 While we ignore the own-effects of regulations in regulated sectors (e.g. the effects of retail regulation on retail productivity), we do cover the cross-effects of regulations in regulated sectors, such as the effects of regulations in retail on the productivity performance of other regulated sectors (e.g. telecoms or the professional services).

other factors. First, our within-sector analysis cannot account for the possible effects of between sector reallocation or other general equilibrium adjustments highlighted in Chen and Tombe (2024). Second, we ignore the possible productivity effects of upstream regulations in downstream sectors that are omitted from our analysis (e.g. agriculture, mining, petroleum refinery and the non-market sector). Third, due to data limitations, we ignore the possible effects of other important regulations, such as FDI and service trade restrictions and barriers to internal trade, which were shown to be important for Canada's productivity performance (Ab Iorwerth and Rosell, 2018). Extending the analysis of procompetitive reforms to include between-sector reallocation effects, spillovers on sectors not covered in this study and a broader range of regulatory barriers to competition could be fruitful avenues for future research.

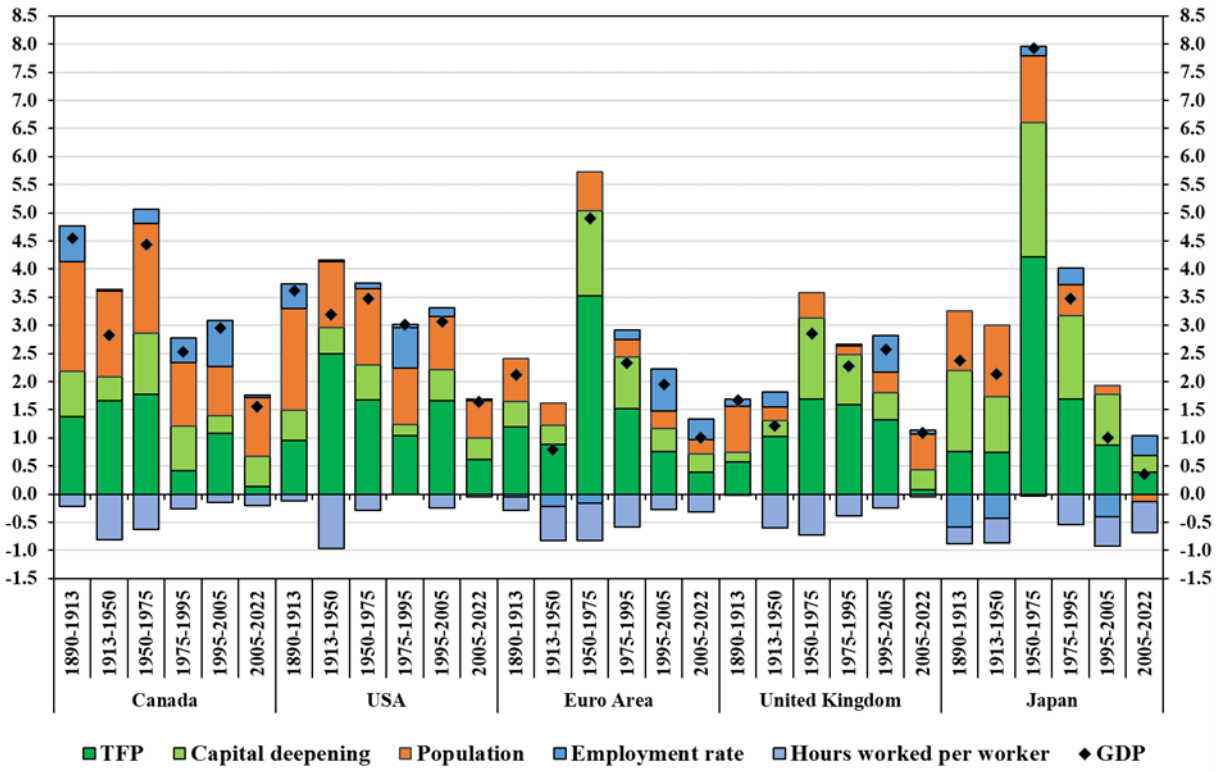
The article is structured as follows. The first section provides some background on historical developments in Canadian productivity cast against those of the United States and other major OECD countries. Section 2 then discusses the role that the persistence of anticompetitive market regulations may have played in this context, with reference to previous research linking such regulations to growth and a focus on those affecting the non-manufacturing sectors. Section 3 lays out our empirical methodology – the analytical framework and the data – and illustrates the results that provide the basis for our scenario analysis, in which we provide simulations of the potential impact of further product market reforms on Canadian aggregate productivity and GDP growth. Section 4 concludes.

Productivity and GDP growth in Canada

It is interesting to put Canadian growth performance into a historical and cross-country perspective (Chart 1). Over the very long period 1890-2022, average annual GDP growth was stronger in Canada, at around 3.4 per cent, than in the United States (3.2 per cent) and the (historically reconstituted) Euro Area (2.2 per cent), but also than in Japan (3.3 per cent) and the United Kingdom (1.9 per cent). However, this stronger performance was primarily due to faster population growth. GDP per capita growth averaged 1.8 per cent annually, below the United States (2.0 per cent) and Japan (2.4 per cent), although slightly higher than the EA (1.7 per cent) and the UK (1.5 per cent). In fact, hourly labour productivity growth averaged 2.0 per cent per year over this long period in Canada, lower than in the other advanced economic areas considered here, i.e. the United States (2.1 per cent), the EA (2.2 per cent) and Japan (2.4 per cent), with the exception of the UK (1.5 per cent), whose weak productivity growth performance can be explained by a higher starting level in 1890 than in the other economic areas.

The 1890-2022 period can be broken down into six different sub-periods: pre-World War I (1890-1913); pre-World War I to post-World War II (1913-1950); post-World War II to the first oil shock (1950-1975), this sub-period often referred to as 'the Golden Age' (or in French 'les 30 glorieuses'); from the first oil shock to the start of the productivity rebound in the United States linked to the spread of ICTs

Chart 1: Sources of GDP Growth

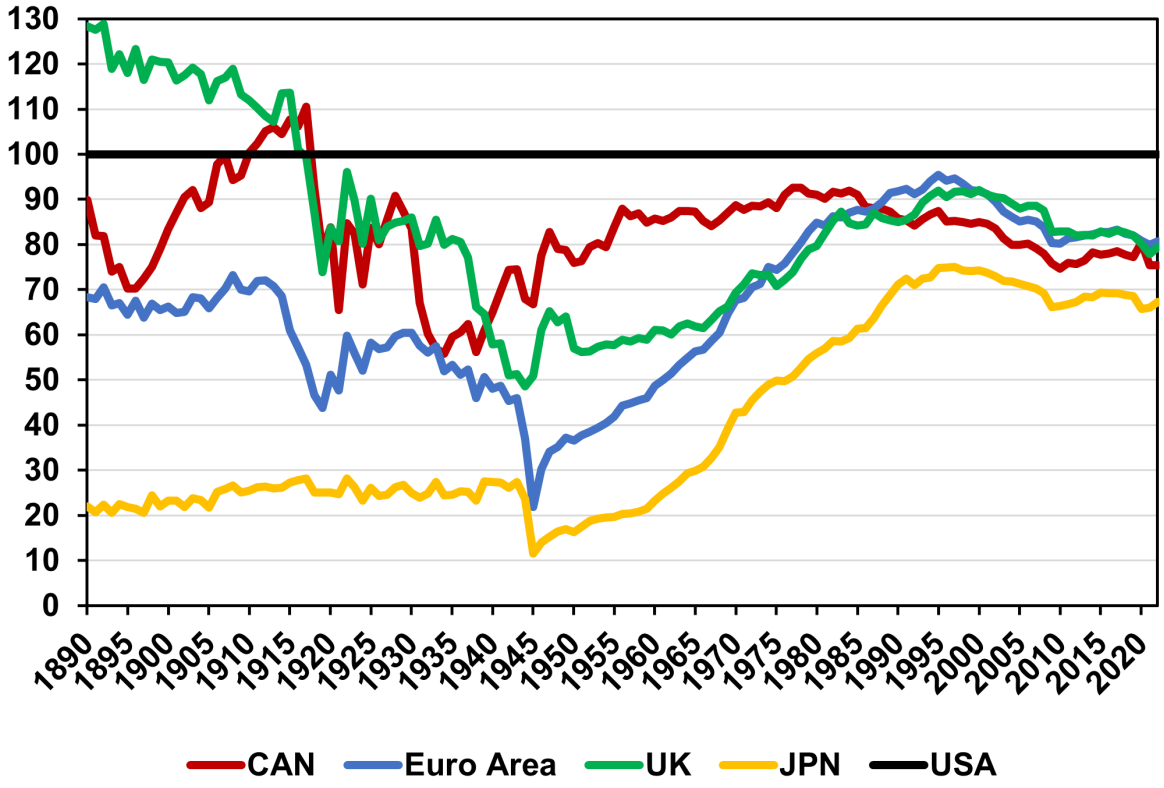


Note: The Chart shows average GDP growth rates and its components. The accounting decomposition of growth proposed in this chart assumes a Cobb-Douglas production function with two factors of production, the volume of fixed capital and the number of hours worked. The elasticity of GDP with respect to capital (labour) is assumed to be equal to 0.3 (0.7). The employment rate is the ratio of employment to total population. Hourly labour productivity growth corresponds to the sum of the growth in total factor productivity (TFP) and capital deepening (the two green bars).
Source: Bergeaud *et al.* (2016) – See: www.longtermproductivity.com.

(information and communication technologies) (1975-1995); the decade of the ICT-driven productivity rebound in the United States (1995-2005); and finally the recent years (2005-2022), characterized by major economic shocks – the Great Financial Crisis that began in 2008-2009, the COVID-related health crisis and the inflationary crisis of recent years.

Compared to the United States, Canadian annual hourly labour productivity growth had quite different profiles over these periods. It was more dynamic over the 1890-1913 sub-period (2.2 per cent vs. 1.5 per cent), reflecting a catch-up process. In fact, before World War I, this catch-up seemed achieved (Chart 2). However, over the next sub-period 1913-1950, labour productivity growth was much lower (2.1 per cent vs. 3.0 per cent), reflecting a major slowdown. A catch-up process appeared again in the third sub-period 1950-1975 (2.9 per cent vs. 2.3 per cent), but was still incomplete in 1975, at the time of the first oil shock, when hourly labour productivity in Canada was about 10 per cent lower than in the United States. A slowdown happened again in the next three sub-periods, 1975-1995 (1.1 per cent vs. 1.2 per cent), 1995-2005 (1.4 per cent vs. 2.2

Chart 2: Comparative Levels of Labour Productivity per Hour Worked, 1890-2020 (United States = 100)



Note: The Chart shows levels of labour productivity per hour worked in percentage of US levels.
Source: Bergeaud *et al.* (2016) – See: www.longtermproductivity.com.

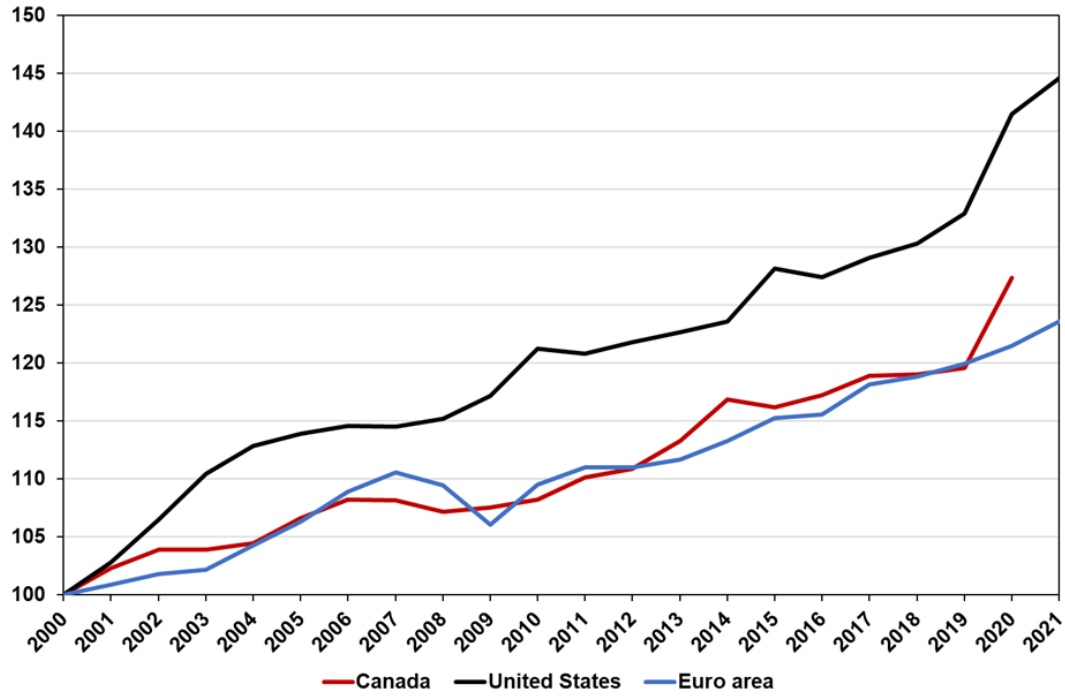
per cent) and 2005-2022 (0.7 per cent vs. 1.0 per cent).

Comparing Canadian postwar productivity trends relative to the United States with those of the EA, the UK and Japan, a major difference emerges. Whereas in the other economic areas, the process of catching up with US productivity levels lasted until the mid-1990s, in Canada it stopped two decades earlier. By 2022, at the end of these trends, hourly labour productivity levels were roughly equivalent in Canada, the EA and the UK, and around 20 per cent lower than in the United States. The case of Japan is quite specific: labour productivity trends over the post-World War II period are similar to those observed on average in the EA, but at levels around 20 per cent lower, due to economic activities in agriculture and services that are highly protected from competition (Bergeaud *et al.*, 2018).

Since 2000, hourly labour productivity trends in Canada have been fairly similar to those observed in the EA and the UK (Charts 1 and 2), with a comparable drop-off from the average productivity level observed in the United States. The same similarity in productivity trends between Canada and the EA can be broadly observed in the database that we use in our analysis (Chart 3).

As a result of these trends, in 2022 Canada's GDP per capita was nearly 25 per cent below that of the United States, a smaller gap in the EA, the UK and Japan

Chart 3: Average Labour Hourly Productivity Index (2000 = 100)



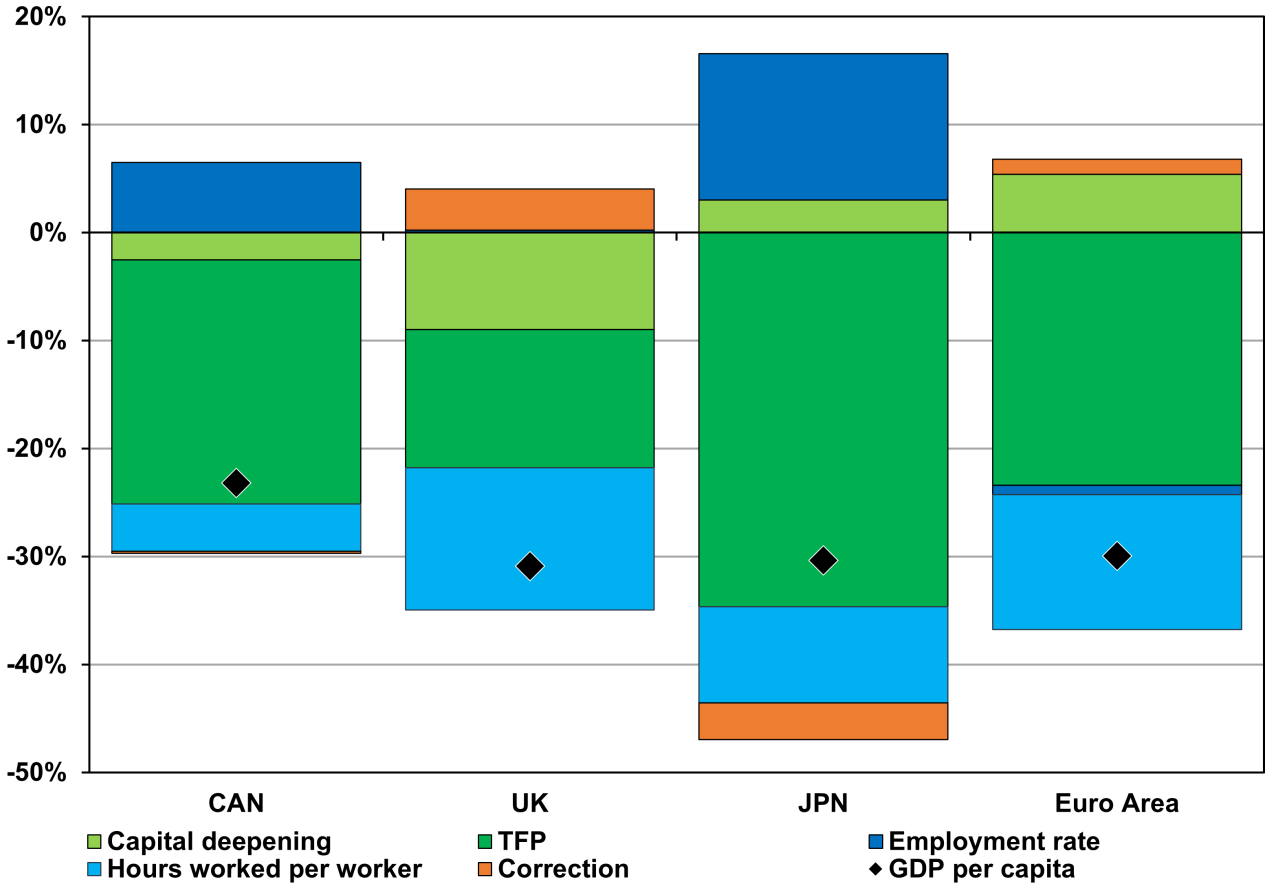
Source: Authors calculations on their database: EUKLEMS & INTANProd (Bontadini *et al.*, 2024) .

(Chart 4). In all four areas the gap was essentially due to lower hourly productivity and, to a lesser extent, shorter average working hours. Weak TFP, rather than capital deepening, is the main cause of this gap in hourly productivity. At the same time, higher employment rates partly offset weaker productivity in both Canada and Japan.

The Canadian specificity of an earlier productivity slowdown than that observed in other advanced economic areas has already been commented on in previous works, such as Conway and Nicoletti (2007),[9] and more recently Sharpe and Sargent (2023), Sargent (2024) or the Bank of Canada (Rogers, 2024). Several studies have sought the root causes of the Canadian specificity in several structural factors. These included the size distribution of Canadian businesses, skewed towards smaller sizes than in the United States (Leung *et al.*, 2008; Baldwin *et al.*, 2014); changes in Canadian industry structure, which moved faster than in the United States away from manufacturing towards less productive services (Almon and Tang, 2011; Tang, 2017); the skill composition of the Canadian workforce, with skill shortages in key areas (OECD, 2006); differential contributions of ICT-producing and ICT-using sectors, with their tim-

9 Conway and Nicoletti (2007: 5) note that "Canada is the only country with long-time series data in which labour productivity per hour has, on average, fallen behind that of the United States in both the 1980-1994 and 1995-2005 periods (in both levels and growth rates)". As far as we know, they are the first to make this point.

Chart 4: Gaps in GDP per capita relative to the United States and contributions, 2022 (PPP US$ 2010)



Note: The chart shows per cent gaps in GDP per capita relative to the United States and the percentage point contributions of its components. The accounting decomposition of the GDP per capita in this chart assumes a Cobb-Douglas production function with two factors of production, the volume of fixed capital and the number of hours worked. The elasticity of GDP with respect to capital (labour) is assumed to be equal to 0.3 (0.7). The employment rate is the ratio of employment to total population. The contribution of hourly labour productivity is the sum of the total factor productivity (TFP) and capital deepening (the two green bars). The correction term results from the cross effects of the various components.
Source: Bergeaud *et al.* (2016) – See: www.longtermproductivity.com.

ing differing across the two countries (Gu and Willox, 2018, 2023); and business dynamism, which suffers from relatively high innovation costs (Rasaninghe, 2017). Haun and Sargent (2023) also point out that productivity trends and levels in this century are fairly similar in Canada to those observed in other advanced countries.

However, a common conclusion is that Canada's relatively stringent product and service market regulations-particularly compared to the United States-played a major role (Conway and Nicoletti, 2007; Sharpe and Sargent, 2023; Sargent, 2024; Gu and Willox, 2018, 2023; Chen and Tombe, 2024; Rogers, 2024; OECD, 2025). This explanation also applies to productivity slowdowns occurring later in other countries (e.g. Nicoletti and Scarpetta, 2003; Bourlès *et al.*, 2013; OECD, 2015; Cette *et al.*, 2016). We devote the rest of this article to substantiate this claim.

The Role of Anticompetitive Regulations

Regulation and Productivity

Market regulations are pervasive in all advanced countries. Most of them are aimed at addressing public objectives that would not be achieved by the spontaneous operation of product, labour or financial markets. These include prominently safety, health and equity outcomes but also cover other domains such as environmental and consumer protection, fair competition, economic efficiency (e.g. in natural monopolies) and property rights (e.g. from new ideas) – where market failures are common. In product markets, these regulations may affect ease of entry (or exit) and growth opportunities by new firms, the behaviour and prerogatives of incumbents as well as the incentive structure of both of them.

Ultimately, product market regulations influence the degree of rivalry among firms and the competitive pressures they experience and, in turn, this affects their incentives to enhance the efficiency of production processes, the quality and variety of the product they supply and their efforts to innovate. While these linkages are complex and ambiguous, they stress the importance of competitive pressures for productivity outcomes.[10] For these reasons, assessing the need for regulations and making sure that their objectives are achieved in a way that is the least intrusive or distortionary for healthy market forces is an important objective for growth-oriented public policy. Often, both the need for regulation and their optimal design change with developments in technology and the business environment.

With this in mind, over the past few decades, numerous product market reforms have been implemented across the OECD. These reforms are expected to influence innovation and productivity throughout the economy-both in regulated and unregulated sectors-through several channels.

First, heightened competitive pressures resulting from reforms increase incentives for incumbent firms to improve efficiency and innovate, while simultaneously forcing less efficient firms out of the market. Second, reducing barriers to entry and firm growth allows new, efficient, and innovative firms to emerge and thrive. These mechanisms foster productivity gains both within firms and across sectors, by facilitating the reallocation of resources where they are most productive, while also enhancing overall business dynamism. Third, the resulting productivity improvements in key upstream sectors that supply intermediate goods and services can cascade through supply chains, amplifying the positive effects of reforms on the broader economy. Taken together, these three channels contribute to stronger aggregate productivity and GDP growth.

A large body of empirical research has documented the positive relationship be-

10 As shown by Aghion *et al.* (2002), the link between competitive pressures and efficiency enhancements can be heterogenous across firms, being stronger for firms that are close to the efficiency frontier than for firms that are far away from it, which may suffer from a "discouragement" effect. In the aggregate, this can generate a bell-shaped relationship between competition and innovation.

tween competitive pressures and productivity, via creative destruction and other channels.[11] Studies span multiple levels of analysis: at the firm level (e.g. Geroski, 1995; Nickell, 1996; Nickell *et al.*, 1997; Blundell *et al.*, 1999), the sector level (Nicoletti and Scarpetta, 2003; Griffith *et al.*, 2006; Inklaar *et al.*, 2008; Buccirossi *et al.*, 2013; Cette *et al.*, 2018), and the aggregate level, typically through panel data analyses across countries (Conway *et al.*, 2006; Aghion *et al.*, 2009).

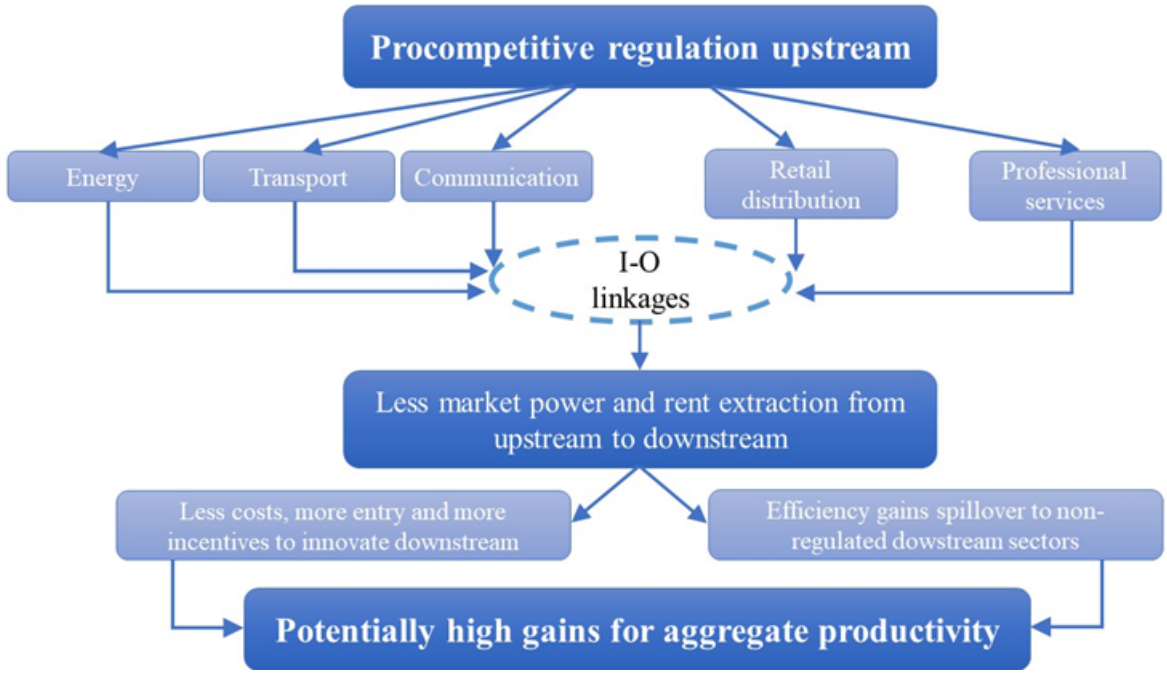
More recent studies emphasize that imperfections in goods and services markets - especially in upstream sectors that provide intermediate goods - can dampen the incentives of downstream firms that use those goods in production to improve productivity via restructuring, investment or innovation. A focus solely on intra-sectoral competition overlooks these important cross-sector linkages. This insight is important for policy-making as it suggests that the productivity-enhancing potential of reforms in downstream industries can be reduced by the lack of pro-competitive reforms in sectors that provide essential intermediate inputs. These often include key non-manufacturing industries – such as communications, transport, energy, distribution and business services - that are often sheltered from international competition and protected at home.

Anticompetitive regulations in upstream industries work their way to downstream industries by changing incentive structures (Figure 1). Regulation that unnecessarily curbs competition upstream grants market power to regulated firms, allowing them to raise prices and capture rents. While these rents could in principle be used for research and development, firms enjoying them often have little incentive to innovate, as their dominant market position reduces the need for further efficiency gains. When upstream firms gain excessive market power, they can appropriate a share of the returns from downstream innovation (e.g. by overcharging for the supply of their products), thereby discouraging entry and efficiency enhancements in downstream markets as well. Furthermore, the concentration of upstream suppliers reduces competition and limits the variety of products available for downstream firms, further undermining their ability to innovate and improve quality. With lower incentives to innovate in both upstream and downstream industries, the result is lower aggregate productivity growth.

Empirical evidence confirms that product market regulations in upstream industries negatively affect the productivity of industries that rely heavily on inputs from regulated sectors. These findings are supported by cross-country and sectoral panel analyses, including studies by Conway and Nicoletti (2007), Barone and Cingano (2011), Bourlès *et al.* (2013) and, more recently, Andrews *et al.* (2025).

11 Aghion and Griffith (2005) provide a conceptual illustration and evidence of these linkages between competition and growth. See also Aghion and Howitt (2009), Acemoglu *et al.* (2006) and Crafts (2006). Through a theoretical approach and estimates on a UK firm dataset, Aghion *et al.* (2009) show that a higher competition should encourage incumbent innovation in sectors that are initially close to the technological frontier, whereas it may discourage incumbent innovation in sectors that are initially further behind the frontier. For a survey of this literature, see Campos *et al.* (2025).

Figure 1: From Upstream Regulation to Downstream Productivity: Transmission Channels



Source: Authors of the article.

The Scope for Easing Anticompetitive Regulations in Canada

As widely discussed in both the academic and the policy arenas, Canadian product markets suffer from a lack of competitive pressures, especially in the non-manufacturing industries. Regulatory settings are still adverse to competition in some important services sectors – such as the professional services – and liberalization in some network industries has been slow and limited – such as in energy and transport. This is compounded by the persistence of differences in regulation and other hindrances to mobility across provinces that curb competitive pressures at the national level as well as by the existence of barriers to foreign direct investment and trade in services that limit competitive pressures from abroad.

Some of these regulatory settings are recorded in the OECD indicators that compare anticompetitive regulations across countries and over time.[12] For instance, the most recent OECD data (which is based on replies by the Canadian government to a questionnaire focusing on the province of Ontario and the city of Toronto) shows that regulations in trade and the professional services are slightly more restrictive of competition than in the average OECD country and by far more restrictive than in the average of the five best practice OECD coun-

12 The data and corresponding documentation are at https://www.oecd.org/en/topics/product-market-regulation.html for non-manufacturing regulations, https://www.oecd.org/en/topics/services-trade-restrictiveness-index.html for service trade restrictions, and https://www.oecd.org/en/topics/sub-issues/sustainable-investment/fdi-regulatory-restrictiveness-index.html for FDI restrictions.

tries. The comparative position of Canada is similar in the network industries, with a particularly bad comparative scoring in energy and communications.

These indicators cover a very wide range of government provisions restricting competition in these sectors, but unfortunately their time coverage is short due to a change in data collection methodology that occurred in 2018. Therefore, they can hardly be used in empirical analysis aimed at identifying the effects of reforms on productivity. To obviate this problem, we developed in full collaboration with the OECD a simplified version of the sectoral indicators of regulation that covers less ground in terms of regulatory provisions but provides a consistent historical series from 1998 to 2023. Table A3 in the online appendix shows how the most complete and the simplified versions of the sectoral indicators are related. Overall, simplified indicators cover less services, less regulatory areas and less information in each regulatory area (for more detail, see the Data section).

For coherency, in the rest of this study we use the indicators with the longest time coverage, which are used in the empirical analysis described in the next section. It is important to note that using this simplified indicator may provide an incomplete account of countries' procompetitive stance as well as affect their relative positions in the cross-country comparison. However, as explained below, the source of identification in our analysis is solely the change in the impact of upstream regulations on downstream sectors in each country. Therefore, what is relevant for the precision of the estimates is the variability of upstream regulations over time rather than the relative positions of countries in each regulatory area.

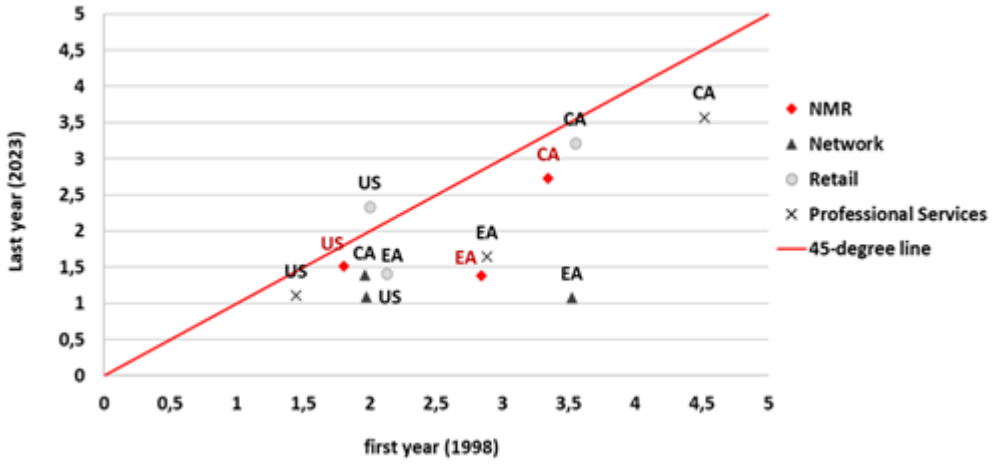
According to these simplified but time-consistent indicators most Canadian regulations have not only been persistently less procompetitive than in the United States over the past 30 years but they also were generally less procompetitive than in the Euro Area (Chart 5, Panel A). Reforms were implemented in the three economic areas over this period, although less so in the United States where deep regulatory changes had already occurred earlier. However, in Canada they were more limited in scope. As a result, in 2023 competition in Canadian non-manufacturing markets was more restricted than in the EA in both services and most network industries (Box 1). Chart 5 (Panel B) shows that delays in reforming energy and transport turned Canada from one of the least to one of the most restrictively regulated in these sectors. By contrast, the simplified indicator is unable to capture changes in regulation of the communication sector in Canada that may have occurred since 1998, when Canada was comparatively more procompetitive than other OECD countries in the areas covered by the indicator.[13]

An important element that is not covered by the OECD indicators are interprovincial barriers to trade and mobility, especially concerning non-manufacturing

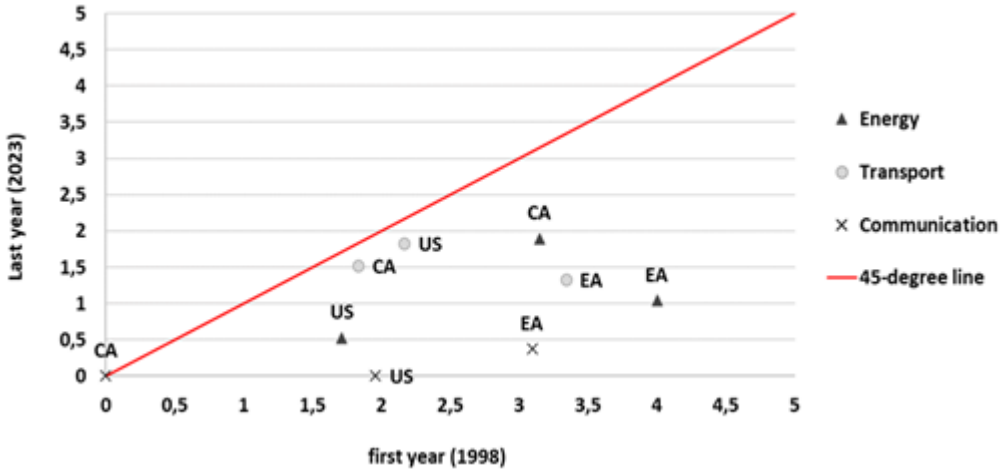
13 Incidentally, this implies that Canadian data for this sector do not contribute to the identification of the effects of network sector reforms on productivity in our sample.

Chart 5: Evolution of Anticompetitive Regulations in the Non-manufacturing Industries in the United States, Canada (CA) and the Euro Area (EA), 1998-2023 (indicators increase with restrictions to competition)

Panel A: Non-Manufacturing Regulation (NMR), Decomposed into Network, Retail Distribution and Professional Services Industries



Panel B: Decomposition of Regulation in Network Industries



Note: The first available year for the United States in the new annual version of the ETCR (Energy, Transport and Communications Regulation) indicator is 2013. Therefore, the value shown for 1998 for the United States comes from the older version of the indicator, which was originally provided at five-year intervals.
Source:Authors' calculations based on OECD data

[linewidth=1pt]

Box 1: Restrictions to Competition in the Canadian Non-Manufacturing Sectors

Since 1998, the OECD surveys legislations and regulations potentially affecting competitive pressures in several non-manufacturing sectors of OECD countries as well as of a subset of non-OECD and emerging economies. The survey is implemented periodically in full collaboration with the governments of the covered countries and qualitative replies on details of such laws and regulations are converted into quantitative indicators – the so-called OECD PMR indicators – that allow to compare policy settings and use the indicators in empirical analysis.

While a full account of laws and regulations affecting competition in Canadian non-manufacturing markets is outside the scope of this paper, it can be useful to provide a few examples drawing from the information underlying the OECD 2023 PMR indicators to highlight areas where Canada lags behind in procompetitive reforms relative to other countries. In interpreting such examples it is important to keep in mind that some regulations vary across Canadian provinces and, in these cases, the OECD only records regulations in the Ontario province and the city of Toronto.

One such area is retail distribution, where according to the OECD data Canada always requires licensing (independent of outlet size), maintains national monopolies for certain products (such as the sale of alcohol) and price controls for other goods (such as gasoline), and regulates hours more restrictively than in other OECD countries. Another area is the professional services, which are an important component of the so-called knowledge-intensive services where digitalization and AI can be widely applied. In most of the services covered by the OECD indicators (accountants, architects, lawyers and engineers, real estate agents and notaries), Canada's regulations concerning entry requirements and business conduct are much more restrictive than in the best practice OECD countries. For instance, professionals in accounting, law, engineering and architecture retain exclusive rights in many of their activities, have to pass professional examinations and register as members of professional associations. Also, regulations restrict their the form of business (generally prohibiting limited liability or joint-stock companies), cooperate interprofessionally (e.g. between architects and engineers or lawyers and accountants), advertise their services (e.g. in accounting) or freely set their tariffs (e.g. in engineering). These restrictions stifle market access, competition and efficiency and have been lifted in many OECD countries, without negative consequences for the quality or the reliability of the services provided.

In network industries as well Canadian regulations are often more restrictive than elsewhere, thwarting competition. This is the case, for instance, in electricity transmission and distribution as well as gas distribution, storage and supply where legal or de facto local monopolies dominate markets, while rail freight is characterized by a duopoly. In some cases, vertical integration of these companies persists, with rules requiring only operational or accounting separation. In transport, public ownership of sometimes dominant companies delivering services is pervasive, with some of them (e.g. water transport) exempted from antitrust rules. In air transport, airlines covered by open-sky agreements do not enjoy all the "freedom of the air" rights and no regulatory supervision is exerted on airport charges. In telecommunications, markets for fixed line services as well as for wholesale mobile call origination/termination services are scarcely competitive.

products. Given the lack of cross-country comparative data on such internal barriers, we could not account for the effects of such barriers in our analysis. However, a multitude of studies report the existence of such internal barriers in Canada and analyse their potential for curbing competition and growth both by raising entry costs via regulatory compliance, to the advantage of local incumbents, and by preventing business dynamism via obstacles to the mobility of labour and capital (Albrecht and Tombe, 2016; Bemrose *et al.*, 2017; OECD, 2019, 2023; Manucha and Tombe, 2022; Teeter, 2024).

Indeed, despite the implementation of the Agreement on Internal Trade (AIT) in 1995 and the Canadian Free Trade Agreement (CFTA) in 2017 (along with several smaller but significant interprovincial agreements), a number of significant (especially non-tariff) barriers remain to internal trade in goods and services in Canada. These include outright prohibitions (e.g. for alcohol and tobacco) as well as technical and regulatory or administrative obstacles (such as differences in standards, processing or labeling obligations, licensing or permit requirements). In one of the rare cross-country studies on this subject, Bambalaite *et al.* (2020) find for instance that heterogeneity in occupational entry regulations across Canadian provinces is relatively high in both the personal and professional services and higher than across the United States, with mobility restrictions playing a large role in certain services (e.g. driving instructors, taxi) or professions (e.g. real estate agents).

Research has argued that these barriers are economically significant and involve high costs in a number of activities, such as for example in trucking and professional services. Such costs are especially relevant for Small and Medium-Sized Enterprises (SMEs), which constitute the backbone of the Canadian economy and whose inability to upscale has been related to weak aggregate productivity growth.

Finally, mainly due to their short time coverage, we also do not consider barriers to international services trade and investment, which are considered significant in Canada by international organizations such as the IMF and the OECD.[14] Canada was assessed to be more restrictive than the United States and the EA in both services trade and FDI, with restrictions in excess of those of the other two areas in a majority of the sectors and areas covered by the indicators. [15]

Lack of action in all these product market areas is likely to have affected aggregate productivity growth by curbing incumbents' incentives to enhance efficiency, hindering the growth potential of dynamic SMEs, limiting the entry of new startups and discouraging innovation. The result-

14 OECD data on these barriers are available only over the past decade. Services Trade Restrictions Indicators (STRI) cover construction, wholesale and retail distribution, transport, storage and postal services; FDI restrictions indicators cover almost all 2-digit NACE sectors and several policy areas, including foreign equity restrictions, screening and approval requirements and restrictions on foreign personnel.

15 Canada's FDI Regulatory Restrictiveness Index was 0.15 in 2023 compared to 0.05 for the United States and 0.02 for the Euro Area. Its total services (incl. construction) Regulatory Restrictiveness Index was estimated to be 0.20 in 2024, higher than 0.18 for the United States and 0.17 for the Euro Area.

ing low competitive pressures, especially in knowledge-intensive service sectors, such as those providing business services, may also have limited the ability of the Canadian economy to fully reap the benefits of developments in both technology (the ICT, the digital and AI revolutions) and global trade and investment. In the following analysis we are only able to capture the effects of some of these regulatory obstacles to growth to the extent that they are correlated with our (simplified) sectoral indicators of regulation. Hence, our estimates of the potential effects of product market reforms do not reflect the full impact that a wider range of procompetitive policies might have on aggregate productivity.

The Impact of Anticompetitive Non-manufacturing Regulations on Canadian Productivity

In the rest of this study we provide an assessment of the potential gains that the Canadian economy might obtain by implementing further product market reforms. The focus is on reforming Non-Manufacturing Regulation (NMR) to increase competitive pressures in energy, transport, communication and services markets. To this end, we estimate the economy-wide impact on productivity of regulations that curb competition in these non-manufacturing industries and use the estimates in a thought experiment that simulates the expected long-run effects of pro-competitive reforms in such regulations on aggregate productivity and GDP per capita. An important caveat in interpreting our results is that the regulations we cover could be related to other omitted sector-specific and time-varying regulations, which we are unable to capture with our explanatory variables. If so, both our estimates and our scenario analysis could also include the impact of changes occurring in such omitted regulations as well.

However, within the limitations inherent in the use of the relatively narrow and simplified set of regulatory indicators described in the previous section, our analysis is up to date, granular and well-focused from a policy standpoint. It takes into account the changes that regulations (in Canada and elsewhere) have undergone between 1998 and 2023 and the regulatory data is sufficiently detailed to allow breaking down the expected gains by regulated sector: energy, transport, communications, retail distribution and the professional services.

This section first describes our main approach to assess the impact of regulations on productivity. Then it describes the data used to implement this approach. Finally, it provides our main results on impact coefficients and expected effects of further reforms on the Canadian economy.

Analytical framework

In order to study the impact of product market reforms on productivity and GDP growth, we estimate an empirical productivity model at sector level, using up to date historical data for economic and policy variables. The basic data are the annual industry-level components of the OECD PMR indicators – which we have revised, made consistent over time and (approximately) mapped into the corresponding NACE sectors – and the most recent re-

vision of the new sectoral EUKLEMS & INTANProd database (Bontadini *et al.*, 2024), which provides data up to 2021. Additional data includes input-output tables, which are used to compute the trickle-down effects of regulations and controls for other policies and structural conditions potentially affecting productivity.

The EUKLEMS & INTANProd database includes a coherent set of production accounts that include both National Accounts (NA) and non-NA intangible investments in the estimation of value added.[16] These data are supplemented with similar data for Canada provided by Statistics Canada. Our estimates of impact coefficients currently cover the period 1996-2021 for an unbalanced panel of 15 OECD countries and 19 sectors of activity.

Scenario analyses of the expected gains from further Canadian reforms take as a starting point the sectoral regulatory stance in 2023 as recorded in the simplified version of the NMR indicator. These expected gains are first calculated for the sample of sectors included in the analysis, and then extended to estimate gains for overall GDP on the basis of transparent and plausible assumptions concerning sectors of the economy not covered.

Measuring the Trickle-down Effects of Regulation

In the spirit of Conway *et al.* (2007) and Bourlès *et al.* (2013), the focus of our analysis is on the economy-wide effects of reforms in a few key non-manufacturing sectors for which we have reasonably complete and timely regulatory data. The sectors covered by our regulatory data include energy, transport, communication, retail distribution and the professional services. Hence, the first step in our analysis is to map these indicators into the corresponding NACE sectors (Table A4 in the online appendix). This mapping is necessarily approximate for three reasons. First, the OECD indicators sometimes only cover a subset of activities within each of these broad economic areas. Second, even within these areas, there is no precise correspondence between the OECD indicators and the national accounts categories. Third, cross-country time-series data are often not available at the level of detail covered by the indicators. A notable example is the distribution sector, where the OECD PMR indicator only covers laws and regulations affecting retail sales of food, clothing and pharmaceuticals, and sectoral data are not available at this level of detail.[17]

As explained in the previous section, anti-competitive regulations in the key non-manufacturing sectors covered by our analysis have trickle-down effects that in-

16 NA intangibles include investments in R&D, software &databases, mineral explorations and literary and artistic designs, but do not cover other increasingly important intangible investments (non-NA): attributed industrial designs, financial product development and, especially economic competencies such as branding, training and organizational capital (see Figure A1 in the online appendix). As the OECD indicators for trade and the professional services are only collected every five years, annual values were calculated by interpolation.

17 The implicit assumption in our analysis is therefore that the evolution of regulation recorded in the OECD indicators is representative (or at least correlated with) with regulations affecting the sector to which the indicator is mapped.

fluence the productivity of all other sectors, including the non-regulated ones, via input–output interlinkages. To account for the effects of upstream regulation on other sectors, we calculate the variable $NMR^{up}_{(c,i,t)}$ as follows:

$$NMR^{up}_{c,i,t} = \sum_j int^{USA}_{i,j} \times NMR_{c,j,t},$$
$$\text{with} \quad int_{i,j} = 0 \text{ if } i = j.$$

Where $NMR^{up}_{c,i,t}$ is our measure of the size of the pass-through effect or "regulatory burden" on the downstream sector i in country c in period t. This effect depends on $NMR_{c,j,t}$, which is the regulation specific to the regulated sector j and the intensity of use of intermediate inputs produced by the regulated sector j for the downstream sector i, $int^{USA}_{i,j}$. This variable is calculated as the ratio of consumption of intermediate inputs used by sector i, produced by sector j, to sector i's total output, based on the 2015 US Input–Output table.

We use the US table rather than country-specific ones for three reasons. First, regulations can also affect the propensity to use intermediate goods, raising a kind of endogeneity that would make the interpretation of changes in $NMR^{up}_{c,i,t}$ difficult. Second, the United States has a diversified industrial structure that guarantees that all sectors are well represented in the I–O table. Third, the United States is the country against which Canadian performance is often benchmarked. Excluding the United States from our estimating sample allows us to control to some extent for the possible endogeneity between regulation and input–output coefficients.[18] Any remaining endogeneity would only result from a correlation between the way the propensity to use intermediate goods has been affected by regulations in the United States and similar relationships in other countries, which seems unlikely given the lack of synchronization of regulatory changes in the United States with those of the other countries in our sample, highlighted in Chart A3 in the online appendix.[19]

We also include as a control labour market regulations in our estimations, focusing in particular on employment protection legislation (EPL). Unlike product market regulations, these are defined at the all industry level. To introduce a sectoral dimension in a manner that is consistent with our measure of the trickle-down effect of non-manufacturing regulation, we assume that the impact of such regulations is greater in sectors with higher labour intensity. We therefore compute the indicator $EPL^{d}_{c,i,t}$ as follows:

$$EPL^{d}_{c,i,t} = \left(\frac{LAB}{GO}\right)^{USA}_{2015,i} \times EPL_{c,t}$$

Where $EPL_{(c,t)}$ represents the value of the OECD EPL indicator, LAB is labour compensation, and GO is total output in value

18 We also exclude intra-sector intermediate consumption (i.e. $int_{ij} = 0$ if j = i). Therefore, our focus is solely on the relationship between sectors. Estimating the effects of regulation within sectors would lead to strong endogeneity issues, notably reverse causality.

19 While most regulatory reforms occurred over the 1998-2023 period in European countries, the United States experienced earlier reform waves during the 1980s.

terms (in millions of dollars) for each sector in the United States in 2015. As for the I–O coefficients, use of the US data as a benchmark, together with the exclusion of this country from regressions, limits any endogeneity between country-specific EPL and the labour intensity measure.

Modelling the Relationship Between Regulations and Productivity

Building on Cette *et al.* (2016), we estimate a reduced–form relationship between productivity and regulation for an unbalanced panel of 15 countries and 19 industrial and services sectors over the 1996–2021 period.[20] We estimate the model using an index of total factor productivity (index base 100 in 2015) and the level of labour productivity (ratio between real value added in PPP and number of hours worked).

In order to formalize the phenomenon of technological catch-up, as well as sector-specific temporal evolutions, we include in the estimates the cross fixed effects *industry* × *year* ($\phi_{i,t}$). We also include *country* × *year* ($\phi_{c,t}$) and *country* × *industry* ($\phi_{c,i}$) cross effects, which enable us to control for various other sources of omitted variables and unobservable variability, such as country-specific macroeconomic shocks and economy-wide public policy changes or time-invariant differences in the measurement of labour productivity.

Specifically, these fixed effects can account for changes in economy-wide product market regulations (such as barriers to entry related to domestic business creation or greenfield FDI) as well as for cross-country time-invariant differences in sector regulatory approaches (such as light-hand regulation versus interventionism). For the labour productivity equation, we also include the logarithm of capital intensity $\ln(intK)_{c,i,t}$, with or without non-NA intangible assets, depending on the definition of productivity.[21]

We therefore estimate the following equations:[22]

$$\begin{aligned}\ln(\text{tfp}_{c,i,t}) = \alpha \; &+ \; \beta \, NMR^{up}_{c,i,t-1} \\ &+ \; \gamma \, EPL^{d}_{c,i,t-1} \; + \; \phi_{c,i} \; + \; \phi_{c,t} \\ &+ \; \phi_{i,t} \; + \; u_{c,i,t}.\end{aligned} \tag{1}$$

20 Countries are Austria (AT), Belgium (BE), Canada (CA), Czech Republic (CZ), Germany (DE), Denmark (DK), Spain (ES), Finland (FI), France (FR), Italy (IT), Netherlands (NL), Sweden (SE), Slovakia (SK), United Kingdom (UK), United States (US). In estimations, the United States is dropped from the sample to avoid endogeneity with I-O and labour intensity coefficients. The list of covered sectors can be found in the online appendix Table A2.

21 Although we control for any effect of regulation that operates through capital intensity, we do not identify to what extent the effect actually passes through changes in this variable. Therefore, to the extent that such effects exist, our estimates may under or overestimate the total impact of regulation on productivity. Underestimation is more likely given the findings of Alesina *et al.* (2005) as to the depressing effects of anticompetitive regulations on investment.

22 In the empirical analysis, the regulatory burden variable is lagged by one year because we assume that, once established, regulations can take some time to be implemented and to exert their effects. Robustness analyses using the contemporaneous variables do not alter the results.

$$\ln(\mathrm{lp}_{c,i,t}) = \alpha \; + \; \beta\, NMR^{up}_{c,i,t-1} \; + \; \gamma\, EPL^{d}_{c,i,t-1} \; + \; \lambda \ln(intK)_{c,i,t} \; + \; \phi_{c,i} \; + \; \phi_{c,t} \; + \; \phi_{i,t} \; + \; u_{c,i,t}. \tag{2}$$

The use of lagged regulation and the "fully saturated" fixed effects structure of the estimated models allows to control for most potential sources of endogeneity, such as omitted variables or confounding factors. Indeed, given this structure and the use of the 2015 US I-O table, the statistical identification of the effects of regulations on productivity depends only on changes occurring in such regulations in each country and sector over time.

Yet, possible estimation bias due to reverse causality deserves discussion. While we are investigating the impact of regulations on productivity, policies may also change in response to economic shocks. For example, if a sector experiences on average low or declining productivity in a certain country, firms in that sector may exert political pressure to raise anticompetitive regulations, thereby protecting the sector from competition and preserve existing rents. In this case, the direct effect of sector regulation on productivity within that sector would be overestimated. However, this bias does not affect our estimation results as we are not concerned with the effects of regulation on productivity within the regulated upstream sector but only on its effects on downstream industries.

Some residual endogeneity might remain if productivity-impaired downstream industries attempt to induce regulatory reforms in upstream industries in order to improve their business conditions (e.g. low productivity manufacturing industries lobbying to ease regulations in the professions or telecoms to obtain cheaper business or communication services). But in this case the direction of endogeneity would tend to bias our estimates downwards, implying that our estimates of the negative effects of regulation in upstream sectors on aggregate productivity would be on the conservative side. The opposite lobbying scenario, in which productivity-impaired industries would push for tighter regulations in upstream industries does not seem realistic as, by generating or inflating upstream rents, it would worsen even further the business conditions of downstream industries, running against their business interests.

Still, we cannot exclude that some endogeneity could originate from a more likely situation: lobbying by dynamic downstream sectors aimed at easing regulations in upstream sectors (i.e. energy-intensive high-tech or digital-intensive ICT sectors pressing for reforms in energy or telecoms) to protect their business interests. This would indeed tend to bias our estimates upwards implying an overevaluation of the potential gains to be obtained from reforms. However, our country-industry fixed effects partly address this risk by capturing the relative productivity characteristics of downstream sectors in each country. This issue will be discussed further in the next subsection.

Simulating the Impact of Reforms

In order to provide an economic anal-

ysis of the results, we carry out scenario analyses. The scenarios considered highlight the effects on labour productivity of aligning Canada's sectoral regulations on best OECD practices. In this respect, it is important to notice that the OECD indicators do not score as best practice (i.e. a zero score) the complete absence of regulation, but rather the alignment of regulation to the internationally recognized most pro-competitive regulatory approches that can be used to achieve public policy goals in each sector. To remain realistic, in our scenario analysis we do not assume regulatory alignment to such theoretical best practices but to the best practices actually observed across the countries in our sample (i.e. to the regulatory approaches adopted in each sector by the country whose indicator score is closest to the theoretical best practice).

As shown in Chart 6, overall the UK is the most pro-competitive country in our sample. However, for each regulated sector, the most pro-competitive country may vary. For the simulations, we use the UK as the benchmark for the energy, transport and communications sectors, the Czech Republic as the reference for retail regulations, and Sweden as the benchmark for professional services.

The effect of these reforms on labour productivity is calculated for all sectors represented in our database, then aggregated at the national level based on each sector's share of the total hours worked in the country. We assume a zero effect for sectors not covered by our estimates. These omitted sectors include the non-market sector, i.e., public administration, as well as agriculture, oil extraction, mining, and real estate activities. To the extent that reforms have cascading effects on these sectors, our cautious assumption tends to underestimate the impact of reforms.

Despite our realistic approach concerning alignment on best practices, it is important to note that implementing the wide range of reforms envisaged in this policy experiment represents an extremely ambitious policy agenda, whose effects would unfold over an extended period of time. Indeed, our model only allows to estimate its ultimate results in the very long period. Keeping this in mind is important to interpret correctly the simulation results.

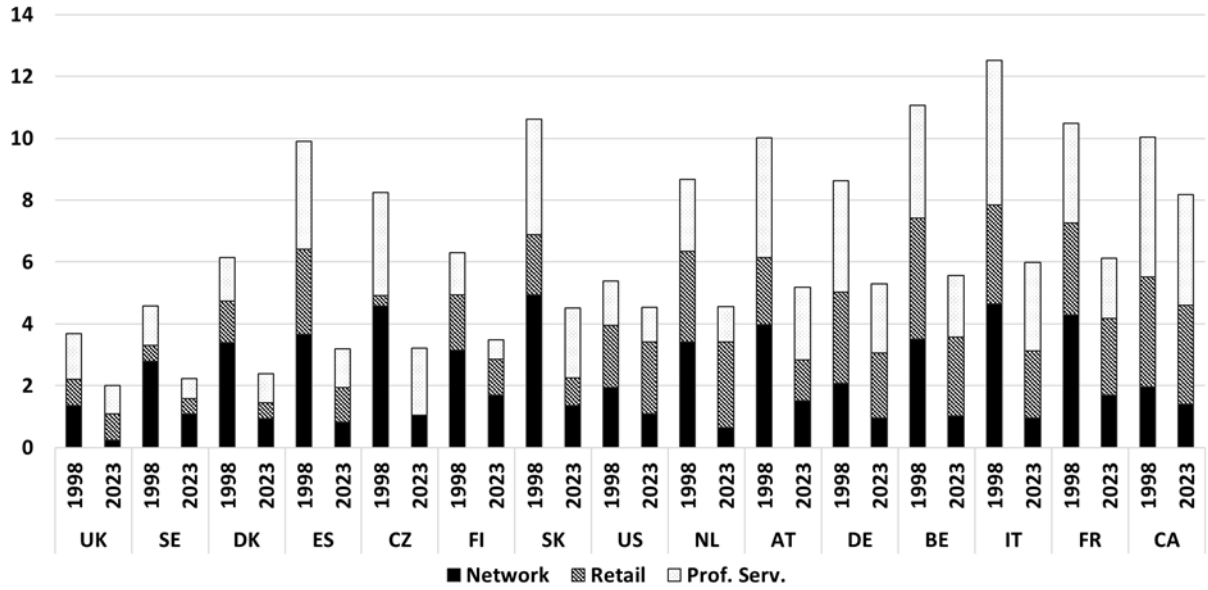
We calculate the long-run aggregate labour productivity effect of reforming regulation in sector j as follows:

$$\begin{aligned} &Aggr.LP\ gain\ from\ reform\ in\ j \\ &= \sum_i \hat{\beta} \times \left(NMR_{c,j} - NMR_{c,j}^{low}\right) \\ &\qquad \times \left(int_{i,j}^{c} \times w_{c,i}\right) \times 100 \end{aligned} \tag{3}$$

Where $NMR_{c,j}$ is our measurement of the level of sector regulation indicator j in country c, $NMR_{c,j}^{low}$ the level of the sector regulation indicator j in the most pro-competitive country, $\hat{\beta}$ the estimated coefficient of equation (2), $w_{c,i}$ the proportion of sector i in the total number of hours worked in country c in 2015, more pre-

23 In the scenario analysis we use the input-output table of Canada to measure intermediate input intensities. This ensure a better accuracy of the potential effects of reforms in Canada.

Chart 6: Evolution of Non-Manufacturing Regulations by Sector in Selected OECD Countries, 1998-2023



Note: The Chart shows the overall level of restrictions to competition in the network sectors, retail distribution and the professional services in each country as well as the contribution of regulatory restrictions in each of these sectors. For each regulated industry, these indicators score regulations over the range 0-6 from least to most restrictive of competition. The index for each industry is then stacked.
Source: Authors calculations based on the OECD indicators of non-manufacturing regulation.

cisely $w_{c,i} = \frac{EMPH^{2015}_{c,i}}{EMPH^{2015}_{c,TOT}}$, and $int^{c}_{i,j}$ the proportion of intermediate input intensity in country c in 2015.[23]

The formula (3) makes clear that, in each country, the aggregate productivity gain from reform in a specific regulated upstream sector depends crucially on three factors: (i) the distance of upstream sectoral regulations from best practice, (ii) the intensity of downstream sectors intermediate sourcing from the regulated sector and (iii) the relative importance of the downstream sectors for the aggregate economy. So, for instance, reform in a specific non-manufacturing upstream sector will have a strong (weak) aggregate productivity impact when the upstream sector supplies a large (small) amount of intermediate inputs to downstream sectors that represent a large (small) share of the economy.

Data

As briefly mentioned above, the study combines several data sources: EUKLEMS & INTANProd data; OECD cross-national data on non-manufacturing regulations revised and made consistent over time especially for this study; OECD cross-national data on employment protection legislation; 2015 OECD Input-Output tables for the United States and the other countries; and Canadian productivity, capital and input-output data provided by StatCan. After

24 Austria-AT, Belgium-BE, Canada-CA, the Czech Republic-CZ, Germany-DE, Denmark-DK, Spain-ES, Finland-FI, France-FR, Italy-IT, the Netherlands-NL, Sweden-SE, the Slovak Republic-SK, the United

cleaning, the combination of these different data sources results in a sample comprising 15 countries[24], for a set of 19 sectors over the 1996-2021 period.[25]

Productivity

The EUKLEMS & INTANProd database provides detailed data for 27 EU member states, the United States, Japan and the UK, covering 40 industries (although coverage may vary over time and across countries) and 23 industrial aggregates over the period 1995 to 2021. The database includes information on key variables for studying productivity, including output, intermediate inputs, gross value added, employment, employee compensation, as well as investment in capital stocks, for both tangible and intangible assets. The analysis in this article uses the revised version of EUKLEMS & INTANProd of 2025 (Bontadini *et al.* (2024)).

We measure TFP and labour productivity in two ways: a "traditional" one where value added is calculated considering non-NA intangible assets as intermediate consumption, and an "extended" one in which non-NA intangible assets are considered as investment.[26] Consistent with the EUKLEMS & INTANProd database, we take "extended" productivity measures as the baseline for our discussion of the results. Results based on the "traditional" measures are similar and are presented in the online appendix (Table A6 in the online appendix). Canada's productivity indicators are constructed from data provided by StatCan, which are consistent with EUKLEMS & INTANProd data.

Labour productivity is expressed as output (value added) per hour worked. In the measurement of the total factor productivity and capital intensity variables we use total tangible assets excluding residential buildings to avoid any bias due to differing housing stocks across countries. All variables are expressed in chain-linked constant PPP US $ with 2015 as the base year.

Anti-competitive Regulations

To identify the impact of competition on productivity, we use data on regulation in key non-manufacturing industries provided by the OECD. These indicators are widely recognized in the literature for their quality since: i) they are explicitly competition-oriented, ii) they record regulations at a granular level, iii) they are regularly updated, and iv) they are less exposed to various types of criticism than other competition indicators – such as for example context dependency, respondent subjectivity and endogeneity problems. In addition the underlying legislative and regulatory data has been vetted by respondent authorities in each country covered by the indicators.

Kingdom-UK, the United States-US

25 All estimates exclude from the outset sectors A, B, and the public sector. The choice of sectors is consistent with the previous study by Bourlès *et al.* (2013). We also exclude sectors C19 and L: the former shows aberrant productivity levels for several countries, and the latter is excluded because it is difficult to define productivity in real estate activities, whose value added largely depends on variations in property prices. For sector definitions see Chart 7, page 27.

26 For more details on variable calculations, see the online appendix.

The indicators cover energy (gas and electricity), transport (rail, road and air), communications, retail distribution and the professional services (accounting, legal, engineering, architecture). These indicators score regulations over the range 0-6 from least to most restrictive of competition. Historical coverage varies by sector, ranging from annually 1975 to 2023 for the network sector to every 5 years from 1998 to 2023 for the distribution and professional services sectors.[27] Since changes in the survey underlying the indicators introduced a break in 2018, this study uses a novel time-consistent indicator series of non-manufacturing regulation that was expressly constructed in collaboration with the OECD. As already mentioned, the price to pay for time consistency was to simplify the indicators reducing the amount of information included in each of them (Table A3 in the online appendix). This has resulted in changes in the ranking of countries relative to the more complete indicators that are available on the OECD website only over the 2018-2023 period. However, in most cases, the time profiles of the simplified and more complete indicators, which reflect reforms occurred over the 1998-2023 period, has remained similar.

Chart 6 shows the values of the NMR indicator (by regulated sector) in 1998 and in 2023, in order to highlight the evolution of regulations. Countries are arranged in ascending order according to the level of regulation observed in 2023.[28] While all the countries in the sample have introduced regulatory reforms, the extent of reforms in Canada was limited and the country has remained relatively regulated in the international comparison.

Labour market regulations are measured by the OECD's Employment Protection Legislation (EPL) indicator. This indicator also ranges from 0 to 6, where 0 represents hiring and firing regulations that are most favourable to labour market flexibility. We use version 1 of this indicator, which compiles data on individual and collective dismissals for both regular and temporary contracts. The indicator is available for the period 1998–2019. To ensure comparable time coverage with the PMR indicators and EUKLEMS data, we extrapolated values for the years 1996–1997 and 2020–2021. The annual evolution of this indicator is shown in Chart A9 in the online appendix, where Canada appears as having the least restrictive hiring and firing rules.

Intermediate Input Intensity

As already explained, to estimate the effect of upstream regulations on downstream sectors we use input–output data for the United States in 2015, while the scenario analysis is based on country-specific 2015 input–output tables.[29] Chart 7 illus-

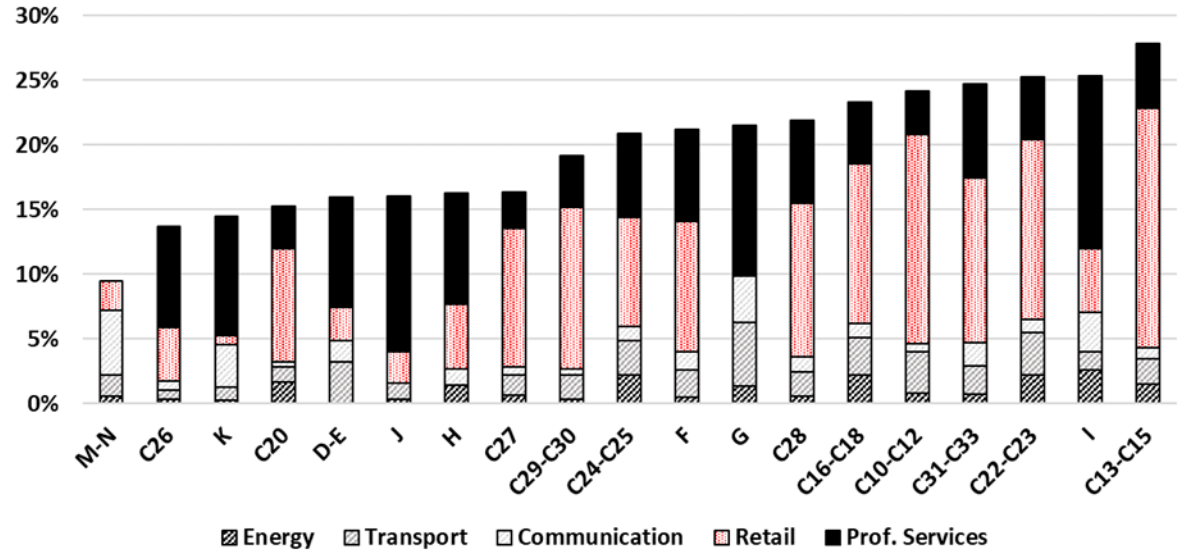
27 To obtain annual series, the values of these indicators were simply interpolated over the 5-year intervals. Sensitivity analyses using different calculation methods (back-casting, extrapolations centered on the survey dates) can be provided by the authors upon request. Overall, results are robust to such variations.

28 Charts A4-A8 in the online appendix show the annual evolution of regulation in our sample countries in each sector over the 1998-2023 period.

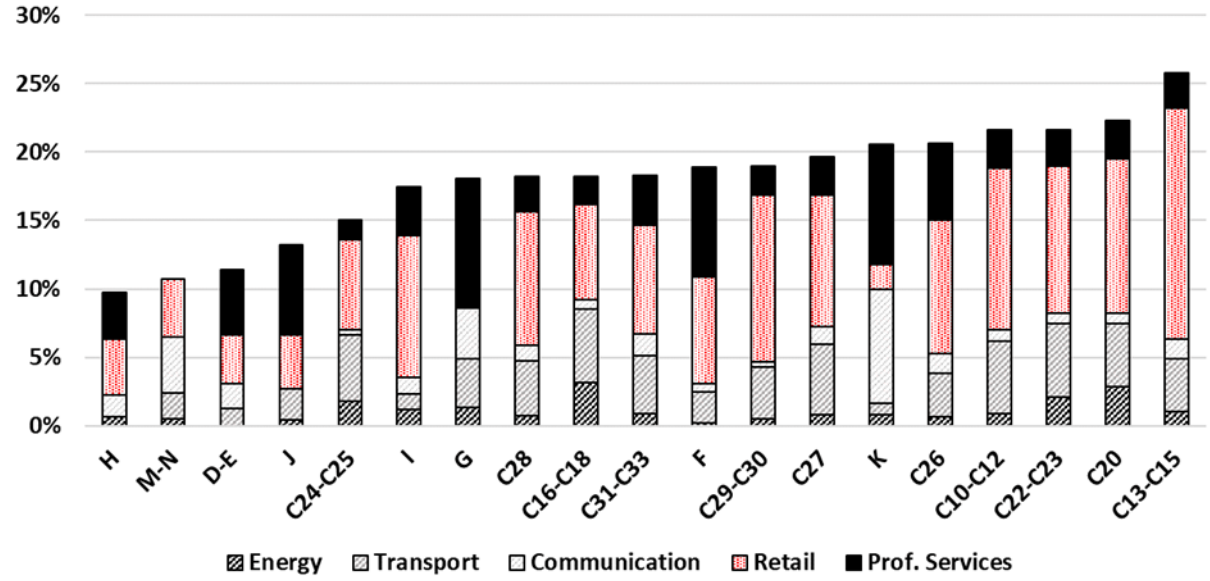
29 For comparability purposes, we use OECD Input-Output Tables for the year 2015.

Chart 7: Intermediate Input Intensity Calculated on Our Database

Panel A: United States in 2015



Panel B: Canada in 2015



Note: Each sector's intensities are computed as the ratio of the value of intermediate inputs sourced from the regulated non-manufacturing sectors over gross output of the sector. We exclude intra-sector intermediate consumption. Detail of sectors : C10–C12 (Manufacture of food products, beverages and tobacco); C13–C15 (Manufacture of textiles, wearing apparel and leather products); C16–C18 (Wood, paper, printing and reproduction); C20 (Chemical products); C22–C23 (Rubber, plastic and non-metallic mineral products); C24–C25 (Basic and fabricated metal products); C26 (Computer, electronic and optical products); C27 (Electrical equipment); C28 (Machinery and equipment n.e.c.); C29–C30 (Motor vehicles and transport equipment); C31–C33 (Furniture, jewellery, musical instruments, toys; repair and installation of machinery); D–E (Energy and utilities); F (Construction); G (Wholesale, retail and vehicle repair); H (Transport and storage); I (Accommodation and food services); J (Telecoms and postal services); K (Financial and insurance activities); M–N (Professional, scientific, technical and administrative services).
Source: OECD Input-Output Tables in 2015

trates intermediate consumption intensity (computed as the ratio of intermediate consumption to gross output) in the United States and Canada in 2015, from the regulated sectors j (energy, transport, communication, distribution and professional services) to the other sectors i of the economy (including the regulated sectors themselves, with $j \neq i$). We exclude self-consumption of intermediates in the regulated sectors.

There is a marked heterogeneity in intensities, since each downstream sector has a distinct use of intermediate inputs.[30] The majority of manufacturing sectors use considerable intermediates from the distribution sector, so the effect of regulation in this sector can be significant on productivity levels. In contrast, the catering (I), finance and insurance (K) and communications (J) sectors use more inputs from the upstream professional services sector.

We map the regulation indicators into the sectoral aggregates described in the input-output tables. The mapping can only be approximate as the tables do not provide the industry detail corresponding to the OECD indicators and the indicators do not cover all the industries aggregated in the tables' sectors: typically, regulations only cover a subset of these industries. The implicit assumption in this article (as well as in much of the empirical research using the OECD indicators of sectoral regulation) is that the subset of regulations covered by the indicators is representative of the wider regulatory stance in each sector.

All results are shown for both multifactor productivity (TFP) and hourly labour productivity (LP) using their "extended" definition that includes both NA and non-NA intangibles. However, results for the "traditional" definition including only NA intangibles are similar (Table A6 in the online appendix). All in all, the model specification is validated by the data. The capital intensity coefficient for the labour productivity estimates corresponds roughly to the average share of capital remuneration in value added, as expected.

Consistent with previous research (Conway *et al.*, 2007; Bourlès *et al.*, 2013; Cette *et al.*; 2016, Cette *et al.*, 2018), regulations in the upstream sectors have a negative impact on productivity in the downstream sectors. Estimates on a shorter period using both the previous and the current version of the regulation indicators produce very similar results (Table 1 columns 2, 3, 5 and 6). Thus, regulation-induced lack of competition in sectors that provide significant intermediate inputs to the whole economy affects the efficiency in which production inputs can be used in downstream sectors that use the regulated products. This induces widespread productivity losses that translate into lower GDP per capita.

While results are qualitatively similar across all columns, the size of the estimated negative effects of regulations on productivity is larger when the previous version of the regulation indicator is used (over the

30 These intensities of intermediate input use vary between approximately 10 per cent and 25 per cent of total production, depending on the sector. The remaining share (75 per cent to 90 per cent of total production) corresponds to the sum of the shares of value added and other intermediate consumptions, for example in industrial products, in total production.

Table 1: Estimation Results

Period	1996–2021	1996–2013	1996–2013	1996–2021	1996–2013	1996–2013
Regression	(1)	(2)	(3)	(4)	(5)	(6)
VARIABLES	TFP all intangibles (log)	TFP all intangibles (log)	TFP all intangibles (log)	LP all intangibles (log)	LP all intangibles (log)	LP all intangibles (log)
Capital intensity (log-lag)				0.236***	0.237***	0.226***
				(0.014)	(0.020)	(0.020)
NMR^{new}_{up} (lag)	-0.420***	-0.411***		-0.322***	-0.433***	
	(0.096)	(0.125)		(0.093)	(0.121)	
NMR_{up} (lag)			-0.511***			-0.476***
			(0.088)			(0.086)
EPL^{d} (lag)	-0.334***	-0.345***	-0.281***	-0.085	-0.114	-0.049
	(0.082)	(0.094)	(0.095)	(0.080)	(0.092)	(0.092)
Constant	4.920***	4.884***	5.112***	-2.210***	-2.157***	-2.007***
	(0.086)	(0.103)	(0.102)	(0.090)	(0.111)	(0.107)
Observations	6,155	4,127	4,127	6,155	4,127	4,127
R-squared	0.773	0.863	0.864	0.997	0.998	0.998
Country × time	YES	YES	YES	YES	YES	YES
Country × industry	YES	YES	YES	YES	YES	YES
Industry × time	YES	YES	YES	YES	YES	YES

Notes: Standard errors in parentheses.
*** $p < 0.01$, ** $p < 0.05$, * $p < 0.1$.

shorter period for which consistent data are available). This difference is particularly large for labour productivity, where the coefficient is almost doubled (compare columns (4) and (6)). However, this difference is due more to the change of period than to the change of regulation indicator, since the estimate on labour productivity with the new indicators but over the short period 1996-2013 also results in an estimated value of the coefficient of the regulation indicator higher than the estimate made over the whole period 1996-2021. A similar finding is obtained when the the sample is truncated just before the COVID crisis (Table A13 in the online appendix).

The decrease in the estimated value of the coefficient of the regulation indicator over the entire 1996-2021 period as compared with the shorter 1996-2013 (or 1996-2019) period may reflect inter alia three factors. First, regulations may have had a weaker impact on productivity in the recent period, due to other possible domestic policy offsets (state aid, etc.) – partly related to the pandemics – or to a diversification of sourcing (including from abroad), which might have reduced their effects for downstream industries. Second, for the same reasons, the measurement of the stringency of regulation indicators might have been less precise in the most recent years than in the past, which might bias the estimate of the regulation coefficient towards zero over the whole period. Third, variability of regulations over time and across countries has declined in the latest period, due to policy convergence, reform fatigue and other policy priorities, reducing the heuristic scope of the NMR indicators.

Labour market regulations, here summarized by the OECD employment protection legislation indicator, also have a negative impact on TFP growth, though the impact appears insignificant on labour productivity. This latter result is consistent with previous analyses, such as Cette *et al.* (2018),

who show that labour market regulations have an impact on productivity of the same nature as that of a rise in labour costs: they reduce innovation efforts and the use of the most advanced technologies, which lowers TFP and labour productivity, but simultaneously they encourage substitution between production factors in favor of non-technological capital and against labour, which positively affects labour productivity. All in all, the overall impact on labour productivity resulting from these two contradictory effects is uncertain (and here insignificant), while the impact on TFP is clearly negative.

The estimation results are robust to a number of standard tests. Not only do the results not change significantly over different periods (as discussed), but they also do not change as single countries are dropped from the sample (Table A10 in the online appendix), and are broadly unchanged when specific sectors are dropped (Table A11), or certain years are omitted (Table A9). The results are also very robust to the exclusion of the labour market regulation indicator (Table A7). Finally, as already mentioned, they are robust to different ways of measuring TFP and labour productivity (Table A6) as well as to different ways to account for the break in the NMR indicator series (Table A8 and A12).

As already discussed, there are many reasons why our estimation approach helps neutralize sources of possible endogeneity between upstream regulatory policies and downstream productivity outcomes: the use of a (lagged) indicator that reflects slow-moving policy changes, the use of an input-output table from a country (the United States) excluded from estimations and the "fully saturated" fixed effects structure of the estimated model, which account for most omitted variables and confounding factors. Indeed, while filtering out fixed effects from both productivity and regulation variables leaves little variance to be explained by changes over time in the latter (Table A5 in the online appendix), visual inspection suggests that the remaining variance highlights a negative correlation between reform trends and changes in productivity (see Charts A10-A11 in the online appendix).[31]

However, we cannot exclude some residual upward endogeneity bias in the estimated coefficients in one instance of possible reverse causality: if firms in sectors in which downstream productivity has increased over the sample period were able to successfully lobby for more procompetitive regulations in upstream sectors. This seems unlikely as casual observation would suggest for instance that it was the combination of technological progress with more procompetitive policies in sectors like energy, transport and communications that supported efficiency improvements in a range of sectors (including hi-tech ones), rather than the reverse.

Other potential sources of bias in our estimates are related to measurement error,

31 These figures plot residual variance in labour productivity vs residual variance in regulations when fixed effects are filtered out of the original variables. They highlight a negative relationship between (filtered) productivity and (filtered) regulations overall and in selected country examples, even before additional controls for capital intensity and EPL are included in the regression.

which however would tend to make coefficients smaller and less significant. For instance, the choice of relying on the US 2015 input-output table to ensure exogeneity could imply two kinds of errors. First, it could provide a poor proxy for intermediate input use in other countries. Second, to the extent that such coefficients partly reflect changes in the use of intermediate inputs due to past deregulation, it could make identification of the effects of regulations on productivity more difficult (as part of these effects would already be incorporated in the input-output coefficients).

Another source of measurement error is related to the approximate mapping of industry-specific regulations into broader sector aggregates. To the extent that regulations are not representative of these sectors' market environment, their trickle down effects could be mismeasured, blurring the identification of their effects on productivity. Among all the regulated sectors covered in the analysis, the approximation is particularly rough for retail distribution because its regulatory settings are also attributed to wholesale trade and vehicle repair, which constitute the bulk of intermediate inputs flowing to other sectors (since in most countries retail distribution is mostly an intermediate input to its own output).

Given that, overall, the sector "retail and wholesale trade and vehicle repair" represents an important share of intermediate inputs in the economy (Chart 7), error in measuring regulation in this sector could bias significantly the regression results. However, excluding this sector from our summary indicator of regulation (NMR^{new}_{up}) and estimating the effects of retail regulation separately leaves regression results largely unaffected. The estimated effect of other upstream regulations on downstream productivity remains negative and significant, with even a larger impact coefficient, while the separate effect of retail regulation is not significant at conventional levels (Table A14).[32] As we shall see, error in measuring regulations in this sector (due to approximate mapping) affects the results of the scenario analysis discussed in the next section.

Finally, our relatively limited coverage of the broad set of regulations potentially affecting productivity performance could be a source of overestimation of the impact coefficients. This might be the case if regulations we do not cover are positively correlated with the ones included in the NMR. For instance, FDI and both foreign and domestic service trade restrictions were shown to be significant in Canada. These restrictions are likely to affect especially the knowledge-intensive sectors that are driving productivity in advanced economies. The NMR could capture part of these omitted effects, thereby overestimating the effects of regulations in upstream sectors on aggregate productivity.

Scenario Analysis

32 Insignificance of retail regulations when it is included separately in the same regression is consistent with mismeasurement issues.

Using the estimation results just discussed, it is possible to simulate the effects of various kinds of product market reforms on labour productivity. In this section, we focus on ambitious reforms aimed at instantaneously aligning 2023 sectoral regulations on those observed in best practice countries in the sample. Based on our NMR_{up}^{new} indicators, best regulatory practices in 2023 ($NMR_{c,j}^{low}$) are observed in the Czech Republic for retail distribution, in Sweden for professional services and in the UK for each of the three network activities (energy, transport and communications).

This reform agenda is ambitious because industry-specific regulatory gaps between countries are large and closing them at once in all sectors is difficult for both practical and political reasons. Historical experience suggests that reforms are usually legislated and implemented gradually and often meet resistance from incumbents and interest groups. Moreover, specific country conditions require the careful tailoring of reforms to match national concerns. For these reasons, the scenario proposed here should be considered only illustrative of the potential (very) long-run productivity and GDP per capita gains that could be obtained with an ambitious and forward-looking reform agenda.

For the scenario analysis we use formula (3) described above. The coefficient β used for the simulation is that corresponding to the estimation results provided in column (4) of Table 1, and we use the Canadian input–output table to better capture the trickle-down effects of reforms on downstream sectors in our country of interest. However, we use country-specific sector shares in total hours w to aggregate sector productivity gains to the national level in order to take into account cross-country differences in industry structure.

The effect of these reforms is calculated for all sectors represented in our database, and then evaluated at the national level, assuming a zero effect on sectors not covered. The omitted sectors include the non-market sector, i.e., public administration, but also agriculture, mining and oil extraction and real estate activities. If, as expected, reforms in the covered sectors also have a positive impact on productivity in these omitted sectors, our conservative assumption would tend to underestimate the simulated reform impact on aggregate productivity and GDP per capita. At the same time, as noted earlier, the possibility that our regression results also capture changes in other sector-specific regulations that are omitted from our analysis would tend to overestimate this impact.

In interpreting the simulation results, one should keep in mind that-aside from the size of the impact coefficient β-they depend on three country-specific factors: the distance of sectoral regulations from best practice, the intensity with which intermediates sourced from regulated sectors are used downstream (the input–output coefficients), and the weight of each downstream sector in the economy. Together, these factors will determine cross-country differences in the impact of the simulated reforms on aggregate productivity and GDP per capita. Given the importance of regulation gaps and input–output coefficients for the simulation outcomes, the online appendix provides some sensitivity analysis. First, we explore an alternative scenario in which regulations are aligned on those of

the United States. This corresponds to a less ambitious reform agenda. Second, we perform the best practice alignment scenario using regression results that exclude retail regulation from the NMR_{up}^{new} variable. This accounts for the possibility that the simulation results are inflated by error in measurement in the approximate mapping of retail regulation to the broader "Retail, wholesale trade and vehicle repair" sector.

Chart 8 shows the main simulation results. For each country, the total height of the bars indicates the overall effect on GDP per capita of reforms aligning regulations in each regulated activity to the best practice. This overall effect is broken down by the sector of regulated activity in which the reforms are implemented, the two bars showing the effect of different reforms, taking these estimated coefficients all else equal.

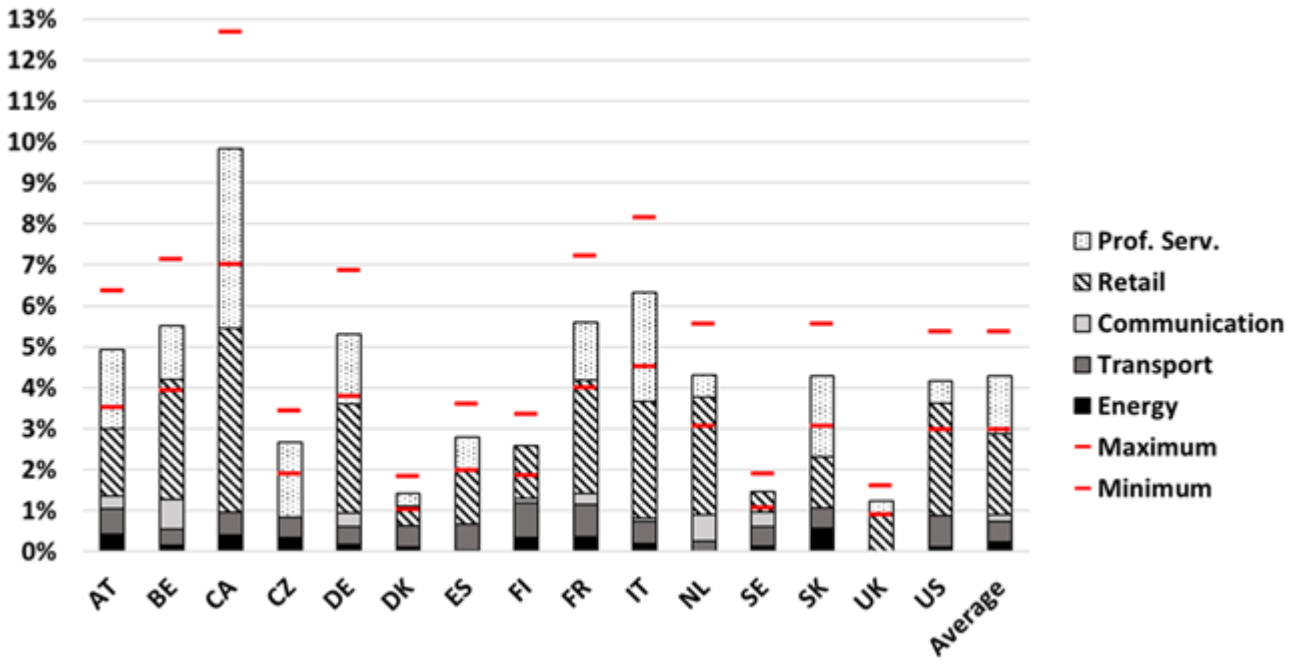
The average impact of reforms on GDP ranges from around 1.5 per cent in Denmark, Sweden and the UK, where the initial level of regulations is the closest to best practice and therefore the reforms envisaged are the smallest, to almost 10 per cent in Canada, where the initial level of some regulations is the farthest away from best practice. Behind Canada, the countries where reforms would have the most favorable impact on GDP per capita are Italy, France and Belgium (around 6.5 per cent, 5.5 per cent and 5.5 per cent respectively). On average, the effect is around 4.5 per cent for the countries in the sample. In all countries, the most significant effects come from reforms in the professional services and retail distribution.

However, further analysis suggests that the effect of retail distribution could be overstated by weighting it with the input–output coefficient corresponding to the larger aggregate that includes also wholesale trade and vehicle repair. Performing the same simulation omitting the impact of retail regulation, whose effect is scarcely significant when it is estimated separately (Table A14 in the online appendix), reduces the impact of reforms on the GDP per capita of the average country from 4.5 per cent to 3 per cent and the impact in Canada from 10 per cent to 6.5 per cent (Chart A12 in the online appendix). The impact on the Canadian economy remains the highest among the countries in our sample, followed by Italy (4.2 per cent), Austria (4 per cent), the Slovak Republic (3.8 per cent) and France (3.5 per cent).

Given the current level of Canadian GDP, the maximum impact of reform would amount to an overall $300 billion CAD increase in GDP, equivalent to a per capita gain of about $7,500 CAD. Assuming that the effects of reforms would be felt over a period of 5 to 10 years, this would correspond to an annual per capita gain of about $750 to $1,500 CAD. Moreover, the total 10 per cent gain in GDP per capita for Canada corresponds to around 50 per cent of the country's current GDP per capita gap with the United States. Excluding reforms in trade, these numbers still be significant, with 195 billion CAD increase in GDP, equivalent to $4,875 CAD increase per capita and annual per capita gains ranging from $488 to $976 CAD.

The United States would benefit from a GDP per capita gain of more than 4 per cent from the implementation of the simulated reforms, as restrictions to competi-

Chart 8: Simulation of the Impact from Adopting Best Regulatory Practices (long-run per cent gains in GDP and GDP per capita)



Note: The Chart shows the point estimates of the effects of regulatory reforms that align regulations in each sector to best practices in our sample as well as their confidence interval (one standard error). The simulations are based on the coefficient of NMR in Table 1 column 4 and on country-specific intensities of intermediate inputs.
Source: Authors' calculations.

tion remain in a number of sectors. But if Canada were to undertake less ambitious reforms aimed at easing its regulations, in each regulated sector, to the level currently observed in the United States, the Canadian GDP per capita gains would be about 5 per cent (see Chart A13 in the online appendix), leaving about three quarters of Canada's productivity gap with the United States to be filled.[33] Other reforms would therefore be necessary in Canada to bring it closer to the average level of labour productivity observed in the United States, these may entail lowering interprovincial barriers to trade or barriers to FDI for example, or reforming the labour or financial markets.

The potential gains in labour productivity and GDP per capita from reforming product markets in a procompetitive sense are significant. However, they should be put into perspective. First, they result from an ambitious reform effort, as in some sectors the current regulatory gap between Canada and best practice countries is large. Second, they should be considered attainable only gradually over a long time span. Given their scope and depth, the reforms required to adopt best practices will need time to be implemented and the corresponding productivity gains will also unfold slowly. This observation raises the eternal problem of undertaking ambi-

33 This scenario assumes that the United States leaves its regulations unchanged at the 2023 level.

tious structural reforms: their political cost is immediate and can be high, as the professions and activities concerned oppose them and defend their anti-competitive rents, while the induced economic benefits only appear gradually. The gap between the immediate and delayed effects of reforms and between the beneficiaries and the losers from reforms contributes to explain why many countries, including Canada, may find it difficult to undertake such wide-ranging and swift regulatory changes.

Finally, as in all simulations based on empirical estimates, the scenario analysis assumes all else equal. It cannot account for several general equilibrium effects that can be ignited by reforms themselves. These include changes in the allocation of resources across sectors, changes in the intensity of use of intermediate inputs, changes in the allocation of hours worked across sectors and changes in the total hours worked in the economy. Also, it is assumed that benchmark countries, whose regulations are taken as representative of best practices or as a reference point (e.g. for the United States-Canada comparison) on which regulations are aligned, do not change their regulations during the experiment. The impact of these assumptions on the entity of the aggregate productivity gains spurred by reforms is difficult to assess as some of these changes may have conflicting effects on sectoral and aggregate productivity.

Conclusions

Our article estimates the effects of anticompetitive regulations in non-manufacturing sectors that provide key intermediate inputs to the economy on the hourly productivity performance of sectors downstream. Then, our simulations use the share of hours worked in each sector to provide the overall impact of reforms on aggregate productivity and GDP per capita. We estimate that, in the very long term, Canadian GDP could rise by between 6.5 and 10 per cent, depending on the range of reforms implemented. The maximum gains would correspond to roughly half the current income gap with the United States.

We consider that our estimates likely provide a lower bound on the gains that could be obtained from a wider set of reforms. First, in order to obtain unbiased estimates we ignore the gains originating from efficiency increases in the regulated upstream sectors themselves, which would also possibly contribute to boosting aggregate productivity. Second, while our sectoral analysis accounts for within-sector labour and capital reallocations ignited by reforms (e.g. from low to high productivity firms), it cannot account for the possible reallocations between sectors (e.g. from low to high-tech or low to high knowledge-intensive sectors). These reallocation effects have the potential to be relevant in Canada where, according to Chen and Tombe (2024), resource misallocation is high and rising, accounting for half of the widening productivity gap between Canada and the United States. Third, our analysis does not cover the potential gains to be obtained from lowering other types of regulations, as for instance trade and investment barriers internally (via the elimination of interprovincial barriers and harmonization of provincial regulatory policies) or internationally (via the easing of barriers to FDI

and services trade), which remain relatively high in Canada.[34] While accounting for these other potential reforms in the empirical analysis could reduce the estimated impact of the set of non-manufacturing reforms that are considered in our analysis, it is reasonable to expect that their joint effects on productivity and GDP per capita would be greater than those resulting from our simulations. These further (likely positive) effects of reforms could however be mitigated by other offsetting general equilibrium adjustments. Future research could usefully investigate these additional channels in order to obtain a fuller picture of the potential growth benefits of implementing a procompetitive reform agenda in Canada.

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