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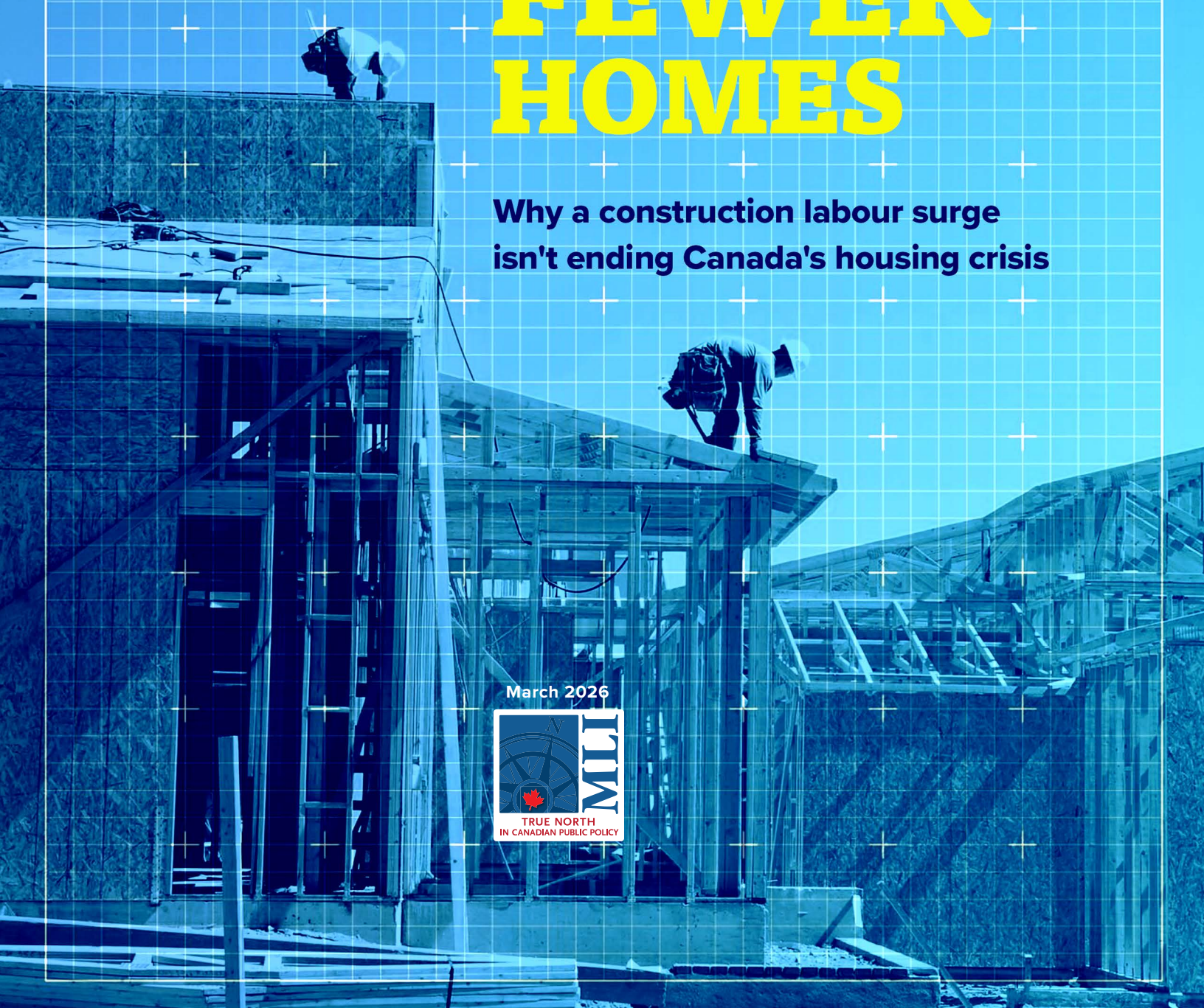
MORE HAMMERS, FEWER HOMES

Why a construction labour surge isn't ending Canada's housing crisis



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Canada's housing shortage is no longer just an affordability problem. It is increasingly a constraint on economic growth, labour mobility, and the ability of cities to function effectively. Despite record levels of construction employment and investment, housing supply continues to fall far short of what Canadians need.

The core problem lies in a sustained decline in residential construction productivity. Employment has surged, but housing output per worker has steadily declined.

This report examines the productivity of residential housing construction in Canada. Its central finding is clear: while some commonly cited measures suggest productivity has improved, they are poorly suited to housing policy. In dollar terms, value added in residential construction has risen modestly. But measured in physical terms – such as homes completed per worker or per hour worked – productivity has been falling for decades.

This gap between value-based and volume-based productivity measures lies at the heart of Canada's housing challenge. It also explains why record levels of construction employment have coincided with historically weak growth in housing completions. The industry has become more productive at building homes that are larger or include improved, higher-end amenities. However, its efficiency in building housing in large numbers has worsened.

Expanding the workforce without addressing underlying inefficiencies will not resolve the housing shortage. It risks entrenching a low-productivity equilibrium in which additional labour raises costs without a commensurate increase in the volume of homes.

The consequences are visible across the country. Canada now employs more construction workers than ever, yet annual housing completions remain well below levels achieved decades ago, when workforces were smaller. Canada Mortgage and Housing Corporation estimates suggest that if productivity had remained near 1990s levels, Canada would likely build well over 350,000 homes per year rather than closer to 250,000.

Housing shortages are physical shortages. Families, employers, and cities are constrained by the number of homes available, not by how much money is spent building

them. Policies guided exclusively by value-added metrics risk mistaking rising costs for efficiency gains while leaving the supply problem unresolved.

Several structural features are to blame for the weak productivity, including:

- Industry fragmentation: Most homebuilders operate on a small scale, limiting standardization of designs, technology investment and adoption, and process innovation.
- Capital investment lags labour growth. Residential construction has become more labour-intensive, even as skilled labour becomes scarcer, older, and more expensive.
- Too much red tape. Planning approvals, zoning rules, codes, and compliance requirements impose cumulative time and coordination costs. Poorly coordinated approval systems compound the problems.
- Several factors hamper the growth of productive firms, including land-use constraints, regulatory barriers, and fragmented markets, reducing competitive pressure and slowing the spread of best practices.
- Some (mostly smaller) firms are slow to adopt productivity-enhancing technologies such as modular construction, prefabrication, digital design, and advanced project-management systems. Risk aversion, fragmented procurement, inconsistent standards, and uncertain demand discourage sustained investment in industrialized methods.

Policy responses have focused on labour shortages, training, and immigration. These measures alone are not enough. Evidence shows that expanded training and certification do not, by themselves, reliably improve industry-wide productivity. Gains depend on addressing the underlying structural capital constraints identified in this report.

In short, Canada cannot build its way out of the housing shortage through labour expansion alone; a workforce-first strategy risks entrenching low productivity and higher costs. Housing policy must focus on how efficiently homes are produced.

Closing Canada's housing gap requires a shift toward a productivity-led strategy. This includes:

- Enabling builders to scale across jurisdictions.
- Accelerating industrialized and off-site construction.
- Improving regulatory coherence rather than relying on blunt deregulation.
- Rebalancing capital and labour through tax and investment policy.
- Adopting productivity metrics that track both value added and physical output.

Canada's housing crisis is ultimately a productivity challenge. History and international experience show that higher housing output is achievable when capital, labour, and institutions align. Without decisive reform, Canada risks perpetuating a cycle of rising costs, constrained supply, and declining affordability. With higher productivity, residential construction can once again support economic growth rather than limit it. MLI

La pénurie de logements au Canada *n'est plus seulement un problème d'abordabilité. Elle entrave désormais la croissance économique, bride la mobilité de la main-d'œuvre et perturbe le fonctionnement des villes. Si l'emploi et l'investissement dans la construction atteignent des sommets, l'offre de logement, elle, ne satisfait pas les besoins.*

Au cœur du problème : un effritement constant de la productivité dans la construction résidentielle. L'emploi a bondi, mais le nombre de logements construits par travailleur n'a cessé de diminuer.

Ce rapport analyse la productivité de la construction résidentielle au Canada.

Il est manifeste que, bien que certaines mesures fréquemment citées suggèrent une amélioration de la productivité, elles se révèlent néanmoins incompatibles avec la politique du logement. Côté revenu, la construction résidentielle a vu sa valeur ajoutée croître modestement. Toutefois, côté volume (à savoir le nombre de logements achevés par travailleur ou heure travaillée), sa productivité baisse depuis des décennies.

Cet écart entre les mesures de productivité (valeur et volume) est central. Il explique aussi pourquoi les niveaux d'emploi record ont coïncidé avec une expansion modeste, historiquement, du parc immobilier. L'industrie a optimisé sa capacité à construire des logements spacieux dotés d'équipements haut de gamme. Néanmoins, sa capacité à construire un grand nombre de logements de façon efficiente s'est amoindrie.

Augmenter les effectifs sans corriger les inefficacités ne saurait pallier la pénurie de logements. Il risque de renforcer un équilibre à faible productivité dans lequel la main-d'œuvre supplémentaire augmente les coûts sans une augmentation proportionnelle du volume des logements.

Les résultats sont visibles partout au pays. La construction emploie plus de travailleurs que jamais, mais le nombre de logements achevés reste considérablement en deçà des niveaux observés il y a des décennies, lorsque les effectifs étaient moindres. Selon la SCHL, le Canada aurait construit bien plus que 350 000 logements au lieu des 250 000 actuels si la productivité était restée la même qu'au début des années 90.

Le manque de logements en crée d'autres. Les familles, les employeurs et les villes s'inquiètent de la disponibilité des logements, et non des sommes dépensées par l'industrie. Les politiques orientées exclusivement sur la valeur ajoutée peuvent confondre coûts et efficacité, ce qui ne résout pas le problème de l'offre.

Plusieurs caractéristiques structurelles expliquent la faible productivité, notamment :

- *La fragmentation : la plupart des constructeurs fonctionnent à échelle réduite, ce qui entrave l'harmonisation des modèles, l'investissement dans les technologies et leur adoption et, donc, les processus novateurs.*
- *Le retard des investissements en capital par rapport à la main-d'œuvre : le secteur est devenu à forte intensité de main-d'œuvre, même si l'effectif hautement qualifié est devenu rare, vieillissant et coûteux.*

- *La bureaucratie excessive : elle impose une charge chronophage et des coûts de coordination, aggravés par des systèmes d'approbation mal coordonnés – aménagement, zonage, codes et conformité.*
- *Les nombreux obstacles à la croissance des entreprises productives : contraintes sur les sols, réglementations et marchés disparates limitent la concurrence et la diffusion des bonnes pratiques.*
- *L'hésitation de certaines entreprises (plus petites) à adopter les technologies innovantes : construction modulaire, préfabrication, conception numérique et systèmes avancés de gestion de projet. L'aversion au risque, la dispersion des achats, l'hétérogénéité des normes et l'indétermination de la demande freinent les investissements dans les méthodes industrialisées.*

Les actions politiques ont ciblé la pénurie de main-d'œuvre, la formation et l'immigration – des mesures insuffisantes à elles seules. Tout indique que la formation accrue et la certification n'améliorent pas en soi la productivité sectorielle. Les progrès sont conditionnés par l'allègement des contraintes structurelles pesant sur le capital, lesquelles sont mises en lumière dans ce rapport.

En bref, le Canada ne peut pas résoudre la pénurie de logements en centrant sa stratégie uniquement sur la main-d'œuvre, étant donné le risque de maintenir une faible productivité et des coûts élevés. La politique du logement doit porter sur les modalités d'une construction efficiente.

Pour résoudre la pénurie de logements, le Canada doit adopter une stratégie axée sur la productivité en privilégiant les actions que voici :

- *Faciliter les activités des constructeurs au-delà de leurs territoires habituels.*
- *Accélérer la construction industrialisée et hors site.*
- *Optimiser la cohérence réglementaire plutôt que de s'appuyer sur la déréglementation massive.*
- *Rééquilibrer le rapport capital/travail au moyen de la fiscalité et des politiques d'investissement.*
- *Utiliser des indicateurs de productivité mesurant à la fois la valeur ajoutée et les volumes.*

La crise du logement au Canada est un problème de productivité. L'analyse historique et les exemples internationaux convergent pour confirmer que l'établissement d'une synergie efficiente entre capitaux, ressources humaines et institutions représente une solution adéquate. Sans réforme importante, le Canada risque de pérenniser un cycle de coûts élevés, d'offre insuffisante et d'inabordabilité. Une productivité accrue dans le secteur du bâtiment peut relancer la croissance, et non la limiter. **MLI**

Introduction

Canada continues to face significant challenges in meeting its housing construction targets. Until recently, the shortage of skilled trades was widely regarded as one of the major barriers to increasing housing supply in Canada. However, recent construction sector data suggest that the issue extends beyond labour availability or shortage. While the construction workforce has reached record levels, housing output has not increased proportionally, suggesting a marked decline in productivity within the residential construction sector. This divergence between workforce growth and construction output raises fundamental questions about the industry's efficiency and the feasibility of achieving national housing objectives.

This study examines how construction productivity in Canada has changed over time, with a focus on the widely reported decline in residential construction. It reviews key academic and industry research in Canada and abroad, showing that measuring productivity in residential construction involves significant conceptual and methodological challenges.

To address these issues, the study assembles a unique dataset and estimates a range of metrics for construction productivity. The results show that assessments of residential construction productivity depend heavily on the metric used. For example, measures such as completions per worker point to declining productivity, while others, such as real value added per labour hour, indicate more favourable trends.

Overall, the findings underscore the need for more nuanced and context-sensitive approaches to measuring productivity. No single indicator provides a complete or reliable picture, and careful attention must be paid to how productivity measures are chosen, interpreted, and compared.

Data from the Canada Mortgage and Housing Corporation (CMHC) illustrate the scale of the problem. In 2023, Canada employed a record 650,000 construction workers, yet housing completions totalled only 240,267 units. If labour productivity levels observed in earlier periods had been maintained, Canada would have produced more than 350,000 homes, with maximum historical productivity levels implying potential output of nearly 400,000 homes in that year (Laberge 2024). Similarly, Statistics Canada data show that since 1997, the residential construction labour force has grown by 136 per cent, while housing starts have increased by only 63 per cent, underscoring that workforce expansion has not translated into commensurate gains in output. Historical comparisons further reinforce this conclusion: in the 1970s, with a significantly smaller workforce and lower population, Canada built more homes than it did in the past 10 years.

> *Canada cannot build its way out of the housing shortage through labour expansion alone.*

The Canadian experience aligns with a broader international pattern. Studies of the United States and other advanced economies consistently report stagnant or declining construction productivity. This is occurring despite rising investment and capital intensity, which in residential construction refers to the amount of capital input per unit of labour (Goolsbee and Syverson 2023; Peters 2024). For instance, between 1970 and 2020, US construction productivity growth lagged that of almost every other sector, with similar trends observed across 16 of the 29 OECD countries (Goolsbee and Syverson 2023). Teicholz (2013) also documented a persistent decline in US construction productivity relative to the economy, attributing it to structural features such as project uniqueness, fragmented industry organization, and underinvestment in technology. These findings underscore that the productivity challenge is not unique to Canada but reflects wider sectoral inefficiencies evident across jurisdictions.

The decline in productivity is further complicated by the fragmented structure of the Canadian residential construction sector. Most firms remain small, with 69 per cent employing fewer than five workers (Laberge 2024). Only one residential construction company in Canada employs more than 500 workers. This atomized industry structure has been documented for decades. Buzzelli (2001) demonstrated that in 1960, more than 94 per cent of Ontario builders employed fewer than 26 workers, while firms with more than 100 employees represented less than one per cent of the sector. Although the share of larger firms increased marginally by the 1970s, the sector remains characterized by limited consolidation. The persistence of small-scale operations may constrain economies of scale, impede investment in technology, and limit firms' capacity to negotiate efficiencies within the construction supply chain.

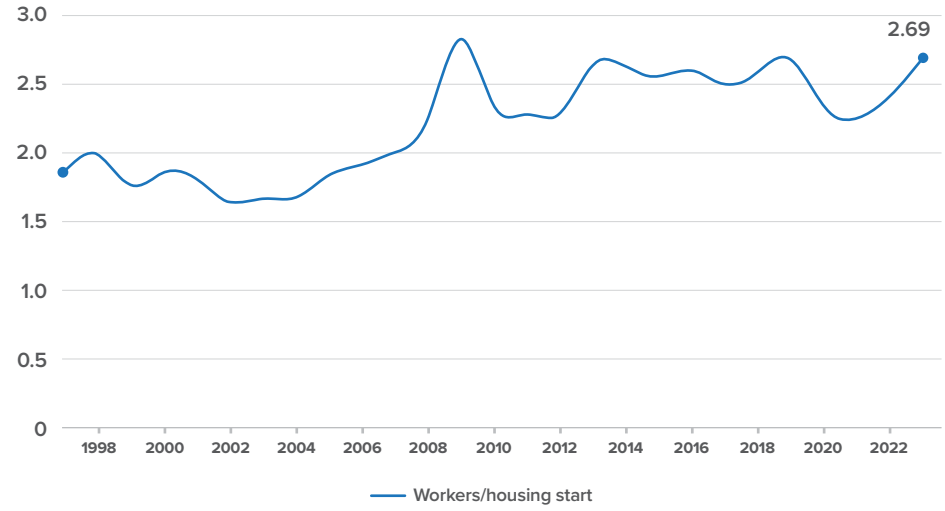
The historical record demonstrates that Canada once achieved substantially higher housing output with a smaller workforce. The contrast between the 1970s, when the sector reached peak housing production despite a smaller population and workforce, and the present day suggests that understanding the factors that underpinned past productivity gains is essential to addressing today's crisis. Comparative evidence from Europe and New Zealand supports this conclusion, highlighting that cyclical effects, regulatory diversity, and measurement challenges are recurring themes in explaining productivity stagnation (Page 2010; Abdel-Wahab and Vogl 2011).

Figure 1 illustrates the residential productivity challenges over recent years, showing that the number of workers per housing start has increased since 1998. The workers per housing start grew the most during the Great Recession. Since the early 2000s, workers per housing start have increased by nearly 70 per cent, suggesting the continuous erosion of worker productivity.

Whereas residential construction accounted for a greater share of the economy, as evidenced by the increase in the residential construction component of GDP in **Figure 2**, there hasn't been a commensurate increase in the number of new housing starts. Similarly, residential employment in 2022 had grown by over 140 per cent, while the number of completions grew by little over 50 per cent over the same period.

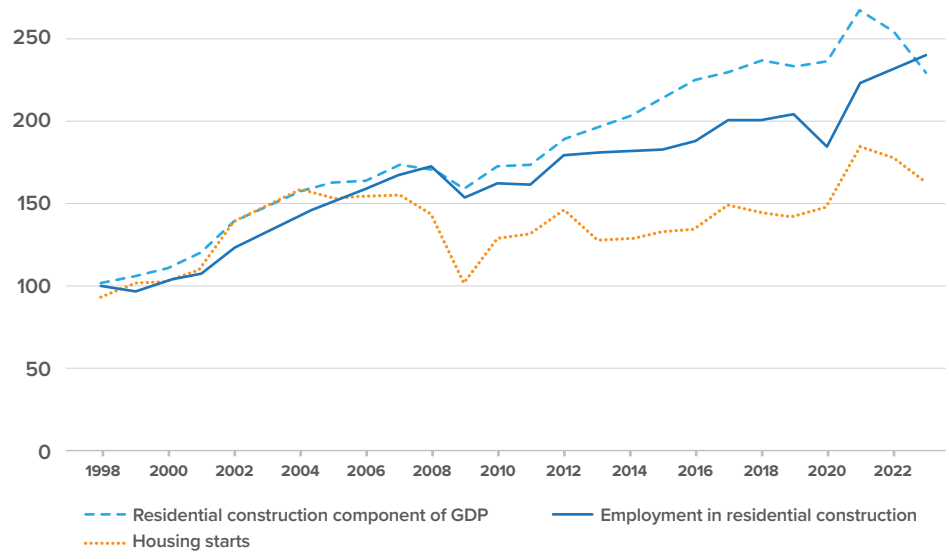
Improving productivity in residential construction is critical for both economic performance and social well-being. Weak productivity growth can contribute to higher per-unit construction costs, which directly translate into higher housing prices. This dynamic exacerbates Canada's affordability crisis and constrains the sector's ability to meet ambitious supply targets, such as the additional

FIGURE 1: Residential construction productivity has gradually declined over time



Note: Calculations and estimates by CMHC. All values are converted to respective indices.
Source: Statistics Canada, Table: 36-10-0480-01, Table: 34-10-0126-01.

FIGURE 2: An increase in the construction labour force did not necessarily produce more housing starts



Source: Data from Laberge 2024.

3.5 million dwellings (beyond business-as-usual levels) projected to be required over the next decade (Laberge 2024). Understanding and reversing productivity declines is therefore essential to ensuring that the construction industry can deliver more housing with the resources already available to it.

> *Improving productivity in residential construction is critical for both economic performance and social well-being.*

This report examines the evidence of declining productivity, surveys the academic and policy literature for explanatory factors, and lays the groundwork for an empirical analysis of recent Canadian data. The decline in residential construction productivity in Canada is investigated through three broad areas of inquiry. First, historical trends in labour productivity are considered by asking how output, measured in terms of housing units produced or inflation-adjusted value-added, has evolved relative to labour inputs such as the number of workers or total hours worked. Particular attention is paid to identifying when significant slowdowns or shifts in productivity have occurred.

Second, the analysis examines the factors that contribute to productivity decline. It asks to what extent regulatory frameworks, including zoning, permitting, and building code requirements, have added complexity and reduced efficiency. Labour force dynamics such as skill shortages, an aging workforce, and training gaps are also considered, alongside the influence of input costs, including land, materials, and capital investment. Whether a slow pace of technological adoption, such as modular construction, prefabrication, or digital design tools, has constrained the pace of efficiency gains is also examined while assessing the possibility that measurement limitations or cyclical economic effects may be distorting reported productivity trends.

Finally, potential policies and innovations that could enhance productivity in residential construction are examined, including but not limited to whether streamlined regulatory processes, faster approvals, and updated building codes could reduce labour requirements per unit of housing. The analysis also evaluates the potential of technological innovations, such as 3-D printing, prefabrication, and advanced project management tools, such as Building Information Modelling, to improve efficiency. Lessons from international and cross-sectoral experiences are drawn upon to identify effective strategies. At the same time, the role of workforce training, investment in equipment, and research and development in enhancing output per worker is also examined.

Productivity metrics and earlier findings

The magnitude of the stagnation

The residential construction sector's performance contrasts sharply with the broader economy, as it has become an economic drag. A comprehensive analysis by the McKinsey Global Institute (MGI) found that while sectors like retail and agriculture have seen productivity rise by over 1,500 per cent since 1945, construction has remained largely flat. Globally, between 1997 and 2017, manufacturing productivity grew by 3.6 per cent annually, while construction productivity grew by only one per cent (MGI 2017). The stakes of such inefficiency are high: MGI estimates that closing this gap could add US$1.6 trillion to the global economy.

In Canada, the industry's lacklustre performance is a pressing issue. Caranci and Marple (2024) document a post-pandemic decline in aggregate productivity, with real GDP per capita in 2023 falling below 2014 levels. The implications of this are stagnant or declining living standards for Canadians. They identify construction as a central source of this weakness. Between 2019 and 2023, real output per hour worked in construction declined by over two per cent annually. The issue is especially pertinent in Canada, where, as Caranci and Marple (2024) show, more of our economy is being directed to our least productive industry – housing construction.

This trend mirrors international findings related to the broader economy. Peters (2024) observes that US labour productivity growth slowed from 2.3 per cent historically to 1.3 per cent after 2005. He attributes this to a decline in "economic dynamism," specifically, reduced competition and lower rates of new business formation, which limit the "creative destruction" necessary to reallocate resources to high-growth firms. Economic dynamism is the key force behind the productivity improvements that Canada's residential construction industry needs.

Structural drivers: capital, regulation, and firm size

Existing research suggests that construction productivity is suppressed by structural inefficiencies rather than a simple lack of effort or demand. Three key drivers emerge: capital misallocation, regulatory barriers, and industry fragmentation.

Productivity growth typically requires "capital deepening," giving workers greater access to tools and technology. Such investments can enhance productivity by augmenting labour's output, leading to more production per hour or per worker. However, Lovely and Marion (2024) document a long-run shift in Canadian investment away from productive capital (such as machinery) toward residential structures themselves. This shift in investment priorities marks a stark change. By 2019, and for the first time in 50 years, the total value of Canada's homes and other residential buildings was greater than the value of all non-residential buildings, such as offices, factories, and commercial properties. This represents a misallocation of resources into residential assets that do not generate sustained productivity gains. Furthermore, the useful life of these assets is declining, compounding the inefficiency. Thus, housing construction is growing in its share of our economy, yet the productivity issue, along with its economy-wide implications, remains unresolved.

Goolsbee and Syverson (2023) reinforce this misallocation view using US data. Their findings suggest that the construction sector fails to reallocate resources efficiently. In their work, however, they don't simply look for changes in capital investment. Rather, they test whether a region's current housing construction productivity predicts the future activity of the sector. In a market where capital and firms are efficiently sorted, this relationship would be strong and positive, suggesting that labour and capital are increasingly allocated to regions and sectors with higher productivity. Unlike other industries, the residential sector's activity does not follow more productive regions or firms. In some cases, the relationship is negative, suggesting that resources are increasingly drawn into less productive areas. Given the unique and inefficient capital investment dynamics driving the sector, one must look to regulation to identify how these distortions are enabled.

Overly stringent regulatory frameworks significantly impair productivity by distorting firm dynamics and increasing costs. The increasing regulatory burden weighs on the industry by diverting resources from core production activities to regulatory compliance. Albouy and Ehrlich (2018) demonstrate that strict land-use regulations increase the gap between construction costs and housing prices, effectively lowering productivity. They also observed that the state-level land use restrictions imposed a greater cost premium than municipal or local level restrictions. Furthermore,

housing construction productivity declined with population, suggesting that as cities become populated, building additional dwellings in prebuilt areas lowers construction productivity. Hence, while one may argue that building in an amenity-rich area (usually a brownfield development) delivers higher-quality-of-life benefits, these benefits are less than the costs associated with land-use restrictions.

Moreover, there seem to be more covert mechanisms through which housing regulation impairs the sector's productivity. D'Amico et al. provide a long-run perspective, noting that residential productivity peaked in 1970 and has since declined. They argue that increasingly restrictive land-use controls have forced down project sizes. Smaller projects favour smaller firms, which lack the economies of scale necessary to invest in innovation. They estimate that if construction firms reached the average size of manufacturing firms, the sector would be 60 per cent more productive. Sharpe (2001) corroborates this observation in a Canadian context, identifying constrained firm size as a key impediment to innovation and the industry's efficiency. A point highlighted is the wide variation in complexity and regulations across municipalities, which prevents firms from expanding across markets.

> *If construction firms reached the average size of manufacturing firms, the sector would be 60 per cent more productive.*

The prevalence of small firms creates a fragmented industry unable to adopt systemic innovations. MGI (2017) notes that fragmentation prevents the consolidation necessary to negotiate better terms with suppliers or regulators. Similarly, Sharpe (2001) highlights that the residential sector has low barriers to entry but high barriers to growth, limiting agglomeration. Furthermore, this structure inhibits investment into Research and Development, a core driver of innovation and productivity. Huang, Chapman, and Butry (2009) report that US research and development spending in construction is negligible (0.5 per cent of the sector's output). While innovations like

prefabrication and modularization exist, their adoption is slowed by risk aversion, project uniqueness, and the lack of integrated supply chains (Teicholz 2013). The less-than-desirable emphasis on research, development, and innovation has persisted in Canada. Sharpe (2001) reports that, in 1999, construction ranked lowest among industries in R&D spending emphasis, with only 16 per cent of firms considering it important. The situation was even more acute in residential construction, where just four per cent of businesses valued R&D investment and only two per cent viewed patenting as necessary.

Labour dynamics and management

While skilled labour shortages are frequently blamed for poor performance, the evidence is nuanced. MGI (2017) argues that a lack of project management expertise in smaller firms leads to onsite inefficiencies. Dozzi and AbouRizk (1993) support this, finding that poor material handling and scheduling can leave tradespeople with only about a third of their time available for direct installation. They also note that regular overtime (above 40 hours) often yields less total output than regular workweeks due to fatigue.

However, simply increasing training may not solve the problem. Abdel-Wahab et al. (2008) found that in the UK, rising rates of worker certification and training between 1995 and 2006 did not correlate with productivity improvements. They argued that training activities may divert time from production or that skills investment crowds out necessary capital investment. This suggests that without fixing the underlying management and structural issues, upskilling labour yields diminishing returns.

A recurring finding is the counter-cyclical nature of construction productivity. Sharpe (2001) and Puddicombe (2021) observe that productivity often rises during economic downturns and falls during booms. This is likely because firms shed inefficient workers and tighten operations during recessions, whereas in boom times, inefficiencies persist. Brox (1993) notes that financing costs can replace capital; when borrowing becomes easier, especially during booms, productivity pressures might ease because the industry tends to substitute borrowed funds for internal capital, which they would usually spend more carefully. In essence, a booming housing market can foster inefficiencies.

An important yet underexplored aspect of productivity in residential construction is Total Factor Productivity (TFP), a measure of the "intangibles" associated with the production process, calculated as the "residual" productivity

remaining after controlling for tangible factors such as labour and capital. Conceptually, TFP estimates how well an industry combines the factors of production to produce efficiently and productively. While Canadian estimates are generally missing for this measure, Abdel-Wahab and Vogl (2011) estimate TFP for the UK housing construction industry. They found that between 1990 and 2005, TFP's contribution to productivity was substantially negative. Their results were corroborated across the Eurozone, reflecting an international trend. Put simply, the overall production system, encompassing management practices, regulations, subcontracting patterns, and output composition, became less efficient over time.

The measurement debate

A significant strand of research questions whether the productivity crisis is real or a statistical artifact. Measuring construction output is notoriously difficult due to the unique, widely varying nature of buildings and the challenge of accounting for quality improvements. The crux of the issue lies in the use of deflators – statistical tools used to strip away distortions caused by inflation and isolate the real value added. The wide variation in housing, in both kind and quality, makes the application of this technique relatively difficult.

Sveikauskas et al. (2018) argue that standard deflation methods overstate inflation in construction costs, thereby understating real output. By using sub-industry-specific deflators that account for amenities (e.g., bathrooms, garages), they find evidence that residential productivity may actually have increased, contradicting the consensus of productivity decline or stagnation.

Conversely, Goolsbee and Syverson (2023) attempt to bypass price deflators entirely by measuring productivity in physical units (square footage per worker). They find the same stagnation and decline evident in financial metrics, suggesting the slowdown is real. Puddicombe (2021) analyzes Total Factor Productivity (TFP) for large US homebuilders and finds no clear trend of productivity improvement between 2000 and 2015. He argues that any apparent gains were driven by pricing power (margins) rather than efficiency. Similarly, in a New Zealand study, Page (2010) tested a variety of productivity measures, yielding contradictory conclusions about the sector's productivity. Page emphasizes the nuanced and sensitive nature of measuring the industry's efficiency and the need for a composite approach in evaluating the industry's trends.

Summarizing insights from existing research

Previous research reveals several consistent insights into the productivity challenges of the construction sector.

First, productivity declines are not unique to Canada but are part of a broader international trend (Goolsbee and Syverson 2023; Peters 2024; McKinsey Global Institute 2017). Second, investment dynamics matter: while non-residential capital accumulation is strongly associated with productivity growth, the shift toward residential investment is increasingly drawing resources away from them (Lovely and Marion 2024; Caranci and Marple 2024). Third, measurement problems remain central, as studies employing different deflators (inflation-adjusting factors), output measures (units built versus value added in dollars), or aggregation techniques lead to conflicting conclusions about whether housing productivity has declined, stagnated, or increased (Page 2010; Sveikauskas et al. 2018; Puddicombe 2021; Huang et al. 2009; Goodrum and others 2002).

While labour and skills are often cited as bottlenecks, empirical tests show mixed results, suggesting that training alone does not guarantee productivity gains (Abdel-Wahab et al. 2008). Stringent regulations have contributed to limiting firm sizes in the residential construction sector and to the efficiency with which firms can produce homes. Finally, technology adoption, prefabrication, and modularization are widely promoted as remedies, yet industry fragmentation, regulatory barriers, and risk aversion have slowed their diffusion (Huang et al. 2009; Teicholz 2013).

These findings underscore that housing construction productivity is shaped not by a single factor but by the interplay among capital allocation, regulatory frameworks, workforce dynamics, and methodological debates. They also demonstrate the importance of distinguishing cyclical fluctuations, such as the counter-cyclical behaviour noted in earlier studies (Sharpe 2001; Puddicombe 2021), from long-run structural forces. The empirical analysis that follows builds directly on these insights by examining how investment patterns, regulatory contexts, and technological adoption interact to shape housing productivity in Canada.

Empirical analysis

Empirical trends in construction productivity depend heavily on the methodological and measurement challenges used to define them. Because different definitions of productivity lead to divergent conclusions, an analysis of measurement errors and methods is fundamental to understanding these trends. A rigorous empirical discussion, therefore, requires an initial focus on the methods and limitations of the data.

Data limitations and measurement issues

Studying productivity in the residential construction sector poses several well-documented data challenges. One major issue is that Statistics Canada has only recently begun regularly breaking down construction industry data by sub-sectors, as highlighted by Sharpe (2001).

Productivity measures in residential construction may differ from those in non-residential construction, yet that breakdown was only recently made available. Time series data on labour productivity and related measures begin only in 1997. With annual time series data, each year contributes just one observation, which poses challenges for statistical estimation of forecasting algorithms that require longer time series with many more observations. For empirical analysis, CMHC's data on housing starts were complemented by additional data on housing completions and other metrics related to dwelling units.

Sharpe (2001) further emphasized that Statistics Canada did not break down data on capital investments and technology indicators by residential and non-residential construction. This situation remains unchanged, as the breakdown of the construction sector's capital and technology investment metrics is available only at the industry-wide level, and not for residential construction specifically.

Furthermore, external shocks such as the Great Recession or the COVID-19 crisis can skew results or reduce the number of reliable data points, especially if these shocks are treated as anomalies. The limitations inherent in the short time span of the series also affect metrics such as labour force size, subsector value-added (residential versus non-residential construction), and unit labour costs. This point highlights an important policy priority that has

been ignored. Housing construction-specific data is lacking; yet smart, data-driven policy requires it.

Beyond data limitations, we must account for how the construction industry operates. One major hurdle is tracking labour, specifically within housing. In practice, the lines between residential and commercial work are blurred; a carpenter or electrician may work on a home in the morning and a retail site in the afternoon. Because these skills are highly transferable, workers move fluidly between sectors, making it difficult to determine exactly how many workers in the total labour force are dedicated solely to residential projects at any given time.

To address the lack of specific data on labour crossover, we focus on long-term trends rather than absolute totals. This approach is reliable because construction methods and labour needs have remained stable over the years. Since few substantial changes have occurred in how homes versus commercial buildings are built, we can reasonably assume the sharing of labour between sectors has stayed consistent. This allows us to reasonably track whether the residential workforce is growing or shrinking, even if the exact number of crossover workers between residential and commercial construction remains hidden.

Value added and deflators

An important distinction should be made between the two primary methods of measuring the industry's production output. One approach, based on Statistics Canada data, is to measure the industry's value added. Residential construction value added is the economic value created when homes are built, after subtracting the cost of materials and other inputs used up in the process. Essentially, it is the new value being created by the process of building houses. This method is useful because it captures not just the number of homes built, but also their quality, size, and other desirable characteristics. However, it relies heavily on "deflators" – statistical tools used to adjust the output for inflation. The reliability of such tools to accurately account for inflation has frequently been questioned, making the approach less appealing (Goolsbee and Syverson 2023; Huang et al. 2009; Puddicombe 2021). Furthermore, this method often misses the "underground economy," where cash-based renovations or small-scale contracts go unreported, distorting estimates of the industry's output.

A more convenient alternative is simply counting dwelling units completed per worker. This approach avoids the issues surrounding deflators,

and the data (via CMHC) goes back much further. A substantial downside of this approach is that it treats a 1,200-square-foot bungalow from 1960 the same as a modern, amenity-rich single-family dwelling with over 3,500 square feet of living space. Because today's homes are larger, more energy-efficient, and more complex to build, naïve comparisons of units produced per worker over time may understate any real productivity gains.

A word about deflators

To understand productivity, price hikes (inflation) must be separated from product improvements (quality). A modern home, as mentioned earlier, is not necessarily comparable to a house built 50 years ago because it is, on average, a much larger structure that is a more complex product with better insulation, modern wiring, and superior materials. Failing to account for these improvements risks misinterpreting a better-built home as merely more expensive. The issue is further complicated by changing inputs and materials in residential construction over time, which makes tracking input price changes difficult.

Recent advances in deflators have been reported by the National Institute of Standards and Technology (Huang et al. 2009). They proposed quality-adjusted modelling, breaking a house down by its individual parts, thereby isolating price changes to inflation. However, no such measure exists for Canadian data that considers a representative range of the housing market. Fortunately, modern statistical methods (like those used by Statistics Canada) minimize this error by focusing on short-term shifts. Rather than comparing a dwelling built in 2025 directly to one constructed earlier in 1980, the "chained" indices compare each year's new construction only to the one produced in the last year. The reasoning for this approach is self-evident: a home built today may be very different from one built 40 years ago, but very similar to a home built last year. This chaining approach is likely better at capturing price changes attributable to inflation rather than quality improvements.

Labour productivity data and trends

Given the distinct strengths and weaknesses of the various productivity measures, it's useful to employ multiple measures. Specifically, we measure labour productivity in the following ways:

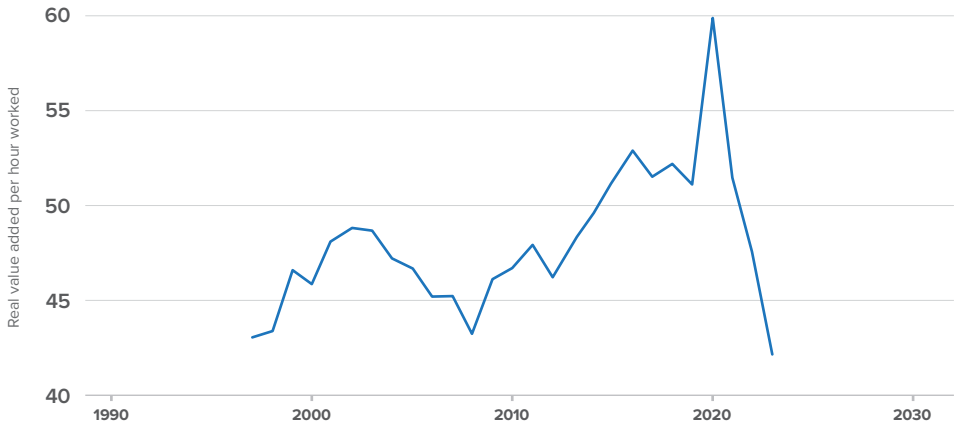
- **Real value added per hour worked**: Across construction sectors, this is the most common productivity measure and is the official published statistic. This metric isolates the net value created specifically by the residential construction sector. Essentially, it gauges how much economic value a unit of labour creates.
- **Nominal value added per hour**: Similar to the first measure, except that value added is not deflated, and is instead kept at current dollars (thus including changes due to inflation).
- **Completions per hour worked**: It serves as a valuable metric in assessing productivity in terms of the volume of housing that is built. However, this variable must be interpreted with care. For instance, if housing units have become more complex to construct, potentially due to enhancements in quality, safety, or other desirable attributes, or have grown in size over time, such factors may lead to a decline in this metric.
- **Completions per worker**: This measure is similar to the one above, but it measures completions per worker rather than per hour.

Improvements in the value-added productivity measure can occur in two main ways. First, the number of housing units produced per hour worked might increase, with housing quality staying the same. Alternatively, higher-quality homes could be built at the same or lower volume than before. It's crucial to determine whether changes are due to increased volume, enhanced quality, or both. To fully understand the trend, we need to compare these changes with other measures of completions per hour worked.

Real value-added productivity metrics show several significant trends, as depicted in **Figure 3** (national aggregate measure) and **Figure 4** (a breakdown by populous provinces). At the national level, value-added productivity exhibits a slight upward trend despite notable fluctuations, such as the Great Recession and the COVID-19 pandemic. Breaking the data down by province reveals significant variation in productivity levels; however, they largely follow similar trends. This observation is important for understanding the variations in productivity across the provinces. While provinces have distinct productivity levels, the shared trends hint toward common underlying factors that affect the variance in productivity.

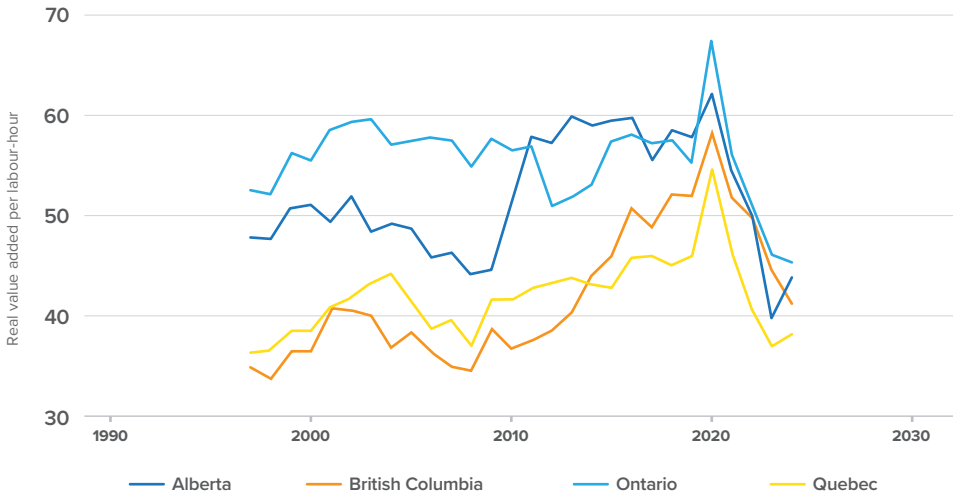
It is also evident that the pandemic years are anomalous, characterized by a significant initial surge in productivity, followed by a subsequent decline.

FIGURE 3: Residential construction, real value added per hour worked



Note: National, delated via Chained Fisher Index
Source: Statistics Canada, Table: 36-10-0480-01.

FIGURE 4: Real Value Added Per Hour worked for Residential construction in populous provinces



Source: Statistics Canada, Table: 36-10-0480-01.

Figure 5 plots the percentage changes in value added and hours worked to investigate the factors contributing to the rapid, significant variation. The deviations observed during 2020–21 are unlikely to reflect authentic fluctuations; rather, they are predominantly influenced by the lockdown and stay-at-home policies that compelled employees to remain out of work,

FIGURE 5: Annual change in residential real value added and residential labour hours worked (Canada-wide)

Source: Statistics Canada, Table: 36-10-0480-01.

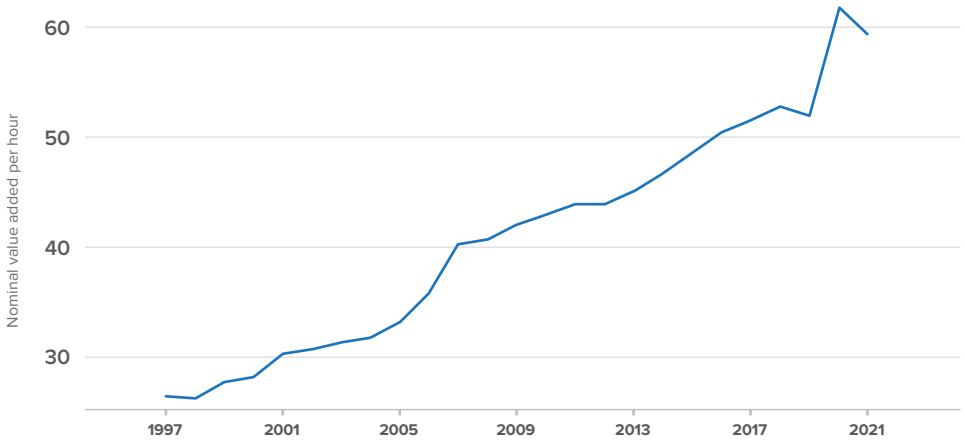
followed by a substantial re-entry into the workforce, which accounts for the observed decline in productivity.

Figure 5 shows that the number of hours dedicated to residential construction in 2020 experienced its largest decline, nearly 15 per cent. Despite the reduced workforce at the onset of the pandemic, work on residential projects continued, and the value added remained comparable, thereby distorting productivity statistics. Likewise, the considerable increase in hours worked in 2021 distorts productivity statistics, reflecting a substantial decline in productivity. However, these fluctuations are not genuine; the pandemic's effects on employment and labour force participation primarily drive it.

While adjusting for inflation is necessary to understand the industry's real economic contribution, it is important to examine the nominal (unadjusted) value-added (**Figure 6**). A visual comparison of **Figure 3** and **Figure 6** clearly demonstrates that the stronger upward trend in nominal productivity is largely driven by inflation, emphasizing the importance of inflation adjustment for a proper comparison.

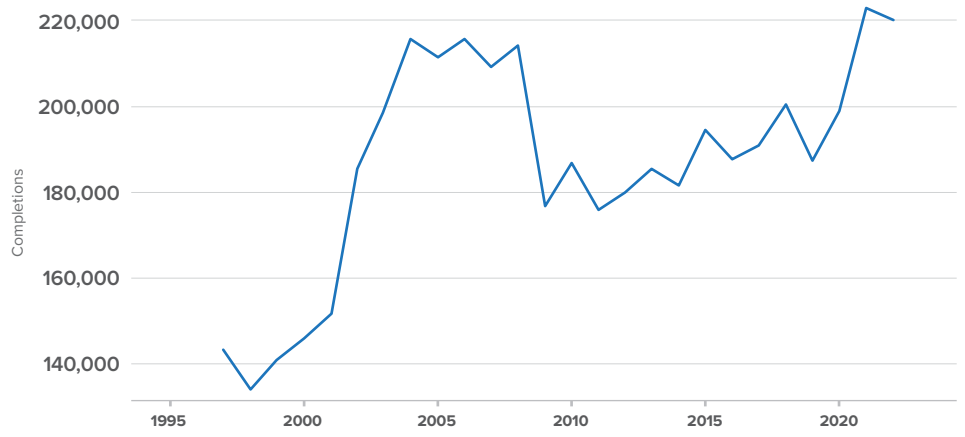
Figure 7 presents annual housing completions in Canada. Here, the impact of the Great Recession is explicitly obvious. Completions were rising briskly from 2000 to the onset of the Great Recession. A temporary decline

FIGURE 6: Nominal value added per hour in residential construction (Canada-wide data).



Source: Statistics Canada, Table: 36-10-0480-01.

FIGURE 7: Housing completions in Canada

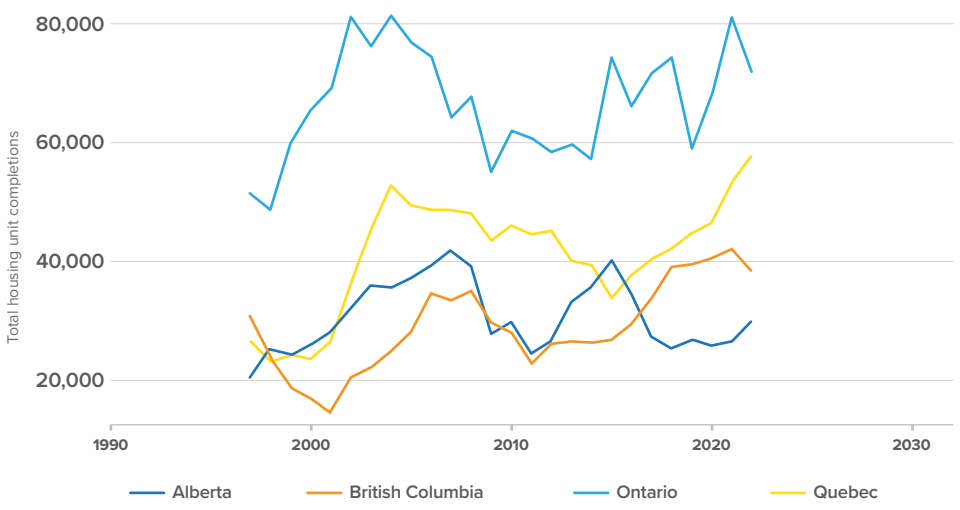


Source: Statistics Canada Table: 34-10-0126-01.

in completions followed the Great Recession. Completions rose sharply again during the COVID-19 pandemic. **Figure 8** presents trends in completions in the four most populous provinces. British Columbia presented a distinct rising trend in completions.

The second set of productivity metrics involves calculating the number of housing units completed per hour worked or per worker employed in the residential construction sector. This is a key measure to consider if an explicit

FIGURE 8: Housing completions in Canada in populous provinces



Source: Statistics Canada Table: 34-10-0126-01.

goal of efficiency is to improve the volume of housing production. **Figure 9** and **Figure 10** illustrate measurements of housing units completed per hour and per worker, respectively. Dwellings built per labour input present a markedly different perspective from the value-added approach to productivity. Instead of exhibiting a marginally upward trend, the data reveal a consistently declining trajectory over time.

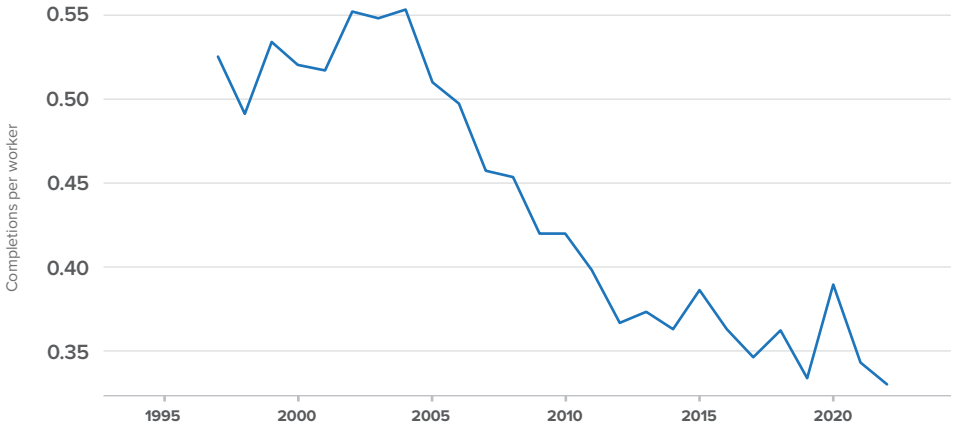
The divergence of the two measures is striking. Units completed per hour show a decrease of more than 30 per cent from 1997 to 2024. The divergence can be explained by the changing nature of homes being built over the last few decades. The industry has shifted its efficiency emphasis onto complexity and amenities, rather than gross volume. This changing emphasis could be driven by changing preferences in Canadians' demand for housing, regulations, or a mix of both. One thing is certain; an honest assessment of the industry's state requires taking both types of measurements into account. An ideal policy set would enable efficiency in both the quantity and quality of housing.

Additionally, the share of apartments in new residential construction has increased over time. It is assumed that high-rise construction is more complex and demanding, and that the labour and material requirements may differ from those for low-rise, ground-oriented housing. Hence, there may be a need to account for the growing share of apartments in the new housing mix.

FIGURE 9: Number of dwellings constructed per hours worked in residential construction

Source: Statistics Canada, Table: 36-10-0480-01, Table: 34-10-0126-01.

FIGURE 10: Number of dwellings constructed normalized by the number of workers in residential construction

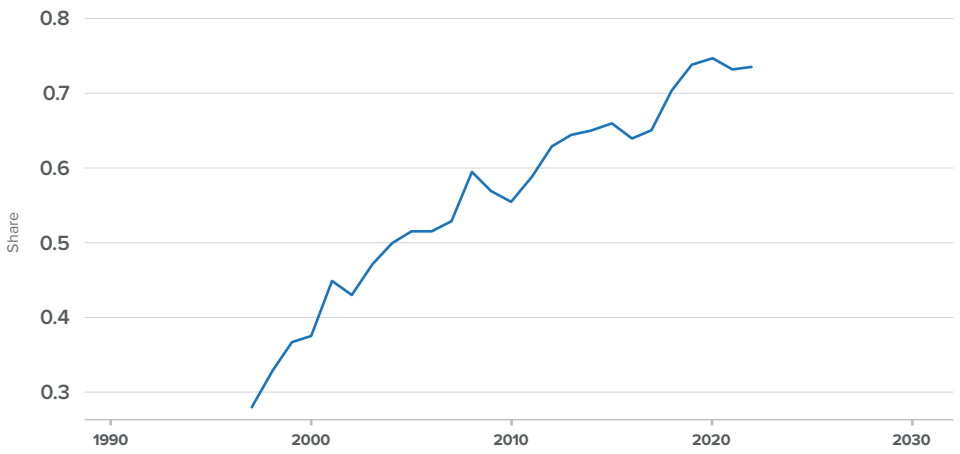


Source: Statistics Canada, Table: 36-10-0480-01, Table: 34-10-0126-01.

Figure 11 shows that the share of apartments (including condominiums) in newly completed housing has increased steadily in recent years.

In summary, defining and measuring construction sector productivity rests on the metrics used. The development industry may prefer value-added metrics that reflect its ability to build high-end, large-scale, amenity-rich housing. Governments and the public, however, are concerned with expanding the volume of housing being produced. The policy preferences will be motivated to increase the rate of housing production rather than the size of individual units.

FIGURE 11: Rising share of apartment construction in Canada (includes condos)



Source: Statistics Canada, Table: 34-10-0126-01.

Possible factors of residential construction productivity

A wide range of potential causes of productivity in construction can be examined. However, the relative lack of historical research on the Canadian housing sector, combined with data limitations, requires a focused approach. To examine the factors with the greatest impact on sectoral efficiency, regional and historical data from across the provinces are used.

Our analysis of the data immediately reveals a failure of policy. There is a distinct lack of data specifically related to residential construction. Estimates of the industry's performance are only available since 1997 – insufficient time to evaluate how many past policies and technologies impacted its performance. Crucial information, such as the industry's technology adoption, is simply missing. Without such data, governments remain poorly informed on their policy choices, and the industry's performance suffers as a result.

Standard economic models suggest that productivity growth is fuelled by three primary sources: capital (investments in machinery and technology), the workforce (labour quality and skill levels), and the "intangibles" (how effectively labour and capital are combined through better management and new building techniques). Identifying which of these levers is underperforming or missing is essential to devising policies that can successfully increase housing supply.

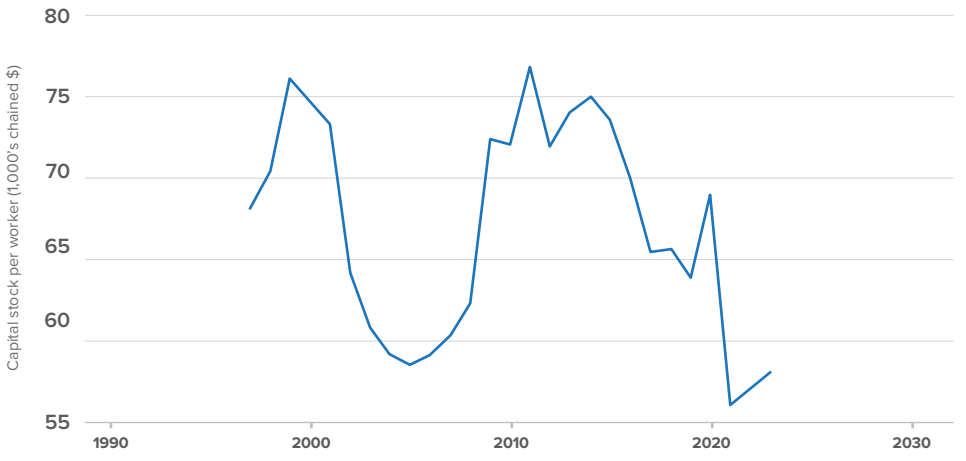
The primary measure used here for the sector's *capital deepening* is the capital-to-labour ratio. This ratio, also named "capital intensity," reflects the

balance between labour and equipment, tools, and machinery in the production process. Changes in capital arise from either its quality (technological advancement) or its quantity (additional equipment). Because measuring quality with historical data is difficult, the capital-to-labour ratio is used as a proxy for investment levels. A rising ratio indicates that construction is becoming more mechanized and less labour-dependent. Theoretically, this shift should drive productivity gains by replacing manual tasks with more scalable and efficient capital (machinery).

Figure 12 illustrates capital intensity at the aggregate level for the construction industry, suggesting an overall decline over time. This implies that the relative increase in labour has surpassed the growth in capital investments in construction. The practical implication is likely that the industry's production process has become more labour-intensive. A less "mechanized" production process will likely also be a less efficient one. Figure 12 also highlights the cyclical nature of construction. Boom periods, such as the lead-up to 2008, rely more heavily on labour-intensive processes, while subsequent cooldowns shift the mix of labour and capital.

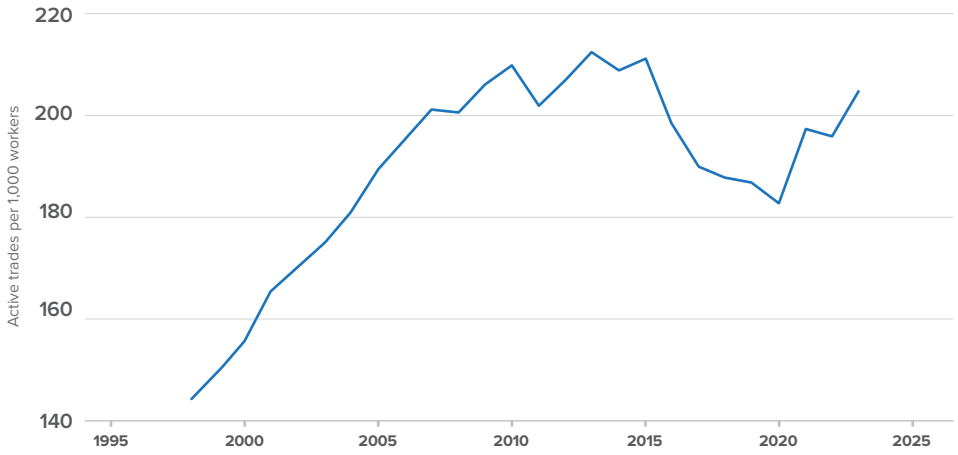
The educational qualifications of the workforce can serve as a proxy for labour quality. Typically, a more highly educated workforce is expected to demonstrate greater proficiency in utilizing technology, manage complex tasks more efficiently, and possess other skills associated with productivity

FIGURE 12: Capital intensity, capital per worker



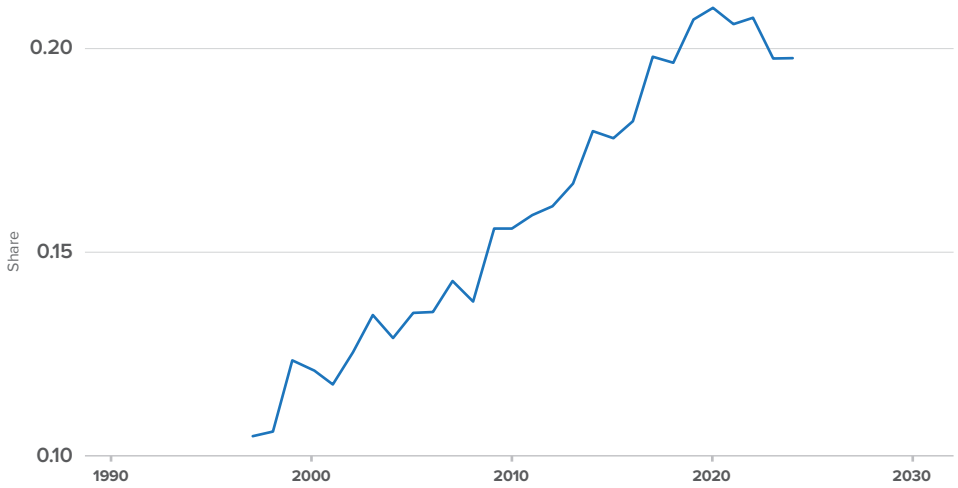
Source: Statistics Canada, Tables: 36-10-0480-01, 36-10-0096-01.

FIGURE 13: Share of new certified trades in the construction labour force



Source: Statistics Canada, Table: 14-10-0023-01, Table: 37-10-0219-01.

FIGURE 14: Share of construction workers 55 years or older



Source: SStatistics Canada, Table: 14-10-0023-01.

enhancements. **Figure 13** suggests that a slight increase in the participation rate of trades-specific education, relative to the construction workforce. This trend continued until the Great Recession. However, since 2014, the participation rate has declined.

An aging workforce may be associated with sluggish productivity in housing; this is tested in the data below. **Figure 14** illustrates the rise in the proportion of the construction workforce aged 55 or older. This trend aligns

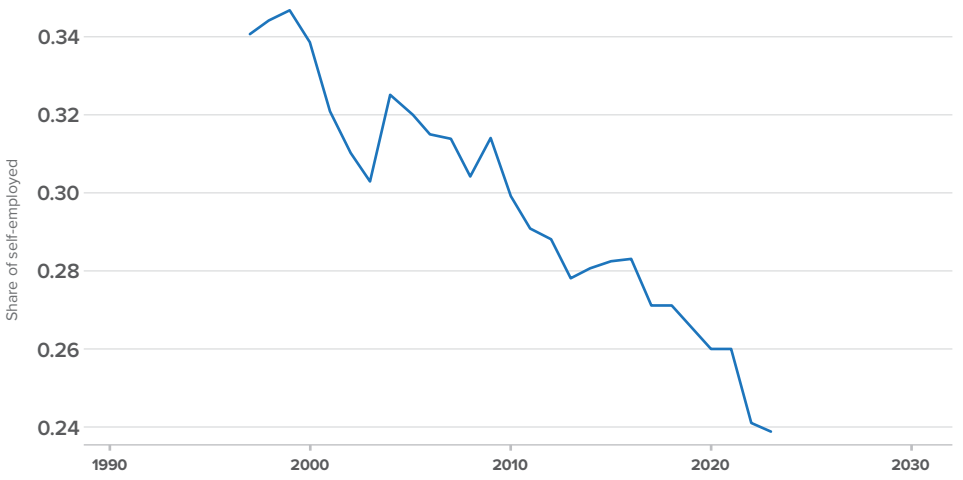
with demographic patterns observed in other sectors of the economy. Notably, a reversal of this trend is observed around the start of COVID-19, when the share of older workers began to decrease, likely due to a substantial number of employees opting for early retirement during the initial stages of the pandemic.

The discussion on housing productivity, along with previous research, indicates that industry fragmentation may contribute to the residential sector's productivity gap. The ratio of self-employed to employed workers can act as an indicator of industry fragmentation, with a higher ratio suggesting more self-employed firms and thus greater fragmentation. Notably, data show a decline in the proportion of self-employed construction workers since 1997 (see **Figure 15**). Despite this decrease, nearly 25 per cent of the workforce remains self-employed, suggesting that the industry remains highly fragmented.

Recent research claims that red tape hampers the efficiency of housing production. Builders must allocate resources to meet regulatory requirements, and differing laws across municipalities limit their scale. However, it is important to recognize that not all regulations affect productivity equally. Some can enhance it by boosting transparency for buyers or encouraging technological innovation. Therefore, investigating the impact of regulations on housing construction productivity through data remains valuable.

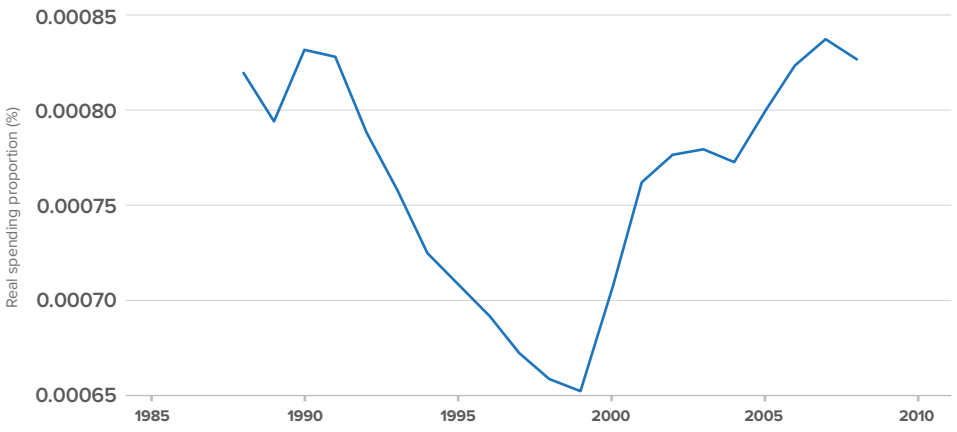
A readily available variable to measure the industry's regulatory burden is missing in Canada. To overcome this, a novel method is deployed to estimate

FIGURE 15: Share of self-employed workers in construction



Source: Statistics Canada, Table: 14-10-0026-01.

FIGURE 16: Regulatory intensity in residential construction



Source: Statistics Canada, Tables: 10-10-0061-01, 36-10-0677-06.

the "regulatory cost" by analyzing municipal and provincial spending on land-use enforcement relative to the region's overall housing stock. The reasoning is simple: if regulations remain constant, enforcement costs should increase proportionally with housing supply. Conversely, if enforcement expenditure grows significantly faster than the number of homes, it indicates a more complex and demanding regulatory environment. The expenditure-to-inventory ratio proxies the administrative burden on the industry and quantifies the productivity costs associated with regulation.

The analysis, however, is once again limited by insufficient public data on the industry. The series that examines local government spending by enforcement activity ends in 2009. This gap in the data is not merely a technical issue; it obscures policy evaluations related to spending and enforcement. Consequently, **Figure 16** reveals a V-shaped trajectory in regulatory complexity. The initial decline reflects a decade of budgetary retrenchment, where enforcement resources lagged a growing housing stock. This trend reversed sharply at the turn of the millennium as systemic failures led to a surge in construction oversight. While intensity moderated slightly during the Great Recession's administrative lag, the underlying trend suggests that regulatory burdens have consistently escalated since 1999.

Statistical models and estimation

As discussed earlier, data scarcity is a defining feature of the Canadian residential construction landscape. Unlike the manufacturing or retail sectors, where detailed performance measures are abundant, the construction industry data suffers from significant shortfalls. Consequently, the quantitative results presented should be viewed as preliminary and suggestive, corroborating the qualitative insights from the review of existing research and evidence.

The dataset comprises housing and other metrics for Canadian provinces starting from 1997. Using statistical estimation algorithms commonly applied to longitudinal data, the analysis tests the statistical association of measured factors and productivity. Given the measurement challenges discussed previously, a multi-measure approach is used, modelling productivity through two distinct lenses:

1. Physical Output: Dwelling completions per worker (Table 1).
2. Economic Value: Real value added per labour hour (Table 2).

This dual approach allows for isolating trends that persist regardless of how productivity is defined. The empirical results are documented in Tables 1 and 2 in the Appendix.

The primacy of capital intensity

Across all specifications and both productivity measures, one driver stood out as a robust predictor of improved productivity: the capital-to-labour ratio. This ratio effectively measures how well-equipped workers are with machinery and technology; it was the single most consistent predictor of productivity growth. Whether measuring the physical number of homes built (Table 1) or the economic value generated (Table 2), investing in mechanization and moving away from purely manual methods yields robust efficiency gains. A lack of industry-specific data means the capital stock reflects the entire construction sector rather than just residential construction. Note, however, that this means our measure likely underestimates the level and importance of capital intensity in the sector.

Workforce demographics and skills

Empirical estimates suggest that labour composition plays a critical role, though the specific impacts depend on the measure used.

An aging workforce: When measuring physical output, an aging workforce is consistently, but weakly, negatively related to productivity. The association between the workforce's age and its efficiency doesn't appear to be straightforward. On one hand, experience and skill are invaluable for any production process. However, if the production process is becoming more labour-intensive, an aging workforce may act as a drag on the sheer volume of completions.

The value of education: The impact of skilled labour revealed an important distinction between speed and value. When measuring physical output (homes per worker), education levels did not have a significant impact. However, when measuring economic value added (Table 2 in the appendix), a higher share of trained workers was associated with higher productivity across all estimations. This suggests that while education may not speed up the physical pouring of concrete, it likely contributes to higher-value, higher-quality output.

Industry fragmentation: Our results indicate that the association between industry fragmentation and productivity remains unclear. It's likely that the data is simply insufficient to find such an effect. Moreover, fragmentation may not be an issue in and of itself. Instead, a lack of technology adoption, and capital investment may come as a result of low agglomeration, in turn hampering productivity.

Land costs and the regulatory costs

The economic environment yielded divergent results, highlighting the sensitivity of these variables, and the difficulty of accurately measuring them. Land prices and our regulatory proxy, did not yield a consistent relationship in our estimations. Data limitations aside, this does not imply that residential productivity is not influenced by regulatory intensity. Regulation and government involvement, more generally, permeate all the factors discussed. Policy affects choices of capital investment, firm size, and trades participation substantially – whose importance is corroborated in our results. The estimated results instead likely indicate the difficulty of quantifying regulatory complexity with current data.

Summary of empirical trends

While constrained by the availability of detailed and more frequently reported data on residential productivity and economic variables that may influence it, these results strongly point in one direction: capital deepening is the most

consistent and corroborated path to productivity. An aging workforce is ambiguously related to productivity in our estimations. The effect of education is nuanced; a more educated workforce seems to improve the efficiency with which higher-quality homes are built, rather than the sheer volume of homes. A key finding of the empirical analysis is that Canada lacks relevant and timely data on residential housing productivity. This issue is pressing; smart, data-driven policy requires high-quality and frequently captured data. Without such data, targeted interventions to devise policies to increase residential-sector productivity will remain elusive.

Recommendations and conclusions

The importance of an efficient residential construction sector can't be overstated. If the government is to meet its ambitious housing construction targets and address the housing crisis more generally, throwing more resources at the problem will simply not suffice.

Determining trends in residential construction productivity is heavily influenced by both the choice of metrics (or proxies) and the statistical methods employed to estimate relationships. The complexities of measuring productivity in the residential construction sector are significant. An earlier report by the Canada Mortgage and Housing Corporation (CMHC) suggested a decline in productivity, as measured by housing completions per worker, a finding supported by the analysis reported here. However, detailed analysis shows that productivity metrics are far more nuanced, and depending on the measure used, conflicting conclusions may result.

Measuring productivity solely as completions per worker over time overlooks important shifts in dwelling characteristics. Housing units today are typically larger, with more amenities, and are subject to greater design variation. Construction processes have also become more complex due to increasingly stringent building codes governing safety, environmental sustainability, and performance standards. As such, productivity, measured by units produced per worker, has declined over time. Whereas productivity,

when measured as real value added rather than by simple unit counts, leads to a more improved picture. Specifically, when real value added in residential construction is normalized by labour hours worked, the sector exhibits productivity growth rather than decline.

Previously published research has also highlighted persistent challenges in construction productivity measurement, including the role of the underground economy, changes in dwelling size and quality over time, difficulties in constructing appropriate deflators (factors to control for inflation and other time-varying residential sector characteristics), and the impact of cyclical fluctuations. These issues underscore the risks of relying on simplistic proxies, which may lead to contradictory or limited-scope conclusions about long-run trends.

Our statistical analysis identifies a key trend: greater capital intensity is robustly associated with significantly higher productivity. Such a shift points toward the industrialization of homebuilding, where prefabrication and modular construction are likely to play an increasingly important role. A trades-educated workforce is also associated with higher value-added productivity, suggesting it will play an important role in meeting the increasingly complex technical requirements of modern homes. Moreover, a highly fragmented industry will be unlikely to take up the investments necessary to industrialize residential construction. While not an impediment in and of itself, firm size can constrain deployment of capital, and the mechanization of the production process.

Our recommendations are based on the empirical analysis and reviewed research, such as the McKinsey Global Institute's report on construction productivity. The data corroborate this direction: across all specifications and both productivity measures, a higher capital-to-labour ratio is consistently and significantly associated with higher productivity. The data also point to the value of trades training: a higher share of trades-trained workers is associated with greater value-added productivity, suggesting that investments in apprenticeships and skilled trades education would support and compound the gains from capital investment. Mass housing production would involve shifting away from highly customized designs towards standardized designs, off-site modular construction, and on-site assembly of prefabricated components. The transition would require significant changes in design practices, transportation logistics, and on-site assembly methods.

These recommendations are particularly relevant to Canada, as the federal government has recently launched a new agency, Build Canada Homes (2025), with a mandate that includes investing in prefabricated modular construction. However, several barriers to adopting such mass-production methods include regulatory constraints, fragmented land ownership, and the complexities of brownfield development, which pose unique challenges compared to greenfield development.

To enhance productivity, prior research has advocated comprehensive reforms to regulatory and contractual frameworks. While the paper's regulatory proxy was constrained by data availability – limiting the ability to detect a statistical effect – the case for regulatory reform is well-supported in the broader literature. The intricacy of construction contracts, which integrate engineering and legal language, must be simplified. Furthermore, the approval process for standardized designs should be streamlined to allow the reuse of pre-approved designs without requiring additional approvals for each project. This approach aims to diminish delays and augment efficiency.

The procurement and supply chain processes also offer opportunities for improvement. Builders should be able to source materials from competitive markets and transport them efficiently, whether to the construction site or to off-site manufacturing facilities for modular production. Enhancements in on-site execution, through improved scheduling, sequencing, and resource allocation, could also lead to substantial productivity improvements. Artificial intelligence (AI) and advanced scheduling algorithms may be employed to optimize construction planning and execution, representing an opportunity for innovation in an industry that has traditionally shied away from innovation.

The construction industry must also embrace technological innovation. The aging workforce in construction presents both a challenge and an opportunity. As the industry modernizes, attracting young workers into the trades and residential construction will be imperative to meet growing challenges and keep up with technological innovation. AI and digital technologies can play a central role in improving logistics, scheduling, and other critical tasks.

MGI highlights several international examples of successful productivity interventions. For instance, Singapore has experimented with cross-laminated timber, while Japan has focused on land-assembly innovations that enable large-

scale development. These examples illustrate the potential for targeted reforms to significantly improve productivity in the construction sector.

These recommendations are particularly relevant in the Canadian context, where Canada aims to increase annual housing production from 250,000 to 400,000 units. Achieving this ambitious goal will require adopting many of the recommendations, particularly standardization, modular construction, and regulatory streamlining.

Canadian municipalities, including Brampton and Edmonton, have already begun experimenting with AI to streamline development application processes (City of Brampton 2024; City of Edmonton 2026). By leveraging these technologies, Canada could significantly reduce delays and improve construction productivity, particularly in the housing sector.

By adopting mass-production techniques, reforming regulatory processes, investing in research and development, and embracing technological innovations, the global construction industry could unlock US$1.6 trillion in additional economic value (MGI 2017). Implementing these recommendations is essential for Canada to meet the growing housing demand and support economic growth. The future success of the construction industry depends on its ability to transform into a more efficient, technology-driven sector capable of delivering the infrastructure and housing necessary for future generations.

Meeting the federal government's stated goal of building millions of additional new homes, in addition to those planned under a business-as-usual scenario, in the next decade will require more than incremental labour force growth. While supply-side barriers such as restrictive zoning, approval delays, and rising development charges remain significant, the residential construction sector must also confront its internal productivity challenge. The research suggests that improving productivity will depend on a combination of regulatory reform, technological adoption, firm consolidation, appropriate workforce training, and better measurement frameworks. Addressing these structural impediments will be critical if Canada is to meet its housing needs and avoid the productivity trap that has constrained construction industries across much of the developed world. MLI

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References

Abdel-Wahab, M., S.G. Ison, P. Bowen, G. Hazlehurst and A.R.J. Dainty. 2008. "Trends of skills and productivity in the UK construction industry." *Engineering, Construction and Architectural Management*, 15(4), 372-382. Available at https://doi.org/10.1108/09699980810886865.

Abdel-Wahab, M., and B. Vogl. 2011. "Trends of productivity growth in the construction industry across Europe, US and Japan." *Construction Management and Economics*, 29(6), 635–644. Available at https://www.tandfonline.com/doi/abs/10.1080/01446193.2011.573568.

Albouy, David, and Gabriel Ehrlich. 2018. "Housing productivity and the social cost of land-use restrictions." *Journal of Urban Economics*, Volume 107, 2018, Pages 101–120, ISSN 0094-1190. Available at https://www.sciencedirect.com/science/article/abs/pii/S0094119018300329.

Antunes, P., and L. Daly. 2024. "Cracking the productivity code: Charting a new path to prosperity." The Conference Board of Canada. Available at https://www.signal49.ca/product/cracking-the-productivity-code/.

Brox J.A., 1993. "Financial Capital and Productivity in Residential Construction." *Journal of Housing Economics*, Volume 3, Issue 1, 1993, Pages 1–15, ISSN 1051–1377. Available at https://doi.org/10.1006/jhec.1993.1001.

Buzzelli, M. 2001. "Firm Size Structure in North American Housebuilding: Persistent Deconcentration, 1945–98." *Environment and Planning A: Economy and Space*, 33(3), 533–550. Available at https://journals.sagepub.com/doi/10.1068/a33103.

Caranci, B., and J. Marple. 2024. "From bad to worse: Canada's productivity slowdown is everyone's problem." TD Economics, August 12. Available at https://economics.td.com/ca-productivity-bad-to-worse.

City of Brampton. 2024. "Building Permit AI Review." Accessed February 23, 2026. Available at https://www.brampton.ca/EN/City-Hall/AI-POC.

City of Edmonton. 2026. "Development Permitting Improvements." Accessed February 23, 2026. Available at https://www.edmonton.ca/business_economy/development-permitting-improvements.

D'Amico, L., E. Glaeser, J. Gyourko, W. Kerr, and G.A.M. Ponzetto. 2024. "Why has construction productivity stagnated? The role of land-use regulation" (No. w33188). National Bureau of Economic Research. Available at https://doi.org/10.3386/w33188.

Dozzi, S.P., and S.M. AbouRizk. 1993. "Productivity in Construction." National Research Council of Canada, Institute for Research in Construction, 1993. Available at https://web.mit.edu/parmstr/Public/NRCan/nrcc37001.pdf.

Goodrum, P.M., C.T. Haas, and R.W. Glover. 2002. "The divergence in aggregate and activity estimates of US construction productivity." *Construction Management and Economics*, 20(5), 415–423. Available at https://www.researchgate.net/publication/24077588_The_divergence_in_aggregate_and_activity_estimates_of_US_construction_productivity.

Goolsbee, A., and C. Syverson. 2023. *The strange and awful path of productivity in the U.S. construction sector* (BFI Working Paper No. 2023–04). Becker Friedman Institute, University of Chicago. Available at https://www.nber.org/papers/w30845.

Huang, A.L., R.E. Chapman, and D.T. Butry. 2009. *Metrics and tools for measuring construction productivity: Technical and empirical considerations* (NIST Special Publication 1101). U.S. Department of Commerce. Available at https://nvlpubs.nist.gov/nistpubs/SpecialPublications/NIST.SP.1101.pdf.

Laberge, M. 2024. *What is Canada's potential capacity for housing construction?* Canada Mortgage and Housing Corporation. Available at https://www.cmhc-schl.gc.ca/observer/2024/what-canada-potential-capacity-housing-construction.

Lovely, W., and S. Marion. 2024. *Canada's underlying productivity problem laid bare (again).* National Bank of Canada, Economics and Strategy. Available at https://www.nbc.ca/content/dam/bnc/taux-analyses/analyse-eco/mkt-view/market_view_241115b.pdf.

McKinsey Global Institute. 2017. *Reinventing construction: A route to higher productivity*. McKinsey & Company. Available at https://www.mckinsey.com/~/media/mckinsey/business%20functions/operations/our%20insights/reinventing%20construction%20through%20a%20productivity%20revolution/mgi-reinventing-construction-a-route-to-higher-productivity-full-report.pdf.

Page, I.C. 2010. *Construction industry productivity* (Study Report SR219). BRANZ. Available at https://www.branz.co.nz/pubs/research-reports/sr219/.

Peters, M. 2024. "America must rediscover its dynamism." Available at https://www.imf.org/en/publications/fandd/issues/2024/09/america-must-rediscover-its-dynamism-michael-peters.

Puddicombe, Michael. 2021. "Productivity in the US Housing Industry: Total Factor and Public Firms." *Engineering Project Organization Journal*, 10(1), 20. Available at https://www.researchgate.net/publication/349996013_Productivity_in_the_US_Housing_Industry_Total_Factor_and_Public_Firms.

Sharpe, A. 2001. "Productivity trends in the construction sector in Canada: A case of lagging technical progress." Centre for the Study of Living Standards. Available at: https://www.csls.ca/reports/cmhc-f.pdf

Sveikauskas L., S. Rowe, J.D. Mildenberger, J. Price, and A. Young. 2018. "Measuring productivity growth in construction," Monthly Labor Review, U.S. Bureau of Labor Statistics, January. Available https://eurekamag.com/research/099/073/099073014.php?srsltid=AfmBOooIqr7qZszcSB8XwOv-vq75Xt6OpKo6bM6uGNev7sOXDTO4vJJID.

Teicholz, P. 2013. "Labor-productivity declines in the construction industry: Causes and remedies." *AECbytes Viewpoint* (Issue 67), March 14. Available at https://www.aecbytes.com/viewpoint/2013/issue_67.html.

Appendix

The appendix presents the results from the longitudinal data (panel) estimation of the determinants of productivity. Two distinct proxies for productivity in the residential construction sector are analyzed. The first set of output estimates productivity as the real value added per labour hour worked (Fischer-chained, 2017$).

The analysis employs a longitudinal (panel) dataset comprising the Canadian provinces, observed annually from 1997 to 2024. The panel structure accounts for both temporal and cross-sectional variation in residential construction productivity while controlling for unobserved *heterogeneity* across provinces. The dependent variable is labour productivity in residential construction, denoted $labprod_{it}$, where i indexes the province and t indexes the year.

The explanatory variables are measured annually for each province and include the capital-labour ratio, land price index, proportion of self-employed workers, trades participation rate, and an index of municipal regulatory intensity. The model evaluates how variation in these determinants is associated with changes in productivity over time.

The baseline specification is written as:

$$labprod_{it} = \alpha + \beta_1 X_{1,it} + \beta_2 X_{2,it} + \cdots + \beta_k X_{k,it} + \mu_i + \lambda_t + \varepsilon_{it},$$

where $X_{k,it}$ represents the k-th explanatory variable for the province i in year t. The term μ_i captures time-invariant unobserved heterogeneity across provinces, while λ_t controls for common year-specific shocks affecting all provinces. The idiosyncratic error term is denoted by ε_{it}.

Depending on the assumptions regarding the correlation between the unobserved effects and the explanatory variables, the model may be estimated using either a fixed effects estimator:

$$labprod_{it} = \alpha_i + \beta_1 X_{1,it} + \cdots + \beta_k X_{k,it} + \lambda_t + \varepsilon_{it},$$

where α_i varies across provinces, or a random effects estimator:

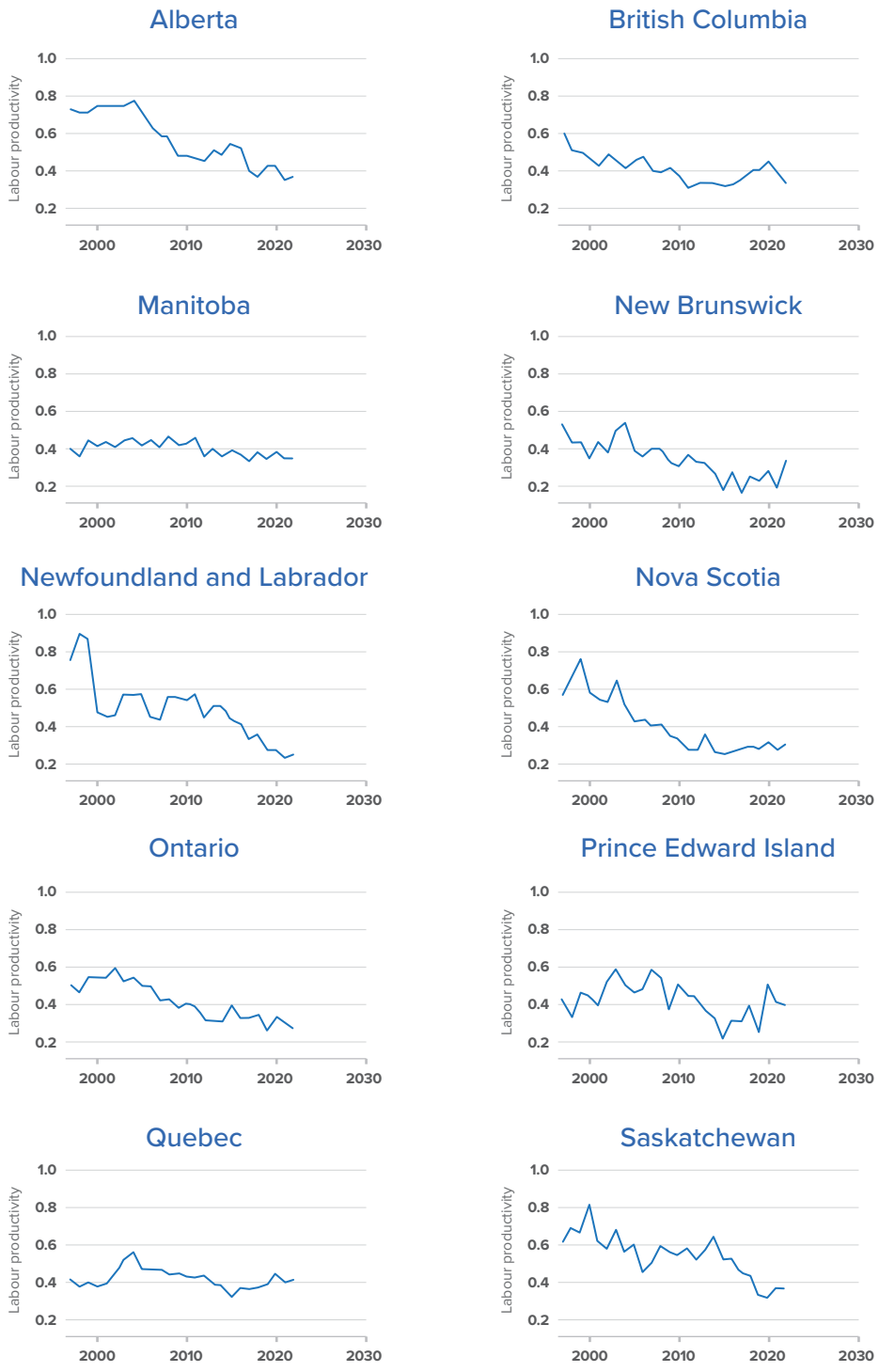
$$labprod_{it} = \alpha + \beta_1 X_{1,it} + \cdots + \beta_k X_{k,it} + \mu_i + \lambda_t + \varepsilon_{it},$$

where μ_i is assumed to be uncorrelated with the explanatory variables.

The panel dataset thus enables an assessment of both within-province (temporal) and between-province (cross-sectional) variation, providing a strong framework for analyzing the drivers of productivity in residential construction across Canada. Our econometric estimates span an effective period of 1997 to 2007, since the regulatory dataset ends in 2009, and we omit the Great Recession period to control for cyclicality.

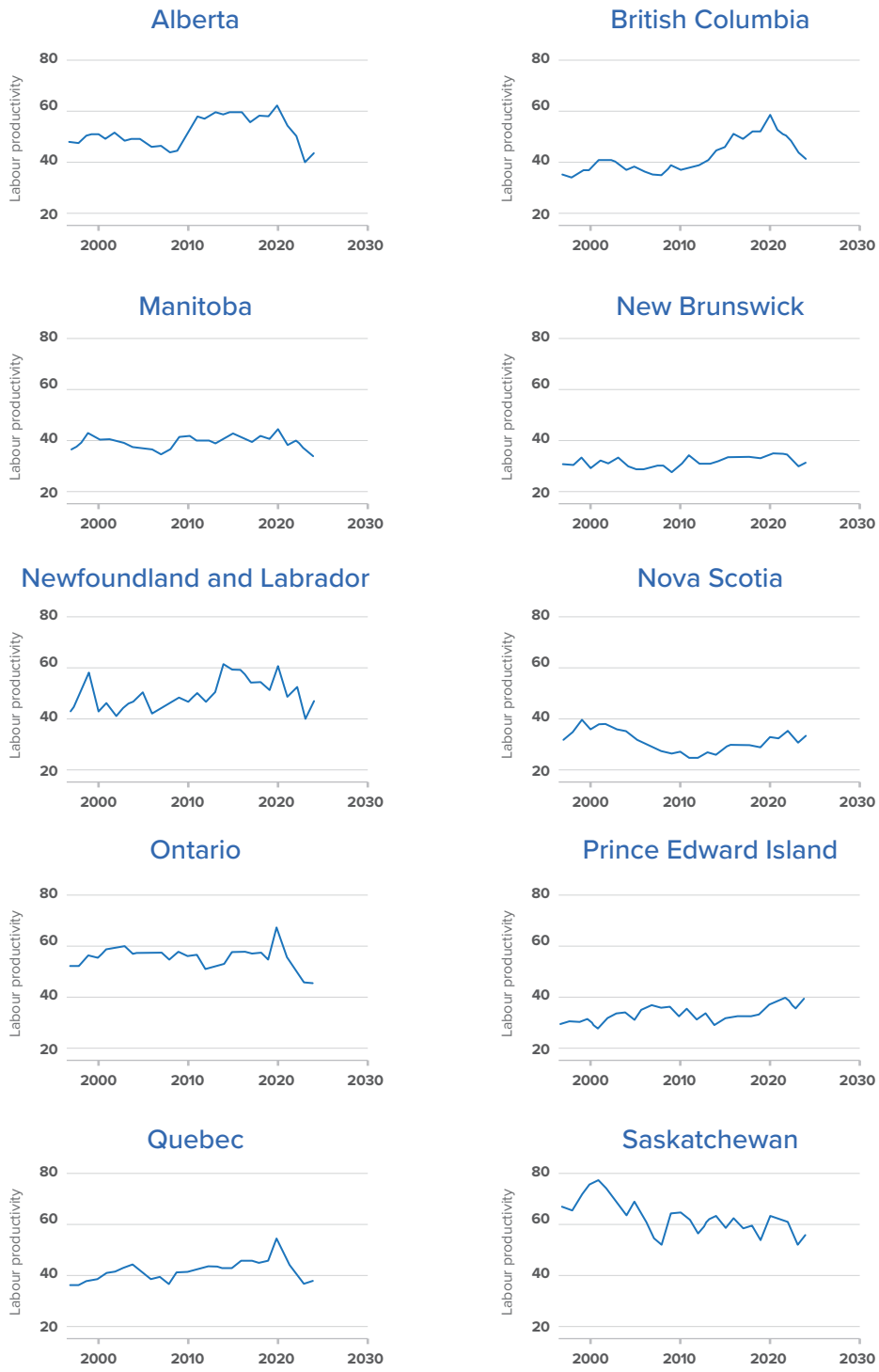
Figure 17 presents a graphical display of labour productivity, measured in units completed per worker. Note the slight variations in productivity trends across the provinces. Yet the overall trend reflects a downward-sloping curve, suggesting a decline in productivity. In contrast, **Figure 18** presents a different picture of productivity in residential construction, plotting real value added per hour worked. Here, the productivity metrics are either stable over time or show a slight increase. MLI

FIGURE 17: Number of dwellings completed per worker as a proxy for labour productivity.



Source: Statistics Canada, Table: 36-10-0480-01, Table: 34-10-0126-01.

FIGURE 18: Real value added per labour hour worked.



Source: Statistics Canada, Table: 36-10-0480-01.

Output from panel data econometric estimations

TABLE 1: Regression results: Residential construction productivity (output per worker)

Variable	(1) GLS–CRE	(2) GLS– Random effects	(3) GLS–MLE	(4) Fixed effects
Capital-labour ratio	0.00265*** (4.39)	0.0144** (2.57)	0.00250*** (4.98)	0.00265*** (4.39)
Land price	-0.00298 (-0.12)	-0.000567 (-0.43)	-0.000539 (-0.33)	-0.000298 (-0.12)
Proportion of self-employed	0.0388 (0.10)	-0,277 (-1.15)	-0.0979 (-0.32)	0.0388 (0.10)
Trades participation rate	-0.000395 (-1.27)	0.000384 (1.54)	-0.000178 (-0.70)	-0.000395 (-1.27)
Regulatory proxy (municipal only)	60.46 (0.92)	4.167 (0.07)	58.93 (1.10)	60.46 (0.92)
Share of workers 55+	-0.839 (-1.40)	-2.615*** (-3.81)	-0.993** (-1.99)	-0.839 (-1.40)
Constant	0.323 (0.81)	0.790*** (4.56)	0.492*** (3.27)	0.437** (2.38)
Observations	81	81	81	81

*Notes: This table presents GLS estimates using correlated random effects (CRE), random effects, fixed effects, and maximum-likelihood specifications (MLE). Our sample is restricted from 1997 to 2009, due to lack of data for our regulatory proxy. T-statistics are reported in parentheses. Significance stars are as follows: *p<0.10; **p<0.05; ***p<0.01.*

TABLE 2: Regression results: Residential construction productivity (value added per hour)

Variable	(1) GLS–CRE	(2) GLS– Random effects	(3) GLS–MLE	(4) Fixed effects
Capital-labour ratio	0.162*** (10.26)	0.320*** (8.76)	0.164*** (11.87)	0.162*** (10.26)
Land price	-0.0518 (-0.80)	0.312*** (3.62)	-0.0547 (-1.01)	-0.0518 (-0.80)
Proportion of self-employed	3.464 (0.34)	66.73*** (4.26)	5.058 (0.56)	3.464 (0.34)
Trades participation rate	0.0192** (2.36)	0.0898*** (5.53)	0.0207*** (2.94)	-0.0192** (2.36)
Regulatory proxy (municipal only)	1038.4 (0.60)	-13253.2*** (-3.28)	952.6 (0.64)	1038.4 (0.60)
Share of workers 55+	-19.06 (-1.21)	-153.7*** (-3.43)	-21.29 (-1.55)	-19.06 (-1.21)
Constant	-67.49*** (-6.49)	-11.20 (-0.99)	26.65*** (5.44)	28.75*** (6.00)
Observations	81	81	81	81

*Notes: This table presents GLS regression estimates using correlated random effects (CRE), random effects, fixed effects, and maximum-likelihood specifications. Our sample is restricted from 1997 to 2009, due to lack of data for our regulatory proxy. T-statistics are reported in parentheses. Significance stars are as follows: *p<0.10; **p<0.05; ***p<0.0*

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