Does Emissions Pricing Hurt Affordability? Quantifying the Effects on Canadian Households

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TOWARD A MORE EQUITABLE CANADA

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KEY FINDINGS

This report investigates the effects of emissions pricing, such as the federal fuel charge or B.C. carbon tax. It focuses on how these policies impact households differently based on their income levels, regions and family types. The analysis is set against the backdrop of rising inflation, particularly between June 2021 and June 2022, when consumer prices rose sharply. One of the key concerns we address is whether emissions pricing significantly contributes to overall cost increases and how government measures, such as rebates, can help ease the financial burden on households.¹

Using detailed historical data, we find that emissions pricing has had a minimal impact on inflation. Contrary to common perceptions, we show that these policies (and all other indirect taxes embedded within items consumers purchase) contributed only about a 0.5 per cent overall increase in consumer prices since 2019 — accounting for a small fraction of the more than 19 per cent increase in such prices over that period. Most of the price increases were driven by global factors, such as surging energy prices and disruptions in supply chains, rather than domestic climate policies. Thus, while emissions pricing does influence costs, its role in driving inflation is relatively small compared to other economic pressures.

Importantly, we highlight the effectiveness of government rebates in offsetting costs for most Canadian households. With the federal Canada Carbon Rebate, households receive quarterly payments that often exceed the additional expense caused by the emissions price. This means that many families, particularly those with lower incomes, are shielded from the negative financial impact of emissions pricing and some may end up with a net financial gain. In provinces covered by the federal pricing system, the rebates generally compensate for the fuel charge, ensuring that most Canadians do not face significant out-of-pocket costs due to climate policy.

The impact of emissions pricing varies significantly across regions and household types. Provinces such as Saskatchewan, which rely heavily on fossil fuels, experience higher costs compared to provinces like Quebec, where low-emission renewable energy plays a predominant role in electricity generation. Additionally, lower-income households and families with children tend to spend a greater share of their income on essentials, making them more vulnerable to price increases. However, these groups also tend to benefit the most from the federal government's rebate system, which helps reduce the financial strain they might otherwise face due to climate-policy-induced rising energy costs.

While emissions pricing directly affects energy costs, it also has indirect effects on other goods and services. Since many sectors rely on energy, the increased costs can ripple through supply chains, affecting the prices of items such as food and household goods. However, we find that these indirect effects are relatively modest, particularly in

¹ The analysis presented here uses Statistics Canada's Social Policy Simulation Database and Model version 30.0.2 and 30.1. The assumptions and calculations underlying the simulation results were prepared by the authors ors and the responsibility for the use and interpretation of these data is entirely that of the authors.

comparison to other inflationary pressures. For example, the rising global price of oil has had a far greater impact on overall costs than domestic emissions pricing policies.

One of the factors that influences how emissions pricing affects households is regional energy use. Provinces vary significantly in their energy consumption patterns and the types of energy they rely on, which in turn affects the financial burden placed on households. For example, provinces like Alberta, which heavily depend on natural gas for heating, experience higher costs due to emissions pricing than provinces that rely more on renewable energy sources. We also find that policy design, such as emissions pricing systems for large industrial emitters, helps prevent these increased costs from being fully passed on to consumers, further mitigating the overall impact on households.

The results in this report underscore the importance of designing climate policies that protect vulnerable households. Through rebates and credits, lower-income households can be shielded from the potentially regressive effects of emissions pricing, ensuring that these policies do not disproportionately harm those who are least able to afford higher costs. In this way, climate policies can be crafted to both reduce emissions and maintain affordability for Canadian families.

Another valuable contribution of this report is that it carefully walks the reader through the steps involved in estimating the effect of emissions pricing on the price of goods and services. By breaking down these steps in a methodical and transparent way, we help clear up common misconceptions that have surfaced in the public debate on emissions pricing. Many people believe that emissions pricing drives up the cost of living significantly, but this detailed explanation shows that the reality is more nuanced. By guiding readers through how regional differences, policy designs, and consumption patterns interact, we provide clarity on a complex topic, helping policymakers and the public to better understand the true impact of emissions pricing. Moreover, the results presented here likely overestimate the short-term costs of emissions pricing, as the resulting behavioural changes that households may adopt (such as shifting to more energy-efficient appliances, better home insulation, adopting heat pumps, increased use of public transit and more) lower the overall impact of emissions pricing on household budgets.

Finally, while climate action has upfront costs, there are long-term benefits. Reducing emissions now helps avoid the more severe economic and environmental consequences of unchecked climate change. Although there are short-term costs associated with these policies, they are necessary investments to prevent greater financial strain on households and the broader economy in the future.

Overall, we show that emissions pricing has a relatively small impact on inflation and affordability when viewed in the context of broader economic factors. The use of government rebates plays a crucial role in offsetting costs for most households, ensuring that climate policies do not create undue financial burden. By carefully explaining the steps behind estimating the effects of emissions pricing, we contribute to a clearer and more informed public debate. Through thoughtful policy design, we demonstrate that Canada can address climate change while still maintaining affordability for its citizens.

Federal, provincial and territorial governments could further improve public understanding of the impact of emissions pricing with transparent analysis of its effects on households across incomes, regions, family size and more. And where there are gaps in support, governments can adjust or introduce new policies. British Columbia, for example, could adopt a rebate approach similar to the federal government in order to ensure that more households receive more than they pay in carbon tax.

The analysis also highlights affordability challenges that are not linked to climate policies. The slow pace of income growth is eroding the purchasing power of many households and causing them to lose ground.

Thoughtful policy adjustments, along with a stronger policy focus on income growth, would allow governments to pursue climate goals without compromising affordability for Canadian households.

FAITS SAILLANTS

Ce rapport étudie les effets de la tarification des émissions, comme la redevance fédérale sur les combustibles et la taxe carbone de la Colombie-Britannique. Il se penche sur l'impact de ces politiques sur les ménages en fonction de leur niveau de revenu, de leur région et de leur type de famille. L'analyse s'inscrit dans un contexte de hausse de l'inflation, en particulier entre juin 2021 et juin 2022, lorsque les prix à la consommation ont fortement augmenté. L'une des principales questions abordées est de savoir si la tarification des émissions contribue de manière significative à l'augmentation globale des coûts et comment les mesures gouvernementales, telles que les remises, peuvent contribuer à alléger le fardeau financier des ménages¹.

En utilisant des données historiques détaillées, nous constatons que la tarification des émissions a eu un impact minime sur l'inflation. Contrairement aux idées reçues, nous montrons que ces politiques (et toutes les autres taxes indirectes intégrées dans les produits achetés par les consommateurs) n'ont contribué qu'à une augmentation globale d'environ 0,5 % des prix à la consommation depuis 2019, ce qui ne représente qu'une petite fraction de l'augmentation de plus de 19 % de ces prix au cours de cette période. La plupart des augmentations de prix sont dues à des facteurs mondiaux, tels que la flambée des prix de l'énergie et les perturbations des chaînes d'approvisionnement, plutôt qu'à des politiques climatiques nationales. Ainsi, si la tarification des émissions influe sur les coûts, son rôle dans l'inflation est relativement faible par rapport à d'autres pressions économiques.

Il est important de souligner l'efficacité des remises gouvernementales pour compenser les coûts pour la plupart des ménages canadiens. Grâce à la Remise canadienne sur le carbone, les ménages reçoivent des paiements trimestriels qui dépassent souvent les dépenses supplémentaires engendrées par le prix des émissions. Cela signifie que de nombreuses familles, en particulier celles à faible revenu, sont protégées de l'impact financier négatif de la tarification des émissions et que certaines d'entre elles peuvent même bénéficier d'un gain financier net. Dans les provinces couvertes par le système fédéral de tarification, les remises compensent généralement la taxe sur les carburants, ce qui garantit que la plupart des Canadiens n'ont pas à payer de frais importants en raison de la politique climatique.

L'impact de la tarification des émissions varie considérablement d'une région à l'autre et d'un type de ménage à l'autre. Les provinces comme la Saskatchewan, qui dépendent fortement des combustibles fossiles, connaissent des coûts plus élevés que des provinces comme le Québec, où les énergies renouvelables à faibles émissions contribuent de manière prédominante dans la production d'électricité. En outre, les ménages à faible revenu et les familles avec enfants ont tendance à consacrer une plus grande part de leur revenu aux produits de première nécessité, ce qui les rend plus vulnérables aux

¹ La présente analyse se sert des versions 30.0.2 et 20.1 de la Base de données et Modèle de simulation de politiques sociales de Statistique Canada. Les hypothèses et les calculs qui sous-tendent les résultats de la simulation ont été préparés par les auteurs et la responsabilité de l'utilisation et de l'interprétation de ces sdonnées incombe entièrement aux auteurs.

augmentations de prix. Cependant, ces groupes ont également tendance à bénéficier le plus du système de remboursement du gouvernement fédéral, qui contribue à réduire la pression financière qu'ils pourraient autrement subir en raison de l'augmentation des coûts de l'énergie induite par les politiques climatiques.

Si la tarification des émissions a une incidence directe sur les coûts de l'énergie, elle a également des effets indirects sur d'autres biens et services. Étant donné que de nombreux secteurs dépendent des prix de l'énergie, l'augmentation des coûts peut se répercuter sur les chaînes d'approvisionnement et affecter les prix d'articles tels que les denrées alimentaires et les biens ménagers. Toutefois, nous constatons que ces effets indirects sont relativement modestes, en particulier par rapport à d'autres pressions inflationnistes. Par exemple, l'augmentation du prix mondial du pétrole a eu un impact bien plus important sur les coûts globaux que les politiques nationales de tarification des émissions.

L'un des facteurs qui influencent la manière dont la tarification des émissions affecte les ménages est la consommation régionale d'énergie. Les habitudes de consommation d'énergie et les types d'énergie utilisés varient grandement d'une province à l'autre, ce qui a une incidence sur la charge financière imposée aux ménages. Par exemple, des provinces comme l'Alberta, qui dépendent fortement du gaz naturel pour le chauffage, connaissent des coûts plus élevés en raison de la tarification des émissions que les provinces qui s'appuient davantage sur les sources d'énergie renouvelables. Nous constatons également que la conception des politiques, telles que les systèmes de tarification des émissions pour les grands émetteurs industriels, permet d'éviter que ces coûts accrus ne soient entièrement répercutés sur les consommateurs, ce qui atténue encore l'impact global sur les ménages.

Les résultats de ce rapport soulignent l'importance de concevoir des politiques climatiques qui protègent les ménages vulnérables. Grâce aux remises et aux crédits, les ménages à faible revenu peuvent être protégés des effets potentiellement régressifs de la tarification des émissions, ce qui garantit que ces politiques ne nuisent pas de manière disproportionnée à ceux qui sont le moins en mesure de supporter des coûts plus élevés. De cette manière, les politiques climatiques peuvent être conçues pour réduire les émissions et maintenir l'accessibilité financière pour les familles canadiennes.

Ce rapport apporte une autre précieuse contribution en guidant soigneusement le lecteur à travers les étapes de l'estimation de l'effet de la tarification des émissions sur le prix des biens et des services. En décomposant ces étapes de manière méthodique et transparente, nous contribuons à dissiper les malentendus courants qui sont apparus dans le débat public sur la tarification des émissions. Nombreux sont ceux qui pensent que la tarification des émissions entraîne une hausse significative du coût de la vie, mais cette explication détaillée montre que la réalité est plus nuancée. En guidant les lecteurs dans l'interaction entre les différences régionales, les conceptions des politiques et les modes de consommation, nous clarifions un sujet complexe et aidons les décideurs politiques et le public à mieux comprendre l'impact réel de la tarification des émissions. Qui plus est, les résultats présentés ici surestiment probablement les coûts à court terme de la tarification des émissions, car les ménages peuvent changer leurs habitudes ou prendre certaines décisions (comme utiliser des appareils plus écoénergétiques, mieux isoler leurs maisons, faire installer une thermopompe ou utiliser davantage les transports en commun, etc.) qui amoindrissent l'impact de la tarification des émissions sur leur budget.

Enfin, si l'action en faveur du climat a un coût initial, elle présente des avantages à long terme. Réduire les émissions aujourd'hui permet d'éviter les conséquences économiques et environnementales plus graves des changements climatiques non maîtrisés. Bien que ces politiques entraînent des coûts à court terme, il s'agit d'investissements nécessaires pour éviter que les ménages et l'économie dans son ensemble ne subissent des pressions financières plus importantes à l'avenir.

Dans l'ensemble, nous montrons que la tarification des émissions a un impact relativement faible sur l'inflation et l'abordabilité générale lorsqu'elle est considérée dans le contexte de facteurs économiques plus larges. L'utilisation de remises gouvernementales joue un rôle crucial dans la compensation des coûts pour la plupart des ménages, garantissant que les politiques climatiques ne créent pas de charge financière indue. En expliquant soigneusement les étapes de l'estimation des effets de la tarification des émissions, nous contribuons à un débat public plus clair et mieux informé. Grâce à une conception réfléchie des politiques, nous démontrons que le Canada peut lutter contre les changements climatiques tout en maintenant l'abordabilité pour ses citoyens.

Les gouvernements fédéral, provinciaux et territoriaux pourraient encore mieux faire comprendre au public l'impact de la tarification des émissions en procédant à une analyse transparente de ses effets sur les ménages en fonction des revenus, des régions, de la taille de la famille, etc. Et là où il y a des lacunes dans le soutien, les gouvernements peuvent ajuster ou introduire de nouvelles politiques. La Colombie-Britannique, par exemple, pourrait adopter une approche de remboursement similaire à celle du gouvernement fédéral afin de s'assurer que davantage de ménages reçoivent plus que ce qu'ils paient en taxe carbone.

L'analyse met également en évidence des problèmes d'abordabilité qui ne sont pas liés aux politiques climatiques. La lenteur de la croissance des revenus érode le pouvoir d'achat de nombreux ménages et leur fait perdre du terrain.

Des ajustements politiques réfléchis, ainsi qu'une politique davantage axée sur la croissance des revenus, permettraient aux gouvernements de poursuivre les objectifs climatiques sans compromettre l'abordabilité générale des biens et services pour les ménages canadiens.

INTRODUCTION

Rising inflation has put a financial strain on many Canadian households. Overall consumer prices increased by more than 8.1 per cent between June 2021 and June 2022, which was the highest rate seen in decades and the fastest acceleration in generations. Highly visible and essential items like food and fuel had particularly large price increases. At the same time, Canadian governments at federal, provincial and territorial levels increased the stringency of their climate policies. Many have raised concerns around the implications of climate policy for affordability (Arnold et al., 2020; Dolter & Winter, 2022; Samson, 2023), including numerous politicians (Levesque, 2022; Major, 2023a, 2023b; Taylor, 2024). This is not unique to Canada and affordability concerns are among the top-cited reasons for opposing such policies (Dabla-Norris et al., 2023). A central debate revolves around how emissions pricing and other climate policies increase energy and other costs, with some claiming these policies cause increases in energy poverty¹ or amplify inflation (Canada, House of Commons, 2023; Furey, 2023; Houston, 2022).

Public opinion surveys reflect this concern, showing a trend of increasing worry about energy prices and affordability tied to climate policy (Leger, 2023; Nanos, 2023). These concerns are long-standing (Coletto & Anderson, 2019) and are tied to broader concerns about the cost of living (Abacus Data, 2019). As an example, polling in March 2019 had 80 per cent of respondents attributing a cost of living and cost of gasoline increase to "the federal carbon tax" (Coletto & Anderson, 2019), before the policy came into effect on April 1, 2019. In March 2019, overall inflation was 1.9 per cent and food inflation was 3.6 per cent (Statistics Canada, 2019), though public opinion polling at the time shows major concerns about the cost of living and a clear perception that prices increased "a lot" (Abacus Data, 2019). This suggests that overall affordability and cost-of-living concerns may contribute to an over-emphasis on the role of climate policy in reducing affordability, exacerbated by recent and significant inflation. While there is growing research on the equity implications of climate policy in Canada — especially emissions pricing (Winter, 2024) — the precise and quantifiable effects of these policies on prices and affordability remain unclear.

In this paper, we explore how emissions pricing affects affordability. Our analysis shows that emissions pricing contributes minimally to overall inflation, accounting for approximately 0.2 percentage points of the year-over-year change in consumer prices, on average. The effect on food price increases is even smaller. While emissions pricing is the most significant change in taxes on goods and services, the collective effect of all such changes on overall price levels has been negligible. Specifically, we find that approximately 98 per cent of price increases since 2018 are due to factors other than tax changes, including the federal fuel charge. In addition, revenue recycling policies, such as the federal Canada Carbon Rebate and British Columbia's Climate Action Tax Credit, help offset these costs. We find that taxpayers in provinces under the federal pricing system generally receive quarterly rebates that exceed the costs associated with the fuel charge. Furthermore, the

¹ Energy poverty is not well defined (Brabo-Catala et al., 2024). A frequently used measure (in Canada and elsewhere) defines household energy poverty as when its energy expenditure is greater than 10 per cent of income. See Shaffer and Winter (2020) for a critique of this definition's use in Canada.

design of large-emitter pricing systems helps to reduce the indirect costs of emissions pricing on consumer prices, further lessening the financial burden on households.

Before proceeding to details, it's worth being clear about what affordability is. For many, the focus is only on price increases. This misses the importance and relevance of household income. We consider affordability to represent the real income of households, which reflects the purchasing power of the household's nominal income. Affordability can deteriorate if incomes decline or prices rise, or if incomes rise by a lower proportion than prices. Such a deterioration is a particular challenge for households with lower levels of income, as a larger fraction of their expenditures is already accounted for by necessities (Uppal, 2023).

Climate policies can affect affordability through several channels, influencing the price of transportation, housing, energy and more. These policies can either increase or decrease prices, depending on their design, implementation and regional context. For example, policies that levy explicit charges, such as emissions pricing, directly affect fossil fuel prices. Regulatory measures like clean fuel standards can increase prices by raising the costs for refineries to produce such fuels. Conversely, policies that promote renewable electricity sources, like wind, solar or hydro, can lead to lower (or sometimes higher) electricity prices (Borenstein et al., 2021; Dolter & Winter, 2022). Climate policy can also affect income levels, since revenues raised from policies like emissions pricing are often rebated to individuals in the form of cash transfers. Macroeconomic factors also play a role. Policies altering production and transportation systems can incur transition costs, potentially affecting productivity growth. This, in turn, can influence the overall economic growth rate and real income growth for Canadians. There are concerns that the significant capital investment required for the green transition might lead to higher interest rates, reducing investment in other sectors of the economy. There are also potential macroeconomic upsides, such as earning economic returns from emissions-reducing innovations.

This paper cannot address all these important issues, so we narrow the scope to what can be directly captured and explored using the latest available data. We specifically examine how climate policies in general, and emissions pricing in particular, influence the affordability of goods and services consumed by households. We estimate changes in the price of goods and service, and the effect of this on total household expenditures, and quantify these additional costs as a share of expenditure and income. Additionally, we quantify how these policy impacts vary across products, provinces, family types, income levels and more. Complementary policies — such as low-income rebates and the federal Canada Carbon Rebate — play a crucial role in alleviating any adverse effects on affordability. We therefore evaluate the effectiveness of these measures in addressing affordability concerns and identify existing barriers and gaps within these policies.

While the question is narrow, the task is complex. The number and type of climate policies vary substantially across Canada, by order of government, scope, instrument and coverage (Scott al., 2023; Scott et al., 2024). There are numerous examples of economy-wide and sector-specific policies aimed at reducing emissions through compliance measures (e.g., emissions pricing or the proposed federal Clean Electricity Regulations) and policies

designed to incent voluntary behavior by targeting specific technologies or projects (e.g., e-bike subsidies or tax credits). The net effect of these policies on households is ambiguous. For example, emissions pricing deliberately increases the prices of emissions-intensive items to incent behavioural change away from emissions-intensive goods and services. Complementary policies, such as rebates to increase incomes, may make households better off (Winter et al., 2023), particularly if households access subsidies for fuel-switching. Despite this complexity, it is possible to estimate the implications of many policies for consumer prices and household finances.

We begin with recent trends in Canada's consumer prices, focusing on the direct effect of price changes on affordability. We also explore whether climate policy has influenced Canada's inflation dynamics over the past two years. A significant portion of the inflation increase in 2022 stemmed from a global surge in energy prices. The price of West Texas Intermediate, a key North American oil benchmark, peaked at over US\$120 per barrel. There were also material increases in natural gas prices and other commodities, unrelated to Canadian climate policies. This rise in energy prices alone contributed 2.6 percentage points to the 8.1 per cent total increase in the Consumer Price Index (CPI) in June 2022 (Chen & Tombe, 2023). Subsequently, the sharp decrease in inflation was primarily driven by falling energy prices. By June 2023, inflation settled at 2.8 per cent, with approximately two-thirds of this reduction attributed to the drop in energy prices (oil stood around US\$70 per barrel by June 2023). The fluctuation in energy prices is crucial because energy is integral to the production of many goods and services. However, when evaluating climate policies such as emissions pricing, our analysis reveals that they contribute minimally to the overall change in consumer prices, accounting for roughly 0.2 percentage points in the year-over-year change. The effect of emissions pricing on food price increases is even smaller.

We organize our analysis of the effects of emissions pricing on affordability into four pillars: consumer spending patterns, price changes due to emissions pricing, gross policy costs and mitigating measures. We analyze household expenditure on essentials like energy, groceries and shelter, highlighting regional differences in energy use. We then quantify the direct and indirect effects of emissions pricing on consumer prices, presenting effective carbon tax rates for various goods and services. We find that the average gross household costs from emissions pricing vary significantly across provinces, ranging from \$536 in New Brunswick to \$1,156 in Saskatchewan. Differences in household expenditure patterns mean that the financial impact of emissions pricing also varies by income and family type. Lower-income households and families with children tend to face higher relative costs as a percentage of their income. Offsetting these costs are revenue recycling policies like the federal Canada Carbon Rebate and British Columbia's Climate Action Tax Credit. We find that taxpayers living in provinces covered by the federal pricing system tend to see lower costs associated with the fuel charge than the quarterly rebates they receive.

To be clear, our analysis includes emissions pricing payments and rebates but does not consider broader economic burdens or environmental benefits. Avoiding the most severe effects of climate change by lowering greenhouse gas emissions undeniably comes with costs for Canadians. There is, after all, no free lunch. While direct costs can pose visible and immediate challenges, they are not insurmountable and can often be compensated for through appropriate financial transfers. However, broader macroeconomic costs, such as slower economic growth rates or lower productivity, are more difficult to shield individuals from. That said, considering only the costs of climate action presents an incomplete picture. There are tangible benefits to climate action that should not be overlooked. Each tonne of emissions Canada avoids is associated with slightly lower environmental damages globally, translating into avoided climate damages and adaptation costs. Estimating these benefits in monetary terms is challenging, but recent federal estimates suggest they are around \$250 per tonne (Environment and Climate Change Canada, 2023a). Any policy capable of reducing emissions at a cost lower than this is generally an efficient policy to adopt.

We contribute to a growing literature on the effect of emissions pricing on household expenditures in Canada. Most of this research focuses on households' costs from emissions pricing and the distributional consequences, assuming no behavioural change and a counterfactual of no pricing. See, for example, Barrington-Leigh et al. (2015), Moffatt et al. (2020) and Winter et al. (2023), and Winter (2024) for a summary and critique. There is some work that incorporates general-equilibrium economic effects, including Dissou and Siddiqui (2014), Beck et al. (2015) and Sawyer (2018). Canada's parliamentary budget officer has also produced analysis of the effect on emissions pricing on households, including macroeconomic effects (Ammar 2019, 2020; Ammar et al. 2022; Ammar, et al., 2023), though it retracted the 2022 and 2023 reports due to modelling errors (Matier, 2024). As with our analysis, these analyses present the short-run mechanical effects of emissions pricing and distributional consequences. Here, we focus on the effects of emissions pricing on affordability, measured by the purchasing power of nominal incomes. Our approach is unique in the extant literature on the effects of emissions pricing.

WHY IS AFFORDABILITY A CONCERN?

Concerns around emissions pricing and its implications for affordability are not raised in isolation. While our analysis focuses on how climate policy interacts with and affects affordability, understanding Canada's recent inflation experience provides necessary and helpful context. The environment in which policymakers operate today is crucial for appreciating the challenges they face when addressing complex policy problems like climate change and voter concerns about cost of living. Therefore, we begin with a detailed examination of inflation and income dynamics in recent years.

Before turning to inflation, though, a brief note about the slow pace of average income growth is necessary. This may be more concerning over the long term than the rise in prices. It is also related to a growing, though distinct, concern among policymakers and the public about slowing productivity growth in Canada. This matters for incomes since labour productivity — the quantity of goods and services produced per hour of work — directly affects the growth of real hourly labour compensation. Since 2015, the pace of productivity and labour compensation per hour growth in Canada has slowed to an average of 0.2 per cent per year, significantly less than the roughly 1.5 per cent per year average of the previous two decades (Tombe, 2024). This exacerbates the impact households feel during periods of rapidly rising prices and suggests that, even as inflation returns to normal, focus and attention on affordability issues will remain high.

Inflation in Canada

The story of inflation's rise and fall in Canada is relatively straightforward. Most products tracked by Statistics Canada had rapid price increases through 2022, with just a few products accounting for most of the overall rise in inflation. Using methodology from Chen and Tombe (2023), we illustrate the contribution of selected items in figure 1. Global supply chain disruptions, especially for durable goods items that Canada disproportionately imports, were an important early contributor. This is evident in the contribution of vehicles and household furniture visible in figure 1. However, the major contributors to high inflation included energy, food and home-ownership costs, accounting for over 60 per cent of June 2022's peak inflation rate. Additionally, energy has large spillover effects on many goods and services. Chen and Tombe (2023) find that approximately 25 per cent of non-energy items within the Consumer Price Index are sensitive to oil prices, including transport, food, restaurant meals and durable goods.

Of course, Canada was not alone in seeing inflation rise to generational highs. Recent data from the Organisation for Economic Co-operation and Development (OECD) show that inflation peaked at an average rate of 10.7 per cent in October 2022 among all OECD countries. For the EU-27 countries, inflation peaked at an even higher rate of 11.5 per cent



Figure 1. Contribution of selected products to Canada's inflation rate, January 2017 to April 2024

Source: Authors' calculations based on Statistics Canada Tables 18-10-0007 and 18-10-0004; method from Chen and Tombe (2023).

Note: Displays the contribution of selected items to Canada's overall year-over-year change in consumer prices.

that month.² The underlying causes of these inflation increases were similar to Canada's, with energy price increases contributing significantly across the OECD. Domestic policy changes — whether in Canada or abroad — account for little of this increase in energy prices, as we demonstrate below. Whatever the underlying source, these consumer price increases have created considerable affordability challenges for many households in all affected countries, including Canada.

Differences in how consumer prices affect families

The individual effect of these price increases on affordability crucially depends on household spending patterns, which can differ significantly between individuals and families in different circumstances. If the price of an item that constitutes a large portion of a household's budget rises, it will have a greater effect on the household's cost of living than if the price of a less frequently purchased item increases. For example, some individuals drive more than others (due to commuting or other personal choices). Those who commute long distances have felt the sting of inflation more sharply, especially as fuel prices have surged during this period. Households with children, understandably, spend more on groceries than those without, making the inflationary effect on food prices more pronounced for these households. While some individuals might own their homes and be insulated from fluctuations in rental markets, others are tenants and may have experienced significant shifts in housing costs due to inflation.

In addition to differences in what households buy, there are differences in the proportion of income households allocate to consumption. On average, lower-income households tend to spend beyond their total disposable incomes,³ resulting in either debt accumulation or asset depletion. In contrast, higher-income households typically save a significant portion of their income. Recent data from Statistics Canada reveal that in 2022 the lowest income quintile households spent approximately \$31,000 more per year than their available disposable income, while the highest income quintile spent approximately \$69,000 per year less.⁴

One approach to capturing the varied effects of price increases on households is to estimate a "personal inflation rate" for different groups. This offers an alternative to the commonly reported aggregate Consumer Price Index, which averages across all households. Instead, a personal inflation rate uses expenditure weights tailored to specific groups' characteristics. In table 1, we report personal inflation rates for a broad selection of household types. In June 2022, when Canada-wide inflation hit its peak of 8.1 per cent, some groups saw substantially different rates. For instance, renters had an average consumer product price rise of 7.3 per cent, while people in rural areas experienced a 9.1 per cent increase. This does not suggest that the same products cost more in rural areas than for renters. Rather, rural Canadians generally bought relatively more of the items that saw larger price increases. Over the course of 2023 and 2024, inflation has dipped. Yet disparities persist among households. In April 2024, inflation was 2.7 per cent. Mortgage-free homeowners saw prices rise by 2.0 per cent, in line with Canada's inflation target. Those with mortgages faced higher rates, influenced by climbing interest rates

² Authors' calculations using OECD data series DSD_PRICES@DF_PRICES_ALL.

³ Disposable income is here defined as a total income from all sources, less taxes and interest payments.

⁴ Authors' calculations using Statistics Canada data table 36-10-0587-01.

making the cost of servicing debt (especially variable-rate debt) rise. Renters experienced a 3.2 per cent inflation rate. Those in the bottom fifth of the income distribution faced a 3.1 per cent average rate of price growth over the year, higher than those in the top quintile. This shows that, while inflation has come down, equity concerns remain.

We also document the contribution of energy items to these personal inflation rates. When inflation peaked in June 2022, energy contributed 2.6 percentage points to the overall total of 8.1 per cent inflation recorded that month. People in rural areas saw a higher contribution from energy, contributing 3.3 percentage points, while renters saw much less, contributing 1.8 percentage points. By April 2024, energy's contribution to overall inflation fell to negligible levels for all groups, although those in rural areas still experience a larger contribution from these items than other groups. When we turn to policy later in this paper, we will specifically explore ways in which the effect of climate policy on prices can also have meaningful effects on affordability for some individuals and families, even if the overall effect is muted. We then explore complementary policies that aim to mitigate these adverse equity effects.

Even these averages mask considerable variation across individuals. To quantify this effect more concretely, we use Statistics Canada's Social Policy Simulation Database

	Year-over-year change as of June 2022 and April 2024					
	All consu	mer prices	Contribution	of energy items		
Household type	June 2022	April 2024	June 2022	April 2024		
All households	8.1%	2.7%	2.6%	0.3%		
Highest income quintile	8.5	2.6	2.0	0.2		
Lowest income quintile	7.5	3.1	2.2	0.3		
Large urban area (>1 million people)	8.0	2.9	1.8	0.2		
Rural area	9.1	2.2	3.3	0.4		
Couple with children	8.5	2.6	2.1	0.2		
Single-parent household	7.9	2.7	2.8	0.3		
One-person household	7.7	3.1	1.9	0.2		
Homeowner with mortgage	8.6	2.9	2.1	0.2		
Homeowner without mortgage	8.8	2.0	2.7	0.3		
Renter	7.3	3.2	1.8	0.2		
Head age 30 and under	7.9	2.9	1.9	0.2		
Head age 65 and over	8.3	2.6	2.5	0.3		

Table 1. Household-type-specific inflation rates in Canada

Source: Authors' calculations based on Statistics Canada Tables 18-10-0004-01 and 11-10-0223-01 through 11-10-0227-01. Based on 2019 Survey of Household Spending expenditure shares.

Note: Displays the average change in consumer prices for various household types. The expenditure shares of each household across goods and services vary, but the price changes for each product item do not. Energy items include the direct contribution to the total change accounted for by energy used for electricity, home heating and gasoline for private transportation. Rural areas are defined as locations with less than 30,000 residents.



Figure 2. The distribution of monthly costs from consumer price changes across households by income, February 2020 to April 2024

Source: Authors' calculations based on Statistics Canada Table 18-10-0004-01 (Statistics Canada, 2024) and SPS-D/M version 30.0.2. Based on region- and product-specific price changes. Median monthly costs are indicated as vertical grey lines.

Note: Displays an estimate of the monthly equivalent increase in household expenditures resulting from observed province- and region-specific price changes in Canada from February 2020 to April 2024. Income measure is net income, total income less deductions from total income, equivalent to the Canada Revenue Agency's net income definition (Line 236/23600 on federal tax forms).

and Model (SPSD/M)⁵ and its detailed data on household spending. By comparing the prices of specific products between February 2020 and April 2024, we estimate the total implied increase in household expenditures. We illustrate the full distribution of implied costs in figure 2. We find the median family with a net income of less than \$30,000 per year faces expenditure pressures equivalent to \$458 per month. The median for families earning between \$60,000 and \$90,000 is over \$722 per month, which is nearly identical to the median family cost for all of Canada (\$713 per month). This does not account for monthly expenditure changes that result from individuals adjusting their purchases in response to price increases, nor does it account for any income changes that individuals may have received, which could partially offset these expenditure pressures. To be clear, changes in household spending patterns are periodically incorporated into the Consumer Price Index calculation. Following the COVID-19 pandemic, Statistics Canada makes such adjustments annually. These estimates therefore provide an informative indicator of the magnitude of pressures that rapid price increases have recently created in Canada.

⁵ The SPSD/M is the combination of detailed non-confidential and statistically representative household data including expenditure, income and taxes (SPSD) and a static model of taxes and transfers (SPSM).

QUANTIFYING THE EFFECT OF EMISSIONS PRICING

Turning now to the main focus of our paper, we quantify the effect of emissions pricing on the affordability challenges facing households. We organize our analysis into four key pillars, each necessary to fully understand the impact of climate policies on households.

The first pillar concerns the pattern of consumer spending across goods and services, noting that emissions intensity varies considerably between different items. The second pillar examines the effect of emissions pricing on the prices charged to consumers for the items they buy. The third pillar combines the first two findings to estimate the gross dollar amount that families are likely to face in increased expenditure pressures due to emissions pricing. However, as the revenue raised through pricing mechanisms is generally recycled in a manner that can offset some of these costs, we turn to the fourth and final pillar, which considers various rebate programs enacted by Canadian governments within their pricing regimes.

Pillar 1: What we buy

We begin our analysis with the first of four pillars: what consumers buy, with a focus on energy expenditures.

Summary of household expenditure patterns

Statistics Canada regularly gathers information on household expenditures. This supports many of its data products, including its calculations of overall inflation and changes in the Consumer Price Index. The detailed Survey of Household Spending (SHS) provides rich information on expenditures across a wide variety of goods and services and distinguishes between households with different characteristics. As of April 2024, the most recent SHS data are from 2021. To abstract from COVID-related disruptions, we use 2019 data to summarize expenditure patterns.

Overall, average total per-household expenditures in Canada were almost \$94,000. Major components of household expenditure are income taxes (just over \$17,200), personal insurance payments and pension contributions (\$5,300), and gifts and charitable contributions (\$2,300), leaving approximately \$69,000 per year for current consumption. Of that, food purchases (both groceries and restaurants) accounted for just over \$10,300. On average, households spend roughly 15 per cent of all expenditure on food, and groceries account for nearly three-quarters of that. Shelter expenditures (including water, fuel, and electricity) were just over \$20,000; combined with household operations, furnishings, and equipment, that rises to just over \$28,100. Nearly 41 per cent of total current expenditures are therefore on housing costs. Clothing expenditures are another essential item, and account for just over \$3,300 per year. Finally, transportation accounts for over \$12,700. All together, nearly 80 per cent of total current expenditures by the average Canadian household was accounted for by food, shelter, household costs, clothing and transportation. We report the distribution of household expenditure shares across selected items for all provinces in table 2.

Product	CAN	BC	AB	SK	MB	ON	QC	NB	NS	PE	NL
Owned accommodation	16.0	18.5	16.7	14.4	14.4	18.4	15.0	12.3	13.2	11.9	13.1
Private transportation	16.3	15.7	17.5	18.1	18.2	15.5	16.3	20.6	17.1	19.3	19.3
Groceries	10.9	9.7	10.0	10.9	11.5	10.6	12.7	12.1	11.2	11.9	12.7
Household operations	7.9	7.7	8.2	8.6	7.7	7.9	7.6	9.2	9.2	10.1	8.6
Recreation	6.7	6.8	7.8	7.7	7.0	6.3	6.5	6.9	6.3	5.8	7.1
Rented accommodation	6.0	6.5	4.8	4.9	5.6	6.3	6.6	3.6	5.8	5.1	3.5
Clothing and footwear	4.8	4.8	4.5	4.1	4.5	4.9	5.2	4.4	4.5	4.5	5.0
Health care	4.0	4.1	3.9	4.1	4.4	3.3	5.1	5.0	4.4	4.7	4.2
Restaurants	4.0	4.0	4.2	3.8	3.7	3.9	4.3	4.2	4.0	4.4	3.4
Utilities	3.7	2.9	4.2	4.7	3.8	3.8	3.2	5.7	5.1	5.8	5.4
Furniture and equipment	3.6	3.3	3.2	3.4	3.7	3.8	3.6	4.0	3.6	3.5	3.4
Alcohol, tobacco and				<u> </u>							<u>.</u>
cannabis	2.6	2.3	2.6	3.1	2.5	2.2	3.3	3.0	3.2	2.7	3.4
Education	2.5	3.0	2.1	2.0	2.3	2.9	1.6	1.5	2.8	1.8	1.5
Public transportation	2.1	2.7	2.1	1.6	2.0	2.3	1.7	1.0	1.8	1.7	1.9
All other expenditures	7.8	8.1	8.0	8.6	8.5	7.8	7.4	6.4	7.8	7.0	7.5

Table 2. Average household expenditure shares, by province and selected items (2019)

Source: Authors' calculations based on Statistics Canada Table 11-10-0223-01.

Note: Expenditure shares are expenditure on each item type divided by total expenditure.

Given the importance of energy, groceries and shelter for current affordability debates in Canada, focusing on those categories is instructive. Overall, energy-related goods (including gasoline, fuel oil, natural gas and electricity) account for nearly 7 per cent of household expenditures, while shelter and groceries account for 29 per cent and 11 per cent, respectively. Within shelter costs, households vary considerably in their expenditures due to critical differences in the composition of such spending. Among households who rent, the average expenditure on this item exceeds \$12,200 per year. Homeowners also display large differences in their expenditure patterns. Those with a mortgage, for example, spend an average of nearly \$17,000 per year on mortgage payments (while those without a mortgage pay \$0). Total shelter costs among those without a mortgage are therefore substantially lower, averaging \$13,300 per year compared to \$14,400 for renters and \$30,700 for homeowners with a mortgage. We combine these expenditure levels with estimates of the price changes for individual goods and services resulting from emissions pricing policies. First, we provide a more detailed examination of energy consumption.



Figure 3. Average 2021 residential energy consumption by energy type (GJ per household)

Source: Authors' calculations based on Natural Resources Canada (n.d.). Note: Average per household energy use calculated by dividing total energy use by the number of households. This will overstate energy use for some households (e.g., those with utilities included in rent) and understate it for others.

Regional differences in energy use

Critical to any analysis of emissions pricing in Canada is the fact that sensitivity to climate policy, especially concerning energy, varies significantly across provinces. Households in most regions are similarly exposed to the effects of changes in the price of transportation fuels — although, of course, the type of vehicles and average distances travelled can vary. The effect of climate policy diverges considerably when it comes to heating fuel. These differences are critical for policy design and require considering the unique energy profiles of each province.

There are three key forms of differences that we explore: the amount of energy households consume, the type of energy they consume and the price of different energy sources. Figure 3 shows average household in-home energy consumption by energy source in each province and the territories. Most notable in the figure is that households in Ontario and west use natural gas and electricity, while households in Quebec and east use electricity, heating oil and wood. Also notable is that households in Alberta, Saskatchewan and Manitoba use significantly more energy on average. One of the major contributors to differences in these energy use patterns is differences in the home heating stock across provinces. For example, about 25 per cent of households in British Columbia use electric heat and about 50 per cent use natural gas, compared to Ontario, where natural gas accounts for 75 per cent of heating systems, and Prince Edward Island, where around 75 per cent of heating oil.

An important determinant of exposure to costs from emissions pricing is the emissions intensity of electricity generation, which varies substantially across the country, as illustrated in figure 4. For eastern provinces, Manitoba and the territories, the emissions intensity of electricity will contribute relatively more to the costs from emissions pricing compared to provinces where households rely more on natural gas. For Alberta,



Figure 4. 2022 Electricity generation emissions intensity (g CO₂e/kWh)

Source: Environment and Climate Change Canada (2024a). Note: GHG intensity is grams of CO_2 -equivalent per kWh of electricity generation, for CO_2 , CH_4 and N_2O .





Source: Authors' calculations based on Environment and Climate Change Canada (2024a) and Natural Resources Canada (n.d.).

Note: We use the average household energy consumption in figure 3 and electricity emissions intensity from figure 4 to calculate potential emissions price exposure, assuming full-price exposure for all priced energy sources. We omit coal and propane from this analysis. Saskatchewan, Nova Scotia and Nunavut, the high emissions intensity of electricity will contribute to increased household costs, though this is offset via the large-emitter pricing systems that dampen the full effect. We discuss these dampening effects further below. Importantly, the differences in emissions intensity from electricity also affect the indirect costs that households face, as electricity is an input in producing all goods and services. Goods and services produced in Alberta, for example, will be affected to a greater degree by emissions pricing than the same product from Ontario, holding all else equal, because of the higher emissions intensity of Alberta's electricity.

Figure 5 shows average potential emissions pricing costs by energy source and jurisdiction at \$80 per tonne, assuming full price exposure (e.g., no exemptions or rebates). The emissions intensity of energy systems and overall energy-use differences combine to create substantial variation in potential burden across Canada, independent of ability to pay or other consumption choices.

Energy used in transportation is also relevant, although the difference across provinces is smaller than for home heating. In Canada, commuters disproportionately opt for driving as the preferred mode of transportation, but recent trends show a growing shift toward public transit. Statistics Canada data show that, as of May 2023, most Canadian commuters (approximately 82.6 per cent) still primarily used cars, trucks or vans to get to work. But this is a slight decrease from previous years. Public transit use, while still lower than pre-pandemic levels, has been increasing. For instance, in May 2023, 10.1 per cent of commuters travelled to work via public transit, up from 8.5 per cent in May 2022 and 7.8 per cent in May 2021 (Statistics Canada, 2023). This uptick in public transit use is particularly notable in provinces like Ontario, British Columbia and Quebec. Across provinces, the propensity to commute by car varied from a high of nearly 93 per cent in Prince Edward Island to a low of 76.8 per cent in British Columbia.

Pillar 2: How prices change

The second pillar to quantify how emissions pricing policies affect household finances concerns the degree to which such policies affect prices. In this section, we begin with simple estimates of the direct and indirect effects of emissions pricing on goods and services throughout the Canadian economy. Direct effects reflect how emissions pricing increases the costs of goods and services by directly increasing the costs of energy inputs, whereas indirect effects capture those costs via the supply chain.

The effect of these direct effects on affordability are relatively straightforward to quantify. Legislation that establishes the emissions charge typically specifies the per-unit charge that will apply to various fuel types, and this is calibrated to the emissions associated with burning that fuel. As of April 1, 2024, the federal fuel charge (carbon tax) on gasoline is 17.61 cents per litre. For a household that purchases 2,000 litres of gasoline per year (equivalent to roughly 400 km per week in a vehicle with fuel economy of 10 litres per 100 km), that adds \$352 to their annual spending. For natural gas, the charge is \$0.1525 per cubic metre, or just under \$4.09 per gigajoule (GJ). For a household that purchases the national average



Figure 6. The effect of indirect tax changes on consumer prices in Canada, January 2019 to April 2024

Source: Authors' calculations based on Statistics Canada Tables 18-10-0256-01 and 18-10-0004-01. Note: Displays the change in average consumer prices (all-items) in Canada with and without the effect of indirect taxes included. Indirect taxes include all taxes on products, such as sales taxes, various excise taxes and carbon taxes.

of approximately 85 GJ per year, this adds nearly \$350 to annual spending.⁶ Importantly, these estimates of the effect of emissions pricing on household expenditures assume no behavioural response. The intent of emissions pricing is to incentivize changes in behaviour whereby households gradually use less fuel, and therefore pay less. While important to appreciate, for most of the analysis to come, we focus on the mechanical effect of emissions pricing alone, ignoring behavioural changes. Our cost estimates should therefore be viewed as upper bounds of the true effect of pricing on the cost of living.

How much of an effect have these direct price increases had on inflation? Since the tax rates that are levied on different items are known, we can construct estimates of how much consumer prices in Canada have increased as a result. Indeed, Statistics Canada does this for all taxes on goods and services, like those on alcohol and cigarettes and general sales taxes like the GST or HST. It also does this for emissions pricing.⁷ Unfortunately, Statistics Canada reports the effect of all indirect taxes together rather than individually. But, in recent years, the main tax change has been the gradual increase in Canada's emissions price, which is currently set to rise to \$170 per tonne by 2030. Using the latest data from Statistics Canada, we display the overall change in Canada's consumer price both with and without these tax changes from 2019 (when the federal pricing system began) to April 2024 in figure 6. Consumer prices have increased by 19.3 per cent over that period. But excluding the effect of indirect tax changes, prices rose by 18.7 per cent. This means that overall consumer prices are only 0.5 per cent higher over this period because of the gradually increasing indirect taxes.⁸ While emissions pricing is the biggest change within taxes on goods and services, such taxes are themselves responsible for a negligible amount of total price changes. This implies that roughly 98 per cent of the

⁶ Source: Authors' calculations based on Statistics Canada Table 25-10-0060-01.

⁷ This includes only B.C.'s carbon tax and the federal fuel charge. It does not include Quebec's cap-and-trade system and most large-emitter pricing systems.

⁸ This is calculated as 1.193/1.187 - 1 = 0.005.

overall price level rise since 2019 is due to factors beyond the effect of tax changes, including emissions pricing like the federal fuel charge.

Indirect effects of emissions pricing

These direct effects of tax changes are not the only cost that consumers face from climate policies. Changes in the prices of gasoline, natural gas, diesel and so on have cascading effects throughout the supply chain for most goods and services. There are several potential sources to draw upon to understand these effects. Most important is Statistics Canada's Social Policy Simulation Database and Model (SPSD/M), which is a tool to analyze the distributional effects of most tax and transfer policies in Canada. It combines a rich and representative database of households with a detailed model of federal and provincial policies, including emissions pricing systems, although it does not include large-emitter pricing systems. This tool builds on many sources, including the Survey of Household Spending, as well as its own model of the input-output structure of Canada's economy, to estimate how price changes for one set of products affect costs, and therefore prices, of others. The model assumes all cost increases are fully passed through to consumers.

To summarize the effect of emissions pricing on product-level prices, we report the "effective tax rate" of emissions pricing for each of the products modelled by Statistics Canada within SPSD/M. This is essentially an estimate of the total amount of tax paid relative to the total expenditures on a particular good or service. It is particularly useful because it can be directly interpreted as the effect of a particular tax measure on the price paid by consumers. Conveniently, Statistics Canada estimates the effective tax rate for the federal emissions price (fuel charge) and B.C.'s carbon tax. As of June 2024, this allows for estimates of the effect of emissions pricing on various products for Ontario, Manitoba, Saskatchewan, Alberta and British Columbia.⁹ We display the latest estimates for selected products and provinces from Statistics Canada for 2023 in table 3. Note that some products are excluded, notably energy products (to focus on indirect costs) and imputed rents (not a cash item).

The effective carbon tax rate in British Columbia, for example, varies from a high of nearly 0.6 per cent for alcoholic beverages to a low of less than 0.1 per cent for property, health and transportation insurance. Food and non-alcoholic beverages are also among the most impacted items from emissions pricing. These estimates suggest that British Columbia's tax rate of \$65 per tonne in 2023 increased the average cost of food in the province by 0.52 per cent. The effect of climate policy on food prices will be critical to examine in more detail, as our focus is on the implications of climate policy for affordability. Other necessities are also affected. Clothing and footwear, for example, are 0.23 per cent more expensive because of B.C.'s carbon tax. Similar patterns are found for other provinces. Overall, despite the significant attention paid to the spillover implications of emissions pricing for the cost of goods and services throughout the economy, the estimates here suggest the overall effect is relatively modest. However, total expenditures on the products listed above are high, so even small changes in price can account for significant dollars in added expenditure pressures for households. To estimate that, we require data on household expenditures. We turn to that question next.

⁹ While New Brunswick, Nova Scotia, Prince Edward Island, and Newfoundland and Labrador are subject to the fuel charge, SPSD/M does not yet include effective emissions tax rates for these provinces. SPSD/M also does not cover the three territories.

Table 3. Effective carbon tax rate for non-energy items in selected provinces, 2023

Product	ON	MB	SK	AB	BC	Overall
Alcoholic beverages	0.49%	0.49%	0.58%	0.34%	0.56%	0.48%
Gross rent paid	0.37%	1.74%	0.61%	0.22%	0.42%	0.44%
Dwelling maintenance	0.40%	0.37%	0.40%	0.50%	0.50%	0.43%
Food and non-alcoholic beverages	0.37%	0.63%	0.57%	0.37%	0.52%	0.42%
Reading and entertainment supplies	0.37%	0.41%	0.42%	0.31%	0.52%	0.39%
Motor vehicle goods and services	0.33%	0.36%	0.36%	0.30%	0.60%	0.38%
Services related to the dwelling	0.34%	0.44%	0.42%	0.56%	0.34%	0.38%
Tobacco	0.31%	0.26%	0.36%	0.25%	0.59%	0.36%
Education	0.22%	0.43%	0.41%	0.26%	0.54%	0.31%
Goods related to the dwelling	0.27%	0.32%	0.38%	0.24%	0.38%	0.29%
Drugs and pharmaceutical products	0.25%	0.25%	0.22%	0.20%	0.38%	0.27%
Goods related to recreation/culture	0.24%	0.32%	0.33%	0.20%	0.31%	0.25%
Miscellaneous goods and services	0.23%	0.28%	0.30%	0.21%	0.33%	0.25%
Restaurants and accommodation	0.18%	0.33%	0.30%	0.15%	0.25%	0.20%
Hospital and outpatient services	0.21%	0.32%	0.19%	0.11%	0.19%	0.20%
Clothing and footwear	0.18%	0.23%	0.22%	0.15%	0.23%	0.19%
Communications	0.12%	0.25%	0.32%	0.11%	0.19%	0.15%
Child care services	0.13%	0.23%	0.19%	0.13%	0.15%	0.14%
New and used (net) motor vehicles	0.12%	0.18%	0.20%	0.12%	0.17%	0.14%
Life insurance	0.13%	0.16%	0.14%	0.11%	0.16%	0.13%
Services related to recreation/culture	0.11%	0.15%	0.16%	0.10%	0.18%	0.13%
Financial services	0.09%	0.14%	0.11%	0.07%	0.17%	0.11%
Purchased air transportation	0.04%	0.08%	0.15%	0.08%	0.25%	0.10%
Insurance	0.06%	0.09%	0.07%	0.05%	0.09%	0.07%

Source: Authors' calculations based on Statistics Canada SPSD/M version 30.1.

Note: Displays an estimate of the effect of emissions pricing on the price levels of various goods and services in 2023. These reflect the indirect costs of emissions pricing. They capture the input-output interconnections between sectors and products. All backstop provinces excluding the Atlantic provinces and B.C. are included here. The Atlantic provinces were included in the federal backstop pricing system too recently to be incorporated into SPSD/M. The overall effect represents the weighted average of the five selected provinces.

Table 4. Average gross household emissions pricing costs in 2024-25 (\$80 per tonne), before rebates, exemptions and other mitigating policies

Product	AB	SK	MB	ON	NB	NS	PE	NL
Average cost per household	\$1,056	\$1,156	\$828	\$869	\$536	\$609	\$628	\$859

Source: Table 5.2 in Department of Finance Canada (2024).

Pillar 3: Gross policy costs and ability to pay

The previous analysis quantified how policy affects prices and how households allocate their expenditures across various goods and services. Combined, these two components of the analysis reveal how emissions pricing affects household finances overall. In this section, we summarize the overall annual costs of an \$80-per-tonne emissions price, assuming full price exposure (e.g., no exemptions, rebates or other mitigating policies).

The Government of Canada regularly reports its own estimates of the total cost of emissions pricing on families in jurisdictions where the federal pricing system (often called the federal backstop) applies. Budget 2024 reports the specific effect of \$80 per tonne that prevails during the 2024-25 fiscal year. We reproduce it here in table 4, for all backstop provinces. Average gross payments per household from emissions pricing range from a low of \$536 in New Brunswick to a high of \$1,156 in Saskatchewan.

However, different households have different patterns of expenditures across goods and services. While all see prices change by similar amounts, differences in the composition of their consumption baskets lead to differences in the cost. To quantify these differences, we use Statistics Canada's SPSD/M database, with a specific focus on Alberta. Overall, the average annual cost of the federal emissions pricing system is \$985 per year per household in Alberta. This is somewhat lower than the federal estimate in table 4. Part of the discrepancy may be due to the government's estimates including the cost of provincial pricing systems outside of the federal backstop (B.C. and Quebec). Consumers in Alberta implicitly pay the B.C. carbon tax on goods and services imported from that province, for example. Our estimates, however, include just the federal charge. We explore several different types of Albertan households and several different metrics.

First, to the extent that families consume less than their income, and therefore save some portion, emissions pricing is a smaller share of current income than of current consumption. We estimate the average household in Alberta faces emissions pricing costs equivalent to

Household income group	Dollars per year	Share of consumption	Share of income
<\$30,000	\$305	1.0%	2.9%
\$30-60,000	\$586	1.5%	1.3%
\$60-90,000	\$713	1.5%	1.0%
\$90-120,000	\$884	1.6%	0.9%
\$120-150,000	\$1,144	1.8%	0.8%
\$150-180,000	\$1,292	1.7%	0.8%
>\$180,000	\$1,611	1.8%	0.6%

Table 5. Gross household emissions pricing costs in Alberta, by income level at \$80 per tonne, before rebates, exemptions and other mitigating policies

Source: Authors' calculations based on Statistics Canada SPSD/M version 30.1.

Note: Income measure is net income, total income less deductions from total income, equivalent to the Canada Revenue Agency's net income definition (Line 236/23600 on federal tax forms).

	Dollars per year		Share of c	onsumption	Share of income	
Household income group	No children	With Children	No children	With Children	No children	With Children
<\$30,000	\$297	\$507	1.0%	1.1%	2.9%	2.3%
\$30-60,000	\$568	\$772	1.5%	1.4%	1.3%	1.6%
\$60-90,000	\$655	\$977	1.5%	1.7%	0.9%	1.3%
\$90-120,000	\$816	\$1,092	1.6%	1.8%	0.8%	1.1%
\$120-150,000	\$1,011	\$1,400	1.6%	2.0%	0.8%	1.0%
\$150-180,000	\$1,123	\$1,611	1.6%	1.9%	0.7%	1.0%
>\$180,000	\$1,434	\$1,897	1.7%	1.9%	0.5%	0.7%

Table 6. Gross household emissions pricing costs in Alberta, by income level and family type at \$80 per tonne, before rebates, exemptions and other mitigating policies

Source: Authors' calculations based on Statistics Canada SPSD/M version 30.1.

Note: Income measure is net income, total income less deductions from total income, equivalent to the Canada Revenue Agency's net income definition (Line 236/23600 on federal tax forms).

1.6 per cent of consumption but 1.0 per cent of income. However, this varies considerably across the income distribution. In table 5, we report emissions pricing costs and shares across income groups. For households earning less than \$30,000 per year, we estimate emissions pricing payments are 1 per cent of consumption but 2.9 per cent of income. For households earning more than \$180,000 per year, we estimate that payments are 1.8 per cent of consumption but only 0.6 per cent of income. This difference is largely due to rates of household savings increasing with income, and due to the lowest-income households generally dissaving (i.e., accumulating debt as consumption exceeds income). This pattern of decreasing tax shares of income is generally an indication of a regressive tax, with the greatest burden falling on those with a lower income. This is a pattern also found with most types of consumption taxes. In the next section, we discuss efforts to mitigate this regressive effect of emissions pricing.

Before turning to such mitigating measures, several other household types are worth highlighting. Among the most important determinants of emissions pricing burden (beyond income and consumption levels) is whether a household has children or not. Families with children tend to spend more on emissions-intensive items like transportation than families without children. The indirect effect of emissions pricing on non-energy items is also higher, notably due to higher food purchases; as we discussed, food prices are affected by emissions pricing through supply chain effects. In table 6, we show that families with children face an average share of consumption that is 0.3 percentage points higher. Among families with income above \$30,000, we also find that emissions pricing costs are nearly 0.15 percentage points higher as a share of income for families with children than for those without.

The above estimates that suggest the effects of emissions pricing on household finances can be a particular burden on lower income families and on families with children. But emissions pricing policies are not enacted alone. In the next section, we explore the design and effectiveness of various mitigating measures that lead the distribution and burden of net emissions pricing costs to differ considerably from the distribution and burden of gross costs.

Pillar 4: Net policy costs and mitigating measures

The final pillar of our analysis concerns the use of emissions pricing revenues to mitigate some of the adverse affect of policies on household finances documented in the previous section. Specifically, we discuss two systems: the federal Canada Carbon Rebate and B.C.'s Climate Action Tax Credit. We conclude this section with a brief discussion of the policy choice between lump-sum versus income-tested rebates and the effect of output subsidies provided to large industrial emitters.

The federal approach: Canada Carbon Rebate

The Government of Canada sets minimum emissions pricing stringency standards, called the federal benchmark (Environment and Climate Change Canada, 2023b, 2024b). It levies the federal system in provinces that do not have a comparable system of their own (Environment and Climate Change Canada, 2023b, 2024b). Quebec is also exempt because cap-and-trade systems that have sufficiently stringent limits on total emissions are exempt from the national minimum price (Environment and Climate Change Canada, 2021). As of April 2024, the Government of Canada levies an emissions charge on fuel in eight of the ten provinces; this does not include emissions from large industrial facilities, which we discuss below. The revenues from the federal fuel charge are not used for federal program expenditures, however. Instead, they are used to fund direct cash transfers to individuals, and to a lesser extent businesses, communities, farms, Indigenous groups and so on. The Government of Canada takes 90 per cent of projected revenue in a given province in a year and rebates that to households every three months in a roughly lump-sum fashion via a refundable tax credit, called the Canada Carbon Rebate. Specifically, the rebates in 2024-25 are based on expected revenue from that fiscal year. Receipt of this tax credit depends on filing taxes, but no other household characteristics.

The amount a family receives from the Canada Carbon Rebate depends on its size and location. In Ontario, for example, a single individual in 2023-24 received \$488. A couple without children would receive an additional \$244, while families with children receive \$122 per child under the age of 18. In addition, those in rural areas receive a 10 per cent boost to these amounts (which was increased to a 20 per cent boost for 2024-25). Critically, these rebates have nothing to do with the amount of fuel that an individual or family chooses to use. They therefore do not undermine the primary purpose of the carbon tax, which is to provide a financial incentive to use less fuel. To be clear, some amount of any additional income that one receives might be spent on fuel, but it is not necessarily the case, and those consumer choices will vary.

The amount received by individuals varies across provinces under the federal system. The rebate is tied to revenues raised within each province, and therefore there is no redistribution across provinces within the federal system.¹⁰ Residents of Alberta receive more than elsewhere, on account of the larger emissions and fuel intensity of the province's economy, as documented earlier. A typical family of four in that province in 2023-24 received \$1,544. For comparison, that same family of four in Saskatchewan received \$1,360. In Newfoundland and Labrador, they received \$1,312; in Manitoba, \$1,056; in Nova Scotia, \$992; in Ontario \$976; and in Prince Edward Island, \$960. We explore the distributional implications of these rebates below. Intuitively, given that these lump-sum amounts are calibrated to 90 per cent of the average per capita amount raised in a province, they will lead more households to receive a rebate that exceeds the average amount paid (both direct and indirect). This is because some revenue raised is from foreign buyers and businesses on intermediate inputs where cost increases cannot be passed on to consumers, and because the distribution of household energy use is positively skewed (i.e., the mean household energy use exceeds the median and therefore the mean value of emissions charges paid is larger than what is paid by more than half of all households).

Some of the controversies surrounding the federal emissions pricing system and affordability issues in Canada stem from analysis by the Office of the Parliamentary Budget Officer (Ammar, 2019, 2020; Ammar et al., 2022; Ammar et al., 2023).¹¹ These examine the direct fiscal implications of the fuel charge and rebates within the federal system (Ammar, 2019, 2020), while the 2022 and 2023 reports quantify the potential longer-term economic implications of emissions pricing. If emissions pricing lowers the rate of economic growth even modestly, or if emissions pricing lowers productivity by shifting labour and capital distortions across sectors, then over time the compounding effect is for the economy to be potentially materially smaller in the future than it otherwise would have been. This means that real incomes of individuals are also lower. This is not incorrect; although methods to estimate the long-term implications of climate policies on growth will vary in their results, it is uncontroversial to note that climate policy comes with some economic consequences. However, alternative approaches to lowering emissions by an amount equivalent to what broad-based emissions pricing can achieve tend to come with greater economic costs, and therefore greater forgone increases in individual real wages. To achieve future emissions reductions goals, such alternative approaches would be necessary. Moreover, the counterfactual in these analyses assumes no climate damages from business-as-usual economic and emissions growth, and therefore likely underestimate the costs of emissions-mitigation policies.

The B.C. approach: Climate Action Tax Credit

In contrast to the federal Canada Carbon Rebate, B.C.'s Climate Action Tax Credit (CATC) is income-tested. The CATC was introduced in Budget 2008 to "help offset the cost of the carbon tax" for lower-income households (Government of British Columbia, 2008a). More specifically, the original Budget language promised that those with low

¹⁰ One exception to this concerns interprovincial trade in goods and services. Residents of one province may pay emissions charges raised in another, which will be included within the rebates received by the residents of that other province only.

¹¹ There is additional controversy over these analyses as in April 2024 the PBO issued a notice of correction on its 2023 and 2024 reports and the underlying assumptions (Matier, 2024), prompting renewed debate on the economic cost of emissions pricing (Fletcher, 2024; Wherry, 2024).

incomes would be protected: "A refundable Climate Action Tax Credit will ensure that those with lower incomes are compensated for the tax, and that most will be better off" (Government of British Columbia, 2008b). In keeping with its focus on lower-income households, the CATC is a quarterly payment tied to the GST rebate and is automatically calculated as part of tax filing.

The CATC was combined with a dividend payment that all tax-filing individuals received. That started at \$100 for a single person in 2008 and was paid before the carbon tax took effect on July 1, 2008. Lower-income British Columbians received an additional amount equal to \$100 per adult and \$30 per child, with maximum benefit values reduced as income exceeded a threshold of \$30,000 for an individual and \$35,000 for families. Over time, these values gradually increased. In the 2023-24 benefit year, for example, the amount of the low-income Climate Action Tax Credit reached \$447 for a single person with income below \$39,115. This increased to \$504 in the 2024-25 benefit year for a



Figure 7a. B.C. Climate Action Credit values, July 2023 to June 2024

Figure 7b. B.C. Climate Action Credit values, July 2024 to June 2025



Source: Authors' calculations based on Government of British Columbia (2024).

single person with income below \$50,170 (Government of British Columbia, 2008b, 2024). Above these income thresholds, the payment value declines by 2 per cent for every dollar a household's income rises above the threshold. We illustrate both periods in figure 7.

These rebates are considerably more modest than in the federal system. Indeed, they have grown very little over time even as carbon tax rates have risen. As of April 2024, the CATC for a single person will have grown to just over five times its initial value in 2008. But over the same period, the carbon tax rate grew to eight times its original rate of \$10 per tonne. In addition to these credits, however, the Government of British Columbia opted to lower various other taxes, which mitigated the net cost for many households. The bottom two personal income tax brackets were lowered, the general corporate tax rate was lowered, and the small business tax rate was also lowered. We focus here on the rebate to highlight the differences between the federal and provincial systems.

Lump-sum versus means-tested rebates

The design of rebates plays a pivotal role in determining the effect of emissions pricing policies on household finances. A clear distinction exists between the federal strategy and British Columbia's approach. The federal government rebates about 90 per cent of emissions pricing revenues to households in the provinces where the fuel charge is collected. These rebates are predominantly lump sum, varying based on household size and whether the household is in a rural or urban location. In contrast, British Columbia offers significantly smaller rebates that focus primarily on lower-income individuals. As a result, in Ontario, for instance, most households receive a rebate that exceeds their direct emissions charge expenditure. However, in British Columbia, it is the reverse. We use detailed household data to illustrate the full distribution of net carbon taxes paid in figure 8 for two selected provinces, Ontario and B.C.



Figure 8. Net cost to selected households of carbon taxes in 2023

Source: Authors' calculations based on Statistics Canada SPSD/M version 30.0.2. Note: Displays the distribution of net emissions pricing costs across households in Ontario and British Columbia in 2023. This reflects the differences between annual emissions charges paid and rebates received. Note that this does not include the savings from lower personal and corporate income tax rates adopted by B.C. when carbon taxation was introduced. In British Columbia, the median annual net carbon tax expense for households stands at \$350, with an average of \$430. A quarter of households in British Columbia incur yearly costs surpassing \$626. In Ontario, meanwhile, the median net costs are -\$300, and the average is -\$250. These data corroborate the Government of Canada's statement that 80 per cent of households get more in rebates than they pay in emissions pricing. Such is not the case in British Columbia, which employs a more selective rebate strategy, although, many would have also benefited from reductions in income tax rates when emissions pricing was first introduced there.

Achieving targets for many rebate programs is challenging. Governments often use refundable tax credits to transfer funds. For instance, the GST credit and federal Canada Carbon Rebate are quarterly payments. However, to get these benefits, one must file taxes. Recent research by Jennifer Robson and Saul Schwartz reveals that 10 to 12 per cent of Canadians skip this step, missing out on about \$1.7 billion in benefits in 2015 (Robson & Schwartz, 2020). Tax filing isn't uniform across demographics; they find that almost 23 per cent of 18- to 24-year-olds don't file, while only 5 per cent of those above 65 don't file. Of the low-income group measured by the Market Basket Measure (MBM),¹² 20 per cent do not file taxes, compared to 11 per cent of those earning more than double the MBM. Additionally, people who are less educated and people who are recent immigrants tend to file less, as do Indigenous people.¹³ Notably, renters are less likely to file than homeowners, a key point for our climate policy and inflation analysis.

Large-emitter pricing systems

Given the central role of energy in the production of a vast array of goods and services, there are also secondary effects on prices due to changes in costs across the supply chain. To mitigate concerns over domestic emissions pricing affecting domestic and international competitiveness, large industrial emitters are granted "output-based allocations," akin to the lump-sum rebates received by individuals (Dobson & Winter, 2018). While these allocations don't eliminate the incentive for businesses to reduce emissions, they do moderate the influence of emissions pricing on input costs and, subsequently, prices faced by households. Determining how such assistance to large emitters affects prices, however, is a challenge.

Recent work by Winter et al. (2023) explores this factor by assessing the cost increments at each supply chain stage, considering both the direct effects of emissions pricing on specific sectors and the cascading impacts on all sectors involved in providing inputs. They find that, with a \$65 per tonne carbon tax, indirect household costs range between \$270 annually in Newfoundland and Labrador and \$641 in Saskatchewan. Absent the subsidies given to large industrial emitters within Canada, these costs would have doubled. The data reveal that indirect costs, especially those related to food prices, are significantly lower due to this industrial policy. For instance, at \$65 per tonne, the average household in Ontario experiences only a two-dollar increase in monthly grocery costs, and in Alberta,

¹² The Market Basket Measure is Canada's official poverty measure, and is an income threshold "based on the cost of a specific basket of goods and services representing a modest, basic standard of living" (Statistics Canada, 2021).

¹³ See Earnscliffe Strategy Group (2022).

it is five dollars. We illustrate these effects in figure 9, originally reported by Fellows and Tombe (2023), for a selection of non-energy goods and services. Similarly, Tombe and Winter (2024) examine how emissions pricing affects food prices in Canada. They find a very small effect, due to the fact that direct emissions in crop and animal production are mostly not priced, and because large-emitter systems dampen the effect of pricing on emissions-intensive sectors that are inputs to agricultural production (e.g., fertilizer). The results here clearly demonstrate that the indirect effects of emissions pricing on consumer prices are considerably mitigated by output-based allocations.



Figure 9. Indirect costs of \$65/tonne emissions price

Source: Fellows and Tombe (2023), which was based on Statistics Canada Table 11-10-0222-01 and Winter et al.'s (2023) unpublished appendix (available on request).

Note: Displays the average monthly indirect cost of emissions pricing, with and without output-based allocations to large emitters. Output-based allocations combine emissions pricing with a performance standard and output subsidies for large industrial emitters. For details on policy design, see Dobson and Winter (2018) and Böhringer et al. (2023).

CONCLUSION

This paper provides a comprehensive analysis of the effect of emissions-pricing policies on household affordability challenges in Canada. We find significant differences in the impacts of such climate policies across products, provinces, family types and income levels. Households in provinces with higher emissions intensities and colder climates naturally tend to experience more pronounced effects on their energy costs. Similarly, lower-income families and those with children face distinct challenges, which could lead to greater financial strain without mitigating measures in place. Our evaluation of current policies, such as British Columbia's Climate Action Credit and the federal Canada Carbon Rebate, shows that these play a crucial role in alleviating the financial burden of emissions pricing. For example, the federal rebate system, which distributes revenue from emissions pricing back to households, typically results in a net benefit for many Canadian families, particularly those in lower income brackets.

Governments could further improve their understanding of the impact of emissions pricing by carefully considering how it affects different households based on their characteristics, such as income, region and family size, and making this analysis public. Clearer communication of these impacts would help the public understand how emissions pricing affects affordability. Additionally, policies could be fine-tuned to address the remaining financial impacts more effectively. British Columbia, for instance, could consider adopting a similar approach to the federal government or increasing its rebate amounts to ensure that more households receive rebates that exceed the additional cost from the carbon tax. This would help a greater proportion of residents come out ahead under emissions pricing, particularly in regions where energy costs are higher.

Our analysis also emphasizes that while emissions pricing has a relatively small impact on overall inflation, many households are facing affordability challenges due to factors beyond climate policies. The slow pace of income growth is an equally important — or potentially more important — factor affecting household affordability. Addressing this issue alongside climate policy would provide a more comprehensive solution to the affordability challenges many Canadians face. Ensuring that income growth keeps pace with rising costs is essential for maintaining household purchasing power and preventing more families from losing ground financially.

In conclusion, while the adverse effects of emissions pricing on affordability are often overstated, continuing to refine these policies to protect vulnerable households and ensuring that the benefits of emissions pricing are more evenly distributed remains important. Thoughtful policy adjustments, along with a stronger focus on income growth, would allow governments to pursue climate goals without compromising affordability for Canadian households.

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