Forest Lavoie
Conseil
Analyses et stratégies • Agroalimentaire

Impact Study on a Minimum Wage Increase in the Agricultural Sector

Final report presented to AGRIcarrières - Comité sectoriel de main-d'oeuvre de la production agricole and the Union des producteurs agricoles du Québec

AGRIcarrières
Comité sectoriel de main-d'oeuvre
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UPA POUVOIR NOURRIR
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1. Mandate, objectives and process

1.1 Mandate context and comprehension

For several months, people across Canada and in Quebec have been discussing the potential ramifications of increasing the minimum wage to $15/hour. While the Government of Quebec has not taken the leap and directly increased its minimum wage to $15/hour, in January 2017 it announced that it would gradually increase the minimum wage over four years. According to the announcement, Quebec's minimum wage will gradually increase by $1.70/hour, rising from $10.75/hour in 2016 to $12.45/hour in 2020.[1]

In the wake of the announcement and the ensuing discussions surrounding a significant increase in the minimum wage, AGRIcarrières and its partners decided to take a closer look at the ways in which a minimum wage increase could affect the agricultural sector. The agricultural industry, particularly its horticultural sectors (fresh vegetables, strawberries and raspberries, apples, etc.), has some very real concerns. Labour represents a significant proportion of its production costs, and competition with imported products is particularly fierce. It is important to determine whether agricultural businesses could remain competitive and profitable if the minimum wage were to suddenly increase. It is equally important to determine how this increase would affect various agricultural sectors according to their specific business environments.

AGRIcarrières and its partners therefore mandated Forest Lavoie Conseil (FLC) to study the potential impact of a sudden minimum wage increase on the competitiveness of Quebec's various agricultural sectors for the purpose of developing mitigation strategies if needed. Two minimum wage increase scenarios were studied: one where the minimum wage was raised to $12.45/h, which is the rate announced by the Government of Quebec for 2020; and one where the minimum wage was raised to $15/h, which is the rate currently being discussed in several Canadian provinces and American states.

1.2 Mandate objectives

The primary objective of this mandate:

- Identify and explain the potential impact of a sudden minimum wage increase on the competitiveness of Quebec's various agricultural sectors in order to develop mitigation strategies, where necessary.

The specific objectives were:

- Review existing literature to gain a better understanding of the problem and to predict the repercussions of a sudden, significant minimum wage increase. In particular, this literature covers:

  - ➢ the evolution of the minimum wage, with an overview of the current situation in Quebec, in other potentially competing provinces, and in other agricultural regions in North America, Central America and certain South American countries, namely Brazil, Peru and Chile;

  - ➢ how price increases are passed along from a sector to the consumer, based on the sector's structure and makeup as well as the openness of its interprovincial and/or international markets;

  - ➢ the economic theories and studies about comparative advantages, industry competitiveness and business and employment localization/offshoring;

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[1] http://www.fil-information.gouv.qc.ca/Pages/Article.aspx?idArticle=2501195313

> ➢ the ripple effects of an increased minimum wage on employees receiving higher wages; and

> ➢ consumer purchasing behaviours following a relative increase in their revenue and a relative increase in the price of certain local foods.

- Assess the current labour conditions (job structure, payroll size, etc.) and the particular business environment (sector structure, pricing methods, current and potential competition,[2] etc.) that could exacerbate or mitigate the effects of a sudden, impactful minimum wage increase in the agricultural production industry, particularly within the following sectors: horticulture (strawberries/raspberries, apples, fresh vegetables), processing fruits and vegetables, dairy, pork, maple products, poultry, and table eggs.

- Catalogue and analyze economic impacts (provincial and extraprovincial production costs, relationship with income security programs, sale price of a food product, replacement value, market access, competition in open markets, business losses, offshoring, etc.) and potential structural changes (changes in salary structure, job losses, business closures, etc.) while identifying similarities and differences of the effects between each agricultural sector.

- Develop potential options based on policies or exceptions that have been developed in other areas to protect the agricultural sector from the effects of a minimum wage increase.
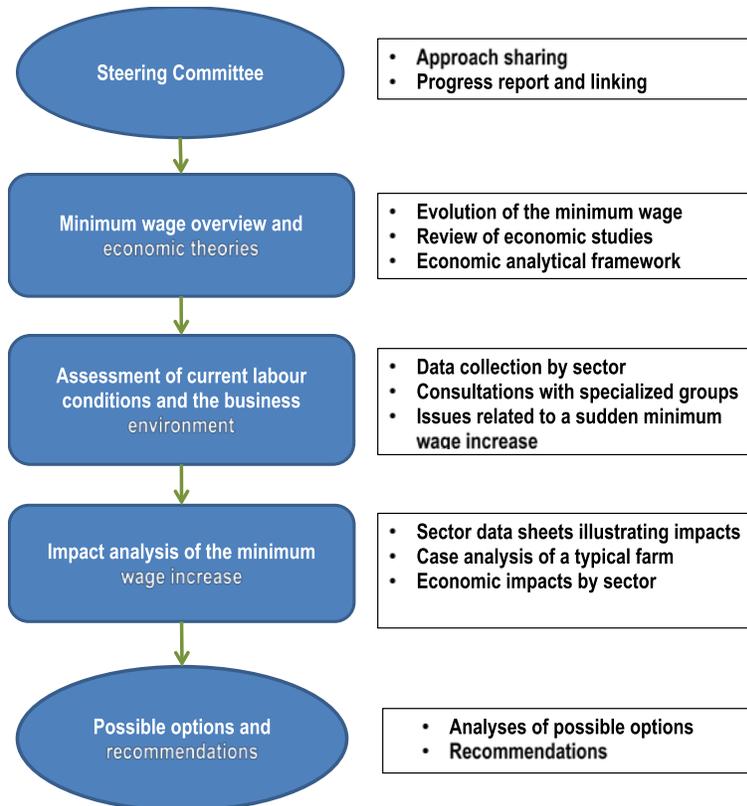
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[2] For example, current competition may come mostly from imports. However, a minimum wage increase could increase the competitiveness of other Canadian provinces.

1.3 Process

In order to reach the objectives that were set, FLC used the process shown in the following diagram.

Figure 1: Study process

Using this process, the following activities were performed:

- Creation of a pilot committee composed of representatives from AGRIcarrières, the UPA and specialized groups whose production was being studied:
    o Two meetings were held with the pilot committee.
    o Regular follow-up meetings were held (by phone, email or in person) with project managers at AGRIcarrières.
- Relevant documents were gathered and a document review was performed.
- Specific consultation meetings were held with the sectors being studied to determine various aspects, such as:
    o Workforce overview (size, pay, etc.)
    o Business environment and pricing processes
    o Farm type
    o Information sources and proposed approach for the impact analysis
    o Issues related to a minimum wage increase in the sector, etc.

- From the information gathered:

  o A general agricultural workforce data sheet was created. This sheet was checked many times throughout the project, both by AGRIcarrières and by the production sectors being studied.

  o Nine sector data sheets were produced. Each illustrates the impacts of a minimum wage increase to $12.45/h or $15/h on each of the sectors being studied. These data sheets were checked by each sector several times throughout the project.

- Potential options were analyzed. Using case studies of other jurisdictions that successfully protected the agricultural industry (or other industries) from the effects of a minimum wage increase, the potential options for agricultural production sectors in Quebec were analyzed.

2. Document review

2.1 Document review objectives

This document review aims to provide a clearer image of the problem and identify elements that are essential to the impact analyses for the production sectors being studied. More specifically, it covers:

- the economic theories and studies about comparative advantages, industry competitiveness and business and employment localization/offshoring;
- the ways prices are transmitted from a sector to its consumers, depending on the sector's structure and makeup and the openness of its interprovincial and/or international markets;
- the effects of a minimum wage increase on:
  - consumer purchasing behaviours following a relative increase in their revenue and a relative increase in the price of certain local foods;
  - businesses;
- the ripple effects of an increased minimum wage on employees receiving higher wages.

The information gathered from the document review will guide the impact analyses for the nine agricultural production sectors being studied. This information will also provide a clearer picture of the factors that affect the anticipated impacts, as well as their severity, particularly in terms of competitiveness.

2.2 Economic theories: comparative and competitive advantages

This section discusses various economic theories regarding comparative advantages, sector competitiveness and business and employment localization/offshoring. It also lists various factors that influence sectors' competitiveness. For example, it may show how a price increase (such as one driven by an increased minimum wage) in one area can affect its competitiveness with other production regions or lead to job offshoring.

2.2.1 Comparative advantage theories

The theories of absolute advantage and comparative advantage were first formalized by Ricardo in 1817 (Feenstra and Taylor, 2008).[3] An economy has an absolute advantage when its unit price for a good is lower than that in another economy. Comparative advantage, on the other hand, measures the opportunity cost of producing one good over another. In other words, absolute advantage analyzes a single good, while comparative advantage analyzes several goods. In Ricardo's model, comparative advantage is created through a difference in production technologies. The comparative advantage theory can also be applied to international trade models based on the availability of resources (production factors). These two theories have led to many other international trade models, in which comparative advantages are determined by differences in technology and production factor endowments. Additionally, Helpman (2010)[4] states that institutions play a role, whereas

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[3] Feenstra, R.C. & A.M. Taylor. 2008. *International Economics*, Worth Publishers, New York.

[4] Helpman, E. 2010. Labor Market Frictions as a Source of Comparative Advantage, with Implications for Unemployment and Inequality. NBER Working Papers 15764, National Bureau of Economic Research, Inc.

Mani and Hwang (2004)[5] posit that comparative advantages come from consumer demand. The latter state that consumer preferences and income can drive the price of a final good down (or up), providing an advantage to the countries producing this good. Siggel (2006)[6] therefore suggests a broader definition of comparative advantage, given that the transition from a "simple" economy to one with many goods and production factors means that comparative advantage comes from primary (labour, capital, etc.) or intermediate (energy, animal feed, manure, etc.) factors, from technological differences or from differing production scales. Since there are so many potential sources of comparative advantage, measuring it can be difficult. This is particularly evident in sectors that have supply management, since they are regulated; resource allocation is not determined solely be economic factors. However, as Larue and Gervais (2008)[7] have pointed out, few studies of the agricultural industry have measured comparative advantage.

2.2.2 Competitiveness theories

In any case, a country's comparative advantage implies that it is more competitive in its provision of a good. It is from this concept that the ideas of competitiveness and competitive advantage emerged. However, it has only recently begun to be used on a macroeconomic (country) scale (Siggel, 2006[8]; Grant, 2011[9]). On a mesoeconomic scale (sectors or regions), the idea of competitiveness and its measurement has gained more traction. Michael Porter, an economist at Harvard, is one of the leading voices on the subject.

Porter (1985)[10] based his ideas on the fact that hypotheses on comparative advantage provided incomplete explanations of trade flow due to economy of scale, unequal competition in several sectors and increasingly differentiated goods, all of which are factors related to demand. Furthermore, due to globalization, businesses do not rely solely on production factor endowments from a single country. Porter's approach has been lauded as a perfect synthesis of various international trade theories and an innovative representation of competitive advantages in international trade (Grant, 2011)[11].

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[5] Mani, A. & J. Hwang, J. 2004. Income Distribution, Learning-by-Doing and Comparative Advantage. *Review of Development Economics* 8: 452-473.

[6] Siggel, E. 2006. International competitiveness and comparative advantage: a survey and a proposal for measurement. *Journal of Industrial Competition and Trade* 6: 137-159.

[7] Larue, B. & J. P. Gervais. 2008. The Assessment of the Concept of Revealed Comparative Advantage and its Applicability in the Allocation of Egg Overbase Production. Report prepared for the National Farm Products Council. Ottawa.

[8] Siggel, E. 2006. International competitiveness and comparative advantage: a survey and a proposal for measurement. *Journal of Industrial Competition and Trade* 6: 137-159.

[9] Grant, R.M. 2011. National economic development and The Competitive Advantage of Nations. In *Competition, Competitive Advantage and Clusters.* Edited by R. Huggins and H. Izuski. Oxford University Press.

[10] Porter, M.E. 1985. Competitive advantage: creating and sustaining superior performance. New York, NY: Free Press.

[11] Grant, R.M. 2011. National economic development and The Competitive Advantage of Nations. In *Competition, Competitive Advantage and Clusters.* Edited by R. Huggins and H. Izuski. Oxford University Press.

Porter (1990)[12] suggests a "National Diamond" diagram for analyzing the competitive advantages of a country or region. Porter explains that each country has four primary pillars that describe the business environment in which it operates. These pillars are: (i) factor endowment; (ii) demand conditions (consumer preferences); (iii) related and supporting industries; and (iv) strategy, structure and rivalry. Porter argues that companies are more likely to succeed in industry sectors where the diamond is the strongest. This diamond is a system whose elements reinforce each other. Therefore, when analyzing competitiveness, a sector must account for all of these elements. For this analysis, productivity determinants had to be identified, as productivity has been identified as the final measurement of competitiveness. The pillars of productivity can be sorted into three groups: (i) basic requirements; (ii) efficiency enhancers; and (iii) innovation and sophistication factors.

On a business scale, Porter (1985)[13] developed a method of analyzing competitive advantage determinants that accounts for value chains as a whole. Among others, the author has identified three main sources of competitive advantage: **(i) cost leadership, which creates lower prices; (ii) product differentiation; and (iii) focus, or technological advantages coming from innovation.** Cost or technological leadership leads to a lower-cost end product that generates profits similar to that of competitors (Huggins and Izuski, 2011).[14] Even if the differentiation strategy is initially costly, it can be managed through cost leadership and technological innovation (Porter, 1985: pp. 17–18).[15]

Finally, note that macroeconomic factors can affect price advantage. In Canada, currency fluctuations can reinforce or undermine price advantages on international markets. For example, a higher Canadian dollar can hinder competitiveness of Canadian sectors.

2.2.3 Business localization/offshoring

Competitiveness factors throughout the sector will influence production localization and offshoring. For example, a processing industry will determine its location by assessing not only the cost of its primary factor input and workforce, but also the cost of transporting that factor input to its processing unit, plus the cost associated with accessing the end market. Therefore, market proximity is a significant factor (Disdier and Mayer, 2004).[16] Byrkett et al. (1976)[17] provide an example of all of the factors that go into determining the location of a slaughterhouse. Agglomeration effects, which allow one or more sectors to reduce costs, may also be a factor (Jones, 2017;[18] Prager, 2015[19]). These effects can improve the overall competitiveness of a sector and encourage businesses to remain in their own countries.

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[12] Porter, M.E. 1990. The Competitive Advantage of Nations. New York Press.

[13] Porter, M.E. 1985. Competitive advantage: creating and sustaining superior performance. New York, NY: Free Press.

[14] Huggins, R. & H. Izuski. 2011. Competition, Competitive Advantage and Clusters: The ideas of Michael Porter. In *Competition, Competitive Advantage and Clusters.* Edited by R. Huggins and H. Izuski. Oxford University Press.

[15] Porter, M. E. 1985. Competitive advantage: creating and sustaining superior performance. New York, NY: Free Press.

[16] Disdier, A. C., & T. Mayer, T. 2004. How different is Eastern Europe? Structure and determinants of location choices by French firms in Eastern and Western Europe. *Journal of comparative Economics*, 32(2), 280-296.

[17] Byrkett, D. L., Miller, R. A., & E.P. Taiganides. 1976. Modeling the optimal location of the cattle feeding industry. *American Journal of Agricultural Economics*, 58(2), 236-244.

[18] Jones, J. 2017. Agglomeration economies and the location of foreign direct investment: A meta-analysis. *Journal of Regional Science.*

[19] Prager, J. C. 2015. La dynamique économique des territoires. *Revue de l'OFCE*, (7), 13-74.

However, several studies emphasize that competitiveness is not the only factor considered when choosing whether to outsource a business. Other factors include institutional stability (Disdier and Mayer, 2004)[20] and the overall stability of the productive fabric (Jones, 2017).[21] This is the case, for example, in the supply management system. Finally, note that "neighbourhood" conditions can also affect a business' location decision (Weterings, 2015).[22] This is a key factor for agricultural businesses operating in short channels.

Section summary

The economic theories and studies about comparative advantages, industry competitiveness and business and employment localization/offshoring.

The economic theories studied here highlighted the fact that sectoral competitiveness is complex and affected by a number of factors, such as cost leadership, product differentiation, technological advantages and various macroeconomic factors that influence prices.

This competitiveness then affects business localization/offshoring. Institutional and economic stability are also important factors.

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[20] Disdier, A. C., & T. Mayer. 2004. How different is Eastern Europe? Structure and determinants of location choices by French firms in Eastern and Western Europe. *Journal of comparative Economics*, 32(2), 280-296.

[21] Jones, J. 2017. Agglomeration economies and the location of foreign direct investment: A meta-analysis. *Journal of Regional Science.*

[22] Weterings, A. 2014. What makes firms leave the neighbourhood?. *Urban Studies*, 51(8), 1613-1633.

2.3 Price transmission factors in agri-food sectors

This section documents the factors that influence price transmission to the market and between the links in each sector's supply chain. This information will help to determine which factors are present in each sector during impact analyses for the nine agricultural production sectors being studied. It will also determine how a price increase (such as one driven by a minimum wage increase) will be transmitted to other links in the chain or passed on to the consumer.

Vertical price transmission influences wealth sharing within a sector. When it is coordinated and efficient, this price transmission leads to a certain symmetry in price movements. Otherwise, the prices received by actors within the sector may not reflect the costs and risks they themselves generate. This leads to asymmetrical price transmission. There are two types of asymmetry. The first involves an unequal *amount* of price transmission, wherein a price change is not entirely passed on to the next link in the supply chain. In this case, a $1 price increase would translate to a less than $1 price increase for the next link in the chain. Second, there is asymmetry in the *speed* of transmission, that is, a price change in one link does not reach the next link right away.

In general, the literature suggests that five factors influence price transmission (Gervais and Lambert, 2008).[23] The first factor is *consumer influence*. For example, consumers are increasingly concerned about the origin and quality of their products. Therefore, businesses "downstream" from a sector will incur certain costs (e.g. certification, identification of origin) in response. These additional costs may be transmitted to providers or consumers, depending on the situation. For example, since producers' short-term supply is often relatively fixed, additional costs due to changes in consumer trends can easily be passed along to them. In that case, they may offer a lower price for their products. Additionally, the intensity of consumers' reaction to a price change will determine whether the cost of a trend-related change will be transmitted to the consumer. For instance, the demand for a highly differentiated product is usually consistent, so the industry can more easily transmit price increases caused by changing trends.

The second factor is *competition between links in the chain* (Lambert et al., 2004).[24] Strong concentration in one link within the sector can give it a certain amount of market power. This can either help it to prevent other links from transmitting their price increases or allow it to more easily transfer any of its own increases (for example, from salary raises) to other links.

Coordination and marketing mechanisms for agricultural products are the third factor in price transmission. For instance, individual contracts and collective marketing can help coordinate relationships between different links in the supply chain. These mechanisms determine each link's ability to transfer price increases and which link will assume the most risk. Collective marketing allows for good vertical coordination among producers, increasing their ability to transmit price increases to other links in the chain. Moreover, several recent studies have found that inventory levels play a role in price transmission symmetry (Abassi et al., 2012).[25] When one link has a larger stock of product, other links are not able to transmit price changes to that link as quickly. Inventory therefore acts as a sort of buffer, allowing that link to continue providing product even when production costs are high. The actors responsible for managing stock therefore influence the way prices are transmitted to other links in the supply chain.

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[23] Gervais, J-P. & Lambert, R. 2008. La transmission des prix dans les filières agroalimentaires. *Bioclips* volume 11, no. 1.

[24] Lambert, R., Criner, G. & Rancourt, Y. 2004. Concentration, prix et pouvoir de marché dans l'industrie alimentaire canadienne. *CRÉA Research Series*, SR.04.09.

Fourth, *external factors* play a role in price transmission. For instance, the cost structure of retail businesses can affect price transmission, because these businesses eventually transmit price increases to certain links. For example, retailers cannot transmit an increase in labour costs to an energy-based link. It may be easier for them to transmit that cost to consumers if demand is inelastic or to their agricultural product provider if they have some amount of market power. However, there can be costs associated with adjusting the retail price of agricultural products. This is true for retailers. In the short term, at least, it is not profitable for retailers to transmit price changes (Azzam, 1999).[26]

Finally, *border openness* affects market prices, and therefore the ability to transmit prices. Consider, for example, what would happen if borders were to close completely. A price increase on an entirely inelastic demand would lead to little or no decrease in consumption. Therefore, price increases could be transmitted fully. On the other hand, if borders were entirely open, global prices would prevail. It would be impossible to increase prices on the local market following an increase in costs. Furthermore, fully open borders would mean that locally produced agricultural goods could be easily replaced with imported goods.

The inset below shows the impact of a $15/h minimum wage on retail prices in Seattle, USA. Note that the impact on retail prices would vary depending on the sector.

Inset 1: Impact of a $15/h minimum wage on retail prices in Seattle, USA.

According to a recent University of Washington study (2016),[27] one year after the minimum wage was increased to $15/h in Seattle, retail prices had not increased in most businesses. This was particularly true in pharmacies and grocery stores, where most employees were paid near minimum wage, yet retail prices did not rise. In these sectors, strong competition between businesses was identified as a significant mitigating factor, as businesses were unable to increase retail prices significantly to compensate for increased labour costs. This may not be the case for less competitive markets, which could more easily offset the costs of an increased minimum wage by increasing retail prices (Nilsson and MacDonald, 2016)[28].

For example, the food service industry in Seattle did experience price increases of 7–9% in one year. The study also lists some of the strategies used by that industry to reduce the impact of increased labour costs, such as closing businesses during low-traffic hours.

It shows that some industries were more easily able to absorb cost increases or transmit those increases to the market. Additionally, the level of competition between food retail businesses seem to reduce the ability to transmit cost increases to consumers, therefore reducing agricultural producers' ability to transmit their own costs to retailers.

Finally, note that as Basker and Khan (2016)[29] have indicated, different studies have drawn different conclusions about the effects of a minimum wage increase on retail prices.

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[25] Abbassi, A., Tamini, L.D. & Gervais, J-P. 2012. Do Inventories Have an Impact on Price Transmission? Evidence from the Canadian Chicken Industry. *Agribusiness*, 28: 173-186.

[26] Azzam, A. M. 1999. Asymmetry and rigidity in farm-retail price transmission. *American Journal of Agricultural Economics*, 81(3), 525-533.

[27] https://www.fastcompany.com/3059118/after-a-year-seattles-new-minimum-wage-hasnt-raised-retail-prices

[28] Nilsson, E., & D. MacDonald. (2016). New Findings Regarding the Effect of the Minimum Wage on Prices.

[29] Basker, E. & M.T. Khan. 2016. Does the Minimum Wage Bite into Fast-Food Prices?. *Journal of Labor Research*, 37(2), 129-148.

Section summary

Price increase transmission throughout a sector — how and where price increases are transmitted — depends on the sector's structure and composition and the openness of its interprovincial and/or international markets.

This section identifies the various price transmission factors within a sector: consumer influence, competition between links and degree of concentration, coordination and marketing mechanisms for agricultural products, external factors such as retail cost structure, and openness of borders (substitution by imports).

In the food retail industry specifically, the ability to transmit price increases to consumers is limited. Depending on the sector's characteristics, price increases may therefore be transmitted between links in the supply chain or to the consumer.

2.4 Agri-food sector characteristics: competitiveness and price transmission factors

Using the theories described in sections 2 and 3, we will now take a closer look at the competitiveness and price transmission characteristics of the sectors that are the focus of this study. By analyzing competitiveness and price transmission, the sector analyses (sector data sheets) generate a clearer picture of the impacts of a minimum wage increase, which can be affected by market openness or the structure of the segments within each sector.

We have grouped the sectors into four groups based on their shared characteristics:

- Dairy, chicken, turkey and eggs, which are under supply management and have relatively little international/interprovincial trade
- Strawberries/raspberries, fresh apples and vegetables, which have relatively large interprovincial/international trade
- Pork and processing fruits and vegetables, which are sectors whose products will be processed, so the relationship between producers and processors plays a major role
- Maple syrup, which is under provincial supply management but relies heavily on international trade

For each of these major groups, we will describe:

- General production characteristics;
- Supply;
- Sector organization;
- Consumer demand characteristics;
- Competitiveness characteristics.

2.4.1 Products under supply management: dairy, chicken, turkey and eggs

2.4.1.1 General characteristics of production under supply management

Production under supply management is characterized by import control at the borders in the form of tariffs. Supply management policies were established with the intent of guaranteeing Canadian consumers regular supply at competitive prices while allowing producers to cover their production costs. In order for this policy to effectively stabilize producer revenue and bring balance to the market, it relies on three pillars: (i) production discipline (national production quota), which is determined by Canadian consumer demand and to which each province contributes; (ii) setting minimum producer prices according to production costs; and (iii) import control through border tariffs.

2.4.1.2 Supply

Most of the supply in the dairy, chicken, turkey and table and hatching egg sectors is domestic. An additional 5–25% (depending on the sector) of Canadian consumption is fulfilled by imports. Canadian producers are able to meet 80–95% of domestic consumer consumption. Even though imports make up a relatively small part of the Canadian market, they show that the domestic market is not fully insulated from fluctuations in international markets.[30] However, the ability to substitute local produce with imports is limited due to import control mechanisms. Demand for supplementary imports can be justified only in the event of a supply deficit on the domestic market.[31]

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[30] Tamini L.D., J-F. Forest & M. Hernandez 2007. Études des facteurs du marché canadien du poulet. Final report prepared by ÉcoRessources Consultants for Chicken Farmers of Canada.

[31] http://www.international.gc.ca/controls-controles/report-rapports/index.aspx?lang=eng

Little data are available on interprovincial trade in sectors under supply management. However, the data that are available indicates that interprovincial trade does exist. For example, Quebec produced nearly 310 million kilograms of chicken in 2016. Approximately 5% of this was imported from other provinces, while approximately 8% was exported.[32]

In the short term, a minimum wage increase should not affect this general production profile, as processing facilities in Quebec supply the majority of processed product. However, a minimum wage increase could affect the provinces' production quotas in the medium term due to (i) a decrease in Quebec's competitiveness and (ii) a potential decrease in demand due to higher retail prices.

2.4.1.3 Sector organization

Vertical integration is not predominant in sectors under supply management.[33] Instead, these sectors are characterized by highly concentrated intermediary links in the supply chain, such as graders and processors for table eggs and slaughterhouses for poultry. In these sectors, the two primary agents have over 75% of the market share.[34] In 2015–16, three factories were responsible for processing just over 77% of fluid milk while nine factories were responsible for processing nearly 78% of industrial milk.[35] This strong concentration of intermediary links could theoretically affect the way that sudden price changes by producers are transmitted along the supply chain. Gervais and Devadoss (2006)[36] show that the highly concentrated nature of this link gives it some negotiating power. For poultry[37, 38] and dairy, studies have shown that retail prices were not being fully transmitted to intermediaries. In other words, the retail portion of the chain should not be able to transmit its price increases to intermediaries (e.g. graders, processors, slaughterhouses). Instead, it must absorb the cost or transmit it to consumers by increasing retail prices. In the latter case, the final impact of a minimum wage increase on retail prices will at least partially reflect the effects of this increase on the links in the supply chain (Chavas and Kim, 2005).[39] In the end, a production cost increase will be partially or completely transmitted to the intermediary links. In turn, these links will transmit some or all of that increase to the retail sector, depending on their market power.

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[32] http://www.agr.gc.ca/eng/industry-markets-and-trade/statistics-and-market-information/?id=1361289956531

[33] Royer, A., & F. Vézina. 2012. *Intégration verticale et contractualisation en agriculture : État de la situation au Québec.* Taken from http://personnel.fsaa.ulaval.ca/fileadmin/fichiers/fichiersPersonnel/AnnieRoyer/Rapport_final_-_Integration.pdf

[34] Three grading facilities, belonging to two companies, grade the majority of Quebec's eggs. Nutri-Oeuf Inc. and Oeufs Ovale SEC both belong to Nutrigroupe and grade 70% of Quebec's eggs. Ferme St-Zotique Ltd., which is owned by Burnbrae Farms, grades approximately 25% of the province's eggs (MAPAQ 2014).

[35] http://www.groupeageco.ca/fsl/

[36] Gervais, J. P., & S. Devadoss. 2006. Estimating bargaining strengths of Canadian chicken producers and processors using a bilateral monopoly framework. *Agribusiness*, 22(2), 159-173.

[37] Tamini L.D., J-F. Forest & M. Hernandez. 2007. Études des facteurs du marché canadien du poulet. Final report prepared by ÉcoRessources Consultants for Chicken Farmers of Canada.

[38] Gervais, J. P., & S. Devadoss. 2006. Estimating bargaining strengths of Canadian chicken producers and processors using a bilateral monopoly framework. *Agribusiness*, 22(2), 159-173.

[39] Chavas, J. P., & K. Kim. 2005. An econometric analysis of price dynamics in the presence of a price floor: the case of American cheese. *Journal of Agricultural and Applied Economics*, 37(01), 21-35.

The table egg sector is well equipped to transmit increased costs, such as those caused by a minimum wage increase, as long as producer prices are equal to production costs. Price transmission is weak to moderate in the dairy sector, where prices are determined partly by national production costs and partly by global prices. Finally, price transmission is very weak in poultry and hatching eggs, because prices are the same as they are in Ontario.

2.4.1.4 Consumer demand characteristics

In Canada, the demand for products under supply management is largely inelastic.[40] This price elasticity is -0.81 for poultry and -0.35 for table eggs (Pomboza and Mbaga, 2007).[41] Overall, for products under supply management, consumer preference should not discourage price transmission, especially since chicken's cross-price elasticity with other meats is very weak. This is also the case for eggs' cross-price elasticity with other sources of protein (Pomboza and Mbaga, 2007). [42]

Recent studies of the Canadian market have found that demand is equally inelastic in the dairy sector. In the whole milk sector, Ntetami (2012) found that elasticity was -0.81 for whole milk, -0.97 for yogurt, -0.66 for ice cream and -0.41 for cottage cheese. According to Rude and An (2013), elasticity is -0.23 for cottage cheese, -0.4 for butter, -0.62 for ice cream and -0.81 for yogurt.[43] Other drinks (orange juice, coffee, tea, soda, etc.) can be substitutes for milk. However, the cross-price elasticity between dairy products and these other drinks is very weak (Ntetami, 2012). Therefore, a price increase in milk following an increase in labour costs should not lead to these products being substituted for milk more frequently.

As far as we know, there are no data on the elasticity of specialty cheeses. That said, these products are highly differentiated but have close substitutes. We believe that demand is elastic for different types of cheeses, with cross-price elasticity being equally significant, as consumers can easily substitute one type of specialty cheese for another.[44]

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[40] Demand is considered inelastic when a 1% price increase translates to a less than 1% decrease in consumption. Demand is considered elastic when a 1% price increase translates to a greater than 1% decrease in consumption.

[41] Pomboza, R. & M. Mbaga. 2007. The Estimation of Food Demand Elasticities in Canada. AAFC.

[42] Pomboza, R. & M. Mbaga. 2007. The Estimation of Food Demand Elasticities in Canada. AAFC.

[43] These data are also available on the FAPRI website (http://www.fapri.iastate.edu/tools/elasticity.aspx)

[44] van Tongeren, F., Disdier, A. C., Ilicic-Komorowska, J., Marette, S., & M. von Lampe. 2010. *Case Studies of Costs and Benefits of Non-Tariff Measures: Cheese, Shrimp and Flowers* (No. 28). OECD Publishing.

2.4.1.5 Competitiveness characteristics

Sectors under supply management barely have to deal with international competitiveness, as they mostly serve the domestic market. However, one of the pillars of supply management is setting prices based on production costs. Note that producer price increases are not necessarily automatic for all sectors under supply management. For example, prices for milk are set according to national production costs, as well as international prices for some classes of milk. Therefore, if production costs were to increase in Quebec but not other provinces, the price increase for Quebec producers would have a relatively small net effect. Cost calculations account for global prices, the consumer price index and Quebec's share of production in Canada. For poultry, the price in Quebec is equal to the price in Ontario. The price in the latter is set according to its production costs. Therefore, if there is no change in Ontario, the price in Quebec will not be affected by an increase in production costs. Finally, for table eggs, the price is based on production costs in Quebec. In this scenario, a labour-related cost increase in Quebec would be reflected by an increase in producer prices. Note that if Ontario were to raise its minimum wage, it would partially (for dairy) or totally (for poultry) change producer prices to reflect labour-related cost increases.

If the producer price is higher than the international producer price, it is worth reconsidering the effectiveness of the border protection system. An increase in production costs in sectors under supply management could theoretically render border tariffs (one of the pillars of the supply management system) less effective. However, our research found that most of the time, tariffs are high enough to ensure that a cost increase translates to weaker border protection (Rafajlovic and Cardwell, 2013; Rude and An, 2013; Rude and Gervais, 2006).[45, 46, 47]

Overall, an increase in producer price should not translate to greater pressure on products under supply management, seeing as consumption is minimally sensitive to price. However, dairy processing (cheese and butter) sectors may be more vulnerable.[48, 49] For these processed products, increased production costs could lead to a decrease in local supply, to the detriment of imports. Note also the issues related to the importation of dairy products such as diafiltered milk, which are not subject to supply management. These products are used in the processing industry and may reduce the sector's ability to transmit price increases due to the substitution effect.

As previously indicated, these sectors, except for the dairy sector, are also characterized by interprovincial trade. All else being equal, if Quebec's sectors were to experience decreased competitiveness, other provinces' relative share of production quotas could decrease in the medium term. In the short term, however, the system is fairly inflexible.

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[45] Rafajlovic, J., & R. Cardwell. 2013. The effects of a new WTO agreement on Canada's chicken market: A differentiated products modeling approach. *Canadian Journal of Agricultural Economics/Revue canadienne d'agroéconomie*, 61(4), 487-507.

[46] Rude, J. & J.P. Gervais. 2006. Tariff-Rate Quota Liberalization: The case of World Price Uncertainty and Supply Management. *Canadian Journal of Agricultural Economics* 54: 33-54.

[47] Rude, J. & H. An. 2013. Trans-Pacific Partnership: Implications for the Canadian industrial dairy sector. *Canadian Public Policy*, 39(3), 393-410.

[48] On, J. 2015. Trade Liberalization and its Impacts on the Canadian Industrial Dairy Sector (Master's dissertation, University of Guelph).

[49] Rasmussen, P. 2016. *The Impact of Trade Policy in Canadian Dairy* (Master's dissertation, University of Calgary).

2.4.2 Strawberries/raspberries, fresh apples and fresh vegetables

2.4.2.1 General horticultural production characteristics

These producers work in an open environment where imports put constant pressure on price and production levels in Quebec. Furthermore, these products are generally destined for the fresh market. Some products (such as carrots, onions and lettuce) are also exported.

2.4.2.2 Supply

In terms of strawberry/raspberry, apple and fresh vegetable production, data on Canadian imports and exports show that foreign markets dominate the supply of these products in Canada. Imported products are therefore available to replace local production in these markets. The importance of imports in the supply of strawberries/raspberries, apples and fresh vegetables means that some shocks (increased or decreased prices and costs) may be transmitted to the domestic market. Conversely, changes to costs or prices in Quebec would not really be transmitted to the markets from which the imports are coming, given Quebec's relatively small share of these markets (Carew et al., 2012).[50]

For Quebec fruit and vegetable distributors, the ability to substitute their supply with imports, at least in the medium term, means that the production sector may be unable to transmit its price increases to other links in the supply chain.

Finally, in horticultural sectors, the balance between supply and demand dictates market conditions. As indicated above, supply is determined by the size of local production each year and each month within a year, as well as by imports. This balance between supply and demand determines prices, as the quantities produced are relatively stable in the short term. For this reason, producers cannot transmit production cost increases. However, economic theory states that a (marginal) increase in production costs following a minimum wage raise will lead to a reduction in local supply if the projected price is equal. This may play out over the medium or long term.

2.4.2.3 Sector organization

Royer and Vézina (2012)[51] state that approximately 70% of domestic vegetable production in Quebec is marketed through long channels (wholesalers, major chains), while the rest is marketed through greengrocers, small retailers and short marketing channels (farmer's markets, farm kiosks).[52] Many studies have found that accessing major chains can be difficult, as they prefer to do business with a smaller number of suppliers. Royer and Vézina (2012)[53] also highlight that major chains tend to obtain their supply from a limited number of producers and distributors that are CanadaGAP certified and that also act as packagers. This organizational structure of vegetable sectors leads us to believe that wholesalers and retailers have significant market power, reducing producers' ability to fully transmit price changes.

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[50] Carew, R., Florkowski, W. J., & A. Doroudian. 2012. Market integration and relationship between farm-level prices: evidence from cherry market in BC, Washington and California. *Journal of International Agricultural Trade and Development*, 8(1), 43.

[51] Royer, A., & F. Vézina. 2012. *Intégration verticale et contractualisation en agriculture : État de la situation au Québec.* Taken from http://personnel.fsaa.ulaval.ca/fileadmin/fichiers/fichiersPersonnel/AnnieRoyer/Rapport_final_-_Integration.pdf

[52] Mundler, P., & S. Laughrea. 2016. The contributions of short food supply chains to territorial development: A study of three Quebec territories. *Journal of Rural Studies, 45,* 218-229.

[53] Royer, A., & F. Vézina. 2012. *Intégration verticale et contractualisation en agriculture : État de la situation au Québec.* Taken from http://personnel.fsaa.ulaval.ca/fileadmin/fichiers/fichiersPersonnel/AnnieRoyer/Rapport_final_-_Integration.pdf

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According to the MAPAQ (2015),[54] between 2009 and 2013 nearly half of apple production was put on the fresh market, but only a small portion of that was from direct sales. In Quebec, apples are marketed through a joint plan administered by the Fédération des producteurs de pommes du Québec (MAPAQ, 2011).[55] According to the *Règlement sur la mise en marché des pommes du Québec* [Quebec marketing regulation for apples], producers may only sell their apples directly to consumers or to an authorized agent. Quebec apples must meet the "Pommes Qualité Québec" standard. Producer prices are the result of negotiations between producers and packagers through a "price committee." Production costs, supply and demand all factor in to pricing for each variety of apple. Apple producers can therefore theoretically transfer part of a production cost increase. However, the significant presence of imports in total consumption, lower production costs in competing markets (British Columbia and the state of Washington) and the limited number of packagers definitely hinder the sector's ability to fully (or even partially) transmit price increases. One implication of a minimum wage increase could be a return of compensation from the ASRA program. However, this is unlikely due to the partnership between the ASRA program and AgriStability, which covers certain business losses.[56]

In some aspects, strawberries and raspberries are marketed in the same way as vegetables. To improve promotion, product availability and coordination within the sector, a coordination chamber was established in 2004. However, the coordination chamber is not involved in the price negotiation process.

2.4.2.4   Consumer demand characteristics

In Canada, the demand for horticultural products is considered inelastic: -0.84 for fruits and -0.65 for vegetables (Pomboza and Mbaga, 2007). Lundy (2014) also found similar results.[57] For these products, consumer preferences should not discourage price transmission in theory, especially since consumers can choose whether or not to pay for the "Produit du Québec" or "Aliments du Québec" labels, as proven by Rodier (2010).[58] Rodier also showed that foods labelled "Aliments du Québec" have a 2.8% bigger market share. However, it is important to note that in addition to substituting local products with imported ones, consumers are just as likely to replace fresh Quebec products with frozen ones.

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[54] Ministère de l'Agriculture, des Pêcheries et de l'Alimentation. 2015. Monographie de l'industrie de la pomme au Québec.

[55] MAPAQ. 2011. Monographie de l'industrie de la pomme au Québec. https://www.agrireseau.net/marketing-agroalimentaire/documents/pommemonographie.pdf

[56] http://www.fadq.qc.ca/statistiques/assurance-recolte/statistiques-annuelles/

[57] Lundy, A. 2014. The Canadian Demand for Healthy and Unhealthy Food: A Comparison of Food Elasticity Estimates Using Several Different Functional Forms. Master's research paper, McGill University.

[58] Rodier, F. 2010. «Mesure de l'impact de la marque de provenance Aliments du Québec sur la valeur du produit». Doctoral thesis, Sherbrooke University, Quebec.

2.4.2.5 Competitiveness characteristics

These sectors are the most likely to be affected by a minimum wage increase, due to the role that paid workers play in the production process. For example, production costs for apples are particularly influenced by four factors, which together account for approximately half of production costs: labour costs, factor input costs, storage costs and machinery repair and maintenance costs (FADQ, 2012).[59] Labour costs are strongly influenced by changes to Quebec's minimum wage because so many jobs pay that wage (Debailleul et al., 2013).[60] This is also true of the strawberry/raspberry and fresh vegetable sectors (see CRAAQ budgets).

Therefore, a cost leadership strategy (as discussed in section 2) cannot be used in these sectors because costs are directly affected by minimum wage increases. Additionally, the fruit and vegetable marketing strategy and the previously described place held by imports in overall supply can further disadvantage Quebec producers. However, in sectors like the apple sector, innovations such as the development of smaller apple trees can be implemented (Débailleul et al., 2013). This can facilitate harvesting operations by allowing them to become automated, reducing labour costs. However, for all of the agricultural production sectors being studied here, this process is not expected to have any effect in the short term, as the sectors are slow to adopt new practices. These innovations are also occurring in other sectors (for example, see Boivin et al., 2010),[61] increasing their competitiveness.

2.4.3 Processing fruits and vegetables and pork

2.4.3.1 General characteristics

Several elements must be considered when analyzing the processing fruits and vegetables sector, as well as the pork sector to a certain extent. First of all, most processing plants are located in Quebec, Ontario and the United States. Therefore, managers compare production costs for their businesses when making their decisions. Labour costs figure heavily into these comparisons, as labour is less expensive in some competing economies (e.g. China and Eastern European countries). Sectors in this category operate in an open market, where imports (and therefore global prices) are a key factor in balancing prices on the market. As a result, the ability of these sectors to transmit price changes is lower.

2.4.3.2 Pork supply and sector organization

Our research has shown that just over one quarter of the pork supply comes from imports, while approximately 80% of domestic production is destined for exportation (with approximately 15% going to other provinces in Canada and the rest going to the United States, Japan, South Korea, China and Mexico). Pork processing facilities obtain most of their supply from Quebec due to production marketing and the degree of vertical integration (Royer and Vézina, 2012; Royer and Gouin,

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[59] FADQ. 2012. Pommes tardives (modèle 2006) coût de production janvier à décembre 2010. Financière agricole du Québec, Lévis, Canada.

[60] Debailleul G, Tamini LD, Doyon M, Clerson-Guicherd MF, Jacques LS, Hernandez M, et al., 2013. Analyse prospective de la position concurrentielle du Québec en matière de production agricole dans un contexte de changements climatiques. Final report for the Ouranos consortium.

[61] Boivin, C., P. Deschênes, & L.D. Tamini. 2010. Évaluation technico-économique d'un système de refroidissement du couvert végétal dans la culture de la fraise à jours neutres en situation de production commerciale. Final report, CDAQ. p. 57 and appendices.

2015[62]). Many businesses are simultaneously involved in breeding, food production, swine production, slaughtering and processing. The level of vertical integration in the pork sector is already significant (58% in 2013) and may increase in the coming years (Royer and Gouin, 2015).[63] Vertical coordination of activities is based on various factors, such as biosecurity, slaughter weight optimization and all-in/all-out production.

The convention de mise en marché des porcs [pork marketing agreement] manages the sector,[64] as it helps to improve the quality of swine produced in Quebec. They also determine how pigs are sorted into three categories: "porcs propriétaires," "porcs spécifiques" and "porcs de proximité." The primary purpose of this division is to reduce transportation costs by encouraging local supply. The price paid by buyers for all swine is the US price for a comparable quality (Paré, 2012).[65] More specifically, "this price corresponds to the price paid to Éleveurs [de porcs du Québec] by all buyers throughout a delivery week, including pigs sold as surplus. Contributions, marketing fees, expenses and adjustments related to cooperative selling, [...] deductions for quality defects and penalties related to producer agreements will be deducted from this price. Bonuses related to producer agreements, compensation for delayed slaughter and index losses and transport fees will be added to this price." [translation] [66]

2.4.3.3   Processing vegetable supply and sector organization

Processing vegetables are marketed through a joint plan that covers peas, beans, sweet corn and cucumber. Producers sign annual contracts that specify areas or volumes with the industry (processors or authorized buyers).[67] Processing vegetables are obtained from other markets only to supplement inadequate volumes. Royer and Gouin (2015) indicate that for processing vegetables, processors depend on volumes from producers, particularly because of the availability of substitutes, i.e. grain corn and soy. This situation could mean that producers could also transmit cost increases. However, it is possible to obtain processing vegetables on markets other than the Quebec market (Ontario, bordering US states). Increased production costs due to an increased payroll could therefore drive buyers to seek supply outside Quebec and cause production to be moved elsewhere.

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[62] Royer, A. & D-M. Gouin (2015). *Coordination verticale dans les secteurs québécois du porc et des légumes de transformation : Statut, motivations et enjeux.* CIRANO, 92 pages.

[63] Royer, A. & D-M. Gouin (2015). *Coordination verticale dans les secteurs québécois du porc et des légumes de transformation : Statut, motivations et enjeux.* CIRANO, 92 pages.

[64] http://legisquebec.gouv.qc.ca/fr/ShowDoc/cr/M-35.1,%20r.%20281/ .

[65] Paré, E. 2012. Mise en marché des porcs au Québec : défis et perspectives.
www.accesporcqc.ca/nsphp/portail/publications.php?dir...en...porcs...

[66] http://legisquebec.gouv.qc.ca/fr/ShowDoc/cr/M-35.1,%20r.%20281/

[67] http://www.legumes-transformation.qc.ca/production/statistiques

2.4.3.4 Consumer demand characteristics

At -0.68, the demand for pork is inelastic. According to Pomboza and Mbaga (2007),[68] beef is a substitute good. A retail price increase for pork could therefore lead to it being substituted by beef. Furthermore, from a consumer point of view, beef does not appear to be differentiated from Quebec pork.

On an international scale, Quebec pork has a good reputation in export markets because it is well differentiated and because of "specialty" meats aimed at specific markets (for example, Japan). Canadian pork has a low price elasticity in the United States and South Korea, at -0.29 and -0.02 respectively (Mutondo and Henneberry, 2007).[69] This is also the case in the Japanese market (Felt et al., 2011).[70] Therefore, even if competition in international markets is greater due to higher-quality pork from the United States or Europe,[71] increased production costs due to a minimum wage increase should not affect its supply in international markets, as a differentiated product is the main purchase criterion. Furthermore, fluctuations in other costs associated with putting Quebec products on the market (such as transportation) are likely to have a larger impact on these products than the changes caused by a minimum wage increase.

As far as we know, there are no specific data on the price elasticity of processing fruits and vegetables.

2.4.3.5 Competitiveness characteristics

- Processing vegetables

Producers

Of the many processing vegetables produced in Quebec, only cucumber harvesting is semi-automated. Cucumber harvesting therefore requires a lot of manual labour, which is largely seasonal and provided by foreign workers (MAPAQ, 2014).[72] Harvesting is almost entirely automated for other crops. Moreover, the geographic distribution of processing vegetable producers is mostly determined by proximity to processing plants, as this proximity reduces transportation costs.

On average, producer prices are higher in Quebec than they are in Ontario. In 2013, the weighted average of peas, beans, sweet corn and cucumbers (PBCC) was $248/tonne in Quebec and $241/tonne in Ontario (MAPAQ, 2014)[73].

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[68] Pomboza, R. & M. Mbaga 2007. The estimation of food demand elasticities in Canada. AAFC.

[69] Mutondo, J. E., & S.R. Henneberry. 2007. Competitiveness of US Meats in Japan and South Korea: A Source Differentiated Market Study. In *2007 Annual Meeting, July 29-August 1, 2007, Portland, Oregon TN* (No. 9713). American Agricultural Economics Association (New Name 2008: Agricultural and Applied Economics Association).

[70] Felt, M. H., Gervais, J. P., & B. Larue. 2011. Market power and import bans: the case of Japanese pork imports. *Agribusiness*, 27(1), 47-61.

[71] See article in *la Terre de chez nous* at http://www.laterre.ca/actualites/alimentation/olymel-bataille-pour-ses-parts-de-marche.php

[72] MAPAQ. 2014. Monographie de l'industrie des légumes de transformation.

[73] MAPAQ. 2014. Monographie de l'industrie des légumes de transformation.

Processing

The industry is highly concentrated (MAPAQ, 2014),[74] and tends to favour growing existing companies. Doing so allows producers to take advantage of economy of scale, thereby reducing production costs. Note that factories in the United States are bigger on average. The American processing vegetable sector is the Quebec sector's main competitor. However, the Quebec sector is developing plenty of product innovations (in cucumbers, sweet corn and beans), which could allow it to differentiate some of its products (MAPAQ, 2014; [75] FQPFLT, 2011[76]). This constant innovation, which is supplementing a range of products that are already differentiated and of high quality, can help to increase the sector's competitiveness.

However, note that the purchase price of processed vegetables is one of the main criteria, if not the main criterion, for buyers. If labour costs were to increase, processors may find themselves losing market shares. Cost disadvantages caused by a minimum wage increase could lead to production being offshored.

Sector organization

One major competitiveness factor for the processing fruits and vegetables sector is proper coordination of the supply chain in Quebec. In addition to providing economic benefits, this level of coordination also allows the sector to determine its research and innovation priorities more cohesively (MAPAQ, 2014;[77] FQPFLT, 2011[78]). Additionally, production conditions in this sector are stable, with little variation in production and a good geographic distribution of producers. These factors may have helped increase the Quebec sector's market share of Canada's overall supply of processing fruits and vegetables: the Quebec sector accounted for 34% of production in 2009 and grew to 40% in 2013.

- Pork

Producers

According to the MAPAQ (2016),[79] increased production by sows and improved biosecurity measures are major competitiveness factors for Quebec pig farms. However, during its analysis of operating costs for the 2003–2008 and 2009–2013 periods, the MAPAQ (2016)[80] found that Quebec's production has deteriorated compared to Ontario and the rest of Canada. Feeding troughs and piglet purchase are two areas where costs are relatively high in Quebec. The MAPAQ (2016)[81] emphasizes that piglets are less readily available in Quebec, which harms the production segment. If the minimum wage were to increase, this production cost disadvantage could worsen.

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[74] MAPAQ. 2014. Monographie de l'industrie des légumes de transformation.

[75] MAPAQ. 2014. Monographie de l'industrie des légumes de transformation.

[76] FQPFLT. 2011. Donner le goût au Québec. Consultation sur l'établissement d'une politique bioalimentaire au Québec. Research paper. Submitted to the Commission de l'agriculture, des pêcheries, de l'énergie et des ressources naturelles.

[77] MAPAQ. 2014. Monographie de l'industrie des légumes de transformation.

[78] FQPFLT. 2011. Donner le goût au Québec. Consultation sur l'établissement d'une politique bioalimentaire au Québec. Research paper. Submitted to the Commission de l'agriculture, des pêcheries, de l'énergie et des ressources naturelles.

[79] MAPAQ. 2016. Monographie de l'industrie porcine québécoise.

[80] MAPAQ. 2016. Monographie de l'industrie porcine québécoise.

[81] MAPAQ. 2016. Monographie de l'industrie porcine québécoise.

Processing

Most Quebec pigs are slaughtered in the province, while other provinces export most of their pigs for slaughter. In 2014, 62% of revenue for Quebec processors came from foreign markets (MAPAQ, 2016).[82] Foreign markets are therefore important for the sector. According to the MAPAQ (2016),[83] approximately 8.35 million pigs were slaughtered in Quebec in 2015. Of those, 13.7% were imported from other Canadian provinces, particularly Ontario, which, as indicated above, has a cost advantage (feeding and piglets). If that cost advantage continues to improve, it could eventually grant Ontario a larger share in the pig slaughtering industry.

Sector organization

The level of vertical integration in the pork sector is already significant (58% in 2013) and may increase in the coming years (Royer and Gouin, 2015). This level of vertical coordination leads to a more uniform final product (standardization of breeding, feeding and raising), improved risk management (both on the market and in terms of biosecurity), cost savings (particularly in terms of labour) and optimized production processes. Increased labour costs could encourage the integration process, as integration provides savings all along the production chain.

The sector's organization (integration and different contract types) also allows it to develop products that meet consumers' expectations (see the Coop Fédérée's Cooperative Pork Network)[84] as well as highly differentiated products for niche markets, such as Nagano pork.[85] This differentiation of Quebec products should allow producers to transfer at least part of their cost increases to other parts of the sector.

2.4.4 Maple syrup

2.4.4.1   Supply characteristics and destinations

Maple products are mostly distributed in syrup form, mainly in bulk (87%) or sent directly to farms and public markets (9%) (MAPAQ, 2011).[86] Additionally, organic maple products have a particularly strong presence, making up 21% of production.

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[82] MAPAQ. 2016. Monographie de l'industrie porcine québécoise.

[83] MAPAQ. 2016. Monographie de l'industrie porcine québécoise.

[84] http://www.porclacoop.coop/fr/porc_lacoop_definition.shtml

[85] http://www.leseleveursdeporcsduquebec.com/documents/news/fr/415-8-lucyporc-la-pari-du-porc-nagano.pdf

[86] https://www.mapaq.gouv.qc.ca/fr/Publications/Monographie_acericole.pdf

Even though a relatively low percentage of product is processed, the processing industry is still very active, producing a variety of products including maple butter, alcoholic beverages, candies, mustards and seasonings. Interprovincial business is very difficult to measure. However, the balance of interprovincial business shows that Quebec is a net provincial exporter.

Quebec is also the leading global exporter. Quebec maple products are primarily sent to the United States (72% in 2011), Japan (8%) and the United Kingdom (5% in 2011). In terms of value, it appears that exportation to Japan is the most profitable: maple syrup sold in Japan generates $8.18/kg of profit, versus $5.78/kg of profit in the United States (Debailleul et al., 2013). Product differentiation is therefore an asset for the Quebec maple syrup sector.

2.4.4.2 Sector organization

Maple syrup production and marketing are administered by a joint plan. This system coordinates marketing, manages the strategic reserve (which stabilizes supply and prices) and manages production quotas, which were established to balance supply and demand on the market. This type of marketing should eventually allow the sector to adjust the amount of bulk syrup that is being put on the market as production conditions change. However, American production is increasing, so its market share could threaten the sector's flexibility.

2.4.4.3 Demand characteristics

From 2006–2010, Quebec consumed approximately 0.17 kg of maple syrup per person per year. While this number has remained relatively stable for several years, maple products are gaining a larger share of the sweetener market: at an average annual growth of 10% between 2006 and 2010, it represented approximately 4% of the sweetener market in 2010 (MAPAQ, 2011).[87] This increased share was not caused by an increase in consumption; instead, it reflects the fact that Canadians are consuming fewer sweeteners overall (MAPAQ, 2011).

On a global scale, the demand for maple products is increasing (a 24.5% increase between 2000 and 2010), particularly in the United States (which is responsible for 50% of the increased demand) and Japan (15% of the increased global demand). In many areas, maple syrup is differentiated, with little to no competition from other sweeteners. Therefore, American demand for maple syrup is fairly inelastic, at -0.26 (Forest-Lavoie Conseil, 2014).[88]

2.4.4.4 Competitiveness characteristics

Quebec is the largest maple syrup producer in the world. For this reason, the province influences global markets. Furthermore, Quebec has been increasing its number of taps for several years, further establishing the province as a world leader on the market even though American production has nearly doubled since 2007 (Debailleul et al., 2013b; Statistics Canada data). Much of the maple syrup produced in the United States is processed in Quebec, then sold on international markets. Table 1 details the production costs for Quebec and the northern United States, showing that the former has a cost disadvantage.

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[87] MAPAQ. 2011. Bioclips, Actualité bioalimentaire, Volume 19, no. 37. Available at
https://www.bibliotheque.assnat.qc.ca/DepotNumerique_v2/AffichageFichier.aspx?idf...

[88] Forest-Lavoie Conseil Inc. 2014. Étude sur le contexte de développement de l'acériculture en Amérique du Nord. Final report for the Conseil de l'industrie de l'érable and the Federation of Quebec Maple Syrup Producers.

Table 1. Primary determinants of Quebec's competitive position on the maple syrup market

	Quebec	American Northeast
Production	46,200 t (2011)	9,392 t (2011)
Yield	1.08 kg/tap (2011)	1.02–1.43 kg/tap (2011)
Production costs	$2.75 – $3.01/kg (2010)	$2.13 – $2.37/kg (1998 indexed at 2.5% to 2011)

Taken from Debailleul et al. (2013) and Tamini et al. (2015).

Even though the Quebec maple syrup sector appears to have a disadvantage in terms of production costs, several other factors allow it to remain a leader in export markets:

➢ The sector's marketing mechanism (described above) allows it to:
  o affect global prices by adjusting its supply. However, higher global prices can leave an opening for other players to enter the market. This has occurred over the past year with the United States, which has increased production.
  o coordinate development actions within the sector.
➢ Its processing industry is dynamic and innovative.

Section summary

Agri-food sector characteristics: competitiveness and price transmission factors

This section summarizes the sectors being studied. Each summary includes various factors that were identified in the literature and analyzes the sector's level of competitiveness and ability to transmit prices between links in its supply chain.

Consumption of the food products being analyzed is relatively unaffected by price (low price elasticity). However, consumption is strongly affected by the price of similar substitution products. Imported products with a lower price therefore reduce consumption of local products, which are more expensive. Substitution is therefore a strong factor in most of the sectors that were studied, with the exception of those under supply management.

Furthermore, price transmission is very good in the egg sector, low to moderate in the dairy sector, low in the poultry, maple, and processing vegetables sectors and very low in the pork, produce, strawberry/raspberry and apple sectors.

2.4.5 Summary of price transmission and competitiveness factors in the agricultural production sectors being studied

	Milk	Eggs	Poultry	Maple products	Pork	Processing vegetables	Fresh vegetables	Strawberries/ raspberries	Apples
Supply and demand	Domestic Import control	Domestic Import control	Domestic Import control	Production control Open market Net exporter World leader	Open market Net exporter	Open market Import-export balance	Open market Net importer	Open market Net importer	Open market Net importer
Sector organization	Price depends on production costs in eastern Canada and international prices	Price depends on production costs in Quebec	Price depends on prices in Ontario, which depend on the province's production costs	Price depends on global market conditions	Price depends on US market price	Price depends on production costs in Quebec and market prices in Ontario and the United States	Price depends on import price and local supply and demand	Price depends on import price and local supply and demand	Price depends on import price and local supply and demand
Consumer demand	Poor direct price elasticity	Poor direct price elasticity	Poor direct price elasticity	Poor direct price elasticity, slightly sensitive to substitute product prices	Poor direct price elasticity, sensitive to substitute product prices	Poor direct price elasticity, sensitive to substitute product prices	Poor direct price elasticity, sensitive to substitute product prices	Poor direct price elasticity, sensitive to substitute product prices	Poor direct price elasticity, sensitive to substitute product prices
Ability to substitute with imports	Low	Low	Low	Medium to low	High	High	High	High	High
Price transmission	**Low to moderate**	**High**	**Very low**	**Moderate**	**Very low**	**Low**	**Very low**	**Very low**	**Very low**

2.5 Effects of a minimum wage increase on households, average salary and employment

In this section, we will analyze the possible effects of a minimum wage increase on household income and the resulting changes to employment and food demand. As indicated in figure 1, a minimum wage increase could have two possible outcomes. On the positive side, the increase could raise income and therefore consumption. On the negative side, it could increase wage costs. Of course, the net effect will depend on the specific characteristics of each sector.
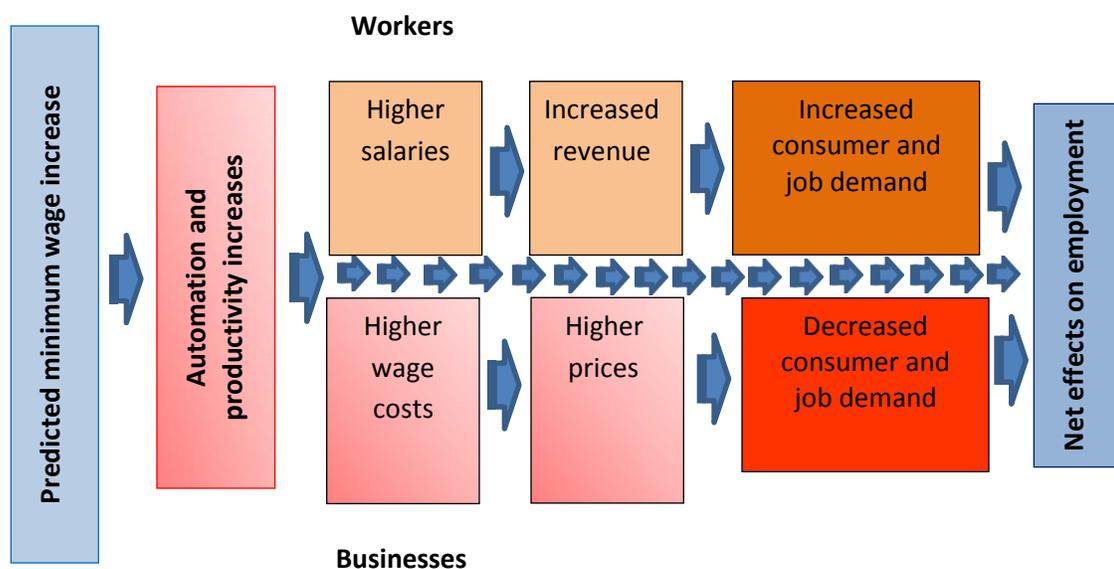
Figure 1. Possible effects of a minimum wage increase

Source: UC Berkeley IRLE Minimum Wage Research Group[89]

2.6 Household income and income elasticity measures

Table 2 presents the income elasticity of demand for each of the goods being studied.[90] The numbers indicate, in percentage points, the demand increase for these goods when income increases by $1. The table shows that most of the goods being studied are "normal", meaning that a 1% revenue increase translates to a less than 1% increase in demand. Fresh fruits and vegetables and low-fat milk products are the only goods with an income elasticity above 1.

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[89] http://irle.berkeley.edu/files/2016/The-Effects-of-15-Minimum-Wage-by-2019-in-San-Jose-and-Santa-Clara-County.pdf

[90] Income elasticity of demand indicates the percentage increase of demand when revenue increases by 1%.

Table 2. Income elasticity for the goods being studied

Product		Income elasticity
Beef		0.839
Poultry		0.842
Pork		0.801
Fish		0.794
Whole milk		0.940
Low-fat milk		2.190
Eggs		0.611
Grains		0.849
Fruits		1.284
Vegetables		1.308

Source: Pomboza, R. & M. Mbaga 2007. The estimation of food demand elasticities in Canada. AAFC.

However, the DAMECO study (2016) for the Conseil du patronat predicted a nominal increase in disposable income (just over 0.8%) for the first three years and that after those three years the increase would fall below increases to the consumer price index (CPI). An increase in disposable income following a minimum wage increase cannot be responsible for a change in the consumption structure for the goods that are part of this study. In other words, higher income associated with a minimum wage increase will not result in greater demand for the goods that are part of this study.

2.7 Average salary and employment by sector

The economic theory on minimum wage is based on the hypothesis that the market is in perfect competition and that supply and demand determine the wage balance within this market (Castillo-Freeman and Freeman, 1992).[91] In this case, a minimum wage policy would lead to unbalanced markets and unemployment; more workers would be attempting to enter the market as employers reduce the number of hours worked. Market balance can be measured by calculating the ratio of minimum wage to average salary (Castillo-Freeman and Freeman, 1992).[92] Fortin (2010)[93] states that this ratio cannot be above 45% in Quebec and should ideally fall around 42–43%. However, as Acs et al. (2014)[94] indicate, perfect competition is the exception, not the rule. In a monopsony, economic theory predicts that employers will have less demand for workers, thereby lowering wages. In this market situation, a minimum wage

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[91] Castillo-Freeman, A.J., & R.B. Freeman. 1992. "When the Minimum Wage Really Bites: The Effect of the US-Level Minimum on Puerto Rico." In *Immigration and the Work Force: Economic Consequences for the United States and Source Areas*, edited by George J. Borjas and Richard B. Freeman, 177–211 (Chicago: University of Chicago Press).

[92] Castillo-Freeman, A.J., & R.B. Freeman. 1992. "When the Minimum Wage Really Bites: The Effect of the US-Level Minimum on Puerto Rico." In *Immigration and the Work Force: Economic Consequences for the United States and Source Areas*, edited by George J. Borjas and Richard B. Freeman, 177–211 (Chicago: University of Chicago Press).

[93] Fortin, P. 2010. Salaire minimum, pauvreté et emploi: à la recherche du «compromis idéal». *Regards sur le travail*, 7(1), 73-91.

[94] Acs, G., Wheaton, L., Enchautegui, M., & A. Nichols. 2014. Understanding the implications of raising the minimum wage in the District of Columbia. *Washington, DC: Urban Institute. http://www. urban. org/publications/413200. html.*

policy would continue to increase wages and decrease demand for labour (Danziger, L. 2010; Hirsch et al., 2015).[95, 96] The specific structure of each sector and the weight of labour expenditures within its businesses will therefore determine how a minimum wage increase would affect employment. According to the Ordre des conseillers en ressources humaines agréés,[97] businesses will be affected differently depending on their wage level, the size of the payroll increase and the decrease of the payroll/profit ratio (part of the profit margin).

Section summary

Effects of a minimum wage increase on households, average salary and employment

A minimum wage increase could have two possible effects. On the positive side, the increase could raise income and therefore consumption. On the negative side, it could increase wage costs.

This section shows that consumers' increased income following a minimum wage increase would not generate significantly more demand for the products in the sectors being studied here. Additionally, the specific structure of each sector and the weight of labour expenditures within its businesses will determine how a minimum wage increase will affect employment.

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[95] Danziger, L. 2010. "Endogenous Monopsony and the Perverse Effect of the Minimum Wage in Small Firms." *Labour Economics* 17 (1): 224–29

[96] Hirsch, B. T., Kaufman, B. E., & T. Zelenska. 2015. Minimum wage channels of adjustment. *Industrial Relations: A Journal of Economy and Society,* 54(2), 199-239.

[97] Ordre des conseillers en ressources humaines agréés. 2017. Salaire minimum à 15 $: les faits et les enjeux.

2.8 Ripple effects of a minimum wage increase

Businesses will be affected by a minimum wage increase in two ways. First, employees whose wages were below the new minimum wage will benefit from the increase. This effect is relatively easy to calculate. Second is the ripple (or domino) effect on other salary brackets. Salaries above minimum wage will also increase to maintain wage hierarchies. This section documents various approaches that have been used to manage the ripple effects of a minimum wage increase.

As Pollin and Wicks-Lim (2015) note, the minimum wage increase is not regulated, so it is difficult to evaluate. It can also be difficult to determine ripple effects, because some businesses choose to replace unqualified minimum wage employees with qualified workers.

For Quebec, Dufour and Langevin (2016)[98] note that wages less than or equal to 115% of the minimum wage would be affected by an increase. Note that these authors did not provide a source for their calculations, however. The CPQ[99] has also made a statement about the minimum wage increase, indicating that deciles 1, 2 and 3 of the salary scale in the agricultural industry would be affected. According to their study, a 10% increase in the minimum wage would lead to a 9.1%, 8.4% and 8.1% wage increase in the 1st, 2nd and 3rd deciles, respectively. Reich et al. (2005) believe that in a highly unionized industry, a minimum wage increase would affect salaries less than or equal to 140% of the minimum wage. Wicks-Lim (2006)[100] calculates elasticities resulting from a minimum wage increase in the United States, both in the retail industry and in the economy as whole. She found that salaries in the 40th percentile and below would be affected. Her calculated wage elasticity of 0.73 in the 10th percentile means that a 1% increase in the minimum wage would lead to a 0.73% increase in the average wage. Wicks-Lim's (2006) calculation is therefore much lower than the CPQ's.

For the United States, Pollin and Wicks-Lim (2015)[101] estimate that salaries equal to or below 130% of the new minimum wage would be affected. In their study of the fast food industry, they estimated that all wages would be affected because the maximum wage in that industry is within the 123% transmission window.

Table 3 presents the maximum wage thresholds that would be affected if the ripple effect was 130% and 140%, and how those thresholds would be affected by a $1.70/hour and a $4.25/hour minimum wage increase.

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[98] Dufour, M, & R. Langevin. 2016. Quels seraient les effets réels d'une hausse marquée du salaire minimum? IRIS research report in collaboration with Caron-St-Pierre, D.

[99] CPQ. 2016. Avis du conseil du patronat du Québec sur l'impact d'une augmentation accélérée du salaire minimum.

[100] Wicks-Lim, J. 2006. *Mandated Wage Floors and the Wage Structure: New Estimates of the Ripple Effects of Minimum Wage Laws.* Political Economy Research Institute, University of Massachusetts at Amherst.

[101] Pollin, R., & J. Wicks-Lim. 2015. A $15 US minimum wage: How the fast-food industry could adjust without shedding jobs. *Political Economy Research Institute Working Paper Series,* (373).

Table 3. Maximum salary thresholds affected by a minimum wage increase

	Increase of $1.70/h		Increase of $4.25/h	
2016 hourly minimum wage	$10.75/h		$10.75/h	
Hourly wage after increase	$12.45/h		$15.00/h	
Affected wage brackets (ripple effect)	130%	140%	130%	140%
Maximum wage threshold affected by the ripple effect	$16.20/h	$17.43/h	$19.50/h	$21.00/h

Source: Compilation and calculations: Lota D. Tamini (2017)

Overall, this brief research into the ripple effects of a minimum wage increase confirms that it would be difficult to calculate these effects within this study, as each sector has a different wage structure. Furthermore, we believe that wage changes would happen at different speeds in different industries. Analyzing the ripple effects therefore requires a good understanding of the wage structure for each sector.

For Quebec's agricultural industry, the effects can reasonably be expected to reach up to 40% above the new minimum wage for the following reasons:

- Scarcity of labour (demand greater than supply)
- Less attractive working conditions (e.g. long work days, unpredictable schedules) than other industries (e.g. working on a farm vs. working in a grocery store in the area)
- Payment practices of producers, who use minimum wage as a baseline
- Additionally, the role of the operator is hardly or not at all accounted for when calculating ripple effects

Section summary

Ripple effects of a minimum wage increase

All of our sources agreed that employees in wage brackets above minimum wage would still be affected by a minimum wage increase. However, the authors were unable to agree on just how strong the ripple effect would be, particularly since the severity would vary depending on the industry. That said, due to the characteristics of Quebec's agricultural industry, our research found that the ripple effects may be felt in wage brackets up to 40% above the new minimum wage.

2.9 Document review conclusions

For this document review, we gathered writings on the ripple effects of a minimum wage increase, identified relevant sources to support sectoral analyses and researched economic theories and studies related to the issue. The information gathered from this review helped us to create various deliverables.

The document review can be summarized as follows:

- **The economic theories and studies about comparative advantages, industry competitiveness and business and employment localization/offshoring.**

  The economic theories we studied emphasized that the competitiveness of an economic sector is complex and can be affected by a number of factors, such as cost leadership, product differentiation, technological advantages and macroeconomic factors that affect prices.

  This competitiveness then affects business localization/offshoring. Institutional and economic stability are also important factors.

- **Price increase transmission throughout a sector — how and where price increases are transmitted — depends on the sector's structure and composition and the openness of its interprovincial and/or international markets.**

  This section identifies the various price transmission factors within a sector: consumer influence, competition between links, coordination and marketing mechanisms for agricultural products, external factors such as retail cost structure, and openness of borders (substitution by imports).

  In the food retail industry specifically, the ability to transmit price increases to consumers is limited. A sector's ability to transmit price/cost increases to consumers or between links in its supply chain depends on its specific characteristics.

- **Agri-food sector characteristics: competitiveness and price transmission factors**

  This section summarizes the sectors being studied. Each summary includes various factors that were identified in the literature and analyzes the sector's level of competitiveness and ability to transmit prices between links in its supply chain.

  Consumption of the food products being analyzed is relatively unaffected by price (low price elasticity). However, consumption is strongly affected by the price of similar substitution products. Imported products with a lower price therefore reduce consumption of local products, which are more expensive. Substitution is therefore a strong factor in most of the sectors that were studied, with the exception of those under supply management.

Furthermore, price transmission is very good in the egg sector, low to moderate in the dairy sector, low in the poultry, maple, and processing vegetables sectors and very low in the pork, fresh vegetables, strawberry/raspberry and apple sectors.

- **Effects of a minimum wage increase on households, average salary and employment**

A minimum wage increase could have two possible effects. On the positive side, the increase could raise income and therefore consumption. On the negative side, it could increase wage costs.

This section shows that consumers' increase income following a minimum wage increase would not generate significantly more demand for the products in the sectors being studied, particularly due to the low income elasticity of products from these sectors. Additionally, the specific structure of each sector and the weight of labour expenditures within its businesses will determine how a minimum wage increase will affect employment.

- **The ripple effects of an increased minimum wage on employees receiving higher wages**

All of our sources agreed that employees in wage brackets above minimum wage would still be affected by a minimum wage increase. However, the authors were unable to agree on just how strong the ripple effect would be, particularly since the severity would vary depending on the industry. That said, due to the characteristics of Quebec's agricultural industry, our research found that the ripple effects may be felt in wage brackets up to 40% above the new minimum wage.

Primary observations drawn from the document review:

- Various internal and external factors affect a sector's competitiveness, as well as its ability to transmit prices to the market and between links in its supply chain. The primary factors used to determine the impact of a minimum wage increase on a sector's **competitiveness** were:

    o **The proportion of low-wage labour expenditures in total operating expenditures compared to businesses' profit margins** (section 2 of the sector data sheets)

    o **Business environment** (section 3 of the sector data sheets), which is determined by the characteristics of the supply on the markets (e.g. price, level of differentiation), sector organization, etc.

    o **Ability to transmit prices to the market** (section 4 of the sector data sheets), which is determined by pricing methods, ability to substitute local products with imports, etc.

- According to observations drawn from our research on **ripple effects**, positions earning up to 40% above the new minimum wage will also experience a wage increase that is equal to up to 85–90% of the minimum wage increase. In other words, a $1/h increase in the minimum wage would lead to an $0.85–$0.90/h increase for these positions. When including employer contributions (e.g. employment insurance, vacation pay, CNESST contributions, etc.), which equal approximately 15% of salaries in the agricultural sector, the actual cost increase for employers would be 100% (85% + 15%) for most employees. Note that for wage brackets that are near minimum wage, the ripple effect could have an even greater impact on employer costs. However, the ripple effect is likely to be weaker for salary thresholds that are further above minimum wage.

- The authors we consulted were clearly divided on the **net social effects of a minimum wage increase**. The increase would benefit workers and society by increasing household income, growing consumer spending and reducing the cost of social programs, among other effects. However, it would also affect businesses' competitiveness and have undesirable side effects (decreased competitiveness due to increased labour costs, potential for jobs to be replaced by technology, job losses, decreased consumer spending, etc.) that may negate some of the benefits. The economic sectors that will be impacted the most will need to be studied more carefully, and the side effects will need to be mitigated so that these sectors can draw as much benefit as possible from a strategy that is intended to reduce poverty.

3. General and specific data sheets: Approach and primary observations

3.1 General workforce data sheet

The general workforce data sheet **(see appendix)** is intended to:

- summarize the agricultural workforce in Quebec; and

- summarize the results and business environments of each sector in this study.

This data sheet contains the following sections:

- Description of the production sectors in this study Farm cash receipts and number of farms per sector

- Realities of the business environment, sorted into three broad categories (products under supply management, horticultural products and products for processing), and an overview of the sector's trade balance. This section focuses on factors that impact a sector's ability to transmit prices to the market and whether the sector's products can be replaced by imports if prices increase.

- General workforce overview

  o Various elements are discussed: overall number and distribution of jobs in the agricultural sector, an overview of temporary foreign workers and the proportion of positions that pay $12/h or less.

  o There is no full statistical overview for all sectors, so we needed to reconcile data from several sources: Statistics Canada's Labour Force Survey, the Canadian Agricultural Human Resource Council [CAHRC], MAPAQ's Profil bioalimentaire, the Fondation des Entreprises en Recrutement de Main-d'œuvre agricole Étrangère [FERME] and the Centres d'emploi agricole [CEA]. These sources used different methodologies and did not necessarily use the same terms or definitions (total jobs vs. labour hired vs. operator, full-time equivalent vs. seasonal work, local labour vs. temporary foreign workers, etc.)

- Progression of the minimum wage in Quebec compared to other areas (Canadian provinces, American states, countries in Latin America)

  o To make this comparison, an hourly wage was calculated from the past 10 years' minimum wages in each area. Salary is calculated on a weekly or monthly basis in some regions in Latin America; in those cases, the average work week was assumed to be 40 hours. Hourly minimum wages were then converted to Canadian dollars (CAD) based on average annual exchange rates. Note that while these calculations provide a general comparison of wage changes in each area, they are affected by exchange rates and the local economic situation.

  o Our analysis of wages over the past 10 years in different areas showed that Quebec's minimum wage is relatively close to that in other provinces (except Alberta, where the agricultural sector is exempt from minimum wage regulations). However, it is higher than the American federal minimum wage in Canadian dollars, despite the Canadian dollar's weakness against the American dollar. The minimum wage in Latin American countries is significantly lower than the minimum wage in Quebec, giving those countries a considerable comparative advantage.

- Proportion of labour expenditures in each agricultural sector

  o This section emphasizes the proportion of labour expenditures in each sector we studied. According to our research, labour costs are significantly higher in horticultural sectors.

- Impact of a minimum wage increase on the agricultural sector.

  o This section highlights the wage thresholds that would be affected by a minimum wage increase in each scenario (an increase to $12.45/h or to $15/h).

Primary observations drawn from the general workforce data sheet:

- There are an estimated 70,300 agricultural jobs in Quebec: 28,200 operators, 38,800 employees (local and temporary foreign workers) and 3,300 available positions.

- 47% of jobs in the agricultural sector pay $12/h or less, and 57% pay $14/h or less.

- The minimum wage in Quebec is already high in comparison to other agricultural regions, so if it were to increase significantly, it could significantly affect the competitiveness of Quebec's agricultural industry. This is particularly true of horticultural sectors, since imports often come from Latin America, where salaries are much lower. Furthermore, unless the value of the Canadian dollar improves against the US dollar, Quebec's minimum wage could be quite a bit higher than its American counterpart in CAD.

- Because of the salary thresholds that could be affected by a minimum wage increase ($17.43/h if the minimum wage were to increase to $12.45 and $21/h if the minimum wage were to increase to $15/h), the vast majority of jobs in the agricultural industry would have increased wages.

- The factor analysis allowed us to draw the following conclusions:

  o **Greater** impact on horticultural sectors due to:
    - The proportion of labour costs relative to production costs and operating profit;
    - A high percentage of workers being paid at or slightly above minimum wage;
    - Reduced competitiveness against imported products, particularly horticultural products from Latin American countries, where the minimum wage is much lower; and

    - Limited ability to automate in the short term, since many tasks are performed manually.
  o **More moderate** impacts on animal sectors (except for the pork sector, where the low net revenue severely limits its ability to absorb cost increases). The extent and specific impacts on these sectors will vary depending on their business environment.

3.2 Sector data sheets

Impact analysis data sheets were produced for nine agricultural sectors:

- Dairy

- Table eggs

- Poultry

- Maple products

- Pork

- Processing fruits and vegetables

- Fresh vegetables

- Strawberries/raspberries

- Apples

These data sheets were developed in close collaboration with specialist groups, particularly when determining the typical farm to use for analyses, identifying relevant sources of information about each sector and verifying the final data sheet. Each data sheet contains the following sections:

- General sector description **(section 1)**. This generally includes the number of farms and farm cash receipts for the sector, the Quebec sector's share in the Canadian market, Canadian imports and exports, etc.

- General workforce description **(section 2)**. This section outlines the sector's workforce, its makeup, average workforce salary, etc.

  o There is no single source for statistical information on the workforce in each sector, so we needed to consult a variety of sources to create a workforce description for each sector. For some sectors, the available studies provided specific data about the workforce (e.g. production cost studies in the dairy, apple and pork sectors). In other cases (such as the strawberry/raspberry and poultry sectors), we collaborated with the specialist groups to create and distribute sector-specific surveys for the purposes of this study. Finally, for some sectors, specific data were extracted (for example, from the FADQ and reliable sources).

- o The average hourly wage for each sector is generally provided with and without social benefits (generally around 15% in the agricultural sector[102]). Employers who employ temporary foreign workers have to bear additional costs for plane tickets, housing, etc. These costs were considered alongside the costs of social benefits in the impact analyses.

- o This section presents the budget of the typical farm (section 5) that was developed for the purposes of this study. The proportion of labour costs within total expenditures on this typical farm are also presented in this section.

- **Business environment (section 3)**. This section describes the main characteristics of the sector's business environment, such as price determination factors, marketing structures, type of market (open or closed) and price changes. This information was gathered during document review and discussions with sector specialists.

- **Ability to transmit a cost increase to the market (section 4)**. The ability to transmit cost increases to the market is determined using various factors we identified during document review, such as pricing methods and ease of substitution. The ability is then graded on a scale from "very low" to "high."

- Impacts of a minimum wage increase on a typical farm's operating costs (section 5). This section evaluated the effects of a $1.70/h and a $4.25/h minimum wage increase on a typical farm.[103] Depending on the information available, the impacts were then measured in terms of labour costs, benefits and sale price, if the increase could be transmitted to the market.

  - o The typical farm models and information used for the impact analysis came from various sources, such as the CECPA inquiry and the CRAAQ budget.

  - o Hours worked by hired labour (family or external) are affected by a minimum wage increase. In some cases, wage costs may make up part of the salary paid to the producer, but this is generally not specified in the studies we used to perform the analyses; in the cases where it is, the operator's salary was not affected. Note that the net profit of an agricultural business is used to pay amortization installments, investors and the operator (partially or fully).

  - o Because of the ripple effect (see the general data sheet and document review), the impact of a minimum wage increase was calculated for all paid labour in the business, as salaries are generally below the thresholds calculated for a $1.70/h and $4.25/h increase.

  - o The sector analyses are intended to <u>determine how a "typical" business would be affected by a minimum wage increase and determine its ability to absorb this increase, all else being equal.</u>

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[102] In the agricultural industry, employer costs vary between 10–20% of the payroll, depending on the sector, but are generally around 15%.
[103] $1.70/h to reach the minimum wage announced for 2020 ($0.50/h in 2017, $0.50/h in 2018, $0.35/h in 2019 and $0.35/h in 2020), and $4.25/h to reach a $15/h minimum wage.

- Analysis of the impact of a minimum wage increase on competitiveness **(section 6)**. Using all the information we gathered and analyses we performed, we determined the degree to which a minimum wage increase would affect competitiveness in each sector. The effect was calculated using the following factors: ability to transfer a cost increase to the market, ability to replace workers with technology and the business' ability to absorb cost increases. The latter was determined by the percentage of labour costs within total operating costs and the ratio of wages to operating profits. Each sector was then assigned a colour that represented the degree to which a minimum wage increase would affect competitiveness: green for low impact, yellow for moderate impact and red for high impact.

The following table summarizes the current labour situation and provides a synopsis of the ways a minimum wage increase would affect competitiveness, as presented in the sector data sheets.

The current labour situation for each sector was determined using three elements, which are taken from the sector data sheets: average employee wage bracket, percentage of labour costs within total operating costs and ratio of labour costs to operating profits.

The impact analysis covers various factors, which are sorted into two categories:

- Factors affecting businesses' <u>ability to adapt to a minimum wage increase</u>, which include:

  - ability to transmit a cost increase to the market. This is determined using the observations made during document review (section 2.4.5).

  - ability to replace the workforce with technology in the short term. This is briefly discussed in each sector data sheet or in document review.

- Factors affecting businesses' <u>ability to absorb a minimum wage increase</u>. This ability depends on each sector's labour profile: average employee wage, percentage of wage costs within total operating costs and the ratio of labour costs to operating profits.

Finally, the factors are combined to determine the overall potential impact of a minimum wage increase on competitiveness. This impact is colour coded using the system described above.

Table 4: Summary of the analysis of the effects of a minimum wage increase on competitiveness

Sector	Current workforce overview			Ability to adapt to a minimum wage increase			Effects on competitiveness[3]
	Employee wage bracket	Labour costs		Ability to transmit a cost increase to the market	Ability to replace the workforce with technology	Ability to absorb the increase	
	Under $12/h $12–14/h $14–18/h $18/h and over	% employee wages[1]/total expenses	Ratio of wage expenses to operating profit				
Milk	$14–18/h	10%	Per $1 of profit, $0.58 is spent on wages	Low to moderate	Low	$1.70/h: Good	(green)
						$4.25/h: Low	(yellow)
Table eggs	$14–18/h	4%	Per $1 of profit, $0.39 is spent on wages	High	Low	$1.70/h: Good	(green)
						$4.25/h: Good	(green)
Poultry	$18/h and over	4%	Per $1 of profit, $0.58 is spent on wages	Very low	Low	$1.70/h: Good	(green)
						$4.25/h: Moderate	(yellow)
Maple products[2]	$14–18/h	16%	Per $1 of profit, $0.95 is spent on wages	Moderate	Low	$1.70/h: Moderate	(yellow)
						$4.25/h: Low	(yellow)
Pork	$14–18/h	4%	Per $1 profit, $13 is spent on wages	Very low	Low	$1.70/h: Very low	(red)
						$4.25/h: Very low	(red)
Processing vegetables *PBC*	$14–18/h	4%	ND	Low	Low	$1.70/h: Moderate	(yellow)
						$4.25/h: Low	(yellow)
Processing vegetables *Cucumber*	Under $12/h	52%	ND	Very low	Moderate	$1.70/h: Low	(red)
						$4.25/h: Very low	(red)
Fresh vegetables	Under $12/h	39%	Per $1 of profit, $6.75 is spent on wages	Very low	Low	$1.70/h: Low	(red)
						$4.25/h: Very low	(red)
Strawberries and raspberries	Under $12/h	54%	Per $1 of profit, $5.51 is spent on wages	Very low	Low	$1.70/h: Very low	(red)
						$4.25/h: Very low	(red)
Apples	Under $12/h	33%	Per $1 of profit, $3.29 is spent on wages	Very low	Very low	$1.70/h: Very low	(red)
						$4.25/h: Very low	(red)

Note 1: Including family, but excluding the operator
Note 2: Average of three business sizes
Note 3: Green: low impact, yellow: moderate impact and red: high impact on competitiveness.

This analysis, which is based on various factors, indicates that some sectors will be more strongly affected by a minimum wage increase. In particular, horticultural sectors (fresh vegetables, strawberries/raspberries, apples), processing cucumbers and pork will be strongly affected.

Adaptive measures and mitigation strategies should focus on these sectors first in the event of minimum wage increase in order to reduce any potential harm to the competitiveness of businesses within these sectors.

Primary observations drawn from the sector data sheets:

- The type and severity of the impacts of a minimum wage increase are different for each sector. Overall, horticultural sectors will be hit the hardest due to a high need for labour, the high percentage of employees paid at or slightly above minimum wage, strong competition with imported products and the limited ability to automate jobs in the short term. Impacts will be more moderate in animal production sectors.

- Average hourly wages are generally higher in animal production sectors than in horticultural sectors. Furthermore, a larger proportion of total expenses in horticultural sectors is associated with labour, due to the higher need for workers.

- According to the conclusions drawn from the document review for each sector, the more open a sector's business environment, the less that sector is able to transmit price increases to the market.

- We analyzed the impact of a minimum wage increase on farm operating costs based on two factors: wage costs and profits.

- Note that when interpreting the results of the impact analyses, the sector's specific business environment must be taken into account. For example, in the pork industry, the results show that a minimum wage increase would have very little impact on prices, but this is misleading. This cost increase cannot be transmitted to the market because of pricing methods (price on the American market). Consequently, even if the cost increase is low, it would still compromise the typical farm's profitability.

- Analyses of three different-sized businesses in the maple syrup industry indicated that a minimum wage increase could affect businesses differently depending on their size. Our analysis of the maple syrup sector showed that larger businesses are more efficient and therefore more easily absorb a cost increase.

- The links in the supply chain "upstream" of the agricultural industry (e.g. factor input suppliers, processing and retail) would also be dealing with labour-related cost increases. This would put more pressure on the agricultural industry, as the price of factor inputs could increase and agricultural and agri-food product imports could grow.

4.   Possible solutions

By increasing the minimum wage, the Government of Quebec seeks to fight poverty, increase the income of lower-class people and reduce social inequality. However, these benefits come at a cost. Increasing the minimum wage could affect businesses' competitiveness and lead to disadvantages that may negate some of the benefits (see section 4.1). During our analyses, the results of which are presented in the sector data sheets, it became clear that some production sectors would be more strongly impacted by a minimum wage increase, leading to decreased competitiveness for businesses in those sectors.

Therefore, this section:

- summarizes the positive and negative effects of a minimum wage increase; and

- lists payroll expense relief programs for businesses.

4.1 Positive and negative effects of an increased minimum wage

The following chart (figure 2) summarizes the positive and negative effects of a minimum wage increase.[104] Overall, this chart shows that a minimum wage increase is intended to benefit workers and society by increasing the revenue of low earners, driving consumption, growing the GDP, reducing the cost of social programs and more. However, the increase could also have negative impacts, such as increasing the burden on businesses, affecting their competitiveness on the market and encouraging businesses to automate jobs, leading to job losses. The severity of these negative impacts depends on the sector.

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[104] For more information, refer to the document review.

Figure 2: Diagram of the positive and negative effects associated with a minimum wage increase

	Workers		Society	
Positive effects	Better wages for low earners		Increased income and reduction in social costs	
	Minimum wage + ripple effect	Increased income and reduced cost of social programs	Consumption increase: benefits the GDP and encourages job creation	**Goal for workers, businesses and society:** Increase positive effects and reduce negative effects to obtain a net positive effect

	Businesses		Society	
Negative effects	Loss of competitiveness for businesses with high labour costs and low wages		Impoverishment and increased social costs	
	Increased labour costs and inability to transmit price increases to the market: lower profit margins	Loss of competitiveness, job loss, lower revenues, replacement of workers by machinery and increased cost of social programs	Decrease in consumption: harms the GDP and discourages job creation	

Source: Adapted by UC Berkeley IRLE Minimum Wage Research Group (2016)

In sum, it is important to identify the economic sectors that will be most affected by the impacts of a minimum wage increase and establish mitigation measures for these sectors. Doing so will optimize the benefits and create a net positive impact for society.

4.2 Examples of payroll expense relief programs/measures for businesses

Several countries have programs or measures that relieve the cost of the payroll for businesses. In this section, we have listed some examples of programs or measures that have been established for the agricultural industry and in rural areas, as well as programs in other economic industries. Overall, these expense relief programs and measures fall into two categories:

- Differentiated minimum wage application. Depending on the jurisdiction, differentiated application may be based on region (e.g. Oregon), industry (e.g. Mexico and Guatemala), qualifications (e.g. Nova Scotia), business size (e.g. California), and so on. In some jurisdictions, the agricultural sector can even be exempted from minimum wage regulations (e.g. Alberta) or apply piece rates (e.g. British Columbia).

- Wage subsidies or tax credits. These subsidies are generally intended to encourage hiring from specific categories of workers (e.g. persons with disabilities, visible minorities, students, apprentices and qualified/specialized employees). They can be applied in several different ways to specific job categories, sectors, regions, etc.

Quebec's agricultural industry could draw inspiration from these examples to determine the most appropriate ways to mitigate the impact on businesses' competitiveness following a minimum wage increase.

Differentiated application of minimum wage in the United States

Some American states have programs or regulations allowing the minimum wage to be applied on a differential basis. Here are some ways they are applied.

In 2016, some US states, including New York, Oregon and California, raised their minimum wage to $15/h. However, the increase was applied progressively, using different methods (differentiated rates). New York and Oregon both applied the increase on a **regional** basis (starting with some rural and urban areas, then moving to others), while in California,[105] the increase was based on **business size.**[106] Overall, the minimum wage appears to have increased more gradually for rural areas and small businesses, giving them more time to adapt. This gradual application of a minimum wage increase means that the impacts can be monitored fairly easily and progression can be modified as needed.

In some US states, **different minimum wage rates** may apply based on social programs (i.e. whether or not a person has Medicare). This is the case in Nevada, for example, where the minimum wage is $7.25 USD/h for people with Medicare and $8.25 USD/h for people without.

Differentiated application of minimum wage in Latin America

In Guatemala, the **agricultural industry** uses a differentiated minimum wage. Historically, this wage has been lower than the general minimum wage. However, since 2009 the minimum wage in the agricultural industry has been the same as the general minimum wage.[107] In Mexico, **certain types of agricultural jobs** (e.g. dairy or poultry production workers) have a differentiated minimum wage that is approximately 17% higher than the general minimum wage.

Differentiated application of minimum wage in Canada

Under Nova Scotia's *Labour Standard Code,* two **experience-based** minimum wage rates apply to the agricultural sector: one for experienced employees (at least 3 months with the same employer) and one for inexperienced employees. The difference between these two minimum wages is $0.50/h ($10.85/h and $10.35/h, respectively, in 2017).[108]

In Alberta, the **agricultural industry** is exempt from minimum wage regulations. However, the scarcity of workers and the state of wages in other economic sectors appear to be pressuring the province's agricultural sector, as the average wage for agricultural workers was $19.93/h in 2016 and the median wage was $19/h.[109] Additionally, Alberta's agricultural sector will likely be included in the province's new labour standards in 2018.

In British Columbia, employees who harvest fruits and vegetables are paid a **piece rate** for volume harvested. They are therefore exempt from minimum wage regulations. Between 2001 and 2015, the provincial minimum wage increased by 30.6% while piece rates increased by 7.5%[110].

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[105] Note that in California, a significant percentage of farm workers are undocumented immigrants. Their work conditions are therefore poorer than those for employees who are paid minimum wage (see general data sheet).

[106] Wadsworth (2016). Differential Minimum Wage: Urban vs. Rural

[107] http://www.mintrabajo.gob.gt/index.php/salariominimo.html

[108] http://novascotia.ca/lae/employmentrights/docs/LabourStandardsCodeGuide.pdf

[109] CAHRC (2016). Agriculture Workforce Management- Comparison of Provincial Agriculture Regulations. 10 p.

[110] http://rankandfile.ca/2016/05/12/bcs-piece-rate-farm-workers-left-out-of-minimum-wage-increases/

Wage subsidies and tax credits in Canada

Canada has several wage subsidy and tax credit programs. These programs target various sectors, businesses and categories of workers. Their objectives and acceptance criteria also differ. To demonstrate the wide variety and application of these programs, we have summarized several programs from which Quebec's agricultural sector can draw inspiration to develop mitigation strategies.

In New Brunswick, the Early Learning and Child Care - Quality Improvement Funding Support program enables owners of certified child day care facilities to increase the wages of eligible permanent employees. Funding can reach $2.75–$3.15/hour for untrained employees and up to $5.00/hour for employees who hold a recognized diploma or university degree in early childhood education.[111] This program provides a **direct subsidy for hourly wages** and is **specific to an economic sector**.

The Nova Scotia Business Inc. Payroll Rebate provides a 5–10% rebate on the gross payroll of knowledge-based businesses that generate an economic benefit for the province (e.g. business expansion, innovation leading to increased exports).[112] This program provides a **rebate on a percentage of gross payroll** and is **specific to an economic sector**.

In Prince Edward Island, the Innovation and Development Labour Rebate Program provides a tax rebate equal to 25% of eligible wages for business owners who specialize in developing new or innovative products, procedures or services. This program is available for certain strategic industrial sectors: aerospace, biosciences, export-focused manufacturing and processing, financial services, information and communications technology and renewable energy.[113] This program provides a **tax rebate on salaries**, is **specific to certain strategic sectors** and encourages **innovation and development**.

In Quebec, the Tax Credit for Gaspésie and Certain Maritime Regions of Quebec is a 15–30% tax credit for wages related to certain eligible activities (marine biotechnology and sea farming, manufacturing or processing of eligible products, wind energy production and recreation and tourism activities).[114] This program provides a **tax rebate on salaries** and is **specific to certain regions** and **activity sectors**. Note the program that is offered to multimedia production businesses. It is a reimbursable tax credit for up to 37.5% of eligible labour expenses.[115]

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[111] https://canadabusiness.ca/programs/child-care-quality-improvement-funding-support-1/

[112] https://canadabusiness.ca/programs/nova-scotia-business-inc-payroll-rebate-1/

[113] https://canadabusiness.ca/programs/innovation-and-development-labour-rebate-program-1/

[114] https://canadabusiness.ca/programs/tax-credit-for-gaspesie-and-selected-maritime-regions-of-quebec/

[115] http://www.investquebec.com/quebec/en/financial-products/smbs-and-large-corporations/tax-credits/production-of-multimedia-titles.html

As this section shows, many different economic sectors already have effective payroll expense relief programs. These programs generally aim to sustain businesses, increase their competitiveness and generate more economic activity in order to optimize benefits for businesses, workers and society as a whole. Quebec's agricultural industry, and its horticultural sectors in particular, can draw inspiration from these programs to help mitigate the effects of a minimum wage increase on businesses, thereby sustaining them and keeping jobs.

5. Conclusion and recommendations

The Government of Quebec has announced its intent to increase the minimum wage in order to reduce poverty by increasing the income of low earners. While the increase certainly comes with its share of benefits, it can also have consequences for businesses that rely on low-earning employees and that have high labour costs relative to their total expenditures and operating profits. To optimize the net benefits of a minimum wage and mitigate the negative impacts, a targeted aid strategy appears to be the best choice to maintain competitiveness in the sectors that will be hit the hardest.

In light of our analyses, it is clear that the agricultural industry will be significantly affected by a minimum wage increase. The horticultural and pork sectors will be hit particularly hard due to the size of the workforce in the former and the low profitability of businesses in the latter.

Given the importance of the agricultural industry as an economic sector and its role in meeting society's expectations regarding the environment and the origin, quality, cleanliness and traceability of products, it is clear that the industry needs to be supported. Otherwise, the number of agricultural businesses will decrease, as will regional economic activity. Local products will also be replaced by imports more often.

Given the permanent effects of a minimum wage increase, relief measures must be implemented to maintain the viability and competitiveness of Quebec agricultural businesses. These measures should be implemented in two phases. In the short term, compensation should be provided to reduce the financial impact of a minimum wage increase on businesses. In the medium term, a permanent strategy is needed to accelerate the adoption of technologies that can reduce the effects of a minimum wage increase on businesses' operating margins.

Appendix 1: General Data Sheet: Agricultural Production in Quebec

Impact analysis of the minimum wage increase

1. Sector description

In 2015, the value of the agricultural industry's cash receipts was estimated at $7,930M, $5,260M of which came from animal producers and $2,671M of which came from plant producers. There were 28,153 agricultural operations in Quebec in that same year.

2. Business environment of the agricultural sector

The realities of the business environment vary depending on the sector. We therefore grouped the sectors in this study into four main groups:

1- Milk, chicken, turkey and eggs, which are under supply management; imports are controlled at the border, so these sectors operate primarily in a domestic (Canadian) market

2- Maple syrup, which is under provincial supply management but relies heavily on international trade

3- Produce, strawberries/raspberries and apples, which operate in a market where international and interprovincial trade (imports and exports) determine market conditions and farm prices

4- Pork and processing vegetables, which are destined to be processed; international and interprovincial trade partially determine market and price conditions

The adjacent table provides an overview of Canada's imports, exports and trade balance for the nine agricultural sectors that were part of this study.

Note that while the business environment for each sector differs, all sectors are increasingly affected by various commercial treaties (WTO, NAFTA, CETA, etc.), which increase the international market's influence on price levels and therefore on Quebec agricultural producers' revenues.

Sector description, Quebec, 2015		
	Farm cash receipts	Number of farms
All agricultural sectors	**$7,930M**	**28,153**
All animal producers	**$5,260M**	
Dairy cattle	$2,187M	6,602
Pigs	$1,322M	2,212
Chickens	$643M	753
Table eggs	$162M	114
Turkeys	$84M	136
All plant producers	**$2,671M**	
Fresh vegetables	$356M	1,550
Maple products	$306M	7,056
Apples	$59M	493
Strawberries	$42M	524
Processing vegetables	$31M	544
Raspberries	$8M	568

Sources: Profil bioalimentaire (2016), Profil horticole (2016), Statistics Canada- Table 002-0001 and special extract, Federation of Quebec Maple Syrup Producers. Compilation by FLC.

	Canadian exports (2015)	Canadian imports (2015)	Trade balance
Supply management			
Milk	$211M	$900M	($689M)
Chickens	$461M	$808M	($347M)
Turkeys	$53M	$37M	$16M
Table eggs (fresh and processed)	$49M	$178M	($129M)
Maple products			
Maple products	$370M	$14M	$356M
Horticulture			
Apples (fresh)	$51M	$253M	($202M)
Produce (fresh and frozen)	$1,587M	$3,455M	($1,868M)
Strawberries and raspberries (fresh)	$4.2M	$742M	($738M)
Products for processing			
Processing vegetables (peas, beans, sweet corn and cucumbers — 2013)	$91M	$112M	($21M)
Pigs	$3,600M	$615M	$2,985M

Sources: Canadian Dairy Information Centre. AAFC, International poultry and egg trade reports. AAFC, Statistical Overview of the Canadian Vegetable Industry – 2015. Government of Canada, Trade Data Online. AAFC. Statistical Overview of the Canadian Maple Industry – 2015. MAPAQ (2014), Monographie de l'industrie des légumes de transformation.

3. General workforce overview

Number of jobs

Based on the study by the Canadian Agricultural Human Resource Council (CAHRC),[1] we estimate that there are 70,300 jobs in the agricultural sector. This number includes agricultural producers, employees (full- and part-time employees, local and foreign seasonal workers) and vacant positions.

In order to understand the distribution of agricultural jobs, we combined the CAHRC data with information from other sources (see adjacent graph). According to Statistics Canada, there were 54,600 agricultural jobs[2] in 2016, including local employees (28,400) and agricultural producers (28,200) but excluding temporary foreign workers (TFWs). Also in 2016, the CAHRC estimates that 10,400 TFWs (see section on TFWs below) worked in Quebec[3] and 3,300 positions were left vacant.
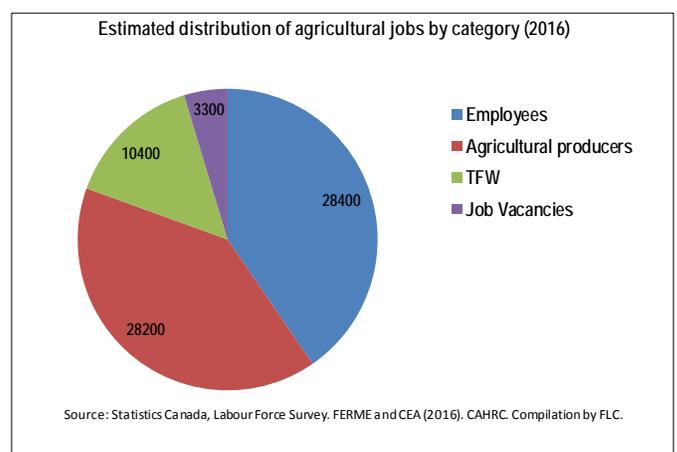
By adding the number of employees (28,400) to the number of TFWs (10,400), we can estimate the number of agricultural jobs in Quebec in 2016 at 38,800.

Estimated distribution of agricultural jobs by category (2016)

- Employees: 28400
- Agricultural producers: 28200
- TFW: 10400
- Job Vacancies: 3300

Source: Statistics Canada, Labour Force Survey. FERME and CEA (2016). CAHRC. Compilation by FLC.

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[1] CAHRC. Quebec Agricultural Labour Market Forecast to 2025.
[2] Data from the Labour Force Survey (LFS).
Jobs: Describes the total number of jobs in all categories. It includes temporary and permanent employees, as well as agricultural producers who are considered self-employed.
Agriculture: Includes agricultural crops, growing and maintaining said crops and supporting animal husbandry.
[3] FERME and Centres d'emploi agricole (CEA).

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Impact analysis of the minimum wage increase

Local workers: number and wages

In 2016, the monthly average number of full- and part-time employees was over 15,000 in the animal husbandry and aquaculture industries and 11,000 in the agricultural industry. During the months when agricultural activity was at its peak, the number of employees reached nearly 20,000 in the animal husbandry and aquaculture industries and was over 18,000 in the agricultural industry. These numbers emphasize the seasonal nature of employment in the agricultural industry, particularly in vegetable production sectors.

Number of monthly employees (2016)			
	Animal husbandry and aquaculture	Crop production	TOTAL
Monthly average	15,458	10,700	26,158
Monthly maximum	19,600	18,300	37,900
Monthly minimum	13,600	6,800	20,400

Source: Statistics Canada. Labour Force Survey (LFS) industry classification estimate — FLC compilation.

Note: These data exclude TFWs and agricultural producers.

Number of agricultural employees by hourly wage (2016) — LOCAL WORKERS	
$12/h and under	27%
$12.01/h to $14/h	13%
$14.01/h to $17/h	22%
$17.01/h to $20/h	19%
$20.01/h and over	18%

Source: Statistics Canada. Labour Force Survey (LFS), special extract, compilation and calculations by FLC.

Note: These data exclude TFWs and agricultural producers.

On average in 2016, 27% of agricultural jobs were occupied by workers who received less than $12/h (at or near minimum wage), 13% received $12.01–$14/h, 22% received $14.01–$17/h, 19% received $17.01–$20/h and 18% received above $20.01/h. According to studies by AGRIcarrières on working conditions, employees in the higher wage brackets are generally farm mangers or team leaders.
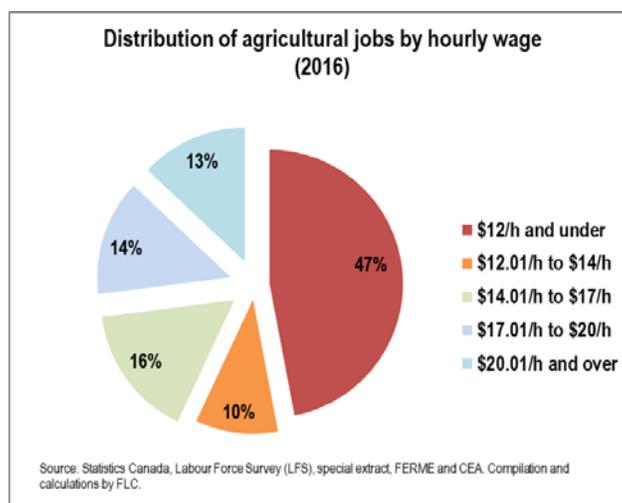
Temporary foreign workers: number and payment

The presence of TFWs in the agricultural industry's workforce is growing. In 2016, there were 10,400 TFWs. The horticultural (produce and fruit) sector employs the most TFWs by far (more than 8,000 in 2016). Most of these workers are paid minimum wage. However, note that the actual cost to employers is above minimum wage, as they must cover transportation (plane tickets) and housing costs for these workers.

Temporary foreign workers – 2016	
Sector	Number of positions
Plant production	
Fresh vgetable production	5,422
Fruit production (strawberries, raspberries, apples and others)	2,080
Fruit and vegetable production	626
Animal production	
Dairy production	381
Pork production	68
Poultry production	43
Poultry production; pork production	17

Source: FERME and Centres d'emploi agricole (CEA)

Percentage of agricultural employees paid near minimum wage

By combining data on local workers and TFWs, we estimate that 47% of jobs in the agricultural sector pay $12/h or less, and 57% pay $14/h or less. These estimates align with data from the National Occupational Classification (NOC),[4] which indicate that 22,314 positions in the agricultural industry were paid near minimum wage in 2014.

Distribution of agricultural jobs by hourly wage (2016)

- 47% — $12/h and under
- 10% — $12.01/h to $14/h
- 16% — $14.01/h to $17/h
- 14% — $17.01/h to $20/h
- 13% — $20.01/h and over

Source: Statistics Canada, Labour Force Survey (LFS), special extract, FERME and CEA. Compilation and calculations by FLC.

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[4] Codes: 8611, 8431, 8613. Source: IMT (2014). Special extract.

4. Evolution of the minimum wage

In Canada

With a minimum wage of $12.20/h in 2016, Alberta has the highest minimum wage in the country.[5] However, Alberta's agricultural sector is exempt from minimum wage regulations. In Ontario, the minimum wage will be increased to $11.60/h in October 2017. Following a $0.50/h increase on May 1, 2017, Quebec's minimum wage is set at $11.25/h, approaching Ontario's upcoming wage hike. However, Ontario's premier announced last May that the province's minimum wage would be increased to $15/h by January 2019.
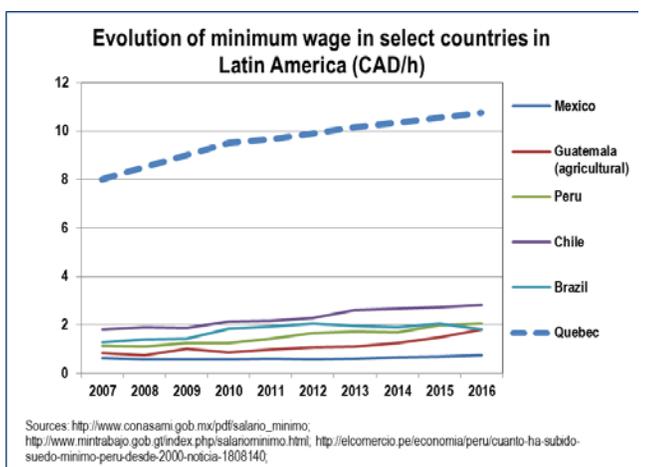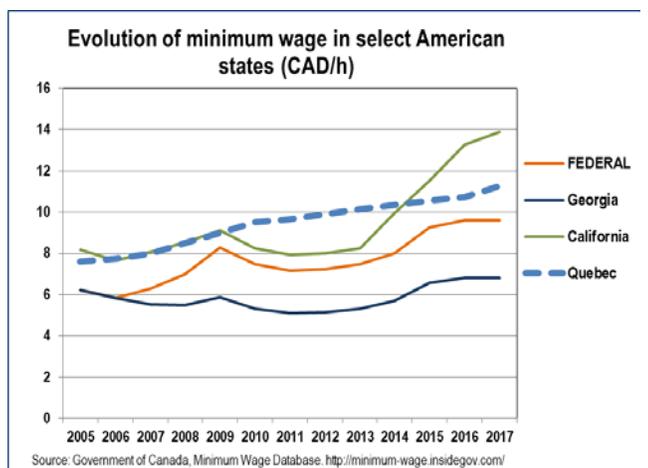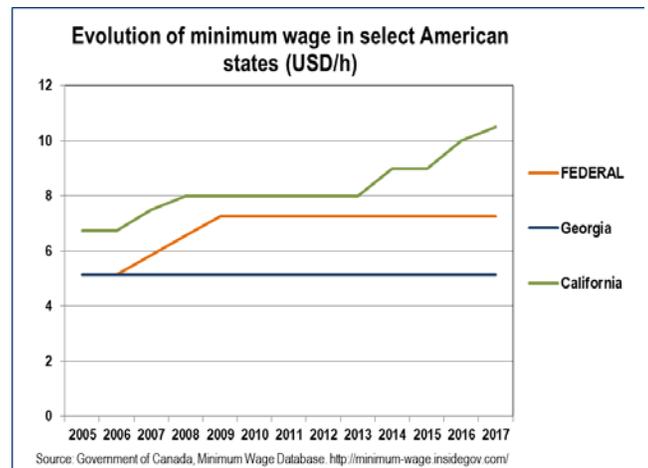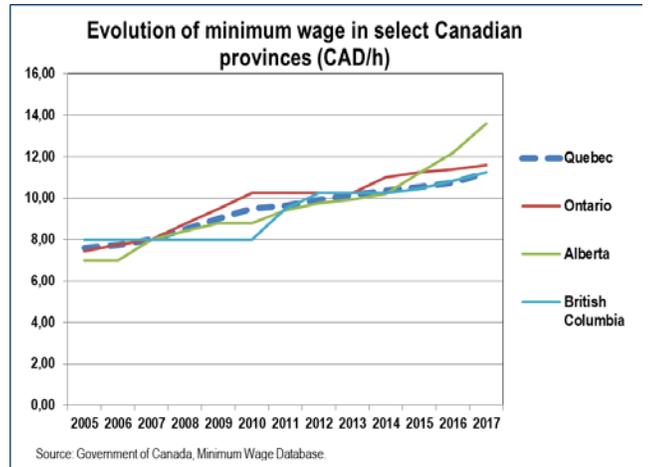
In the United States

In US dollars per hour (USD/h), the federal minimum wage in the United States is $7.25 USD/h as of 2017. This number has remained unchanged since 2008. The state with the lowest minimum wage is Georgia, where the minimum wage has been $5.15 USD/h since 2005. After Washington, the state with the highest minimum wage is California, with a minimum wage of $13.89 USD/h in 2017. California and Washington, which are both major fruit and vegetable producers, could therefore serve as a sort of barometer for the minimum wage in horticultural sectors (produce, strawberries, raspberries, apples). However, it is well known that the vast majority of horticultural workers in these two states are undocumented workers, who are paid significantly below minimum wage. Therefore, the agricultural industry in these two states is effectively exempt from minimum wage regulations.

In many American states, the minimum wage is tied to the federal minimum wage. This is the case in Wisconsin, which is a major producer of milk and processing vegetables, as well as in Iowa, which is a major producer of pork. Among the primary poultry producers, the minimum wage varies greatly: $5.15 USD/h in Georgia and $8 USD/h in Arkansas. In Vermont, the United States' primary maple syrup producer, the minimum wage was $9.60/h in 2017.

The United States' federal minimum wage in Canadian dollars (CAD/h) remains below the minimum wage in Quebec (in 2017, $9.59 CAD/h in the US vs. $11.25 CAD/h in Quebec), despite the Canadian dollar's current weakness against the American dollar (exchange rate of 1.3229 in 2017). Note that if the Canadian dollar
were to strengthen against the American dollar, it would only increase the gap between the minimum wages in Quebec and the United States. This would, in turn, further harm the competitiveness of Quebec agricultural businesses.

In Latin America

Canada continues to import more agricultural products from Latin American countries. Despite enormous transport costs, Latin American countries have successfully maintained extremely competitive prices compared to local Canadian products. This is particularly the case for raspberries and green beans from Mexico, blueberries from Chile, asparagus from Peru and more. The minimum wages in Latin American countries were significantly lower than the minimum wage in Quebec in 2016—for example, the minimum wage in Mexico was equivalent to $0.73 CAD/h for an 8-hour day.

Evolution of minimum wage in select Canadian provinces (CAD/h)

Source: Government of Canada, Minimum Wage Database.

Evolution of minimum wage in select American states (USD/h)

Source: Government of Canada, Minimum Wage Database. http://minimum-wage.insidegov.com/

Evolution of minimum wage in select American states (CAD/h)

Source: Government of Canada, Minimum Wage Database. http://minimum-wage.insidegov.com/

Evolution of minimum wage in select countries in Latin America (CAD/h)

Sources: http://www.conasami.gob.mx/pdf/salario_minimo; http://www.mintrabajo.gob.gt/index.php/salariominimo.html; http://elcomercio.pe/economia/peru/cuanto-ha-subido-suedo-minimo-peru-desde-2000-noticia-1808140;

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[5] In Alberta, minimum wage is expected to increase to $13.60/h in October 2017 and $15/h in 2018.

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5. General effects of a minimum wage increase on the agricultural industry

Many studies[6] have recently been done on the potential effects of a minimum wage increase. While they disagree on the extent of the net impact (gains minus losses), all studies agree that some sectors will be hit particularly hard, especially in terms of job losses. With this in mind, we analyzed nine agricultural production sectors[7] with the intent of documenting and more precisely measuring the potential impacts of a minimum wage increase, particularly on farm competitiveness. The two scenarios that we analyzed were: 1 - an increase of $1.70/h, which is the increase announced by the Government of Quebec in order to bring the minimum wage up from $10.25/h in 2016 to $12.45/h in 2020; and 2 - an increase of $4.25/h, which would bring the minimum wage to $15/h.

Proportion of minimum wage employees in agriculture and the ripple effect

We found that 47% of agricultural employees (local and temporary foreign workers, excluding agricultural producers) received around minimum wage ($12/h and under) in 2016. However, this wage bracket is not the only one that would be affected by a minimum wage increase. Positions earning higher wages would be affected as well. This is called the ripple (or domino) effect. In other words, a minimum wage increase would lead to an increase in higher wage brackets as well.

According to observations drawn from our research into ripple effects (see the "Document Review" section of the full report), positions earning up to 40%[8] above the new minimum wage will also experience a wage increase that is equal to up to 85–90% of the minimum wage increase. In other words, a $1/hour increase in the minimum wage would lead to an $0.85–$0.90/hour increase for these positions. When including employer contributions (e.g. employment insurance, vacation pay, CNESST contributions, etc.), which

Illustration of the ripple effect	Increase of $1.70/h	Increase of $4.25/h
2016 hourly minimum wage	$10.75	$10.75
Increased hourly wage	$12.45	$15.00
Ripple effect: On wages that are up to 40% higher than the new minimum wage	X 140%	X 140%
Salary threshold affected by the ripple effect	$17.43	$21.00

equal approximately 15% of salaries in the agricultural sector,[9] the actual cost increase for employers would be 100% (85% + 15%) for most employees. In each of the nine sectors we analyzed, the average wage was generally below $18/h and would therefore be affected by a $1.70/h or a $4.25/h increase.

Sector impacts

Our analyses indicated that a minimum wage increase would affect different sectors in different ways. Furthermore, the links in the supply chain that are "upstream" of the agricultural industry (e.g. factor input suppliers, processing and retail) would also be dealing with labour-related cost increases. This would put even more pressure on the agricultural industry, because the price of factor inputs could increase, as could the amount of agricultural and agri-food imports.

The following table summarizes the current labour situation and provides a synopsis of the ways a minimum wage increase would affect competitiveness, as presented in the sector data sheets.

The current labour situation for each sector was determined using three elements, which are taken from the sector data sheets: average employee wage bracket, percentage of labour costs within total operating costs and ratio of labour costs to operating profits.

The impact analysis covers various factors, which are sorted into two categories:

- Factors affecting businesses' ability to adapt to a minimum wage increase, which include:

  o ability to transmit a cost increase to the market. This is determined using the observations made during document review (section 2.4.5).

  o ability to replace the workforce with technology in the short term. This is briefly discussed in each sector data sheet or in document review.

- Factors affecting businesses' ability to absorb a minimum wage increase. This ability depends on each sector's labour profile: average employee wage, percentage of wage costs within total operating costs and the ratio of labour costs to operating profits.

Finally, the factors are combined to determine the overall potential impact of a minimum wage increase on competitiveness. This impact is colour coded using the system described above.

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[6] For example: IRIS (multiple publications), Dameco (2016), etc.

[7] Sectors studied: Dairy, pork, poultry, table eggs, maple products, produce, strawberries and raspberries, apples, processing fruits and vegetables

[8] Given the problems and issues related to labour in the agricultural sector, realistic estimates state that a minimum wage increase will affect positions that are paid up to 40% above minimum wage. A more conservative rate (e.g. 30%) could have been considered, but would not have changed the sector impact analyses. In most of the agricultural sectors we analyzed, the average wage was below the threshold for wages that would be affected by the ripple effect. In sectors where the average wage was above the threshold, the analyses showed that businesses would have a moderate or good ability to absorb cost increases related to a minimum wage increase.

[9] In the agricultural industry, employer costs vary between 10–20% of the payroll, depending on the sector, but are generally around 15%.

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Impact analysis of the minimum wage increase

Summary of the analysis of the effects of a minimum wage increase on competitiveness

Sector	Current workforce overview			Ability to adapt to a minimum wage increase			Effects on competitive-ness[3]
	Employee wage bracket	Labour costs		Ability to transmit a cost increase to the market	Ability to replace the workforce with technology	Ability to absorb the increase	
	Under $12/h $12–14/h $14–18/h $18/h and over	% employee wages[1] /total expenses	Ratio of wage expenses to operating profit				
Milk	$14–18/h	10%	Per $1 of profit, $0.58 is spent on wages	Low to moderate	Low	$1.70/h: Good	🟩
						$4.25/h: Low	🟨
Table eggs	$14–18/h	4%	Per $1 of profit, $0.39 is spent on wages	High	Low	$1.70/h: Good	🟩
						$4.25/h: Good	🟩
Poultry	$18/h and over	4%	Per $1 of profit, $0.58 is spent on wages	Very low	Low	$1.70/h: Good	🟩
						$4.25/h: Moderate	🟨
Maple products[2]	$14–18/h	16%	Per $1 of profit, $0.95 is spent on wages	Moderate	Low	$1.70/h: Moderate	🟨
						$4.25/h: Low	🟨
Pork	$14–18/h	4%	Per $1 profit, $13 is spent on wages	Very low	Low	$1.70/h: Very low	🟥
						$4.25/h: Very low	🟥
Processing vegetables *PBC*	$14–18/h	4%	ND	Low	Low	$1.70/h: Moderate	🟨
						$4.25/h: Low	🟨
Processing vegetables *Cucumber*	Under $12/h	52%	ND	Very low	Moderate	$1.70/h: Low	🟥
						$4.25/h: Very low	🟥
Produce	Under $12/h	39%	Per $1 of profit, $6.75 is spent on wages	Very low	Low	$1.70/h: Low	🟥
						$4.25/h: Very low	🟥
Strawberries and raspberries	Under $12/h	54%	Per $1 of profit, $5.51 is spent on wages	Very low	Low	$1.70/h: Very low	🟥
						$4.25/h: Very low	🟥
Apples	Under $12/h	33%	Per $1 of profit, $3.29 is spent on wages	Very low	Very low	$1.70/h: Very low	🟥
						$4.25/h: Very low	🟥

Note 1: Including family, but excluding the operator
Note 2: Average of three business sizes
Note 3: Green: low impact, yellow: moderate impact and red: high impact on competitiveness.

Our analysis of the factors in the table allowed us to draw the following conclusions:

- **Greater** impact on horticultural sectors due to:
  - The proportion of labour costs relative to production costs and operating profit;
  - A high percentage of workers being paid at or slightly above minimum wage;
  - Reduced competitiveness against imported products, particularly horticultural products from Latin American countries, where the minimum wage is much lower; and

  - Limited ability to automate in horticultural sectors, since many tasks are performed manually.
- **More moderate** impacts on animal sectors (except for the pork sector, where the low net revenue severely limits its ability to absorb cost increases). The extent and specific impacts on these sectors will vary depending on their business environment.

A more detailed analysis for each sector is provided in the sector-specific data sheets.

Data sheet created by Forest Lavoie Conseil (2017) for AGRIcarrières as part of its "Impact Study on a Minimum Wage Increase in the Agricultural Sector."