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Wage Growth in Canada and the United States: Factors Behind Recent Weakness



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Abstract

This note examines the relatively subdued pace of wage growth in Canada since the commodity price decline in 2014 and assesses whether the weakness is attributable to cyclical (e.g., labour market slack) or structural factors (e.g., resource reallocation and demographic change). Our analysis indicates that ongoing labour market slack and, to a lesser extent, weak labour productivity growth appear to be key factors weighing on wage growth since 2014 in Canada. The decline in commodity prices may also be a key factor that contributed to subdued Canadian wage growth. A comparative analysis of US wage growth is also conducted. In the United States, weak labour productivity growth is a key macro factor weighing on wage growth, but labour market slack is no longer a material drag.

Bank topics: Labour markets; Recent economic and financial developments

JEL codes: E, E2, E24, J3, J30

Résumé

Dans cette note, nous nous interrogeons sur les raisons de la croissance relativement modérée des salaires au Canada depuis la baisse des prix des produits de base, en 2014, et cherchons à établir si des facteurs conjoncturels (telle une marge de ressources inutilisées sur le marché du travail) ou structurels (redistribution des ressources et évolution démographique, par exemple) sont en cause. Notre analyse indique que la persistance d'une marge de ressources inutilisées et, dans une moindre mesure, la faiblesse de la croissance de la productivité du travail, apparaissent comme des facteurs importants de ralentissement de la croissance des salaires au Canada depuis 2014. Le recul des prix des produits de base serait aussi un facteur explicatif important pour l'économie canadienne. Une analyse comparée de la croissance des salaires aux États-Unis révèle que la faiblesse de la croissance de la productivité du travail constitue un des principaux facteurs macroéconomiques d'entrave à la croissance des salaires, mais que les ressources inutilisées sur le marché du travail ne représentent plus un frein notable.

Sujets : Marchés du travail; Évolution économique et financière récente

Codes JEL : E, E2, E24, J3, J30

Summary

This note examines potential factors behind the relatively subdued pace of wage growth in Canada since the commodity price decline in 2014. A comparative assessment of US wage growth is also conducted.

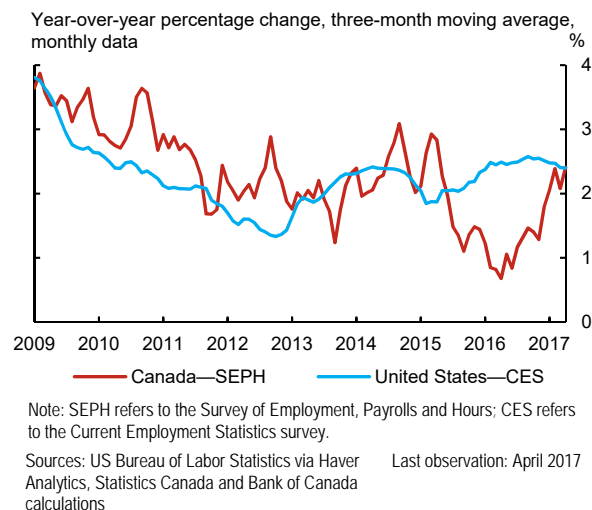
- Based on a simple wage equation, ongoing labour market slack and, to a lesser extent, weak labour productivity growth appear to be key factors weighing on wage growth since 2014 in Canada. In the United States, weak labour productivity growth is a key macro factor weighing on wage growth, but labour market slack is no longer a material drag.
- Alternative wage growth decompositions suggest that the decline in commodity prices may also be a key factor for Canada. We found a more pronounced decline in wage growth in both the goods-producing sector and the energy-intensive regions in Canada. However, the drag from the commodity price decline appears to have peaked in early 2016 and has since been gradually dissipating. Unlike Canada, US wage growth has not been overly affected by industry-specific dynamics following the commodity price decline.
- US wage growth still appears relatively moderate despite the tight conditions in the US labour market. This likely in part reflects ongoing workforce compositional changes that are depressing wage growth (e.g., retirement of highly paid mature workers and replacement with lower-paid marginal workers) in addition to historically weak labour productivity growth.

These findings suggest that Canadian wage growth should be expected to pick up as labour market slack is taken up and the effects of the commodity price decline fade. The US experience, however, suggests that Canadian wage growth could remain in the lower range of historically observed levels if labour productivity growth is low relative to history and workforce compositional effects pose a drag. On the latter, preliminary analysis in this note highlights that wage growth for older Canadian workers has recently been weak, which may be a signal that retirement trends may have started posing a drag.

1. Context

Since the commodity price decline in mid-2014, wage growth has been relatively subdued in Canada, while it has strengthened moderately in the United States (**Chart 1**).¹ Statistics Canada’s Survey of Employment, Payrolls and Hours (SEPH) shows that Canadian wage growth weakened in early 2015 and, while it has strengthened recently, remains below its historical average.² In contrast, the US Bureau of Labor Statistics Current Employment Statistics (CES) survey reveals that US wage growth has strengthened since early 2015, although it has recently flattened out. This levelling-off is puzzling, as it has occurred in parallel with ongoing tightening in the US labour market (e.g., declines in measures of labour underutilization and elevated job openings and quit rates).³ This note explores potential factors behind the different paths of Canadian and US wage growth.⁴

Chart 1: Wage growth in Canada has been weaker than in the United States since 2015



¹ To facilitate comparability, this note assesses wage dynamics as reported in each country’s monthly establishment survey: the Survey of Employment, Payrolls and Hours (SEPH) in Canada and the Current Employment Statistics (CES) survey in the United States. For the United States, wage data are based on average hourly earnings of production and non-supervisory employees, given that data for all employees were not available before 2006.

² Other data sources—including the Labour Force Survey (LFS), Major Wage Settlements, and National Accounts data on labour income and unit labour cost—also point to below-average growth in Canada.

³ Other measures of US labour compensation also indicate relatively sluggish growth, including the Bureau of Labor Statistics (BLS) Employment Cost Index, hourly compensation and unit labour costs in the BLS’s Productivity and Costs Report, National Accounts data on wages and salaries, and CES data on average hourly earnings for private employees.

⁴ Relatively weak wage growth has also been observed in other advanced economies and presents a broader puzzle at the global level. Recent publications from the Bank of England (2017), European Central Bank (2017) and Reserve Bank of Australia (Bishop and Cassidy 2017) have all highlighted weak wage growth in their countries.

2. Can Fundamentals Explain Recent Wage Growth Dynamics?

Theory suggests that wage growth dynamics are linked to developments in labour market slack and productivity. We investigate the contribution of these factors to Canadian and US wage growth using simple reduced-form wage equations. More specifically, quarterly nominal wage growth is regressed on lags of the labour input gap (our proxy of labour market slack) and productivity growth, with inflation added as a necessary control.⁵ While these simple reduced-form specifications should be interpreted with caution, they do provide insight about the relationships between these variables and what these relationships suggest for the pace of wage growth today.⁶

Of these factors, labour market slack appears to be the most important driver behind recent weakness in Canadian wage growth. **Chart 2** (Canada) and **Chart 3** (United States) show the decomposition of year-over-year wage growth derived from our reduced-form equations. The charts suggest that labour market slack (proxied by the labour input gap) exerted significant drag on wage growth in both countries since 2010, and that it continues to weigh on Canadian wage growth but is no longer a major factor in the United States.⁷ These results are consistent with the findings in Brouillette et al. (2017) that suggest slack remains in the Canadian labour market—due to weakness in average hours worked and despite good employment numbers—whereas the United States is close to full employment.

Weak labour productivity growth also appears to have put some small downward pressure on wage growth in both countries since early 2015. In Canada, labour productivity fell after the commodity price drop, leading to negative contributions to wage growth. However, the labour productivity contribution has been recovering as of late 2016 (**Chart 2**). In the United States, low inflation and weak productivity growth have been a constant source of drag for the past several years, which helps explain why

⁵ In these equations, wage growth, productivity growth and inflation are demeaned. Quarterly total CPI inflation and business sector productivity growth are used. The labour input gap represents the deviation of labour input (i.e., total employment multiplied by average hours worked) from its estimated trend. The regressions are estimated with quarterly data from 1992–2017 in both Canada and the United States.

⁶ Caution is warranted, as the relationship between wage growth and these variables could change over time. For example, **Appendix 1** discusses whether the relationship between wage growth and labour slack has weakened since 2008. The International Monetary Fund (2017) highlights structural changes that affect how productivity growth that feeds into wages has resulted in a structural decline in the labour share of income since the 1980s.

⁷ A decomposition was also made with LFS data. Results are in line with those from SEPH: the labour gap is the main driver of wage growth since the 2008–09 recession and the effects of labour productivity and inflation are smaller. However, a slightly larger part (relative to SEPH) of recent weakness in wage growth remains unexplained.

wage growth has been weaker than labour market conditions alone would suggest (**Chart 3**).

Chart 2: Labour market slack and productivity are the main drivers behind recent weakness in Canadian wage growth

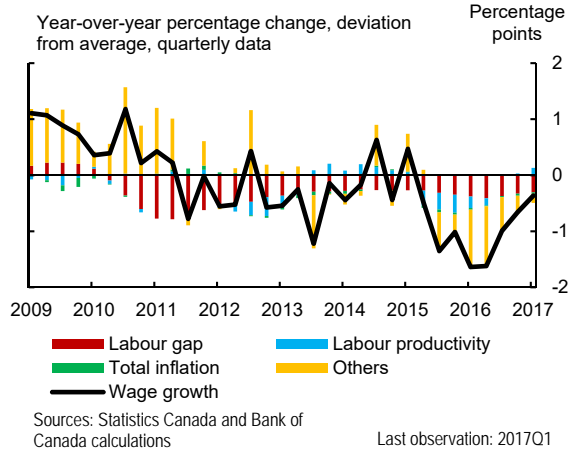
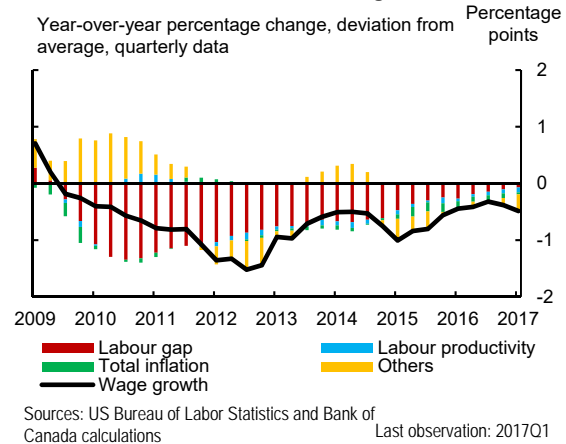


Chart 3: Labour slack is no longer a large drag on US wage growth, but productivity and inflation continue to weigh



Other factors appear to have weighed on Canadian wage growth since early 2015. The Canadian decomposition shows a large negative unexplained factor beginning in mid-2015, although it has diminished more recently (**Chart 2**). A much smaller unexplained factor was observed in the United States at the same time, and there has also been some unexplained weakness in the most recent quarter (**Chart 3**). The large unexplained factor suggests that other factors—not captured by the wage equations presented in this section—may have contributed to the weakness of wage growth for both Canada and the United States. The importance of these other factors, particularly reallocation effects, is reviewed in the next section.

3. Are Reallocation Effects Meaningful?

The commodity price decline in mid-2014 could be a key element weighing on sector and regional wage growth dynamics since early 2015. This could have affected wage growth through a shift of resources across regions or sectors, but also growth within sectors or regions. These effects are not directly captured in the wage equations presented above. This section investigates these channels by reviewing wage growth dynamics by sector and region in Canada and the United States. **Appendix 2** and **Appendix 3** review additional factors behind weak wage growth in Canada and the United States, respectively.

Goods-producing and service sectors

Since early 2015, the dynamics in wage growth in Canada and the United States diverged on a sectoral basis. In Canada, wage growth in the goods-producing sector fell after 2014 and eventually became negative, while growth in the service sector did not decline in a similar way (**Chart 4**). In contrast, US wage growth improved in both the goods-producing and service sectors over that period (**Chart 5**). These developments could be linked to the fact that the oil sector is relatively more prominent in the Canadian economy than in the United States.

Chart 4: Wage growth by sector fell in Canada after the commodity price decline ...
Year-over-year percentage change, three-month moving average, monthly data

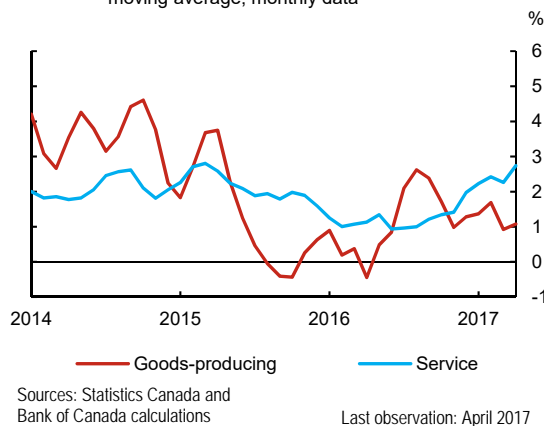
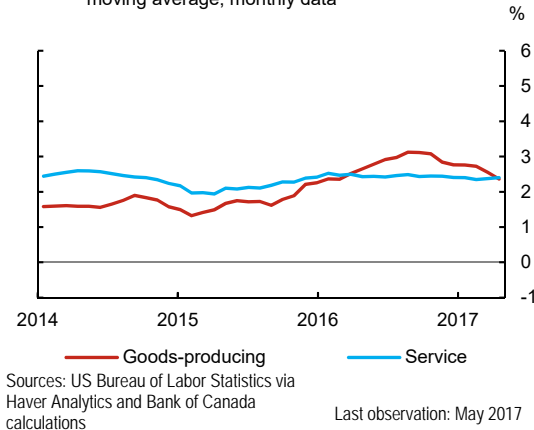


Chart 5: ... and remained steady in the United States
Year-over-year percentage change, three-month moving average, monthly data



In Canada, wage growth in the goods-producing sector has been a key factor that has disproportionately (relative to its employment share) weighed on aggregate wage growth from mid-2015 to mid-2016. **Chart 6** and **Chart 7** show monthly wage growth decompositions by sector (goods-producing and service) for each country from shift-share analysis.⁸ The key takeaways include the following:

- The reallocation effect of employment from the goods-producing sector to the service sector is playing a limited role for both countries.⁹ In Canada, from mid-2015 to mid-2016 the shift towards the service sector (where wages are lower) reduced Canadian wage growth by only about 0.1 percentage points (**Chart 6**, green bars). The shift towards services is trivial for the United States (**Chart 7**).

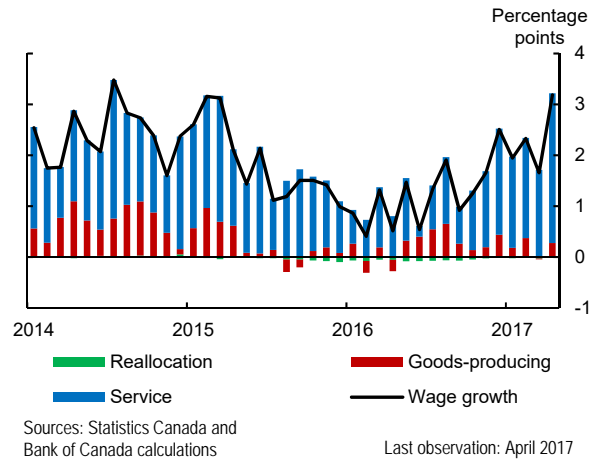
⁸ The decompositions are dynamic in the sense that for month T, the reference period is T-12 and not a fixed month (e.g., T* = 2007). This exercise allows us to better capture the recent short-term dynamics.

⁹ The reallocation effect captures the impact on wage growth of worker reallocation from the goods-producing to the service sector only. Therefore, it does not capture reallocation occurring within each sector—for example, if workers formerly employed in the relatively high-paying oil sector move to other employment in the construction sector. The latter effect is captured by the blue and red bars of **Chart 6** and **Chart 7**.

- Over that period, declining wage growth in the goods-producing sector led to a material easing in aggregate wage growth in Canada (**Chart 6**, red bars), mostly because of the resources and construction sectors. Overall, the goods-producing sector was responsible for close to 50 per cent of the decline in aggregate Canadian wage growth over this period, despite representing 20 per cent of Canadian employment. In contrast, the goods-producing sector in the United States did not contribute to a material weakening in wage growth (**Chart 7**, red bars).

Chart 6: The goods-producing sector was the main drag on wage growth in Canada between mid-2015 and mid-2016

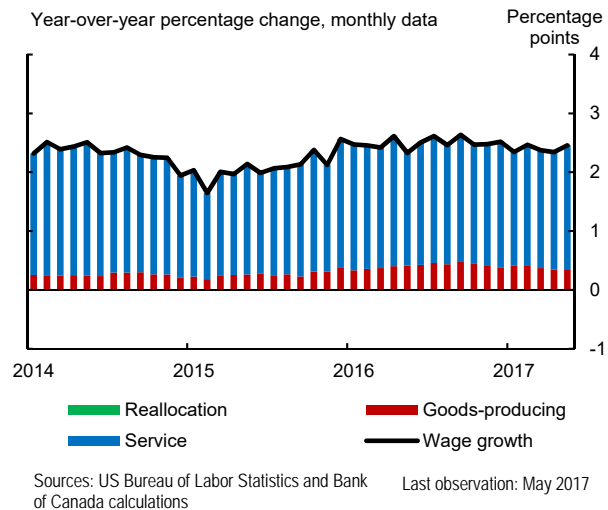
Year-over-year percentage change, monthly data



- Since mid-2016, the contribution to wage growth of the goods-producing sector in Canada has been recovering in line with improved labour productivity growth in that sector.¹⁰

Chart 7: Sector-specific dynamics did not overly affect US wage growth

Year-over-year percentage change, monthly data



- A modest easing in service sector wage growth in Canada also contributed to weaker aggregate wage growth from mid-2015 to mid-2016 (**Chart 6**, blue bars). Overall, developments in the service sector explain 40 per cent of the decline in aggregate wage growth over this period—much smaller than the service sector’s overall employment share (80 per cent).

- Service sector wage growth in Canada has declined the most in trade (retail and wholesale); transportation and warehousing; finance, insurance and real estate; and,

¹⁰ Overall, the observed wage dynamics from 2015–17 in Canada appear to be roughly in line with the impacts of the commodity price decline expected at the time of the Bank of Canada’s January 2016 Monetary Policy Report (see Box 1, Bank of Canada 2016). See Champagne et al. (2016) for more details.

to a lesser extent, professional services. The decline in transportation and warehousing and professional services may be linked to resource sectors, but less so for other sectors, suggesting that other factors could have been dragging on wage growth in Canada. In the United States, service sector wage growth has been relatively steady and broad-based.

- Decomposing aggregate wage growth between the export-related and non-export-related sectors for Canada and the United States show similar results to those for the goods-producing and service sectors.^{11,12}

Regions

The decomposition by region conveys a similar message, as Canada's energy-intensive regions (EIR) experienced relatively weak wage growth following the mid-2014 commodity price decline (**Chart A2.2**).¹³

- The effect of employment reallocation away from EIR is very small. While there is evidence that some workers moved out from EIR in late 2015 and early 2016, the slight shift effect probably reflects the small share of employment in the oil and gas extraction sector (less than 0.5 per cent of all employees).
- Between mid-2015 and mid-2016, declining wage growth in EIR was the main driver of the decline in aggregate wage growth in Canada—mostly attributed to Alberta. However, we also observe a slowdown in non-EIR wage growth.¹⁴

Overall, the more pronounced decline in wage growth in the goods-producing sector and EIR in Canada, relative to the United States, supports the idea that the impact of the commodity price decline was more severe in Canada. However, the decline in the contributions from the service sector and non-EIR is consistent with our view that broader labour market slack has also depressed wage growth in Canada.

¹¹ The export-related sector includes both goods-producing (e.g., resources—i.e., forestry, mining, quarrying, and oil and gas extraction—and manufacturing) and service sectors (e.g., transportation and warehousing, and professional services).

¹² This may result from the exchange rate that has not fallen as much as it should have, given the oil price decline. To maintain the competitiveness of their products abroad, firms may have decided to restrain wage growth in the export-related sector.

¹³ EIR in Canada includes Newfoundland and Labrador, Saskatchewan and Alberta.

¹⁴ Contribution to the decline of EIR is slightly more disproportionate than for goods: EIR accounts for 55 per cent of the decline in aggregate wage growth between mid-2015 and mid-2016, while it accounts for about 17 per cent of employment.

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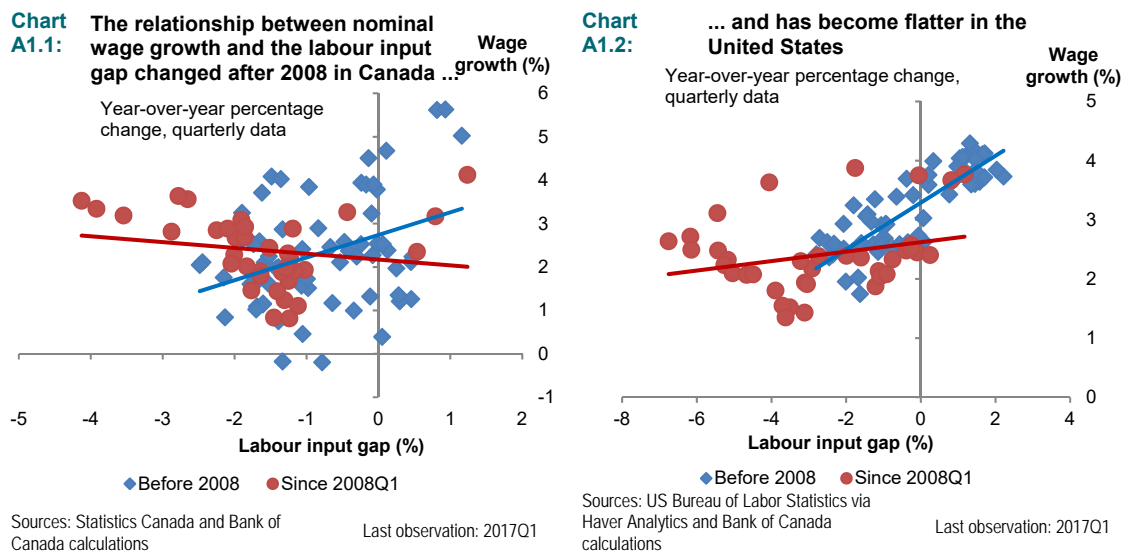
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Appendix 1. Stability of the Wage Growth–Labour Input Gap Relationship

We find mixed evidence that the relationship between wage growth and the labour input gap may have weakened in Canada and the United States since the Great Recession. In many advanced economies, relatively weak wage growth has been observed despite ongoing labour market recovery (as pointed out in footnote 4). This suggests that the structural relationship between wage growth and labour market conditions may have weakened and become flatter. However, an alternative hypothesis is that the wage growth–labour input gap relationship may be a non-linear function. At this stage, our preliminary analysis cannot discriminate against either hypothesis.

Evidence of a flattening relationship

Chart A1.1 and **Chart A1.2** show that the relationship between nominal wage growth and the labour gap weakened after 2008 in both Canada and the United States (the slope of a linear fit is closer to zero after 2008).¹⁵



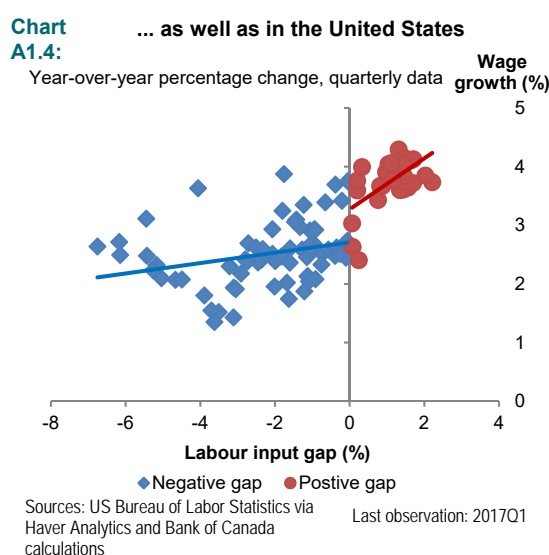
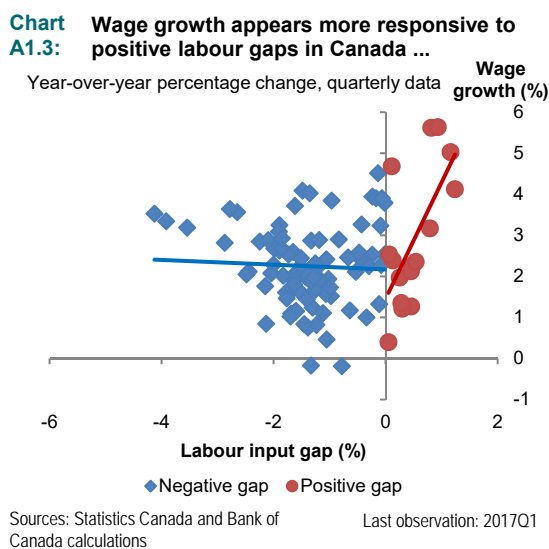
To test this hypothesis more formally, we re-estimate the wage equation from section 2, allowing for a change in the slope (by including an interaction term between the labour input gap and a binary variable equal to 1 for periods after 2007). Under this specification, our results are as follows:

¹⁵ Similar evidence of changes in the relationships between macroeconomic variables is documented in Brouillette and Kyui (2017).

- For Canada, we find weak evidence of flattening. While the change in the relationship is statistically significant, it is small and unlikely to have any significant economic impact.
- For the United States, the results suggest a significant flattening in the wage growth–labour input gap relationship. In particular, in the post-recession period the sensitivity of wage growth to the labour input gap is less than half that observed before the Great Recession.

Non-linearity of the wage growth–labour input gap relationship

Chart A1.3 and **Chart A1.4** present historical evidence for Canada and the United States that could suggest that wages increase at a faster rate when the labour input gap turns positive (i.e., when labour market conditions are tighter). This means that there could be non-linearity in the wage growth–labour input gap relationship, which is a topic that has drawn some attention in the literature, especially in the United States.¹⁶



The fact that the labour input gap has been negative in both Canada and the United States for most of the time since the Great Recession may explain why the relationship between wage growth and the labour input gap has been flatter over this period. This would support the view that there has not been a material structural change in the relationship between wage growth and tightness of labour market conditions. While more work is required on this issue, a potential explanation for the flatter relationship

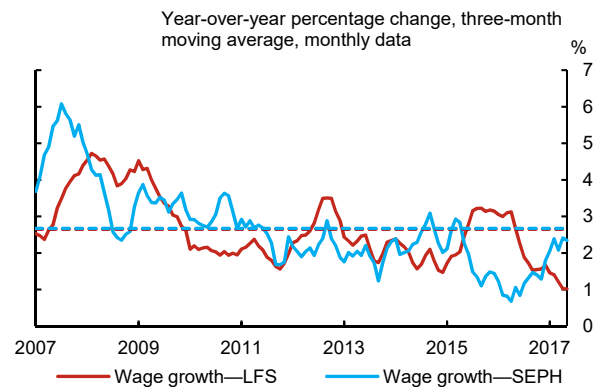
¹⁶ For instance, Kumar and Orrenius (2015) exploit the variability in wage growth and the unemployment rate across US states to test for the convexity of the wage Phillips curve. Although such an exercise is of interest for Canada, it could be difficult to use provincial-based results to inform monetary policy.

when the labour gap is large and negative could be the presence of downward nominal wage rigidity.¹⁷

Appendix 2. Can Other Structural Factors Be at Play in Canada?

Wage growth between the Labour Force Survey (LFS) and the Survey of Employment, Payrolls and Hours (SEPH) has been diverging since mid-2015, with the former reaching its historical low in April 2017 (**Chart A2.1**). The diverging dynamics in LFS and SEPH are reflected in wage growth decompositions by region. From early 2015 to mid-2016, contributions of energy-intensive regions (EIR) and non-EIR slowed in SEPH (**Chart A2.2**), while they strengthened slightly in LFS (**Chart A2.3**). The pattern reversed around mid-2016: both EIR and non-EIR contributed to the strengthening wage growth in SEPH. In contrast, LFS wage growth weakened mostly because of the decline in contributions from non-EIR, although contributions of EIR weakened as well.¹⁸

Chart A2.1: Wage growth in LFS and SEPH has been diverging since 2015 in Canada



Note: Dashed lines represent the averages since 2007. LFS refers to the Labour Force Survey; SEPH refers to the Survey of Employment, Payrolls and Hours.

Sources: Statistics Canada and Bank of Canada calculations

Last observation: April 2017

The divergence in wage growth in LFS and SEPH could reflect other structural factors not induced by commodity prices. This is investigated through decomposition by worker characteristics.¹⁹

¹⁷ There is not much evidence that downward nominal wage rigidity plays an important role in Canada (Brouillette, Kostyshyna and Kyui 2016). However, there is some evidence that it was a factor in the United States (Daly, Hobijn and Ni 2013).

¹⁸ Decompositions by sector show similarly contrasting dynamics of the contributions of goods-producing and service sectors.

¹⁹ Wages by worker characteristics are available only in LFS.

Chart A2.2: Wage growth by region has weakened between mid-2015 and mid-2016 in SEPH data...

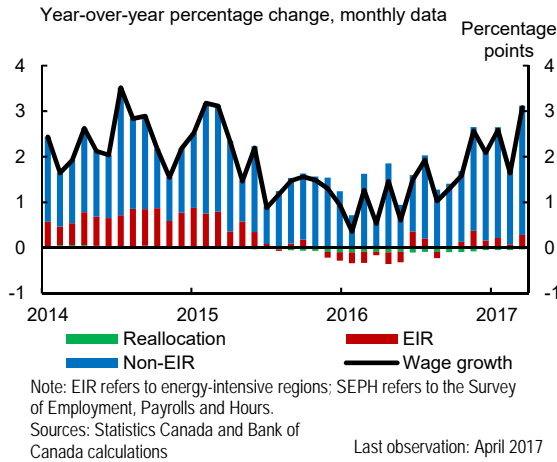
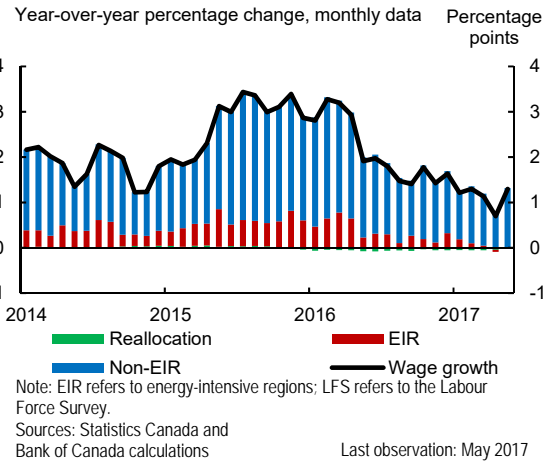


Chart A2.3: ... but increased in LFS data over the same period

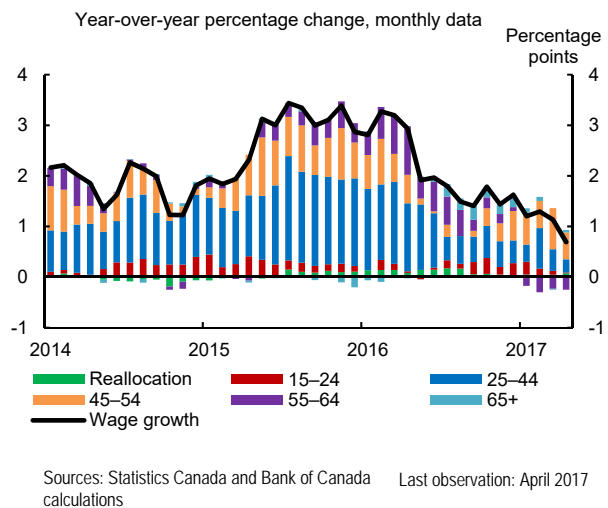


Workforce composition by age

The results from decomposition by age group can be summarized as follows:

- The main driver of weaker wage growth since mid-2016 is the group aged 25–44, as it represents the largest share of employment (**Chart A2.4**). Within that age group, wage growth of workers in EIR were disproportionately affected by the decline in commodity prices given their share of employment.
- The youngest (aged 15–24) and the oldest (aged 65+) groups have not contributed significantly to declining wage growth in Canada, as their shares are lower. Both groups tend to work fewer hours than prime-age workers and work in low-paying jobs. Their participation rates also tend to be much lower.

Chart A2.4: Age group 25–44 was the main driver of weaker wage growth since 2016



While we cannot entirely rule out that aging has been playing a role in the recent easing, this is likely relatively modest (reallocation effect is small).

- The fact that contribution to growth for the group aged 55–64 has turned negative in recent months can be consistent with retiring baby boomers: they

presumably hold high-paying jobs, and their exit from employment would push down wage growth. However, evidence of this is limited, and volatility in the data can also reflect noise.^{20,21}

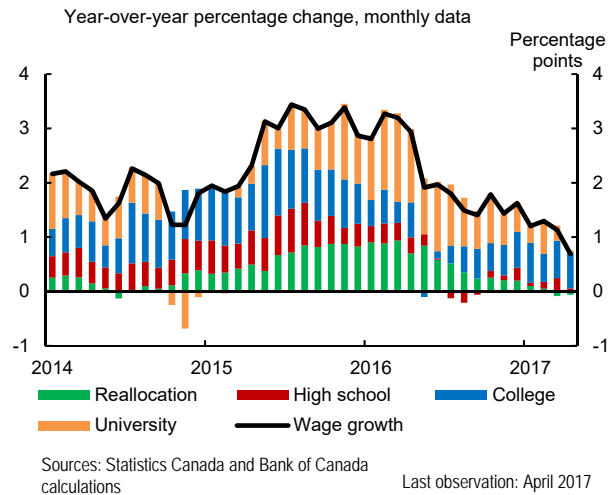
Other compositional effects can be at play but they are difficult to disentangle. For instance, our simple decomposition does not account for the effects of transitions into and out of the labour force. Such factors seem to matter for the United States and may also be of importance in Canada.

Decomposition by educational attainment

Chart A2.5 shows the wage decomposition by educational attainment.

- The reallocation effect was sizable in Canada in 2015 and over most of 2016. During that period, the employment share of workers with a university degree increased relative to the other groups. This has lifted wage growth, as these workers tend to earn higher wages. Job gains in the information and computer technology sector might be related to that outcome.
- While the deceleration in wage growth since mid-2016 is relatively broad-based, the drag from lower-educated workers has been sizable. This decline was due to workers with only a high school diploma in both EIR and non-EIR. This suggests that labour market conditions may have recently degraded for lower-educated workers in Canada.

Chart A2.5: Increase in the wages of university-educated workers boosted growth in 2015 and 2016



²⁰ It is generally agreed that the baby boom started in 1952 in Canada. This means that baby boomers start turning 65 in 2017.

²¹ Another piece of evidence on the likely small effect of aging is found by comparing the LFS fixed- and variable-weighted wage measures. The former holds constant to its 2000 average the following dimensions: sector, occupation, permanent/temporary, and part-/full-time status. Any discrepancy between these two measures should be attributable to other factors such as aging or changes in education. But since 2000, the only period where these measures differ is during most of 2015, which is likely because of a reallocation effect in educational attainment of the workforce (Chart A2.5).

Overall, we find that lower-educated and prime-age workers have contributed to weaker wage growth in Canada recently, while the role of aging remains unclear.

Appendix 3. Explaining Relatively Moderate Wage Growth in the United States

US wage growth appears relatively sluggish compared with the current stage of the business cycle and has moderated in recent quarters despite ongoing tightening in the US labour market. Several potential factors have been identified in recent literature to explain this absence of strong wage pressures, including the following:

- weak labour productivity growth restraining real wage growth
- workforce composition changes due to aging and entry of lower-paid workers
- continued effects of past downward wage rigidity, as firms could be reluctant to increase wages given that they could not cut wages following the recession
- a shift in employment towards lower-paying sectors
- still-existing labour market slack not captured by headline measures of unemployment
- declining labour market dynamism leading to fewer job-to-job transitions
- reduced bargaining power of labour

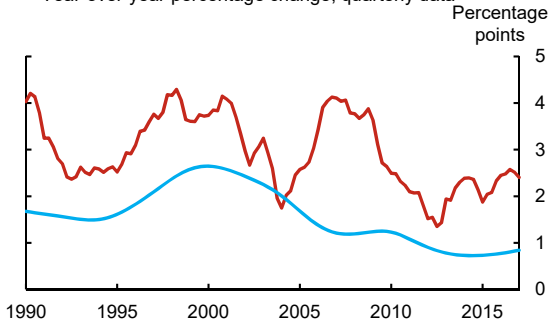
In our view, there are two key factors behind the relatively moderate wage growth in the United States.

- (i) Weak labour productivity growth—trend labour productivity growth is currently well below levels recorded in the 1990s and early 2000s (**Chart A3.1**).²²
- (ii) Workforce composition changes—Daly, Hobijn and Pyle (2016) find that increased retirement of higher-paid workers and replacement with lower-paid individuals (e.g., those transitioning from part-time to full-time work or entering employment from an unemployment status outside the labour force) has been a key factor weighing on wage growth. In line with this finding, wage growth of continuously employed full-time workers (which is not as affected by compositional workforce change) appears stronger and closer to pre-recession levels compared with other wage growth measures (**Chart A3.2**).

²² The Bank of England has also recently highlighted weak productivity growth as a potential factor behind sluggish UK wage growth (Bank of England 2017).

Chart A3.1: Trend productivity growth in the United States has slowed

Year-over-year percentage change, quarterly data

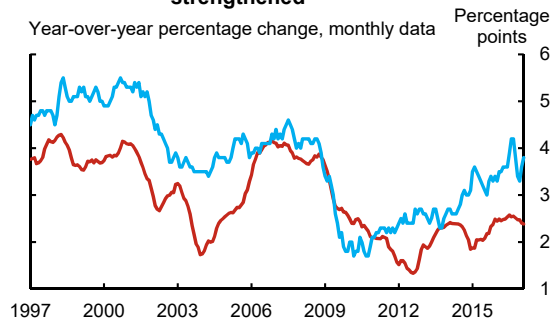


— Nominal wage growth — Trend productivity growth

Sources: US Bureau of Labor Statistics via Haver Analytics and Bank of Canada calculations Last observation: 2017Q1

Chart A3.2: Wage growth for continuously employed workers has strengthened

Year-over-year percentage change, monthly data



— Average hourly earnings — Continuously employed full-time

Sources: US Bureau of Labor Statistics, Federal Reserve of Atlanta and Bank of Canada calculations via Haver Analytics Last observation: April 2017