

Minimum Wage Arises- \$15 per Hour for the People

By Paul Tulloch- Living Work Analytics

Introduction

The Ontario Government under Premier Wynne has announced its plan to raise the minimum wage level from the current of \$11.40 per hour to \$15 per hour by 2019. Research from many sources have shown that over the past 30 years there has been an increasing level of income polarization. In fact, the minimum wage level over the past 30 years have barely kept pace with inflation – meaning many of the lowest paid workers have been witnessing a stagnant wage. As stated in a 2016 Statistics Canada report- “In 2013, the minimum wage was around \$10 in all provinces. In constant dollars, this rate was similar to the rate observed in the late 1970s”. The Ontario government along with several other regions across North America have implemented, or are considering, a substantial raise of the minimum wage level. This of course has many in the business community up in arms. Several economists and business interest groups are making the claim that such minimum wage hikes will unfairly push their “bottom line”. They warn such actions will result in both massive layoffs and inflationary price pressures throughout the economy. It has many in the country talking about the rise in the minimum wage with some serious questions. With that in mind research was undertaken to answer some of these questions. How many workers are affected and what are the demographics of such workers. What will it cost in economics terms and what are the benefits with such a rise in the minimum wage.

After extensive data wrangling and a rigorous estimation method- it was calculated for 2016 that approximately 1 out of 4 workers in Canada currently work for \$15/hour or less with a similar proportion in Ontario. In this representative population estimate- the major findings noted that a significantly higher proportion of lower waged workers are women, and that a majority of low wage workers are older than 25 years of age. In the second part of the research using a simulation of 2016 data, it was found that the for Ontario the direct cost of raising employees to the new \$15/hour minimum wage would have added \$6 billion annually in wages - or a mere 1.71% of the total wages paid to all Ontario based employees in 2016. It also simulates the minimum wage rise to \$15/hour for all provinces in Canada and estimates the total direct cost would have added \$14.7 Billion in annual wages or 1.6% of the total wages paid in the country for 2016.

Methods and Data Quality

The following report makes use of a custom dataset of employees making \$15 or less built on data from the Labour Force Survey (LFS). The data is provided by Statistics Canada through the public use micro file (PUMF). This allows a database to be built from the individual respondents rather than the traditional aggregates. It will also uses selected tables for aggregates of total wages paid and Gross Domestic

Product (GDP) provided by Statistics Canada's CANSIM aggregation and dissemination vehicle. (Statistics Canada LFS PUMF anonymizes the data by removing all identifying tombstone data.) Data accuracy and reliability measures are adhered to allowing a data science approach with statistically robust methods. For further information on survey methods and data collection please consult Statistics Canada's "Guide to the Labour Force Survey".

As with most measures of income and wage rates- there are different pathways used in the calculation of income and benefits a worker receives for work performed. For example, there are large variances in how a worker is paid- by the hour- by the month- piece work, salaried etc. There is also a large variance in reporting how many hours a worker works in a week, month, or year. The labour force survey attempts to resolve such reporting variances by asking for a per hour rate- and when that is not provided they receive what information they can- and use a standardized algorithm to produce hourly estimates. In terms of hours work- the LFS asks the respondent an estimate of "usual hours of work" as well as the "actual hours worked" during the reference week. It is through these two metrics that the wage rate is determined- and an estimate of hourly compensation is derived.

It should be noted that the question of compensation is only asked to respondents who declare they are employees- i.e. they are not self- employed. This poses a problem from an underestimate perspective- as there are known groups of workers- especially some of the more precarious like homecare workers, nannies, temp agency workers and others who are declared self-employed and therefore excluded from these counts. Obviously, this means the estimates produced using this data source- and those released by Statistics Canada using similar methods- will be underestimates of the actual number of low wage workers. It poses a challenge from a measurement standpoint- but one must clearly lay out what is being measured and inform the users of the information. More on the self- employed later.

How many workers are working for \$15/hour and below?

Using the hourly metric noted above- it is estimated that in 2016 the annual number of Canadians earning \$15/hour or less were 3.99 Million workers or 26% of the workforce who defined themselves as employees. For Ontario- the number of workers estimated to be making \$15/hour or less in 2016 was 1.63 million or 27.7% of the workforce who defined themselves as employees. (table 1) That evaluates to a bit more than 1 in 4 workers who are working for wages that many activists and policy makers have defined as earning wages below a living wage.

Table 1- Workers Earning \$15 and Below- 2016

Age	Male	%	Female	%2	Total	%3
Age 15-24	760,180	45.1%	883,593	38.4%	1,643,772	41.2%
Age 25+	924,207	54.9%	1,419,321	61.6%	2,343,528	58.8%
Total	1,684,387	100.0%	2,302,914	100.0%	3,987,301	100.0%
Canada	42.2%		57.8%		100.0%	

Age	Male	%	Female	%2	Total	%3
Age 15-24	316,901	45.6%	358,165	37.9%	675,067	41.2%
Age 25+	377,851	54.4%	585,974	62.1%	963,825	58.8%
Total	694,752	100.0%	944,140	100.0%	1,638,892	100.0%
Ontario	42.4%		57.6%		100.0%	

Source: Statistics Canada Public Use Micro File

(The estimated total percentages were verified with those reported by Statistics Canada quoted in an article by Armine Yalnizyan, published with McLean's online, June 2, 2017)

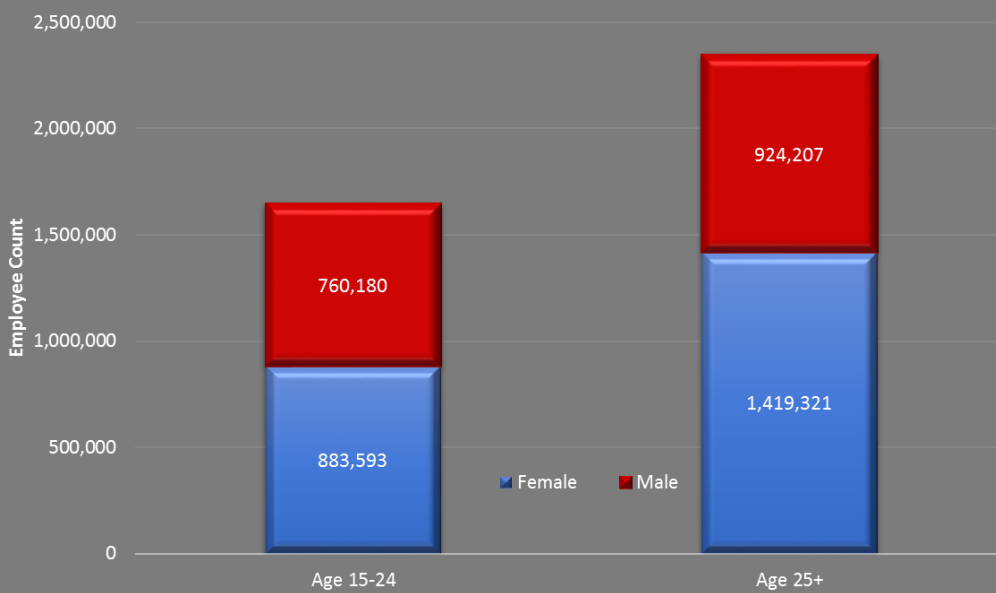
Demographics of Lower Waged Workers

In providing a brief description of who works at \$15/hour and below, the micro data were aggregated into demographics of age group and the sex of worker. The data clearly show that a much higher proportion of low wage workers are women. In Canada for 2016 it is estimated that 57.8% or 2.30 million low wage workers were women, the proportion for Ontario women was almost the same at 57.6% or 944,000 employees. As stated in the Government of Ontario's press release over its new minimum wage proposal- this policy would help prime age women more than other groups- so they obviously did their research.

Oddly enough, there has been a long-held belief that pervades the public knowledge over labour markets in which a majority of lower waged workers tend to be younger as in high school aged in which most of the wages earned are defined as discretionary spending. Yet as shown in the data- a much larger proportion of workers earning below \$15/hour for both Canada 58.8% and Ontario 58.8% are aged 25 years and older. Such popular misinformed notions need to be displaced- as they continue to be used by some groups to marginalize the importance of minimum wage legislation in helping fight poverty. It is a critical point to be made- as income and wealth becomes more polarized- the income for many workers in the prime age category increasingly becomes reliant on minimum wages. There is a question regarding component of family income that is reliant on low income work that remains to be answered. It will be followed up in future research.

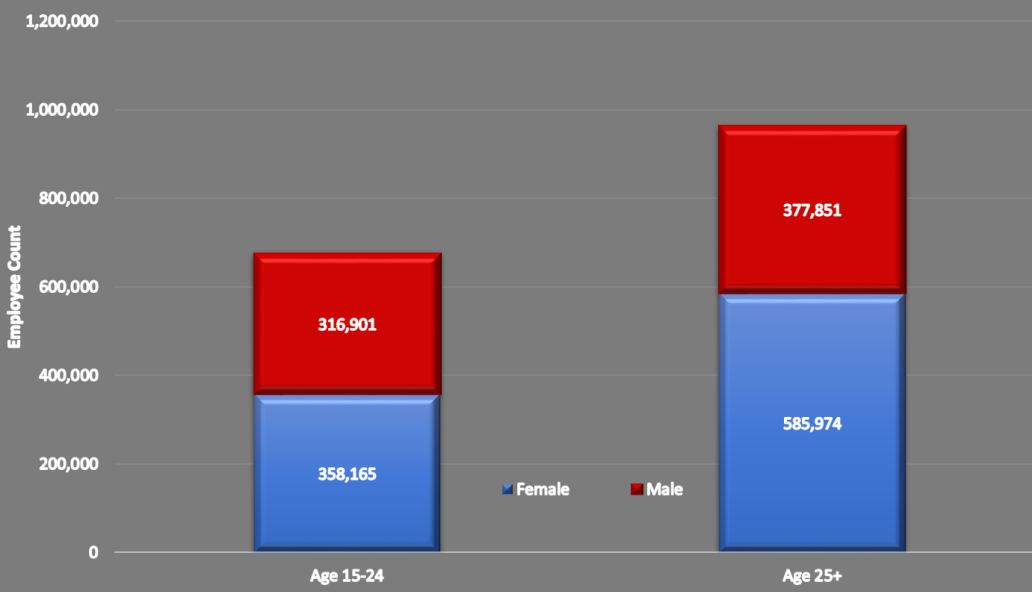
Adding another layer of demographics and examining the age and sex groupings the difference in the lower wage category between the age groupings is significantly greater for women greater than 25 years of age.

Canadian Workers: Age and Sex, Earning \$15/Hr and Less 2016

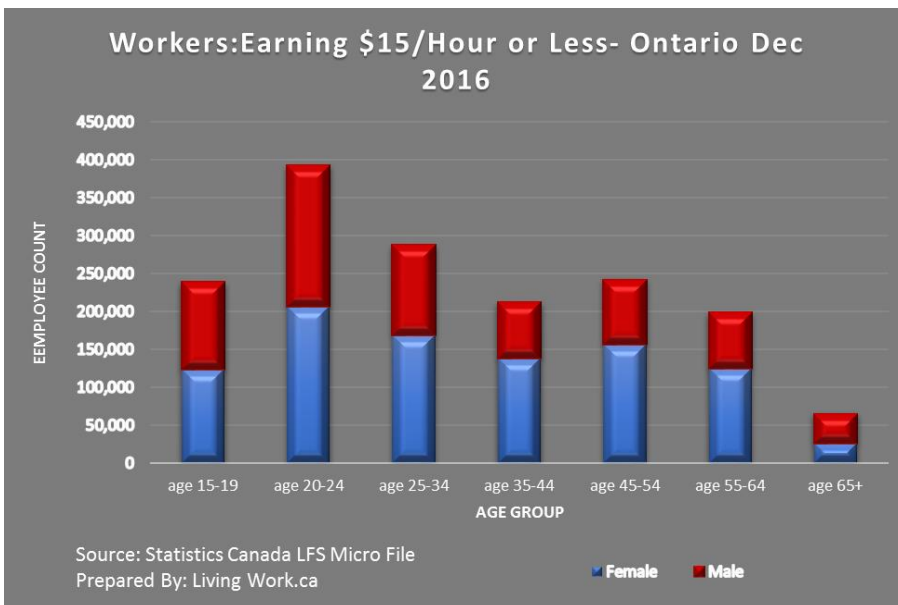
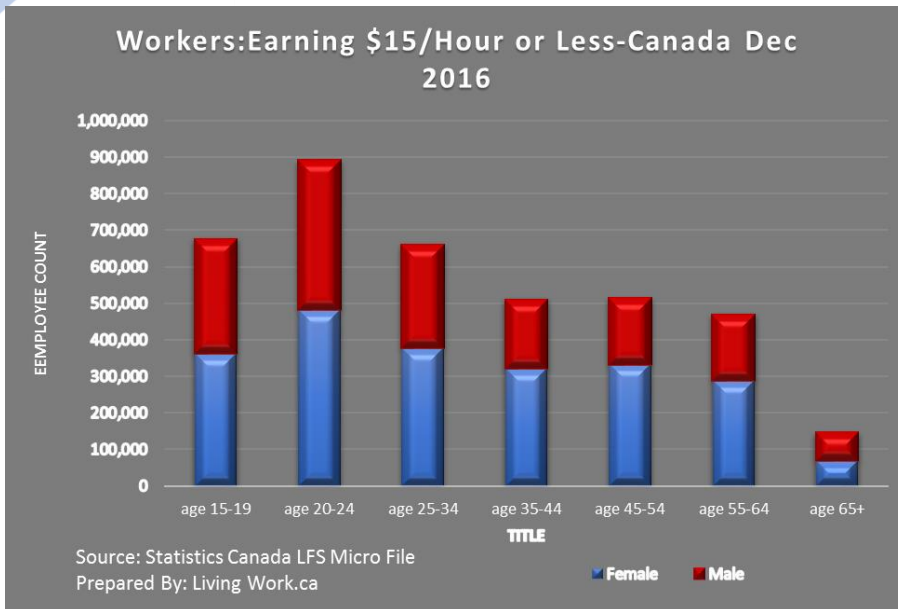


Source: Statistics Canada LFS Micro File
Prepared By: Living Work.ca

Ontario Workers: Age and Sex, Earning \$15/Hour and Less- 2016



Source: Statistics Canada LFS Micro File
Prepared By: Living Work.ca



Expanding the age categories by sex into finer levels of age groupings shows that women in the older age categories increasingly make up more of the total low wage workers. It is actually quite pronounced for women between the age of 35- 54 where nearly 2/3 of low wage workers are women. Again, clearly showing that low wages do impact prime aged women more than any other age and sex group. Such statistical facts provide some very important information.

This specifically when considering child care policies and other efforts to mitigate low wages and their impacts on families. This brings to light a critical understanding of jobs and work that demographic facts underline. Low wage work has been transforming the meaning of dollar values and wage levels at this end of the wage rate spectrum that has a much more encompassing potential causation effect on many sociological as well as economic outcomes. Minimum wage legislation is not just about younger people

and disposable income that once defined much of this terrain. After 30 years of polarization in wages- low waged workers and their dollar values and purchasing decisions have a much more transformative meaning. As expenditure for such workers are more likely to be focused on basic living needs than discretionary spending. This is especially true for low wage workers who are in single earning families- or multiple income low wage families.

Workers Earning \$15/hour and Below, Ontario- December 2016

Ontario Dec 2016	Male	%	Female	%2	All	%3
age 15-19	114,226	48.0%	123,574	52.0%	237,800	100%
age 20-24	184,633	47.2%	206,952	52.8%	391,585	100%
age 25-34	118,514	41.3%	168,434	58.7%	286,948	100%
age 35-44	73,585	34.8%	138,013	65.2%	211,598	100%
age 45-54	84,475	35.0%	156,617	65.0%	241,092	100%
age 55-64	72,787	36.8%	124,850	63.2%	197,637	100%
age 65+	38,361	59.7%	25,883	40.3%	64,244	100%
All	686,581	42.1%	944,323	57.9%	1,630,904	100%

Workers Earning \$15/hour and Below, Canada- December 2016

Canada Dec 2016	Male	%	Female	%2	All	%3
15-19	310,622	46.1%	363,878	53.9%	674,500	100%
20-24	407,469	45.7%	483,510	54.3%	890,979	100%
25-34	281,680	42.7%	377,506	57.3%	659,186	100%
35-44	187,146	36.8%	321,890	63.2%	509,036	100%
45-54	179,430	35.0%	333,396	65.0%	512,826	100%
55-64	178,092	38.0%	289,961	62.0%	468,053	100%
65+	75,537	52.3%	68,923	47.7%	144,460	100%
All	1,619,976	42.0%	2,239,064	58.0%	3,859,040	100%

The Costs and Benefits of Giving Low Wage Workers a Raise.

Minimum wage legislation has long been a part of the policy tools used by governments to protect workers from the vagrancies of markets. Minimum rates of pay act as a wage floor in which fundamentally determine the standard of living for many workers. It is in this light that the meaning of a minimum wage transcends the economics of production and industry to become a new form of safety net under neo-liberal economics. Government have been attempting to set minimum level of living standards through taxation and income transfers for last couple hundred years. However minimum wage legislation- has less of a history. Indeed, there is a very lengthy class struggle in wage determination in terms of collective organizing, unions and class interests but rarely has the state in Canada directly pushed this far into the wage rate setting mechanism. In many ways, it has been the failure of the state to effectively empower labour unions to represent workers that has potentially led to

such new interests and policy outcomes on the minimum wage legislations. Unfortunately, this new minimum wage legislation could come at the expense of unions- and potentially worker outcomes. Under a union model it could be argued that much like the post war era and the onset of Keynesian economics- a much more efficient wage and bargaining outcome mechanism for workers could be achieved through traditional collective bargaining. However, that would mean much greater legislative changes to collective representation and empowering unions to organize these low wage workers. But given the choices for effecting demand management policies- the new much higher minimum wage laws- could be the beginnings of a new- “new deal” similar to that of the post war era- but with potentially less desirable outcomes for workers.

Therefore, as the state becomes a more direct actor in such wage setting policy, the leap from the economic realm in the minimum wage debate will become ever more politicized and barbed in ideological overtones- and more so at election time. As the new reality of such policy direction becomes more prominent- it pits the wages of workers through the state- against the profits of employers in a much more significant manner. And hence why such measures of cost and further understanding of the workings of such laws and wage setting economics are required.

The power to set pay scales within a capitalist planned economy has long served as one of the fundamental “management rights” in the social bargain. It has been a long-guarded principle of private property and the rights of corporations versus the workers that has defined the historical aspects of an adversarial industrial relations system. And as such the wage setting mechanisms become more embedded within a state versus corporate- cultural understanding within such a history of debate, rhetoric and hyperbole in which class struggle has been defined.

In estimating, what the costs and benefits of such a new minimum wage levels might be- it must be clearly delineated what one is measuring. On the cost side, the rise in a minimum wage can have a direct and indirect impact on wages that have to be paid by companies while concurrently setting the living standards for many more workers.

The following framework demarcates many such costs and benefits.

Costs- Direct and Indirect

- 1) The direct costs – are the amount of new wages that would be incurred by all industries to raise all low waged workers to the \$15/ hour level.
- 2) The indirect costs focus on the secondary wage push that results from a rise in the minimum wage. These are not automatic- as these indirect wage gains are related to wage bargaining power- be it unionization or other mechanism. It would difficult to assess what these wages might be given the variances in bargaining power of such workers. However, some methods using historical minimum wage data have proven some level of effectiveness in such estimation.
- 3) Net loss of Jobs- as a result of such wage hikes. Many business groups state that the proposed minimum wage hike will cost the Ontario economy thousands of jobs. Other groups of economists see a net gain in the number of jobs- as new spending brought about by the minimum wage levels will expand the aggregate demand within the economy. Other

economists- most recent Card Et al- have noted a neutral net effect.

- 4) Inflationary price pressures- and the wage and pricing mechanism can pressure costs in the economy to rise. Most low wage jobs are located in non-export sectors- as well in sectors that have a low input/ output connection in terms of intermediate goods and value adding- therefore prices will be restricted to sectors for the most part.

Benefits:

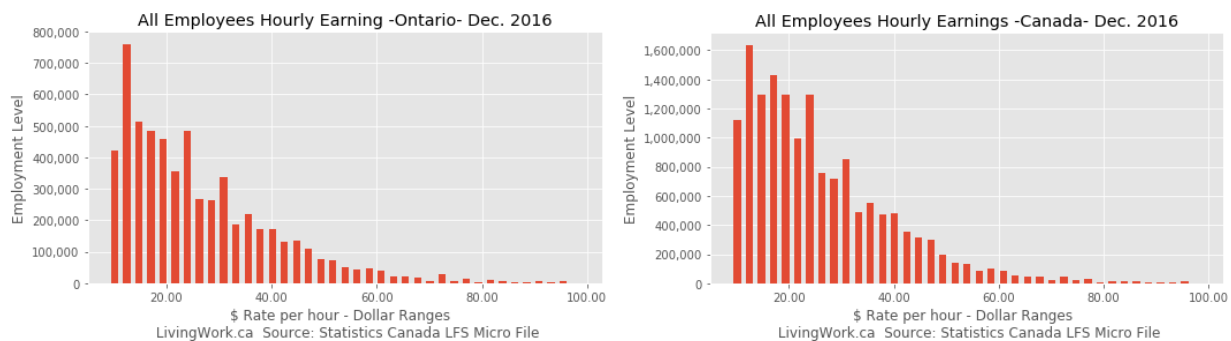
- 1) Reduction of individuals caught within poverty or as some refer to these as the working poor.
- 2) Increased incentives for working will improve the labour force participation rate
- 3) Net Jobs created- this due to increased aggregate wages being paid
- 4) All the direct and indirect costs of poverty on social outcomes and health
- 5) Reduce gender and other wage discrimination practices.

As can be imagined- to produce a reliable cost- benefit analysis of the above framework would prove to be a massive undertaking- and in many cases- it would be difficult to measure. One of the larger issues in the debate surrounding the minimum wage is a veritable lack of measurement outcomes for the benefits to workers. This is typically caused by the short-sighted measures designed to measure cost and most cases in terms of dollar values. If one were to have better designed sources of data on the benefit side of measurement it would allow for a much wider, balanced and fair assessment. However much of the costs of poverty are not directly measured and therefore quite difficult to place anything but a qualitative measure on- such as reduced poverty and the numbers of workers within such space. A large amount of research and from many studies have shown empirically that poverty is negatively correlated to health, education, and other positive social outcomes.

Estimating the Direct Cost of a \$15 Minimum wage

With such shortcomings in data availability in mind, the research process started by measuring the direct cost to employers. That is, what would it have cost employers in terms of new wages paid to bring all workers up to the new minimum wage of \$15/hour in 2016 at the usual hours worked. A majority of economic modelling relating to wage and price interactions are based upon past relationships and derived from historical data. There are a variety of techniques that have proven to be useful and can aid in providing some significant insights into predicting the future behavior and outcomes of actors within the economy. Through such- it was decided that the modelling would make use of a simulation based method in which a hybrid agent based aggregation approach would be simulated. That is, the simulation

was set up with initial parameters and then the simulation was run- statistical measures were aggregated from such actor behavior and the changes inherent to the inner workings of the markets. Given the goal is to measure the direct costs of raising wages - the agents within the model would be designed in a quite rudimentary fashion- that is the employer and worker agents will keep prices and wages fixed. That is, prices and wages other than the minimum wage hike- will remain constant and will ignore any changes to the demand for labour or product outputs. One could develop a more rigorous model and simulate elasticities for price changes using empirical data on the many minimum wage increases over the past. Such advanced modelling is planned for implementation in part 2 of this research using occupational and industrial data variables as well as providing more decision autonomy for the agents based upon historical actions and probabilities.

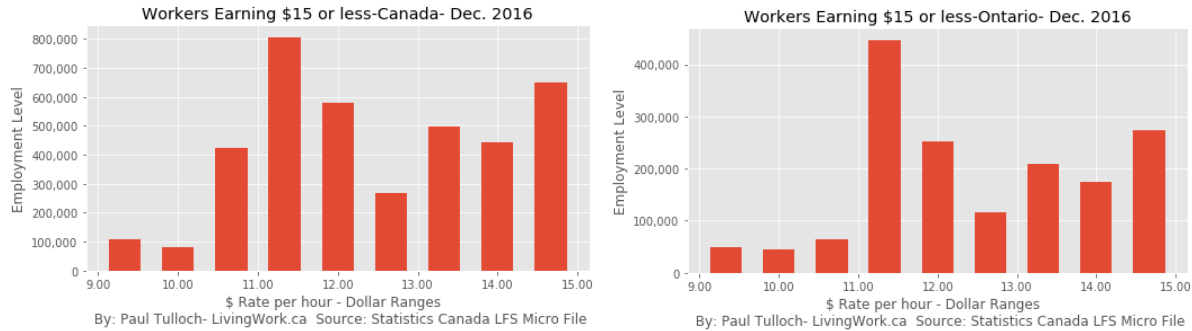


A data file from the twelve-monthly files of 2016 was combined containing all workers reporting \$15 per hour and less. Monthly data was used rather than annual – due to the presence of significant seasonality of some industries containing low wage workers. Also note that all self-employed workers were not included in the study- due to wage data not being collected in the Labour Force Survey for the self-employed. The histogram above is for all workers and wage levels by \$/hour earned from a cross section in Dec. 2016.

The goal of part one is to estimate the following scenario- simulate a new minimum wage implemented on January 1, 2016- agents within the simulation are companies and workers – prices and wages are fixed at those in which the agents experienced historically throughout the 2016 year- save for the implementation of a new minimum wage hike. The model then aggregates the wages at this new level for the usual hours worked for all workers that fell below the \$15/hour. The simulation was then run 12 times, once for each month to estimate the seasonal aspects. The time frame was then estimated at an annual basis. Equation 1 provides the details. (this was performed first at the Canada level and then at the Ontario level- with quality assurance measures and reliability checks implemented at appropriate points)

$$\text{Equation 1- Direct Cost Weekly Wage} = \sum (\text{Min. Wage} - \text{Worker Wage}) * \text{Usual Hrs work} * \text{LFS Weight}$$

Using the above criteria- table 1 provides the monthly estimates of the cost to employers to raise all worker's wages to the \$15/ hour threshold. The simulation was run at the Canada level- as well as the Ontario level.



As can be seen in table 2- the total cost for the entire 2016 year to bring all workers below the \$15/ hour threshold to the proposed minimum wage for Ontario is about \$500 Million per month. It would add \$6.1 billion to the annual wage bill for all employers. This would affect over 1.6 million low wage workers. It is definitely quite a small amount when one considers that the total wages paid to all workers in Ontario for the 2016 year estimated from CANSIM table 384-0037 was \$358 billion. That represents 1.7% of the entire wages paid to all workers for Ontario in 2016. Amazing that such a small amount of money could bring so many workers up to such a possible living wage.

Table 2- Direct Cost of \$15/ hour Minimum Wage Ontario 2016 Simulation

Ontario 2016	Direct Cost of Increased Wages	Number of Employee
Jan-16	\$ 489,267,917	1,568,440
Feb-16	\$ 478,001,705	1,571,805
Mar-16	\$ 471,022,896	1,542,594
Apr-16	\$ 481,338,063	1,558,743
May-16	\$ 537,059,538	1,711,313
Jun-16	\$ 536,553,856	1,702,444
Jul-16	\$ 558,555,455	1,721,633
Aug-16	\$ 568,489,413	1,745,663
Sep-16	\$ 514,356,259	1,636,153
Oct-16	\$ 502,089,515	1,629,322
Nov-16	\$ 487,341,781	1,647,687
Dec-16	\$ 489,518,337	1,630,904
Total	\$ 6,113,594,735	1,638,892
	Total Annual Direct Wage cost	Ave Monthly Employees
% of Total Wages Paid in Ontario 2016= 1.71%		

The simulation was run again this time on the entire LFS micro records representing all Canadians. Again, the minimum wage was set at \$15 per hour for every province and jurisdiction. The direct cost to employers was estimated at a monthly average of \$1.2 billion in added wages to bring all workers up to the \$15/hour level. Or on an annual basis \$14.8 billion to bring 3.9 million workers to a more livable wage level. CANSIM table 384-0037 estimates that the annual wage bill for all workers in Canada for 2016 was \$905 Billion. The \$14 billion-direct cost to employers to raise the minimum wage to \$15/hour was a mere 1.6% of the entire wages paid to workers in 2016.

Table 3- Direct Cost of \$15/ hour Minimum Wage Canada 2016 Simulation

Canada 2016	Direct Cost of Increased Wages	Number of Employee
Jan-16	1,189,180,650	3,820,373
Feb-16	1,166,820,944	3,850,835
Mar-16	1,155,612,943	3,862,772
Apr-16	1,194,419,962	3,901,707
May-16	1,290,278,935	4,148,761
Jun-16	1,332,784,847	4,169,537
Jul-16	1,407,833,538	4,240,054
Aug-16	1,385,029,240	4,193,143
Sep-16	1,210,709,170	3,932,946
Oct-16	1,180,076,643	3,940,784
Nov-16	1,145,778,758	3,927,658
Dec-16	1,121,024,470	3,859,040
Total	\$ 14,779,550,099	3,987,301
	Total Annual Direct Wage cost	Ave Monthly Employees
% of Total Wages Paid in Canada 2016= 1.63%		

Considering the total estimated direct cost are low compared to the entire wages paid out in the economy- it is a difficult process to understand why so many economists and business lobbyist have raised such alarm bells. In fact, when one thinks about the dynamics of such a minimal amount of dollars in the midst of a such large economic numbers as Gross Domestic Product (GDP)- one starts to question the ideological aspects behind the motivations of this debate. Think about the Canada level- GDP for the Canadian economy was estimate at \$1.6 Trillion in 2016 that makes the direct cost of a country wide pay hike to \$15/hour amount to \$14 Billion and in a \$1.6 trillion economy- it is a mere 0.8% of GDP for Canada. For the province of Ontario in 2016 it had a GDP of \$798.2 Billion which means the direct cost of such a wage increase would amount to 0.77% of Ontario's GDP in 2016. When one gathers the amounts that are allocated on other areas like healthcare, police services, education- it does make you wonder how businesses allocate so little to so many people who work for a living. It does bring a lot of questions to many aspects of how wages are formed in society and about the functional aspects of the economy and priorities.

Conclusion and Potential Outcomes

In terms of the estimated job losses or jobs gained as discussed by many economists- given the low level of the direct costs as calculated above it is difficult to envision much of a change in the number of jobs. The amount of extra spending for workers or wage costs for employers caused by such additional dollars in the economy will have a small marginal effect on job creation and job destruction. The dollars involved are just not enough to create much in the way of economic shock in positive or negative direction. However-the benefit for nearly 4 million workers at the Canada level is invaluable in terms of making progress towards a livable wage.

Indeed, there is the potential for some sectoral adjustment. However, given low wages are concentrated in a handful of low productivity sectors- the overall effect should be small and contained. Few export sectors have significant amounts of low wage workers- therefore international trade flows will be marginally impacted and mainly by indirect wage pressures. Additionally, sectors that have high economic multipliers contain a small amount of low wage workers like manufacturing, resource extraction, professions etc. The combination of such factors would again predict that such multipliers in terms of jobs created or destroyed would be minimal. A quite interesting recent study by D.Cengiz,, Arindrajit Dube, Attila Lindner and Ben Zipperer using a new wage binning method for statistical wage measurement for estimating minimum wage effect on jobs – estimates over a 40 year period of different minimum wage hikes across the United States concluded that there had been very little impact on job creation or destruction due to minimum wage increases.

With regard to inflationary pressures- given the low level of estimated wage increases in the simulation of \$6 billion in Ontario and \$14 Billion at the Canada level- would suggest that inflationary pressures would be minimal and contained within sectors. This however assumes that we operate within an economy that has some degree of competitiveness that would prevent price increases. But that ignores the fact that current industrial organization structures and inherent market powers in terms of oligopoly functionality- are the norm for most major industries in Canada. Rarely do such industries act as pure price takers in which much of the orthodox theory predicts. For many industries, are more generally oriented towards pricing behavior suited to that described as price givers. Of course, this will be hotly contested by the orthodoxy- competitiveness as laid out in the theory of many economic textbooks- rarely describes the actually existing of the economy. This essentially predicts that most industries will not absorb the wage costs as denoted above- and instead will pass them on to consumers. Potentially a more dangerous threat to inflation than the actual wage increases paid to low wage workers and the benefits they accrue, are the Industrial organization structures and how it could produce undesirable outcomes. We could witness the economic machinery use such minimum wage hikes as an excuse with their oligopoly power to increase prices willy nilly. There is and has always been opportunism within the profit seeking behavior of oligopoly structures. We do not exist in a state of perfect competition- our reality is much more fitting to what Anwar Shaik describes as “Real Competition” in his latest book that encapsulates his 30 years in the economics profession called - “Capitalism: Competition Conflict Crises” - which is a mix of Post- Keynesian/Kalecki with Baran and Sweezy like market model of imperfect competition.

That said- there are some industries with enough competitiveness in which companies cannot pass all or part of the costs on to the consumers. Such companies will be forced through the competitive process

to find cost savings through a variety of means. There are options in finding savings through internal mechanisms such as innovations, in the form of work organization, automation, expanding markets, pressuring supply chains and finally renegotiating fixed costs such as commercial property leasing costs etc. Of course, for some service industries like many parts of the food services- there is a limit to economic adjustment on the shop floor. As the recently deceased economist William Baumol theorized in terms of what he called the cost disease for service sector industries. That is – where a production process is mainly reliant on activities that must be performed by humans- traditional automation and innovation strategies to replace labour costs cannot help such entities bring costs down. Over time persistent wage increases and lack of productivity enhancements due to a lack of automation push the costs of such services up relative to other industries. These businesses face an increasingly difficult adjustment without raising prices and hence face a declining market share because of rising prices and the resulting shrinkage of demand. Some businesses could face bankruptcy, downsizing or market share loss- but given the smaller size of the overall wage increase- such pressures should be small.

Another factor that will play a role in the inflationary effects will be the role of wage compression. The term wage compression will soon become a foundational aspect to most corporate newspeak for many companies. That is- the wage push and pressure that the new minimum wage will create on all workers with wages above the current minimum wage. Traditionally when minimum wages rise- employees working above the previous minimum wage levels make demands for pay raises to keep pace with the rise to a new minimum wage. There is indeed a decent set of empirical data to examine such wage distributional changes over time, but rarely have minimum wages jumped to such higher levels with such a speed. It is difficult to determine whether these past indirect wage pressures can be used to predict the future. Unionized workers and some more organized workers have shown to be more successful in obtaining historical wage gains which would create some wage inflationary pressures. Similarly, more organized sectors on the employer side will be much more effective at compression of wages and cost containment when faced with such minimum wage related cost pressures.

Many workers will be demanding a higher wage due to the minimum wage hike. However- given the decline in unionization rates in the private sector- it is difficult to see the forces that will push employers to accommodate such wage demands. As stated- we could see an unprecedented level of wage compression across quite a number of occupations and industries. Much of the inflationary pressures are effected by the corporate response than the wage response. If the larger more concentrated corporate sectors use the minimum wage hike to raise prices - regardless of labour costs and instead search for higher profits caused by the increased purchasing power- then inflation could be pushed to higher levels in a price spiral. If however the corporate sector tries to accommodate these wage pressures with cost savings through innovation and other mean- then inflationary pressures will be less of a problem.

Small businesses and the self-employed could bear the brunt of such costs. Many small businesses will find it more difficult to pass costs onto consumers- and will try to emulate the behavior of larger companies- finding savings internally- within their supply chain or innovate with new technology. However, these measures are much more expensive and difficult to implement for small business as most are price takers and do not have the investments required to innovate. There is also a potential window for an expanded black market- especially for small businesses and the self-employed- where regulatory and monitoring costs are much higher.

Lastly with the concerns about costs and inflation- any potential small inflationary outcomes will be outweighed by the many workers who now have access to a higher wage- and hence a potentially higher standard of living. It is not the aggregate of these wages- but the effect that each dollar has on these low wage individuals will have. The marginal rate of benefit is at a much higher level for these workers for every dollar than at other parts of the wage curve. The benefits to these individuals and society – need to be held up in the same light when debating these very complicated but necessary economic matters. For many it will mean more security and independence- towards a new standard of living- that is difficult to quantify. But the research has empirically swayed heavily in favour of the argument that less poverty in society is better for all.

Future Activities

Also coming in part two of this research- the project will expand the research into estimating the indirect costs as outline above- and also attempt to measure the net affect such will have on jobs. And lastly part two will also attempt to provide some measures of benefit for workers- beyond the increased wages and purchasing power. We will attempt to look at who in terms composition of family income and low wage earners and also look into the racialized aspects of low wage work.

Part two of the research will also expand the coverage of the employees to encompass the self-employed. As indicated the report above excludes the self-employed which number over 3 million workers at the Canada level. This given there is no wage data collected for the self-employed in fact there is very little data collected on the self-employed by Statistics Canada. It is a large data gap indeed. However, LivingWork Analytics has constructed a Neural Network binary based prediction system to determine whether a worker is low wage or not. The neural network is a multilayered perceptron with 37 input variables from the LFS micro file. The network was designed with two hidden layers one with 120 nodes and the second with 54 nodes. It was trained on over 250,000 employees from the LFS micro file- to identify low wage workers. Using a relu and sigmoid function on the hidden layers- the neural network achieved a 91% accuracy rating on the training file- and a 88% accuracy rating on the test file. That is it successfully predicted the workers as being low waged or high waged on the known labelled training set. Such predictive powers are quite efficient. The stated neural network will be employed to estimate the low wage status of the self-employed. The NN is still being trained to achieve even higher levels of efficiency. More information on this model is available at LivingWork.ca.

New Quarterly Statistical Time Series to Measure Lower Wage Workers

As a follow, up to this research- LivingWork.ca will be publishing a new quarterly measure of workers making \$15 per hour and below - using both the LFS method of excluding the self- employed as well as using the Neural Network enhanced approach noted above to include the self-employed. It will publish the data by several demographics variables and make the data available to the public for download. The new measure will be available in for the 3rd quarter of 2017.

References:

Galarneau, Diane and Eric Fecteau, "The Ups and Downs of minimum Wage." Statistic Canada- July 2014.

Brennan, Jordan. "\$15 Minimum Wage Should Be Something All Ontarians Can Agree On." Huffington Post, July 5, 2017

Yalnizyan, Armine. "Why a \$15 Minimum Wage Is Good for Business." *Macleans.ca*. N.p., 03 June 2017. Web. 06 July 2017.

Jackson, Andrew. "The Return of the Gilded Age: Consequences, Causes and Solutions." *Broadbent Institute*. Web. 06 July 2015.

Walks, Alan. "Income Inequality and Polarization in Canada's Cities: An Examination and New Form of Measurement." Cities Centre, University of Toronto, August 2013.

Thomas, Jasmin. "Trends in Low-Wage Employment in Canada: Incidence, Gap and Intensity, 1997-2014." Center For the Study of Living Standards, July 2016.

Government of Ontario, "2014 Minimum Wage Advisory Panel." Minister of Labour, Jan, 2014.

C. Michael Mitchell and John C. Murray, "Changing Workplaces Review: Final Report." Government of Ontario, 2017.

Schenk, Christopher, "From Poverty Wages to a Living Wage." Ontario Federation of Labour, November 2001.

Card, David and Alan B. Krueger, Myth and measurement: the new economics of the minimum wage, New Jersey: Princeton University Press 1995.

Workers' Action Center, "Building Decent Jobs from the Ground Up." Workers' Action Center/Parkdale Community Legal Services – Toronto, September 2016.

Ivanova, Iglia, Seth Klein and Pamela Reano, "Working For a Living Wage 2017." Canadian Center for Policy Alternatives, April 2017

Vosko, Leah F. Temporary Work: The Gendered Rise of a Precarious Employment Relationship. Toronto: University of Toronto Press, 2000

Vosko, Leah F., John Grundy, et al, "Closing the Employment Standards Enforcement Gap." Closing the Gap Policy Forum, June 2017.

Morissette, René, Garnett Picot, and Yuqian Lu, "The Evolution of Canadian Wages over the Last Three Decades." Statistics Canada, March 2013.

Schmitt, John, "Why Does the Minimum Wage Have No Discernible Effect on Employment?", Center for Economic and Policy Research, Washington, D.C. Feb. 2013.

Cengiz, D, Arindrajit Dube, Attila Lindner and Ben Zipperer, "The effect of minimum wages on the total number of jobs: Evidence from the United States using a bunching estimator." Journal of Labor Economics- website. <http://www.sole-jole.org/17722.pdf>

Baumol, William; William Bowen. Performing Arts, The Economic Dilemma: a study of problems common to theater, opera, music, and dance. New York: Twentieth Century Fund, 1966

Shaikh, Anwar, Capitalism: Competition, Conflict, Crises. Oxford University Press, 2016