The Effect of Economic Conditions on Self-employment in Canada

by

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Abstract

This paper analyzes how economic conditions affect self-employment across Canada. A number of governments introduce self-employment programs based on "regression-push" hypothesis. Many studies overlook the reverse causality between economic conditions and self-employment. I use asynchronous variation in economic conditions across time and provinces to overcome the reverse causality. Additionally, I apply provincial unemployment rates as a measure of economic conditions, since the shock in 2008-2009 was unexpected and most likely exogenous. Focusing on employed males in Canada over the period of 2005-2011, I find a negative relationship between provincial unemployment rate and self-employment rate. This suggests that individuals are "pulled" into self-employment by the prosperous economy. Although the model is based on Schuetze (2000), this finding contrasts with his finding. My contrary results are puzzling, and may indicate that the period I study is quite unusual, possibly because of the financial crisis of 2008-2009.

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Table of Contents

1. Introduction

In the recent recession of 2008-2009, Canada experienced a sharp decline in economic conditions as indicated by a spike in the 2009 unemployment rate. At the same time, there was an increase in self-employment. During economic downturns, many firms reduce hiring and increase layoffs. To help combat the unemployment problem, the Canadian government and SEDI (Social and Enterprise Development Innovations) promote self-employment as a reasonable alternative. In Canada, self-employment programs have targeted individuals who are receiving unemployment insurance or other social welfare (Bruce & Schuetze, 2004). These programs offer financial aid and assistance for small start-up businesses. Meager (1992), Picot and Heisz (2000), and LaRochelle-Côté (2011), find that poor economic conditions "push" individuals to become self-employed. In contrast, others find that individuals are "pulled" into self-employment by the prosperity of the economy (Blanchflower, 2000; Benedict & Hakobyan, 2008). Despite these findings at the macro level, these data files are too broad to capture individuals' characteristics. Moreover, there is no exogenous influence on self-employment, leading to the potential endogeneity problem in the related literature outlined above.

In this paper, I examine how economic conditions affect self-employment using micro-level data from 2005 to 2011. Specifically, I use the unemployment rate as a measure of economic conditions. I overcome the endogeneity problem using asynchronous variation in economic conditions across provinces and time (pooled data) and variation in economic conditions caused by the 2008-2009 recession. This variation was unexpected and likely exogenous. The econometric approach used in this paper is similar to Schuetze (2000) with a couple of differences in terms of identification strategy.

Similar to Schuetze (2000), I examine the impact of economic conditions on self-employment by utilizing micro-level data. Unlike Schuetze (2000) who uses variation across provinces and States in Canada and the U.S., my approach utilizes cross-provincial data variation only coupled with an exogenous shock to unemployment rates generated by the 2008-2009 economic downturn.

In particular, the sample utilized is composed of all males from ten provinces in Canada who were employed during the period 2005 to 2011. They are "prime aged men", ranging from 25 to 64 years of age. This age range is less affected by schooling and retirement. Unlike men, women were affected by "a massive secular rise in wages" (Schuetze, 2000), hence my focus on an all-male sample. Additionally, this study uses a different self-employment measure. I divide self-employment into two categories: 1) by an individual's primary job, and 2) by being self-employed in the reference year. The second group is considered in order to see how influential economic conditions are for the group with non-primary self-employment. Moreover, this paper is dissimilar in its independent variables that measure economic conditions, individuals' characteristics, and time dummies. Provincial unemployment rates are used as a measurement of economic conditions. I use both current and one-year lagged unemployment rates to explain the current situation. As the change in unemployment might not affect self-employment immediately, the lagged term could capture the "churning" effect (Meager, 1992).

The data for this paper is retrieved from the Survey of Labour and Income Dynamics (SLID), while the provincial unemployment rates are from the Canadian Socio-Economic Information Management System (CANSIM). There are approximately 87,000 observations within the 7-year period. The annual Canadian unemployment rates for males aged over 25 represented in Figure 1 show that there was a spike in the unemployment rate in 2009. In the

same year, the self-employment rate peaked in 2009, as shown in Figure 2. This suggests that high unemployment rates sway people to become self-employed. Figure 3 shows no peak in the self-employment rate in 2009, when there was a slightly increase in self-employment rate. However, it appears that an unconditional positive correlation exists between the unemployment rate and the self-employment rate (Figures 1 and 2). Canadian provincial unemployment rates retrieved from CANSIM are displayed in Figure 4. Not all provinces were consistent with the Canadian unemployment rate (Figure 1). Some provinces such as Ontario, British Columbia, and Alberta experienced a jump in high unemployment rates in 2009, whereas some provinces did not experience this increase. In particular, the rate was slightly declined in New Brunswick. Using variation in economic conditions can provide a better explanation of the self-employment level. Therefore, I consider provincial unemployment rate as the measure for economic conditions to analyze the conditional relationship between unemployment rate and self-employment rate.

Analyzing how economic conditions affect self-employment using micro-level data, I find the following results. First, the results persist regardless of self-employment definition and specification. However, the second group of self-employment, by ever-experienced self-employment in the reference year, is more sensitive to economic conditions. The economic conditions are more influential on the self-employment decision for individuals who did not have self-employment as their primary job. Second, the probabilities of being self-employed are different based on individual characteristics. There is a positive relationship between self-employment rate and ages of the samples: as ages increase, the self-employment rates increase as well. Married males tend to be more self-employed than males of other marital statuses. These

results are consistent with Schuetze (2000). However, no significant correlation is found between educational attainment and self-employment rates, unlike Schuetze (2000).

Finally, the regression results show that increases in both current and lagged provincial unemployment rates are negatively correlated with both classes of self-employment. This fits with the "pull" hypothesis. Increases in provincial unemployment rates are linked to small declines in self-employment rates in both categories. However, the lagged unemployment rates are more important than current unemployment rates. With similar standard errors, the results are highly correlated between equations that control either current or lagged unemployment rates in both self-employment groups. Therefore, my main results are influenced by equations that control for both current and lagged unemployment rates concurrently. As expected, the lagged unemployment rate is statistically significant with the self-employment rate whereas the current rate, surprisingly, is not. An increase in one percent of lagged unemployment rate decreases 1.05 percent of self-employment level considered by their primary job. The lagged unemployment rate decreases 1.07 percent of self-employment rate, which is classified by "ever held self-employment job", as well. The results show that individuals were being pulled into self-employment when they experienced a low unemployment rate economy. Self-employment was pro-cyclical, controlling for other determinants. These results suggest that self-employment should not be promoted only during economic downturns. Rather, government policies should consider other macroeconomic conditions as well.

The remainder of the paper is structured as follows: Section 2 shows the literature review and mentions the contribution of this paper, Section 3 describes the data, Section 4 outlines the empirical strategy, Section 5 explains the characteristics and trends of self-employed individuals,

Section 6 investigates the results from regression models, and Section 7 provides some concluding remarks.

2. Literature Review

Many studies have examined the effect of economic conditions on self-employment rates, with contrasting results. As public policy becomes interested in entrepreneurship to generate employment growth, policy makers turn to literature seeking advice (Thurik, et al. 2008). Studies often use unemployment movements as a proxy for economic fluctuations (Meager, 1992). While some researchers find that unemployment rates and self-employment rates have negative effects, others find the opposite. The researchers use different techniques to capture this relationship at both the macro- and micro-levels to find the best explanation for improving policy implications. Some studies show that a higher unemployment rate induces more people to become entrepreneurs. These findings match with the "push" hypothesis, in which employees or unemployed workers are pushed or forced to become self-employed. They see self-employment as an alternative solution in order to stay active in the labour force market. This "push" hypothesis reveals a positive correlation between self-employment and unemployment. In contrast, other studies that support a negative relationship state that people are more likely to be self-employed when economic activity opportunities are high. In other words, they are "pulled" by the prosperity of the economy. When there is an increase in unemployment, there is a decline in self-employment.

The "push" theory suggests that economic conditions force individuals to become self-employed. This theory suggests policy implications such as self-employment programs to be introduced especially during economic downturns. Using Canadian macro-level data during the

1990s, Picot and Heisz (2000) find a rise in self-employment with the drop in paid full-time jobs between the 1980s and 1990s. The weak labour market depressed hiring rates, leading to a decline in labour force participation and high unemployment. The impact of economic downturns encourages both unemployed and paid employees to become self-employed. However, their analysis is too broad to identify the factors influencing individuals' decision to enter self-employment. Another finding that focuses on net changes in self-employment also supports the "push" hypothesis (LaRochelle-Côté, 2011). There were losses in paid employment during the Canadian 2008-2009 recession while self-employment rose. This raises the possibility of laid-off workers being "pushed" into self-employment. However, LaRochelle-Côté's (2011) longitudinal result reveals that recently laid-off employees are unlikely to account for the majority of those who entered self-employment during the recession. Meager (1992) uses the lagged term to capture the "churning" effect. He suggests that the inflows and outflows of self-employment would be better captured with micro-level data. Using micro-level data comparing the United States and Canada, Schuetze (2000) finds self-employment as a "job of last resort" during times of high unemployment. Examined by the linear probability model, his result also suggests that male individuals are "pushed" into self-employment. However, he concentrates on the current unemployment rate as his independent variable. According to the recession-push hypothesis, economic difficulty can push individuals to become self-employed.

In contrast, some studies claim that economic conditions provide individuals incentives to become self-employed. This fits with the "pull" hypothesis that explains how low unemployment pulls unemployed and paid employees towards self-employment. This hypothesis implies that the self-employment program should be emphasized even with high levels of economic activity. Blanchflower (2000) examines the important factors for making the self-employment decision.

He analyzes data from the Organization for Economic Cooperation and Development (OECD) countries. His results reveal a negative relationship between the self-employment rate and the unemployment rate in most countries. This result suggests that a low rate of unemployment "pulls" individuals to be self-employed. His limitation is the comparability across countries; hence, there is a little evidence that self-employment and unemployment are consistent across countries. Moreover, Benedict and Hakobyan (2008) also find "prosperity-pull" explaining self-employment in the United States, while the "recession-push" cannot explain the self-employment. The authors mention that macro-level data might not be clear for the explanation for the push and pull factors, hence their focus on state-level data instead. Their results reveal a negative and statistically insignificant coefficient of unemployment rate. This suggests that the push theory cannot explain the self-employment rate. The Self-Employment Assistance (SEA) Program also has a negative influence on self-employment in the U.S. It is shown that the SEA program does not encourage workers to become self-employed. Their results indicate that the current program, based on the recession-push hypothesis, has inaccurately focused on the unemployed. One concern with this paper is that their data files do not report the occupation of the self-employed person. Hence, it is difficult for them to determine whether an individual was self-employed or not.

There is also reverse causality between unemployment and self-employment: unemployment can affect self-employment, and vice versa. Thurik and his coauthors (2008) attempt to explain why using a two-equation vector autoregression model to estimate both changes in unemployment and self-employment across OCED countries. Using the lagged data to explain the current situation, they find not only "push" effects from poor economic conditions to self-employment but also a "pull" effect from self-employment to improve poor economic

conditions. This suggests that a policy dedicated to generating jobs and reducing unemployment should focus on entrepreneurship. Firm start-ups hire new employees, leading to a subsequent decrease in unemployment. They use the standardized unemployment rate of OECD Main Economic Indicators for the comparability across countries as an explanatory variable. Small business sectors, including self-employment, have become increasingly crucial to OECD countries as they attempt to generate employment. A limitation of Thurik et al. (2008) is that it cannot capture heterogeneity across individuals, since its data files are taken from macro level.

This raises a few concerns. Self-employment has not been correctly determined, as data at the macro-level is too broad to observe the influence of propensities to experience self-employment. The current unemployment rate does not seem able to capture the "churning" effect on self-employment. Additionally, reverse causality between unemployment and self-employment can lead to endogeneity problem if not consider exogenous influences on self-employment. This literature review suggests a few steps to examine my data. First, using micro data level, I focus on cross-sectional data to determine factors that influence propensities to experience self-employment. As well, I look at the influence of diverse personal and economic characteristics on males' probability of being self-employed during 2005 to 2011. Second, a number of studies focus only on self-employment as a primary job, so I determine self-employed individuals using two categories. Third, I use provincial unemployment rates as a measurement of economic conditions with the unexpected shock caused by 2008-2009 downturn. I retrieve the unemployment rates from Canadian Socio-Economic Information Management System (CANSIM) to avoid any potential endogeneity problem. Additionally, I add time dummies and lagged provincial unemployment rates as my explanatory variables. More details will be discussed in section 3.

3. Data

I focus on the nonagricultural sector for self-employed workers as my dependent variable. Compared to other industries, the agricultural sector experiences a unique economic condition which might lead to different conclusions (Schuetze, 2000; Benedict & Hakobyan, 2008). I use a series of micro data files from Survey of Labour and Income Dynamics (SLID) for Canadian data as a result from yearly availability data of SLID. All samples are composed of males aged 25 to 64 who were employed[1] during 2005 to 2011. SLID, however, has a limited detail on family characteristics, which is the reason I cannot include the number of children in my model. Instead, I include the number of household composition. Two methods are used to analyze and determine whether a person was self-employed in time period. The first method that identifies the self-employed is by looking at a person's primary job in the reference year. For this primary job category, there are two types of employed[2] workers: employees and self-employed workers. By considering an individual by his primary job, individuals can be either a paid-employee or self-employed worker in this category. Self-employed workers include working in an incorporated business - with paid help, incorporated business - no paid help, not incorporated business - with paid help, and not incorporated business - no paid help. My survey contains 86,596 observations from a pooled data, or approximately 12,371 individuals per year, from this category. Second, I consider whether an individual had a "self-employment job ever" in the reference year. In this category, I include all individuals who experienced in self-employment in the reference year. For instance, an individual who was a multiple jobholder with secondary job

[1] I excluded individuals who are either unemployed or not in the labour force.

[2] Unpaid family workers were excluded from the employed worker.

[3] According to Statistics Canada, Economic family refers to a group of two or more persons who live in the same dwelling and are related to each other by blood, marriage, common-law or adoption. A couple may be of opposite or

[2] Unpaid family workers were excluded from the employed worker.

in self-employment is included in this category. The self-employment job includes either an incorporated business or in an unincorporated business. There are 86,728 observations from this pooled data, which are approximately 12,390 persons per year.

Unemployment fluctuations are considered as a proxy for fluctuations in the level of economic activity (Meager, 1992). The unemployment rate is treated as explanatory variable for self-employment in this paper. Specifically, I concentrate on provincial unemployed rates taken from Canadian Socio-Economic Information Management System (CANSIM). The national unemployment level might be too unclear to determine the correlation between economic conditions and self-employment; hence, it is important to use regional indicators. The rates from CANSIM will act as exogenous influences on self-employment. These exogenous variables remove any potential endogeneity issue or reverse causality between unemployment rate and self-employment for the year 2005 to 2011. Regardless, I include both current provincial unemployment rates and one-year lagged provincial unemployment rates into my analysis. As previously mentioned, I expect to see a subsequent outcome of self-employment from the previous year's unemployment rate. Additionally, I use time dummies for the year 2005 to 2011. These year dummies pick up any factors across time that are not picked up by unemployment rate. The remaining explanatory variables look at the influence of various personal and economic characteristics on probability of being self-employed over the sample group.

All the retrieved data, both micro data files and provincial unemployment rates, were pooled together to create a single file showing the Canadian level as a whole. In this paper, I do not analyze the impact of provincial unemployment rates on provincial self-employment rates. Instead, I focus on the country level of self-employment based on provincial unemployment rates as a measure of economic conditions.

4. Empirical Strategy

In order to identify the effect of economic conditions on self-employment, I utilize an approach similar to Schuetze (2000) but with some important differences. Unlike Schuetze, I do not focus on across countries data. Instead, I focus on cross-sectional data in Canada for the year 2005 to 2011. Two dependent variables indicate self-employment in my paper. Thus, self-employment is classified into two categories: by their primary job, and by had "self-employment job ever" in the reference year. Schuetze (2000) considers an income tax as his explanatory variable, but I drop the variable as it is my "potential omitted variable". I use exogenous shift in economic conditions caused by 2008-2009 recession in addition to the Canadian provincial unemployment rate as my exogenous independent variable.

A linear probability model by ordinary least squares (OLS) examines an empirical examination of the effect of economic conditions on self-employment. It is an explanation of males becoming self-employed by using the pooled cross-section time-series data in Canada. The model is similar to Schuetze (2000). By considering individuals' primary job, the data has 86,596 observations during 2005 to 2011. As well, 86,728 observations had "self-employment job ever" in the reference year.

My base model is the linear probability model by OLS. It is adapted from Schuetze (2000):

$$\mathbf{SE}_{it} = \alpha_{it} + \beta_1 \boldsymbol{urate}_{it} + \beta_2 \boldsymbol{age}_{it} + \beta_3 \boldsymbol{edu}_{it} + \beta_4 \boldsymbol{indus}_{it} + \beta_5 \boldsymbol{marst}_{it} + \beta_6 \boldsymbol{HH}_{it} + \beta_7 \boldsymbol{year}_{it} + \varepsilon_{it}$$

$\boldsymbol{\alpha}$ and $\boldsymbol{\beta_1}$ are scalars whereas the remaining variables are vectors in the equation. Subscript "i" represents each of the individuals (1st to 86,596th and 86,728th observations). Subscript "t" represents the reference year between 2005 and 2011. ***urate*** is the unemployment rate at time t, from CANSIM at provincial level, relates to the year-province where individuals i lives. ***lurate*** is

the one-year lagged provincial unemployment rate at year t. **SE** or dependent variables are a 0-1 indicator variables for being self-employment. It will be equal to one if the individual is self-employed, and equal to zero when the person is a waged employee. The dependent variable has two categories: $\mathbf{SE^P}$ and $\mathbf{SE^S}$.

As mentioned above, the self-employment rates are classified into two categories. First, I denote SE^P as self-employed males by their primary job as a self-employment in the reference year. Second, SE^S indicates self-employed males by "ever experienced" in either incorporated business or unincorporated business. I consider self-employed males as "ever had self-employment job" in the reference year. First three equations consider self-employment rates by their primary job. They are the first three columns in the regression results table (Table 6). The last three equations consider self-employment rates by "ever had self-employment job". They are columns 4, 5, and 6 in Table 6.

The remaining independent variables controlling for the characteristics of becoming self-employed are all sets of dummy variables. If the statement is true, the value will be 1 and 0 otherwise. The first independent variable is ***age***. It represents age cohorts as sets of dummy variables. Eight age cohorts are 25 to 29 (omitted group), 30 to 34, 35 to 39, 40 to 44, 45 to 49, 50 to 54, 55 to 59, and 60 to 64. ***edu*** represents five groups of highest education level. They are 0-8 years of schooling (from never attended school to elementary school. This is the omitted group), 9-10 years of elementary and secondary school, 11-13 years of elementary and secondary school (did not graduate), graduated from high school, and any post-secondary institution. Industrial indicators are indicated as ***indus***. These are sets of the dummy variables: forestry/fishing/oil and gas/utilities (omitted variable); construction; manufacturing; trade; transportation & warehousing; finance/insurance/real estate and leasing; professional

services/business services/educational services/health care/information/food services/other services; and public administration. Variable ***marst*** indicates marital status. It includes married/common-law, separated/divorced/widow, and single (omitted variable). ***HH*** stands for household composition as of December 31 of reference year. This variable includes one-person household (omitted variable), two or more person household/one economic family[3], or two or more person household/two or more economic families. A dummy set of year variables between 2005 and 2011 is presented by ***year***, with the year 2005 being the omitted variable. All omitted variables are those that get compared with other variables. For instance, the result from Table 6 in column 1 shows -0.0189 in the 9-10 years of schooling, this means one percent increase in this category reduces 1.89 percent of being self-employed compared to 0-8 years of schooling (the omitted variable).

There are a total of 6 equations, all of which are represented in 6 columns in Table 6. All of the equations control for the same explanatory variables with the different controlling for ***urate*** variable. In each self-employment category either $\mathbf{SE^P}$ or $\mathbf{SE^S}$, I have three sets for controlling ***urate.*** First, I control for both current and one-year lagged unemployment rates concurrently. Controlling for both current and lagged simultaneously, I expect to see the lagged unemployment rate as more influential than the current unemployment rate. The second set only controls for the current unemployment rate. Finally, only lagged unemployment rate is controlled in the last set. If controlling for only the current unemployment rate has similar results to controlling for only the lagged unemployment rate, they might have a higher correlation. In fact,

[3] According to Statistics Canada, Economic family refers to a group of two or more persons who live in the same dwelling and are related to each other by blood, marriage, common-law or adoption. A couple may be of opposite or same sex. Foster children are included.

this resulted in my greater attention towards controlling both current and lagged unemployment rates simultaneously.

5. Individual Characteristics

This section describes the factors that influence individuals' propensities in joining self-employment from the pooled data. These numbers show the self-employment rates across personal and economic characteristics. In Table 1-5, the first columns represent self-employment rates by individuals' primary job. The second columns indicate self-employed rates by considering "ever had self-employment job". First, Tables 1 and 2 represent self-employment rates influenced by industry sectors and marital status. Self-employment rates are highest in the manufacturing industry, as demonstrated in Table 1. The manufacturing characteristic is the highest industrial group in both self-employment classifications, columns (e) and (f), followed by public administration sector. It might be the case that manufacturing businesses are an easier start-up activity compared to other options. For the marital status in Table 2, the separated males have the highest rate of being self-employed in both columns (g) and (h) followed by married males; however, regression result reveals that the married males have relatively high probabilities of becoming self-employed.

The following self-employment rates influenced by personal characteristics are consistent with previous studies (Blanchflower, 2000; Schuetze, 2000). First, Table 1 shows that self-employment rates correspond with age cohorts. The highest self-employment rates are in 60 to 64 age cohorts for both self-employment groups, which are column (a) and (b). The results show that older males are more likely to become self-employed. As people age, they gain more work experience and skills, such as entrepreneurship. This might explain why many males decide to

become self-employed in their old ages. These highest self-employment rates are consistent with Blanchflower (2000) and Schuetze (2000). Second, the 0-8 years of schooling group has the highest self-employment rates in both self-employment groups represented in columns (c) and (d) from Table 2. Focused on educational attainment on self-employment decision, male individuals with 0-8 years of schooling tend to be more self-employed. This result is consistent with Blanchflower (2000). Many paid full-time jobs require a certain level of education. Individuals who do not have the adequate skills needed to work as paid full-time workers often end up self-employed, which might explain the highest self-employment rates. The lowest self-employment rates are shown in the group of males who graduated from high school. This education level group has enough educational requirements for being paid employees; therefore, most likely prefer staying in paid-worker industries. These are accurate for both groups of self-employment. Third, Table 3 shows self-employment rates that influence by HH composition. The highest self-employment rates occur when males live with one economic family with two or more person household. The highest rates occur for both groups of self-employment. These highest rates match with Schuetze (2000), who claims that males who live with second income family are more likely to be self-employed.

6. Estimation Results and Discussion

The estimation results using linear probability model are shown in Table 6. The numbers in the table show the estimated coefficients and the standard errors; the standard errors are presented in parentheses. Columns 1 to 3 in Table 6 indicate the estimation results for self-employment rates classified by individuals' primary job. Also, the results of self-employment rates classified by considering whether individuals "ever had self-employment job" are in columns 4 to 6. The results in columns 2 and 3 are highly correlated, as well as columns 5 and 6,

and are controlled by either current unemployment rate or lagged unemployment rate holding other explanatory variables. The coefficients in these columns provide similar results to controlling for both rates; therefore, my main are shown in columns 1 and 6.

The effects of personal and economic characteristics are as expected. All age group variables are statistically positive and significant. As individuals move to the older age cohorts, the higher probability of being self-employed is shown. For instance, one percent increase in the 30-34 age range, there is a 4.15 percent increase from 25-29 age cohort (omitted variable) in probability of being self-employed. It implies that the ages have a positive effect on the probability of self-employment as ages increase for both self-employment groups. These results coincide with previous studies (Blanchflower 2000 & Schuetze 2000): the older the age group, the more they become self-employed. Individuals might gain more entrepreneur skills as they age, allowing them to enter self-employment activities easier than in their younger age. The educational variables are not significant, which contradicts with Blanchflower (2000) and Schuetze (2000). Most of the regression results show insignificant coefficients for the educational attainment. These are not sufficiently explainable results for the relationship between self-employment rate and education level. Moreover, males who are married were the most likely to experience self-employment compared to single and divorced males. These results are consistent with Schuetze (2000), who states that married males "are more likely to be in a family with a second income". Furthermore, the year indicator variables are not significant for all 7 years. From column 1 controlling for both current unemployment rate and lagged unemployment rate, a one percent increase in the year 2007 decreases 2.51 percent of self-employment rate from 2005 (the omitted year). Since self-employment rates in 2008 and 2009 did not provide any

significant difference compared to 2007 before the recession, it is uncertain of what was going on during 2008-2009.

The regression results show a negative correlation between the economic condition and self-employment. Negative and significant effects of provincial lagged unemployment rates on level of self-employment for Canadian males are found for both self-employment groups. The results from both groups, columns 1 and 4, show that the lagged unemployment rates are statistically significant, whereas the current unemployment rates are not significant. This implies that the lagged unemployment rates are more important than current unemployment rates when both rates are considered at the same time. In column 1 considered from individuals' main job, an increased one percent in lagged unemployment rate decreases self-employment rate by 1.05 percent. Also, by considering individuals with "ever had self-employment job", a one percent increase in lagged unemployment rate decreases self-employment rate by 1.07 percent, as shown in column 4. These results show that the second group of the self-employment, "ever had self-employment job", is more sensitive to the lagged unemployment rate. This might explain why individuals who "ever had self-employment job" can respond slightly faster with the economic change. Leaving the current unemployment rates out of the model declines the impact of the lagged unemployment rates on self-employment rates. A one percent increase in lagged unemployment rate decreases self-employment rate by 0.74 percent and 0.87 percent in the first and second self-employment groups, respectively. However, the remaining coefficients are similar to controlling for both rates concurrently. Therefore, my main results are influenced by equations that control for both current and lagged unemployment rates concurrently.

My result contrasts with Schuetze's (2000) on the relationship between unemployment rate and self-employment rate. My paper shows a small negative relationship, whereas Schuetze

claims a small positive relationship. Since this paper mainly focuses on the impact of economic conditions on self-employment, I might omit a potential important variable, such as an income tax rate. This is one possible reason for the contradiction. Because of this contradiction, I plan to include the income tax rate as one of the determinants of self-employment in the future to improve an explanation for this relationship.

7. Conclusion

In this paper, I examine how economic conditions affect self-employment using unemployment rate as a measure of economic conditions. Many studies do not pay attention to the endogeneity issue, leading to a reverse causality between unemployment and self-employment. I overcome this problem by using pooled data and asynchronous variation in economic conditions across provinces and time. Further, I use variation in economic conditions caused by the recent 2008-2009 recession. This variation was unexpected and likely exogenous. The linear probability model of this paper is similar to Schuetze (2000) in terms of finding the effect on self-employment at micro-level data, but differs in terms of its identification strategy. This study focuses on cross-provincial variation in Canada for employed males aged 25 to 64 during 2005 to 2011. Self-employment is categorized by the individuals' main jobs and "ever had" self-employment job in the reference year. Particularly, I control for both current and lagged provincial unemployment rates and personal characteristics' dummies.

The regression results show a negative correlation between unemployment and self-employment, which satisfies with the "pull" hypothesis. This hypothesis suggests that individuals are "pulled" into self-employment by the prosperity of the economy. The lagged provincial unemployment rate is more important than the current unemployment rate when

controlling them simultaneously, and is negatively correlated with both classes of self-employment. Therefore, self-employment is pro-cyclical controlling for other determinants. Some personal characteristics can influence self-employment decision as well. Older individuals tend to become self-employed. Moreover, males who are married and males with one economic family were more likely to be self-employed than other groups.

All in all, the results suggest that self-employment programs should not be promoted solely for the purpose of solving unemployment during economic downturns. Many governments want to overcome high unemployment rates, which represent poor economic conditions, by promoting self-employment programs. Governments often encourage self-employment as a reasonable option for unemployed workers, leading to the creation of self-employment programs. However, based on this study's findings, I suggest that governments follow the prosperity-pull hypothesis. Rather than focusing on self-employment only during periods of low employment rates, people should be introduced to the programs when experiencing good economic conditions. To better serve those most affected by the high unemployment rates in specific areas, these self-employment programs provided by the government should be guided by an in-depth understanding of localized economic conditions. Having programs designed for the local economy will not only benefit the people by providing them the resources to be self-sustaining, but will decrease the unemployment rate, thereby fostering better economic conditions in general.

Tables

Table 1 Self-Employed with Industry Groups		
Industry	(e)	(f)
Oil/utilities	0.1583	0.1915
Construction	0.0006	0.0269
Manufacturing	0.3351	0.3577
Trade	0.0435	0.0696
Transportation	0.1620	0.1898
Finance	0.2316	0.2560
Services	0.2251	0.2717
Public admin.	0.3150	0.3445

Table 2 Self-Employed with Marital Status		
Marital Status	(g)	(h)
Married/common law	0.2142	0.2493
Separated/divorced/widow	0.2284	0.2613
Single	0.1265	0.1575

Table 3 Self-Employed with Age cohorts		
Age group	(a)	(b)
25 to 29	0.0805	0.1137
30 to 34	0.1267	0.1692
35 to 39	0.1725	0.2161
40 to 44	0.2028	0.2393
45 to 49	0.2181	0.2468
50 to 54	0.2422	0.2743
55 to 59	0.2845	0.3100
60 to 64	0.3310	0.3521

Table 4 Self-Employed with Educational Attainment		
Years of schooling	(c)	(d)
0-8 years of schooling	0.2411	0.2541
9-10 years	0.2019	0.2262
11-13 years (did not graduate)	0.2046	0.2252
Graduated from high school	0.1898	0.2155
Any post secondary	0.1939	0.2318

Table 5 Self-Employed with HH Composition		
Household Composition	(i)	(j)
One-person household	0.1946	0.2312
Two or more person household/one economic family	0.2014	0.2350
Two or more person household/two or more economic families	0.1311	0.1637

Table 6 Regression Results Linear Probability (OLS), Pooled Data						
Variables	Primary Job- Coef.			Ever Had Self-employment Job-Coef.		
	(1)	(2)	(3)	(4)	(5)	(6)
urate	0.0033	-0.0071**		0.0022	-0.0084**	
	(0.0024)	(0.0007)		(0.0026)	(0.0007)	
lagged urate	-0.0105**		-0.0074**	-0.0107**		-0.0087**
	(0.0023)		(0.0007)	(0.0025)		(0.0007)
30 to 34	0.0415**	0.0415**	0.0415**	0.0477**	0.0475**	0.0477**
	(0.0051)	(0.0051)	(0.0051)	(0.0054)	(0.0054)	(0.0054)
35 to 39	0.0870**	0.0868**	0.0870**	0.0935**	0.0933**	0.0935**
	(0.0051)	(0.0051)	(0.0051)	(0.0055)	(0.0055)	(0.0055)
40 to 44	0.1154**	0.1155**	0.1154**	0.1155**	0.1155**	0.1155**
	(0.0051)	(0.0051)	(0.0051)	(0.0054)	(0.0054)	(0.0055)
45 to 49	0.1302**	0.1300**	0.1302**	0.1233**	0.1231**	0.1233**
	(0.0051)	(0.0051)	(0.0051)	(0.0054)	(0.0055)	(0.0055)
50 to 54	0.1537**	0.1536**	0.1537**	0.1496**	0.1494**	0.1496**
	(0.0053)	(0.0053)	(0.0053)	(0.0056)	(0.0056)	(0.0060)
55 to 59	0.1911**	0.1909**	0.1911**	0.1796**	0.1794**	0.1796**
	(0.0057)	(0.0057)	(0.0057)	(0.0061)	(0.0061)	(0.0061)
60 to 64	0.2280**	0.228**	0.2280**	0.2121**	0.2121**	0.2121**
	(0.0066)	(0.0066)	(0.0066)	(0.0070)	(0.0070)	(0.0070)
9-10 years of schooling	-0.0189**	-0.0189**	-0.0190**	-0.0094	-0.0095	-0.0095
	(0.0089)	(0.0089)	(0.0089)	(0.0094)	(0.0094)	(0.0094)
11-13 years (did not graduate)	-0.0028	-0.0023	-0.0029	0.0009	0.0013	0.0008
	(0.0101)	(0.0101)	(0.0101)	(0.0107)	(0.0108)	(0.0107)
Graduated from high school	0.0110	-0.0107	-0.0111	-0.0026	-0.0024	-0.0027
	(0.0078)	(0.0078)	(0.0078)	(0.0083)	(0.0083)	(0.0083)
Post secondary	-0.0066	-0.0062	-0.0067	0.0096	0.0100	0.0096
	(0.0073)	(0.0072)	(0.0073)	(0.0077)	(0.0077)	(0.0077)

Construction	-0.1689**	-0.1687**	-0.1688**	-0.1777**	-0.1775**	-0.1776**
	(0.0125)	(0.0125)	(0.0125)	(0.0133)	(0.0133)	(0.0133)
Manufacturing	0.1793**	0.1795**	0.1794**	0.1694**	0.170**	0.1694**
	(0.0076)	(0.0076)	(0.0076)	(0.0081)	(0.0081)	(0.0081)
Trade	-0.1155**	-0.1153**	-0.1153**	-0.1225**	-0.1222**	-0.1223**
	(0.0073)	(0.0073)	(0.0073)	(0.0078)	(0.0078)	(0.0078)
Transportation & warehousing	0.0121	0.0121	0.0121	0.0071	0.0071	0.0071
	(0.0075)	(0.0075)	(0.0075)	(0.0080)	(0.0080)	(0.0080)
Finance/insurance /real estate	0.0594**	0.0595**	0.0595**	0.0518**	0.0520**	0.0518**
	(0.0080)	(0.0080)	(0.0080)	(0.0085)	(0.0085)	(0.0085)
Services	0.0764**	0.0764**	0.0766**	0.0885**	0.0886**	0.0886**
	(0.0070)	(0.0070)	(0.0070)	(0.0074)	(0.0074)	(0.0074)
Public administration	0.1526**	0.1526**	0.1527**	0.1493**	0.1493**	0.1493**
	(0.0091)	(0.0091)	(0.0091)	(0.0096)	(0.0096)	(0.0096)
Married/common-law	0.0438**	0.0438**	0.0438**	0.0574**	0.0574**	0.0574**
	(0.0042)	(0.0042)	(0.0042)	(0.0045)	(0.0045)	(0.0045)
Separated/divorced/widow	0.0311**	0.0311**	0.0311**	0.0401**	0.0401**	0.0401**
	(0.0055)	(0.0055)	(0.0055)	(0.0058)	(0.0058)	(0.0058)
2 or more/one eco family	-0.0244**	-0.0242**	-0.0243**	-0.0327**	-0.0325**	-0.0326**
	(0.0048)	(0.0048)	(0.0048)	(0.0051)	(0.0051)	(0.0051)
2 or more/2 or more eco families	-0.0498**	-0.0496**	-0.0498**	-0.0560**	-0.0557**	-0.0559**
	(0.0061)	(0.0061)	(0.0061)	(0.0065)	(0.0065)	(0.0065)
2006	-0.0086	-0.0093	-0.0089	-0.0068	-0.0075	0.0070
	(0.0049)	(0.0049)	(0.0049)	(0.0052)	(0.0052)	(0.0051)
2007	-0.0251**	-0.0222**	-0.0244**	-0.0237**	-0.0208**	-0.0232**
	(0.0049)	(0.0049)	(0.0049)	(0.0052)	(0.0052)	(0.0052)
2008	-0.0234**	-0.0187**	-0.0221**	-0.0222**	-0.0174**	-0.0213**
	(0.0050)	(0.0049)	(0.0049)	(0.0053)	(0.0052)	(0.0052)
2009	-0.0331**	-0.0027	-0.0236**	-0.0232**	0.0077	-0.0169**
	(0.0085)	(0.0051)	(0.0049)	(0.0091)	(0.0054)	(0.0052)
2010	-0.0093	-0.0128**	-0.0099	-0.0011	-0.0046	-0.0015
	(0.0050)	(0.0050)	(0.0050)	(0.0054)	(0.0053)	(0.0053)
2011	-0.0208**	-0.0258**	-0.022**	-0.0195**	-0.0246**	-0.0204**
	(0.0050)	(0.0049)	(0.0050)	(0.0053)	(0.0052)	(0.0052)

Note: ** shows significance at 5 percent level or $p<0.05$

Figures

Figure (1)

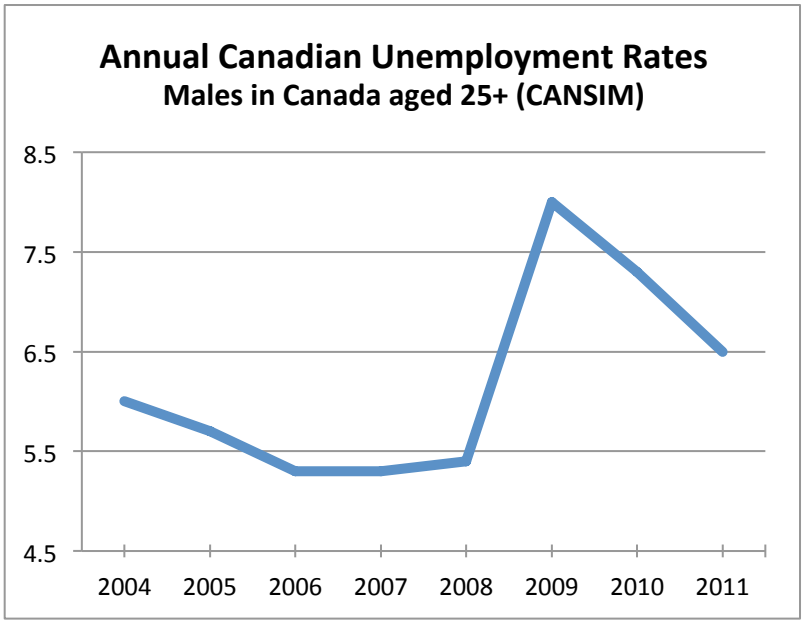


Figure (2)

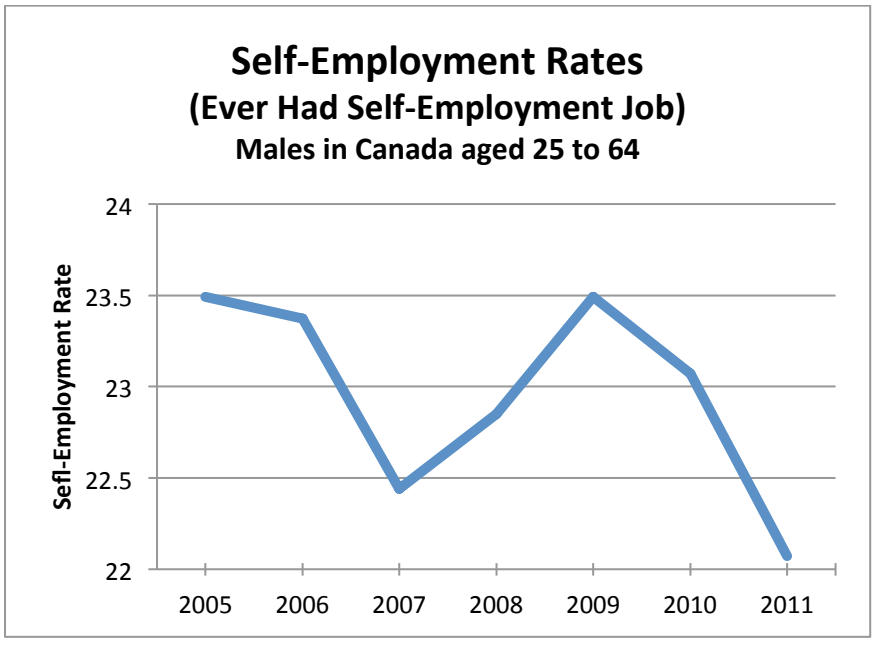


Figure (3)

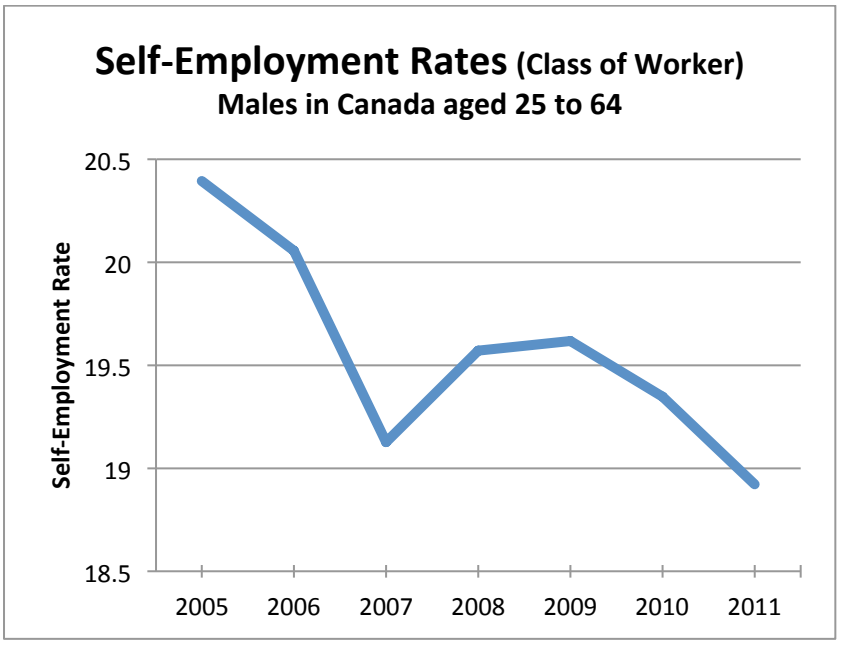
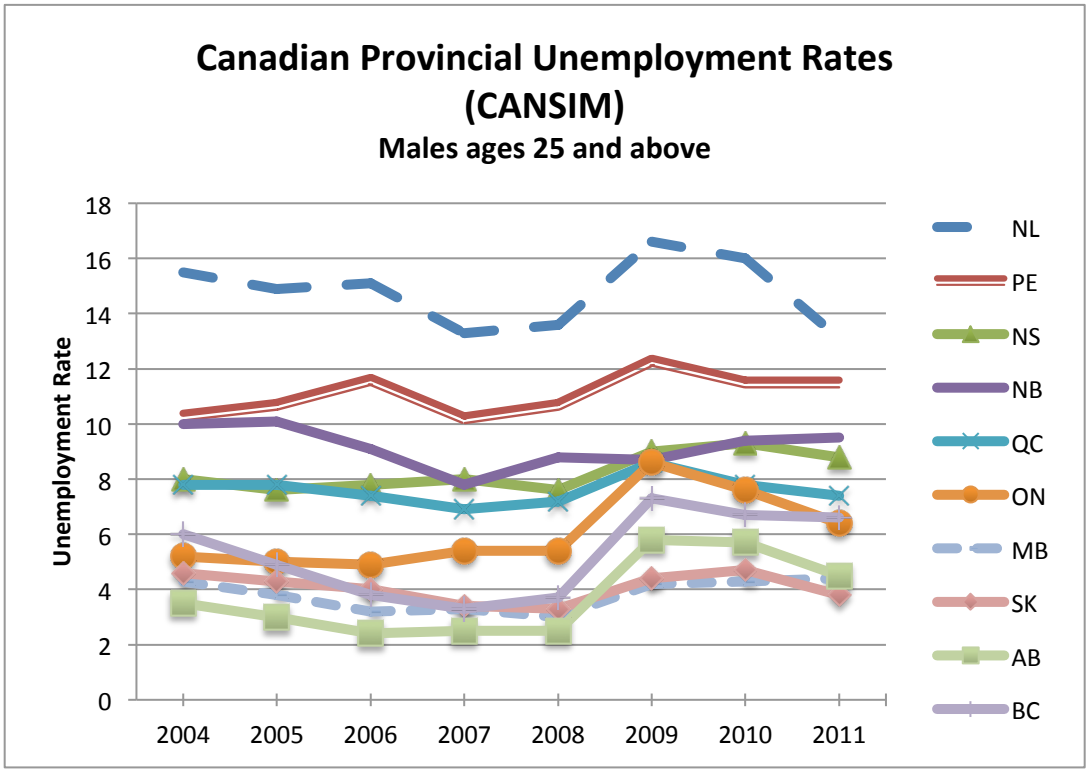


Figure (4)



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