Detailed Description

Objectives

This research proposal has three main objectives. The first one is to empirically study the income dynamics of entrepreneurs − before, during, and after an entrepreneurship. Using Canadian linked employer-employee administrative data − the Canadian Employer-Employee Dynamics Database (CEEDD) − we plan to focus on (i) the income dynamics before individuals enter entrepreneurship, (ii) the changes in income as people leave jobs to start businesses, (iii) the patterns of entrepreneurial income dynamics as businesses grow, and (iv) if entrepreneurs are unsuccessful, shut down their businesses, and return to the labour market, how their labour earnings prior to starting a business compare to their earnings after exit. We expect to provide empirical evidence studying the following questions:

- Who selects into entrepreneurship? In particular, what is the role of financial frictions and wealth in the decision to become an entrepreneur and for subsequent success? Is there a correlation between labour market and entrepreneurial productivity?

- What proportion of entrepreneurs earn less as entrepreneurs than they did as employees, yet remain as entrepreneurs? What proportion exit after learning that their entrepreneurial earnings are lower than their employment earnings were? What proportion experience low earnings early on followed by high earnings growth?

- What do unsuccessful entrepreneurs typically do after shutting down a business? What proportion return to the labour market, retire early, or start a new business?

- Do unsuccessful entrepreneurs typically experience an unemployment spell between shutting down their business and before finding employment?

- For unsuccessful entrepreneurs that return to the labour market, how do their earnings compare to what they earned before they started a business? Are there job-scarring losses of unsuccessful entrepreneurship?

- What are the lifetime earnings losses that unsuccessful entrepreneurs experience compared to the counter-factual where they never started a business?

The second objective is to build a quantitative life-cycle model of occupational choice, where agents choose whether to be workers or entrepreneurs. The model will include heterogeneity in both worker and entrepreneurial ability, non-pecuniary benefits of entrepreneurship, financial frictions, labour market frictions, uninsurable risk to both types of ability, and government policies to encourage entrepreneurship.

The third objective is to use this framework to address the following questions:

- Are borrowing constraints binding for most entrepreneurs? Is this a key barrier to entrepreneurship preventing those without financial wealth from starting businesses?

- How important is entrepreneurial income risk for the decision to become an entrepreneur? How much information do potential entrepreneurs have about the likelihood of business success?

- Are the lifetime income losses due to experimentation in entrepreneurship large enough to discourage entrepreneurs with high ability from experimenting, given plausible risk-aversion?

- What proportion of entrepreneurs are primarily motivated by the non-pecuniary benefits of entrepreneurship? What proportion of the return to entrepreneurship do non-pecuniary benefits represent?

- How do various government policies, such as loan programs and tax benefits, affect the decision to become an entrepreneur and the amount of money individuals invest? Are there incentive compatible partial insurance schemes that can encourage entrepreneurial activity by insuring a portion of entrepreneurial earnings?

Context

There is a large literature on people's decisions to become entrepreneurs. Ever since Evans and Jovanovic (1989), financial frictions have been considered an important barrier that prevents those with sufficient wealth from starting a business. Subsequent work by Quadrini (1999) and Cagetti and De Nardi (2006) argue that these financial frictions generate strong savings motives, encouraging entrepreneurs to save at high rates. These high savings rates are a key mechanism that can explain the high concentration of wealth we observe in the data. Buera (2009) show that these financial constraints can substantially reduce aggregate productivity by misallocating resources.

In response to this idea, a number of papers have examined the role of these financial frictions in reducing aggregate productivity in developing countries. In a model calibrated to US and Mexican data, Buera and Shin (2011) show that financial frictions can explain a substantial share of these countries manufacturing TFP due to a misallocation of both capital and talent. Comparing South Korea to the Chinese and Columbia economies, Midrigan and Xu (2014) argue that these losses are more likely to result from a reduction in technological adoption. Castro and Ševčík (2017) demonstrate that binding financial constraints when entrepreneurs start businesses encourage them to invest less in human capital formation. They quantify the resulting loss of aggregate productivity as explaining 22%-44% of per capita income differences between the US and India.

Within the US context, Hurst and Lusardi (2004) challenges the view that financial frictions are important for entrepreneurial selection. Using the Panel Study of Income Dynamics (PSID) they find no evidence that entrepreneurs change their savings behaviour to accumulate wealth before starting a business. They also show that both past and future inheritances predict business entry, suggesting that liquidity constraints are not the only important factor in generating this relationship between wealth and entrepreneurship.

An alternative mechanism, originally proposed by Kihlstrom and Laffont (1979), is uninsurable entrepreneurial risk. Cressy (2000) argues that this risk can also generate a relationship between wealth and entrepreneurship. If agents have decreasing absolute relative risk aversion, wealthier individuals will be more likely to take on a risky entrepreneurial venture. Certainly, entrepreneurs face substantial idiosyncratic risk. In a sample of venture capital backed entrepreneurs, Hall and Woodward (2010) show that three quarters of these entrepreneurs receive close to a zero payout. In the manufacturing industry, Castro et al. (2015) show that 80% of unexplained variation in revenue TFP is due idiosyncratic risk. Overall in the US economy, Decker et al. (2016) calculate that firm exit rates are consistently 8%-10% per year. Using IRS data, DeBacker et al. (2018) document that entrepreneurial income volatility is substantially higher than employment income.

One key contribution of our research project is therefore to provide evidence for these two narratives about entrepreneurial selection. If borrowing constraints are a major obstacle to en-

trepreneurs starting businesses, we should see entrepreneurs' capital income rise in the years prior to entry as they save up. When they start their business, we should see an abrupt fall in capital income as they liquidate their financial assets in order to invest in their business. If entrepreneurs continue to have capital income from outside sources while operating their business, we can infer they are not borrowing constrained. Furthermore, we can compare new business growth between unconstrained entrepreneurs, who have outside capital income, and potentially constrained entrepreneurs, who have no outside capital income, to understand how much of business growth is due to entrepreneurial savings.

To analyze entrepreneurial risk, using the large sample size of the Canadian CEEDD administrative data, we can characterize the full distribution of entrepreneurial outcomes. In particular, we can calculate the lifetime earnings losses unsuccessful entrepreneurs experience. Viewed through the lens of our model, we can then asses whether the risks to lifetime income are sufficient to discourage people from starting businesses, given plausible values of risk aversion.

Moskowitz and Vissing-Jørgensen (2002) ask whether large idiosyncratic entrepreneurial risks are compensated for with high entrepreneurial returns. They find that the returns to private equity are no higher than the returns to public equity. Given that most entrepreneurs are poorly diversified and most stockholders are well diversified, this result is puzzling. Using a longer sample, Kartashova (2014) shows that this result is highly sensitive to the exact period of study.

Regardless, others have taken seriously the idea that not all of the return to entrepreneurship is pecuniary in nature. Hurst and Pugsley (2011) document that in the Panel Study of Entrepreneurial Dynamics, most entrepreneurs report that they greatly value flexibility in schedule or the psychological value of being their own boss. Using French administrative data, Catherine (2017) estimates a structural model of entrepreneurship and finds that non-pecuniary benefits are worth some 15% of profits. In a model of non-pecuniary benefits, Hurst and Pugsley (2015) argue that entrepreneurs motivated by non-pecuniary benefits, rather than a comparative productivity advantage, should be disproportionately found in industries with a small average firm size.

Of course, while some entrepreneurs quit jobs to start a business there is also strong evidence that some become entrepreneurs because of poor employment opportunities. These "entrepreneurs of necessity" are prevalent. Using Global Entrepreneurship Monitor data, Poschke (2013) documents that 12.3% of entrepreneurs in the US and 16.9% of entrepreneurs in Canada report that they became an entrepreneur because they had no better choices for work. He finds that the relationship between wages and the probability of becoming an entrepreneur is U-shaped due to the high proportion of low-wage individuals becoming entrepreneurs out of necessity. Comparing new businesses created by unemployed and employed individuals, Galindo da Fonsec (2017) finds that businesses created by previously unemployed individuals hire fewer workers and are more likely to exit.

One contribution of our work will be to explore to what extent people become entrepreneurs for pecuniary benefits rather than the lack of an attractive job opportunity. If people leave jobs in order to become entrepreneurs, and then they make less as entrepreneurs but remain entrepreneurs, we can infer that they are likely motivated by non-pecuniary benefits. By comparing their prior labour market earnings to their entrepreneurial earnings, we can then estimate the distribution of values these entrepreneurs place on the non-pecuniary benefits of entrepreneurship. The ability to measure their prior labour market earnings and in particular their employment status prior to starting a business is a key feature of the Canadian employer-employee linked data.

Our work also seeks to investigate some of the broader labour market consequences of entrepreneurship. Particularly, we are interested if there are long term consequences of unsuccessful attempts of entrepreneurship. In a seminal paper, Jacobson et al. (1993) documents that workers

who separate from distressed firms experience persistent earnings losses over the course of their working lives. Both Couch et al. (2011) and Davis and von Wachter (2011) document that these job-scarring losses can be much larger if workers are displaced when unemployment is high. We are interested in whether there are similar job-scarring losses of unsuccessful entrepreneurship. When an entrepreneur shuts down their business and returns to the labour market, do their earnings suffer similarly to displaced workers? Alternatively, perhaps the experience of entrepreneurship gives them additional skills that employers value. Either way, the labour market earnings of successful entrepreneurs matters greatly for the risks that they face when initially deciding whether to start a business.

Finally, we turn to government policy for entrepreneurs. A large literature studies how taxation systems should optimally tax entrepreneurs. Meh (2005) demonstrates that progressive income taxation has little impact on wealth inequality in a model with entrepreneurs, but a big impact without them. Panousi and Reis (2016) argues that capital income taxes are attractive because they provide insurance against capital income risk. While Bruggemann (2017) demonstrates that revenue maximizing top marginal tax rates on entrepreneurs can be as high as 85%. What has been less studied within the macro-entrepreneurship literature are the optimal policies to encourage entrepreneurial activity. If entrepreneurial talent is misallocated due to borrowing constraints or a lack of insurance for entrepreneurial risk, there is scope for government policy to alleviate this misallocation. We intend to contribute by considering the efficiency of government subsidized loan programs, entrepreneurial grants, and insurance schemes that partially insure entrepreneurial earnings.

Methodology

Empirical Evidence

Using the panel nature of our data, we can document the dynamics of income for entrepreneurs. To do so we plan to use various specifications of the following distributed lag model:

$$y_{it} = \sum_{k=-2}^{5} \delta_k D_{i,t}^k + \delta_6 D_{i,t}^{6+} + \mathbf{X}_{i,t}'\beta + \alpha_i + \gamma_t + \epsilon_{i,t} \ , \tag{1}$$

where y_{it} is a measure of log income, $\{D_{i,t}^k\}$ is a set of dummy variables that identify entrepreneurs in the kth year since starting a business, $\mathbf{X}_{i,t}'$ is a vector of demographic characteristics, α_i is a set of individual fixed effects and γ_t is a set of time fixed effects. Estimates of δ_k are then difference-in-difference estimates of the average change in log income between entrepreneurs in the kth year of starting a business and individuals who are currently working as employees but will later become entrepreneurs.

Firstly, we can use this regression to study the change in different components of an entrepreneur's income as they start a business. We can run this regression on their capital income outside the business to understand whether they are liquidating financial assets to invest in the business. Running it on their employment earnings will allow us to see whether new entrepreneurs are replacing their labour income with a salary from their new business, and how quickly that income grows after they start the new business. We can then compare the income dynamics of different sub-samples, such as exiting entrepreneurs vs. entrepreneurs who survive at least 5 years, individuals from the top of the distribution of labour income vs. those at the bottom, and wealthy individuals vs. wealth-poor individuals.

Secondly, we will examine the subset of entrepreneurs who exit, shut down their business, and return to the labour market. We can use a similar regression framework to compare their labour market earnings before they start a business to their earnings after they shut down their business. This comparison will allow us to document whether there are job-scarring losses for unsuccessful entrepreneurs and how large these losses might be.

Theoretical Approach

We will then build a general equilibrium model of occupational choice with the following features.

- Two types of ability. Agents in the model will have both worker and entrepreneurial ability. Having both types allows us to measure misallocation of talent and to compare how policies will affect entrepreneurs with different outside options.

- Uninsurable idiosyncratic risk. Motivated by the substantial differences in income risk between entrepreneurship and employment, incorporating realistic degrees of both types of income risk is key for understanding the decision to become an entrepreneur.

- Non-pecuniary benefits. These benefits are motivated by survey responses that indicate a large fraction of entrepreneurs consider the flexibility in working hours and the psychological benefit of being their own boss to be important determinants of their decision to become an entrepreneur.

- Financial frictions. Entrepreneurs will need some personal wealth in order to invest in productive capital and to pay fixed costs. Entrepreneurs who are able to pledge more collateral will be able to borrow more and so operate larger businesses.

- Labour market frictions. In order to capture the prevalence of entrepreneurs of necessity and also the income dynamics as entrepreneurs return to the labour market, we anticipate including simple labour market frictions which generate some frictional unemployment in the model.

- General equilibrium (GE). Including GE forces is vital for understanding how changes in government policy lead to changes in the economic environment.

Policy Analysis

Governments across the world spend a substantial amount of scarce public funds directly subsidizing businesses through loan subsidies or grants, and by reducing the taxes paid on entrepreneurial income. Our rich framework will allow us to study the efficacy of these policies. In particular, governments subsidize loans and grants motivated by the idea that borrowing constraints prevent many high-ability people from starting businesses. However, they may also reward individuals who would have started businesses anyway. Given the risks that entrepreneurs face, tax provisions that allow entrepreneurs to carry forward business losses are likely to be extremely important, yet it is less clear how much entrepreneurial activity is actually increased when entrepreneurial income is taxed at a lower rather than labour income. Finally, we will study whether incentive-compatible partial earnings insurance schemes are an attractive way to get risk-averse individuals to experiment with starting a business, given the high degree of entrepreneurial risk they face.

References

Bruggemann, B. (2017). Higher Taxes at the Top: The Role of Entrepreneurs. *Working Paper*.

Buera, F. J. (2009). A dynamic model of entrepreneurship with borrowing constraints: Theory and evidence. *Annals of Finance 5*(3-4), 443–464.

Buera, F. J. and Y. Shin (2011, May). Self-insurance vs. self-financing: A welfare analysis of the persistence of shocks. *Journal of Economic Theory 146*(3), 845–862.

Cagetti, M. and M. De Nardi (2006). Entrepreneurship, Frictions, and Wealth. *Journal of Political Economy 114*(5), 835–870.

Castro, R., G. L. Clementi, and Y. Lee (2015). Cross Sectoral Variation in the Volatility of Plant Level Idiosyncratic Shocks. *The Journal of Industrial Economics 63*(1), 1–29.

Castro, R. and P. Ševčík (2017). Occupational Choice, Human Capital, and Financial Constraints. *Working Paper*.

Catherine, S. (2017). Keeping Options Open: What Motivates Entrepreneurs? *Working Paper*.

Couch, K. A., N. A. Jolly, and D. W. Placzek (2011). Earnings losses of displaced workers and the business cycle: An analysis with administrative data. *Economics Letters 111*(1), 16–19.

Cressy, R. (2000). Credit rationing or entrepreneurial risk aversion? An alternative explanation for the Evans and Jovanovic finding. *Economics Letters 66*(2), 235–240.

Davis, S. and T. von Wachter (2011). Recessions and the Cost of Job Loss. *National Bureau of Economic Research Working Paper Series* (17638).

DeBacker, J., V. Panousi, and S. Ramnath (2018). A Risky Venture: Income Dynamics within the Non-Corporate Private Business Sector. *Working Paper*.

Decker, R. A., J. Haltiwanger, R. S. Jarmin, and J. Miranda (2016, July). Where has all the skewness gone? The decline in high-growth (young) firms in the U.S. *European Economic Review 86*, 4–23.

Evans, D. S. and B. Jovanovic (1989). An Estimated Model of Entrepreneurial Choice under Liquidity Constraints. *Journal of Political Economy 97*(4), 808–827.

Galindo da Fonsec, J. (2017). Unemployment, Entrepreneurship and Firm Outcomes. *Working Paper*.

Hall, R. E. and S. E. Woodward (2010). The Burden of the Nondiversifiable Risk of Entrepreneurship. *American Economic Review 100*(3), 1163–1194.

Hurst, E. and A. Lusardi (2004). Liquidity Constraints, Household Wealth, and Entrepreneurship. *Journal of Political Economy*, 319–347.

Hurst, E. G. and B. W. Pugsley (2011). What Do Small Businesses Do? *Brookings Papers on Economic Activity 43*(2), 73–142.

Hurst, E. G. and B. W. Pugsley (2015). Wealth, Tastes, and Entrepreneurial Choice. *National Bureau of Economic Research Working Paper Series* (21644).

Jacobson, L. S., R. J. LaLonde, and D. G. Sullivan (1993). Earnings Losses of Displaced Workers. *The American Economic Review 83*(4), 685–709.

Kartashova, K. (2014). Private Equity Premium Puzzle Revisited. *The American Economic Review 104*(10), 3297–3334.

Kihlstrom, R. E. and J.-J. Laffont (1979). A General Equilibrium Entrepreneurial Theory of Firm Formation Based on Risk Aversion. *Journal of Political Economy 87*(4), 719–748.

Meh, C. A. (2005). Entrepreneurship, wealth inequality, and taxation. *Review of Economic Dynamics 8*(3), 688–719.

Midrigan, V. and D. Y. Xu (2014). Finance and Misallocation: Evidence from Plant-Level Data. *American Economic Review 104*(2), 422–458.

Moskowitz, T. J. and A. Vissing-Jørgensen (2002). The Returns to Entrepreneurial Investment: A Private Equity Premium Puzzle? *The American Economic Review 92*(4), 49.

Panousi, V. and C. Reis (2016). A Unified Framework for Optimal Taxation with Undiversifiable Risk. pp. 16.

Poschke, M. (2013). Who becomes an entrepreneur? Labor market prospects and occupational choice. *Journal of Economic Dynamics and Control 37*(3), 693–710.

Quadrini, V. (1999). The Importance of Entrepreneurship for Wealth Concentration and Mobility. *Review of Income and Wealth 45*(1), 1–19.