Entrepreneurs' Diversification and Labor Income Risk*

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Diversified entrepreneurs can better shield employees from income shocks. Using data on the universe of Canadian exporting firms and their owners, we find that firms with more diversified owners offer more stable jobs and earnings, as foreign exchange shocks have lower pass-through to layoffs and wages. These results also hold conditioning on shareholders' wealth. Diversified owners absorb shocks by adjusting their own compensation and increasing firm leverage, while their diversification does not contribute to the transmission of shocks to non-exporting firms in their portfolios. The insurance they provide supports the retention of valuable human capital by reducing employee turnover.

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1 Introduction

Labor income risk stems from the potential loss of employment or wage fluctuations that can affect workers' earnings. This type of risk is significant because most individuals rely on employment as their primary source of income. Due to frictions in labor markets, the consequences of dismissals may extend far beyond the temporary income loss experienced during unemployment spells: displaced workers often suffer persistent scarring effects, in the form of permanent earnings losses, and harm to physical and mental health.[1] Labor market frictions also make it time-consuming and costly for workers to change jobs in the wake of a salary cut, which results in firms having significant latitude in setting wages.[2] Hence, in the presence of labor market frictions, firms can play a crucial role in providing implicit insurance to their employees (Azariadis, 1975; Baily, 1974) by absorbing shocks that hit them rather than passing them to employees via wage cuts or dismissals (Guiso et al., 2005; Ellul et al., 2018).

This paper is the first to examine whether entrepreneurs' risk-bearing capacity, resulting from their portfolio diversification, contributes to providing labor income insurance in closely held firms. An entrepreneur's ability to insulate employees from adverse shocks should primarily depend on the extent to which the entrepreneur's own income is exposed to these shocks, and therefore on the diversification of her equity stakes. In other words, risk sharing between workers and entrepreneurs should depend on entrepreneurs' portfolio diversification. For example, a negative shock to one of the entrepreneur's firms

[1] Even upon re-joining the workforce, the unemployed frequently experience substantial, long-term earnings losses due to skill depreciation (Edin and Gustavsson, 2008), the loss of firm-specific human capital (Jacobson, LaLonde and Sullivan, 1993), and signaling-induced reputational damages (Gibbons and Katz, 1991). Unemployment is associated with a deterioration in physical and mental health conditions and increased mortality risk (Paul et al., 2018; Reeves et al., 2012; Roelfs et al., 2011). The harmful effects of job loss also extend to the households of displaced workers, whose families are more likely to experience financial hardship and divorce (McKee-Ryan and Maitoza, 2018). Youths are particularly vulnerable, as parental job loss reduces children's educational attainments (Kalil and Wightman, 2011).

[2] A vast literature in labor economics now recognizes that employers often have substantial monopsony power over their workers' salaries and has proposed methods to estimate its magnitude (see, for instance, the surveys by Azar and Marinescu (2024), Card (2022), and Manning (2011)).

may be less likely to translate into layoffs and wage cuts in this firm if other firms owned by the same entrepreneur are unaffected by the shock or are affected by the shock in the opposite way. Prior work provides no empirical evidence on the role of entrepreneurs' diversification in their firms' provision of such insurance.

The setting of closely held firms is highly relevant to studying this question. First, entrepreneurs typically hold most of their wealth as equity in their own firms; their wealth tends to be highly concentrated, often in a single private company (Moskowitz and Vissing-Jørgensen, 2002). Entrepreneurs' frequent lack of diversification may thus limit the extent to which they can insulate their employees from firm shocks. Second, the vast majority of private sector employees work in closely held firms, most of which are small and medium-sized enterprises (SMEs).[3] Entrepreneurs' diversification may thus be a key determinant of labor income stability for most employees.

To assess firms' insurance against labor income risk, we focus on the extent to which exporting firms shield their employees from shocks arising from exchange-rate–induced fluctuations in their exports. These shocks affect firms differentially depending on the share of their exports destined to a given country over total exports. We view these shocks as an appropriate testing ground because they are sudden and plausibly exogenous to firms' prior choices, mitigating concerns about reverse causality, such as firms anticipating them and adjusting employment in advance. Moreover, the existing literature suggests that small firms, which dominate our sample, are unlikely to hedge against such shocks using financial derivatives.

Our sample includes, on average per year, approximately 35,000 exporting Canadian private firms, their 650,000 employees, and their 70,000 individual shareholders.[4] drawn

[3]SMEs, defined as firms with fewer than 500 employees, comprised 89.6% of the Canadian labor force in 2017 and accounted for 85.3% of net employment growth in the years 2013-2017 (Innovation, Science, and Economic Development Canada, 2019). In the European Union (EU), 67% of all workers were employed in firms with fewer than 250 employees in 2017 (Eurostat, 2020). In the United States (US), 47.1% of the private workforce was employed in firms with fewer than 500 employees in 2017 (U.S. Small Business Administration, 2020).

[4]In what follows, we will use the terms shareholder, owner, and entrepreneur interchangeably.

from the administrative Canadian Employer-Employee Dynamics Database (CEEDD). This dataset allows us to observe each shareholder's equity stakes, identify which firms are owned by the same shareholder, and trace the income flowing from each firm to each shareholder. It also reports the reason for each firm-worker separation, allowing us to precisely measure layoffs. The resulting sample consists of a firm-shareholder panel of approximately 475,000 observations and a firm-shareholder-employee panel of over 4.5 million observations.

To develop our key measure of a business owner's capacity to provide labor income insurance—via her ability to absorb risk through portfolio diversification—we link CEEDD data to firm-level export records and construct firm-specific exchange rate shocks based on the firm's prior export sales distribution by country, following the approach of Bertrand (2004) and Caggese et al. (2019). Canadian firms in our sample export to 246 countries or foreign territories, with the U.S. being the largest market and the euro area being the second largest. We define the risk absorption capacity that each owner can provide to the employees of a firm in which she invests as the extent to which her portfolio is insulated from the exchange rate shocks hitting the firm's sales.

Specifically, for any entrepreneur j owning a stake in a given firm i, we measure j's risk absorption capacity as the difference between the variance of exchange-rate-driven sales shocks of firm i and the variance of the same shocks hitting all the companies present in owner j's portfolio. The former variance measures the exchange rate risk exposure of the employees of firm i, absent any risk sharing with the firm's owners, while the latter measures entrepreneur j's exchange rate risk exposure. This difference in exposure will be positive if, beside a stake in firm i, entrepreneur j owns stakes in other firms unaffected by exchange rate risk (e.g., non-exporters) or not exposed to exchange rate shocks hitting firm i (e.g., exporters to other countries), so that she has a lower exposure to exchange rate shocks than a single-firm owner. The difference between the two variances will instead be zero if j only owns equity in firm i: in this case, entrepreneur j is not better positioned than firm i to absorb exchange rate shocks affecting it and will thus be inclined to pass

these shocks to the firm's employees. Hence, the difference between the two variances measures potential risk sharing between the employees of firm i and entrepreneur j.

To gain intuition about this measure, consider a shareholder owning two firms exporting to two different countries. As long as the exchange rates between these two countries' currencies and the Canadian dollar are not perfectly correlated, the return to the owner's portfolio will fluctuate less in response to exchange rate shocks than the returns to each of the two individual firms. Likewise, the portfolio of the owner of an exporting firm and a non-exporting one will be less sensitive to exchange rate shocks than the exporting firm is. The latter example also underscores that, while the portfolio of such an owner can absorb the exporting firm's risk, it may (at least partly) offload such risk to the non-exporting firm. Diversification places firm owners in a position to intermediate risk across firms with different exposures, much like insurance brokers do.

In principle, firms may use financial (or operational) instruments to hedge against currency risk. Hence, we start our analysis by investigating the impact of currency shocks on firm profitability. Our evidence shows that the firms in our sample do not (fully) hedge the effects of currency shocks. This is consistent with prior research showing that small and private firms, which predominate in our sample, face significant frictions in hedging currency risk due to the implied costs and restricted access to derivative markets (Hau et al., 2023), making currency risk hedging largely the domain of large, publicly listed firms (Allayannis and Ofek, 2001; Alfaro et al., 2023; Bartram et al., 2009).

Our key finding is that shareholders deploy the risk-bearing capacity that diversification confers to them to mitigate the shocks affecting workers: employees' jobs and earnings are significantly more stable in firms whose owners can absorb their risk. We estimate the extent to which exchange rate shocks affecting firm sales are passed to their employees, and test whether firms owned by more diversified shareholders provide more insurance to their employees. The effect of diversification is economically and statistically significant. In the most demanding specification, an increase from the 10th to the 90th percentile of an owner's risk-bearing capacity is associated with a 12.6% reduction

in the pass-through of negative shocks to layoffs for an owner with average wealth. We particularly focus on negative exchange rate shocks, which occur when the Canadian dollar appreciates, leading to lower competitiveness of Canadian firms' exports. Firms can be expected to respond to such shocks by increasing layoffs or cutting wages; thus, it is precisely in these situations that employment insurance is most valuable for workers.

This result holds after accounting not only for shareholder wealth but also, more importantly, for the interaction between shareholder wealth and the shock. This matters because wealthier shareholders may be less risk averse and thus be more willing to draw on their resources to protect employees from labor income risk; they may also find it easier or cheaper to leverage their wealth as collateral to secure external financing for such insurance. Yet, for a given wealth level, portfolio diversification can further strengthen an entrepreneur's ability to provide labor income insurance, as the value of the portfolio will be more resilient to the shocks affecting its component firms. Controlling for wealth enables us to isolate the specific contribution of diversification. Our results are also qualitatively unchanged when controlling for firm characteristics and saturating our regressions with firm, industry-by-year, and owner-level fixed effects.

Turning to wage insurance, we find that the effect of owner diversification on the pass-through rate for worker-level wages is slightly larger than for layoffs: the estimates from our most demanding specification show that an increase from the 10th to the 90th percentile of risk-bearing capacity for an owner with average wealth increases the degree of wage insurance provided to employees by 17.7%. These specifications include worker fixed effects to control for unobserved heterogeneity across workers, besides controlling for workers' age. As in the specifications for employment insurance, we also control for firm and owner characteristics and include firm, industry-year, and owner fixed effects.

Next, we investigate the reasons that could explain why diversified owners provide insurance to employees. First, insurance against labor income shocks might be priced in the form of lower average wages. Second, providing insurance may improve employee retention, reducing costly turnover. While we do not find evidence that insurance is

priced into wages, we find support for the second mechanism: turnover is lower in firms owned by diversified shareholders. We then investigate the different mechanisms through which diversified owners provide labor income insurance. To provide it, firms must either draw on internal financial resources or access external finance. We find that when the firm is hit by a negative shock, more diversified owners accept a significant cut in their compensation (by forgoing their salaries in the firm), and the firms they own increase their leverage more than those owned by less diversified shareholders. This suggests that conserving the firm's short-term financial resources and its ability to borrow are instrumental in providing insurance to their workers. We then investigate the relationship between the entrepreneur's risk absorption capacity and the respective firm's profitability. Providing insurance—particularly during negative shocks—could reduce profitability if the firm maintains a larger workforce with a higher wage bill than efficiency would dictate. However, offering insurance can also provide benefits, such as a more stable workforce that can invest in firm-specific human capital. Probably these effects balance out, as we find no correlation between an entrepreneur's risk-bearing capacity and the respective firms' profitability.

Finally, we examine whether the employment and wage insurance that diversified entrepreneurs provide to the employees of their exporting firms affects layoff rates and wages in the non-exporting firms present in their portfolios, which are by definition unaffected by the shock. One might expect that insurance granted to workers in exporting firms comes at the expense of employment or wages in unaffected ones, implying spillover effects across the portfolio. In our setting, this would mean that non-affected firms adjust employment or wages to offset the insurance provided elsewhere. We find some evidence of transmission from exporting to non-exporting firms, although the relevant coefficients are not precisely estimated. Moreover, spillover effects are not significantly affected by the degree of shareholders' portfolio diversification.

Our work contributes to three strands of literature. The first is the recent empirical literature on risk sharing within the firm (see Pagano (2020) for a survey). Previous

research has focused on possible factors explaining firm heterogeneity in the provision of such risk sharing: for instance, Ellul, Pagano and Schivardi (2018) find that family firms provide more job stability in countries and periods in which public employment insurance is less generous, whereas no such substitutability is present for non-family firms; Ellul and Pagano (2019) document that, in choosing their leverage and the resulting exposure of their employees to distress and bankruptcy risk, firms take into account the extent to which employees are protected by seniority rights in bankruptcy. We contribute to this research by demonstrating that shareholder diversification is a key determinant of risk sharing within firms—a point overlooked by previous research. We also innovate at the methodological level by basing our estimates on an exogenous, time-varying, firm-level measure of exposure to exchange rate shocks, whereas past work has generally resorted to macroeconomic or industry-level variables to instrument firm-level shocks.[5]

The second strand of literature we contribute to is that on internal capital markets (see Almeida et al., 2015, for a review) and internal labor markets (Cestone et al., 2017; Faccio and O'Brien, 2021; Giroud and Mueller, 2015; Tate and Yang, 2015) in business groups and conglomerates. This literature finds that business groups and diversified firms feature more employment stability than standalone ones in response to adverse shocks, a result that is interpreted as evidence that firms exploit their internal markets to reallocate funds and employees efficiently. Compared to this literature, we explore a novel mechanism—owners' diversification—that operates across firms with a common owner, and we isolate its effect by controlling for owners' wealth. These network effects need not operate via the internal capital or labor markets of business groups, with funds or workers being reshuffled as uncorrelated shocks hit the group's firms: the firms that we study need not be part of a single corporate entity, such as a business group, being solely connected by common ownership. Hence, insurance provision by an individual

[5]Examples of shocks used in the literature include negative GDP growth (Faccio and O'Brien, 2021; Bena, Dinc and Erel , 2022), the introduction of new airline routes (Giroud and Mueller, 2015), or shocks to house prices (Giroud and Mueller, 2019).

shareholder need not imply either capital or labor flows across the firms concerned, and may go undetected if measured by these flows.

Finally, our paper complements previous work on the transmission of shocks in the economy. The literature has extensively studied financial contagion (e.g., Acemoglu, Ozdaglar and Tahbaz-Salehi, 2015; Gilje, Loutskina and Strahan, 2016) and intersectoral input–output linkages (e.g., Acemoglu et al., 2012; Caliendo et al., 2018), but the propagation of shocks through networks of firms with common ownership has been largely overlooked. Two exceptions are Giroud and Mueller (2019), who find that establishment-level employment is sensitive to shocks in other regions in which the firm operates, and Bena, Dinc and Erel (2022), who find that multinational companies transmit macroeconomic shocks to subsidiaries located in different countries. Both studies focus on large, listed multi-regional or multinational firms, where cross-ownership arises from the presence of large institutional investors; in contrast, in closely held firms, cross-ownership mainly arises from the portfolio choices of individual and family shareholders who hold large stakes and are relatively undiversified. In our setting, we find evidence for the propagation of shocks across firms with common owners: workers in unaffected firms within the same portfolio bear the costs of the insurance extended to workers in the affected firm, although portfolio diversification does not appear to exacerbate such spillover effects.

2 Empirical Methodology

This section outlines our empirical methodology. Section 2.1 describes how we construct firm-level export sales shocks triggered by exchange rate changes, and Section 2.2 introduces our metric of owners' ability to insure employees against export shocks. Next, Section 2.3 presents the specifications of the panel regressions that we estimate to test whether owners' risk-bearing capacity translates into actual insurance provision for workers against layoff risk and wage fluctuations arising from export sales shocks.

2.1 Measuring Firm-level Export Shocks

We construct our measure of exogenous shocks based on fluctuations in firms' exports driven by exchange rate movements, which impact firms differently depending on the share of exports going to a specific country relative to total exports. We focus on the impact of foreign exchange shocks on firm sales because it is a single, precisely measurable source of exogenous risk that is relevant for many firms, and to which firms may have different exposure. Our methodology is close to that used by Bertrand (2004) and Caggese et al. (2019). We define our shock Δe_{it} as the change in the average exchange rate faced by firm i's in its export markets between year $t-1$ and t. Formally,

$$\Delta e_{it} = \sum_{c} s_{ict} \Delta E_{ct}, \tag{1}$$

where the subscripts i, c, and t denote the firm, country, and year, respectively. We construct the exchange rate index e_{it} as firm i's export-weighted average of the logs of real exchange rates E_{ct} vis-à-vis destination countries. Real exchange rates are defined as nominal exchange rates (Canadian dollars per unit of foreign currency) multiplied by the foreign country's consumer price index and divided by the domestic consumer price index. The weights s_{ict} are the lagged shares of firm i's exports to country c over its total exports: to avoid endogeneity in the export shares, these weights are averages of export shares in the previous two years.[6] An increase in E_{ct} represents an appreciation (in real terms) of country c's currency vis-à-vis the Canadian dollar, which makes Canadian goods cheaper for foreign buyers to purchase. Therefore, a positive Δe_{it} amounts to a positive shock for exporters; conversely, a negative Δe_{it} is a negative shock. Canadian companies exporting to different countries are exposed to different exchange rate shocks: for instance, between 2014 and 2015, the Canadian dollar depreciated by almost 16% against the US dollar, which increased the competitiveness of exporters to the US, while it appreciated by more

[6] While firms' export shares are quite stable over time, averaging them over the previous two years further dampens the impact of transitory year-to-year variations in firms' export shares.

than 3% against the euro, reducing the competitiveness of Canadian firms exporting to the euro area.

These changes in exchange rates constitute exogenous shocks to the export sales of Canadian firms, as they are price takers in the foreign exchange market, with the Canadian dollar being the sixth most traded currency in the world. Moreover, upon being hit by such competitiveness shocks, Canadian exporters are arguably unable to readily redirect their exports across destination countries, as entering new export markets entails significant time and monetary costs (Baldwin and Krugman, 1989; Das, Roberts and Tybout, 2007).

Following Bertrand (2004) and Caggese et al. (2019), we focus on exports rather than imports for two reasons. First, imported goods may be final goods purchased by domestic consumers or production inputs for firms: while changes in the former can be regarded as exogenous shocks to domestic firms' sales, changes in the latter are endogenous to their production choices. We cannot distinguish between the two, as no data are available on the uses that firms make of imported goods. Since our risk-bearing capacity measure relies on sales shocks to the owner's portfolio, we focus solely on export shocks that can affect sales. A second reason to avoid using import shocks is that foreign inputs may substitute for labor in production (Hummels et al., 2014). When the Canadian dollar depreciates, making imports more expensive for Canadian firms, these firms may be able to substitute away from them by employing additional labor. Thus, a negative import shock could be good news for workers, leading to wage increases and fewer layoffs. This is especially relevant in our context because Canada is a top importer of machinery (which is a good labor substitute) and a top exporter of raw materials such as oil, gas, wood, and ores (which are poor labor substitutes). Hence, an additional reason to focus on exports is that their effect on labor demand is unambiguous.[7]

[7] In any event, our results are robust to the inclusion of an indicator variable that identifies importing firms in our sample: see Tables A4 and A6.

2.2 Measuring Owners' Risk-Bearing Capacity

Our data enable us to measure not only the exposure of private firms to foreign exchange rate risk, but also the exposure of entrepreneurs' equity portfolios to this risk, as Form T2S50 of the CEEDD reports all the individual equity investments in Canadian-controlled firms above a 10% equity ownership threshold (although it does not contain data about their securities and cash positions). Leveraging these data, we construct a measure of the risk absorption capacity that the owner of a firm can offer to its employees by comparing the owner's exposure to foreign exchange risk with that of the firm.

First, we define sales shocks for firm i in year t, denoted by η^f_{it}, as the product of the export shock Δe_{it} from equation (1), and the firm's lagged sales, S_{it-1}:

$$\eta^f_{it} = \Delta e_{it}\, S_{it-1}, \tag{2}$$

where the superscript f is a mnemonic for "firm". Next, we define owner j's exposure to exchange rate fluctuations as the exposure of her portfolio of private equity stakes to these shocks, measured by the stake-weighted average of the export shocks Δe_{it} for any firm i present in owner j's portfolio in year t:

$$\eta^p_{jt} = \sum_i \omega_{ijt-1}\, \eta^f_{it}, \tag{3}$$

where the superscript p is a mnemonic for "portfolio". The weight ω_{ijt-1} is the (lagged) value of firm i's assets multiplied by owner j's stake in the firm and scaled by the sum of the same terms across all firms present in j's portfolio in year $t-1$. Finally, we compute the variance of firm i's sales shocks and the variance of owner j's portfolio sales shocks over the years $t-4$ through t, and define owner j's capacity to bear the foreign exchange risk to which firm i is exposed as the difference between the variance of firm i's shocks η^f_{it} and the variance of owner j's portfolio shocks η^p_{jt} in year t:

$$RBC_{ijt} = \mathrm{Var}(\eta^f_{it}) - \mathrm{Var}(\eta^p_{jt}), \tag{4}$$

where RBC is a mnemonic for "risk-bearing capacity".

This measure captures the difference between the foreign exchange risk exposure of firm i's employees (when unmitigated by any labor income insurance) and the exposure of owner j's portfolio to the same risk. A positive value of RBC_{ijt} indicates that j's portfolio can mitigate the effect of an export shock on the employees of firm i, making their employment and/or wages more stable than they would otherwise be. This can occur if owner j's portfolio includes stakes in firms that export to countries whose exchange rate changes vis-à-vis the Canadian dollar have low or negative correlation, or stakes in non-exporting firms, which are unaffected by exchange rate fluctuations. In other words, owner i's portfolio can provide insurance to firm j's employees if it is diversified with respect to foreign exchange risk. Conversely, RBC_{ijt} is zero if entrepreneur j only owns equity in firm i, and therefore has a completely undiversified portfolio. In this case, owner j cannot provide insurance to the employees of firm i. Finally, a negative difference indicates that j's portfolio is more exposed to foreign exchange risk than firm i. In this case, owner j is not only unable to provide insurance to firm i's employees, but would – if possible – wish to unload exchange rate risk onto them by transferring shocks from other firms present in her portfolio to firm i.

Importantly, in our setting, risk absorption capacity is defined at the firm-owner level, capturing an exporting firm's exposure to exchange-rate risk relative to that of its owner's portfolio. This is particularly clear when the portfolio is composed of a single exporting firm and a single non-exporting one: shareholdings in the non-exporter enable the owner to mitigate exchange-rate shocks to the employees of the exporting firm; however, from the standpoint of the employees of the non-exporting firm, the owner's shareholdings in the exporting firm may increase their exposure to exchange-rate risk.

Figure 1 illustrates how the difference between firm variance $\text{Var}(\eta^f_{it})$ (measured on the horizontal axis) and portfolio variance $\text{Var}(\eta^p_{jt})$ (measured on the vertical axis) maps into the risk absorption capacity of portfolios in our data. Each marker in the figure represents an equally spaced bin of firm variances, with its area being proportional to

the logarithm of the number of firms in the bin. The 45° line, where firm variance equals portfolio variance, is the *no insurance* locus, which includes portfolios composed of single firms or portfolios composed of multiple firms with perfectly correlated shocks. Points below the line indicate positive risk-bearing capacity, i.e., the firm provides insurance to employees via portfolio diversification. The horizontal axis represents the *full insurance* locus, for instance, portfolios including two equal-sized firms with perfectly negatively correlated shocks. Points above the 45° line indicate *contagion*, as in non-exporters exposed to exporter shocks. The mass of observations lies below the 45° line, indicating that, on average, firms' employees can obtain insurance from their shareholders' portfolios. The fact that portfolio bins lie along an increasing line indicates that, while greater firm risk results in greater portfolio risk, its contribution is not one-for-one, being to some extent balanced by diversification.

By construction, the RBC_{ijt} measure is increasing in the size of the relevant firm: a greater value of firm i's lagged sales S_{it-1} raises the variance of firm i's sales shocks (equation (2)) more than the variance of the sales shocks hitting owner j's portfolio (equation (3)), unless this portfolio only includes firm i's equity, in which case $RBC_{ijt} = 0$ anyway. Such scale sensitivity of our risk-bearing capacity measure is desirable: a larger firm typically employs more workers; hence, the risk exposure of its workforce to foreign exchange shocks is greater than that of smaller firms. In other words, the measure is an increasing function of the risk to be borne. However, the measure does not take into account that, for a given composition of owner j's portfolio, the insurance that j can provide to the employees of firm i also depends on the scale of j's portfolio, i.e., his or her wealth: if owners' risk aversion is decreasing in their wealth and if the overall value of their equity portfolio is increasing in their wealth level, one would expect an owner with a larger equity portfolio to offer more insurance to workers than one with a smaller portfolio. As our metric neglects this possible determinant of risk-bearing capacity, in our regressions we shall also control for their wealth, as proxied by the (log of) their previous 10 years' total income, which includes not only the payouts from their portfolio firms but

also their labor income and payouts from other assets.

It is worth comparing the measure of risk-bearing capacity (equation (4)) with potentially alternative measures. In asset pricing, an asset's contribution to the risk borne by an investor is typically measured by its covariance with the investor's portfolio, which in our context could be captured by the beta of firm i's sales shocks with owner j's portfolio sales shocks or by the correlation between them. However, such measures of covariance risk do not adequately capture the contribution of a stake in firm i to owner j's portfolio risk in our context, where portfolios are typically composed of a few large stakes in private firms and are thus significantly exposed to these firms' idiosyncratic risk. While for a highly diversified portfolio of equity stakes in public firms the risk contribution of any of the (small) component stakes is accurately measured by its beta with the portfolio, for a relatively undiversified portfolio formed by large stakes in a few private firms the contribution of each stake is dominated by the idiosyncratic risk that it adds to the portfolio. Moreover, the correlation is not even defined when firm i is a non-exporter and one or more of the firms in the portfolio are exporters, because $\text{Var}(\eta_{it}^f) = 0$; in contrast, the variance difference RBC_{ijt} captures the diversification opportunity that non-exporting firms in owner j's portfolio provide for export shocks affecting firm i.

Our risk-bearing capacity metric also dominates traditional diversification measures used in previous studies on business groups, such as the count of commonly owned firms or concentration indices like the Herfindahl-Hirschman Index. These conventional measures are typically based on industry classifications defined by statistical agencies, such as 2- or 3-digit SIC codes. This approach has several drawbacks (Iacobucci and Rosa, 2005), as it (i) assumes a constant distance between any two pairs of industry codes in terms of diversity, or any relevant metric that increases diversification, such as return covariance; (ii) ignores vertical relatedness between industries (Fan and Lang, 2000); (iii) abstracts from diversification "within" industry groups, i.e., the extent of a firm's activities in different market segments within the same product category—product differentiation and/or market segmentation strategies (Hitt, Hoskisson and Kim, 1997); and (iv) neglects

geographical diversification (Davies, Rondi and Sembenelli, 2001).

2.3 Regression Specifications

We begin our analysis by assessing the baseline impact of the export shock on firm profitability, defined as net income scaled by assets.[8] This validation exercise aims to check that firms in our sample do not insulate themselves from currency shocks through operational hedging (e.g., importing inputs from the same country they export to) or financial hedging (e.g., using instruments provided by banks or derivatives markets).

We estimate the following firm-level regression:

$$\pi_{ijt} = \beta\, \Delta e_{it} + X'_{it-1}\, \gamma_1 + Z'_{jt-1}\, \gamma_2 + \mu_i + \mu_{mt} + \varepsilon_{ijt}, \tag{5}$$

where i, j, and t index firms, owners, and years, respectively. The dependent variable π_{it} is profitability, measured as the ratio of net income to total assets. The explanatory variable of interest, Δe_{it}, is the firm's export shock, as defined by expression (1). X_{it-1} are firm-level time-varying control variables (log of lagged total assets, as a size proxy, and log of age), to capture potential life-cycle patterns in firm profitability. Z_{jt-1} is a lagged shareholder-level control, namely the lagged wealth of the firm's main shareholder, which may be associated with the firm's performance: for instance, wealthier entrepreneurs may be savvier investors and thus pick more profitable firms; conversely, they may invest in a larger set of firms and thus be less able to monitor them, leading to lower profitability. μ_i are firm fixed effects, capturing unobserved heterogeneity in firm profitability; μ_{mt} are industry-by-year fixed effects that capture industry-specific cycles.[9] ε_{ijt} is the error term, clustered at the owner level.

After validating the export shock, we test the hypothesis that an owner's portfolio

[8] Net income is computed after firms recognize any losses or profits from foreign exchange transactions, including the possible income from financial transactions intended to hedge foreign currency risk.

[9] In all specifications, industry is defined as 4-digit NAICS.

diversification affects the corresponding firm's propensity to provide insurance against layoffs. We estimate the following firm-shareholder-level employment regression:

$$\Delta \frac{n_{ijt}^{Layoff}}{n_{ijt}} = \beta_1 \, \Delta e_{it} + \beta_2 \, \Delta e_{it} \times RBC_{ijt} + \beta_3 \, RBC_{ijt} + X'_{it-1} \, \gamma_1 + Z'_{jt-1} \, \gamma_2 + \\ + \mu_i + \mu_j + \mu_{mt} + \varepsilon_{ijt}. \tag{6}$$

The dependent variable is the change in the ratio of firm-initiated separations (n_{ijt}^{Layoff}) to the total employment of firm i (n_{ijt}) between years $t-1$ and t. Layoffs are firm-initiated terminations of employer-employee relationships, i.e., those for which firms reported Code 1 (Shortage of Work) as the reason for the separations in their Record of Employment (ROE) filings. RBC_{ijt} is owner j's risk-bearing capacity, as determined by her portfolio diversification relative to firm i's foreign exchange risk, as defined by equation (4). The key coefficients of interest are β_1 and β_2. The first measures the shock's pass-through onto the layoff rate: $\beta_1 < 0$ indicates that an exchange rate appreciation (a negative shock) affecting firm i is associated with more layoffs. The second measures the differential pass-through rate depending on owner j's risk-bearing capacity: $\beta_2 > 0$ indicates that the owner's risk-bearing capacity has a mitigating effect, as it implies that the exchange rate appreciation translates into fewer layoffs.

All other variables are defined as in equation (5), except that in equation (6), the owner-level time-varying control variables Z_{jt-1} include not only owner j's lagged wealth but also its interaction with the shock, to take into account that wealthier entrepreneurs may offer more employment insurance to their employees on account of their greater risk tolerance: a negative coefficient of lagged wealth implies that wealthier owners are associated with lower layoff rates, while a positive coefficient of its interaction with the shock implies that they are also associated with greater mitigation of the impact of negative shocks on layoffs.

All specifications include firm fixed effects and industry-by-year fixed effects. The first absorb unobserved heterogeneity in firms' employment growth: as the dependent

variable is the first difference of layoffs, firm fixed effects absorb firm characteristics that affect firm-specific trends in layoffs. The second, instead, absorb industry-level shocks to employment growth, as we wish to focus on firm owners' ability to provide insurance against firm-specific shocks rather than industry-level ones. Some specifications also include shareholder fixed effects in order to control for fixed differences in shareholders' portfolios due, for instance, to their industry specialization. Shareholder fixed effects can be included because our sample is constructed at the firm-shareholder level; therefore, we accurately measure variation driven by portfolio shocks for each shareholder over time. Notice that, even though owners' portfolios are quite stable over time, our risk-bearing measure (equation (4)) varies over time also in response to changes in the variances of the shocks (equations (2) and (3)).

The error term ε_{ijt} is clustered at the owner level to take into account that the shocks affecting the employment policies of firms with common owners are likely to be correlated. However, errors are clustered at the firm level in regressions estimated on a subsample that includes only the largest shareholder for each firm, where variation occurs only at the firm level. The regressions at the firm-shareholder level are estimated using weighted OLS, where the weights are the logarithms of the stakes owned by shareholder j in firm i.

Next, we test whether owners' risk-bearing capacity affects a firm's propensity to provide insurance against wage risk by estimating the following employee-firm-shareholder level wage regression:

$$\begin{aligned}\Delta w_{lijt} = \theta_1\, \Delta e_{it} + \theta_2\, \Delta e_{it}\, RBC_{ijt} + \theta_3\, RBC_{ijt} + X'_{it-1}\, \gamma_1 + Z'_{jt-1}\, \gamma_2 + V'_{lt-1}\, \gamma_3 + \\ + \mu_i + \ \mu_j + \mu_l + \mu_{mt} + \varepsilon_{lijt},\end{aligned} \tag{7}$$

where the dependent variable is the change in the logarithm of the real earnings of employee l in firm i between years $t-1$ and t. We require employees to work for the entire year in firm i without earnings interruptions in both $t-1$ and t. Also in this specification, the owner-level time-varying control variables Z_{jt-1} include not only owner j's lagged

wealth w_{jt-1} but also its interaction with the shock, for the same reason explained above. V'_{lt-1} is a vector of time-varying worker characteristics; μ_l denotes employee fixed effects, which this specification adds to the fixed effects present in equation (6); and ε_{lijt} is the stochastic component of earnings. In this case, the key coefficients of interest are θ_1 and θ_2. The first measures the shock's pass-through onto the wage growth rate: $\theta_1 > 0$ indicates that an exchange rate appreciation (a negative shock) affecting firm i is associated with lower wage growth. The second gauges the impact of owner j's risk-bearing capacity on the wage pass-through: $\theta_2 < 0$ indicates that diversified owners reduce wages less than their undiversified counterparts in response to a negative export shock.

All regressions include firm-level, worker-level, and industry-year fixed effects. Some of them also include owner fixed effects. Errors are double-clustered at the owner and worker level in the baseline regressions, and at the worker and firm level in regressions estimated on the sample that only includes the largest owner for each firm. As above, the baseline regressions are estimated by weighted OLS, where weights are the logarithms of the stakes owned by shareholder j in firm i.

One might question whether owners' diversification is exogenous to firms' employment policies. In closely held private firms, ownership structures are highly stable (as will be seen in Table 2). In multi-owner settings dominated by large blockholders, transfers typically require unanimous consent from existing owners, and secondary markets for block stakes are thin. Hence, although ownership is ultimately a choice, in our setting it is effectively predetermined: portfolio holdings rarely adjust to shocks of the type and magnitude we study.

Another concern is that our diversification measure may proxy for owner characteristics, such as risk aversion or investing skills, if more risk-averse or more sophisticated investors systematically hold more diversified portfolios. We address this in three ways. First, all specifications control for owners' wealth, which correlates with risk tolerance, investing skill, and access to financial markets (Section 2.2). Second, we present specifications that include an interaction between wealth and the shock, allowing wealthier

owners to differentially buffer employees from shocks. Third, we estimate specifications with owner fixed effects, which absorb all time-invariant shareholder characteristics.

3 Data

In what follows, we present our data sources (Subsection 3.1) and describe the sample to be used in our estimates (Subsection 3.2).

3.1 Sources

The primary data source for this study is the Canadian Employer-Employee Dynamics Dataset (CEEDD), an administrative dataset compiled from tax records by Statistics Canada. CEEDD contains the annual labor income that each worker receives from each employer. It also reports the reasons for employer-employee separations, allowing precise identification of layoffs. This information comes from the Record of Employment (ROE), a document that employers must submit every time an employee experiences an interruption in earnings and is used to calculate unemployment benefits. At the individual level, CEEDD provides information on worker characteristics such as age, gender, and marital status; at the firm level, it contains financial data, location, and industry classification.

We link CEEDD with T2 Schedule 50 (T2S50), a tax form containing information on firm ownership structure. Private firms are required to disclose the identity of all owners with a stake of 10% or more of common or preferred shares. We use this information to precisely measure the currency risk exposure of individual shareholders' private equity portfolios. The availability of ownership data in an employer-employee matched dataset is a unique feature of CEEDD, which allows us to overcome a common measurement issue in the literature, where owners are typically proxied by top earners.

From 2010 onward, CEEDD can be linked to detailed export data reported at the firm-country-product-year level. We use these data to construct predetermined levels of firms' export sales to different countries to measure the firms' foreign exchange exposure. We then combine the exporting firms' exposures to bilateral exchange rates with exchange

rate fluctuations that induce random variation in exporter-level terms of trade.

Canadian firms export to almost all countries worldwide, generating considerable heterogeneity in their foreign currency price exposure. Canada's goods exports to GDP ratios ranged between 29% and 32% during our sample years (2010-17), suggesting that exchange rate movements were a major source of risk for many firms in the economy, though not for all of them. The availability of detailed data at the firm-product-country-year level allows us to capture firms' heterogeneity in exposure to exchange rate shocks. Figure 2 maps the intensity of bilateral trading relationships (focusing exclusively on exports) between Canada and other countries, aggregated by currency bloc. Unsurprisingly, the United States is the top export destination for Canadian firms, accounting for 31% of trading relationships in our sample. The euro area is Canada's second-largest trading partner, accounting for 14.6% of trade. Other major trading partners include Great Britain (3.5%), China (3.2%), and Australia (2.8%). As a result, fluctuations in exchange rates between the Canadian dollar and currencies such as the British pound, Chinese renminbi, and Australian dollar pose risks for many Canadian firms. While exposure to the U.S. dollar—and to a lesser extent, the euro—is dominant, Canadian companies export to 246 countries and face diverse currency exposures.[10] On average, each exporter ships to 2.76 countries per year.

3.2 Sample Description

Our sample includes the universe of Canadian-controlled for-profit private corporations,[11] for all the firm-years for which at least one individual owner holds a direct stake or an indirect one, i.e., a stake held via other firms. We require that firms appear in the sample for at least two years. We exclude firms that operate in the utilities and public

[10] To be precise, they export to 246 territories featuring ISO 3166 country codes. Of these, 193 are sovereign states that are members of the United Nations, while the remaining 53 are dependent territories and special areas of geographical interest.

[11] We exclude sole proprietorships and other unincorporated businesses.

administration sectors, NAICS 22 and 91, respectively.[12]

CEEDD contains no information on the hours or weeks worked by employees. To minimize the effect of variation in hours worked and remove employees not strongly attached to the labor market (Song et al., 2019), we assign an employee to a firm in a given year only if the annual labor income received by the employee from that firm exceeds a threshold of one quarter (13 weeks) of full-time work at the lowest minimum wage across all provinces in that year.[13] We restrict our sample to firms with at least three employees who are not owners of the firm in one or more years.

Table 2 presents summary statistics for our sample, covering the years from 2010 to 2017. Statistics for variables that describe firms are reported in Panel A using firm-year data, those that refer to workers are shown in Panel B based on employee-firm-year data, those for variables that describe shareholders are reported in Panel C using shareholder-firm-year data, while Panel D presents statistics regarding the distribution of our measure of risk-bearing capacity (RBC), as defined in Subsection 2.2. Panel A tabulates characteristics for our panel of firms, composed of over 241,000 firm-year observations with non-missing values of the relevant variables. The average firm in our sample is slightly over 21 years old, has \$4.58 million worth of total assets, generates \$7.25 million in sales per year, and has a 7.78% profit rate and a 21.18% leverage ratio. It employs 51 workers, 10% of whom are laid off each year. The median firm is considerably smaller than the average firm in terms of assets (\$1.9 million), sales (\$2.98 million), and employment (15 employees). The layoff rate is also highly skewed: the median layoff rate is zero, and the mean is about 10%, but there are cases of massive layoffs, as shown by the 90$^{\text{th}}$ percentile

[12]The utilities sector consists mostly of government-owned entities in Canada (Crown corporations), and thus their employment and wage policies might be set according to social preferences or to meet policy goals, rather than market forces.

[13]For example, in 2014, the Northwest Territories had the lowest minimum wage across all provinces at 10 CAD/hour. Since a week of full-time work has 30 hours, the threshold is 10×30×13=3,900. An individual who in 2014 earned more than 3,900 CAD in a firm is considered an employee of that firm. In Table A1, we check that the results are robust to an alternative definition of employment relationships, which excludes workers whom we identify as seasonal. One might conjecture that temporary workers are the first to be laid off when a negative shock hits the firm, while "core" employees receive insurance. We show that the results are unchanged when those workers are not included in the sample.

of the layoff rate being 33%.

Ownership structures of the firms in our sample are remarkably stable. Only 2.58% of firm-years exhibit an expansion of the ownership base, i.e. the entry of at least one new owner relative to the prior year. Changes in control are rarer: the identity of the largest owner turns over in 1.24% of firm-years, and the identity of the majority owner changes in just 0.21%. Complete exits are uncommon: one of the incumbent owners fully liquidates in 4.78% of firm-year observations, while the majority owner fully exits only in 0.90% of firm-year observations.

Panel B presents descriptive statistics of worker characteristics for our sample of over 4.5 million worker-firm-year observations. The average worker is 45 years old, and is employed at the firm for slightly over 8 years (since 2001, the first year available in our employment data). On average, the sample workers' real earnings grow by 2.58% per year, with the median growing by 1.52%.

Panel C summarizes shareholder characteristics. Average shareholder wealth, measured as the sum of real taxable income over a ten-year period, is close to CAD 2 million. Ownership is highly concentrated: on average, a shareholder holds 43.6% of the equity in each firm they own. Portfolios are modest in scope, with shareholders holding an average of 3.4 firms and a median of two. About two-thirds of shareholders are actively involved in their firms, as indicated by receiving labor compensation in a given year.

Shareholder portfolios are also remarkably stable. Most shareholders maintain the same holdings year to year, with only 1.56% of shareholder-years involving the addition of a new firm to the portfolio. Large additions are even less frequent: 0.89% of shareholder-years involve adding a firm that accounts for at least 25% of the portfolio, and just 0.60% involve adding a firm in which the shareholder becomes the largest owner of the newly added firm. Exits occur at similarly low rates: the likelihood of a shareholder liquidating a position in a given year is 2%, dropping to 1.26% when the firm represents more than 25% of the portfolio, and to 0.93% when it is the shareholder's largest ownership position.

Panel D characterizes the distribution of shareholders' risk-bearing capacity. The

top row of Panel D shows how this variable is distributed across firms: it is positive (0.12) for the average firm and zero for the median firm, while it is almost twice the average for firms at the 90th percentile. Hence, its distribution across firms is right-skewed, with many firms having undiversified owners but also a sizable segment of firms whose owners feature significant and quite different degrees of diversification. The second row of Panel D illustrates the distribution of owners' risk-bearing capacity across workers: in this case, the average (0.55) is much higher than across firms, the median is positive (0.05) and the 90th percentile is almost four times the average. This indicates that most workers are employed in firms whose owners have a significant, and in some cases a very high, degree of portfolio diversification.

The lower part of Panel D shows how risk-bearing capacity varies depending on the number of firms and industries present in the owner's portfolio. As one would expect, its average value is positively correlated with the number of firms owned by shareholders and the number of unique industries represented in their portfolios. Intuitively, owners with stakes in several firms are more diversified than single-firm owners, even if these firms are within the same industry, as occurs for 84% of the observed portfolios (397,290 out of 475,255): shareholders' average RBC increases monotonically with the number of (same-industry) firms, rising from zero for single-firm owners to 0.03 for those with stakes in two firms, 0.07 for those with stakes in three firms, and 0.24 for those with stakes in at least four firms—a level of diversification achieved by 44% of the observed portfolios. Moreover, spreading ownership across industries provides additional scope for diversification. Also in this case, the increase is monotonic: the average RBC of portfolios containing at least four firms rises from 0.24 if they are all in the same industry to 0.27 if they are in two different industries, 0.39 if they span three industries, and 0.46 if they span four or more industries. Hence, diversifying across both firms and industries nearly doubles the average portfolio's RBC compared to diversifying within a single industry. However, such diversification is attained by fewer than 1% of the observed portfolios (4,620 out of 475,255).

4 Results

We start our analysis by confirming that adverse firm-level exchange rate shocks are associated with lower firm profitability, defined as the ratio of net income to total assets. In the regression shown in column 1 of Table 3, where the firm-level shock is defined according to the continuous measure of expression (2), the coefficient of the shock is positive and significant, indicating that positive exchange rate shocks (arising from CAD depreciation) lead to significantly larger firm profitability, after controlling for firm observable characteristics (size and age) that may affect profitability, as well as for firm and industry-year fixed effects, and for owners' lagged wealth. These estimates are consistent with those shown in columns 2 and 3, where the shock (2) is replaced by indicator variables that equal 1 for positive and negative shocks respectively, and 0 otherwise: in column 2, negative shocks are seen to result in lower firm profitability, while in column 3 positive ones result in lower profitability.

These findings are consistent with the idea that the firms in our sample are far from being fully hedged against currency risk. As such, they align with previous research, which indicates that while firms generally hedge against currency risk, this practice is much more common among large, publicly listed companies than among small, private firms like those prevalent in our sample. Larger firms benefit from better access to financial instruments, economies of scale, and stronger institutional incentives to manage risk. In contrast, smaller and private firms face higher hedging costs, discriminatory pricing, and restricted access to derivative markets.[14]

[14]Specifically, Allayannis and Ofek (2001) show that U.S. multinationals frequently use currency derivatives to manage exchange rate exposure, Alfaro et al. (2023) find that hedging in Chile is concentrated among a small group of large exporters. This trend is further supported by Bartram et al. (2009), who document that derivative usage is predominantly among larger, publicly listed firms internationally. Conversely, small and private firms hedge significantly less. Hau et al. (2023) demonstrate that these firms encounter substantially worse pricing and tighter collateral requirements in over-the-counter derivative markets, discouraging effective hedging. Moreover, directly relevant to our study, Huang et al. (2023) suggest that firms may use currency derivatives to stabilize labor costs when employees are paid in foreign currencies, though this behavior remains largely confined to multinational firms with extensive international operations.

4.1 Employment Insurance

The evidence in Table 3 validates our main premise that exchange rate fluctuations are exogenous shocks that firms cannot fully hedge. Absent any insurance provision by firms, these shocks, especially negative ones, should affect the firm's employees. We now investigate whether shareholders whose portfolios are more diversified vis-à-vis firm-level idiosyncratic shocks provide more employment insurance. Table 4 reports estimates of the specification in Equation (6). All regressions in the table include industry-year and firm effects, firm-level controls for company size and age, as well as shareholder wealth, measured as income earned by the shareholder in the previous 10 years. The specifications shown in columns 3, 6 and 9 also include owner fixed effects.

In the specifications shown in columns 1–6 of the table, the firm-level shock is defined according to expression (2), while in the regressions of columns 7–9 it is replaced by an indicator variable that equals 1 when negative shocks occur, and 0 otherwise, since implicit employment insurance should be relevant only when firms are hit by adverse shocks.

Moreover, the specifications shown in columns 1–3 and 7–9 are at the firm-shareholder level, whereas those shown in columns 4–6 are estimated on a firm-year panel, by restricting the set of shareholders to those with the largest equity share in the respective firms. These two different levels of analysis complement each other. The specifications estimated at the firm-shareholder level directly link firm-level outcomes to the diversification and wealth of *all* the shareholders who invest in those firms, and thus also exploit within-firm variation across shareholders' portfolios. This takes into account that firm outcomes may reflect the different exposure of all its owners to the firm's risk, as well as their respective wealth levels. Conversely, the firm-level specification focuses on the impact that the portfolio characteristics of the largest shareholder have on the provision of employment stability to the respective firm's employees, and as such is predicated on the idea that the firm's employment policy is dictated by its largest shareholder. Accordingly, standard errors are clustered at the shareholder level in columns 1–3 and 7–9 and at the firm level

in columns 4–6.[15]

The results show that negative exchange rate shocks increase the growth rate of layoffs, while positive ones reduce it: in columns 1–6 of Table 4, the pass-through coefficient, i.e., the coefficient of the shock, is invariably negative, sizable, and significant (except in column 4, where it is imprecisely estimated). But in firms whose owners have a high risk-bearing capacity, the pass-through is significantly lower than in firms where the owner has low diversification: the coefficient of the interaction variable between the shock and risk-bearing capacity is invariably positive and statistically significant at the conventional confidence level.

Interestingly, shareholders' wealth also appears to play a mitigating role, as its interaction with the shock has a positive and significant coefficient. Controlling for wealth ensures that the estimated impact of diversification captures risk-sharing through portfolio structure rather than mere affluence. At the same time, it indicates that entrepreneurs' wealth plays a concomitant role to that of diversification, whether via entrepreneurs' lower risk aversion or their ability to post their wealth as collateral to provide employment stability. Moreover, both the levels of risk-bearing capacity and that of wealth enter these specifications with negative and significant coefficients, implying that, even in the absence of shocks, firms whose shareholders are better diversified and wealthier tend to experience less severe increases in layoff rates. Finally, both shareholders' risk capacity and their wealth turn out to have a larger mitigating role in the sample where only the main shareholder for each firm (columns 4–6) is retained than for the complete sample that includes all shareholders (columns 1–3). This suggests that these are the shareholders that really dictate the respective firms' employment policies, so that their portfolio characteristics are those that matter the most for the provision of employment insurance.

The estimates shown in columns 1–6 rely on the continuous measure of the shock,

[15]The specification of column 6 includes shareholder fixed effects, in spite of the fact that the data is collapsed at the firm level, because the same main shareholder can hold equity in multiple firms and the identity of the main shareholder can change over time (even though this is a very rare occurrence).

which can therefore take both positive values (the case of a Canadian dollar depreciation) and negative ones (the case of a Canadian dollar appreciation). This specification imposes symmetry across positive and negative shocks on the estimates of the potential mitigating effects of the relevant shareholders' diversification and wealth. To some extent, it is natural to expect mitigation to be present in both contingencies: if a firm owned by a diversified shareholder significantly reduces the pass-through rate to employment of a negative shock, it will naturally need to increase employment by less in the face of a positive shock. However, both the impact of the shock on layoff rates and its mitigation may not be symmetric. If both of them are larger for negative shocks than for positive ones, imposing symmetry, as done in the specifications of columns 1–6, will underestimate the insurance provided to workers.[16]

To better assess the employment insurance that firms offer against negative shocks, in columns 7–9, we estimate the same specification conditional on the exporting firm being hit by a negative shock. In these specifications, the shock is a dummy variable that equals 1 when the firm faces an appreciation of the Canadian dollar and 0 otherwise. Hence, the signs of the relevant coefficients (for the shock and the interaction with the risk-bearing capacity) are predicted to be opposite to those in columns 1–6: a realization of the (negative) shock can be expected to be associated with a greater layoff rate, so the indicator variable should have a positive coefficient, while a mitigating role of diversification and wealth will translate into a negative coefficient for their respective interactions with the indicator variable.

The results in columns 7–9 confirm those discussed above. First, the coefficient of the shock variable is estimated to be positive, meaning that negative shocks are associated with greater layoff rates in the absence of shareholder risk-bearing capacity. The coefficient of the interaction between the shock and shareholder's risk-bearing capacity is estimated to be negative, meaning that a higher risk-bearing capacity of the owner

[16] Our estimates in Table A3, whose regressions are estimated separately for positive and negative shocks, show that this is indeed the case.

leads to a lower pass-through rate. To assess the economic significance of the estimated reduction in the pass-through coefficient, we consider the specification in column 9, which refers to the occurrence of a negative shock and includes industry-year, firm, and owner fixed effects, as well as firm- and owner-level controls. Relative to a firm owned by a completely undiversified shareholder (i.e., only holding equity in the firm itself), a firm owned by a shareholder with average wealth and average risk-bearing capacity exhibits a 6.9% lower pass-through to layoffs. Instead, moving from the 10^{th} to the 90^{th} percentile of risk-bearing capacity reduces the pass-through of the shock by 12.6% for an owner with average wealth. Symmetrically, moving from the 10th to the 90th percentile of the wealth distribution reduces the firm's pass-through of the shock by 16% for an owner with average risk capacity.[17] These estimates show that the owner's risk-bearing capacity has a significant impact on the pass-through rate, and one that is comparable to that of the owner's wealth when it comes to the provision of labor insurance to workers.

These estimates confirm that shareholders' wealth reduces the shock's pass-through rate, playing a distinct but concurrent role relative to portfolio diversification. Including the interaction between shareholders' wealth and the negative shock indicator in the specification of column 8 reduces the estimated mitigation role of risk-bearing capacity by about 1/5 relative to its estimate in column 4 (from –0.0029 to –0.0021), while leaving it precisely estimated. Failing to include the interaction between wealth and shock, one would attribute to diversification what is, in fact, the ability of wealthy shareholders to buffer employees from shocks. However, the role of shareholders' risk-bearing capacity persists after the inclusion of both the level of shareholder wealth in column 8 and its interaction with the shock in column 9.

[17] These estimates are calculated as follows. For an owner with average log wealth (13.93) and average risk-bearing capacity (0.12), the reduction in the pass-through rate is $\frac{0.0019\times0.12}{0.0284-0.0018\times13.93} = 0.069$. Increasing risk-bearing capacity from the 10^{th} percentile (0.00) to the 90^{th} percentile (0.22) of the RBC cross-firm distribution reduces the pass-through by $\frac{0.0019\times0.22}{0.0284-0.0018\times13.93} = 0.126$. Analogously, increasing an owner's log wealth from its 10^{th} percentile (12.80) to its 90^{th} percentile (15.31), for an owner with average risk capacity, reduces the pass-through by $\frac{0.0018\times(0.0284-(15.31-12.80)}{0.0019\times0.12} = 0.160$.

The inclusion of firm fixed effects, industry-year effects, and owner fixed effects dispels several potential concerns regarding our estimates. Firm fixed effects rule out that results are driven by unobserved firm characteristics, such as legal structure, business model, or technology, which may affect the response of layoffs to shocks. Industry-year effects absorb the systematic component of the change in layoffs, so as to focus on firms' idiosyncratic layoff risk. Owner fixed effects rule out that unobserved heterogeneity in time-invariant owner characteristics, like their investing skills or industry specialization, may drive the results.

It is worth noting that the effects of portfolio diversification uncovered in Table 4 differ from those found by research on internal labor markets in business groups, where workers are reshuffled across firms belonging to the same group in response to firm-specific shocks. The firms in our sample need not even be part of a single legal entity, rendering it difficult for management to resort to such re-shuffling. In fact, worker transitions between firms owned by the same shareholder are rare in our data: only 2.08% of workers who separate from their firms are subsequently employed by another firm that shares at least one of the same shareholders. In Section 4.4, we investigate whether in our sample common ownership is a vehicle for contagion, in the sense that the provision of insurance to the employees of exporting firms creates shock spillovers to non-exporting firms owned by the same shareholder.

We perform several robustness checks on our results, all shown in tables in the Internet Appendix. First, we investigate the robustness of the results to redefining the layoff measure so as to exclude seasonal workers, identified as those whose job spells last less than 120 days both in the current year and the lagged year. Given the implicit nature of the labor insurance arrangement, which requires that workers and owners remain in the employment relationship over multiple periods, it is to be expected that seasonal workers are not given such insurance. The estimates in Table A1 of the Internet Appendix show that our core results continue holding when adopting this alternative measure of the dependent variable. We also check the robustness of our results by expanding the set of

firm-level controls, adding the squared value of firm age and firm size, and of shareholder-level controls, adding shareholder leverage. The former set of controls takes into account non-linearities that may exist in the relationship between those two firm characteristics and the respective layoff rates. For example, firms' access to financial markets may change non-linearly as they get larger, thus influencing the amount of resources they can rely upon to provide employment insurance. Shareholder leverage, defined as the (lagged) ratio of total debt to total assets owned by shareholders in their firms, can also influence their ability to provide employment insurance. The results are shown in Table A2. Our core results continue to hold when including these controls.

Furthermore, we investigate whether the relationship between the shock and the change in layoffs, as well as the mitigating impact of risk-bearing capacity, is symmetric for negative and positive shocks. The estimates shown in Table A3 indicate that the coefficient of the shock is opposite in sign in the two cases, as expected, and much larger in absolute value for negative shocks than for positive ones: comparing the coefficient estimate in the first row of column 3 with the respective estimate in column 6 shows that layoffs increase in response to adverse shocks over twice as much as they drop in response to favorable ones. Consistent with our hypothesis, we find that the dampening effect of owners' risk-bearing capacity on separations is also about five times as large for negative shocks as for positive ones.

Our estimates are also robust to the presence of the firm's importing activities, which could provide a natural hedge against the currency shock affecting exports. We show the results in Table A4. In this specification, we include an indicator variable that takes the value of 1 if the firm is also importing, in addition to exporting and zero otherwise. Our results continue to hold even in the presence of this control.

Finally, the richness of the data enables us to investigate in Table 5 how the impact of firm-specific shocks and the mitigating influence of owners' diversification and wealth vary across workers by age (columns 1–4) and by earnings classes (columns 5–8). The results in columns 1–4 suggest that both exposure to employment risk and employment

insurance are skewed in favor of younger workers. First, shocks tend to affect more the layoff rate of older workers, defined as those aged 45 or older, than that of younger workers: in the case of negative shocks, the coefficient estimate is 1.8 times larger for older workers than for younger ones. Second, the employment insurance provided by diversified shareholders is significantly larger for younger workers: while the coefficient estimate of the interaction variable between the shock and risk-bearing capacity is large and precisely estimated for younger workers, it is almost zero and not significant for older workers in column 3 and less than half the size of the coefficient for younger workers in column 4. However, older workers appear to receive more employment insurance than younger ones from wealthier entrepreneurs.

The table also shows that workers with above-median earnings (columns 5–6) are more than twice as exposed to layoff risk as lower-paid workers (columns 7–8), possibly because they are high-skill workers with performance-sensitive jobs. Moreover, low-paid workers appear to receive more employment insurance than high-paid ones by diversified shareholders (when considering negative shocks), while high-paid workers seem to receive more insurance from wealthier entrepreneurs.

So portfolio diversification and shareholder wealth appear to affect differently the provision of employment insurance both across age and income groups: diversification tilts it in favor of younger, low-pay workers, whereas wealth tilts it towards older, high-pay ones. While on average both diversification and wealth appear conducive to greater employment insurance, their effects differ cross-sectionally depending on employees' characteristics.

4.2 Wage Insurance

As workers are concerned not only with employment stability but also with wage stability, in this section we investigate the effect of owners' risk-bearing capacity on the provision of wage insurance. Table 6 reports estimates of Equation (7), where the dependent variable is the change in the logarithm of annual earnings.

As in Table 4, in columns 1–6 of Table 6 the firm-level shock is defined as a continuous variable according to expression (2), while in columns 7–9 it is replaced by an indicator variable that equals 1 when negative shocks occur and 0 otherwise. Moreover, the specifications in columns 1–3 and 7–9 are estimated at the firm-shareholder-worker-year level, whereas the data are converted to a firm-worker-year panel in columns 4–6, by restricting the set of shareholders to those with the largest equity share in the respective firms. Accordingly, standard errors are double clustered at the shareholder and worker level in columns 1–3 and 7–9 and at the worker and firm level in columns 4–6.

All regressions in the table include worker fixed effects, besides industry-year effects, firm fixed effects, and firm-level controls (firm size and age). Those shown in columns 3, 6 and 9 also include owner fixed effects. Including worker fixed effects is particularly important, as they absorb all worker-level unobserved characteristics, such as education and skills, which may otherwise bias the estimates of interest.

The estimates in Table 6 show that foreign exchange shocks affect annual earnings, although their coefficient is statistically significant only in the specifications of columns 4, 6, 7 and 9. However, owner diversification attenuates their pass-through to wages in all the specifications: the coefficient on the interaction term remains consistently negative and significant in columns 1–6, and positive and significant in columns 7–9. This applies even when controlling for the interaction between the shock and wealth, whose coefficient is imprecisely estimated in most specifications.

To assess the economic significance of the results regarding wage insurance, we focus on the specification of column 9, which is estimated for negative shocks only and includes all fixed effects, because combining both positive and negative shocks may obscure their distinct effects as well as those of shareholder diversification, as discussed earlier. An appreciation of the Canadian dollar lowers employee real yearly wage growth by 2.5 percentage points. Owners' portfolio diversification mitigates this impact on wage growth: comparing a firm whose owner features average wealth and average risk-bearing capacity to a firm owned by a completely undiversified owner, we find that the former features

a 9.6% reduction in the pass-through to wage growth. Instead, increasing the owner's risk-bearing capacity from the 10^{th} to the 90^{th} percentile lowers the shock's pass-through by 17.7%, assuming that the owner features average wealth. A similar effect on the pass-through is observed for owners' wealth: moving from the 10^{th} to the 90^{th} percentile of wealth reduces the pass-through by 24.9% for an owner with average risk-bearing capacity.[18]

Tables A5 and A6 of the Online Appendix perform robustness checks of our wage regression estimates. The estimates in Table A5 enable us to investigate whether wage growth responds differently to positive and negative shocks, and whether owners' diversification affects the insurance provided by firms differently in the two cases. The baseline coefficient of the shock is larger in absolute value for negative than for positive shocks, as in layoff regressions, although it is not precisely estimated in most specifications. Consistent with this asymmetry, the mitigation effect of shareholders' risk-bearing capacity is greater (roughly twice as large) for negative than for positive shocks, as one would expect. Moreover, in contrast to the results regarding employment insurance, the interaction between the shock and shareholder wealth is never statistically significant, suggesting that wealth does not contribute to the provision of wage insurance. Furthermore, Table A6 shows that our wage growth estimates are robust to controlling for firms' importing activities, which could naturally hedge against currency shocks to exports.

As for employment insurance, the provision of wage insurance by firms may also vary among workers, depending on their age and earnings. Table 7 shows how the estimates vary across workers by age (columns 1–4), and by earnings classes (columns 5–8). The results are akin to those obtained for employment insurance: shareholders' risk-bearing capacity appears to contribute more to stabilizing the wages of younger workers (aged less than 45 years) and low-paid ones (those with below-median earnings) than to those

[18] These estimates are obtained as follows. For an owner with average wealth and risk capacity, the reduction in the pass-through is $\frac{0.0025\times0.12}{0.0254-0.0016\times13.93}=0.096$. Increasing risk capacity from the 10^{th} to the 90^{th} percentile lowers the pass-through by $\frac{0.0025\times0.22}{0.0254-0.0016\times13.93}=0.177$. Similarly, raising log wealth from the 10^{th} to the 90^{th} percentile reduces the pass-through by $\frac{0.0016\times(15.31-12.80)}{0.0254-0.0025\times0.12}=0.249$.

of older and better paid ones, while the opposite applies to shareholders' wealth.

4.3 Mechanisms and Incentives

The results presented thus far are consistent with owners' diversification significantly affecting firms' provision of insurance against labor income risk. This section looks at the two related questions of which mechanisms buttress such insurance provision and which payoffs to firms and their owners justify its provision.

4.3.1 Insurance Funding Mechanisms

Which mechanisms do firms rely upon to fund the provision of insurance to their employees when they are hit by foreign sale drops? And, in particular, do better diversified shareholders directly contribute to fund the cost of limiting layoffs and wage cuts when the firms they own are hit by such adverse shocks? When their firms are hit by negative shocks, diversified shareholders can sustain their employment and wages in two ways: leverage the firm's assets to raise external debt, or accept a cut to their profits or to their own compensation from the firm, so as to preserve its liquidity despite the drop in revenue. We examine both channels in Table 8.

Panel A shows that, when pooling positive and negative shocks (columns 1–3), leverage changes little on average, whereas isolating negative shocks (columns 4–6) reveals deleveraging: in the column 6 specification, leverage falls by 2.1 percentage points relative to the mean leverage of 21%. This result is consistent with dynamic trade-off and collateral-based models of capital structure in which a persistent adverse earnings shock (e.g., an exchange-rate appreciation) lowers debt capacity and the target leverage (Goldstein, Ju, and Leland, 2001; Hennessy and Whited, 2005; Rampini and Viswanathan, 2013). Our new result is in the cross-section: the interactions of the negative-shock indicator with owners' risk-bearing capacity and with owners' wealth are positive, indicating that better-diversified and wealthier owners sustain higher leverage in the face of adverse shocks. We interpret these coefficients as evidence of attenuated deleveraging (and, at

the upper tail, potentially net increases) among owners with greater risk-bearing capacity and wealth. Taken together with our evidence of lower pass-through of negative shocks to layoffs and wages, these results indicate that owners rely—where debt capacity permits—on external borrowing to (partly) finance labor-income insurance. In short, owner diversification and wealth enhance firms' debt capacity, allowing firms to avoid sharper labor-income adjustments.

The estimates in Panel B of the table show how owners' compensation responds to firm-level shocks. In contrast to our previous wage equation estimates, whose sample excludes workers who also hold equity in the firm, here the wage equation is estimated exclusively for firm owners, in order to understand how their compensation responds to firm shocks. The dependent variable is an indicator variable equal to 1 if the shareholder ceases to draw any salary from the firm. Shocks, even negative ones, do not lead shareholders to stop drawing their compensation from the firm. However, diversified shareholders engage in such behavior, especially when their firm is hit with negative shocks: the estimates in columns 4–6 show that highly diversified shareholders are likely to stop drawing their salary while their wealth does not seem to play any role, at the same time that they mitigate the transmission of shocks to workers' wages, as shown in Section 4.2. Overall, the results suggest that diversified owners provide insurance to workers by absorbing more of the shock themselves—allowing their own compensation to become more sensitive to firm performance while shielding workers' wages.

4.3.2 Payoffs from Insurance Provision

Another natural question is why shareholders should assume additional risk on behalf of workers: what are the benefits of providing labor income insurance to workers? More specifically, does the provision of labor income insurance entail savings in the average compensation of employees? Or does it generate other benefits for firms, for example, more employee retention? And, if so, are these benefits large enough to offset the costs of providing labor income insurance, translating into greater profitability?

Panel A of Table 9 provides evidence on whether firms whose shareholders are more diversified tend to pay lower wages to their employees, on account of the fact that they typically enjoy more labor income insurance, according to our previous estimates reported. Within the framework of implicit contract theory, firms with more diversified owners should be better positioned to credibly commit to providing enhanced employment security and wage stability, and as a result should be able to pay lower wages in competitive labor markets, thereby extracting an implicit "insurance premium". From the perspective of risk-averse workers, accepting lower wages represents a rational trade-off for the reduced income uncertainty associated with greater job stability. Panel A of the table shows worker-firm-level earnings regressions whose explanatory variables include firm size and age, the risk capacity and wealth level of the firm's main shareholder, as well as worker, firm and industry-time fixed effects (as well as shareholder fixed effects in columns 2 and 4). The specifications of columns 1–2 are estimated on the full sample, while those of columns 3–4 restrict the sample to the largest shareholder. The results reveal that, in firms whose owners have greater risk-bearing capacity, employees do not receive higher average wages, all else being equal. This evidence suggests that, in our sample, reducing labor costs is unlikely to be a motivation for providing insurance to employees.

Panel B of Table 9 shows how employee turnover (in columns 1–2) and profitability (in columns 3–4) correlate with the risk-bearing capacity and wealth level of the shareholders in the corresponding firms, controlling for the same time-varying firm controls and for the same fixed effects included in the regressions of panel A. Lower employee turnover reduces recruiting, onboarding, and training costs and allows firms to retain the human capital accumulated through on-the-job training, thereby mitigating productivity losses when experienced workers are replaced by less seasoned hires. These benefits can offset the costs of providing insurance and may ultimately raise firm profitability. To measure turnover, we adapt the standard churn concept from the labor literature (e.g., Burgess et al. (2000)) to focus on voluntary rather than total worker flows. The conven-

tional churn measure captures the overlap between hires and separations within a firm but treats quits and layoffs symmetrically. Our version instead isolates the voluntary component of turnover, reflecting worker-initiated separations that impose replacement costs and indicate reallocation activity, whereas layoffs are firm-driven adjustments that do not necessarily lead to rehiring.[19]

The estimates in columns 1-2 show that labor turnover is significantly lower in firms whose owners feature greater risk-bearing capacity and have greater wealth. Instead, firm profitability is not significantly correlated with risk-bearing capacity. So, while labor income insurance may indeed lower turnover, thus helping firms retain firm-specific skills and avoid costly recruitment and training, offsetting the expense of stabilizing wages or employment that exporting firms face during adverse shocks, the net benefit in terms of additional profits appears negligible.

4.4 Spillover Effects to Non-Exporting Firms?

Finally, we investigate whether the provision of labor income insurance for the employees of exporting firms has any implications for the employees of non-exporting companies that may be present in the same owner's portfolio. In other words, we want to examine whether there is any transmission of foreign exchange shocks from exporters to non-exporters held by common owners. One hypothesis is that common ownership may act as a vehicle for spillover or contagion: stabilizing the employment or wages of exporting firms' employees may occur at the cost of destabilizing the employment or wages of the employees of non-exporting firms owned by the same shareholder.

[19]The churn rate is typically defined as $(H + S - |\Delta E_t|)/\bar{E}_t = 2\min(H, S)/\bar{E}_t$, where H and S denote hires and separations, $\Delta E_t = E_t - E_{t-1}$ is the change in total employment, and $\bar{E}_t$ is average employment between $t-1$ and t. This measure captures "excess" worker flows—simultaneous hiring and separations within firms that do not change total employment. When the firm expands ($H > S$), all separations are replaced, so churn equals $2S/\bar{E}_t$; when it contracts ($S > H$), all hires are offset by separations, so churn equals $2H/\bar{E}_t$. We adapt this definition to focus on voluntary turnover by replacing total separations with quits (Q), hence defining the turnover rate as $(H + Q - |\Delta E_t|)/\bar{E}_t$. Letting $S = Q + L$, where L denotes layoffs, this can be written as the standard churn rate minus the layoff rate, $L/\bar{E}_t$.

Recall that an equity stake in a non-exporting firm can serve as a hedge against shocks experienced by exporting firms, thus affecting the value of the corresponding equity stakes. Holding constant the foreign currency against which we measure Canadian dollar movements, an appreciation of the Canadian dollar reduces the exporting firm's sales but should leave the revenue of non-exporting firms unaffected. Hence, diversified owners could use the non-exporting firms to absorb the employment and wage insurance provided to workers in the exporting firm. In fact, this is yet another mechanism through which labor insurance is provided. Hence, focusing exclusively on exporting firms may obscure the broader labor outcomes affecting the employees of the firms present in the owners' portfolio. In other words, if employment insurance benefits workers in exporting firms at the expense of those in non-exporting firms, this may not increase the welfare of all workers.

We examine this issue in Table 10, restricting the sample to non-exporting firms whose shareholders also own at least one exporting firm. In Panel A, the dependent variable is the change in the firm's layoff rate, while in Panel B it is the change in a worker's yearly earnings. In Panel A, all regressions include firm and industry-time fixed effects, as well as firm size, firm age, and shareholder wealth as time-varying controls; the specifications of columns 3 and 5 also include shareholder fixed effects. The regressions of Panel B also include worker fixed effects, as well as workers' age. The key difference from previous specifications is that in the regressions shown in Table 10 the shock is the weighted average of exchange rate shocks affecting all exporting firms within the same portfolio, while in all previous regressions it was measured at firm level according to expression (2).

In Panel A of Table 10, the coefficient of this portfolio-level shock is negative and weakly significant in four of the five specifications, which provides some evidence that negative exchange rate shocks to shareholders' portfolios are associated with greater layoff rates in the non-exporting firms present in their portfolios (and viceversa for positive shocks). Hence, there is some evidence that common ownership is associated with labor

market contagion from exporting to non-exporting firms, although the relevant estimates are not very precise and do not survive in the most demanding specification shown in column 5. Moreover, spillover effects do not appear to be affected by the degree of shareholders' portfolio diversification. These findings suggest that the effect of diversification on the provision of employment insurance in exporting firms documented in Section 4.1 does not translate into additional contagion in terms of more layoffs for employees of non-exporting firms owned by the same shareholders.

In Panel B of Table 10, the coefficient of the portfolio-level shock is positive and significant in four of the five specifications, which indicates that negative foreign exchange shock hitting portfolios that include stakes in exporting firms translates into lower earning growth rates for the employee of non-exporting firms whose stakes are present in the same portfolios. Hence, there is some evidence of contagion via common ownership also for wages, even though, again, it does not survive the most demanding specification of column 5. However, as in Panel A, the coefficient of the interaction between the portfolio shock and shareholders' risk capacity is not significantly different from zero. Hence, also for wage insurance the effect of diversification on the provision of employment insurance in exporting firms does not increase contagion to the wage growth rate of employees of non-exporting firms owned by the same shareholders.

5 Conclusion

This paper shows that entrepreneurs' portfolio diversification crucially shapes the extent of labor income insurance provided by closely held firms. Using a rich matched employer-employee-owner dataset that encompasses the universe of Canadian private firms, and focusing on exporting firms, we document that more diversified entrepreneurs tend to absorb more firm-specific export shocks and offer greater protection to their employees against both layoffs and wage cuts. These results also hold when controlling for shareholders' wealth, which reinforces the role of portfolio diversification in providing insurance to the employees of their firms. The ability to spread risk across firms and to cushion

them with their own wealth enables these owners to act as informal insurers, stabilizing labor income in the face of adverse shocks.

The evidence suggests that the provision of such insurance by diversified shareholders is funded via the issuance of additional firm debt and the entrepreneurs' willingness to take a reduction in compensation from the firm, rather than by transferring the cost of the insurance provision on to the employees of non-exporting firms present in the same shareholders' portfolios. While we detect some spillovers from exporting to non-exporting firms within the same portfolio, these effects are modest and not systematically amplified by owner diversification.

These findings highlight a distinctive feature of privately held firms: their capacity to insure workers depends not only on firm fundamentals but also on the financial position of their owners. Importantly, owners appear willing to provide insurance despite no clear increase in firm profitability, suggesting that the motivation may lie in retaining valuable human capital, reducing costly turnover, or fulfilling implicit contracts with employees. We also find that the owners' financial positions affect how the implicit insurance they offer is distributed across employees: diversification disproportionately benefits younger and lower-paid workers, while wealthier owners appear to offer greater protection to older and higher-paid employees.

These findings show that diversified entrepreneurs' portfolios can contribute to shielding employees from adverse labor income shocks, even if the firms employing them are not part of business groups with active internal capital and labor markets. However, diversified ownership may also facilitate the transmission of economic shocks, as, in principle, it may also be a contagion channel. On balance, our results indicate that entrepreneurs' diversification and wealth cushion workers against adverse shocks without significantly increasing spillover effects. Future research could assess whether owners' diversification has similar effects in different countries or institutional environments, or how the growing role of institutional and private equity investors—who diversify on a larger scale—affects the provision of labor income insurance.

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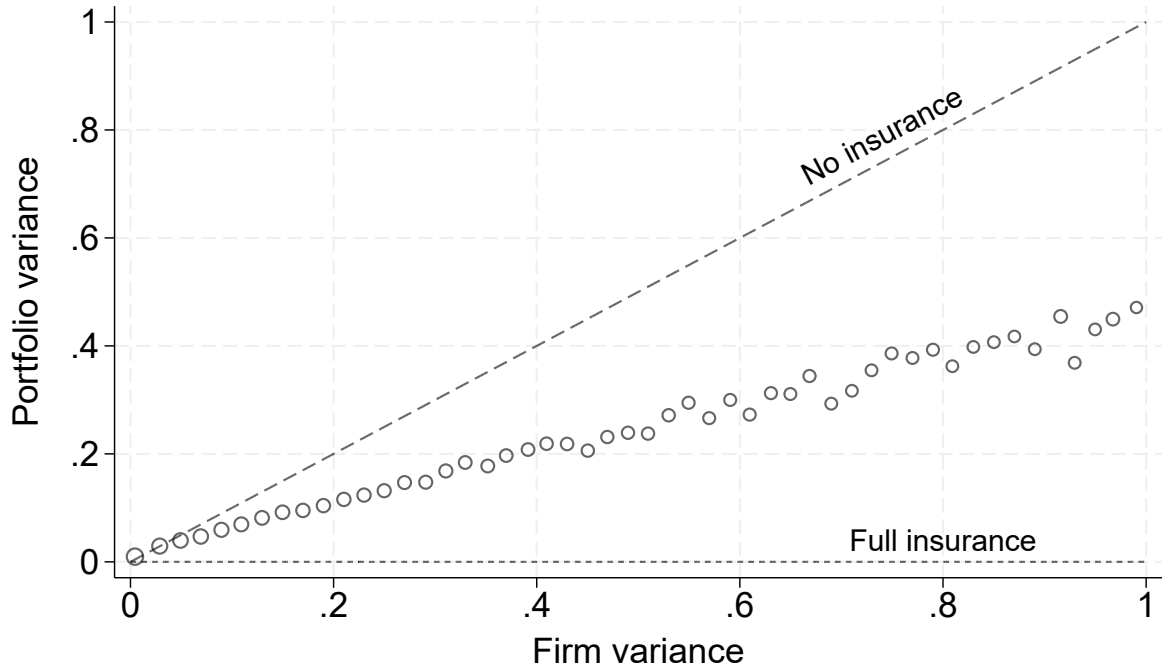
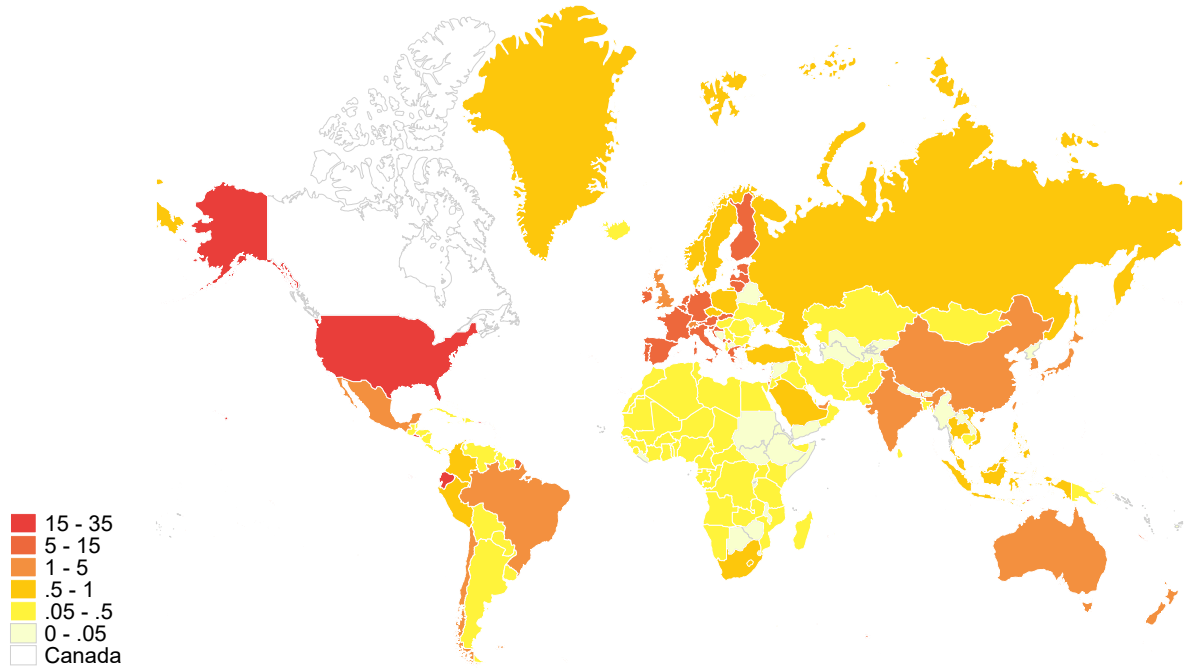
Figures

Figure 1: Firm variance, portfolio variance, and insurance provision



Notes: This figure shows the relationship between firm variance, portfolio variance, and risk-bearing capacity. The x-axis plots the variance of firm-level shocks, $\text{Var}(\eta_{it}^f)$. The y-axis plots the variance of portfolio shocks, $\text{Var}(\eta_{jt}^p)$. Risk-bearing capacity is defined as $\text{RBC}_{ijt} = \text{Var}(\eta_{it}^f) - \text{Var}(\eta_{jt}^p)$. Each marker represents an equally spaced bin along the x-axis. Marker area is proportional to the log of the number of firms in the bin. The 45° line, where firm variance is equal to portfolio variance, denotes *no insurance*. Points below the line indicate positive risk-bearing capacity. The lower bound at $y = 0$ corresponds to *full insurance*. Points above the 45° line indicate *contagion*.

Figure 2: Destination of Canadian exports



Notes: Map shows the distribution of Canada's export relationships across destination countries, grouped into currency blocs and reported as a percentage of shipment records.

Tables

Table 1: Variable definitions

Variable	Definition
Shock Δe_{it}	Change in firm-specific average exchange rate. Specifically, $\Delta e_{it} = \sum_c s_{ict}\, \Delta E_{ct}$, where E_{ct} is the log of the real exchange rate between the CAD and the currency of country c and $s_{ic\tau}$ is the average share of firm i's exports to country c over its total exports in years $t-1$ and $t-2$.
$\mathbb{I}\{\text{Shock} < 0\}$, $\mathbb{I}\{\text{Shock} > 0\}$	Indicator equal to 1 if the shock Δe_{it} is negative or positive, respectively, and 0 otherwise.
Portfolio shock Δe^p_{jt}	Weighted average of firm shocks. Specifically, $\Delta e^p_{jt} = \sum_i w_{ijt-1} \Delta e_{it}$, where the weight w_{ijt-1} is the relative sizes of firm i in shareholder j's portfolio.
Shareholder's risk-bearing capacity RBC_{ijt}	Difference between the variance of firm i's sales shocks and the variance of portfolio sales shocks in years $t-4$ to t, as defined by expression (4), together with expressions (2) and (3).
Layoff rate change $\Delta \frac{n^{\text{Layoff}}_{ijt}}{n_{ijt}}$	Change in the ratio of firm-initiated separations to total employment of firm i between years $t-1$ and t. Separations are firm-initiated if the employer indicated "shortage of work" as the reason.
Earnings change Δw_{lijt}	Change in the log of a worker's real earnings between year $t-1$ and t. Workers must be employed for the entire year without earnings interruptions in both $t-1$ and t.
Firm size	Log of total assets, lagged.
Firm age	Log of years since incorporation date or, when this date is missing, since the first year the firm appears in the data.
Wealth	Log of total shareholder income in the previous 10 years, lagged.
Worker age	Log of worker's age.
Shareholder leverage	Ratio of total long term liabilities to total assets owned by shareholders across all firms.
Firm employment	Log of firm employment, lagged.
Profitability	Ratio of net income to total assets.
Firm leverage	Ratio of total long-term liabilities to total assets.
Cut in shareholder pay	Indicator variable equal to 1 if the shareholder stops drawing a salary from the firm in year t, 0 otherwise.
Actively involved	Indicator variable equal to 1 if the shareholder draws a salary from the firm.
Turnover rate	Firm-level employee turnover rate, defined as [new hires + quits − |Δ employment|]/average employment in year t.

Table 2: Descriptive statistics

Panel A: Firm characteristics

	Mean	SD	p10	p50	p90	N
Assets (millions)	4.58	6.47	0.29	1.90	13.26	241,025
Sales (millions)	7.25	9.80	0.46	2.98	23.12	239,970
Firm age	21.46	12.68	8.00	19.00	38.00	241,170
Number of employees	51.39	517.25	3.00	15.00	88.00	241,160
Layoff rate (%)	9.80	18.60	0.00	0.00	33.33	241,160
Profitability (%)	7.78	27.27	-10.30	6.51	30.67	240,920
Leverage (%)	21.18	27.75	0.00	8.49	64.42	240,670

Firm-level ownership changes

Shareholder entry	2.58%					250,490
Majority shareholder entry (>50% share)	0.21%					250,490
Largest shareholder entry	1.24%					250,490
Shareholder exit	4.78%					250,490
Majority shareholder exit (>50% share)	0.56%					250,490
Largest shareholder exits	2.10%					250,490

Panel B: Worker characteristics

	Mean	SD	p10	p50	p90	N
Earnings (thousands)	62.70	92.29	23.23	49.84	134.76	4,568,060
Earnings growth (%)	2.58	24.15	-10.04	1.52	17.16	4,568,060
Age (years)	45.49	12.00	29.00	46.00	60.00	4,568,060
Tenure (years)	8.46	4.05	3.00	8.00	14.00	4,568,060

Panel C: Shareholder characteristics

	Mean	SD	p10	p50	p90	N
Wealth (millions)	1.98	2.76	0.36	1.01	4.46	475,255
Equity share (%)	43.56	31.16	7.70	39.50	100.00	475,255
Number of firms owned	3.37	5.49	1.00	2.00	6.00	475,255
Actively involved (%)	65.26					475,255

Portfolio changes

Add new firm	1.56%					446,175
Add new large firm (>25% of portfolio)	0.89%					446,175
Add new firm, largest shareholder	0.60%					446,175
Drop firm from portfolio	2.02%					446,175
Drop large firm (>25% of portfolio)	1.26%					446,175
Drop firm, largest shareholder	0.93%					446,175

Table 2: Descriptive statistics – continued

Panel D: Risk-bearing capacity

	Mean	SD	p10	p50	p90	N
Risk-bearing capacity (firm level)	0.12	0.59	0.00	0.00	0.22	475,255
Risk-bearing capacity (worker level)	0.55	1.16	0.00	0.05	1.91	4,568,060

RBC and portfolio structure

	Number of unique industries in the portfolio				
Number of firms owned	1	2	3	4+	Total
1	0.00				0.00
	(78,360)				(78,360)
2	0.03	0.04			0.03
	(101,470)	(3,900)			(105,375)
3	0.07	0.06	0.20		0.07
	(73,720)	(6,525)	(100)		(80,340)
4+	0.21	0.27	0.39	0.46	0.24
	(143,740)	(51,050)	(11,775)	(4,620)	(211,185)
Total	0.09	0.24	0.39	0.46	0.12
	(397,290)	(61,475)	(11,875)	(4,620)	(475,255)

Notes: This table reports summary statistics for the main samples. Panel A summarizes firm characteristics. Firm-level ownership changes report the fraction of firm–year observations experiencing each event, including entry of a new shareholder, entry of an absolute majority shareholder, entry of a relative majority shareholder, and analogous exit events. Panel B reports worker characteristics. Panel C summarizes shareholder characteristics. Portfolio changes report the fraction of shareholder–year observations experiencing each event, including adding a new firm to the portfolio, adding a firm that represents more than 25% of total portfolio value, adding a firm in which the shareholder is the relative majority owner, and analogous exit events. Panel D shows the distribution of risk-bearing capacity (RBC) in the firm sample and in the worker sample. Portfolio structure shows how shareholders' average RBC varies with the number of firms and of unique industries present in their portfolios. In this table, an industry is defined as 1-digit NAICS. The number of observations is reported in parenthesis. RBC is defined as the difference between the variance of firm export shocks and the variance of portfolio export shocks. The numbers of observations are rounded to the nearest five to comply with the confidentiality requirements of Statistics Canada.

Table 3: Effects of exchange rate shocks on firm profitability

	(1)	(2)	(3)
Shock	0.0535***		
	(0.0122)		
$\mathbb{I}\{\text{Shock} < 0\}$		-0.0034**	
		(0.0015)	
$\mathbb{I}\{\text{Shock} > 0\}$			0.0047***
			(0.0013)
Wealth	-0.0147***	-0.0147***	-0.0146***
	(0.0015)	(0.0015)	(0.0015)
Firm size	-0.0186***	-0.0185***	-0.0187***
	(0.0020)	(0.0020)	(0.0020)
Firm age	0.0187***	0.0193***	0.0180***
	(0.0063)	(0.0063)	(0.0063)
Firm FE	Yes	Yes	Yes
Industry × year FE	Yes	Yes	Yes
R^2	0.55	0.55	0.55
Observations	305,575	305,575	305,575

Notes: This table examines the effect of export shocks on firm performance. The dependent variable is profitability, measured as the ratio of net income to total assets. Standard errors are reported in parentheses and are clustered at the firm level. *, **, and *** indicate statistical significance at the 10%, 5%, and 1% level, respectively. The numbers of observations are rounded to the nearest five to comply with the confidentiality requirements of Statistics Canada.

Table 4: Entrepreneurs' risk-bearing capacity and employment insurance

	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)
Shock	-0.0158**	-0.2144***	-0.2469***	-0.0158	-0.2491***	-0.2699**			
	(0.0076)	(0.0626)	(0.0683)	(0.0104)	(0.0966)	(0.1096)			
Shock × Risk capacity	0.0116***	0.0077***	0.0072**	0.0141***	0.0086**	0.0101**			
	(0.0027)	(0.0027)	(0.0029)	(0.0040)	(0.0040)	(0.0045)			
Shock × Wealth		0.0144***	0.0167***		0.0168**	0.0182**			
		(0.0044)	(0.0048)		(0.0068)	(0.0076)			
$\mathbb{I}\{\text{Shock} < 0\}$							0.0029***	0.0266***	0.0284***
							(0.0009)	(0.0076)	(0.0084)
$\mathbb{I}\{\text{Shock} < 0\} \times$ Risk capacity							-0.0026***	-0.0020***	-0.0019***
							(0.0005)	(0.0005)	(0.0006)
$\mathbb{I}\{\text{Shock} < 0\} \times$ Wealth								-0.0017***	-0.0018***
								(0.0005)	(0.0006)
Risk capacity	-0.0008**	-0.0008**	-0.0010**	-0.0007	-0.0007	-0.0021***	0.0006*	0.0005	0.0003
	(0.0003)	(0.0003)	(0.0004)	(0.0005)	(0.0005)	(0.0006)	(0.0003)	(0.0003)	(0.0004)
Wealth	-0.0004**	-0.0007***	-0.0027***	-0.0015*	-0.0018**	-0.0027	-0.0004**	-0.0001	-0.0022**
	(0.0002)	(0.0002)	(0.0010)	(0.0009)	(0.0009)	(0.0017)	(0.0002)	(0.0002)	(0.0010)
Firm size	0.0186***	0.0186***	0.0192***	0.0151***	0.0151***	0.0067***	0.0185***	0.0185***	0.0191***
	(0.0009)	(0.0009)	(0.0010)	(0.0013)	(0.0013)	(0.0008)	(0.0009)	(0.0009)	(0.0010)
Firm age	-0.0123***	-0.0121***	-0.0120***	-0.0061	-0.0059	-0.0050***	-0.0128***	-0.0129***	-0.0128***
	(0.0027)	(0.0027)	(0.0029)	(0.0040)	(0.0040)	(0.0014)	(0.0027)	(0.0027)	(0.0030)
Firm FE	Yes	Yes	Yes	Yes	Yes	No	Yes	Yes	Yes
Shareholder FE	No	No	Yes	No	No	Yes	No	No	Yes
Industry × year FE	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
R^2	0.11	0.11	0.11	0.09	0.09	0.10	0.11	0.11	0.11
Observations	484,895	484,895	475,255	246,820	246,820	241,165	484,895	484,895	475,255

Notes: This table examines how shareholders' risk-bearing capacity affects the pass-through of exchange rate shocks to firms' layoff rates, by estimating Equation 6. The dependent variable is the change in the ratio of layoffs to total employment. Risk-bearing capacity is the difference between the variance of firm export shocks and the variance of portfolio export shocks. Columns 4–6 restrict the sample to the largest shareholder. Standard errors are reported in parentheses and are clustered at the shareholder level in columns 1–3 and 7–9 and at the firm level in columns 4–6. *, **, and *** indicate statistical significance at the 10%, 5%, and 1% level, respectively. Observation counts are rounded to the nearest five to comply with the confidentiality requirements of Statistics Canada.

Table 5: Entrepreneurs' risk-bearing capacity and heterogeneity in employment insurance

	Younger workers		Older workers		Pay below median		Pay above median	
	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)
Shock	-0.1910**		-0.2865***		-0.1355**		-0.3812***	
	(0.0788)		(0.0837)		(0.0683)		(0.1012)	
Shock × Risk capacity	0.0116***		0.0001		0.0020		0.0034	
	(0.0035)		(0.0030)		(0.0027)		(0.0042)	
Shock × Wealth	0.0123**		0.0207***		0.0094**		0.0258***	
	(0.0055)		(0.0059)		(0.0047)		(0.0071)	
$\mathbb{I}\{\text{Shock} < 0\}$		0.0194**		0.0352***		0.0143*		0.0315**
		(0.0096)		(0.0104)		(0.0084)		(0.0129)
$\mathbb{I}\{\text{Shock} < 0\} \times$ Risk capacity		-0.0023***		-0.0011*		-0.0012**		-0.0012
		(0.0007)		(0.0007)		(0.0006)		(0.0010)
$\mathbb{I}\{\text{Shock} < 0\} \times$ Wealth		-0.0012*		-0.0023***		-0.0009		-0.0020**
		(0.0007)		(0.0007)		(0.0006)		(0.0009)
Risk capacity	-0.0016***	0.0001	-0.0001	0.0007	-0.0009**	-0.0003	-0.0004	0.0005
	(0.0005)	(0.0005)	(0.0005)	(0.0005)	(0.0004)	(0.0004)	(0.0006)	(0.0006)
Wealth	-0.0029**	-0.0025**	-0.0024*	-0.0017	-0.0011	-0.0008	-0.0037**	-0.0028*
	(0.0012)	(0.0012)	(0.0013)	(0.0013)	(0.0011)	(0.0011)	(0.0016)	(0.0016)
Controls	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Firm FE	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Shareholder FE	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Industry × year FE	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
R^2	0.11	0.11	0.11	0.11	0.14	0.14	0.12	0.12
Observations	446,275	446,275	438,330	438,330	395,475	395,475	386,135	386,135

Notes: This table examines heterogeneity in how shareholders' risk-bearing capacity affects the pass-through of exchange rate shocks to firms' layoff rates, by estimating equation 6 for different subsamples of workers. The dependent variable is the change in the ratio of layoffs to total employment, calculated separately for each group. Columns 1–2 report estimates for workers younger than 45; columns 3–4 for workers aged 45 or older. Columns 5–6 report estimates for workers whose earnings in the prior year were below their firm's median, and columns 7–8 for those at or above their firm's prior-year firm-median. Risk-bearing capacity is the difference between the variance of firm export shocks and the variance of portfolio export shocks. Controls include firm size and firm age. Standard errors are reported in parentheses and are clustered at the shareholder level. *, **, and *** indicate statistical significance at the 10%, 5%, and 1% level, respectively. The numbers of observations are rounded to the nearest five to comply with the confidentiality requirements of Statistics Canada.

Table 6: Entrepreneurs' risk-bearing capacity and wage insurance

	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)
Shock	0.0183	0.0428	0.1425	0.0279**	0.1592	0.1762*			
	(0.0121)	(0.1014)	(0.1204)	(0.0116)	(0.1635)	(0.0955)			
Shock × Risk capacity	-0.0250***	-0.0246***	-0.0216***	-0.0262***	-0.0240***	-0.0151***			
	(0.0050)	(0.0053)	(0.0056)	(0.0056)	(0.0056)	(0.0045)			
Shock × Wealth		-0.0017	-0.0083		-0.0090	-0.0104			
		(0.0070)	(0.0084)		(0.0112)	(0.0066)			
$\mathbb{I}\{\text{Shock} < 0\}$							-0.0035***	-0.0056	-0.0254***
							(0.0012)	(0.0080)	(0.0091)
$\mathbb{I}\{\text{Shock} < 0\} \times$ Risk capacity							0.0039***	0.0039***	0.0025***
							(0.0007)	(0.0008)	(0.0007)
$\mathbb{I}\{\text{Shock} < 0\} \times$ Wealth								0.0001	0.0016**
								(0.0005)	(0.0006)
Risk capacity	0.0014***	0.0014***	0.0014**	0.0016**	0.0016**	0.0019***	-0.0014**	-0.0014**	-0.0011
	(0.0005)	(0.0005)	(0.0007)	(0.0007)	(0.0007)	(0.0007)	(0.0006)	(0.0006)	(0.0008)
Wealth	-0.0005	-0.0004	-0.0116***	-0.0002	-0.0000	-0.0112***	-0.0004	-0.0004	-0.0120***
	(0.0003)	(0.0004)	(0.0018)	(0.0012)	(0.0012)	(0.0034)	(0.0003)	(0.0003)	(0.0018)
Controls	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Worker FE	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Firm FE	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Shareholder FE	No	No	Yes	No	No	Yes	No	No	Yes
Industry × year FE	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
R^2	0.45	0.45	0.45	0.31	0.31	0.33	0.45	0.45	0.45
Observations	8,916,485	8,916,485	8,914,440	4,569,015	4,569,015	4,568,060	8,916,485	8,916,485	8,914,440

Notes: This table examines how shareholders' risk-bearing capacity affects the pass-through of exchange rate shocks to wages, by estimating Equation 7. The dependent variable is the change in the logarithm of yearly earnings. Risk-bearing capacity is the difference between the variance of firm export shocks and the variance of portfolio export shocks. Columns 4–6 restrict the sample to the largest shareholder. Controls include worker age, firm size, and firm age. Standard errors are reported in parentheses and are double clustered at the shareholder and worker level in columns 1–3 and 7–9 and at the worker and firm level in columns 4–6. *, **, and *** indicate statistical significance at the 10%, 5%, and 1% level, respectively. The numbers of observations are rounded to the nearest five to comply with the confidentiality requirements of Statistics Canada.

Table 7: Entrepreneurs' risk-bearing capacity and heterogeneity in wage insurance

	Younger workers		Older workers		Pay below median		Pay above median	
	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)
Shock	0.0637		0.1978		0.0459		0.1949	
	(0.1206)		(0.1246)		(0.1066)		(0.1375)	
Shock × Risk capacity	-0.0248***		-0.0170***		-0.0224***		-0.0201***	
	(0.0062)		(0.0056)		(0.0050)		(0.0069)	
Shock × Wealth	-0.0026		-0.0125		-0.0024		-0.0114	
	(0.0084)		(0.0087)		(0.0073)		(0.0097)	
$\mathbb{I}\{\text{Shock} < 0\}$		-0.0241**		-0.0248**		-0.0104		-0.0347***
		(0.0101)		(0.0106)		(0.0099)		(0.0094)
$\mathbb{I}\{\text{Shock} < 0\}$ × Risk capacity		0.0027***		0.0019**		0.0038***		0.0014*
		(0.0008)		(0.0009)		(0.0008)		(0.0008)
$\mathbb{I}\{\text{Shock} < 0\}$ × Shareholder wealth		0.0014**		0.0016**		0.0006		0.0022***
		(0.0007)		(0.0007)		(0.0007)		(0.0006)
Risk capacity	0.0019**	-0.0009	0.0006	-0.0015*	0.0019***	-0.0010	0.0005	-0.0017*
	(0.0007)	(0.0008)	(0.0007)	(0.0008)	(0.0007)	(0.0007)	(0.0008)	(0.0009)
Wealth	-0.0128***	-0.0131***	-0.0103***	-0.0107***	-0.0059***	-0.0060***	-0.0136***	-0.0142***
	(0.0020)	(0.0020)	(0.0019)	(0.0019)	(0.0018)	(0.0017)	(0.0020)	(0.0020)
Controls	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Worker FE	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Firm FE	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Shareholder FE	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Industry × year FE	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
R^2	0.50	0.50	0.40	0.40	0.59	0.59	0.46	0.46
Observations	4,347,740	4,347,740	4,514,520	4,514,520	4,115,100	4,115,100	4,662,830	4,662,830

Notes: This table examines heterogeneity in how shareholders' risk-bearing capacity affects the pass-through of exchange rate shocks to wages, by estimating equation 7 for different subsamples of workers. The dependent variable is the change in the logarithm of yearly earnings. Columns 1–2 report estimates for workers younger than 45; columns 3–4 for workers aged 45 or older. Columns 5–6 report estimates for workers whose earnings in the prior year were below their firm's median, and columns 7–8 for those at or above their firm's prior-year firm-median. Risk-bearing capacity is the difference between the variance of firm export shocks and the variance of portfolio export shocks. Controls include worker age, firm size, and firm age. Risk-bearing capacity is the difference between the variance of firm export shocks and the variance of portfolio export shocks. Standard errors are reported in parentheses and are double clustered at the shareholder and worker level. *, **, and *** indicate statistical significance at the 10%, 5%, and 1% level, respectively. The numbers of observations are rounded to the nearest five to comply with the confidentiality requirements of Statistics Canada.

Table 8: Insurance provision mechanisms

Panel A: Firm leverage

	(1)	(2)	(3)	(4)	(5)	(6)
Shock	-0.0004	0.0446	0.0635			
	(0.0061)	(0.0587)	(0.0629)			
Shock × Risk capacity	-0.0087**	-0.0078**	-0.0043			
	(0.0034)	(0.0036)	(0.0037)			
Shock × Wealth		-0.0033	-0.0046			
		(0.0042)	(0.0045)			
$\mathbb{I}\{\text{Shock} < 0\}$				-0.0013*	-0.0189**	-0.0214***
				(0.0008)	(0.0075)	(0.0080)
$\mathbb{I}\{\text{Shock} < 0\} \times$ Risk capacity				0.0028***	0.0024***	0.0023***
				(0.0007)	(0.0007)	(0.0008)
$\mathbb{I}\{\text{Shock} < 0\} \times$ Wealth					0.0013**	0.0014**
					(0.0005)	(0.0006)
Risk capacity	0.0015**	0.0015**	0.0009	0.0000	0.0001	-0.0002
	(0.0007)	(0.0007)	(0.0009)	(0.0006)	(0.0006)	(0.0008)
Wealth	0.0001	0.0001	0.0061***	0.0001	-0.0002	0.0058***
	(0.0003)	(0.0003)	(0.0017)	(0.0003)	(0.0003)	(0.0017)
Controls	Yes	Yes	Yes	Yes	Yes	Yes
Firm FE	Yes	Yes	Yes	Yes	Yes	Yes
Shareholder FE	No	No	Yes	No	No	Yes
Industry × year FE	Yes	Yes	Yes	Yes	Yes	Yes
R^2	0.84	0.84	0.85	0.84	0.84	0.85
Observations	487,635	487,635	478,125	487,635	487,635	478,125

Table 8: Insurance provision mechanisms – continued

Panel B: Cut in shareholder pay

	(1)	(2)	(3)	(4)	(5)	(6)
Shock	0.0081	-0.0308	-0.0623			
	(0.0076)	(0.0673)	(0.0726)			
Shock × Risk capacity	-0.0080**	-0.0088**	-0.0092**			
	(0.0036)	(0.0038)	(0.0042)			
Shock × Wealth		0.0028	0.0051			
		(0.0048)	(0.0052)			
$\mathbb{I}\{\text{Shock} < 0\}$				-0.0005	0.0044	0.0048
				(0.0009)	(0.0089)	(0.0096)
$\mathbb{I}\{\text{Shock} < 0\} \times$ Risk capacity				0.0023***	0.0024***	0.0025**
				(0.0009)	(0.0009)	(0.0010)
$\mathbb{I}\{\text{Shock} < 0\} \times$ Wealth					-0.0004	-0.0004
					(0.0006)	(0.0007)
Risk capacity	0.0004	0.0004	0.0000	-0.0008	-0.0008	-0.0012*
	(0.0006)	(0.0006)	(0.0008)	(0.0006)	(0.0006)	(0.0007)
Wealth	0.0008***	0.0008**	0.0111***	0.0008***	0.0009***	0.0113***
	(0.0003)	(0.0003)	(0.0014)	(0.0003)	(0.0003)	(0.0014)
Controls	Yes	Yes	Yes	Yes	Yes	Yes
Firm FE	Yes	Yes	Yes	Yes	Yes	Yes
Shareholder FE	No	No	Yes	No	No	Yes
Industry × year FE	Yes	Yes	Yes	Yes	Yes	Yes
R^2	0.14	0.14	0.20	0.14	0.14	0.20
Observations	488,125	488,125	478,630	488,125	488,125	478,630

Notes: This table examines the mechanisms through which shareholders provide insurance to workers. In Panel A, the dependent variable is firm leverage, defined as long term liabilities divided by total assets. In Panel B, the dependent variable is an indicator equal to 1 if the shareholder ceases to draw any salary from the firm (i.e., records zero payroll compensation). Risk-bearing capacity is the difference between the variance of firm export shocks and the variance of portfolio export shocks. Controls include firm size and firm age. Standard errors are reported in parentheses and are clustered at the shareholder level. *, **, and *** indicate statistical significance at the 10%, 5%, and 1% level, respectively. The numbers of observations are rounded to the nearest five to comply with the confidentiality requirements of Statistics Canada.

Table 9: Does insurance provision affect firm performance and earnings?

Panel A: Worker earnings

	(1)	(2)	(3)	(4)
Risk capacity	0.0004	-0.0002	0.0002	0.0001
	(0.0004)	(0.0006)	(0.0007)	(0.0006)
Wealth	0.0003	0.0009	0.0019	0.0022
	(0.0002)	(0.0018)	(0.0012)	(0.0029)
Firm size	0.0406***	0.0433***	0.0417***	0.0446***
	(0.0033)	(0.0037)	(0.0044)	(0.0051)
Firm age	-0.0588***	-0.0361***	-0.0390***	-0.0289***
	(0.0077)	(0.0070)	(0.0120)	(0.0098)
Worker age	2.5018***	2.4964***	2.5601***	2.5538***
	(0.0470)	(0.0470)	(0.0772)	(0.0787)
Worker FE	Yes	Yes	Yes	Yes
Firm FE	Yes	Yes	Yes	Yes
Shareholder FE	No	Yes	No	Yes
Industry × year FE	Yes	Yes	Yes	Yes
R^2	0.95	0.95	0.94	0.94
Observations	8,916,485	8,914,440	4,569,015	4,568,060

Panel B: Firm outcomes

	Employee turnover		Profitability	
	(1)	(2)	(3)	(4)
Risk capacity	-0.0175***	-0.0186***	0.0006	0.0009
	(0.0045)	(0.0059)	(0.0006)	(0.0007)
Wealth	-0.0125***	-0.1037***	-0.0040***	-0.0290***
	(0.0024)	(0.0137)	(0.0003)	(0.0022)
Firm size	0.1111***	0.1122***	-0.0361***	-0.0354***
	(0.0117)	(0.0127)	(0.0022)	(0.0024)
Firm age	-0.3921***	-0.3422***	-0.0066	0.0015
	(0.0353)	(0.0351)	(0.0056)	(0.0059)
Firm FE	Yes	Yes	Yes	Yes
Shareholder FE	No	Yes	No	Yes
Industry × year FE	Yes	Yes	Yes	Yes
R^2	0.38	0.38	0.60	0.61
Observations	424,855	414,465	488,120	478,630

Notes: This table examines how worker earnings, employee turnover, and firm profitability correlate with the respective owners' risk-bearing capacity. The specifications in columns 1-2 are estimated on the full sample, while those in columns 3-4 restrict the sample to the largest shareholder. In Panel A, the dependent variable is workers' log earnings. In columns 1–2 and 3–4 of Panel B, the dependent variables are employee turnover rate and firm profitability, respectively. Risk-bearing capacity is the difference between a firm's export sales variance and its owners' portfolio variance. Standard errors are reported in parentheses and double clustered at the worker and shareholder level (Panel A) and clustered at the shareholder level (Panel B). *, **, and *** indicate statistical significance at the 10%, 5%, and 1% level, respectively. The number of observations is rounded to the nearest five to comply with the confidentiality requirements of Statistics Canada.

Table 10: Within-portfolio transmission of exchange rate shocks from exporters to non-exporters

Panel A: Δ Layoff rate

	(1)	(2)	(3)	(4)	(5)
Portfolio shock	-0.0240	-0.5478*	-0.5495*	-0.5225*	-0.5763
	(0.0323)	(0.2902)	(0.3260)	(0.3159)	(0.3583)
Portfolio shock × Risk capacity				0.0197	0.0194
				(0.0212)	(0.0234)
Portfolio shock × Wealth		0.0362*	0.0364	0.0366*	0.0402
		(0.0197)	(0.0222)	(0.0216)	(0.0246)
Risk capacity				0.0000	0.0003
				(0.0014)	(0.0021)
Wealth	0.0003	0.0002	-0.0004	-0.0002	-0.0010
	(0.0006)	(0.0006)	(0.0020)	(0.0005)	(0.0023)
Controls	Yes	Yes	Yes	Yes	Yes
Firm FE	Yes	Yes	Yes	Yes	Yes
Shareholder FE	No	No	Yes	No	Yes
Industry × Year FE	Yes	Yes	Yes	Yes	Yes
R^2	0.17	0.17	0.17	0.20	0.18
Observations	162,535	162,535	160,020	130,015	127,340

Table 10: Within-portfolio transmission of exchange rate shocks from exporters to non-exporters – continued

Panel B: Δ Worker earnings

	(1)	(2)	(3)	(4)	(5)
Portfolio shock	0.0900**	0.9405**	0.8584*	0.8723*	0.7390
	(0.0441)	(0.4530)	(0.4790)	(0.4734)	(0.4852)
Portfolio shock × Risk capacity				-0.0059	0.0025
				(0.0410)	(0.0456)
Portfolio shock × Wealth		-0.0568*	-0.0508	-0.0521	-0.0419
		(0.0304)	(0.0321)	(0.0325)	(0.0332)
Risk capacity				0.0009	0.0005
				(0.0030)	(0.0038)
Wealth	-0.0021***	-0.0020***	-0.0135***	-0.0018**	-0.0114***
	(0.0007)	(0.0007)	(0.0036)	(0.0007)	(0.0040)
Controls	Yes	Yes	Yes	Yes	Yes
Worker FE	Yes	Yes	Yes	Yes	Yes
Firm FE	Yes	Yes	Yes	Yes	Yes
Shareholder FE	No	No	Yes	No	Yes
Industry × Year FE	Yes	Yes	Yes	Yes	Yes
R^2	0.42	0.42	0.43	0.44	0.44
Observations	902,795	902,795	902,190	752,330	751,710

Notes: This table examines the transmission of exchange rate shocks from exporters to non-exporters within shareholder portfolios. In Panel A, the sample is restricted to non-exporting firms whose shareholders also own at least one exporting firm. The dependent variable is the change in the firm's layoff rate. In Panel B, the sample includes workers employed at non-exporting firms whose shareholders also own at least one exporting firm. The dependent variable is the change in yearly earnings. Portfolio shock is the weighted average of exchange rate shocks hitting exporting firms in the portfolio. Risk-bearing capacity is the difference between the variance of firm export shocks and the variance of portfolio export shocks. Controls include firm size and firm age (Panel A), and additionally worker age (Panel B). Standard errors are in parentheses and clustered at the shareholder level (Panel A) and both the worker and shareholder level (Panel B). *, **, and *** indicate significance at the 10%, 5%, and 1% level. Observation counts are rounded to the nearest five to comply with Statistics Canada confidentiality rules.

Internet Appendix to

"Entrepreneurs' Diversification and Labor Income Risk"

Table A1: Entrepreneurs' risk-bearing capacity and employment insurance: alternative layoff measure

	(1)	(2)	(3)	(4)	(5)	(6)
Shock	-0.0159**	-0.2229***	-0.2566***			
	(0.0076)	(0.0629)	(0.0686)			
Shock × Risk capacity	0.0112***	0.0072***	0.0067**			
	(0.0027)	(0.0027)	(0.0029)			
Shock × Shareholder wealth		0.0150***	0.0174***			
		(0.0044)	(0.0048)			
$\mathbb{I}\{\text{Shock} < 0\}$				0.0031***	0.0250***	0.0266***
				(0.0009)	(0.0076)	(0.0084)
$\mathbb{I}\{\text{Shock} < 0\} \times$ Risk capacity				-0.0025***	-0.0020***	-0.0019***
				(0.0005)	(0.0006)	(0.0006)
$\mathbb{I}\{\text{Shock} < 0\} \times$ Wealth					-0.0016***	-0.0017***
					(0.0005)	(0.0006)
Risk capacity	-0.0008**	-0.0008**	-0.0010**	0.0006*	0.0005	0.0003
	(0.0003)	(0.0003)	(0.0004)	(0.0003)	(0.0003)	(0.0004)
Wealth	-0.0004**	-0.0007***	-0.0028***	-0.0004**	-0.0001	-0.0023**
	(0.0002)	(0.0002)	(0.0010)	(0.0002)	(0.0002)	(0.0010)
Controls	Yes	Yes	Yes	Yes	Yes	Yes
Firm FE	Yes	Yes	Yes	Yes	Yes	Yes
Shareholder FE	No	No	Yes	No	No	Yes
Industry × year FE	Yes	Yes	Yes	Yes	Yes	Yes
R^2	0.11	0.11	0.11	0.11	0.11	0.11
Observations	484,800	484,800	475,170	484,800	484,800	475,170

Notes: This table examines how shareholders' risk-bearing capacity affects the pass-through of exchange rate shocks to firms' layoff rates, by estimating Equation 6. The dependent variable is the change in the ratio of layoffs to total employment excluding seasonal workers (i.e., those whose job spells lasted less than 120 days both in year t and $t-1$). Risk-bearing capacity is the difference between the variance of firm export shocks and the variance of portfolio export shocks. Controls include firm size and firm age. Standard errors are reported in parentheses and are clustered at the shareholder level. *, **, and *** indicate statistical significance at the 10%, 5%, and 1% level, respectively. The numbers of observations are rounded to the nearest five to comply with the confidentiality requirements of Statistics Canada.

Table A2: Entrepreneurs' risk-bearing capacity and employment insurance: additional controls

	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)
Shock	-0.0161**	-0.2113***	-0.2438***	-0.0157**	-0.2137***	-0.2453***	-0.0157**	-0.2138***	-0.2458***
	(0.0076)	(0.0626)	(0.0683)	(0.0076)	(0.0625)	(0.0682)	(0.0076)	(0.0625)	(0.0683)
Shock × Risk capacity	0.0119***	0.0082***	0.0077***	0.0120***	0.0081***	0.0078***	0.0120***	0.0081***	0.0078***
	(0.0027)	(0.0027)	(0.0030)	(0.0027)	(0.0027)	(0.0030)	(0.0027)	(0.0027)	(0.0030)
Shock × Wealth		0.0141***	0.0165***		0.0143***	0.0166***		0.0143***	0.0167***
		(0.0044)	(0.0048)		(0.0044)	(0.0048)		(0.0044)	(0.0048)
Risk capacity	-0.0010***	-0.0010***	-0.0012***	-0.0010***	-0.0009***	-0.0012***	-0.0010***	-0.0009***	-0.0012***
	(0.0003)	(0.0003)	(0.0004)	(0.0003)	(0.0003)	(0.0004)	(0.0003)	(0.0003)	(0.0004)
Firm size^2	0.0004	0.0004	0.0004*	0.0004*	0.0004*	0.0005**	0.0004*	0.0004*	0.0005**
	(0.0002)	(0.0002)	(0.0003)	(0.0002)	(0.0002)	(0.0003)	(0.0002)	(0.0002)	(0.0003)
Firm age^2	-0.0057	-0.0055	-0.0063*	-0.0055	-0.0053	-0.0061	-0.0055	-0.0054	-0.0063*
	(0.0036)	(0.0036)	(0.0038)	(0.0036)	(0.0036)	(0.0038)	(0.0036)	(0.0036)	(0.0038)
Shareholder leverage				-0.0064***	-0.0064***	-0.0093***	-0.0064***	-0.0064***	-0.0093***
				(0.0013)	(0.0013)	(0.0021)	(0.0013)	(0.0013)	(0.0021)
Firm employment							-0.0002	-0.0003	-0.0012
							(0.0012)	(0.0012)	(0.0012)
Basic controls	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Firm FE	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Shareholder FE	No	No	Yes	No	No	Yes	No	No	Yes
Industry × year FE	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
R^2	0.11	0.11	0.11	0.11	0.11	0.11	0.11	0.11	0.11
Observations	484,895	484,895	475,255	484,435	484,435	474,790	484,435	484,435	474,790

Notes: This table expands the list of control variables included in regressions that test how shareholders' risk-bearing capacity affects the pass-through of exchange rate shocks to firms' layoff rates. The dependent variable is the change in the ratio of layoffs to total employment. Risk-bearing capacity is the difference between the variance of firm export shocks and the variance of portfolio export shocks. Basic controls include firm size, firm age, and shareholder wealth. Additional controls include the squared value of firm size and age, shareholder leverage (defined as the lagged ratio of total debt to total assets owned by shareholders in all firms), and firm employment. Standard errors are reported in parentheses and are clustered at the shareholder level. *, **, and *** indicate statistical significance at the 10%, 5%, and 1% level, respectively. The numbers of observations are rounded to the nearest five to comply with the confidentiality requirements of Statistics Canada.

Table A3: Entrepreneurs' risk-bearing capacity and employment insurance: negative vs. positive shocks

	(1)	(2)	(3)	(4)	(5)	(6)
Negative shock	0.0485**	0.4438**	0.5193***			
	(0.0207)	(0.1855)	(0.1966)			
Negative shock × Risk capacity	-0.0487***	-0.0401***	-0.0329***			
	(0.0103)	(0.0105)	(0.0113)			
Negative shock × Wealth		-0.0288**	-0.0346**			
		(0.0131)	(0.0140)			
Positive shock				-0.0116	-0.2091***	-0.2432***
				(0.0083)	(0.0687)	(0.0761)
Positive shock × Risk capacity				0.0101***	0.0064**	0.0064**
				(0.0029)	(0.0029)	(0.0032)
Positive shock × Wealth					0.0143***	0.0167***
					(0.0048)	(0.0054)
Risk capacity	0.0003	0.0002	0.0001	-0.0008**	-0.0008**	-0.0010**
	(0.0003)	(0.0003)	(0.0004)	(0.0003)	(0.0003)	(0.0004)
Wealth	-0.0004**	-0.0002	-0.0023**	-0.0004**	-0.0008***	-0.0028***
	(0.0002)	(0.0002)	(0.0010)	(0.0002)	(0.0002)	(0.0010)
Controls	Yes	Yes	Yes	Yes	Yes	Yes
Firm FE	Yes	Yes	Yes	Yes	Yes	Yes
Shareholder FE	No	No	Yes	No	No	Yes
Industry × year FE	Yes	Yes	Yes	Yes	Yes	Yes
R^2	0.11	0.11	0.11	0.11	0.11	0.11
Observations	484,895	484,895	475,255	484,895	484,895	475,255

Notes: This table estimates separately the pass-through rate of negative and positive exchange rate shocks to firms' layoff rates and its mitigation by shareholders' risk capacity. A negative shock equals $\mid \Delta e_{it} \mid$ if $\Delta e_{it} < 0$ and zero otherwise. A positive shock equals Δe_{it} if $\Delta e_{it} > 0$ and zero otherwise. Controls include firm size and firm age. Standard errors are reported in parentheses and are clustered at the shareholder level. *, **, and *** indicate statistical significance at the 10%, 5%, and 1% level, respectively. The numbers of observations are rounded to the nearest five to comply with the confidentiality requirements of Statistics Canada.

Table A4: Entrepreneurs' risk-bearing capacity and employment insurance: controlling for importing firms

	(1)	(2)	(3)	(4)	(5)	(6)
Shock	-0.0159**	-0.2147***	-0.2474***			
	(0.0076)	(0.0626)	(0.0682)			
Shock × Risk capacity	0.0116***	0.0077***	0.0072**			
	(0.0027)	(0.0027)	(0.0029)			
Shock × Wealth		0.0144***	0.0167***			
		(0.0044)	(0.0048)			
$\mathbb{I}\{\text{Shock} < 0\}$				0.0029***	0.0266***	0.0284***
				(0.0009)	(0.0076)	(0.0084)
$\mathbb{I}\{\text{Shock} < 0\}$ × Risk capacity				-0.0026***	-0.0020***	-0.0019***
				(0.0005)	(0.0005)	(0.0006)
$\mathbb{I}\{\text{Shock} < 0\}$ × Wealth					-0.0017***	-0.0018***
					(0.0005)	(0.0006)
Risk capacity	-0.0008**	-0.0008**	-0.0010**	0.0006*	0.0005	0.0003
	(0.0003)	(0.0003)	(0.0004)	(0.0003)	(0.0003)	(0.0004)
Wealth	-0.0004**	-0.0007***	-0.0027***	-0.0004**	-0.0001	-0.0022**
	(0.0002)	(0.0002)	(0.0010)	(0.0002)	(0.0002)	(0.0010)
Importer	0.0008	0.0008	0.0013	0.0007	0.0007	0.0012
	(0.0012)	(0.0012)	(0.0013)	(0.0012)	(0.0012)	(0.0013)
Controls	Yes	Yes	Yes	Yes	Yes	Yes
Firm FE	Yes	Yes	Yes	Yes	Yes	Yes
Shareholder FE	No	No	Yes	No	No	Yes
Industry × year FE	Yes	Yes	Yes	Yes	Yes	Yes
R^2	0.11	0.11	0.11	0.11	0.11	0.11
Observations	484,895	484,895	475,255	484,895	484,895	475,255

Notes: This table examines how shareholders' risk-bearing capacity affects the pass-through of exchange rate shocks to firms' layoff rates, controlling for importer status. The dependent variable is the change in the ratio of layoffs to total employment. Risk-bearing capacity is the difference between the variance of firm export shocks and the variance of portfolio export shocks. Controls include firm size and firm age. Standard errors are reported in parentheses and are clustered at the shareholder level. *, **, and *** indicate statistical significance at the 10%, 5%, and 1% level, respectively. The numbers of observations are rounded to the nearest five to comply with the confidentiality requirements of Statistics Canada.

Table A5: Entrepreneurs' risk-bearing capacity and wage insurance: negative vs. positive shocks

	(1)	(2)	(3)	(4)	(5)	(6)
Negative shock	-0.0438*	0.0397	-0.2918			
	(0.0255)	(0.3040)	(0.2755)			
Negative shock × Risk capacity	0.0476***	0.0490***	0.0372***			
	(0.0141)	(0.0142)	(0.0144)			
Negative shock × Wealth		-0.0058	0.0165			
		(0.0209)	(0.0190)			
Positive shock				0.0180	0.0624	0.1594
				(0.0145)	(0.1188)	(0.1455)
Positive shock × Risk capacity				-0.0281***	-0.0275***	-0.0244***
				(0.0060)	(0.0063)	(0.0068)
Positive shock × Wealth					-0.0031	-0.0095
					(0.0083)	(0.0102)
Risk capacity	-0.0008	-0.0008	-0.0008	0.0018***	0.0018***	0.0019***
	(0.0005)	(0.0005)	(0.0008)	(0.0006)	(0.0006)	(0.0007)
Wealth	-0.0004	-0.0004	-0.0119**	-0.0005	-0.0004	-0.0116**
	(0.0003)	(0.0003)	(0.0018)	(0.0003)	(0.0004)	(0.0018)
Controls	Yes	Yes	Yes	Yes	Yes	Yes
Worker FE	Yes	Yes	Yes	Yes	Yes	Yes
Firm FE	Yes	Yes	Yes	Yes	Yes	Yes
Shareholder FE	No	No	Yes	No	No	Yes
Industry × year FE	Yes	Yes	Yes	Yes	Yes	Yes
R^2	0.45	0.45	0.45	0.45	0.45	0.45
Observations	8,916,485	8,916,485	8,914,440	8,916,485	8,916,485	8,914,440

Notes: This table estimates separately the pass-through rate of negative and positive exchange rate shocks to wages rates and its mitigation by shareholders' risk capacity. A negative shock equals $\mid \Delta e_{it} \mid$ if $\Delta e_{it} < 0$ and zero otherwise. A positive shock equals Δe_{it} if $\Delta e_{it} > 0$ and zero otherwise. Controls include worker age, firm size, and firm age. Standard errors are reported in parentheses and are double clustered at the shareholder and worker level. *, **, and *** indicate statistical significance at the 10%, 5%, and 1% level, respectively. The numbers of observations are rounded to the nearest five to comply with the confidentiality requirements of Statistics Canada.

Table A6: Entrepreneurs' risk-bearing capacity and wage insurance: controlling for importing firms

	(1)	(2)	(3)	(4)	(5)	(6)
Shock	0.0186	0.0438	0.1436			
	(0.0121)	(0.1015)	(0.1204)			
Shock × Risk capacity	-0.0250***	-0.0246***	-0.0216***			
	(0.0050)	(0.0053)	(0.0056)			
Shock × Wealth		-0.0017	-0.0083			
		(0.0070)	(0.0084)			
$\mathbb{I}\{\text{Shock} < 0\}$				-0.0035***	-0.0057	-0.0255***
				(0.0012)	(0.0080)	(0.0091)
$\mathbb{I}\{\text{Shock} < 0\}$ × Risk capacity				0.0039***	0.0039***	0.0025***
				(0.0007)	(0.0008)	(0.0007)
$\mathbb{I}\{\text{Shock} < 0\}$ × Wealth					0.0001	0.0016**
					(0.0005)	(0.0006)
Risk capacity	0.0014***	0.0014***	0.0014**	-0.0014**	-0.0014**	-0.0011
	(0.0005)	(0.0005)	(0.0007)	(0.0006)	(0.0006)	(0.0008)
Wealth	-0.0004	-0.0004	-0.0116***	-0.0004	-0.0004	-0.0120***
	(0.0003)	(0.0004)	(0.0018)	(0.0003)	(0.0003)	(0.0018)
Importer	-0.0046**	-0.0046**	-0.0043**	-0.0046**	-0.0046**	-0.0043**
	(0.0019)	(0.0019)	(0.0019)	(0.0019)	(0.0019)	(0.0019)
Controls	Yes	Yes	Yes	Yes	Yes	Yes
Worker FE	Yes	Yes	Yes	Yes	Yes	Yes
Firm FE	Yes	Yes	Yes	Yes	Yes	Yes
Shareholder FE	No	No	Yes	No	No	Yes
Industry × year FE	Yes	Yes	Yes	Yes	Yes	Yes
R^2	0.45	0.45	0.45	0.45	0.45	0.45
Observations	8,916,485	8,916,485	8,914,440	8,916,485	8,916,485	8,914,440

Notes: This table examines how shareholders' risk-bearing capacity affects the pass-through of exchange rate shocks to wages, controlling for importer status. The dependent variable is the change in the logarithm of yearly earnings. Risk-bearing capacity is the difference between the variance of firm export shocks and the variance of portfolio export shocks. Controls include worker age, firm size, and firm age. Standard errors are reported in parentheses and are double clustered at the shareholder and worker level. *, **, and *** indicate statistical significance at the 10%, 5%, and 1% level, respectively. The numbers of observations are rounded to the nearest five to comply with the confidentiality requirements of Statistics Canada.