Employment and Wage Insurance within Firms: Worldwide Evidence

Andrew Ellul
Kelley School of Business, Indiana University, CSEF, CEPR, and ECGI

Marco Pagano
University of Naples Federico II, CSEF, EIEF, CEPR, and ECGI

Fabiano Schivardi
LUISS, EIEF, and CEPR

Using a firm-level international panel data set, we study if unemployment insurance offered by the government and by firms are substitutes. We exploit cross-country and time-series variation in public unemployment insurance as a shifter of workers' demand for insurance within firms, and family versus nonfamily ownership as a shifter of firms' supply of insurance. Our evidence supports the substitutability hypothesis: employment stability in family firms is greater, and the wage discount larger, in countries and periods with less generous public unemployment insurance, whereas no such substitutability emerges for nonfamily firms. (*JEL* G32, G38, H53, J65)

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Unemployment risk imposes considerable welfare losses on workers (Low, Meghir, and Pistaferri 2010). Displaced workers experience earnings losses, not only while unemployed but also upon reemployment (Jacobson, LaLonde, and Sullivan 1993), due to both general skill depreciation and the loss of match-specific human capital. In unemployment spells, even when their income drop

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is temporary, households cut back on expenditures (Gruber 1997; Browning and Crossley 2001) if they face borrowing constraints and hold illiquid assets (Browning and Crossley 2009). These risks are difficult to insure through standard market mechanisms, owing to moral hazard. To address this market failure, in most countries layoffs are partially insured by public unemployment insurance systems,[1] which provide significant consumption smoothing benefits to unemployed workers (Gruber 1997) and reduce both unemployment risk and the compensating wage differentials associated with such risk (Topel and Welch 1980; Topel 1983, 1984).

In principle, the firm is an alternative insurance provider. Generally speaking, a firm is better positioned to detect its employees' opportunistic behavior than is a market-based insurance provider. At the same time, it has greater risk-bearing capacity than its employees. This idea at least dates back to Knight (1921): "The system under which the confident and venturesome assume the risk and insure the doubtful and timid by guaranteeing to the latter a specified income in return for an assignment of the actual results . . . is the enterprise and wage system of industry" (pp. 269–70). The idea was formalized in the implicit contract model of Baily (1974) and Azariadis (1975), where risk-neutral entrepreneurs insure risk-averse workers by insulating their salaries from adverse shocks to production in exchange for a lower average salary. In fact, entrepreneurs' risk-absorption capacity needs not be rooted in their preferences but in differential access to capital markets: if they can diversify idiosyncratic risk better than workers, they behave "as if" they were less risk-averse, and thus insure workers (Berk and Walden 2013).

Ironically, such risk-sharing arrangements can break down because of moral hazard and limited commitment on the side of *firms*, rather than *employees*: firms must be trusted to honor their promises in the event of a negative shock, as assumed by implicit contract theories. Recent empirical literature, surveyed below, highlights that family ownership might be particularly suited to address this commitment problem, by establishing an identity between the firm and the household that controls it: family firms are less likely than nonfamily ones to breach implicit contracts because the reputation of the controlling family is at stake. Long-term ownership and control, possibly over generations, enable them to win and retain the trust of their employees.[2] Their credibility is also buttressed by their resilience to hostile takeovers, and hence to unforeseen

[1] The first unemployment benefit scheme was introduced in the United Kingdom in 1911, followed by a scheme in Germany in 1927. In response to the great depression, the U.S. federal government passed the Social Security Act of 1935, which encouraged the states to set up unemployment insurance programs. The process spread out to the other advanced economies during the expansion phase of the welfare state following the Second World War.

[2] This specificity of family firms was recognized by President Obama in a 2012 speech: "The family business in Warroad, Minnesota, that didn't lay off a single one of their four thousand employees during this recession, even when their competitors shut down dozens of plants, even when it meant the owners gave up some perks and pay …understood their biggest asset was the community and the workers who helped build that business" (*Baltimore Sun* 2012).

changes in control, as argued by Shleifer and Summers (1988).[3] In the context of implicit contract theory, this "commitment hypothesis" implies that family firms can credibly offer more secure employment than nonfamily firms. In exchange for this security, they should be able to pay lower wages, effectively earning an "insurance premium."

If indeed both governments and firms can provide insurance to workers, it is natural to expect them to substitute for each other: insofar as the social security system provides more insurance to workers, they should demand less insurance from firms. Yet, so far no research has investigated whether this substitutability is present in the data, and how strong it is. This is precisely our research question. To address it, we use both cross-country and time-series variation in government insurance programs as a shifter of workers' *demand for insurance* within firms and family versus nonfamily ownership as a shifter of firms' *supply of insurance*. We investigate whether firms stabilize employment more in countries and periods in which governments offer less insurance. We expect the negative relationship between government- and firm-provided insurance to emerge more forcefully among family firms: because of the lack of a credible commitment technology, nonfamily firm insurance provision should be less responsive to changes in public insurance. This naturally leads to a differences-in-differences empirical strategy, based on the interaction between family-firm status and social security provision, to investigate whether firm-provided insurance and social security are substitutes and whether the degree of substitutability differs between family and nonfamily firms.

Our tests rely on a firm-level panel comprising 7,822 firms in 41 countries from 1988 to 2013. We estimate the degree to which firms' shocks are passed over to employment: the lower the pass-through, the higher the insurance provided. We measure shocks as fluctuations in industry-level sales or as the unanticipated component of the change in firm-level sales. These two different measures of shocks capture different aspects of firms' insurance provision to their employees, and each has its own merits and shortcomings, as explained in Section 2. Since insurance obviously matters for adverse shocks, we separately repeat the estimation for negative realizations of sales shocks. Moreover, since firms should be better positioned to insure their employees against transient shocks than persistent ones, we also assess employment insurance in response to each of these two types of shocks.

Our difference-in-differences methodology assesses the relationship between employment insurance provided by firms and by governments exploiting both cross-country differences in social security arrangements and within-country changes due to social security reforms. We measure public

[3] A firm's implicit contracts with its employees lack credibility when control is contestable, because the firm may be taken over by an entrepreneur who is not bound by this commitment. Shleifer and Summers (1988) argue that a corporate raider may be precisely attracted by the potential short-run gain from breaching such contracts, for example, firing workers when sales diminish or cutting wages once employees' investment in firm-specific human capital is sunk.

insurance with the income replacement rate, that is, the ratio of unemployment benefits to previous salary. Replacement rates differ widely not only across countries (from 0% to greater than 50%), but also over time in the same country, due to reforms of national social security systems.

Our key finding is that indeed firm- and government-provided insurance are substitutes: when governments step up the provision of unemployment insurance by increasing the replacement rate, family firms reduce the supply of insurance to their employees by increasing the pass-through of sales shocks, and vice versa. This does not apply however to nonfamily firms: these do not vary their provision of insurance significantly in either case. Family firms almost completely offset shocks when the social security replacement rate is zero, but the offset drops by approximately one-third for a replacement rate of 50%. This substitutability between private and public unemployment insurance is present also when one only focuses on large and persistent changes in the replacement rate, emerges more clearly for negative shocks and disappears for persistent shocks, which are more difficult to insure, as predicted by Gamber (1988).

A skeptical reader may suspect that our finding that family firms provide more stable employment than nonfamily ones, and the more so the less generous the public insurance system, is vitiated by endogenous selection of firms out of family ownership,[4] by unobserved heterogeneity between family and nonfamily firms, or by reverse causality from changes in employment to changes in the replacement rate. We address these concerns in a number of ways, exploiting both the cross-country and the time-series dimensions of our data.

First, we show that in our sample the fraction of family firms is uncorrelated with country-level institutional variables, when controlling for country fixed effects. Hence, regressions based only on within-country variation in the replacement rate are free from selection issues associated with cross-country differences. We also repeat the estimation on a sample of family firms matched with similar nonfamily firms in the same industry and country, and obtain results consistent with those found with the panel estimation on the full sample. Therefore, our findings cannot be explained by systematic differences in the observable characteristics of these two types of firms, including their different distribution across countries or sectors.

Second, one may worry that our results are driven by unobserved heterogeneity between family and nonfamily firms, as some country-level unobserved variable may be driving both the presence of family firms and the generosity of public unemployment insurance. We address this problem by including a full set of interactions between country dummies, the shocks and the family firm dummy, so as to effectively rely only on within-country variation to estimate the parameters of interest: this eliminates the impact of

[4] We use the expression "selection out of family ownership" rather than "selection into family ownership" because firms typically are born as family firms and then some switch to a different ownership structure.

all constant country-level characteristics—whether or not observed—on the estimates. Even in this demanding specification, we still find that family firm insurance provision decreases with more generous public insurance provision, whereas nonfamily firm provision is unaffected. Also if our regressions are estimated separately on the two subsamples of family and nonfamily firms, we find that family firms mitigate more the impact of sales shocks when public unemployment insurance is less generous; instead, in the subsample of nonfamily firms, employment stabilization does not significantly respond to public insurance.

To deal with possible reverse causality from employment growth to the replacement rate, we include country-time effects in all our regressions: hence firm-level employment changes—our dependent variable—are purged of all aggregate country-level variation, including changes related to the business cycle.

We also study the wage implications of the substitutability between public- and firm-provided insurance. Risk-averse workers should be willing to pay an insurance premium by accepting a lower wage in exchange for the extra employment stability offered by family firms. Arguably, this willingness to pay should be inversely related to the extent of government-provided insurance. This is exactly what we find in our data: controlling for country, industry, and time effects, wages in family firms are 6% lower than in nonfamily firms when the government provides no insurance, and the difference decreases as the replacement rate becomes more generous. These results are to be taken with caution, being obtained on a considerably smaller sample than those regarding employment insurance, since information about wages is missing for over 50% of the firms for which we have employment data.

When investigating if firms differ in their provision of wage insurance, we find that family firms actually provide *less* wage insurance than nonfamily firms. This result can be explained by another feature of employment relations in family firms: these are known to feature more "paternalistic" and less confrontational labor relations (Mueller and Philippon 2011). Our finding on wage insurance is consistent with this "renegotiation hypothesis" according to which greater trust in industrial relations enables family firms to provide job security in exchange for wage flexibility. Further, the data suggest that the unemployment insurance provided by the government does not affect the provision of wage insurance by firms, and by family firms in particular.

As a final exercise, we investigate the mechanisms through which family firms provide insurance. We document that their profits, dividends and cash reserves act as buffers that absorb the impact of sales shocks, especially adverse ones, much more than those of nonfamily firms. We also document that access to financial markets is important for them to be able to provide insurance to their employees (Berk and Walden 2013): during banking crises, family firms both provide less insurance than in normal times and substitute less for

public insurance. Instead, in recessions not associated with a banking crisis, family firms still provide employment insurance, because in such recessions they arguably retain access to finance.

1. Related Literature

Our study differs from most of the previous work on risk-sharing within firms, which focus on specific countries and accordingly cannot explore how differences in public unemployment insurance influence risk-sharing between firms and their employees.

A growing literature, mostly based on French data, shows that family firms differ from nonfamily ones in their employment policies. In French heir-managed firms, employment is less sensitive to industry-wide sales shocks, average wages are lower, and profits are higher than in other firms (Sraer and Thesmar 2007; Bassanini et al. 2013). Family firms also feature lower layoff risk during dynastic chief executive officer (CEO) transitions (Bach and Serrano-Velarde 2015). This greater employment stability appears to buy social peace: family firms face fewer strikes and less unionized workers, and inflict sanctions and undergo litigation less frequently (Mueller and Philippon 2011).

Employment in family firms has also been found to respond differently to crises. In Italy, family firms reacted to the 2008 crisis by safeguarding more than nonfamily firms workplaces closer to the firm's headquarters (D'Aurizio and Romano 2013). But evidence from Norway indicates that, though generally less likely to shut down, family firms may be less resilient in a severe banking crisis, such as that of 2009 (Bryson, Dale-Olsen, and Gulbrandsen 2016). Both of these findings are consistent with our evidence.

The only cross-country study related to our work that we are aware of is Bennedsen et al. (2015), who investigate whether family firms have a comparative advantage owing to their ability to offer implicit contracts. Differently from us, they test whether family firms have higher return on assets in countries with less regulated labor markets, while we consider whether family firms provide employment insurance, and do so differently depending on public provision of insurance.

Kim, Maug, and Schneider (2014) inquire whether risk-sharing within firms varies depending on workers' role in corporate governance. Using data from German companies, they find that in firms with parity codetermination white-collar and skilled blue-collar workers are protected against layoffs and wage cuts, whereas unskilled workers are not. Only white collar workers pay for this benefit, with a 3% lower wage.

There is also evidence that firms' ability to access credit affects their ability to provide risk-sharing benefits. This finding is, again, consistent with our findings: for example, Sharpe (1994) documents that in the United States, employment more sharply responds to fluctuations in aggregate output in more leveraged firms.

Another strand of research investigates firms' wage insurance against temporary and permanent shocks: Guiso, Pistaferri and Schivardi (2005) show that the earnings of Italian workers are fully insured against transitory shocks to the firm's value added and only partially insured against permanent shocks.[5]

2. Empirical Methodology

Our main research question is whether the insurance implicitly provided by firms is a substitute for that provided by governments via the social security system. As theory suggests that family firms are better at committing to provide insurance to their employees, we test whether the substitutability between private and public insurance is stronger for family firms than for nonfamily ones. This section presents our empirical methodology, and discusses the relevant identification issues and how we address them.

2.1 Specifications

To quantify the insurance that firms offer to their employees, we estimate the elasticity of employment or wages to shocks in sales, namely the extent to which these shocks are allowed to "pass-through" to their employees: the larger the "pass-through coefficient," the less insurance firms provide to their employees. Specifically, we test whether this pass-through coefficient varies depending on social security arrangements, which should affect the employees' demand for insurance, and on firms' family ownership status, which determines their ability to supply insurance. For robustness, we adopt different definitions of a "shock" in sales: in some specifications, it is the percentage change in the industry's sales; in others, it is an idiosyncratic firm-level shock, measured as the unexpected component of the change in the firm's sales. In yet other specifications, the change in sales is broken down into positive and negative, or transitory and persistent components.

The baseline specification of our employment regression is

$$\Delta n_{it} = \beta_1 \varepsilon_{it} + \beta_2 \varepsilon_{it} F_{it} + \beta_3 \varepsilon_{it} S_{ct} + \beta_4 \varepsilon_{it} F_{it} S_{ct} + \beta_5 F_{it} + \beta_6 F_{it} S_{ct} + \gamma' X_{it-1} + \mu_{cj} + \mu_{ct} + u_{it}, \quad (1)$$

where the subscripts i, j, c, and t index firms, industries, countries, and years, respectively, Δn_{it} is the change in the log of employment of firm i in year t, ε_{it} is either an idiosyncratic shock to the sales of firm i or the shock to the sales of its industry j (excluding firm i itself) in year t, F_{it} is a family-firm dummy equal to 1 for family-owned firms and 0 for nonfamily ones, S_{ct} is a measure of public unemployment insurance (based on the income replacement rate) provided in

[5] Broadly similar results are reported for Portugal by Cardoso and Portela (2009), for Hungary by Kátay (2016), and for Germany by Guertzgen (2014).

country c and year t, and X_{it-1} is a vector of firm-specific variables measured in year $t-1$: size (log of market capitalization), asset tangibility (ratio of plant, property, and equipment to total assets), profitability (return on total assets), and leverage (ratio of total debt to total assets). Finally, μ_{cj} is a country-industry effect, μ_{ct} is a country-year effect, and u_{it} is the error term. The country-year effects absorb the impact of all country-specific aggregate variables, such as macroeconomic and time-varying institutional variables.

In a variant of this specification we also include an interaction between country effects and the family firm dummy, to allow for the fact that the difference in employment growth between family and nonfamily firms may vary across countries. In another specification, we include firm fixed effects instead of country-industry effects. Finally, for robustness, we also estimate specifications that include financial development, labor market tightness, employment protection legislation and creditor rights, since also these institutional variables—besides unemployment insurance—may affect the response of employment to the shocks hitting firms.

In specification (1), the coefficient β_1 measures the elasticity of employment to the sales shock (the pass-through coefficient) in nonfamily firms, and β_2 the difference in that elasticity between family and nonfamily firms; β_3 captures the baseline effect of public insurance on risk-sharing in firms, whereas β_4 is the differential effect of public insurance on risk-sharing in family firms.[6] β_5 controls for potential differences in the rate of employment growth between family and nonfamily firms, and β_6 allows family firms to have different employment growth rates in countries with different public insurance systems. The specification cannot include public insurance among the explanatory variables because its effect is absorbed by the country-year effects, μ_{ct}. Hence $\beta_2 < 0$ indicates that employment responds less to shocks in family than in nonfamily firms ($\beta_2 = -\beta_1$ being the case of full insurance by family firms), $\beta_3 > 0$ that more public insurance is associated with a greater pass-through of shocks to employment in nonfamily firms, and $\beta_4 > 0$ that the increase in pass-through associated with public insurance is stronger for family firms. In other words, $\beta_3 > 0$ indicates substitutability between public and private provision of employment insurance, and $\beta_4 > 0$ implies that this substitutability is particularly strong for family firms.

We also test if firms differ in the propensity to stabilize wages, and if such stabilization depends on the unemployment insurance provided by the government. We estimate an equation similar to Equation (1), the only difference being that the dependent variable is the growth rate of the average

[6] More precisely, the estimate of the pass-through for nonfamily firms is $\beta_1 + \beta_3 S_{it}$, whereas for family firms, it is $\beta_1 + \beta_2 + (\beta_3 + \beta_4) S_{it}$, and therefore in both cases it depends on the level of the replacement rate S_{it} in the relevant country and year. Therefore, when we discuss pass-through based on estimates of β_1 and β_2 only, we are evaluating it for the baseline case of $S_{it} = 0$, that is, a country with no public unemployment insurance.

real wage, measured by the change in its logarithm:

$$\Delta w_{it} = \delta_1 \varepsilon_{it} + \delta_2 \varepsilon_{it} F_{it} + \delta_3 \varepsilon_{it} S_{ct} + \delta_4 \varepsilon_{it} F_{it} S_{ct} + \delta_5 F_{it} + \delta_6 F_{it} S_{ct} + \phi' X_{it-1} + \mu_{cj} + \mu_{ct} + u_{it}, \quad (2)$$

As explained below, unfortunately the sample for which this regression can be estimated is considerably smaller than for employment Equation (1), as wage data are available for only about 43% of the firms for which we have employment data, since reporting wages in accounting data is at the firm's discretion.

Finally, we test an important prediction of the implicit contract theory, namely that the insurance provided by companies to their employees is "priced" in the form of lower wages. An implication of this prediction is that, insofar as privately supplied insurance is a substitute for public unemployment insurance, its implicit "price" should be lower if public unemployment insurance is more generous: a higher replacement rate should induce employees to place a lower value on firm-provided insurance. To test these predictions, we estimate a regression for the log of the real wage w_{it}:

$$w_{it} = \lambda_1 F_{it} + \lambda_2 F_{it} S_{ct} + \pi' X_{it-1} + \mu_{cj} + \mu_{ct} + e_{it}, \quad (3)$$

where $\lambda_1 < 0$ implies a wage discount for family firms, and $\lambda_2 > 0$ a lower wage discount if the replacement rate S_{ct} is higher. Like in previous specifications, we control for firm characteristics, X_{it-1}, country-industry or firm effects, μ_{cj}, and country-time effects, μ_{ct}.

2.2 Identification

A key concern is how to interpret the estimates of our regressions. Specifically, does a negative estimate of coefficient β_2 in Equation (1) imply that family ownership and control leads a firm to offer greater employment stability than other firms? By the same token, can a positive estimate of coefficient β_4 be read as meaning that more generous public unemployment insurance induces family firms to be less committed to employment stability? Such interpretations of our estimates might be unwarranted for two reasons: endogenous selection out of family ownership and unobserved heterogeneity between family and nonfamily firms.[7]

As far as family firms' selection is concerned, one may worry that, for some reason, family firms are more prevalent in countries in which the government offers less public unemployment insurance and firms *in general* offer more employment stability. If so, our estimates would reflect the overrepresentation of family firms in such countries rather than a causal effect from family ownership to insurance. We deal with this problem in several ways.

[7] The same concerns also apply to the wage growth regression (2): since they are similarly addressed in the estimation, here, for brevity, we refer to employment regression only.

First, we estimate country-level panel regressions of the fraction of family firms on the replacement rate and on other time-varying country characteristics that, according to the literature, may affect family ownership (family values, trust, financial development, labor market tightness, employment protection legislation). We also estimate linear probability models with firm-level data, where the dependent variable equals 1 if the firm is family owned and 0 otherwise. The results are reported in Tables A1 and A2 of the Web Appendix. In specifications that do not include country effects, the estimates show that the presence of family firms is uncorrelated with all country-level variables, except for financial development and the replacement rate. But the coefficient of the replacement rate is positive and significant. So, in countries in which employment insurance is less generously provided by the government, and therefore more highly valued by employees, there are *fewer* family firms, not more of them, a finding that excludes the possibility that our results are driven by this type of sample selection. Moreover, in specifications that include country effects, family firm presence is uncorrelated with *all* country-level variables, including the replacement rate, except for financial markets development. Hence, the fraction of family firms is orthogonal to within-country variation in the generosity of the social security system: insofar as our estimates are based only on such variation, they are immune from the above selection critique. As explained below, one of our specifications only exploits this dimension of data variability.

As a second check for the potential effects of heterogeneous selection, we estimate specifications (1) and (2) for a sample of matched family and nonfamily firms, obtained with propensity score matching based on firm characteristics (country, industry, size, return on assets, asset tangibility, leverage, and cash-flow volatility). In these estimates, family and nonfamily firms are balanced on the variables used to construct the propensity score, so that sample composition issues along these dimensions cannot affect the estimated coefficients. We also separately estimate Equation (1) for family and nonfamily firms, exploiting the variability of the insurance provided by each type of firm as it faces different degrees of public insurance: these regressions are by construction immune from any potential sample composition problem in terms of family and nonfamily firms.

Even though matching techniques control for observed heterogeneity, they do not eliminate concerns stemming from unobserved heterogeneity: family and nonfamily firms might differ along unobserved dimensions, in addition to the capacity to commit to implicit contracts, and this might also affect their response to shocks. For example, family firms might use production technologies that require more firm-specific human capital. If so, they may be more reluctant to fire workers in the wake of negative shocks because this would entail a loss of valuable human capital. This can be viewed as an omitted variable bias: following up on the example, the different technology used by family and nonfamily firms is unobserved, yet it affects the reaction to shocks. This omitted

variable would be correlated with $\varepsilon_{it} F_{it}$, so that the estimate of β_2 is biased. This problem arises in all within-country studies of insurance provision by family firms. But our cross-country setting allows us to move one step further. In fact, our main coefficient of interest is β_4, which captures the differential degree of insurance that family firms provide in countries with different degrees of public insurance. This coefficient is biased if the potential omitted variable satisfies two requirements: (1) the difference in this variable between family and nonfamily firms is correlated with public unemployment insurance, and (2) it affects firms' response to shocks. For example, if the different sensitivity of employment to shocks in family and nonfamily firms were to stem from different technologies, such technological differences would have to decrease as the generosity of public unemployment insurance increases. Clearly, this is a stronger requirement than just assuming some form of heterogeneity between family and nonfamily firms that determines the response to shocks.

However, a skeptical reader might still argue that this is a possibility: there might be country characteristics that affect differentially family and nonfamily firms and that are also correlated with the replacement rate. To address this concern, in yet another specification we exploit *only within-country* variation in public unemployment insurance to assess if, as this changes, the insurance provided by family firms changes accordingly. In this specification, we add as additional controls a set of country dummies interacted with the shock and the family-firm dummy (including all lower-level interactions):

$$\Delta n_{it} = \beta_3 \varepsilon_{it} S_{ct} + \beta_4 \varepsilon_{it} F_{it} S_{ct} + \beta_6 F_{it} S_{ct} + (\rho_{1c} \varepsilon_{it} + \rho_{2c} F_{it} + \rho_{3c} \varepsilon_{it} F_{it}) \mu_c + \gamma' X_{it-1} + \mu_{cj} + \mu_{ct} + u_{it}, \quad (4)$$

where μ_c is a country dummy. In this specification, the triple interaction $\varepsilon_{it} F_{it} \mu_c$ captures any country-level attribute possibly correlated with the replacement rate and capable of determining a differential response to shocks by family and nonfamily firms. Hence, the coefficient β_4 of the interaction between the shock, the family firm dummy and the replacement rate is estimated exploiting only changes in family firm provision of insurance following changes in public insurance. This additional control comes at the cost of not being able to identify the direct effects of the shocks, that are absorbed by the interaction with the country dummies: in fact, in Equation (4), we drop β_1 and β_2.

Another possible concern is reverse causality from firm-level employment growth Δn_{it} to the provision of public unemployment insurance S_{ct} in the corresponding country: governments may expand the provision of employment insurance in recessions and reduce it in expansions. However, all our specifications address the potential endogeneity of public unemployment insurance by including a country-time effect μ_{ct}, which absorbs any country-level aggregate variation in firm-level employment growth Δn_{it} and thus

any possible feedback from aggregate employment growth to unemployment insurance S_{ct}.[8]

3. Data and Variables

To gauge the differential ability of firms to provide employment and wage insurance in countries with different unemployment insurance systems, we bring together three types of data: (1) firm-level measures of employment, wages, sales, and other characteristics including total assets, leverage, asset tangibility, and profitability; (2) firm ownership to classify firms as family or nonfamily firms; and (3) country-level measures of public unemployment insurance, labor market tightness, and financial development.

3.1 Sources and definitions

Employment, wage and financial data for firms outside the United States are drawn from Worldscope and Osiris and for U.S. firms from Compustat, which contains historical data from the financial reports of publicly listed companies. Our data refer to listed firms in 41 countries and span from 1988 to 2013. We drop financial institutions and firms that do not have employment data (total number of employees at firm level) for at least seven consecutive years, so as to have reasonably long time series for each firm. This leaves 7,822 firms and 124,432 firm-year observations. Wage data (total firm-level staff costs) for at least seven consecutive years are available for a subset of 3,350 firms and a total of 49,122 firm-year observations; however, our results about employment insurance continue to hold in this subset of firms.

Family firms are defined as those where a family blockholder is the ultimate largest shareholder, has at least 25% of the firm's cash flow rights, and is present in the firm's management. This strict definition is applied in all our baseline tests, although we then check robustness by relaxing it in two ways: (1) lowering the threshold for cash flow rights to 10% or (2) retaining the 25% threshold but removing the requirement of presence in the firm's management. All our results are confirmed with these alternative definitions.

Ownership data are based on the sources used in Ellul et al. (2010). In identifying whether the firm's ultimate owner is a family blockholder, the major challenge is that in many firms the largest shareholder is a private company or a nominee account: in these cases ascertaining if the firm is family-owned requires identifying the owner of the controlling private company or the holder of the nominee account. To this purpose, we first use the scant ownership data in Worldscope, together with hand-collected data taken from company

[8] Moreover, our measure of public unemployment insurance is purged of any automatic business-cycle variation: as explained in detail in Section 3.1, the variable changes by construction only when legal reforms change either the unemployment replacement rate or the length of the benefits' eligibility period, and therefore is unaffected by the operation of automatic stabilizers built into the existing social security rules.

Web sites, and—for European firms—from the ownership file of AMADEUS. Altogether these sources allow us to identify the ultimate blockholder for less than 25% of our sample. For the remaining firms, we resort to direct information obtained via a questionnaire about their ultimate owner. For nonrespondents (32% of the sample) we use the classification in Faccio and Lang (2002) for European firms and that in Claessens, Djankov, and Lang (2000) for East Asian firms: we classify as nonfamily firms those classified as "widely held" by these studies. For U.S. firms, we collect ownership data from the 20-F forms or proxy statements every two years over the same period. The definition of family firms varies in the literature, mostly because of different ownership thresholds used to define family blockholders: based on our criterion, the sample of 7,822 firms used in our estimation contains 2,359 family firms. The resultant fraction of one-third is bracketed by those in previous studies.[9]

Our country-level measure of public unemployment insurance, S_{ct}, is based on the income replacement rate, that is, the ratio of unemployment benefits to previous salary. We use the gross replacement rates (GRRs) as computed by Aleksynska and Schindler (2011), using the ratio of the unemployment insurance benefits received by a worker in the first two years of unemployment to the worker's last gross wage. This measure is intended to capture both the level and the duration of unemployment benefits, which are the two measures used by Agrawal and Matsa (2013) in their study on U.S. state-level data. Aleksynska and Schindler (2011) calculate GRRs for the first and second year of unemployment at annual frequency by identifying changes in regulations. The information is obtained from various sources including the ILO, OECD, and national agencies. We extend their measures, which are computed up to 2005, to the end of our sample period (2012). This variable—hereafter labeled "unemployment security"—is used in all our specifications to measure the public provision of unemployment insurance.

Finally, we measure each country's financial development by the ratio of its stock market capitalization to gross domestic product (GDP) computed by the World Bank (World Development Indicators), employment protection legislation by the EPL measure produced by the OECD (Strictness of Employment Protection data set), and labor market tightness by the reciprocal of the share of long-term unemployed in total unemployment ("long-term" being 12 months or more), so that higher values indicate shorter unemployment duration (based on the OECD's Employment dataset). While EPL gauges the regulatory costs of dismissing workers, labor market tightness captures the likelihood of finding a new job quickly, hence the extent to which the state of the labor market itself mitigates unemployment hardship. This variable

[9] The fraction of family firms in our data set is smaller than in the data set of Faccio and Lang (2002) (for European firms) and of Claessens, Djankov, and Lang (2000) (for Asian firms), but larger than that in the data set used by Lins et al. (2013).

therefore captures a different dimension of the demand for employment insurance. Since the presence of family firms correlates with financial development but not with other country-level variables, we control for financial development in the main tables. Employment protection legislation and labor market tightness are included as additional controls in specifications reported in the Web Appendix as robustness checks.

3.2 Measures of sales shocks

The sales shock ε_{it} is a key variable in specifications (1), (2), and (4). As already mentioned, we measure these shocks in two different ways, and use both measures to test the robustness of our results. First, we measure the sales shock ε_{it} as the growth of the sales of the industry to which firm i belongs, after subtracting the sales of firm i itself. The advantage of this measure is that it does not include the sales of firm i, and therefore avoids potential reverse causality from employment growth to the sales growth of firm i. The disadvantage is that industry-level shocks may give a biased measure of firms' employment insurance, as they compound two elements that are actually distinct: how much insurance a firm offers when hit by a shock and how exposed the firm is to industry shocks. As argued by Michelacci and Schivardi (2013), family firms might select low-risk-low-return, and possibly less cyclically sensitive, projects. If so, employment in family firms might respond less to industry shocks because these firms are less exposed to them. In fact, in a regression of firm sales growth on industry sales growth (plus the controls X_{it-1}, the country-industry dummies μ_{cj} and the time dummies μ_t), the coefficient for nonfamily firms is 0.58, while the coefficient of the interaction between industry shocks and the family dummy is -0.21, significant at the 5% level. Although this still implies lower employment risk in family firms, the underlying economic mechanism is very different from the firm's sheltering workers from actual shocks. This explains why we also rely on a measure of firm-level idiosyncratic shocks ε_{it}, estimated as the residual from a first-stage predictive regression: the growth rate of the sales of firm i in year t is regressed on its lagged value, the same set of firm-level control variables like in specification (1), industry effects, and country-time effects. The inclusion of country-time effects ensures that the resultant estimates of the firm-level sales shocks are purged of all country-level aggregate variation in sales, and therefore reflect purely idiosyncratic firm-level risk. Since the lagged dependent variable and fixed effects are included, the predictive equation is estimated via the generalized method of moments (GMM) of Arellano and Bond (1991), to obtain consistent estimates. The residual from this regression is then included as the ε_{it} variable in the estimation of Equations (1) and (2) and their variants. To correct for the generated regressor problem, in all the specifications that rely on this measure of the shock, ε_{it}, we use bootstrapped standard errors calculated using 100 repetitions.

3.3 Descriptive statistics

Table 1 shows the number of firms for each of the 41 countries in our sample. As expected, there is significant variation, with the United States, Japan, the United Kingdom, Germany, France, and Australia having the largest samples.

Columns 1 and 2 show the number of nonfamily and family firms in each country. The relative number of these two types of firms considerably varies across countries: nonfamily firms are more widespread in Australia, Canada, Ireland, Japan, New Zealand, Norway, the United Kingdom, and the United States, where the number of nonfamily firms is at least twice as large as that of family ones; the opposite occurs in Argentina, Brazil, Greece, Hong Kong, Malaysia, Mexico, and South Korea, where family firms are more widespread than nonfamily ones. The differences are less extreme in continental Europe, but the picture is also mixed, with fewer family firms in Denmark, France, Germany, the Netherlands, Spain, and Sweden and more in Italy and Portugal. Overall, our sample includes about twice as many nonfamily firms as family firms. Columns 3 and 4 report average firm sales growth by country, for nonfamily and family firms, respectively. Broadly speaking, firms in developing countries have higher annual sales growth than in developed ones, but there is also significant dispersion in the comparative performance of family and nonfamily firms: in some countries (e.g., Australia, Brazil, Colombia, Hong Kong, Singapore, and the Czech Republic) sales growth is faster in family firms, whereas in others (e.g., France, Germany, Mexico, the Netherlands, New Zealand, and South Africa) the opposite is true. Columns 5 and 6 show average total employment in nonfamily and family firms. In almost all countries family firms have fewer employees, consistently with the literature on the relative size of family and nonfamily firms.

Column 7 shows our unemployment security measure, that is, the average gross income replacement rate, for the countries in our sample. The international differences are significant: for example, in Colombia, Indonesia, Malaysia, Mexico, and Singapore, the replacement rate is zero; in France, the Netherlands, Norway, Portugal, Spain, and Switzerland, it is over 0.40. In addition, the rates significantly vary over time—within the same country—in a good number of countries because of reforms in unemployment insurance. For example, South Korea had no unemployment insurance until 1994, introduced it in 1995 with a replacement rate of 0.125, and reduced it to 0.063 in 2002. In Australia, several changes have influenced the social security system: the replacement rate rose gradually to 0.23 in 1997 and then slowly decreased to 0.19 in 2007. To highlight this variability over time, Column 8 of Table 1 shows the coefficient of variation of the GRR for each country, that is, its standard deviation divided by its average over 1988-2013. Several countries, such as Italy, South Korea, Taiwan, Thailand, and Turkey, experienced significant changes. Others did not: for example, Mexico had no unemployment insurance throughout the entire period, and in the United Kingdom and Spain the replacement rate changed little over time, respectively, around a low and high average.

Table 1
Descriptive statistics

	Number of non family firms (1)	Number of family firms (2)	Sales growth of nonfamily firms (3)	Sales growth of family firms (4)	Employment of nonfamily firms (5)	Employment of family firms (6)	Mean GRR (7)	Coefficient of variation of GRR (8)
Argentina	9	18	0.074	0.088	3,859	2,207	0.136	0.324
Australia	393	102	0.091	0.121	6,540	1,844	0.199	0.118
Austria	39	27	0.102	0.090	4,843	2,881	0.385	0.037
Belgium	30	21	0.082	0.097	5,073	2,948	0.336	0.034
Brazil	33	76	0.105	0.142	9,135	3,122	0.068	0.231
Canada	296	53	0.072	0.084	9,571	3,025	0.238	0.185
Chile	12	19	0.121	0.131	3,601	1,949	0.079	0.644
Colombia	8	14	0.098	0.140	3,102	1,822	0.000	–
Czech Republic	15	14	0.101	0.122	3,218	1,043	0.060	0.000
Denmark	40	25	0.078	0.067	4,929	2,186	0.518	0.107
Finland	63	53	0.092	0.102	6,011	2,107	0.396	0.160
France	312	179	0.097	0.078	10,092	6,090	0.447	0.069
Germany	349	210	0.110	0.093	12,057	6,221	0.306	0.134
Greece	8	19	0.046	0.051	3,214	1,879	0.168	0.211
Hong Kong	38	78	0.120	0.147	7,180	8,085	0.154	0.397
India	102	97	0.145	0.138	8,217	6,149	0.130	0.000
Indonesia	11	19	0.076	0.102	3,218	3,409	0.000	–
Ireland	49	11	0.065	0.056	5,045	2,110	0.250	0.145
Israel	49	57	0.092	0.081	4,379	2,815	0.154	0.067
Italy	61	95	0.078	0.070	9,021	5,144	0.298	0.701
Japan	798	104	0.092	0.067	11,207	2,135	0.130	0.187
Malaysia	16	34	0.074	0.052	3,745	2,497	0.000	–
Mexico	29	48	0.092	0.052	9,441	5,901	0.000	–
Netherlands	52	27	0.082	0.061	9,624	7,280	0.491	0.114
New Zealand	27	8	0.113	0.070	2,724	1,244	0.250	0.102
Norway	80	40	0.094	0.094	3,598	1,655	0.517	0.120
Peru	8	10	0.081	0.086	1,605	982	0.000	–
Philippines	28	41	0.087	0.104	3,072	1,805	0.000	–
Portugal	22	30	0.049	0.061	3,833	1,788	0.617	0.108
Singapore	21	34	0.140	0.146	9,314	5,211	0.000	–
South Africa	29	15	0.118	0.085	6,221	2,519	0.144	1.071
South Korea	96	154	0.123	0.131	6,512	8,912	0.063	0.792
Spain	195	143	0.102	0.072	9,771	5,209	0.520	0.051
Sweden	92	57	0.091	0.083	9,283	7,081	0.387	0.131
Switzerland	119	59	0.099	0.080	11,409	7,108	0.464	0.172
Taiwan	65	56	0.141	0.118	5,740	4,911	0.096	0.991
Thailand	39	72	0.098	0.131	4,976	3,192	0.047	1.372
Turkey	36	16	0.102	0.115	4,287	2,210	0.080	1.016
United Kingdom	722	111	0.075	0.086	10,956	1,540	0.092	0.047
United States	1,065	101	0.072	0.082	15,972	1,580	0.134	0.210
Uruguay	7	12	0.081	0.103	1,091	822	0.132	0.052
Number of firms	5,463	2,359						
Average values			0.093	0.095	6,504	3,478	0.207	0.295

Column 1 reports the number of nonfamily firms in each country in our sample. Column 2 reports the number of family firms in each country in our sample. Columns 3 and 4 report the average annual sales growth of nonfamily and family firms, respectively, over the sample period from 1988 to 2013. Columns 5 and 6 report the average total firm-level number of employees of nonfamily and family firms, respectively, over the same sample period. Column 7 reports the average (over time) GRR, calculated as the ratio of the unemployment insurance benefits received by a worker in the first two years of unemployment to the worker's last gross wage in each country of the sample, using the method of Aleksynska and Schindler (2011). Column 8 reports the coefficient of variation of the GRR, that is, the ratio of its standard deviation for each country divided by the respective mean.

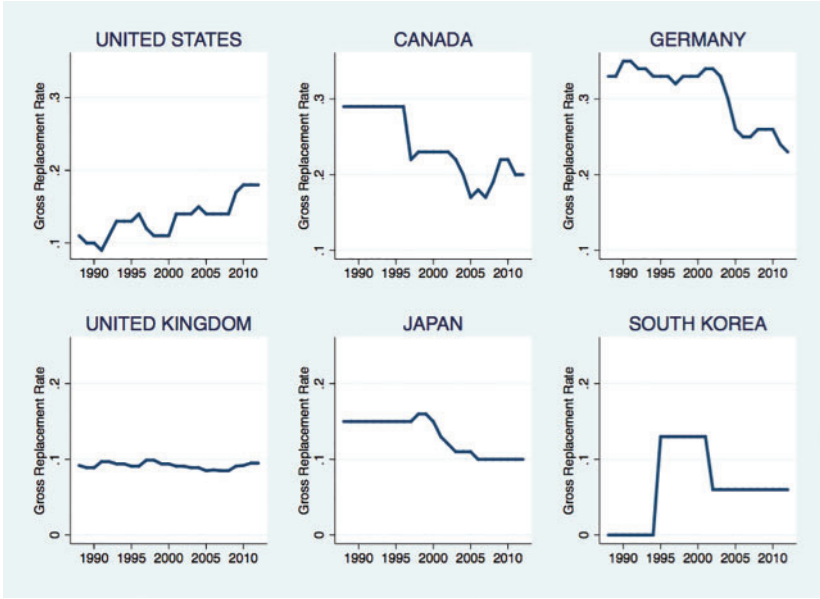

Figure 1
Gross replacement rates for the six major countries by continent
The figure shows the gross replacement rates (GRRs) for the two countries with the largest number of firms in each of three continents: the United States and Canada (for the Americas), Germany and the United Kingdom (for Europe), and Japan and South Korea (for Asia). GRRs are calculated as the ratio of the unemployment insurance benefits received by a worker in the first two years of unemployment to the worker's last gross earnings.

Figures 1 and 2 illustrate the cross-country and within-country variability of unemployment security. Figure 1 displays the time series of unemployment security for the two countries with the largest number of firms in our sample from America (the United States and Canada), Asia (Japan and South Korea), and Europe (the United Kingdom and Germany). The figure confirms the considerable variability of replacement rates over time, as well as the variation of its average level across countries. Figure 2 documents that unemployment security varies widely both across countries and over time also for the sample as a whole: the left panel of the figure illustrates cross-country variation, by plotting the average replacements rate for each country; the right panel provides a gauge of the time variation of replacements rates within each country, and shows that only 9 countries (out of 41) feature no change in unemployment security over the sample period.

4. Employment Insurance within Firms

This section presents the regression results on the provision of employment insurance by firms, and its relationship with public unemployment insurance. We start with panel regressions (Section 4.1), then report the estimates obtained

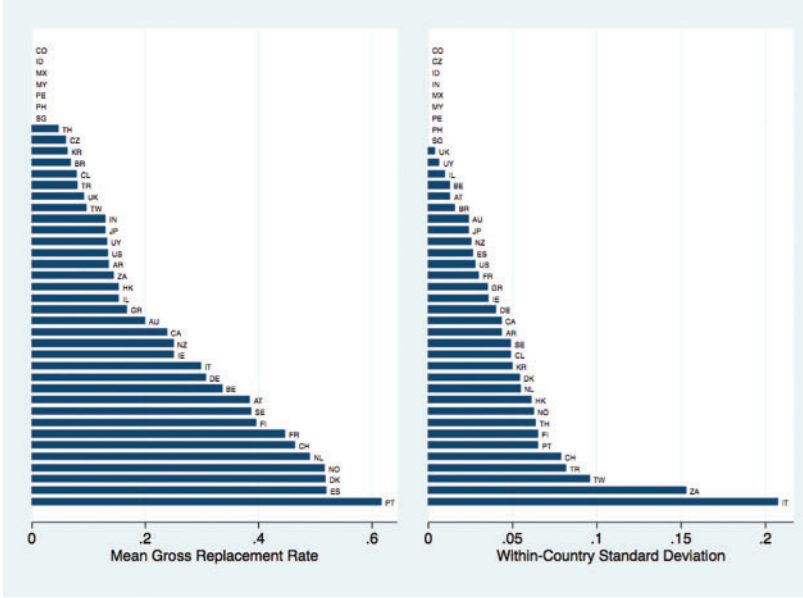

Figure 2
Mean and standard deviation of the GRRs, by country
The figure shows the within-country time-average (left panel) and standard deviation (right panel) of the GRRs for all the countries in our sample over the period 1988–2013. GRRs are calculated as the ratio of the unemployment insurance benefits received by a worker in the first two years of unemployment to the worker's last gross earnings.

from a matched sample of family and nonfamily firms (Section 4.2), and from separate subsamples of family and nonfamily firms (Section 4.3). Next, we investigate whether firms offer different amount of insurance depending on the persistence of the shocks (Section 4.4) and their access to capital markets (Section 4.5). Finally, we analyze the channels through which family firms provide employment insurance (Section 4.6).

4.1 Panel regressions

Table 2 shows the estimates of various specifications of the employment growth Equation (1), where the sales shock for each firm-year observation is the contemporaneous growth in the sales of the firm's industry and country, net of those of the firm itself. Standard errors are clustered at the country level.[10] All regressions in the table include country-year effects and firm-level controls for company size (log of market capitalization), profitability (return on assets), asset tangibility (ratio of plant, property and equipment to total assets), and leverage (ratio of total debt to total assets), all lagged by one year.

[10] We also experimented with clustering standard errors at the firm level and obtained similar results.

Table 2
Employment insurance in family and nonfamily firms in response to shocks in industry sales

	(1) Full sample	(2) Full sample	(3) Full sample	(4) Negative shocks	(5) Full sample	(6) Large reforms
Shock	0.1425***	0.1418***	0.1488**	0.2052***		
	(2.91)	(2.85)	(2.31)	(3.14)		
Shock × Family	−0.1194**	−0.1095**	−0.1192**	−0.1861**		
	(−2.58)	(−2.37)	(−2.08)	(−2.68)		
Shock × Unemployment security	0.0297	0.0265	0.0281	0.0391	0.0372	−0.0577
	(0.91)	(0.73)	(0.67)	(0.89)	(0.58)	(−0.98)
Shock × Family × Unemployment security	0.0897**	0.0865**	0.0897**	0.1107**	0.1502**	0.1659***
	(2.47)	(2.45)	(2.09)	(1.99)	(2.62)	(2.72)
Family	0.0042	0.0038	−0.0029			
	(0.75)	(0.74)	(−0.31)			
Family × Unemployment security	−0.0012	−0.0014	0.0051	−0.0068	0.0052	−0.0048
	(−0.35)	(−0.32)	(0.41)	(−0.29)	(0.24)	(−0.80)
Shock × Financial development		0.0025				
		(0.62)				
Family × Financial development		−0.0018				
		(−0.87)				
Shock × Family × Financial development		−0.0034				
		(−1.56)				
Firm-level controls	Yes	Yes	Yes	Yes	Yes	Yes
Firm fixed effects	No	No	Yes	Yes	Yes	Yes
Country × Industry effects	Yes	Yes	No	No	No	No
Country × Time effects	Yes	Yes	Yes	Yes	Yes	Yes
Family × Country effects	No	No	No	No	Yes	Yes
Shock × Country effects	No	No	No	No	Yes	Yes
Shock × Family × Country effects	No	No	No	No	Yes	Yes
R^2	0.28	0.30	0.38	0.29	0.45	0.41
Number of observations	124,432	124,432	124,432	30,122	124,432	54,582

The table presents estimates of a pooled regression for 7,822 firms from 41 countries over the period 1988–2013. The dependent variable is the yearly change in the logarithm of total employment of firm i in year t. *Shock* is measured as the yearly change of log sales of each industry j in year t excluding the log sales of firm i from the calculation; *Family* is a dummy that takes the value of 1 if the firm i's ultimate blockholder is a family blockholder who is present in the firm's management, and 0 otherwise; *Unemployment security* is the GRR in each country, calculated as the ratio of the unemployment insurance benefits received by a worker in the first two years of unemployment to the worker's last gross earnings; and *Financial development* is the ratio of stock market capitalization to GDP. Firm-level control variables are as follows: *Firm size* is the log of market capitalization of each firm i in year $t-1$; *Return on assets* is the return on total assets of each firm i in year $t-1$; *Asset tangibility* is the ratio of plant, property, and equipment to total assets of each firm i in year t-1; and *Leverage* is the ratio of total debt to total assets of each firm i in year t-1. The estimates shown in Columns 1–3 and 5 are obtained by estimating the regression on the full sample period. The estimates shown in Column 4 are obtained by estimating the regression on the sample years with negative shocks to industry sales. The estimates shown in Column 6 are obtained by estimating the regression on the sample years surrounding large reforms of the GRR. t-statistics are reported in parentheses. Standard errors are clustered at the country level. *, **, and *** indicate statistical significance at the 10%, 5%, and 1% level, respectively.

The regressions in Columns 1 and 2 include country-industry effects. Column 1 shows the estimates of the baseline specification (1), whereas Column 2 also includes interactions with financial development, beside those with public unemployment security. This specification is further enriched in Column 3, by replacing the country-industry effects with firm fixed effects, to control for firm-level unobserved heterogeneity. The specification of Column 3 is then reestimated in Column 4 using only negative sales shocks, in order to focus on the shock realizations for which employees truly need insurance. Column 5 reports the estimates of the expanded specification (4), which allows

the differential responses by family and nonfamily firms to vary systematically across countries, by including a triple interaction between the sales shock, the family-firm dummy and country effects ($\varepsilon_{it} F_{it} \mu_c$), as well as the corresponding double interactions ($\varepsilon_{it} \mu_c$ and $F_{it} \mu_c$). This specification is very demanding, as it controls for any fixed country attribute that might differentially affect the response of family and nonfamily firms to shocks. In fact, in this specification β_1 and β_2 cannot be identified, being absorbed by the country dummies interacted with the shocks and the family dummy. β_4 is now identified only by within-country changes in unemployment security. Since only sizable changes in the security system should arguably give rise to changes in the insurance offered by family firms, in Column 6, we reestimate this specification using only periods characterized by "large reforms" in replacements rates. These periods are time intervals centered on large and persistent changes in replacements rates, that is, 5 years before and 5 years since the reform (including the reform year itself). We define large and persistent reforms as changes in the replacement rate (1) exceeding $\pm$ 3% in a single year, (2) not completely reversed in the subsequent 4 years, and (3) not accompanied by major changes in employment protection legislation, defined as changes in the EPL index exceeding $\pm$ 0.5 (the index ranging from 0 to 6) in the subsequent 4 years for OECD countries. As the EPL index is available only for OECD countries, for the six non-OECD countries of our sample that featured large reforms of the replacement rate we retained only reforms not accompanied or followed by significant changes in the regulation of workers' dismissal in the subsequent 4 years.[11] This third requirement is imposed to avoid the potential confounding effects of changes in other aspects of labor market regulation. We describe these events in Table A3, which reports the average GRR in the five years before and after the reform and the average value of the EPL over the same time window: 30 large reforms occur in the sample, affecting 25 distinct countries. If workers' demand for employment stability is affected only by persistent changes in public insurance against unemployment risk, then this specification is more appropriate as it filters out short-lived reforms from our unemployment security indicator.

The pass-through coefficient shown in the top row of Table 2 is invariably positive and significant ($\beta_1 > 0$): the baseline elasticity of employment to industry sales shocks ranges from 14% to 20% depending on the specification. But, in family firms, the pass-through is considerably milder than in nonfamily ones ($\beta_2 < 0$): its implied estimate ($\beta_1 + \beta_2$) ranges from 2% to 3%, depending on the specification. The hypothesis $\beta_1 + \beta_2 = 0$ is not rejected for any of the specifications of Table 2, except that in Column 1. Interestingly, the estimate of $\beta_1 + \beta_2$ is closest to zero (1.9%) for negative sales shocks (Column 5).

As to the key research question of this paper – whether firm-provided insurance is affected by public insurance – the estimates indicate that more

[11] All our results are robust to the exclusion of firms incorporated in non-OECD countries.

generous public unemployment security is not associated with a significantly different pass-through by nonfamily firms (the hypothesis that $\beta_3 = 0$ not being rejected in any specification), while it is associated with significantly lower provision of insurance by family firms, that is, a greater pass-through of sales shocks. For family firms, the estimate of β_4 is not only statistically significant, but economically sizeable in all specifications: it implies strong substitutability between private and public unemployment insurance, with family firms offering close to full insurance if no public insurance is provided (a pass-through as low as 2% for $S_{ct} = 0$), and barely more insurance than nonfamily firms if there is full public insurance (a pass-through of 11% for $S_{ct} = 1$).[12]

In Column 2, the role of unemployment security is tested jointly with that of financial development. The coefficients of interest (β_1, β_2, and β_4) are almost unchanged from Column 1, while none of the coefficients of the interactions with financial development is significantly different from zero: the hypothesis that financial development does not impact the demand for insurance by workers cannot be rejected. The results are also robust to the inclusion of firm fixed effects (Column 3). Moreover, as expected, both the insurance offered by family firms and its substitutability with public unemployment insurance emerge more clearly for negative shocks (Column 4).[13]

The last two Columns report the most demanding specification, that is, that of Equation (4), where country dummies are interacted with shocks and with the family firm dummy, so that the estimation relies only on within-country variation in unemployment security: the coefficient of the triple interaction between the family-firm dummy, the shock and unemployment security is positive and significant, and even larger than in the basic specifications. Hence, the substitutability between private and public provision of employment insurance emerges from within-country variation alone. Interestingly, the estimate is more precise if one focuses on large reforms only (Column 6), although the difference is small. These results dispel two potential concerns regarding our estimates: first, that they may be driven by unobserved country characteristics impacting differentially the response to shocks by family and nonfamily firms; second, that they can arise from selection out of family ownership at the country level. In fact, as noted in Section 1.2, the share of family firms is unrelated to *changes* in unemployment insurance, the only dimension of data variability used to estimate the parameters in this specification.

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[12] Regarding firm-level controls (which are not shown for brevity), employment growth is significantly lower in large firms and higher in more profitable ones: this is expected, since mature firms grow less, whereas more profitable ones invest and grow more. Instead, leverage and asset tangibility are not significantly related with employment growth.

[13] In Column 3, the coefficient of the family firm dummy can still be estimated owing to the presence of some firms that switch from the family to the nonfamily status. This is not the case in Column 4, as no such "switchers" are present in the smaller sample used to estimate that specification.

Table 3
Employment insurance in family and nonfamily firms in response to idiosyncratic shocks in firm sales

	(1) Full sample	(2) Full sample	(3) Full sample	(4) Negative shocks	(5) Full sample	(6) Large reforms
Shock	0.2685***	0.2419***	0.2729***	0.3168***		
	(3.22)	(3.08)	(3.27)	(3.58)		
Shock × Family	−0.2261**	−0.2079**	−0.2461**	−0.2892**		
	(−2.41)	(−2.20)	(−2.11)	(−2.43)		
Shock × Unemployment security	0.057*	0.0491	0.0186	0.0342	0.0292	−0.0111
	(1.76)	(1.61)	(1.24)	(1.32)	(1.28)	(−0.79)
Shock × Family × Unemployment security	0.1251**	0.1106**	0.1487**	0.1604**	0.2572***	0.2292***
	(2.18)	(2.02)	(2.11)	(2.32)	(2.86)	(2.77)
Family	0.0050	0.0062	−0.0145			
	(0.76)	(0.79)	(−0.54)			
Family × Unemployment security	−0.0022	−0.0010	0.0015	0.0034	−0.0041	−0.0028
	(−0.21)	(−0.37)	(0.11)	(0.48)	(−0.21)	(−0.21)
Shock × Financial development		0.0021*				
		(1.82)				
Family × Financial development		−0.0008				
		(−0.75)				
Shock × Family × Financial development		−0.0039*				
		(−1.77)				
Firm-level controls	Yes	Yes	Yes	Yes	Yes	Yes
Firm fixed effects	No	No	Yes	Yes	Yes	Yes
Country × Industry effects	Yes	Yes	No	No	No	No
Country × Time effects	Yes	Yes	Yes	Yes	Yes	Yes
Family × Country effects	No	No	No	No	Yes	Yes
Shock × Country effects	No	No	No	No	Yes	Yes
Shock × Family × Country effects	No	No	No	No	Yes	Yes
R^2	0.32	0.36	0.37	0.37	0.46	0.44
Number of observations	124,432	124,432	124,432	35,572	124,432	54,582

The table presents estimates of a pooled regression for 7,822 firms from 41 countries over the period 1988–2013. The dependent variable is the yearly change in the logarithm of total employment of firm *i* in year *t*. *Shock* is the residual from a first-stage GMM regression estimated with the Arellano-Bond method, whose dependent variable is the first difference of the log of sales of firm *i* in year *t*; *Family* is a dummy that takes the value of 1 if the firm *i*'s ultimate blockholder is a family blockholder who is present in the firm's management, and 0 otherwise; *Unemployment security* is the GRR in each country, calculated as the ratio of the unemployment insurance benefits received by a worker in the first two years of unemployment to the worker's last gross earnings; and *Financial development* is the ratio of stock market capitalization to GDP. Firm-level control variables are as follows: *Firm size* is the log of market capitalization of each firm *i* in year *t*-1; *Return on assets* is the return on total assets of each firm *i* in year *t*-1; *Asset tangibility* is the ratio of plant, property, and equipment to total assets of each firm *i* in year *t*-1; and *Leverage* is the ratio of total debt to total assets of each firm *i* in year *t*-1. The estimates shown in Columns 1–3 and 5 are obtained by estimating the regression on the full sample period. The estimates shown in Column 4 are obtained by estimating the regression on the sample years with negative idiosyncratic shocks. The estimates shown in Column 6 are obtained by estimating the regression on the sample years surrounding large reforms of the GRR. Bootstrapped standard errors clustered at the country level are used in each specification. *t*-statistics are reported in parentheses. *, **, and *** indicate statistical significance at the 10%, 5%, and 1% level, respectively.

As explained in Section 2.2, these results based on industry-level shocks may provide a biased measure of firms' employment insurance, insofar as family firms select less cyclically sensitive projects and thus are less exposed to industry-level sales shocks. To address this issue, Table 3 repeats the estimation with our firm-level sales shock variable, which captures idiosyncratic variations in sales (see Section 2.2 for the construction of this alternative measure, and its merits compared with industry-level shocks).

The estimates obtained using idiosyncratic shocks fully confirm – indeed strengthen – all the patterns found with industry shocks. Specifically, the coefficient β_1 is larger in absolute value and more precisely estimated: idiosyncratic shocks to firm-level sales affect employment more severely than industry shocks. The offset in family firms is correspondingly larger. In fact, we never reject the hypothesis $\beta_2 = -\beta_1$ in the specifications of Table 3: this implies that employees of family firms are full insured in countries in which the replacement rate is zero. The offset decreases as the replacement rate increases[14] ($\beta_4 > 0$) and is stronger for negative shocks (Column 4). Finally, the results continue to hold in the estimates of specification (4), which includes the triple interaction between the sales shock, the family-firm dummy and country effects, as shown in Column 5 (that uses all observations) and Column 6 (that restricts the sample to large and persistent changes in the social security provision).[15]

The results of this section indicate that the substitutability between the insurance provided by family firms and that provided by social security systems is present irrespective of whether shocks to firm sales are measured at the industry or at the firm level, but emerge more clearly for idiosyncratic shocks, as one would expect considering that these are more diversifiable than industry shocks. Moreover, as mentioned above, estimates based on idiosyncratic shocks measure only the transmission of shocks to employees, irrespective of the relevant firm's exposure to industry fluctuations. For brevity, therefore, hereafter we focus on idiosyncratic shocks. All the results are confirmed with industry shocks.

We check the robustness of our results in several ways. First, we investigate whether the substitution between firm-level employment insurance and public unemployment insurance is robust to the inclusion of other time-varying indicators of the labor market. Specifically, we expand specification (1) to control also for employment protection legislation (EPL), for labor market tightness, and for the respective interactions with the shock, family ownership and replacement rate. These regressions, reported in Tables A4 and A5 of the Web Appendix, show that results are robust to these changes in the specification.

We also test whether the protection of creditor rights afforded by bankruptcy law constrains firms' ability to provide employment insurance by increasing the threat of liquidation in case of financial distress. In Table A6 of the Web Appendix, we report estimates of our baseline regression separately for countries in the bottom and in the top terciles of the distribution of creditor rights (measured by the LaPorta et al. 2000 index): in countries in which creditor rights are weak, family firms provide more employment insurance

[14] There is also evidence of substitutability for nonfamily firms ($\beta_3 > 0$), but only in some specifications.

[15] We also find that family firms provide more insurance in countries with higher financial development, in line with the idea that easier access to finance facilitates insurance provision. The effect, however, is small and only marginally significant.

and are closer substitutes for public unemployment insurance than in countries in which creditor right are strong.

Finally, we test whether the provision of insurance to employees is present also for the subsample of dynastic family firms, that is, those controlled by descendants of the founder, the idea being that later generations may have a different degree of commitment towards employees compared with the founder. Since we do not observe succession within families, we identify dynastic family firms as those that are at least 30 years old since incorporation: the 30-year threshold appears long enough an interval for succession at the helm of the company to have occurred. To ensure homogeneity with nonfamily firms, we impose the same age threshold on them as well. The results are shown in Table A7 of the Web Appendix, and on the whole are very similar to those obtained for the entire sample. The same applies when using a threshold of 25 or 35 years to identify dynastic firms.

4.2 Matched-sample regressions

As explained in Section 1.2, to address possible selection biases due to different characteristics of family and nonfamily firms, we repeat the estimation on a balanced matched sample. Each family firm is matched with two nonfamily firms, relying on propensity-score matching based on country, industry, size, return on assets, asset tangibility, leverage, and cash-flow volatility.[16] The matching produces a sample of 1,938 family firms and 3,876 nonfamily ones. Table A8 in the Web Appendix reports the mean and median values of financial characteristics of family and nonfamily firms in the matched sample. For most observed firm characteristics, matched family firms are not different from nonfamily firms, the only exceptions being leverage, where the difference is statistically significant at the 10% confidence level.

Table 4 shows how employment growth responds to idiosyncratic sales shocks in the matched sample. The structure of the table is identical to that of the previous ones. The results are also very similar: the pass-through of sales shocks ranges between 21 and 29% in nonfamily firms, almost exactly offset by the coefficient β_2 for family firms; moreover, the insurance offered by family firms decreases as public unemployment insurance increases, also in the specifications where country dummies are interacted with the shocks and the family-firm dummy.

That the results of Tables 2 and 3 are confirmed in this balanced sample indicates that they are not driven by the uneven distribution of family firms across industries, countries or firms characteristics.

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[16] The reason for matching each family firm with two nonfamily ones is that in our sample the ratio of family to nonfamily firms is very close to one to two. Moreover, the nonfamily firms used in the matching comprise only firms in which family blockholders hold less than 5% of the cash-flow rights, instead of less than the 25% threshold that we use to define nonfamily firms: this stricter criterion is meant to avoid matching a family firm with one that has a significant family blockholding, for example, 20%, yet is classified as nonfamily by our definition.

Table 4
Employment insurance in response to idiosyncratic shocks in a matched sample of family and nonfamily firms

	(1) Full sample	(2) Full sample	(3) Full sample	(4) Negative shocks	(5) Full sample	(6) Large reforms
Shock	0.2489**	0.2397**	0.2132**	0.2859**		
	(2.53)	(2.46)	(2.08)	(2.60)		
Shock × Family	−0.2192**	−0.2043**	−0.1901*	−0.2605**		
	(−2.21)	(−2.09)	(1.92)	(−2.35)		
Shock × Unemployment security	0.0358	0.0345	0.0427	−0.0292	0.0511	0.0488
	(1.09)	(1.27)	(1.09)	(−0.81)	(1.29)	(1.16)
Shock × Family × Unemployment security	0.1239**	0.1092**	0.0906*	0.1247**	0.2328**	0.2921***
	(2.29)	(1.99)	(−1.91)	(−2.42)	(2.51)	(3.15)
Family	0.0082	0.0077	−0.0052			
	(1.02)	(0.97)	(−0.26)			
Family × Unemployment security	−0.0007	−0.0019	−0.0022	0.0031	−0.0008	−0.0005
	(−0.32)	(−0.49)	(−0.32)	(0.62)	(−0.36)	(−0.23)
Shock × Financial development		0.0008				
		(1.36)				
Family × Financial development		0.0009				
		(1.41)				
Shock × Family × Financial development		−0.0032*				
		(−1.79)				
Firm-level controls	Yes	Yes	Yes	Yes	Yes	Yes
Firm fixed effects	No	No	Yes	Yes	Yes	Yes
Country × Industry effects	Yes	Yes	No	No	No	No
Country × Time effects	Yes	Yes	Yes	Yes	Yes	Yes
Family × Country effects	No	No	No	No	Yes	Yes
Shock × Country effects	No	No	No	No	Yes	Yes
Shock × Family × Country effects	No	No	No	No	Yes	Yes
R^2	0.31	0.37	0.39	0.42	0.44	0.42
Number of observations	93,201	93,201	93,201	25,908	93,201	42,011

The table presents estimates of a pooled regression model for family firms and their nonfamily matches from 41 countries over the period 1988–2013. We match each family firm with nonfamily firms using a propensity-score matching methodology based on firm characteristics (firm size, return on assets, asset tangibility, leverage, cash-flow volatility, and the country of incorporation and industry classification) as the matching variables. The dependent variable is the yearly change in the logarithm of total employment of firm i in year t. *Shock* is the residual from a first-stage GMM regression estimated with the Arellano-Bond method, whose dependent variable is the first difference of the log of sales of firm i in year t. The other independent variables are as follows: *Family* is a dummy that takes the value of 1 if the firm i's ultimate blockholder is a family blockholder which is present in the firm's management and 0 otherwise, *Unemployment security* is the GRR in each country, calculated as the ratio of the unemployment insurance benefits received by a worker in the first two years of unemployment to the worker's last gross earnings; and *Financial development* is the ratio of stock market capitalization to GDP. Firm-level control variables are as follows: *Firm size* is the log of market capitalization of each firm i in year t-1; *Return on assets* is the return on total assets of each firm i in year t-1; *Asset tangibility* is the ratio of plant, property, and equipment to total assets of each firm i in year t-1; and *Leverage* is the ratio of total debt to total assets of each firm i in year t-1. The estimates shown in Columns 1–3 and 5 are obtained by estimating the regression on the full sample period. The estimates shown in Column 4 are obtained by estimating the regression on the sample years with negative idiosyncratic shocks. The estimates shown in Column 6 are obtained by estimating the regression on the sample years surrounding large reforms of the GRR. Bootstrapped standard errors clustered at the country level are used to compute the t-statistics reported in parentheses. *, **, and *** indicate statistical significance at the 10%, 5%, and 1% level, respectively.

4.3 Separate regressions for family and nonfamily subsamples

The matching method used to produce the estimates in Table 4 controls for observable differences between family and nonfamily firms, but does not rule out that the results may be affected by unobserved differences between family and nonfamily firms. To address this concern, in Table 5 the regressions

Table 5
Employment insurance within family and nonfamily firms in response to idiosyncratic shocks in firm sales

	(1)	(2)	(3)	(4)	(5)	(6)
	Family			Nonfamily		
	Full sample	Negative shocks	Large reforms	Full sample	Negative shocks	Large reforms
Shock	0.0125	0.0174		0.3022***	0.3421***	
	(1.12)	(1.51)		(3.65)	(4.18)	
Shock × Unemployment security	0.1082***	0.1197***	0.1508***	0.0149	0.0095	0.0212
	(2.91)	(2.89)	(3.45)	(1.52)	(1.48)	(1.60)
Firm-level controls	Yes	Yes	Yes	Yes	Yes	Yes
Firm fixed effects	Yes	Yes	Yes	Yes	Yes	Yes
Country × Time effects	Yes	Yes	Yes	Yes	Yes	Yes
Shock × Country effects	No	No	Yes	No	No	Yes
R^2	0.35	0.21	0.24	0.44	0.28	0.31
Number of observations	40,278	12,577	22,102	84,154	22,995	32,196

The table presents estimates of a panel regression model for family firms only are shown in Columns 1–3 and nonfamily firms only are shown in Columns 4–6. The firms come from 41 countries over the period 1988–2013. The dependent variable is the yearly change in the logarithm of total employment of firm i in year t. *Shock* is the residual from a first-stage GMM regression estimated with the Arellano-Bond method, whose dependent variable is the first difference of the log of sales of firm i in year t; *Family* is a dummy that takes the value of 1 if the firm i's ultimate blockholder is a family blockholder who is present in the firm's management, and 0 otherwise; and *Unemployment Security* is the GRR in each country, calculated as the ratio of the unemployment insurance benefits received by a worker in the first two years of unemployment to the worker's last gross earnings. Firm-level control variables are as follows: *Firm size* is the log of market capitalization of each firm i in year t-1; *Return on assets* is the return on total assets of each firm i in year t-1; *Asset tangibility* is the ratio of plant, property, and equipment to total assets of each firm i in year t-1; and *Leverage* is the ratio of total debt to total assets of each firm i in year t-1. The estimates shown in Columns 1 and 4 are obtained by estimating the regression on the full sample period. The estimates shown in Columns 2 and 5 are obtained by estimating the regression on the sample years with negative idiosyncratic shocks. The estimates shown in Column 3 and 6 are obtained by estimating the regression on the sample years surrounding large reforms of the GRR. Bootstrapped standard errors clustered at the country level are used in each specification. t-statistics are reported in parentheses. *, **, and *** indicate statistical significance at the 10%, 5% and 1% level, respectively.

are reestimated separately on the two subsamples of 2,359 family firms and 5,463 nonfamily ones, using firm-level idiosyncratic shocks to sales.[17] In these regressions, we no longer estimate the difference between family and nonfamily firms but can still identify how the insurance provided by each type of firm varies with the degree of public insurance. The benefit of this approach is that identification exploits only variation within each group of firms, so that the results cannot be driven by unobserved heterogeneity between family and nonfamily firms.

For each of the two subsamples, the table presents the estimates obtained using all the observations (Columns 1 and 4), using only negative realizations of the sales shocks (Columns 2 and 5), and finally including country dummies interacted with the shocks (Columns 3 and 6). To save space, in the latter specification, we focus on the sample of large and persistent changes in the replacement rate. The results also hold in the overall sample.

When the regressions are estimated on the subsample of family firms only, these are again seen to mitigate the impact of sales shocks in countries and

[17] To save space, in what follows, we focus on the specification with firm effects, unless otherwise specified.

periods in which public unemployment insurance is less generous. In fact, for these firms the coefficient of the shock is never statistically different from zero, whereas the coefficient of the interaction between the shock and unemployment security is positive and significant: firm insurance is full when no public insurance is provided, and it decreases as unemployment security increases. In contrast, in nonfamily firms about 30% of the sales shocks are transmitted to employment, the pass-through coefficient being around 0.3 and statistically significant, while the coefficient of the interaction with unemployment security is close to zero and not statistically significant.

The substitutability relationship between the private insurance offered by family firms and the unemployment insurance offered by the social security system is indeed present both across countries and over time. To capture it graphically across countries, we plot a measure of the employment insurance offered by family firms in each country against the replacement rates of the respective social security system. We measure the insurance offered by family firms in each country by estimating the respective family-firm pass-through coefficients via separate regressions for each of the 41 countries in our data set. Specifically, for each country c, we estimate the following regression using only the family firms present in that country:

$$\Delta n_{it} = \beta_c \varepsilon_{it} + \gamma' X_{it-1} + \mu_j + \mu_t + u_{it}, \tag{5}$$

where β_c is the pass-through coefficient of country c, ε_{it} are the idiosyncratic sales shocks, μ_j are industry effects and μ_t are year effects. The employment insurance offered by the family firms in country c is measured by $1-\beta_c$, namely, the fraction of the sales shocks that family firms do not transmit to employment: for instance, if in country c the pass-through coefficient for family firms is 0.03, then the measure of the employment insurance that they offer is 97%.

Figure 3 plots this country-level measure of the employment insurance provided by family firms against the public unemployment insurance in the corresponding country, measured by its average replacement rate from 1988 to 2013. The substitutability between them is conveyed visually by the negative slope of the regression line plotted in the figure.

This substitutability emerges equally clearly from within-country time-series variation in replacement rates: Figure 4 visually conveys the impact that major changes in unemployment security have on the employment stabilization provided by family firms. The major changes in replacement rates correspond to the large and persistent reforms defined above in Section 4.1. On the vertical axis, the figure plots the change in the measure of the employment insurance provided by family firms (i.e., the change in $1-\beta_c$, as defined above) between the 5 years before the reform and the subsequent 5 years (we discard all reforms for which less than 5 years of data before and after are available, to have a sufficient number of data points to estimate the coefficient). On the horizontal axis, the figure plots the change in unemployment security S_{ct} triggered by a reform in a given country: for instance, the point "NO02" corresponds to a 2002

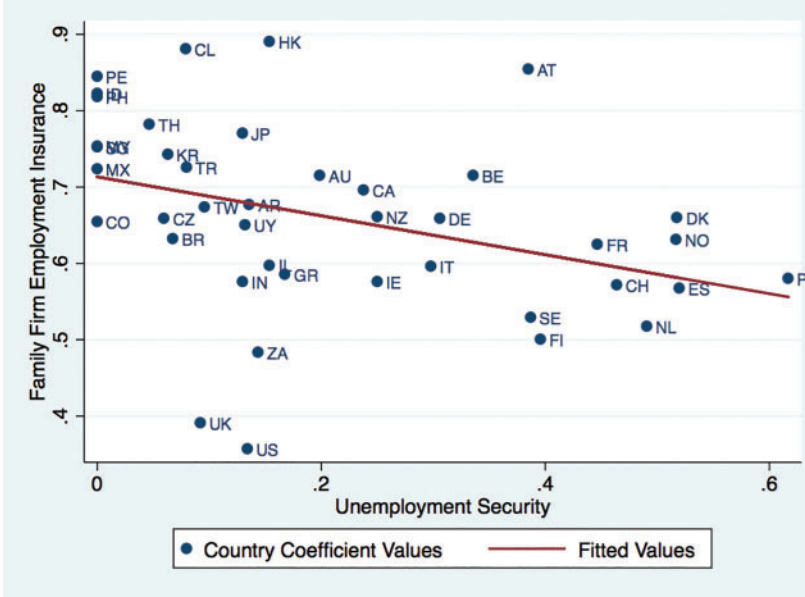

Figure 3
Employment insurance in family firms and public unemployment security
The measure shown on the vertical axis is a country-level measure of employment insurance provided by family firms, namely the fraction of the sales shocks that family firms do not transmit to employment. The variable measured on the horizontal axis is the unemployment security provided by the public sector of each country, as measured by the respective GRR, that is, the ratio of the unemployment insurance benefits received in the first two years of unemployment to the worker's last gross earnings.

reform that reduced the GRR in Norway from 0.62 to 0.48. The figure shows that most of the reforms that increased unemployment security are associated with a reduction in the unemployment stability offered by family firms (points in Quadrant IV), that is, with an increase in the pass-through coefficient β_c. Conversely, all the reforms (except three) that reduced public unemployment security are concomitant with greater provision of employment insurance by family firms (points in quadrant II of the graph). Hence, Figure 4 shows that the substitutability between the provision of employment insurance by governments and by family firms is apparent also in the time series dimension when focusing on major changes in unemployment security, not only in the cross-country dimension illustrated by Figure 3 (where each observation refers to a single country for the whole sample period).

4.4 Distinguishing between transitory and persistent shocks

Firms are more likely to be able to offer insurance against transitory than persistent shocks. This prediction, formalized by Gamber (1988), has been tested for wage insurance by Guiso, Pistaferri and Schivardi (2005) for Italy, by Cardoso and Portela (2009) for Portugal, by Kátay (2016) for Hungary, and

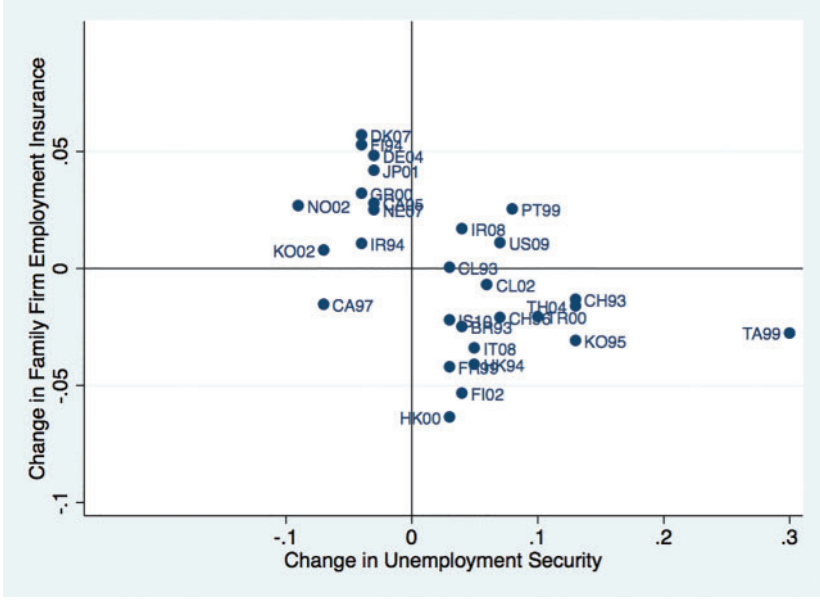

Figure 4
Employment insurance in family firms following major reforms in unemployment security
The variable shown on the vertical axis is the change in the estimate of employment insurance provided by family firms between the 5 years before the reform and the subsequent 5 years (discarding reforms for which less than 5 years of data before and after are available). The variable measured on the horizontal axis is the country-level change in public unemployment security triggered by a reform in a given country, as measured by the change in the respective GRR between the year before the reform and the year after it.

by Guertzgen (2014) for Germany. We adapt the approach by Guiso, Pistaferri and Schivardi (2005) to the case of employment insurance, simplifying some of their assumptions (see the Appendix of this paper for details) and check whether the substitutability between public and firm provided insurance is stronger against transitory than permanent shocks. The results of this exercise, reported in Table 6, fully support this hypothesis.

Columns 1 and 2 of the table show the estimates, respectively, obtained with transitory and persistent shocks. As expected, firms provide more insurance against transitory than against permanent shocks: the top row coefficient in Column 1 is smaller than that in Column 2. Moreover, family firms provide full insurance against transitory shocks, and like in Column 1, the first coefficient (−0.195) is completely offset by the second one (−0.191); however, they do not offer greater insurance than nonfamily firms against persistent shocks, as the second coefficient in Column 2 is not significantly different from zero.

Consistently with the overall picture, the coefficients of the triple interaction between the sales shock, the family firm dummy and unemployment security is positive and significant for transitory shocks but not for permanent ones: there is substitutability between the employment insurance provided by family

Table 6
Employment insurance in family and nonfamily firms in response to transitory and persistent idiosyncratic shocks

	(1) Transitory shocks	(2) Permanent shocks
Shock	0.1952***	0.2790***
	(3.28)	(4.79)
Shock × Family	−0.1914***	−0.0719
	(−2.70)	(−1.25)
Shock × Unemployment security	0.0312	0.0277
	(0.95)	(1.09)
Shock × Family × Unemployment security	0.1083**	0.0204
	(2.26)	(0.92)
Firm-level control	Yes	Yes
Country× Industry effects	Yes	Yes
Country× Time effects	Yes	Yes
F-test (*p*-value)	<0.001	<0.001
Number of observations	94,987	31,445

This table presents the estimates of the sensitivity of employment to persistent and temporary shocks in sales for 7,822 firms from 41 countries over the period from 1988 to 2013. The dependent variable is the yearly change in the logarithm of total employment of firm i in year t. The coefficient estimates are obtained via two separate IV regressions that identify sensitivity to transitory shocks (Column 1) and to persistent ones (Column 2), respectively (see the appendix for details). The independent variables are as follows: *Transitory shock* is the transitory component of the change in sales of firm i; *Persistent shock* is the persistent component of the change in sales of firm i; *Family* is a dummy that takes the value of 1 if the firm i's ultimate blockholder is a family blockholder who is present in the firm's management, and 0 otherwise; and *Unemployment security* is the GRR in each country, calculated as the ratio of the unemployment insurance benefits received by a worker in the first two years of unemployment to the worker's last gross earnings. Firm-level control variables are as follows: *Firm size* is the log of market capitalization of each firm i in year t-1; Return on Assets is the return on total assets of each firm i in year t-1; *Asset tangibility* is the ratio of plant, property, and equipment to total assets of each firm i in year t-1; and *Leverage* is the ratio of total debt to total assets of each firm i in year t-1. t-statistics are reported in parentheses. The power of the instruments is given by the p-value of the F-test on the excluded instruments. *, **, and *** indicate statistical significance at the 10%, 5%, and 1% level, respectively.

firms and by social security systems against transitory shocks, but not against persistent ones. Family firms do not reduce their insurance against these shocks in response to more public provision of such insurance, because they do not provide much of it in the first place.

4.5 Does employment insurance depend on firms' access to finance?

We argued above that the level of insurance provided by firms depends not only on the credibility of their commitment to implicit contracts but also on their access to finance. Berk and Walden (2013) contend that access to capital markets enables firms to offload the risk they assume from workers. When firms have limited access to financial markets, therefore, we expect both the difference in insurance provision between family and nonfamily firms to be reduced and the substitutability between firm- and government-provided insurance to be weaker. To test these hypotheses, we use banking crises (as defined by Laeven and Valencia 2012) as a laboratory, these being episodes in which firms' access to capital markets is likely to be impaired.[18]

[18] Laeven and Valencia (2012) define a systemic banking crisis as one in which there are both significant signs of financial distress in the banking system and significant banking policy intervention measures in response to

To single out the financial access channel, we also identify recessions not associated with a banking crisis, which for brevity we refer to as "recessions": in these periods, firms should still be able to provide employment insurance (in fact more valuable than ever to their employees), since their access to financial markets should not be impaired. We define years with such a recession as those in which the GDP's growth rate is zero or negative, based OECD data, but no banking crisis occurred according to the classification by Laeven and Valencia (2012).

We benchmark the estimates obtained for banking crises and for recessions against those obtained using the residual subsample of "normal" years, defined as years in which neither a recession nor a banking crisis occurred. Note that these sample splits are done based on the economy-wide environment rather than potentially endogenous firm characteristics. Table 7 shows the results for normal years in Columns 1 and 2, those with recessions in Columns 3 and 4, and those for banking crises in Columns 5 and 6.[19]

First, the estimates in the table show that the pass-through of shocks for nonfamily firms is stronger in recessions than in normal years: β_1 is 0.22 in normal years and 0.28 in recessions. However, family firms offset this increased pass-through: β_2 equals −0.18 in normal years and –0.25 in recessions, which suggests that in fact they step up their insurance provision when it is most needed. Moreover, their provision of insurance correlates negatively with that by governments both in normal times and in recessions.

Things are very different during banking crises. In those periods, the transmission of shocks to employment in nonfamily firms is higher than in normal periods (as β_1 rises to 0.30), just as it does in recessions. But in banking crises the offset by family firms is much lower (β_2 is –0.11 and not statistically different from zero): family firms behave similarly to nonfamily firms, which is not the case during simple recessions. Moreover, there is still evidence of substitutability between firm- and government-provided insurance, although the estimates are on the borderline of statistical significance.

Overall, these results further corroborate the evidence of substitutability in insurance provision between firms and the government, and highlight that family firms' ability to insure their employees depends crucially on their access to financial markets: when this is impaired, their behavior is closer to that of their nonfamily analogues, that is, offer less insurance and substitute less for its public provision.

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significant losses in the banking system and apply this definition to classify crises in a large set of countries between 1970 and 2011.

[19] We comment the results for the regressions with all shocks (Columns 1, 3, and 5), but note that, like in previous tables, all the effects are confirmed and magnified in the regressions estimated on the subsample with negative sales shocks only (Columns 2, 4, and 6).

Table 7
Employment insurance in banking crises, recessions, and "normal" periods

	(1)	(2)	(3)	(4)	(5)	(6)
	"Normal" periods		Recessions		Banking crisis	
	Full sample	Negative shocks	Full sample	Negative shocks	Full sample	Negative shocks
Shock	0.2211***	0.2849***	0.2809**	0.3415**	0.3044***	0.3981**
	(2.68)	(2.72)	(2.47)	(2.60)	(4.01)	(2.53)
Shock × Family	−0.1809**	−0.2544**	−0.2511**	−0.2903**	−0.1142	−0.1622*
	(−2.26)	(−2.47)	(−2.01)	(−2.00)	(−1.57)	(−1.71)
Shock × Unemployment security	0.0411	0.0522	0.0518	−0.0009	−0.0131	−0.0128
	(0.77)	(0.67)	(0.24)	(−0.16)	(−0.58)	(−0.42)
Family × Unemployment security	0.0041	0.0034	−0.0039	−0.0051	0.0008	0.0007
	(0.50)	(0.41)	(−0.29)	(−0.11)	(0.49)	(0.32)
Shock × Family × Unemployment security	0.1609**	0.1768*	0.1492**	0.1642*	0.1108*	0.1004
	(2.58)	(1.92)	(2.00)	(1.89)	(1.84)	(1.57)
Family	−0.0041	−0.0018	−0.0052	0.0016	0.0011	0.0004
	(−0.37)	(−0.28)	(−0.22)	(0.19)	(0.25)	(0.19)
Family × Unemployment security	0.0018	0.0022	−0.0042	−0.0056	−0.0008	0.0007
	(0.35)	(0.29)	(−0.31)	(−0.28)	(−0.48)	(0.29)
Firm-level controls	Yes	Yes	Yes	Yes	Yes	Yes
Firm fixed effects	Yes	Yes	Yes	Yes	Yes	Yes
Country × Time effects	Yes	Yes	Yes	Yes	Yes	Yes
R^2	0.34	0.14	0.11	0.07	0.18	0.09
Number of observations	69,701	15,443	11,981	7,409	27,106	10,270

The table presents estimates of a pooled regression for 7,822 firms from 41 countries over the period 1988–2011. Banking crises are defined like in Laeven and Valencia (2012). Recessions are years of negative GDP growth in which there is no banking crisis. "Normal" periods are years with neither a banking crisis nor a recession. The specifications shown in Columns 1 and 2 are estimated using only "normal" periods; those in Columns 3 and 4 are estimated using only recession years; and those in Columns 5 and 6 are estimated using only years of banking crisis. *Shock* is the residual from a first-stage GMM regression estimated with the Arellano-Bond method, whose dependent variable is the first difference of the log of sales of firm i in year$t$; *Family* is a dummy that takes the value of 1 if the firm i's ultimate blockholder is a family blockholder who is present in the firm's management, and 0 otherwise; and *Unemployment security* is the GRR in each country, calculated as the ratio of the unemployment insurance benefits received by a worker in the first two years of unemployment to the worker's last gross earnings. Firm-level control variables are as follows: *Firm size* is the log of market capitalization of each firm i in year t-1; *Return on assets* is the return on total assets of each firm i in year t-1; *Asset tangibility* is the ratio of plant, property, and equipment to total assets of each firm i in year t-1; and *Leverage* is the ratio of total debt to total assets of each firm i in year t-1. Bootstrapped standard errors clustered at the country level are used to compute the t-statistics reported in parentheses. *, **, and *** indicate statistical significance at the 10%, 5%, and 1% level, respectively.

4.6 How do firms provide employment insurance?

A natural question concerns the financial margins on which family firms adjust so as to absorb sales shocks and provide implicit insurance to their employees. The evidence in the previous section suggests that *external* finance is one such margin: when they have better access to financial markets, their employment level responds less to sales shocks. But family firms may also bear part of the costs of insurance provision by using *internal* financial resources. In this section, we investigate how some key financial indicators respond to sales shocks. We consider three indicators: earnings, dividends, and cash holdings. All are normalized by the previous year's total assets. If family firms retain their employees in the wake of a drop in sales, while nonfamily firms fire some of them, the earnings of the former should decrease more than those of the latter. Similarly, the extra labor costs that they bear and the corresponding

Table 8
Impact of employment insurance on earnings, dividends, and cash holdings

	(1)	(2)	(3)	(4)	(5)	(6)
	Earnings		Dividends		Cash	
	Full sample	Negative shocks	Full sample	Negative shocks	Full sample	Negative shocks
Shock	0.1861***	0.2650***	0.1215	0.1827**	0.6073***	0.7388***
	(2.75)	(3.81)	(1.57)	(2.24)	(2.75)	(3.41)
Shock × Family	0.0108**	0.0158***	0.0056	0.0078**	0.0280*	0.0346**
	(2.36)	(3.43)	(1.54)	(2.07)	(1.91)	(2.31)
Shock ×	0.0015	0.0021	−0.0004	0.0010	0.0024	−0.0041
Unemployment security	(0.74)	(1.01)	(−0.27)	(0.80)	(0.63)	(−0.21)
Family × Unemployment	0.0005	−0.0003	−0.0004	−0.0005	0.0018	0.0022
security	(0.12)	(−0.15)	(−0.27)	(−0.11)	(0.15)	(0.19)
Shock × Family ×	−0.0062**	−0.0080***	−0.0026	−0.0060*	−0.0178*	−0.0220**
Unemployment security	(−2.25)	(−2.91)	(−0.94)	(−1.93)	(−1.92)	(−2.30)
Firm-level controls	Yes	Yes	Yes	Yes	Yes	Yes
Firm fixed effects	Yes	Yes	Yes	Yes	Yes	Yes
Country × Time effects	Yes	Yes	Yes	Yes	Yes	Yes
R^2	0.45	0.49	0.27	0.34	0.46	0.52
Number of observations	124,432	35,572	124,432	35,572	124,432	35,572

The table presents estimates of a pooled regression for 7,822 firms from 41 countries over the period 1988–2013. The dependent variables are as follows: in Columns 1 and 2 the earnings before interest and taxes of firm i in year t is scaled by the previous year's total assets; in Columns 3 and 4 the dividend paid by firm i in year t is scaled by the previous year's total assets; and in Columns 5 and 6 the total cash holdings of firm i in year t is scaled by the previous year's total assets. *Shock* is the residual from a first-stage GMM regression estimated with the Arellano-Bond method, whose dependent variable is the first difference of the log of sales of firm i in year t; *Family* is a dummy that takes the value of 1 if the firm i's ultimate blockholder is a family blockholder who is present in the firm's management, and 0 otherwise; and *Unemployment security* is the GRR in each country, calculated as the ratio of the unemployment insurance benefits received by a worker in the first two years of unemployment to the worker's last gross earnings. Firm-level control variables are as follows: *Firm size* is the log of market capitalization of each firm i in year $t-1$; *Return on assets* is the return on total assets of each firm i in year $t-1$; *Asset tangibility* is the ratio of plant, property, and equipment to total assets of each firm i in year $t-1$; and *Leverage* is the ratio of total debt to total assets of each firm i in year $t-1$. The estimates shown in Columns 1, 3, and 5 are obtained by estimating the regression on the full sample period; those shown in Column 2, 4, and 6 are obtained by estimating the regression over the sample years with negative idiosyncratic shocks. Bootstrapped standard errors clustered at the country level are used in each specification. t-statistics are reported in parentheses. *, **, and *** indicate statistical significance at the 10%, 5%, and 1% level, respectively.

reduction in profits should be reflected in lower dividends and/or in decreased cash holdings. All these effects should be stronger the lower the degree of public unemployment security, when family firm insurance provision is stronger.

To test these predictions, we replace employment growth with these financial indicators as dependent variables in the baseline specification (1). Table 8 shows the results for the full sample and for the negative shocks subsample. They are consistent with the view that to some extent family firms provide insurance by directly bearing some of the implied costs: earnings, dividends and cash holdings are more sensitive to shocks in family than in nonfamily firms, although the difference is fairly small, the coefficient for family firms being about 5% larger than for nonfamily firms in all specifications. Moreover, the extra sensitivity decreases with unemployment security, in line with the fact that family firms provide less insurance when there is more public insurance.

Overall, these estimates indicate that firms absorb shocks by modifying more strongly cash holdings than earnings, and earnings more than dividends. The

sensitivity to sales shocks is lower for earnings than for cash and, for the full sample, it is not statistically significant for dividends, in line with the well-known finding that firms try to pay a smooth flow of dividends to their shareholders.

5. Wage Insurance

Workers should be interested not only in the stability of employment but also in that of wages. In principle, wages can vary both as a result of renegotiation in the wake of sales shocks and as a result of changes in the hours of overtime work, which is generally better paid than regular work time. Therefore, it is important to investigate whether family firms offer more or less wage stability than nonfamily ones, and whether such stability is systematically related to the provision of public unemployment insurance. The evidence that our wage data can provide on these issues is to be taken with caution, because of their lower quality and more limited coverage compared to employment data. However, it is worth noticing that all the previous results regarding employment insurance hold also for the subsample of firms for which wage data are available.

In Table 9 we investigate wage insurance in the subsample of companies for which at least seven consecutive years of wage data are available, estimating Equation (2) and variants of it. The dependent variable is the percentage change of the average real wage in the corresponding firm-year, obtained by dividing the firm's wage bill by its employment level. The table closely replicates the specifications reported in Table 3 for employment growth. The results, however, differ markedly.

First, the coefficient estimates in the top row of Table 9 are considerably lower than those in the top row of Table 3, suggesting the presence of wage stickiness: faced with a sales shock, firms adjust the number of employees more than real wages. The estimates are very similar across the different specifications: the basic one (Column 1), the specification that controls for financial development (Column 2), that with firm fixed effects (Column 3), and that estimated on the negative shocks subsample (Column 4).

Second, rather than providing more insurance, like in the case of employment, family firms display wider wage fluctuations than do nonfamily firms: the coefficients of the second row are positive and significantly different from zero. The magnitude of the effect is fairly small: for example, the elasticity of wages to shocks is 6.5% in nonfamily firms, and 0.4% larger in family firms. Still, it is opposite to that of employment insurance. This result may be explained by the "renegotiation hypothesis" discussed in the introduction: family firms may be able to get wage concessions from their employees in response to drops in sales and are ready to raise wages in the case of sales gains. But, since our wage data measure the average wage *per worker* paid in a given firm, this response of wages to sales shocks may simply reflect the fact that in family firms hours worked respond more to sales shocks, that is, employees are ready

Table 9
Wage insurance in family and nonfamily firms in response to idiosyncratic shocks

	(1) Full sample	(2) Full sample	(3) Full sample	(4) Negative shocks	(5) Full sample	(6) Large reforms
Shock	0.0652***	0.0594***	0.0718***	0.0788***		
	(3.49)	(3.12)	(2.81)	(3.11)		
Shock × Family	0.0044**	0.0041**	0.0052**	0.0061**		
	(2.48)	(2.39)	(2.16)	(2.39)		
Shock × Unemployment security	−0.0263**	−0.0218**	−0.0193*	0.0063	−0.0082	−0.0161
	(−2.37)	(−2.11)	(−1.87)	(0.97)	(−1.12)	(−1.57)
Shock × Family × Unemployment security	0.0378**	0.0329**	0.0201	0.0209	0.0095	−0.0078
	(2.35)	(2.01)	(1.58)	(1.42)	(0.78)	(−0.94)
Family	−0.019*	−0.015*	−0.0092			
	(−1.82)	(−1.74)	(−1.48)			
Family × Unemployment security	−0.0095	−0.0087	−0.0054	0.0012	−0.0065	−0.0049
	(−1.03)	(−1.01)	(−0.88)	(0.29)	(−0.78)	(−0.74)
Shock × Financial development		0.0002				
		(0.88)				
Family × Financial development		0.0003				
		(1.47)				
Shock × Family × Financial development		−0.0004				
		(−1.50)				
Firm-level Controls	Yes	Yes	Yes	Yes	Yes	Yes
Firm fixed effects	No	No	Yes	Yes	Yes	Yes
Country × Industry effects	Yes	Yes	No	No	No	No
Country × Time effects	Yes	Yes	Yes	Yes	Yes	Yes
Family × Country effects	No	No	No	No	Yes	Yes
Shock × Country effects	No	No	No	No	Yes	Yes
Shock × Country effects × Family						
R^2	0.09	0.14	0.19	0.22	0.25	0.23
Number of observations	49,122	49,122	49,122	14,107	49,122	21,054

This table presents the estimates of a pooled regression model for 3,350 firms from 41 countries over the period from 1988 to 2013. The dependent variable is the yearly change in the logarithm of the real average wage of firm i in year t. The independent variables are as follows: *Shock* is the residual from a first-stage GMM regression estimated with the Arellano-Bond method, whose dependent variable is the first difference of the log of sales of firm i in year t; *Family* is a dummy that takes the value of 1 if the firm i's ultimate blockholder is a family blockholder who is present in the firm's management and 0 otherwise; *Unemployment security* is the GRR in each country, calculated as the ratio of the unemployment insurance benefits received by a worker in the first two years of unemployment to the worker's last gross earnings; and *Financial development* is the ratio of stock market capitalization to GDP. Firm-level control variables are as follows: *Firm size* is the log of market capitalization of each firm i in year $t-1$; *Return on assets* is the return on total assets of each firm i in year $t-1$; *Asset tangibility* is the ratio of plant, property, and equipment to total assets of each firm i in year $t-1$; and *Leverage* is the ratio of total debt to total assets of each firm i in year $t-1$. The estimates shown in Columns 1–3 and 5 are obtained by estimating the regression on the full sample period. The estimates shown in Column 4 are obtained by estimating the regression over the years in the sample with negative idiosyncratic shocks. The estimates shown in Column 6 are obtained by estimating the regression on the sample years surrounding large reforms of the GRR. Bootstrapped standard errors clustered at the country level are used to compute the t-statistics reported in parentheses. *, **, and *** indicate statistical significance at the 10%, 5%, and 1% level, respectively.

to do overtime when the firm faces an abnormally high demand, and reduce their hours worked when demand is weak. Possibly owing also to this flexibility of their labor force, family firms manage to save jobs in downturns, and therefore provide greater employment stability.

The results concerning public unemployment insurance are less clear cut. For nonfamily firms, there is some evidence that the degree of wage insurance is higher when unemployment security is more generous. In fact, β_3 is negative and statistically significant in the first three specifications, and it

loses significance in the negative shocks sample (Column 4) and with the interactions between country dummies, shocks and the family firm dummy (Columns 5 and 6). A possible interpretation is that, when the public insurance is more generous, the outside option of workers is higher, so that they are less willing to accept wage cuts to save jobs: hence the wage is less affected by shocks. This effect is not present in family firms: β_4 is positive in the first five columns, although statistically different from zero only in the first two. Moreover, the wage insurance offered by family firms does not vary with public insurance provision, the null hypothesis $\beta_3+\beta_4=0$ being never rejected. This is again consistent with the wage renegotiation hypothesis: the employees of family firms should be more willing to accept wage variability in exchange for employment stability.

As done for employment insurance in Section 3.2, also for wage insurance we check whether our results are affected by the unequal distribution of family firms across industries with different technology or demand characteristics, across countries with different characteristics, or across different firm types. To this end, we re-estimate the specifications in Table 9 on a matched sample of family and nonfamily firms, built using the same propensity score matching procedure based on country, industry and firm characteristics (i.e., size, return on assets, asset tangibility, leverage, and cash-flow volatility) already illustrated in Section 3.2. Table 1 displays the results. Overall, they are very close to those of Table 9. While matching does not deal with selection issues based on unobservable characteristics, these results are reassuring as they show that our results are not driven by sample selection based on observables.

6. Is Employment Insurance Priced by Wages?

A central prediction of the implicit contract theory is that the insurance provided by firms to their employees should be "priced," that is, in exchange for more stable employment, firms should be able to pay lower wages. Applied to our international panel, this prediction has a sharp implication: the wage discount that family firms enjoy should be higher the less generous the public unemployment insurance. Conversely, if they receive generous support for the social security system during unemployment spells, workers value firm-provided insurance less and are therefore less willing to accept a wage discount in exchange for it.

To test these implications, we estimate the wage Equation (3): the average real wage paid by a firm in a given year is regressed on the family-firm dummy and its interactions with public unemployment security provisions, on the usual set of firm-level controls, and country-industry and country-time fixed effects. In one specification we also include firm-level fixed effects, so that we identify the family firm effect only from firms that switch between the family and the nonfamily status. Table 11 shows the results.

Table 10
Wage insurance in response to idiosyncratic shocks in a matched sample of family and nonfamily firms

	(1) Full sample	(2) Full sample	(3) Full sample	(4) Negative shocks	(5) Full sample	(6) Large reforms
Shock	0.0532***	0.0499**	0.0564**	0.0681**		
	(2.75)	(2.63)	(2.29)	(2.58)		
Shock × Family	0.0039**	0.0037**	0.0044*	0.0049*		
	(2.10)	(1.99)	(1.91)	(1.84)		
Shock ×	−0.0194*	−0.0150	−0.0168	0.0052	−0.0062	−0.0120
Unemployment security	(−1.81)	(−1.55)	(−1.35)	(0.63)	(−0.71)	(−1.28)
Shock × Family ×	0.0312**	0.0287*	0.0141	0.0171	−0.0075	−0.0071
Unemployment security	(1.98)	(1.83)	(1.04)	(1.19)	(−1.35)	(−1.19)
Family	−0.0122	−0.0101	−0.0065			
	(−1.36)	(−1.26)	(−1.08)			
Family × Unemployment	−0.0086	−0.0067	−0.0049	−0.0009	0.0045	−0.0031
security	(−0.87)	(−0.79)	(−0.62)	(−0.18)	(0.56)	(−0.47)
Shock ×		0.0002				
Financial development		(0.69)				
Family × Financial		0.0002				
development		(0.95)				
Shock × Family ×		−0.0003				
Financial development		(−1.14)				
Firm-level controls	Yes	Yes	Yes	Yes	Yes	Yes
Firm fixed effects	No	No	No	Yes	Yes	Yes
Country × Industry effects	Yes	Yes	Yes	No	No	No
Country × Time effects	Yes	Yes	Yes	Yes	Yes	Yes
Firm × Country effects	No	No	Yes	Yes	Yes	Yes
Shock × Country effects	No	No	Yes	Yes	Yes	Yes
Shock × Family × Country effects	No	No	Yes	Yes	Yes	Yes
R^2	0.10	0.13	0.16	0.14	0.18	0.09
Number of observations	38,702	38,702	38,702	15,819	38,702	23,244

This table presents the estimates of a pooled regression model for family firms and their nonfamily matches from 41 countries over the period 1988–2013. We match each family firm with nonfamily firms using a propensity-score matching methodology based on firm characteristics (firm size, return on assets, asset tangibility, leverage, cash-flow volatility, and the country of incorporation and industry classification) as the matching variables. The dependent variable is the yearly change in the logarithm of the real average wage of firm i in year t. The independent variables are as follows: *Shock* is the residual from a first-stage GMM regression estimated with the Arellano-Bond method, whose dependent variable is the first difference of the log of sales of firm i in year t; *Family* is a dummy that takes the value of 1 if the firm i's ultimate blockholder is a family blockholder who is present in the firm's management, and 0 otherwise; *Unemployment security* is the GRR in each country, calculated as the ratio of the unemployment insurance benefits received by a worker in the first two years of unemployment to the worker's last gross earnings; and *Financial development* is the ratio of stock market capitalization to GDP. Firm-level control variables are as follows: *Firm size* is the log of market capitalization of each firm i in year $t-1$; *Return on assets* is the return on total assets of each firm i in year $t-1$; *Asset tangibility* is the ratio of plant, property, and equipment to total of each firm i in year $t-1$); and *Leverage* is the ratio of total debt to total assets of each firm i in year $t-1$. The estimates shown in Columns 1–3 and 5 are obtained by estimating the regression on the full sample period. The estimates shown in Column 4 are obtained by estimating the regression on the sample years with negative idiosyncratic shocks. The estimates shown in Column 6 are obtained by estimating the regression on the sample years surrounding large reforms of the GRR. Bootstrapped standard errors clustered at the country level are used to compute the t-statistics reported in parentheses. *, **, and *** indicate statistical significance at the 10%, 5%, and 1% level, respectively.

In the specification of Column 1, the coefficient of the family-firm dummy is negative and significant, and implies that the average real wage paid by family firms is approximately 6% to 7% lower than in nonfamily firms. This result should be taken cautiously because it could reflect unobservable skill differentials between employees of family and nonfamily firms: the wage discount could simply reflect the fact that, on average, family firms employ

Table 11
Price of employment insurance in family firms

	(1) Full sample	(2) Full sample	(3) Full sample	(4) Large reforms
Family	−0.0742**	−0.0652**	−0.0201*	
	(−2.41)	(−2.21)	(−1.78)	
Family × Unemployment security	0.0051**	0.0044**	0.0057**	0.0064**
	(2.23)	(2.01)	(2.48)	(2.05)
Family × Financial development		0.0034		
		(0.87)		
Firm size	0.0499***	0.0452***	0.0409**	0.0428**
	(2.87)	(2.74)	(2.59)	(2.20)
Asset tangibility	0.0095*	0.0086	0.0079	0.0082
	(1.87)	(1.62)	(1.49)	(1.60)
Return on assets	0.0801***	0.0748***	0.0679**	0.0722***
	(3.21)	(2.89)	(2.51)	(2.89)
Leverage	−0.0422	−0.0798	−0.0372	−0.0390
	(−1.04)	(−0.91)	(−0.87)	(−0.92)
Firm-level controls	Yes	Yes	Yes	Yes
Firm fixed effects	No	No	Yes	Yes
Country × Industry effects	Yes	Yes	No	No
Country × Time effects	Yes	Yes	Yes	Yes
Family × Country effects	No	No	No	Yes
R^2	0.15	0.18	0.22	0.16
Number of observations	49,122	49,122	49,122	21,054

This table presents the estimates of a pooled regression model for 3,350 firms from 41 countries over the period from 1988 to 2013. The dependent variable is the log of the real average wage of firm i in year t. The independent variables are as follows: *Family* is a dummy that takes the value of 1 if the firm i's ultimate blockholder is a family blockholder who is present in the firm's management and 0 otherwise; *Unemployment security* is the GRR in each country, calculated as the ratio of the unemployment insurance benefits received by a worker in the first two years of unemployment to the worker's last gross earnings; *Financial development* is the ratio of stock market capitalization to GDP; *Firm size* is the log of market capitalization of each firm i in year $t-1$; *Asset tangibility* is the ratio of plant, property, and equipment to total assets of each firm i in year $t-1$; *Return on assets* is the return on total assets of each firm i in year $t-1$; and *Leverage* is the ratio of total debt to total assets of each firm i in year $t-1$. The estimates shown in Columns 1–3 are obtained by estimating the regression on the full sample period. The estimates shown in Column 4 are obtained by estimating the regression on the sample years surrounding large reforms of the GRR. Standard errors are clustered at the country level. t-statistics are reported in parentheses. *, **, and *** indicate statistical significance at the 10%, 5%, and 1% level, respectively.

less skilled workers. However, interpreting this wage discount as the "price of employment stability" squares also with the finding that the price that workers are willing to pay is smaller in countries and periods in which public unemployment insurance is more generous: the estimated coefficient of the interaction of the family-firm dummy with public unemployment security shows that the wage discount is smaller when the social security system provides stronger protection against unemployment. This squares with our earlier finding that in these circumstances family firms offer less employment insurance, and so benefit from a lower wage discount: both the quantity and the price of the insurance provided by family firms decline as the government provides more insurance. These results are confirmed when we control for financial development (Column 2).

To address unobserved heterogeneity in workforce composition, the specification shown in Column 3 includes also firm fixed effects. This is a very demanding specification, as we identify the family-firm effect only from

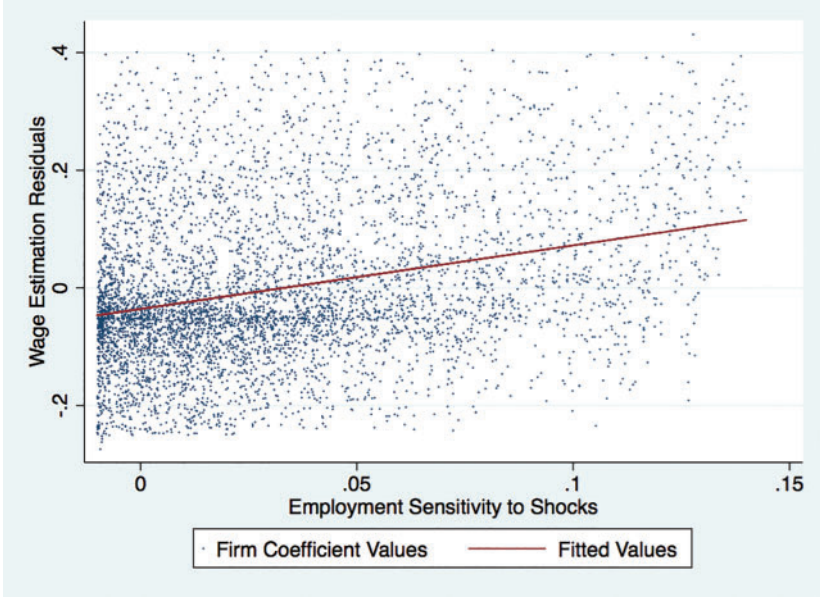

Figure 5
Employment sensitivity to firm-level sales shocks and average real wage
The variable shown on the vertical axis is the residual of a cross-sectional regression of the average real wage on fixed country, time and industry fixed effects. The measure reported on the horizontal axis is a firm-level estimate of the "pass-through" coefficient, that is, the sensitivity of employment to the unexpected component of firm-level sales, controlling for country-industry and time fixed effects and for firm-level variables.

firms switching status. In fact, when a firm switches from nonfamily to family, the downward adjustment in wages might require time to realize, given nominal wage rigidity: this estimate should therefore be interpreted as a lower bound of the overall effect. Indeed, the coefficient drops to 2%, and is significant only at the 10% level. However, even in this specification we find that the wage discount that family firms enjoy decreases with public insurance, consistently with the central finding of our analysis. Finally, in Column 4, we estimate on the sample of large reforms the specification that also includes the interaction between country dummies and the family-firm dummy, to control for potential fixed country characteristics that might differentially affect the level of wages in family firms and be correlated with unemployment security. Even with these additional controls, the wage discount that family firms obtain decreases as the degree of public unemployment security increases.

Interestingly, the finding that firms providing less employment insurance pay higher real wages is not confined to the comparison between family and nonfamily firms, but holds more generally in our sample. This is shown in Figure 5, which plots each firm's average real wages against its own pass-through coefficient, that is, the sensitivity of its employment to idiosyncratic sales shocks. More precisely, the measure plotted on vertical axis is the residual

of a cross-sectional regression of the average real wage on country, time and industry fixed effects (in order to control for country-, time- and industry-related variability in real wages), and the measure shown on the horizontal axis is a firm-level estimate of the elasticity of employment to sales shocks.[20] The relationship is clearly positive, suggesting that firms whose employment responds more sharply to sales shocks compensate their employees with higher wages. The fitted line is obtained from a regression of the firm-level wage regression residuals (on the vertical axis) on a constant and on the firm-level coefficient of employment sensitivity to idiosyncratic shocks (on the horizontal axis). The t-statistic of the estimated slope coefficient of this regression is 26.07. This confirms that the employment insurance provided by firms is valued by workers and priced accordingly: the higher the insurance, the higher the wage discount.

7. Conclusion

This paper has investigated whether and to what extent the implicit insurance provided by firms to their employees substitutes for the unemployment insurance provided by the social security system. We used a panel of firm-level data from 41 countries and relied on differences between family and nonfamily firms to identify the supply of insurance as well as on differences among national social security programs to gauge workers' demand for insurance.

Our evidence shows that family firms provide more employment protection than do nonfamily firms, but do so less in countries in which the social security system provides more generous unemployment insurance. We also have found that the employment protection provided by family firms is priced: their employees earn 6% less on average, controlling for country, industry and time effects. Moreover, family firms also obtain a larger wage discount when public unemployment insurance is less generous, so that employees are more eager to obtain the additional employment stability that they can offer. Hence, the evidence is consistent with the view that private and public provisions of employment insurance are substitutes.

Appendix. Estimating the Persistent and Transitory Components of Sales Shocks

This appendix shows how the persistent and transitory components of sales shocks are obtained, disregarding—at least, initially—the cross-country component and also the distinction between family and nonfamily firms.

[20] The firm-specific "pass-through coefficients," θ_{1i}, are obtained by estimating the following regression for the employment growth of each firm i: $\Delta n_{it} = \theta_{0i} + \theta_{1i}\varepsilon_{it} + \gamma_i' X_{it-1} + \xi_{it}$, where ε_{it} is the sales shock, X_{it-1} is a vector of lagged firm-specific variables, and ξ_{it} is the error term.

We assume the following stochastic process for firm sales:

$$s_{it} = \mu_i + \mu_{cjt} + \lambda Z_{it} + \varepsilon_{it}, \tag{A1}$$

where s_{it} is the logarithm of the sales of firm i in industry j in year t, μ_i is a firm fixed effect, μ_{cjt} is a country-industry-year dummy, Z_{it} is a set of other controls, and ε_{it} is a shock to firm i's sales, which we can decompose into a persistent and a transitory component as follows:

$$\varepsilon_{it} = \zeta_{it} + v_{it}, \tag{A2}$$

$$\zeta_{it} = \zeta_{it-1} + u_{it}, \tag{A3}$$

where ζ_{it} is the persistent component, modeled as a random walk, and v_{it} the transitory component of sales innovations. This is a simpler version of Guiso, Pistaferri and Schivardi (2005), where s_{it} and v_{it} are modeled as AR(1) and MA(1) processes, respectively.

Employment is assumed to respond to persistent and transitory shocks with different sensitivities α^P and α^T, respectively:

$$n_{it} = \mu_i + \alpha^P \zeta_{it} + \alpha^T v_{it} + \gamma X_{it} + \psi_{it}, \tag{A4}$$

where μ_i is a firm fixed effect, X_{it} are other controls, and ψ_{it} is an idiosyncratic shock to employment uncorrelated with ζ_{it} and v_{it}.

Sensitivities α^P and α^T are estimated in three steps. First, the first differences of (A1) are computed, and the resultant sales growth regression is estimated:

$$\Delta s_{it} = \Delta \mu_{jct} + \lambda \Delta Z_{it} + \Delta \varepsilon_{it}, \tag{A5}$$

so as to recover an estimate of $\Delta\varepsilon_{it}$, without directly identifying the persistent and the transitory shocks. Second, the first differences of (A4) are computed and the resultant employment growth regression is estimated:

$$\Delta n_{it} = \gamma \Delta X_{it} + \alpha^P u_{it} + \alpha^T \Delta v_{it} + \Delta \psi_{it} = \gamma \Delta W_{it} + \Delta \omega_{it}, \tag{A6}$$

using $\Delta\zeta_{it} = u_{it}$ from (A3), and redefining the error term as $\Delta\omega_{it} \equiv \alpha^P u_{it} + \alpha^T \Delta v_{it} + \Delta\psi_{it}$.

Finally, since $\Delta\varepsilon_{it} = u_{it} + \Delta v_{it}$, the coefficients α^P and α^T are recovered by estimating two separate IV regressions of $\Delta\omega_{it}$ on $\Delta\varepsilon_{it}$. Specifically, as shown by Guiso, Pistaferri and Schivardi (2005), a regression of $\Delta\omega_{it}$ on $\Delta\varepsilon_{it}$ with the latter instrumented by $\Delta\varepsilon_{it+1}$ and its powers identifies the transitory shock coefficient α^T, while a regression of $\Delta\omega_{it}$ on $\Delta\varepsilon_{it}$ with the latter instrumented by $\Delta\varepsilon_{it+1} + \Delta\varepsilon_{it} + \Delta\varepsilon_{it-1}$ and its powers identifies the persistent shock coefficient α^P. We use the first three powers of the instruments, which gives us two over-identifying restrictions for each equation. We test for the power of the instruments in the reduced-form regressions with the p-value of the F-test on the excluded instruments.

To estimate a different coefficient for family firms, we just include in the regression the interaction between the family-firm dummy F_i and the shocks, and, among the instruments, the interaction between the original instruments just described and the family-firm dummy.

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