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ABSTRACT

Tenancy by the Entirety and the Value of Wealth Insurance for Entrepreneurs*

This paper explores the willingness of entrepreneurs to pay for wealth insurance to protect personal assets in case of business failure and the impact of this strategy on small business operation decisions. I show that antidiscrimination laws allow married firm owners in half of U.S. states to choose between asset protection and having more collateral for business funding, allowing entrepreneurs to reveal their valuation for preserving personal assets at time of failure. I find that firm owners value asset protection offered by tenancy by the entirety laws at $900-$1000 per year. Firms receive smaller loans when entrepreneurs use this form of ownership to reduce the personal costs of firm failure, but show no differences in hiring patterns or spending on risky projects. This strategy of preparation in case of failure appears to affect small businesses through the funding channel.

JEL Classification: K35, K36, L26, M13

Keywords: personal bankruptcy, tenancy by the entirety, revealed preference, entrepreneurship

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1 Introduction

Small businesses are a large part of the U.S. economy. In 2015, firms with fewer than 500 employees employed approximately 48% of all private sector workers, paying 41% of private sector payroll (U.S. Small Business Administration, 2018). Individual small businesses, however, are frequently short-lived. Between 2005 and 2017, only 79% of small businesses survived a single year, while about one-third of establishments survived ten years. The financial crisis likely impacted small business survival, as firms founded in 2006 had a five-year survival rates of 45%, while firms founded in 2011 had a five-year survival rate of 51%. Roughly two-thirds of establishment exits in the U.S. over 2005 to 2017 were firm closures. These statistics indicate that the lifespan of a small business may be short and that firm closure is a common occurrence, suggesting that entrepreneurs may wish to plan for this possibility from the firm's inception.

In the U.S., the bankruptcy system plays an important role in protecting the personal assets of small business owners. Berkowitz and White (2004) discuss how entrepreneurs are frequently required to give personal guarantees on loans for their small businesses even when the firms are incorporated. These guarantees imply that the number of business bankruptcies can understate the role of bankruptcy in resolving entrepreneurial business debt. The U.S. Administrative Office of the Courts reports that over the period 2005-2017, approximately 436,000 personal bankruptcies featured predominantly business debts (U.S. Administrative Office of the Courts, 2007; 2012; 2017). However, Sullivan et al. (1999) and Lawless and Warren (2005) estimate that nearly one-fifth of all personal bankruptcy filings result in the discharge of debts related to the filer's business, suggesting that over 2,000,000 additional personal bankruptcies involved business debts.[1] The asset protections available in personal bankruptcy are therefore relevant for a large number of small business owners. This paper explores the willingness of entrepreneurs to pay for personal asset protection in the case of

[1] Figure from author's calculations based on U.S. Administrative Office of the Courts report of 12,775,578 nonbusiness bankruptcies filed over this period. See `https://www.uscourts.gov/news/2018/03/07/just-facts-consumer-bankruptcy-filings-2006-2017` for more details.

business failure and the impact of a firm owner's desire to protect personal assets on the operation of U.S. small businesses.

Bankruptcy exemptions allow a debtor to retain certain assets as part of a post-bankruptcy fresh start. The wealth insurance offered by the bankruptcy system may influence an entrepreneur's business operation decisions long before a firm nears closure, as exemption levels affect an entrepreneur's potential losses from failure. To the extent that entrepreneurs are aware of the risks and costs of firm failure, this insurance may be of significant value to firm owners. However, it is difficult to estimate the value of asset protection through bankruptcy to firm owners because changes in exemption levels can shift both the supply and demand curves for credit (Gropp et al., 1997). Observed changes in firm owner behavior when bankruptcy exemption levels change may be confounded with changes in lending behavior and therefore partially reflect the preferences of both creditors and firm owners.

In order to determine the firm owner's valuation of asset protection at the time of firm failure, this paper uses variation in the presence of tenancy by the entirety (TBE) laws across U.S. states. TBE laws allow married debtors in half of U.S. states to exempt property owned jointly by a husband and wife from claims by the creditors of only one spouse. Married entrepreneurs can use TBE laws to exempt property from creditors' claims if the owner's spouse has no financial role in the business. The owner must secure loans in his or her own name, with the spouse bearing no responsibility for repayment. Also, the spouse must not be a joint owner of any business assets. If the spouse cosigns a loan or acquires an equity share in the business, then creditors will be able to seize TBE property to satisfy joint debts of the spouses. These conditions imply that in order to enjoy the protections of TBE laws, owners may not use any jointly owned assets as loan collateral to finance the business, which may credit constraint the firm and result in lower profits.

In this paper, I assume that TBE laws affect loan demand but not loan supply. In the U.S., the Equal Credit Opportunity Act of 1974 prohibits lenders asking borrowers

for their marital status or using marital status information when underwriting loans.[2] Bank regulators and courts enforce this antidiscrimination law both before and after a loan is made and can require creditors to remove a spouse as a loan guarantor if the spouse was added improperly.[3] Married business owners are functionally indistinguishable from unmarried business owners to lenders, eliminating lenders' ability to respond to the availability of TBE asset protections when making credit decisions. Traczynski (2019) shows that married and unmarried borrowers have no differences in loan terms and denial rates in TBE and non-TBE states, supporting the assumption that creditors are unable to respond to TBE asset protections. I therefore assume that observed differences in behavior associated with TBE laws reflect differences in firm owner decision making rather than creditor choices.

Many papers have investigated the links between the impact of wealth insurance or debt discharge in the personal bankruptcy system and small businesses. Fan and White (2003), Berkowitz and White (2004), Jia (2010), Severino et al. (2015), and Cerqueiro and Penas (2016) examine the impact of bankruptcy exemptions on self-employment decisions and credit use by startups. Since these papers use variation in exemption levels, their results do not reflect the preferences of firm owners, as first argued by Gropp et al. (1997). Wang and White (2000), White (2005), Athreya (2005), Han and Li (2007), Chen (2011), and Dobbie and Song (2013) study the relationship between bankruptcy filings and individual labor supply decisions, showing that the wealth insurance offered by bankruptcy can influence how individuals respond to negative economic shocks. This paper focuses on entrepreneurs' willingness to pay for wealth insurance through TBE laws as part of planning in case of firm closure, which requires action throughout the life of the business and before the owner and the business encounter negative shocks.

[2]There is an exception to this rule that applies only in community property states (Alaska, Arizona, California, Idaho, Louisiana, Nevada, New Mexico, Texas, Washington, and Wisconsin). Of these, only Alaska recognizes TBE property ownership, but requires married couples to opt out of community property ownership in order to own property as an entirety. All other states do not allow married couples to opt out of community property ownership. Results are robust to excluding Alaska.

[3]For examples of courts enforcing this antidiscrimination law after lenders tried to collect debts from spouses improperly added as guarantors on loans, see *Empire Bank v. Dumond*, WL 6238605 (N.D. Okla., 2013) and the other cases cited therein.

The paper most similar to this one is Traczynski (2019), which examines the effects of TBE laws on the credit choices and labor supply decisions of entrepreneurs. Traczynski (2019) shows that married firm owners take advantage of TBE laws by using mortgages and home equity loans as a funding source less often than comparable unmarried firm owners and reducing hours worked. Traczynski (2019) also documents that differences in observable characteristics and selection into firm ownership for married firm owners in TBE states are minimal. This paper uses antidiscrimination laws and the requirements of TBE ownership to argue that differences in firm owner decisions reflect revealed entrepreneur preferences, explores how business operation decisions differ when owners enjoy significant personal asset protection, and quantifies the cumulative impact of these strategic choices on firm revenues and expenditures. Viewed through the lens of revealed preference, the impact of TBE laws on firm profits indicates the firm owner's valuation of wealth insurance in the form of asset protection in case of firm failure. Taking advantage of TBE asset protections requires firm owners to plan and maintain a funding strategy from firm inception to closure, suggesting that TBE laws offer a way to study entrepreneurs' willingness and ability to mitigate the impact of firm failure on their personal financial well-being.

I find that the average firm owner is credit constrained when choosing to use the protections of TBE laws, as firms take out smaller loans when owners choose to withhold housing collateral. I show that this effect on business capital comes through a reduction in amounts of personal loans to the owner rather than loans made in the name of the business. Specifically, firm owners obtain less funding through mortgages/housing equity loans. As marital homes are often jointly owned by both spouses, TBE laws should have the greatest effect on business financing through home equity. I use the tradeoff between the legal protections of TBE and the lack of loan collateral used to secure business financing to infer a value for wealth insurance. I find that the median firm owner in the KFS sample gives up \$900-\$1000 per year in profits to move from approximately \$165,000 of personal asset protection to the unlimited amount offered by TBE laws. This amount is very close to the average yearly U.S.

homeowner insurance premium of $880 in 2009 (National Association of Insurance Commissioners, 2016). However, I find minimal impacts of securing personal asset protection through TBE laws on other firm operating decisions. I find that TBE laws do not have a statistically significant influence on firm employment levels or the probability of a firm engaging in and spending on research and development projects. These findings support the idea that entrepreneur's adoption of TBE asset protection affects firms through a collateral channel and does not spur owners to take on additional risks that may contribute to the likelihood of firm failure.

2 Bankruptcy Exemptions and TBE

2.1 Personal Bankruptcy

U.S. debtors petitioning for personal bankruptcy may choose between filing under Chapter 7 or Chapter 13 of the Bankruptcy Code. Chapter 7 allows debtors to eliminate all debts, but debtors must liquidate any assets above designated exemption levels to repay creditors. Chapter 13 allows debtors to keep a greater amount of assets, but debtors must complete a multi-year repayment plan approved by a judge to receive a discharge of their remaining debts. Businesses may file for Chapter 7 or Chapter 11 bankruptcy. A Chapter 11 reorganization bankruptcy gives firms the opportunity to continue operating while negotiating debts and contract terms with creditors. However, small business owners rarely choose to file under Chapter 11 because of the high legal costs associated with creditor negotiations.

Since most debtors control whether to file under Chapter 7 or Chapter 13, debtors can consider exemption values when making this decision.[4] Thus, bankruptcy exemptions are a

[4]The Bankruptcy Abuse Prevention and Consumer Protection Act of 2005 introduced a means test that can restrict chapter choice in personal bankruptcy. However, the means test does not apply to filers whose debts are primarily business debts. For discussion of the applicability of the means test to business debtors, see Wedoff (2005), Paik (2013), and *In re Kinnee*, Case No. 06-21356 (Bankr. E.D. Wis, 2006) (unpublished decision available at `http://www.wieb.uscourts.gov/opinions/files/pdfs/In_Re_Kinnee,_06-21356.pdf`)

measure of the dollar amount of personal asset protection regardless of a filer's chapter choice. States and the federal government offer a variety of bankruptcy exemptions. Homestead exemptions apply to housing equity and are usually the largest single exemption in terms of dollar value. Several states have no dollar limit on homestead exemptions. Table 1 lists the homestead exemption for married couples in every U.S. state in 2009. Personal property, including automobiles, equipment used for various professions, jewelry, and even cash typically have smaller exemptions. Some states offer wildcard exemptions that can exempt any type of property from seizure by creditors. Some wildcard exemptions are only available to debtors who do not claim the homestead exemption. These substitute exemptions are generally much smaller in dollar value than the homestead exemption but allow non-homeowners to protect additional assets.

2.2 Tenancy by the Entirety

Tenancy by the entirety laws allow a husband and wife to own jointly the undivided whole of a piece of property. A married person cannot give away, partition, or sell an interest in TBE property without spousal approval because the property is wholly owned by both partners.

When an individual debtor files for bankruptcy, the bankruptcy estate must include all of that debtor's property. However, property owned by an entirety is not property of an individual debtor. Therefore, the debtor may exclude the property owned by the entirety from the bankruptcy estate with no dollar limit on the property value. Essentially, the debtor can exclude the TBE property from the estate on the grounds that the TBE property is owned entirely by the non-debtor spouse. A married debtor can thus exempt TBE property from creditors who have claims against the debtor only. If a married couple files for bankruptcy jointly or a debtor has joint debts with a spouse such as a home equity loan or mortgage on property that both partners own, then property held as TBE is part of the bankruptcy estate and may be sold to pay creditors. Because it may be applied to keep unlimited amounts of housing equity away from creditors, TBE is potentially a powerful form of asset protection.

TBE first appeared as a form of ownership in England in the 1200s (Carrozzo, 2001). The English common law doctrine of coverture gave husbands control over all TBE property owned by a married couple. In the U.S., states passed Married Women's Property Acts beginning in the early 1800's that allowed wives to own and control property separately from their husbands, creating a conflict with TBE under coverture. Between the 1820s and the 1970s, state courts gave interpretations of the relationship between various state Married Women's Property Acts, the traditional treatment of TBE property, and state constitutions that created the current variation in the existence of TBE laws across states. Table 1 summarizes TBE laws across states in 2009, and Figure 1 presents a map of TBE states. TBE and non-TBE states appear in all regions of the county, though there is a concentration of TBE states east of the Mississippi River. The western U.S. features more community property states, a possible reflection of the Spanish legal origin of this region (Newcombe, 2011).

I treat TBE laws in a state as exogenous with respect to modern entrepreneurial decision making because of the historical origins of the laws and the series of judicial and legislative decisions necessary to create the current pattern of TBE states. Hynes et al. (2004) find no economic or political variables that predict whether TBE laws exist in a state in the late 20th century other than whether the state had previously recognized TBE ownership. This interpretation is consistent with legal and economic scholarship on the origins of TBE laws.[5]

3 Empirical Approach and Data

I use a triple difference model to compare decisions made by married business owners and single business owners in states with and without TBE laws, controlling for the interactive effects of bankruptcy exemptions. Specifically, I use the statistical model

[5]Papers that discuss the origins and consequences of TBE laws include Kalevitch (1986), Concannon (1990), Dickerson (1998), Carrozzo (2001), Hynes et al. (2004), Hynes (2004), and White (2007).

$$
\begin{aligned}
Y_{is} \;=\; & \alpha + \beta_1 \cdot Married_i + \beta_2 \cdot TBE_s + \beta_3 \cdot Exemption_s + \beta_4 \cdot TBE_s \cdot Exemption_s \\
& + \beta_5 \cdot TBE_s \cdot Married_i + \beta_6 \cdot Married_i \cdot Exemption_s \\
& + \beta_7 \cdot TBE_s \cdot Married_i \cdot Exemption_s + \pi \cdot X_{is} + \epsilon_{is}
\end{aligned} \tag{1}
$$

where Y_{is} is the outcome of interest, TBE_s is a dummy variable indicating whether state s permits any form of TBE ownership, $Married_i$ indicates if the primary owner of firm i is married, $Exemption_s$ is the state's bankruptcy homestead exemption for married couples in \$10,000s, and X_{is} are other control variables. I use a logistic specification when Y_{is} is a binary variable. X_{is} includes firm owner work experience and a quadratic function of age, along with dummy variables for the owner's education level, race, ethnicity, and gender, as well as dummy variables for the form of legal organization of the firm and the 2-digit NAICS code for the firm's industry. For firms with multiple owners, I follow Robb and Robinson (2014) and define the primary owner as the individual who owns the largest share of the firm, breaking ties in favor of the owner with a greater number of hours worked, level of education, age, and years of work experience in order. For states with unlimited homestead exemptions, I set $Exemption_s$ equal to \$550,000, which Table 1 shows is the largest defined homestead exemption in the sample. I also include a dummy variable for whether a state has an unlimited homestead exemption.[6] All standard errors are clustered at the state level.

The triple difference model captures the fact that married firm owners in TBE states receive less additional asset protection from TBE laws relative to unmarried people in states with generous bankruptcy exemptions. The homestead exemption protects housing equity in bankruptcy, which is likely the most valuable asset jointly owned by a married couple.

[6]Both Berkowitz and Hynes (1999) and Traczynski (2011) assign the highest defined exemption value in their sample periods to states with unlimited homestead exemptions and include dummy variables to indicate these states, so this treatment of unlimited homestead states follows precedents in the literature. The results below are not sensitive to the exemption amount assigned to unlimited homestead exemption states. In states that allow debtors to elect to use federal exemptions, I replace the state homestead exemption with the federal homestead exemption if the federal exemption is larger.

Intuitively, TBE laws and bankruptcy exemptions are substitute forms of asset protection, and the triple difference model controls for this in estimating the effect of TBE laws on firm owners' decisions. Using the homestead exemptions for married couples in all states in 2009 listed in Table 1 and assigning unlimited exemption states a value of $550,000, the state-level correlation between the homestead exemption and recognition of TBE laws is -0.147. This correlation suggests that states with TBE laws have somewhat less debtor-friendly bankruptcy exemptions than states without TBE laws, motivating the use of the triple difference specification to account for cross-state differences in exemption levels.

In equation (1), $\beta_5 + \beta_7 \cdot Exemption_s$ quantifies the difference between married and unmarried firm owners in the outcome variable across states with and without TBE laws. To obtain average differences, I set $Exemption_s$ to the national average homestead exemption level of approximately $165,000. I determine the statistical significance of the impact of TBE laws via F-tests on the joint statistical significance of β_5 and β_7.

Married individuals in TBE states have access to an unlimited bankruptcy exemption for TBE property against the debts of only one spouse that they may choose to use, but unmarried people do not. Unmarried firm owners are a reasonable control group for married firm owners because they face the same regulations and economic conditions in each state as married firm owners but are unaffected by TBE laws. Interpreting this estimate as an result of TBE asset protections relies on the assumption that no other differences exist across TBE and non-TBE states that affect relative outcomes of married and unmarried firm owners. Traczynski (2019) tests this assumption using the method of Altonji et al. (2005) to determine the magnitude of bias resulting from omitted variables and finds that the unobservable differences between TBE and non-TBE states do not have a statistically significant impact on estimates of the impact of TBE laws on outcomes.

I obtain data from Kauffman Firm Survey (KFS), a survey of firms founded in 2004.[7] I use the KFS data from 2009, so all firms in the sample have operated for 5 years. The KFS

[7]More information about the KFS can be found at `http://www.kauffman.org/kfs/About-the-KFS.aspx`.

is a sample of Dun & Bradstreet's 2004 listing of new businesses and oversamples firms from industries with a high industry-wide level of employees performing research and development. I therefore use the provided weights when presenting results from KFS data. The restricted access version of the KFS contains firm state identifiers necessary to determine the relevant TBE laws and bankruptcy exemptions. Table 2 reports summary statistics. Nearly 47% of firms in the 2009 KFS are in states that recognize TBE ownership, indicating that the choices offered by TBE laws are relevant to many U.S. firm owners.

4 Results

4.1 TBE and Firm Profits

I use Equation 1 to estimate the relationship between TBE laws and firm profits. Standard economic theory assumes that firms are profit-maximizing entities, so deviations from the profit-maximizing levels of capital and labor normally lead to deadweight loss. Because TBE laws allow borrowers to choose whether they prefer to use jointly held assets as collateral for business loans or to keep those same assets safe from creditors in case of business failure, firm owners may choose to incur a loss in exchange for wealth insurance in case of firm failure. The fall in profits associated with TBE laws therefore represents an overall measure of entrepreneurs' willingness to pay for the asset protection that TBE offers.

Estimating effects on profits is challenging because of the distribution of profits across firms. Profits have a highly skewed distribution and are negative for some firms in the sample, precluding the use of a log transformation to address the skewness concern. Instead, I estimate the effects of TBE laws on firm revenues and expenditures separately, calculate the reduction of the gap between revenues and expenditures, and apply this percentage to median firm profits. In order to determine if outliers in the distribution of revenues and expenditures still have a strong influence on results after using the log transformation on the data, I also estimate median regressions to limit their influence.

Columns (1) and (2) of Table 3 present findings from the weighted least squares specifications and show that mean firm revenues and expenditures are lower for married firm owners in TBE states, while firms in states with a larger homestead exemption see less of a negative impact of TBE laws. Columns (1) and (2) show that revenues for married firm owner in a TBE state are 18.2% lower while expenditures are 8.5% lower. Expenditures in the KFS data include wages, salaries, interest on loans, capital leases, and materials, so the fall in expenditures may reflect firms having fewer business assets and owners having less personal debt. Both of these findings are economically large. Using the median values of revenues and expenditures, an 18.2% reduction in revenues and 8.5% decrease in expenditures means that the difference between revenues and expenditures falls to approximately 67% of its previous level. As the median value of profits is this sample is $1000, such a reduction implies that profits would fall by nearly $332. Traczynski (2019) shows that one-third of firm owners take advantage of TBE protections. Scaling up the present estimate, I find that the median firm owner in this sample is willing to give up approximately $995 in yearly profits in exchange for the additional asset protections of TBE laws above what the states already protect through homestead exemptions. Repeating this exercise using coefficients from the median regressions in columns (3) and (4) yields an estimate of the median firm owner's willingness to pay for the additional asset protection of $884 per year, indicating that outliers in the distribution of revenues and expenditures do not have a large impact on results.

A potential drawback of studying firm profits is that for small businesses, firm profits may be a close substitute for owner wages if the owner is also an employee of the firm. In this case, changes in firm profits may not fully capture the owner's willingness to pay for asset protection. To address this concern, I create a subsample where the firm owner is a firm employee and examine whether the expenditure result differs for this subset of firms.

Columns (5) and (6) show results for this subsample using weighted least squares and median regression, respectively. Comparing the weighted least squares regressions, the coef-

ficients on $TBE \cdot Married$ and $TBE \cdot Married \cdot Exemption$ in column (2) are within the 95% confidence intervals of those in column (5). Similarly, the coefficients on $TBE \cdot Married$ and $TBE \cdot Married \cdot Exemption$ from the median regression in column (4) are within the 95% confidence intervals of those in column (6). The lack of a significant difference in the response of expenditures to TBE laws when owner wages are part of firm expenditures indicates that the estimates of the profit response of firms to TBE asset protections is not confounded by substitutions between profits and owner salary.

There are two other notable features of every regression in Table 3. First, the coefficient on a state having TBE laws is not statistically significant, indicating that the outcomes of unmarried firm owners are not different across TBE and non-TBE states. This result offers evidence against the claim that there is some unobserved characteristic of states correlated with TBE status that is affecting the estimated results. Second, the coefficient on $TBE \cdot Married \cdot Exemption$ is opposite in sign to the coefficient on $TBE \cdot Married$. This finding shows that states with larger bankruptcy exemption levels have smaller estimated effects of TBE laws, which supports the assumption that TBE laws are a substitute for the asset protection provided by bankruptcy exemption levels. These findings support the use of the triple difference research design in this paper and the identification assumptions behind it.

4.2 TBE and Firm Credit

The results in Table 3 show that TBE laws are associated with lower firm profits. I now demonstrate that this result is related to reductions in personal loan and home equity loan amounts, suggesting that the entrepreneur's unwillingness to use housing equity as collateral is a key factor in explaining the lower profits.

Firm owners who wish to retain the asset protections of TBE laws in the event of firm failure should not use mortgages or home equity loans to finance the business. If both the owner and his or her spouse accept the loan, this joint debt would expose the married couple's housing equity to creditors. The KFS contains data on both personal and business loan

amounts. A loan is considered a personal loan if it is guaranteed by the owner's personal wealth and a business loan if the loan is guaranteed by business assets only. In order to estimate the effect of TBE laws on total amount of personal and business loans, I add \$1 to the totals in each category so that all firms have a positive amount of personal and business loans. As in Table 3, all regressions find that TBE laws have no statistically significant effect on unmarried firm owners and that states with larger homestead exemptions have smaller estimated effects of asset protection from TBE laws.

Table 4 presents results. Column (1) shows that married firm owners in TBE states have smaller average personal loan amounts. The size of this effect is economically significant. The difference between personal loan amounts used to finance the business for married and unmarried firm owners is 10.3% smaller in TBE states when setting exemptions to the national mean level.[8] Scaling the estimate from column (1) by the one-third takeup rate from Traczynski (2019) indicates that the dollar amount of loans guaranteed by the firm owner falls by approximately 31% for entrepreneurs who choose not use housing equity as a source of business funding.

Since TBE laws provide protection for personal and not business assets, I run a similar regression on business assets as a falsification check. Column (2) indicates that there is no statistically significant effect of TBE laws on loan amounts for loans made in the name of the firm. The point estimates are also economically smaller than for personal loans, as the coefficients suggest that business loans fall by only 11% for married firm owners in utilizing TBE laws.

As housing equity is likely the most valuable jointly owned asset for a married couple, I investigate whether the observed drop in personal loans used to finance businesses associated with TBE laws is driven by a drop in mortgage or home equity loans. Column (3) of Table 4 indicates that there is a statistically significant drop in the dollar amounts of mortgage

[8]This treatment effect estimate is calculated using the coefficients from column (1) as $e^{-0.657+0.333\cdot 16.45} - 1 \approx .103$, where 16.45 is the average homestead exemption level in units of \$10,000 when calculated as described in Section 3. All other treatment effect estimates when the dependent variable has undergone a logarithmic transformation are calculated analogously.

and home equity loans used to finance firm operations. Married firm owners in TBE states have 38% smaller mortgage and home equity loan amounts, indicating that housing collateral is being utilized less by married entrepreneurs living in TBE states compared to all other firm owners. This finding is consistent with married owners choosing to refrain from using housing equity to finance a business in order to protect the marital home from creditors in case of business failure.

Since personal loans fall for married firm owners in TBE states and business loans do not rise to fill this gap in funding, the overall amount of borrowing is smaller for these firms. However, these firms may not be credit constrained if this gap is offset by personal funds of the owner or by recruiting additional owners to provide funds. Traczynski (2019) shows that firms have a 12% reduction in the value of business assets when owners take advantage of TBE laws, suggesting that firm owners are able to find some alternative sources of funding to compensate for the lack of borrowing against home equity induced by TBE laws but cannot replace all of the lost capital. These results are consistent with married firm owners in TBE states choosing to operate smaller firms by reducing borrowing among loan types that jeopardize TBE protections in case of firm failure.

4.3 TBE and Business Operations

I examine two other aspects of business operations that may be impacted by an entrepreneur's decision to forgo funding in favor of personal asset protection. First, as firms have fewer business assets, their derived demand for labor may change and thereby alter the optimal number of employees to hire. Second, greater wealth insurance may limit the downside risk of failed projects, encouraging firm owners to have more projects with uncertain returns or invest more in such projects. More risky projects may increase the probability of firm failure, thereby increasing the value of wealth insurance to the firm owner. Both of these business operation decisions may be part of a firm owner's considerations when deciding whether or not to use TBE laws to protect personal assets and may explain part of the effect of TBE

laws on profits.

Table 5 presents results. Column (1) shows that among firms with at least one employee other than the owner, there is no statistically significant change in employment levels. There is no evidence that hiring levels among firms larger than sole proprietorships change in a way associated with TBE asset protections. Columns (2) and (3) report the effects of TBE laws on firm spending on research and development. Column (2) shows results for the extensive margin of R&D spending using a binary variable equal to 1 if a firm has any R&D expenditures, while column (3) reports results for the intensive margin of R&D spending using the natural log of the cumulative total of dollars spent over the period 2004-2009. While point estimates of the effect of TBE laws are positive, indicating that owners are more likely to undertake and spend more money on a risky project when personal asset protections are stronger, the results are not statistically significant. Thus, I find no clear impacts of the personal asset protections of TBE laws on firm project selection. As above, all regressions find that TBE laws have no statistically significant effect on unmarried firm owners and that states with larger homestead exemptions have smaller estimated effects of asset protection from TBE laws.

The negative findings in Table 5 are useful in ruling out some possible strategies that entrepreneurs might consider in concert with using TBE asset protections. These results provide no evidence to suggest that firm owners substitute labor for the reduced supply of business assets, nor that firm owners increase the risk of failure by engaging in R&D projects that may have more uncertain returns. Together, these results suggest that entrepreneurs' decision to use TBE laws to protect personal assets affects business operations largely through the funding channel rather than through labor input or project choices.

5 Conclusion

Previous research has found that the asset protections of bankruptcy exemptions encourage self-employment and have both supply and demand effects in credit markets. This paper considers the strategic choices of entrepreneurs in using tenancy by the entirety property ownership, a form of personal asset protection that allows married couples in half of U.S. states to shield jointly held assets from the claims of the creditors of a single spouse. I find that when TBE protections are available for housing equity, firm owners reduce the use of mortgages and home equity loans as a source of small business funding in order to protect the asset from creditors in the event of firm failure. This is an asset protection strategy that comes at the cost of lower profits due to credit constraints. I estimate that the median firm owner values this additional asset protection at approximately $900-1000 per year, a value similar to the price of a homeowner's insurance policy.

The unique policy setting of U.S. antidiscrimination laws coupled with the interaction of English legal history and variation in state constitutions and court interpretations allows firm owners to choose whether to reveal their marital status to lenders in most states. This choice and its resulting impact on the ability of firm owners to secure lending for their business needs create a situation in which owners can reveal their preference for personal asset protection or higher profits. While this asset protection strategy could affect firm profits in many ways, the aggregate effect is a reasonable measure of the entrepreneur's willingness to pay for wealth insurance in case of business failure. This paper is the first to show that TBE laws offer some firm owners these tradeoffs and use data on firm funding sources and profits to quantify the value of wealth insurance to entrepreneurs. Future research can use variation in TBE laws to explore other issues that require separate identification of supply and demand effects in credit markets and investigate other consequences of asset protection strategies that entrepreneurs use in anticipation of possible firm failure.

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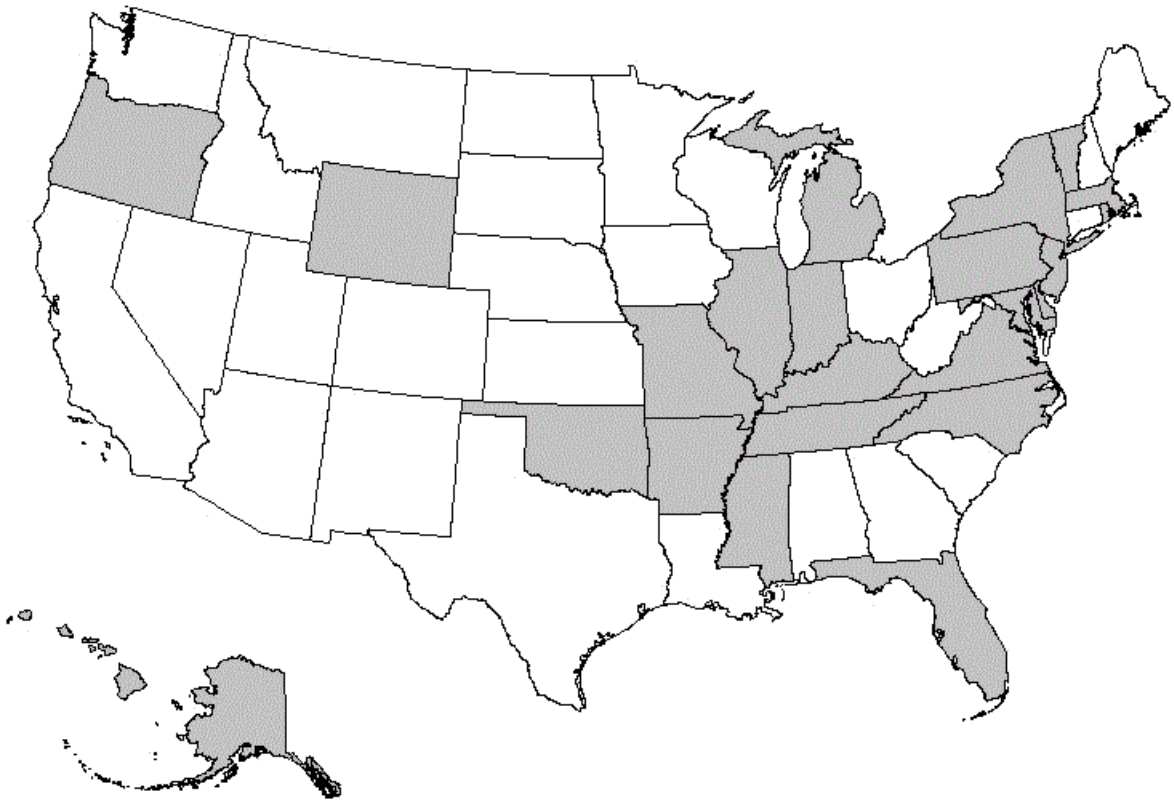
Figure 1: Map of TBE Laws by State



Source: Franke (2009) States that recognize TBE property ownership are shaded gray.

Table 1: 2009 Homestead Exemptions and Tenancy by the Entirety Laws by State

State	Homestead	TBE	State	Homestead	TBE
Alabama	10000		Montana	500000	
Alaska	70200	Yes	Nebraska	60000	
Arizona	150000		Nevada	550000	
Arkansas	unlimited	Yes	New Hampshire	200000	
California	75000		New Jersey	0	Yes
Colorado	120000		New Mexico	120000	
Connecticut	150000		New York	100000	Yes
Delaware	0	Yes	North Carolina	37000	Yes
District of Columbia	unlimited	Yes	North Dakota	100000	
Florida	unlimited	Yes	Ohio	40000	
Georgia	20000		Oklahoma	unlimited	Yes
Hawaii	30000	Yes	Oregon	39600	Yes
Idaho	100000		Pennsylvania	0	Yes
Illinois	30000	Yes	Rhode Island	300000	Yes
Indiana	30000	Yes	South Carolina	100000	
Iowa	unlimited		South Dakota	unlimited	
Kansas	unlimited		Tennessee	7500	Yes
Kentucky	10000	Yes	Texas	unlimited	
Louisiana	25000		Utah	40000	
Maine	90000		Vermont	150000	Yes
Maryland	0	Yes	Virginia	10000	Yes
Massachusetts	500000	Yes	Washington	125000	
Michigan	34450	Yes	West Virginia	50000	
Minnesota	300000		Wisconsin	40000	
Mississippi	150000	Yes	Wyoming	20000	Yes
Missouri	15000	Yes	Federal	40400	

Sources: State statutes for homestead exemptions and Franke (2009) for TBE laws. Homestead exemptions are as applicable to a married couple with no age or disability modifications. "Full" and "Modified" refer to the type of bar TBE provides against creditors in that state. "Full" means that creditors of an individual spouse cannot obtain an interest against TBE property. "Modified" means that creditors of an individual spouse may obtain some interest in TBE property, though the exact nature varies by state.

Table 2: Summary Statistics

Variable	Obs.	Mean	Std. Dev.
Share Firms in TBE states	2606	0.467	0.499
Owner experience	2590	12.806	10.726
Married	2606	0.667	0.471
Hours worked	2582	40.416	22.515
Age	2585	48.943	10.655
Female	2587	0.313	0.464
Some college	2606	0.359	0.480
College graduate	2606	0.309	0.462
Graduate degree	2606	0.197	0.398
Hispanic	2606	0.052	0.221
Firm profits	2498	14,505.36	756,588.90
Ever spend on R&D	2408	0.376	0.484
Total R&D spending	2408	14,235.70	180,751.3

Sources: 2009 Kauffman Firm Survey. All summary statistics weighted using provided sample weights. KFS data reports data for firms in 2009 using previous years (2004-2009) for firm histories.

Table 3: Effect of TBE Laws on Firm Profits

	(1)	(2)	(3)	(4)	(5)	(6)
Dep. Var:	Ln(Total Revenues)	Ln(Total Expenditures)	Ln(Total Revenues)	Ln(Total Expenditures)	Ln(Total Expenditures)	Ln(Total Expenditures)
Married	0.343	0.193	0.382**	0.170	0.191	0.246
	(0.217)	(0.184)	(0.151)	(0.174)	(0.222)	(0.212)
TBE	0.224	0.161	0.242	-0.0223	-0.0463	0.0973
	(0.313)	(0.207)	(0.171)	(0.238)	(0.258)	(0.221)
Exemption	0.00531	0.00478	0.00623	0.0113**	0.00852	0.0173
	(0.0109)	(0.00737)	(0.00887)	(0.00495)	(0.00851)	(0.0119)
$TBE \cdot Exemption$	-0.0216**	-0.0207**	-0.0230**	-0.0205***	-0.0275***	-0.0383**
	(0.00813)	(0.00811)	(0.00998)	(0.00715)	(0.00992)	(0.0148)
$TBE \cdot Married$	-0.586**	-0.375	-0.503**	-0.124	-0.159	-0.186
	(0.268)	(0.253)	(0.233)	(0.275)	(0.319)	(0.285)
$Married \cdot Exemption$	-0.00573	-0.00425	-0.00528	-0.00811	-0.0129	-0.0154
	(0.00528)	(0.00708)	(0.00966)	(0.00625)	(0.00768)	(0.0102)
$TBE \cdot Married \cdot Exemption$	0.0234***	0.0174*	0.0229**	0.0162**	0.0314**	0.0407**
	(0.00811)	(0.00966)	(0.0117)	(0.00864)	(0.0125)	(0.0161)
Obs.	2371	2371	2371	2371	1337	1337
Owner	All	All	All	All	Employee	Employee
Homestead Exemption	All	All	All	All	All	All
F-test P-value	0.0206	0.0182	0.0740	0.0753	0.0157	0.0264
Regression	WLS	WLS	Median	Median	WLS	Median

Regressions are weighted estimates of equation (1) using the sampling weights provided. Columns (1)-(3) are median regressions and columns (4)-(6) are WLS regressions. Dependent variable is listed at top and described in text. *, **, *** denote statistical significance at the 10%, 5%, and 1% levels respectively. Standard errors in parentheses are Huber-White robust estimates clustered at the state level. Homestead exemption measured in units of $10,000. Control variables in all regressions are work experience, age, age^2, dummy variables for education level, race, ethnicity, and gender of owner, legal status and 2-digit NAICS code of firm, and whether the firm is located in a state with an unlimited homestead exemption. "F-test P-value" is the p-value of an F-test for joint significance of the coefficients on the interaction variables $TBE \cdot Married$ and $TBE \cdot Married \cdot Exemption$ in all columns.

Table 4: Effect of TBE Laws on Firm Credit

	(1)	(2)	(3)
Dep. Var:	Ln(Pers. Loans + 1)	Ln(Bus. Loans + 1)	Ln(Mortgage/Home Eq. Loans + 1)
Married	0.416	0.536	0.835*
	(0.353)	(0.397)	(0.433)
TBE	0.274	0.0807	0.492
	(0.281)	(0.413)	(0.535)
Exemption	-0.0316**	-0.00127	0.000290
	(0.0126)	(0.0118)	(0.0157)
$TBE \cdot Exemption$	-0.00168	-0.0216*	-0.00251
	(0.0117)	(0.0116)	(0.0124)
$TBE \cdot Married$	-0.657*	-0.221	-0.550*
	(0.368)	(0.466)	(0.303)
$Married \cdot Exemption$	-0.00734	-0.0159	0.00541
	(0.0103)	(0.0181)	(0.00959)
$TBE \cdot Married \cdot Exemption$	0.0333	0.0111	0.0252
	(0.0351)	(0.0194)	(0.0286)
Obs.	2371	2371	2371
Homestead Exemption	All	All	All
F-test P-value	0.0834	0.6910	0.0891

Regressions are weighted estimates of equation (1) using the sampling weights provided. All columns are WLS regressions. Dependent variable is listed at top and described in text. *, **, *** denote statistical significance at the 10%, 5%, and 1% levels respectively. Standard errors in parentheses are Huber-White robust estimates clustered at the state level. Homestead exemption measured in units of $10,000. Control variables in all regressions are work experience, age, age^2, dummy variables for education level, race, ethnicity, and gender of owner, legal status and 2-digit NAICS code of firm, and whether the firm is located in a state with an unlimited homestead exemption. "F-test P-value" is the p-value of an F-test for joint significance of the coefficients on the interaction variables $TBE \cdot Married$ and $TBE \cdot Married \cdot Exemption$ in all columns.

Table 5: Effect of TBE Laws on Business Operations

	(1)	(2)	(3)
Dep. Var:	Ln(Employees)	R&D	Ln(R&D Spending)
Married	0.129	-0.473**	-0.576
	(0.130)	(0.227)	(0.364)
		[-0.0983]	
TBE	-0.0304	0.0292	0.0588
	(0.155)	(0.319)	(0.514)
		[0.00607]	
Exemption	0.00880	0.0168**	-0.0279*
	(0.00545)	(0.00772)	(0.0146)
		[0.00349]	
$TBE \cdot Exemption$	-0.00870*	-0.00809	0.0127
	(0.00477)	(0.00768)	(0.0138)
		[-0.00168]	
$TBE \cdot Married$	-0.174	-0.00566	0.231
	(0.174)	(0.291)	(0.426)
		[-0.00118]	
$Married \cdot Exemption$	-0.00563	0.00206	0.0187*
	(0.00466)	(0.00593)	(0.0103)
		[0.000428]	
$TBE \cdot Married \cdot Exemption$	0.00567	0.00968	-0.00759
	(0.00588)	(0.00807)	(0.0132)
		[0.00201]	
Obs.	1415	2379	554
Homestead Exemption	All	All	All
F-test P-value	0.5737	0.3764	0.8572

Regressions are weighted estimates of equation (1) using the sampling weights provided. Columns (1) and (3) are WLS regressions and column (2) is a logistic regression. Estimates reported in brackets are average marginal effects. Dependent variable is listed at top and described in text. *, **, *** denote statistical significance at the 10%, 5%, and 1% levels respectively. Standard errors in parentheses are Huber-White robust estimates clustered at the state level. Homestead exemption measured in units of $10,000. Control variables in all regressions are work experience, age, age^2, dummy variables for education level, race, ethnicity, and gender of owner, legal status and 2-digit NAICS code of firm, and whether the firm is located in a state with an unlimited homestead exemption. "F-test P-value" is the p-value of an F-test for joint significance of the coefficients on the interaction variables $TBE \cdot Married$ and $TBE \cdot Married \cdot Exemption$ in all columns.