Competition Builds Trust

Patrick Francois (University of British Columbia, CEPR, CIFAR)
Thomas Fujiwara (University of British Columbia)
Tanguy van Ypersele (GREQAM, CEPR)[1]

October 2009

Abstract: This paper shows that (firm-level) competition has a positive impact on (individual-level) trust. Using US states' banking de-regulation from the mid 1970s, we first show that an increase in competition had a causal impact on trust, measured in the General Social Survey (GSS). We develop a model which explains why increased competition within a state increases trust. The model also predicts a positive correlation between trust and sectoral competitiveness in the cross-section. We explore this implication using the 2004 wave of the GSS which we match with US census of firms competition measures. The model's predictions are strongly borne out.

[1]Thanks to Andrew Hill and Anirban Mukherjee for research assistance. Sandra Black and Philip Strahan generously provided the new incorporations data. Siwan Anderson, Paul Beaudry, Tim Besley, Matilde Bombardini, Joe Henrich, Jenny Hunt, Jonathan Temple, Ashok Kotwal, Joel Mokyr, Joanne Roberts, Guido Tabellini and Francesco Trebbi for helpful comments. We also thank participants at UBC, GREQAM, Canadian Institute For Advanced Research, Victoria, Calgary, the CEPR culture and institutions conference Paris, and the CEPR conference on institutional change in Bristol.

1 Introduction

Recent empirical evidence, gleaned from a number of different sources, across many countries, and using different methods, is making a plausible case that culture affects economic outcomes.[2] Measures of culture are usually derived from responses to survey questions (for example the canonical "trust" question that we will discuss below).[3] Many of these studies attempt to unearth the effects of culture on outcomes by exploiting its inter-generational persistence. For example, trusting parents are more likely to have trusting children, and these children are also more likely to inculcate trust into their children, and so on. Such persistence also survives migration – trust levels of US immigrants' children are better predicted by the average trust levels of their parents' birth countries than by trust levels in the US. As we briefly survey in the next section, this persistence has been important in helping researchers conclude that culture affects economic outcomes and is not just a reflection of them.

A tempting, but flawed, conclusion to draw from such inter-generational persistence is that the cultural factors that are important for economic outcomes are beyond the reach of policy. Trust is determined by the distant past, the distant past cannot be changed, so policy is irrelevant. But maybe the distant past is not all that matters. Montesquieu argued that markets themselves are key in providing the cultural underpinnings, like trust, that make societies work. Drawing on examples from European countries of his time, he argued that markets themselves tended to "civilize" people. Early in the 20th century, the sociologist, Georg Simmel (1908), provided an important caveat. He argued that it's not markets per se that lead to good culture, but market competition. Uncompetitive markets would not build it, but competitors pitted against each other in a quest for market share would.[4] This is the hypothesis that we explore here.

We proceed in three steps. Firstly, we exploit an episode of well-defined changes in competition to see what effects these had on trust. Following the approach of Levine et al. (2008), we instrument an increase in competition by using both intra-state and inter-state deregulation of the banking industry that occurred over a period of about 25 years starting in the mid 70s. Black and Strahan (2002) documented that the timing of this deregulation differs across US states and that it is linked to a significant increase in new incorporations and thus firm level competition.[5] We use multiple waves of the US General Social Survey (GSS) to identify a causal relationship between trust, as measured by answers to the canonical generalized trust question, and this change in competition. We find that increases in state level competition precipitated by these reforms are strongly related to increases in state trust levels as measured in the US General Social Survey (GSS).

We then develop a model to explain why competition might increase trust. The model is based on the

[2] A brief survey of this literature follows in the next section.

[3] A simple barometer for the state of a culture, that has been the focus of much of the new empirical work, is the generalized "trust" question. "Do you think that most people can be trusted or that you can't be too careful in dealing with people?" This question has been asked for over thirty years in the US General Social Survey (GSS) and internationally in the World Values Survey.

[4] Simmel's prosaic description of this process did not pin down a precise mechanism through which this occurred. The data and model that we develop will however be very specific in trying to pin this down.

[5] This state-level variation in the timing of competition reforms has already been explored in previous work that we describe in more detail in Section 3 of the paper.

disciplining effect that competition has on free-riding within the workplace. When one's co-workers free-ride, one is more likely to not only distrust these co-workers, but also to distrust people generally. But groups with more free-riders tend to under-perform. Where firms are engaged in more intense competition, the collective punishment for under-performance is greater – underperforming firms are more likely to be forced to shut-down. Consequently inter-firm competition punishes free-riding, and this punishment is greater the stronger is sectoral level competition. The model explains why an exogenous increase in competition, as seen in the US states' data, will decrease free-riding and increase trust. The model also has equilibrium cross-sectional implications: Firms in higher competition sectors should have lower levels of free-riding and consequently higher levels of trust amongst their workers.[6] It also predicts a threshold effect in the impact of competition on trust. At low levels, the impact is non-existent, and only beyond a threshold should a positive correlation be observed.

The third part of the paper shows that US data is strongly consistent with these cross-sectional predictions. We use the 2004 wave of the GSS to explore these as it included an extremely detailed workplace module that asked about many dimensions of work. Using this wave allows us to match trust levels to sectoral competition measures from the US Census of firms in order to test the model's predictions. Specifically we check whether workers employed in more competitive sectors have higher levels of trust. The immense detail of this wave of the GSS allows us to control for a large number of workplace characteristics – as well as including the many other individual level controls in the GSS. We introduce a full set of individual controls – including all of the previous factors that have predicted trust such as education, income, ethnicity, race, marital status, age, city size. We also include extensive workplace controls – workplace size, unionization rates, intensity of supervision, and measures of workplace relations. The predictions of the model are strongly supported: the more competitive the sector of work, the higher individual trust levels, and there is no evidence that this is due to selection of high trust individuals into more competitive sectors. Furthermore, there is evidence of a threshold effect in the relationship between trust and sectoral level competition. At low levels, the relationship is flat, and only beyond a certain level of competition do increases in competition increase trust, again, as predicted by the model.

To our knowledge, our paper presents the first micro-level evidence of a causal relationship between competition and trust. The effects are also large. In variance normalized terms, they are slightly smaller than the effects of one of the most well-established trust determinants, schooling. Given the recent evidence concerning the magnitude and importance of trust for development outcomes that we will survey in the next section, an immediate implication of our findings is a renewed emphasis on the importance of strong competition regulation. We discuss further implications in the conclusion.

The Paper proceeds as follows. Section 2 locates the paper with respect to numerous literatures to which it is related. Section 3 explores the exogenous variation in competition caused by banking de-regulation to

[6] As we describe in the next section, evidence of such a group competition effect working in precisely such a way has already been seen in laboratory experiments, and the theory we develop is related to previous models that have looked at the disciplining effect of team competition on free-riding. Since our aim is to take this model's implications to the distribution of trust in US firms, it is unique in having an extensive analysis of optimal wage setting within the organizations.

estimate its impact on trust. Section 4 develops a model to explain the positive relationship between trust and competition. Section 5 establishes the relationship between trust and competitiveness using the 2004 wave of the GSS and census of firms data on sectoral competition. Section 6 concludes, discusses the results obtained here in reference to the current literature, and suggests future directions of research.

2 Previous Literature

Arrow (1972) was amongst the first modern economists to emphasize the importance of trust in overcoming everyday transaction costs and facilitating trade. He further argued a link to development: low trust tended to both characterize underdeveloped economies and significantly contribute to their state of underdevelopment. Other social scientists have also emphasized the key role played by trust for considerable time, some examples are Banfield (1958), Coleman (1988), Putnam (1993, 2000), Williamson (1993), and Fukuyama (1995). A recent and growing body of empirical work studies the evidence regarding that link. Typically, this work explores the relationship between aggregate (country or region wide survey) responses to the World Values Survey generalized "Trust" question and economic outcome variables such as GDP per capita. The question: "In general, would you say that individuals can be trusted, or that you can't be too careful in dealing with people", has been asked in the World Values Survey for nearly thirty years, and in country surveys (e.g., the US General Social Survey and the German Socio-Economic Panel Study) and continent level surveys (Latinobarometer, Asiabarometer, Eurobarometer, Afrobarometer). At the micro level, answers have been shown to predict behavior in games where financial rewards are at stake, and other types of pro-social behavior; most well known is the "Trust" game described in Berg, Dickhout and McCabe (1995). Glaeser et. al. (2000) showed the answers to this question correlated with trustworthiness (receiver behavior in this game), using a sample of Harvard undergrads. On the other hand, Fehr et. al. (2003) showed that it correlated with trusting (sender) behavior in the "Trust" game, using the German Socio-Economic Panel. Sapienza, Toldra and Zingales (2008) also find evidence to suggest that answers to the trust question pick up trusting behavior in a sample of Chicago MBA students, and argue that the survey questions are generally better at eliciting trust. Uslaner (2005) also shows trusting to be correlated with charitable contributions, and volunteering. Bacharach Guerra and Zizzo (2007) provide an extensive review of experiments on the Trust game, and interpretations of the findings therein. They also explore another way in which trust is built – i.e., the communication of a belief that an individual will be trustworthy leads individuals to act in more trustworthy ways.

A recent literature in development economics has singled out trust as a key component of the broader notion of social capital in explaining underdevelopment; both Platteau (2000) and Basu (2006) discuss the societal benefits that arise when a generalized trust is extended between previously unacquainted indviduals. This notion also underpins the formal theories developed by Zak and Knack (2000) and Francois and Zabojnik (2005). Uslaner (1999) also emphasizes the importance of generalized trust, i.e., trust in the unknown other rather than acquaintences. He argues that such trust derives largely from parents, and is not affected by

daily experience. Our empirical results question this conclusion.

To explore causal effects of trust on economic outcomes, economists have utilized varying sets of (usually historical) instruments to isolate the effects of predetermined components of trust on outcome variables (most commonly GDP per capita). Most studies in this vein report evidence of significant, and usually large effects of trust, which they argue suggest a causal link from trust to economic development. Some attempts at identifying trust's effects are: Knack and Keefer (1997) who use a sample of countries and instrument for trust using ethnic fractionalization, Tabellini (2007) includes generalized trust as one of his sub-components in explaining economic outcome differences across regions of Europe, he also includes it directly, and instruments for it using historical literacy rates and historical political institutions. Guiso, Sapienza, and Zingales (2006) instrument trust using the average levels in country of origin for children of parents who immigrated to the US. La Porta et. al (1998) instrument for trust using hierarchical religions. Algan and Cahuc (2009) explore within country variation by using country fixed effects. They do this by constructing a long time series on trust for countries by using information about ancestors' origins in the GSS. They also find a strong and large causal role of trust on country level outcomes, which persists with the addition of other time varying controls.[7] Guiso et. al (2009) is another recent and compelling study using historical variables to show that culture, although in this case the measure is not survey based trust but measures of civic engagement, has an important determining effect on economic outcomes.

We are examining a contrasting side of the trust phenomenon to that which has been the focus of much recent work. While not denying the importance of the past, it is also clear that trust is not entirely determined by the past. For example, education has long been known to correlate with reported trust levels.[8] We view our inquiry as thus complementary to these studies. Whereas they have been trying to rule out higher frequency influences on attitudes in order to uncover their persistent components (which we do not contest on the basis of strong evidence for such effects), we are interested in a relatively immediate impact of an economic factor on these same attitudes.

Previous models of cultural evolution, which primarily hinge on parent-to-child values transmission such as Bisin and Verdier (2001), do not seem like the natural place to start to examine the effect of the workplace.[9] A caveat to this statement is in cases where individuals with differing characteristics, that are acquired through the family, select into different occupations or different sectors based on these characteristics. These are features explored in the models of Corneo and Jeanne (2007) and Doepke and Zilibotti (2008). The latter assume that parents effectively choose the occupation of their off-spring by selecting a discount rate

[7] The idea of inheriting attitudes has been applied more broadly than trust. For example, Fernandez (2007) used attitudes towards working women in source countries to predict attitudes of US immigrants to such work.

[8] For example, Tabellini (2008b) is concerned with the problem that trust levels may be determined by the quality of governance indicators and vice versa. One empirical strategy he exploits there is to explore exogenous source of variation in values (deriving from language) and exogenous sources in governance (deriving from legal origins) in order to net out causal effects running from trust to governance.

[9] Cross-generational characteristic acquisition has been modeled through processes of cultural evolution that were pioneered in economics by Bisin and Verdier. See Bisin and Verdier (2001) for an early formal treatment of cultural selection, and Bisin and Verdier (2006) for an extensive discussion of the many applications of this model.

for them, whereas the former explore the effects of parents' inculcating different values on these occupational choices. Both develop models that are focused on societal trajectories over the very long run, and since our data will suggest that selection is not a big factor for our findings, we do not use models like those here.

The role of market settings and competition on subject behavior has been analyzed in laboratory contexts. The results are mixed. Bowles (1998) summarizes the earlier experimental literature which generally found the closer the experimental setting approximated the competitive ideal, the less other-regarding behavior ensued. However, Huck Lunser and Tyran (2007) studied the effects of increased competition amongst sellers with an ability to build reputations for experience goods. Increased competition, which lead to the possibility of punishing sellers by shopping elsewhere, increased trust in sellers. But in a similar environment, Brandts, Riedl and van Winden (2006) found increased competition had little positive effect.[10]

The only paper we are aware of that has explored the much more directly related group competition effect in the laboratory is Nalbandian and Schotter (1997). There, they found that individual contributions to group output could be increased by creating group level rewards (shared equally among members) that depended on the group's performance relative to an outside group. This inter-group competition leading to increased intra-group effort is key to the mechanism we will develop in our theory. The potential for gain arises because of a type of X-inefficiency as in Leibenstein (1987), which allows the possibility of free-riding within firms. Previous theoretical work: Scharfstein (1988), Vega-Redondo (1993) and Sjostrom and Weitzmann (1996) have explored the way in which increased competition between groups of individuals can increase efficiency within groups.[11] However, a difference between these and ours is that we allow firms to set compensation in response to competition levels in their sectors. We believe that such a complication must be allowed in any model purporting to explain behavior in US firms. It will be seen that this is key to generating the predicted threshold effects in competition that we test.

Laporta, Lopez, Shleifer, Vishny (1997) use the World Values Survey (WVS) trust question (which is similar to that used here) to compare trust across countries and its correlation with legal, civic and bureaucratic features of countries. They find positive correlations between bureaucratic quality, tax compliance, judicial performance, civic participation, large organizations and trust levels. Nunn and Wantchekon (2008) use Afrobarometer surveys to explore the effects of the slave trade on trust within African regions today. They find it to be large and deleterious. Fischer (2007), using the similar generalized trust question as used here from the World Values Survey interacts country level competition (proxied by investment price/goods price ratio) and market integration (proxied via income categories). She finds that market integration seems to have a larger positive impact on trust in competitive environments.

[10] The work in laboratory settings on this issue does not seem to have reached a clear conclusion yet. In a recent study, Bolton, Loebbecke and Oxenfels (2008) argue that in internet markets competition may improve trust levels by improving information flows.

[11] As Sjostrom and Weitzman (1997) note, this is also related to biologists' work on group selection, as described in Wilson (1983). Henrich (2004) argues for a type of group based selection in explaining pro-social behavior that is similar to what we model. In his model the "between-group" component of selection acting on the frequency of a group beneficial, but individually costly trait (here it is trustworthiness) exactly offsets the "within-group" forces that disfavor that trait. Henrich's paper argues more broadly for models of "group selection" in the social sciences, and provides some context and comparison with their use in genetics and biology.

In primitive societies, related findings have been reported in a series of papers by Henrich et. al. (2001). Market integration leads to higher average offers in the ultimatum game played in these societies, though the marked difference in contexts suggests no easy parallels with the results here, and competition levels are not measured there.

Finally Glaeser et. al. (2000) and Alesina and La Ferrara (2002) have examined many of the determinants of trust using different waves of the General Social Survey. Their analyses inform the basic regressions and controls that we undertake throughout the analysis of individual level variation. Glaeser's study was important in being the first to demonstrate that responses to the trust survey correlate with actual trusting play in experimental situations where financial rewards are at stake.[12] Alesina and La Ferrara extended the analysis of trust to investigation of neighbourhood effects. They documented such effects on trust arising from equality and heterogeneity and showed that it can be an important contributor to mistrust.

3 Banking Deregulation, Competition, and Trust

3.1 Background and Data

3.1.1 Bank Branching Deregulation

This subsection provides a brief overview on bank deregulation in the US, the reader is directed to Krozsner and Strahan (1999) for a more detailed discussion. Since the McFadden Act 1927 ruled that national banks had to follow state-level bank branching restrictions, state governments have imposed significant restrictions on branching within and between their borders. Firstly, since the US Constitution prohibits the taxation of interstate commerce, all states prohibited the opening of out-of-state bank branches inside their borders, what we refer to as interstate branching restrictions. Additionally, most banks were only allowed to open branches within a small geographic area within the state. Hence, some banks could only operate in one county, or within 100 miles from its head office, or even were only allowed to have a single branch (a regulation known as *unit branching*). In most cases, these intrastate baking restrictions were such that a bank would be a monopolist in these narrow confines.[13]

Starting in the 1970s, several technological innovations such as automatic teller machines (ATMs), phone and mail banking, and more sophisticated credit-scoring systems radically reduced the cost of using banking services from a distant branch. These changes lead states to lift interstate and intrastate restrictions from the mid-1970s[14], allowing banks from out-of-state to operate in their borders (which we refer to as *interstate deregulation* henceforth) and permitting banks to operate multiple branches, either by opening new ones or by merging with other banks, in any part of the state (which we refer to as *intrastate deregulation* henceforth).

[12] Though, somewhat surprisingly, they found that being trusting was correlated with playing trust games in a trustworthy matter. It was not the case that reporting oneself as trustworthy correlated with trustworthiness of play in the game. See also footnote 3 above.

[13] The likely reason for imposing intrastate regulations derive from the states aiming to maximize charter fees by granting local monopolies.

[14] And with an added impetus after the Saving and Loan crisis of the early 1980s lead to the belief that larger (and less prone to failures) banks were desirable.

In 1994, federal legislation (the Riegle-Neal Act) eliminated interstate restrictions nationwide.

Of particular interest for our research design is the fact that different states promoted interstate and intrastate deregulation at different times (the Supplemental Appendix presents the dates in more detail). Krozsner and Strahan (1999) and Black and Strahan (2002) argue that the differences in the timing of these reforms across states were mainly driven by the state-level structure of banking, and by federal actions, but not associated with changes in the states' overall economic situation. More importantly, Black and Strahan (2002), Kerr and Nanda (2009), Levine et al. (2008) and our own evidence below, show that the reforms can be seen as positive exogenous shocks to the competitiveness of a state's *non-financial* sector.

Specifically, the timing of the reforms are not correlated with previous trends in the creation of new firms, but generated a large increase in the number of (non-financial) firms being started after they were implemented. This is explained by the fact that the deregulation of branching restrictions resulted in a more competitive (by breaking local monopolies) and efficient (by allowing mergers to occur) banking sector and more availability of credit, which in turn facilitated the creation of new firms and raised the contestability of local markets.

3.1.2 Data Description

The main data source for this section are the several waves of the US General Social Survey, which was first implemented in 1972, and at least every other year since then (a list of the included years is available in the Supplemental Appendix). The survey is asked of one adult per household and the sampling reflects regional population densities.[15] The dependent variable of interest is the response to the following question: "Generally speaking, would you say that people can be trusted or that you can't be too careful in dealing with people?", which was discussed in more detail in Section 2 . In the period analyzed in this section, the three possible answers were "Can Trust", "Cannot Trust" and "Depends". We code this into a binary variable taking value 1 if the respondent reported "Can Trust" and zero otherwise. Given that a very small fraction (4.5%) of the sample reported "Depends", different treatments of this answer (coding it as one, zero, or excluding it from the sample) do not affect the results in any significant way. The GSS also includes several economic and demographic variables on the respondents, such as age, education, marital status, and race which we use as controls.

Not all states are surveyed at every year of the GSS, and we use an unbalanced panel of 40 states for the period 1973-1994 (the Supplemental Appendix presents the list of states included in the sample). The starting date is defined by the availability of information on state of interview, and the final point (1994) is defined both by the availability of our measure of competition and by the fact that in that year federal legislation (the Riegle-Neal Act) eliminated interstate banking restrictions nationwide.

As a proxy for state-level competition, we use the number of new incorporations per capita measured by the Dun and Bradstreet Corporation. The dates of both interstate and intrastate banking deregulation are

[15]The main General Social Survey website is at http://www.norc.org/GSS+Website/ This site contains full information and documentation for every wave of the survey and downloads up to 2006.

taken from Kroszner and Strahan (1999).

3.2 Results

3.2.1 Graphical Analysis

We begin by presenting the results in a graphical analysis, tracing out the year-by-year relationship between the timing of the reforms, our measure of competition and trust levels. We do this by first estimating the following equation:

$$trust_{ist} = \alpha + \sum_{j=-10}^{10} \beta_j^{inter} D_{st,j}^{inter} + \sum_{j=-10}^{10} \beta_j^{intra} D_{st,j}^{intra} + \pi X_{ist} + \delta_s + \delta_t + \theta_s t + \varepsilon_{ist} \quad (1)$$

where $trust_{ist}$ is a dummy variable indicating if person i living in state s at year t responded "Can Trust" to the trust question. The $D_{st,j}^{inter}$ variables indexes a set of 20 variables that indicate the number of years until an interstate deregulation is enacted. The numbers are relative to the effect on the date of the reforms' enactment ("year zero"), which are normalized to zero. For example, $D_{st,-5}^{inter}$ takes value one if state s at year t is going to enact interstate deregulation in exactly five years or is zero otherwise, while $D_{st,3}^{inter}$ is an indicator that takes value one if and only if an interstate deregulation happened exactly three years ago. The $D_{st,q}^{intra}$ variables repeat the same measurement for the intrastate de-regulation.

Hence, the model estimates the effect of being 10,9,8,7...1, years *before* a particular reform, as well as 1, 2, ...,10 years *after* it in a very flexible manner. The estimation controls for a vector of individual level controls (X_{ist}) that are known to be correlated with trust[16] as well as state and year fixed effects (δ_s and δ_t) and state-specific linear trends ($\delta_s t$). Hence, the specification rules out state differences that are fixed or vary linearly through time, as well as nationwide factors that may evolve nonlinearly, such as the business cycle.

[Insert Figures 1a and 1b]

Figure 1a plots the estimates of β_j^{inter}, hence tracing out the relationship between timing of *interstate* reforms and trust levels (conditional on all the controls). It also plots the result of performing the same exercise but substituting the dependent variable for our proxy of state-level competition: the (log of) new incorporations per capita. Figure 1b repeats the exact same exercise for *intrastate* reforms (i.e., it plots the values of β_j^{inter}.

Both figures show a very similar, and striking, pattern. The first remarkable feature to notice is that the relationship between the timing of both reforms with trust and firm entry is flat in the periods *before* a reform occurs. This is direct evidence that the timing of the reforms is not correlated with previous trends in trust or competition and reinforces the notion that they can be considered exogenous events in the

[16] These variables are a quadratic polynomial of age, indicators for completed high school and college education, population size of city/town of respondent, and a full set of dummies for race and marital status. These variables are included only to increase the precision of the estimates, while their inclusion does not affect the magnitude of the estimates. We based the choice of covariates on what previous studies - Glaeser et al. (2000), Alesina and La Ferrara (2002) and Helliwell and Putnam (2007) - found to be correlated with trust.

analysis of competition and trust. However, virtually immediately after each of the reforms take place, both competition and trust start trending up almost linearly. This precise coincidence in the timing of reforms and a trend break in the evolution of competition and trust make a convincing case that both interstate and intrastate deregulation had a causal impact on competition and trust. Moreover, the similarity in the pattern that both our competition and trust variable indicates that it is likely that they are determined by a unique process (which we aim to model in Section 4).

This nonparametric exercise in which no particular shape on the relationship between the timing of deregulation and our outcome variables is imposed is also valuable in guiding the parametric estimations reported in the next subsection. Figures 1a and b make it clear that the inclusion of number of years after the reforms as a dependent variable in equation (1) is more adequate than, for example, using a dummy indicator for the post-reform period.

3.2.2 Regression Results

Guided by the graphical results presented in Figure 1a and 1b, we first explore the rich temporal and spatial variation in the timing of interstate and intrastate banking deregulation by estimating the following equation using the GSS waves for 1973-1994:

$$trust_{ist} = \alpha + \beta^{inter} Post_{st}^{inter} + \gamma^{inter} Years_{st}^{inter} + \beta^{intra} Post_{st}^{intra} + \gamma^{intra} Years_{st}^{intra} + \pi X_{ist} + \delta_s + \delta_t + \theta_s t + \varepsilon_{ist} \quad (2)$$

where again $trust_{ist}$ is a dummy variable indicating if person i in state s at year t trusts. $Post_{st}^{inter}$ is a dummy variable taking value one if at time t state s has already enacted an interstate reform and zero otherwise. The variables $Years_{st}^{inter}$ measures, at year t, the number of years since state s has enacted its intrastate reform. For example, if a state enacted its reform in 1982, this variable equals one when t=1983, two when t=1984 and so on (while it value is zero for all years before, and including, 1982). The analogous measurement is done for intrastate reforms by the variables with superscript *intra*.

As in the section above, the estimation also controls for a vector of individual level controls (X_{ist}) that are known to be correlated with trust as well as state and year fixed effects (δ_s and δ_t) and state-specific linear trends ($\delta_s t$). Hence, the specification rules out state differences that are fixed or vary linearly through time as well as nationwide factors that may evolve nonlinearly, such as the business cycle. Standard errors are clustered at the state level, allowing for correlation of unknown form across individuals within the same state (even at different years) and also addressing the issue of serial correlation in difference-in-difference studies.[17]

This econometric framework requires only the *timing* of the reforms to be exogenous in order to estimate its causal effects, since the model captures trend breaks that coincide exactly with the timing of their

[17]The simulations in Bertrand et al. (2004) and Hansen (2007) show that clustering standard errors at the state level lead to almost negligible size distortions in panels with similar cross-sectional and time-series dimensions as the one used here.

enactment. Notice that we include the number of years after the reform was carried out in addition to the dummy indicating the post-reforms periods. This choice was guided by the fact that Figures 1a and 1b clearly show that both firm entry and trust grow linearly over time after the reforms take place. The result for firm entry is also found in previous studies (Kerr and Nanda, 2009; and Levine et al., 2008). However, one must notice that this specification nests the simple difference-in-difference case (where only post-reform dummies are included.

[Insert Table 1]

Table 1 presents the results of the estimation of equation (2) using both the log of new incorporations per capita and trust levels as the dependent variable. Columns (1)-(3) show the results for our measure of competition, estimating first the impact of each type of reform individually (columns (1) and (2)) and then jointly (column (3)). The estimates reinforce the results already obtained in Black and Strahan (2002) and Levine et al. (2008) that both forms of banking deregulation had a sizable positive effect on firm entry measured by the number of new incorporations. The results suggest that a state that implements both reforms would have about 7% more new firms being incorporated every year following the reform. This effect is also statistically significant (at the 5% level) in all cases.

There are slight differences between our point estimates and the ones obtained in previous studies, which are driven by the inclusion of state-specific time trends, which is a novel feature of our study. In particular, our results are inconclusive with respect to which kind of reform (intrastate or interstate) has a larger impact on entrepreneurial activity.

Columns (4)-(6) report the estimated effects of the reforms on trust levels. In consonance with the graphical analysis presented in the previous section, most estimates indicate that each type of banking deregulation had an economically large and statistically significant impact impact on trust levels, independently, if they are estimated jointly or separately. The estimates of our preferred specification (column (6)) imply that a state that enacted both an interstate and intrastate reform at the same time would experience a 1.6 percentage point increase in the share of its population reporting that they "Can Trust" every year after the reform. Notice also that while the coefficients on the variables measuring the number of years after each type reform on the specification in column (6) are not statistically significant individually, their sum (the total yearly impact of implementing both reforms) is significant at the 1% level.

The results in Table 1 are robust to a series of specification checks that are not reported here due to space constraints. These include adding the square of the years since reform variable, excluding the "post-reform" dummies, and not controlling for individual level covariates (e.g., education, race).

While Table 1 (and Figure 1) establish that banking deregulation had a large impact on both competition and trust. Table 2 explores the relationship between competition and trust directly by reporting estimates of the following equation:

$$trust_{ist} = \alpha + \beta log(new\ \ incorporations) + \pi X_{ist} + \delta_s + \delta_t + \theta_s t + \varepsilon_{ist} \tag{3}$$

where the variables and parameters are defined above. First, Column (1) reports simple OLS estimate of equation (3), reporting a negligible and statistically insignificant effect of competition on trust levels.

[Insert Table 2]

Columns (2)-(5) report the estimates of β when the log of new incorporations is instrumented by variables measuring the number of years since banking reforms were enacted (and dummies indicating the post-reform periods). Irrespective of which instruments are used, our 2SLS estimates imply a large positive impact of competition on trust, implying that a 1% increase in firm entry in a state causes a 0.25 p.p. increase in the share of its population responding that they "Can Trust".

This result is economically large and and statistically significant in most cases (we discuss inference in more detail in the subsection addressing the possibility of weak instruments below). Given that the standard deviation of new incorporations per capita is about half of its mean, in variance-normalized terms a one-standard deviation change in competition raises the percentage of people reporting they can trust by 10-12 p.p.

Possibly Weak Instruments[18]

Although in Table 1 we report that our instruments have a strong and statistically significant (at the 5% level) relationship with the log of new incorporations variable, the F-test for the excluded instruments on the first stage regression (reported on Table 2) is, although significant in most cases, always below 5, which is below the usual "rule of thumb" for the detection of (possibly) weak instruments. Hence, we try to address the consequences of this issue for our estimates in several ways here.

It is important to keep in mind that Table 1 reported that our instruments have economically large and statistically significant (at the 5% level) impact on log of new incorporations (i.e., the first-stage relationship) and trust levels (i.e., the reduced form). Hence, there is a good case from these estimates that the relationship between the instruments and the variables of interest does exist.

The weakness of instruments usually has two consequences for 2SLS estimates: bias and incorrect inference. We show, however, that addressing both of these issues only makes the case of a positive impact of competition on trust even *stronger*.

Firstly, it has been shown that weak instruments bias the 2SLS results towards their OLS counterpart. Since Table 2 show that the OLS estimate is close to zero while the ones obtained by 2SLS are larger and positive, we can infer that the possible weakness of the instrument is biasing our estimates *downwards*. Hence, the possibility of weak instruments makes our main argument (that competition has a positive impact on trust) even stronger.

Secondly we address the issue of inference. When instruments are weak, the usual t-tests and confidence intervals based on the 2SLS coefficients and standard errors can have incorrect size, making inference based on them invalid (e.g., the probability that a true null hypothesis is rejected at the 5% level may be different from

[18] Several of the results on weak instruments discussed in this section are explained in more detail in the surveys by Andrews and Stock (2005) and Stock et al. (2002).

5%). To address this issue, we compute Anderson-Rubin (AR) statistics that have correct size independently of the strength of the instruments. In particular, we compute AR statistics that allow for heteroskedasticity and clustering at the state level using a procedure detailed in Chernozhukov and Hansen (2007).[19]

The AR statistics are used to both test the null that the coefficient measuring the impact of firm entry on trust (β) is zero and also to compute a 95% confidence interval for this coefficient. The p-value of the tests are reported in Table 2 below the estimated coefficients in brackets. In all specifications, the weak instrument robust test indicates that the results are *more* significant than the inference based on the 2SLS standard errors would indicate.

Moreover, Table 2 includes the the 95% confidence interval obtained by the test inversion of the AR-statistics. Although they are wider than the standard 2SLS confidence intervals, all of them exclude economically large negative impacts of competition on trust (and half of them exclude the zero-effect case). If anything, these confidence intervals cannot reject very large impacts of competition on trust.

To summarize, addressing the possibility of weak instruments both by assessing in which way it would bias our 2SLS results and by implementing tests that are robust to their presence only makes the case that the impact of competition on trust is *larger and more statistically significant* than what the 2SLS estimations would suggest.

In conclusion, this section finds a strong causal effect of increased competition on trust at the state level. The next section develops a model to explain why.

4 The model

Since so much of one's waking and productive life is spent in the workplace, we think it is a reasonable place to start our investigation of the effects that competition may be having on trust. The basic way in which competition will affect trust here is going to be through the effect that competition across firms has on the behavior of individuals within firms. There are precedents for this in the literature. Firstly, there have been at least three models previously developed that have shown that with individuals joined together in groups, or firms, where free-riding or some other sort of X-inefficiency mitigates efficiency, increased competition across firms serves to attenuate such inefficiency. This is a feature of: Scharfstein (1988), Vega-Redondo (1993) and Sjostrom and Weitzmann (1996). Secondly, there is evidence of precisely such effects arising in laboratory settings. As mentioned earlier, Nalbandian and Schotter (1997) found that individual contributions to group output could be increased by creating group level rewards (shared equally among members) that depended on the group's performance relative to an outside group.

The model we shall develop here aims to capture precisely these features. A significant departure from the previous theoretical literature is that we will allow for firms to optimally choose wages in light of the

[19] Although different weak-instrument robust tests have been derived (Andrews and Stock, 2005), we are not aware of publicly available routines that would implement its heteroskedasticity and cluster-robust versions, and hence use only the Anderson-Rubin statistic.

competition levels that prevail in their sectors. We will also allow that all individuals can select the firm and sector in which they work. As will be seen, characterizing the equilibrium wage policies of firms is far from straightforward when these possibilities are allowed, but we feel that this is an important complication to introduce as both the ability of firms to choose their compensation policies, as well as labor mobility are essential characteristics of the US workforce.

Though the model we develop will formally demonstrate how increased competition reduces free-riding, this does not directly relate to our empirical findings without a further step. The analogy to our empirical findings on trust is only complete if it also follows that the trust question in the GSS is picking up respondent's beliefs about how others are likely to behave, i.e, the trustworthiness of others. There is good reason to believe that this is the case. Sapienza et. al (2008) look at how answers to the trust question correspond with play in a modified version of the trust game where senders are also asked directly for information on their beliefs regarding receiver behavior. They show there that trust, as reflected in answers to the GSS type trust question, is highly correlated with a respondent's beliefs about the trustworthiness of a paired playing partner in the game. This relationship between the trust question and trusting behavior was also reported by Fehr et. al (2003), but it should be noted that Glaeser et. al (2000) found it to be a better predictor of trustworthiness (receiver behavior in the trust game) though Sapienza et. al (2008) provide a reconciliation of these findings.

Notation

There are $J+1$ sectors and a firm in each sector requires N workers to produce. The model is static. Firms in the J sectors produce either high quality (H) or low quality (L), depending on the effort decisions of their workforce. There are no other factors of production.

In sector $J+1$ there is a constant (piece-rate) employment technology, workers there obtain wage W with certainty, at effort cost normalized to zero.

Work Decision

Workers search for employment in a sector of choice. Search and matching are frictionless in all J sectors. After entering one of the J sectors a worker can apply (costlessly) to all, or any sub-set, of firms in the sector. If offered at least one job, they choose one, and then firms can re-offer positions until all are either filled, or there remain no more workers in the sector. Alternatively, one can think of the firms moving in order. Firms are ordered randomly. The first firm in the sector orders all applicants (perhaps randomly) and proceeds down the list of applicants until it receives the required number of acceptances. After that, the second firm proceeds, and so on, until either all firms have completed hiring, or all individuals in the sector are employed. If an individual is not offered a job, the worker is unemployed and receives zero wage. Let the equilibrium object, p_j^i, denote the probability of obtaining employment in firm i in sector j. Alternatively, a worker can work in sector $J+1$, the piece-rate sector, in which case he is hired with probability one at wage W.[20]

[20] Worker indifference conditions will trade-off wages and employment possibilities similar to that explored in Harris and Todaro (1970). An implication is that sectoral unemployment rates can possibly differ in equilibrium, as in Helpman, Itzhoki and Redding (2008) and Helpman and Itzhoki (2009).

Production technology

Each worker employed in a J sector firm independently and simultaneously chooses whether to provide non-contractible effort. Effort provision imposes disutility cost of c, and without effort disutility costs of working are zero. If and only if at least one of the N workers provides non-contractible effort the firm is high, H, quality, otherwise it is low quality, L.

Utility

Worker utility is linearly increasing in wages and decreasing in effort costs.

Competition

Competition determines the probability that a low quality firm is forced to shut-down. The more competitive the environment, the higher this probability. L quality firms shut down with probability $\gamma_j \geq 0$, for each sector j. H quality firms do not shut down. The competitiveness of a sector is thus denoted by the probability of shut down in the event of low quality; γ_j.

Wages and Profits

Firm revenues are denoted R. Firms call wages, w_j^i for firm i in sector j, before workers apply for jobs. Wages are conditioned only on whether production occurs, and are paid equally to all workers. Importantly, they cannot be conditioned upon whether effort costs are contributed by the worker, nor on whether the firm is L or H quality. If the firm shuts down, workers become unemployed, are not paid their wages, and firm revenues are zero. Consequently firm profits are $R - Nw_j^i$ if production occurs, and zero otherwise.[21]

4.1 Analysis

4.1.1 Effort Decision

Employed individuals in the J sectors choose whether to contribute non-contractible effort to production – at personal cost c. The basic tension arises because contributing effort increases the chance the firm will be H quality, and that wages will be paid, but since all individuals receive the same wage, all have incentive to free-ride on the efforts of others. The effort contribution decision depends on individual expectations about the contributions of co-workers.

If a worker were to contribute effort at any firm in which she works, then the firm would be H with probability one. Consequently, the expected benefit to applying in sector j, conditional upon effort being contributed if employed is $\int_0^{n_j} \left(w_j^i - c\right) p_j^i di$,where n_j is the measure of firms in sector j, and p_j^i is the probability of being employed by firm i. In equilibrium, it will be seen that all firms in sector j choose the same wages, which we shall denote w_j. Since we will only focus on symmetric equilibria, it saves on notation to simply denote a constant probability of receiving a job offer from at least one firm in sector j, p_j.[22] In establishing the equilibrium, we will of course allow firms to deviate to choosing any wage.

[21] In order to ensure zero economic profits ex ante, we could also introduce an earlier fixed entry cost decision stage. We do not model this as it is of no consequence for our equilibrium implications, and we do not have any information about firms in our data.

[22] Note that the object p_j is not simply the symmetric version of p_j^i in the previous expression.

Thus the expected benefit to contributing effort if employed in sector j is $w_j - c$.Not contributing effort lowers the chances of receiving a wage. How much it does so depends on the probability of at least one other worker in the firm contributing effort, which we denote α_j. In a symmetric equilibrium, α_j depends positively on the probability of any single worker in sector j contributing effort, denoted ϕ_j. Even if no other worker contributes effort, a worker will still be paid if the low quality firm is not shut down. These considerations imply that the expected benefit to not contributing effort, if employed, is $w_j\left(\left(1-\gamma_j\right)\left(1-\alpha_j\right)+\alpha_j\right)$ where $1-\alpha_j=\left(1-\phi_j\right)^{N-1}$.

Equalizing these last two expressions yields the conditions under which workers are indifferent to contributing effort in a firm in sector j if and only if:

$$\phi_j = 1 - \left(\frac{c}{w_j \gamma_j}\right)^{\frac{1}{N-1}}. \tag{4}$$

Intuitively at a value of ϕ_j solving this expression, the disutility cost of higher effort to a worker in sector j is just offset by the increased probability that the worker will receive the wage w_j. Clearly, ϕ_j is increasing in w_j and increasing in sectoral competitiveness, γ_j, for any given w_j.

Before considering optimal wage setting, we note that wages must also be sufficient to induce participation in a sector J instead of exercising the fall-back option of sector $J+1$. The relevant case of this participation constraint occurs when the wage is set so that no one contributes effort, $\phi_j = 0$, which implies that $\alpha_j = 0$. In that case, to induce participation in sector j, when the probability of obtaining employment there is p_j, wages must satisfy:

$$w_j \quad \geq \quad \frac{W}{p_j\left(1-\gamma_j\right)} \tag{5}$$

since a worker can obtain W with probability one in sector $J+1$.

4.1.2 Optimal Wage Setting

Wages will have to at least induce participation from workers for production to be viable. But firms may also be willing to set them strictly in excess of such a level in order to induce more effort – a type of efficiency wage. We characterize that here. First note, that a situation where all agents contribute effort for certain will never arise, and for some values of γ_j, all workers not contributing effort is also not feasible. These are proved in the following:

Lemma 1 ***(A)*** *For all* γ_j, $\phi_j < 1$. ***(B)*** *For* $\gamma_j > c/\left(W+c\right)$, $\phi_j > 0$.

Proofs of this and all results are in the appendix.

Intuitively, if noone else were to free-ride, free-riding would be costless, as production would always occur, and would thus dominate contributing effort. Consequently, there must always exist individuals who plan to shirk with some positive probability; hence Part (A). Part (B) applies only when sectors are competitive

enough. For sectors where $\gamma_j > c/(W+c)$, the threat of competition itself is sufficient to discipline workers. Consequently, even at wages just satisfying the participation condition, there is a positive chance of someone contributing effort; i.e., $\phi_j > 0$.

For $\gamma_j > \frac{c}{W+c}$ the firm's problem is to pick w_j to maximize $E(\Pi_j) = \left[1-\left(1-\phi_j\right)^N\right](R-Nw_j) + \left(1-\phi_j\right)^N(1-\gamma_j)(R-Nw_j)$ subject to inducing worker participation: $w_j \geq W+c$. An implication of the lemma is that for $\gamma_j > \frac{c}{W+c}$ since $\phi_j \in (0,1)$ ϕ_j solves equation (4). Consequently, we can substitute for ϕ_j and maximize $(R-Nw_j)\left(1-\gamma_j\left(\frac{c}{w_j\gamma_j}\right)^{\frac{N}{N-1}}\right)$ subject to $w_j \geq W+c$ in this range of γ. This yields one of two solutions. Either the participation condition for workers binds, so that workers are just indifferent to working for the firm or working in sector $J+1$, i..e, $w_j = W+c$. Or the firm follows the high wage strategy. Workers at the firm then obtain strictly higher utility than they would have obtained had they worked in sector $J+1$. By paying a higher wage, the firm raises ϕ_j and thus increases the probability that production occurs, and R is received. Of course, this comes at the cost of higher wages. The level of this higher wage is determined from the interior solution to the firm's optimization problem, which is unique, i.e.:

$$\begin{aligned}
\frac{dE(\Pi_j)}{dw_j} &= -N\left(1-\gamma_j\left(\frac{c}{w_j\gamma_j}\right)^{\frac{N}{N-1}}\right) + \gamma_j(R-Nw_j)\frac{N}{N-1}\left(\frac{c}{w_j\gamma_j}\right)^{\frac{N}{N-1}}\frac{c}{w_j^2\gamma_j} = 0 \\
\text{so that } w_j^* \text{ solves } 1 &= \left(\frac{R}{w_j^*}-1\right)\left(\frac{\gamma_j^{-\frac{1}{N-1}}}{N-1}\left(\frac{c}{w_j^*}\right)^{\frac{N}{N-1}}\right). \qquad (6)
\end{aligned}$$

Optimal wage setting by firms depends on whether the benefits to the high wage strategy, in terms of higher effort contributions, offset the extra wage costs. It turns out that this depends on the profitability of production as specified below. Moreover, note that once optimal firm strategies are computed, since firms take into account the effects of their wage decisions on worker effort and sectoral choices, the solution to the firm's problem is sufficient to pin down the equilibrium of this model.

Proposition 2 *(Equilibrium) There exist two critical values of γ denoted $(\tilde{\gamma},\overline{\gamma}) \in (0,1]$:*
Case 1. If $\overline{\gamma} > \tilde{\gamma}$, then for low levels of competition, wages just induce participation and no discretionary effort is contributed. Beyond a threshold level of competition, firms follow the high wage strategy, and discretionary effort levels are non-zero. Formally: for $\gamma \in [0,\tilde{\gamma}]$, $w_j = \frac{W}{1-\gamma_j}, p_j = 1$, and $\phi_j = 0$. For $\gamma \in [\tilde{\gamma},1]$ $w_j = \max\left[w_j^*, W+c\right]$, where w^* is the solution to (6), $p_j < 1$,and $\phi_j > 0$.
Case 2. If $\overline{\gamma} \leq \tilde{\gamma}$, then at all levels of competition, wages are just sufficient to induce participation. However, there still exists a threshold in competition levels below which discretionary effort is not contributed, and above which discretionary effort is non-zero. Formally: for $\gamma_j \leq \frac{c}{W+c}, w_j = \frac{W}{1-\gamma_j}, p_j = 1$, and $\phi_j = 0$. For $\gamma_j > \frac{c}{W+c}, w_j = W+c, p_j = 1$, and $\phi_j > 0$.
Case 1 is more likely the higher are firm revenues relative to worker opportunity costs. That is: $\overline{\gamma} \geq \frac{c}{c+W} \geq \tilde{\gamma} \Leftrightarrow R \geq \tilde{R} \equiv \frac{(N-1)(W+c)^2}{c} + (W+c)$.

In words, this proposition says that in sectors with low competition, discretionary effort is not forthcoming, and there is no trust. Beyond a threshold, increases in competition increase discretionary effort, and increase trust levels. Firms' wage seting follows one of two different scenarios depending on the value of firm revenues relative to labor opportunity costs. Where revenues are relatively high, firms follow the high wage strategy for some levels of sectoral competitiveness, when opportunity costs are relatively high, wages just induce participation in all sectors.

Graphically, wage setting in the two cases is as follows: Figure 2a corresponds to Case 1, which occurs when $\overline{\gamma} > \tilde{\gamma}$, and is depicted by the heavy line below:

[Insert Figure 2a]

For $\gamma < \tilde{\gamma}$, firms set wages at binding participation inducing wages. In these sectors, all applicants find jobs, $p_j = 1$, and receive utility exactly equal to what they would have received had they gone to the reservation sector $J + 1$. For $\gamma \in (\tilde{\gamma}, \overline{\gamma})$ firms pay wages so that workers who get jobs receive strictly higher expected utility than workers in sector $J + 1$. This is still only expected utility, as final receipt of promised wage payments depends on production occurring. The probability of obtaining work in one of the sectors between $\tilde{\gamma}$ and $\overline{\gamma}$, p_j, falls strictly below one, so that workers are ex ante indifferent across sectors. For γ beyond $\overline{\gamma}$, wages are again at participation inducing levels, so that there is no sectoral unemployment.

Wages are non-monotonic because two different forces are determining their pattern over the differing regions. For low values of γ, competition is too low to induce discretionary effort from employees and hence trust is low. Here, wages are increasing in γ in reflection of the higher shut-down probabilities that occur as markets become more competitive. Beyond a threshold level, $\tilde{\gamma}$, competition is sufficient to induce effort from employees and firms follow the high wage strategy. But note that wages and competition both have the effect of increasing effort, consequently as competition increases beyond the threshold, firms optimally choose to cut back on their use of wages to induce effort, so that wages decline beyond $\tilde{\gamma}$ until the participation constraint binds again at $\overline{\gamma}$.

Case 2:In case 2, which occurs when $\overline{\gamma} \leq \tilde{\gamma}$, depicted in Figure 2b, wages (the bold line) are always set at binding participation inducing levels, and there is no unemployment.

[Insert Figure 2b]

The final part of the proposition indicates that Case 1 becomes relatively more likely the higher are firms net profits, i.e., revenues relative to opportunity costs of labor. Intuitively, when net profits are likely to be high, firms find it more costly to risk shut-down in case of low quality. They respond by raising wages and inducing more effort, in expectation. This corresponds to pure profit here, as we have not modelled the costs of ex ante investment decisions.

Now that we have established equilibrium behavior of firms, it is straightforward to calculate the effect on ϕ_j in each sector j, that is precipitated by an increase in γ_j. This is stated in the following proposition:

Proposition 3 *(Competition Reform) Consider a reform that increases competition in all sectors of the economy; that is γ_j increases for all j. Then, any sector j in which there is non-zero discretionary effort under existing levels of competition, $\phi_j > 0$, will have a strictly higher level of discretionary effort after the reform.*

The proposition provides an explanation for the increases in trust upon the implementation of competition enhancing reforms in banking that were documented in US states previously. Such reforms increased competition in even non-financial sectors by facilitating entry. In any sector where competition has increased, individuals now face a greater threat of shut down in the event that their firm underperforms. At the margin, they are now more willing to contribute discretionary effort, as the benefit of doing so, which is that the firm remains high quality and therefore does not risk shut down, rises with competition.

The model also makes a tight prediction about the cross-sectional relationship that we should expect to observe between sectoral competition and discretionary effort. Specifically:

Corollary 4 *(Cross-Sectional Prediction) Let $\widetilde{\gamma}$ denote the lowest value of γ for which $\phi_j > 0$, this varies depending on whether Case 1 or Case 2 applies. But, in either case we have ϕ is monotonically increasing in γ beyond $\widetilde{\gamma}$ and independent of γ for γ below $\widetilde{\gamma}$. Formally: $\frac{d\phi_j}{d\gamma_j} > 0$, for $\gamma \geq \widetilde{\gamma}, = 0$ for $\gamma < \widetilde{\gamma}$.*

Low levels of competition are insufficiently strong to induce any discretionary effort from employees. In either case 1 or 2, there exists a threshold level of γ denoted $\widetilde{\gamma}$ where discretionary efforts are forthcoming. For levels of γ beyond this, discretionary effort is monotonically increasing in competition. Though firms internalize the effect of increased competition by lowering wages beyond $\widetilde{\gamma}$ in case 1, the net incentive to contribute effort is still higher. In case 2, it is clearly higher, so in both cases ϕ_j rises with j.

Under the same assumption that ties this model to the cross-state reforms, namely that individuals whose coworkers are less likely to free-ride report higher levels of generalized trust, we obtain a further set of predictions in the cross-section. The model predicts that for any single year of the GSS, workers employed in sectors with higher levels of competition should report higher levels of trust. Moreover, this positive relationship should only occur beyond a certain threshold level of sectoral competitiveness. The Supplemental Appendix discusses the robustness of these predictions to alternative specifications of the model. We will be able to test these predictions in the next section.

5 Trust and Sectoral Competition

The model predicts that sectors with higher levels of competition should have higher levels of reported trust. We explore this prediction here. The model allows no underlying individual heterogeneity, and so makes predictions about reported trust for individuals who are otherwise identical in their propensity to trust ex ante, but who work in sectors with different levels of competition. Since there are many previously well documented determinants of individual trust, it is imperative to control for these when looking at this

prediction. It is also essential to control for as many other details of the workplace that may be varying, as these are also factors which, according to the theory we develop, should not be playing a causal role.

A major challenge we face in testing the model is in obtaining a measure of competition at the level of sector in which an individual is employed. The GSS includes no such measures, although sector of employment is identified. For these reasons we use a particular wave of the GSS, 2004, that is advantageous for two reasons. Firstly, this wave included an extremely detailed extended wokplace module. Secondly, by taking this year we can link individual sectors of employment to a measure of sectoral level of competition that we obtain from the US census of firms wave that was administered in 2002.

Data Description

In this section we use only the 2004 wave of the US General Social Survey. In this wave, there are four responses to the same generalized trust question as we saw earlier, "Can Trust", that are linked to the workplace module. These are (with unconditional response rates in parentheses): 1 "always trusted" (3.76%), 2 "usually trusted" (44.40%), 3 "usually not trusted" (42.14%) and 4 "always not trusted" (9.70%).

The literature on trust has established a set of individual characteristics to be used as explanatory variables. We use these as our basic controls in all regressions: Income, which is a categorical variable with 24 categories which we include as dummies; Education, measured in years of completed schooling; Age, Marital status; Sex; and City size.[23] Additionally, three categories of race (white, black, other) and self-reported ethnicity information by country of ancestral origin are included. From these we construct ethnicity and race dummies, the details of which are elaborated in the Supplemental Appendix. This appendix also reports the sample means and standard deviations for each of these variables for our sub-sample of 616 individuals who comprise the core of our analysis. The determinants of this sample are explained below.

The Competition Measure

We match individual sector of employment with a sectoral measure of competition. Every five years, the Census Bureau surveys the population of US firms. The survey reports the percentage of total sales covered by the n largest firms ($n = 4, 8, 20, 50$) in North American Industrial Classification System (NAICS) sectors.[24] As a measure of competition this is clearly not perfect, as factors other than the competitiveness of a sector will affect these measures. A preferred, but still imprecise measure would be the Hirschman/Herfindahl Index measure of concentration, but the census reports these for manufacturing only.

The main determinant of selection into the sample we analyze is the availability of an industry code for individuals. Not all individuals – the unemployed and retired for example – will have such a code. Since the GSS reports sector, or industry of employment, using 1980 census (3 digit) codes, it is necessary to first convert these to 1990 census code measures and then use a cross-walk converter to obtain the corresponding NAICS (4 and 5 digit) measures. Each one of these steps also leads to the loss of a small number of observations as industry classification systems change. Our final sample includes 102 industry

[23] We mainly follow Glaeser et. al. (2000) here. We include controls for the size of a city in which one lives, and will include workplace size controls later. Alesina and La Ferrara (2002) analyze a richer set of regional measures than we have available, and connect these to regional income Ginis and fragmentation measures.

[24] See the website http://www.census.gov/epcd/www/naics.html for details.

classifications.

Once a NAICS measure is obtained for each observation it is matched with the census percentage sales measures. The final variable, which is our measure of competition using the sales measure for the top 50 firms, "Comp50" is computed by subtracting the concentration measures from 100.[25] Thus Comp50 for sector x is the percentage of total sales in x that is NOT covered by the largest 50 firms in that sector. Since our measures are of competition they are coded inversely to concentration measures. The correlations between Comp50, which has the advantage of being available for all sectors, and the Hirschman/Herfindahl index of concentration which is available for manufacturing sectors only is -0.85.

The average sector in our sample has measures of 60.53 for Comp50. A sector corresponding approximately to the average is NAICS # 42314 "Used Motor Vehicle Parts Merchant Wholesalers". An example of a competitive sector is NAICS # 44112 "Used Car Dealers", Comp50 = 87. A particularly uncompetitive sector is NAICS # 31132 "Chocolate and Confectionery Manufacturing from Cacao Beans", with Comp50 = 1.2. The Supplemental Appendix plots the distribution of Comp50 and reports sectoral averages for highly aggregated sectoral constructs.[26] In general, most services are more competitive than both manufacturing and retailing.

Estimation Procedure

In order to test the cross-sectional prediction, we run regressions of the following form:

$$Cantrust = \beta_0 + \beta_1 Comp50 + \widetilde{\beta}\widetilde{Z},$$

where $\widetilde{Z}$ is a vector of independent variables that we describe below. The vector $\widetilde{\beta}$ corresponds to their coefficients. Since the "Cantrust" variable has four ordered categories, it is natural to try to estimate this with an ordered logit regression. We have experimented with many such estimates, but a Brant test of any of these ordered logit specifications rejects the parallel regressors assumption imposed in ordered logit estimation. This is not surprising since parallel regressors amounts to imposing a constant set of βs for the transition across each category. Such an assumption is restrictive in the present context as, for example, it amounts to assuming that the marginal impact of a regressor on the choice between answering "always trust" and "usually trust" is equivalent to the marginal impact of a variable on the choice between answering "usually trust" and "usually don't trust". Accordingly, none of the ordered logit estimation results will be reported from hereon. Since almost ninety percent of the responses fall in the two middle categories "usually trust" and "usually don't trust", we focus on these from hereon. We code "usually trust" as 1 and "usually don't trust" as 0 and name this variable "trust2". We have estimated all of the regressions we report below as logit and probit, but we report results in the paper obtained from estimating a linear probability model, since the significance of estimates does not change under this specification, and the coefficients can be directly

[25] We have also computed results for all four measures of competition available, but report only results for Comp50 in the text. Results for Comp4, which are largely similar, are reported in a not-for-publication "appendix for referees". Results for Comp12 and 20 are even closer to those for Comp50 and are not reported.

[26] There are over 100 different sectors reported by respondents in the full sample. The Supplemental Appendix aggregates up to two digit NAICS sectoral classification numbers.

interpreted.[27]

Results

We first show that the data conform to the usual patterns seen when trust is regressed on individual characteristics. This set of estimations is on our core sample of 616 respondents for whom we have industry information and can therefore designate a competition variable, Supplemental Appendix reports summary statistics for this core sample as well. The mean answer to the trust question, which is our dependent variable in all reported regressions, is 0.495 with standard deviation 0.500, i.e., about 50% of respondents answer "usually trust" as opposed to "usually don't" in response to the canonical trust question. This is higher than the usual positive answers to the trust question reported in most previous studies undertaken using US subjects. This is because, in order to obtain workplace competition measures, we have selected on individuals who have a sector of employment, and therefore have jobs. As previous studies have found a positive correlation between trust and income, we should expect this to imply a higher than representative proportion of trusters in our core sample.

To check that selecting on workers does not otherwise lead to a strange set of findings regarding trust, column one of Table 3 reports results for a basic set of regressors that have been explored in previous studies. For these, and all regressions we report, the set of regressors includes income, gender, race, ethnicity, marital status, religion and occupation dummies as well as city size.[28] Robust standard errors are reported throughout, in parentheses, in all tables. As the column indicates, and as is consistent with previous studies of trust (Glaeser et. al (2000), Helliwell and Putnam (2007) and Alesina and La Ferrara (2002)), years of education is a strong determinant of trust, with each year of completed schooling being correlated with a 2.54% increase in the probability that an individual reports that they "usually trust" as opposed to "usually don't trust" in answer to the canonical trust question. A one standard deviation increase in years of schooling increases trust by 7.3 percentage points. Income dummies are included as income is a categorical variable in the GSS, and, as in previous studies, higher income is a positive determinant, (F-test suggests these are jointly significant). Age is entered as a second order polynomial, and is significant at the higher order, though marginally when occupation dummies are included. The unreported variables will not be discussed further except to note that neither race nor religion have significant effects, though their signs are consistent with those found in previous studies – e.g. Alesina and La Ferrara (2002) find women and blacks less likely to trust – and that some nationalities in self-reported ethnicity do affect outcomes, though these are generally marginal.[29]

[27] We also experimented with two further types of estimation. In one, we estimate a multinomial logit version of the model which utilizes all of the four response categories, but allows different βs to be estimated for the transition to each response relative to an omitted category. The results that we obtained on the "usually trust" versus "usually don't" under this estimation are very similar to those reported here. In a second variant, we pooled all responses into a binary category. That is, the responses "always trust" and "usually trust" are coded as 1 for "yes" to the trust question and "always don't trust" and "usually don't trust" are coded as 0 for "no". This estimation yields slightly lower size on the competition variables than reported here, and consequently lower significance, but leaves things otherwise unchanged.

[28] We also report estimates of the full set of coefficients without occupation dummies in the appendix.

[29] By varying the sets of regressors, both of these variables sometimes become significant, but since this is not the focus of the present paper we do not explore this here and instead persist with the full set of occupation, income, ethnicity, religion and marital status dummies under which they are not significant.

[Insert Table 3]

Column 2 adds the sectoral competitiveness variables to the baseline set of regressors and is the most basic test of the model's predictions, i.e., that workers in competitive sectors should have higher levels of trust. Since the variation in competition arises at the sectoral level, for all of the regressions where sectoral competitiveness measures are used we report results with errors clustered at the sectoral level, (there are approximately 100 clusters).[30] The coefficient on Comp50 in column 2 is 0.00191 and is significant at the 5% level.[31] This coefficient means that a 5% increase in sectoral level competition leads to 0.191 percentage points increase in the probability that a respondent answers "usually trust". In variance normalized terms, this implies that a one standard deviation increase in Comp50 leads to about a 4.8 percentage points increase in trust. The other regressors enter in a similar direction to the previous table: income and education remain significant determinants of trust.

This finding is consistent with the model's cross-sectional implication, and is completely robust to tinkering with the regressors that are included in the baseline specification. The remaining columns in the table introduce various additional individual controls in order to demonstrate that the effect we are picking up is being driven by competition per se, and not some other correlates of trust that happen to be correlated with competition. On this front, we explore all the possibilities that we were able to identify and that the data allow, namely that competitive sectors have workplaces which: have less job security, are smaller, have more supervision, select different types of individuals, or somehow cultivate more congenial workplaces.

Job Security

It has been found in play of the trust game first described by Berg, Dickhout and McCabe (1995) by for example Karlan (2005) and Schechter (2004), that trusting behavior in this game (the amount sent by the first mover) is highly correlated with low risk aversion. If competitive sectors had low levels of job security, then it may be that these select risk lovers, who are also those likely to trust. This makes some sense. If trusting involves taking a risk (as it certainly does in the trust game) then individuals who report trusting may simply be individuals with less aversion to risk. This could be the underlying reason for the significance of competition in column 2, but has nothing to do with the model we developed. Since we don't have information on risk aversion directly we thus include a measure of job security. Respondents were asked to respond to the statement "job security is good". We code a dummy variable equal to 1 if individuals respond that this is "very" or "somewhat" true, and equal to zero if "not too" or "not at all" true. As column 3 reports, the coefficient on Comp50 is entirely unaltered by the addition of this variable. In fact, most coefficients on all variables change only slightly with its addition. The point estimate on job security is extremely close to zero, and not significantly different from it.

[30] We have also replicated all of these results without clustering of errors, and by running the regressions with robust standard errors. Nothing significant changes when this is done.

[31] As indicated in the "note to referees", results for Comp4 are largely in line with those reported here for Comp50, except of marginally lower significance.Our conjecture as to why this is the case relates to the coefficient of variation in Comp50 being significantly larger than that of Comp4. The proportion of sales covered by the largest 50 firms seems to be picking up much more of the cross industry variation in competition than that of the top 4.

Workplace Size

It is possible that competition is affecting trust by altering the size of workplaces in which individuals work. For instance, it may be the case that more competitive sectors, by admitting more firms, ceteris parabus, also tend to have smaller workplaces. By repeatedly interacting with a smaller group of individuals, it may be the case that individuals are developing reputation based trust with these individuals, which then translates into higher levels of trust overall. The GSS does attempt to measure the size of the workplace by literally asking: "About how many people work at the location where you work?" Respondents were allowed to choose from 7 categories, 1-9, 10-49, 50-99, 100-499, 500-999, 1000-1999 and 2000+. Column 4 adds dummy variables constructed from these categories to the baseline set of regressors. The first thing to note, is that none of these categories on its own is significant, nor are they jointly significant in effecting trust. More importantly, their introduction does not attenuate the effect of competition on trust as the coefficient on Comp50 increases in size, and now becomes significant at the 1% level.

Congeniality of the Workplace

One may conjecture that the forces of competition induce firms to provide more congenial workplaces – which are costly – in order to retain the best employees. This is an argument made by Cohen and Prusak (2001). They argue that competitive environments that threaten employers with worker turnover are those that require successful employers to provide the sorts of workplaces that mitigate stress, allow workers to attain a sense of achievement, and respect family and other obligations. This bears some relation to the mechanism highlighted in our theoretical section, but is distinct. According to our explanation, individuals merely judge it in their self-interest to free-ride less, and this engenders a greater sense of trust in co-workers. According to the suggestion of Cohen and Prusak, it is the more congenial workplace that employers must provide in order to retain their employees which contributes to a sense of overall well-being, and perhaps higher levels of trust. In order to see whether this is what the basic correlation is picking up, we exploit the 2004 wave's addition of a rich set of workplace related questions. These are briefly described in the Supplemental Appendix, with details (means, standard deviations, response categories) reported there as well. Many of these variables are directly concerned with the respondent's perceptions of relations between co-workers in the workplace; for example, whether there are heated arguments, people shout, people are put down, others take credit, others are helpful when needed, people act upset, or they turn away when others are threatened. Others ask directly whether the workplace is stressful and how often the respondent skipped work due to unhappiness with the work situation. Respondents were also asked whether they felt their job security was good.

Column 5 reports the relationship between Comp50 and trust, after the addition of these extra workplace variables to the basic set of controls in column 2. The picture that emerged previously is largely unchanged. The coefficient on Comp50 remains at around .002, suggesting that these workplace variables do not seem to be related to the avenues through which competition affects trust. Comp50 remains highly significant ($t-statistics$ over 2.5). For the most part, the additional workplace questions are generally not significantly

correlated with trust. The one exception is the variable "Heated Arguments" which is the answer to the question: "Please respond to the following statements based on your experience during the past 12 months unless otherwise specified, with reference to your current place of employment only:. Heated arguments occur in my workplace." this is coded as a 1 if heated arguments occur "often", or "sometimes" and 0 if "rarely" or "never". The negative sign suggests that places with fewer heated arguments are also workplaces where individuals have higher levels of trust. The "skipwork" variable is marginally significant. The literal question is: "During the past 3 months, how often did you stay at home or leave work early because you were unhappy about your work situation?"

The regressors also include whether the workplace is unionized, which is never significant, and we have also included the job security and workplace size controls. We have experimented with many different combinations from this full set of additional workplace variables and the picture obtained remains unchanged. The significance and magnitude of the competition measure is largely unaltered by the particular combination we try.[32]

Supervision

Another possible hypothesis for the coefficient in column 2 is that sectoral competition, by increasing the costs to firms from poorly performing employees, induces firms to employ proportionately greater supervisory resources. Acting in a more restricted environment could make workers seem more trustworthy and lead to higher reported trust levels. This, once again, is related to but distinct from the theory that we developed in the previous section. The model suggests competition across groups of workers is the key disciplining effect on free-riding, not restrictions on their discretion. In order to examine the possibility that supervision is the source of the effect, we include responses to the question: "Does the Respondent have a supervisor on your job to whom you are directly responsible." This variable is included in column 6. The supervision variable never enters as a significant determinant of trust. Moreover, the results on other variables are essentially unchanged from the basic results reported in the previous columns; the coefficients on Comp50 and the other regressors are only slightly altered.

Optimism

As mentioned earlier, individuals who are observed to play high levels of trust in the trust game, are also individuals who are less averse to risk. While we have ruled out the selection of these more risk loving types through the job security question, it is possible that competitive sectors are selecting individuals with other characteristics that are related to their willingness to bear risk. One such characteristic is optimism. Individuals who are more optimistic that outcomes will turn out well, may be more willing to risk trust. Once again, we want to ensure that such an effect is not generating a spurious causal relation from competition to trust. The results from doing this are reported in column 7. There we include the variables "optimist" (strength of agreement with "I'm always optimistic about my future") and "moregood"

[32] In the "notes for referees", we repeat the specification in column 3 including only unionization, the size of the workplace and the two workplace variables that were significant in column 3 ("hotargus" and "skipwork"), and we also modify this by dropping unionization and size of the workplace. Neither of these specifications change anything of substance with respect to Comp50, and repeating the same steps for Comp4 also leads to no changes of note.

(strength of agreement with "Overall, I expect more good things to happen to me than bad"). Both of these are constructed as dummies with responses to the statements that are "strongly agree" and "agree" coded a 1, and "disagree" and "strongly disagree" coded a zero. It should be noted that the sample size drops to 532 when we do this, as these questions were given to only a subsample of all survey respondents. Neither of these optimism variables enters significantly either on their own or together, though they do marginally reduce the size of the coefficient on Comp50, but not its significance.

As a final test, column 8 reports the regression results obtained when we include all of the variables reported above simultaneously. Once again, the coefficient on Comp50 remains at around 0.002 and strongly statistically significant.

Selection

Even though we have controlled for a number of observables, a correlation between competition and trust may be observed in such a cross-section even without sectoral competition causing increased trust if it is the case that individuals who are inherently more trusting are somehow selected into competitive sectors. The theory we developed in the previous section starts from ex ante symmetry across individuals. Consequently, once we have controlled for the individual specific factors that have predicted trust in previous studies, that theory would suggest that there should be no evidence of individuals who are inherently trusting selecting into competitive sectors. Evidence against this theory would then be provided if we found that individuals with no, or little, experience had higher (or as high) levels of trust, as individuals with longer experience. The GSS does not follow individuals through time, but we can get at this in another way by constructing an experience measure for respondents in the sample. This is created by subtracting years of education from the respondent's age minus 6. We then interact our competition measure with this constructed experience variable. Experience interacted results are reported in Table 4. Column 1 reports results obtained when we add this interaction term and omit experience directly in the regressions; as it is colinear with age and education.[33]

The results here are striking. Adding the interaction term makes both competition variables on their own insignificantly different from zero. Moreover, the interaction term itself is positive and significant for both competition variables across all specifications, at the 10% level. Table 4 replicates the regressions reported in Table 3 in the same order but now including the experience interaction. In general, $p-values$ are well below 0.1 on Comp50 in all specifications. For example, the final column (7) which includes all of the potential regressors, and the experience interaction, has a $p-value$ of .57.

[Insert Table 4]

The zero finding on direct inclusion of competition is evidence against selection. Individuals without experience are no more likely to respond positively to the trust question if they work in competitive sectors.

[33] In order to be able to include experience directly, we also report in the "notes to referee" a specification where we include age dummies, instead of age as a continuous variable, and include our constructed measure of experience as a control as well. The results in these two specifications are not significantly different so we discuss the specification with continuous age in the paper.

However, as individuals increase their experience in the labor market, working in a competitive sector has a positive impact on their reported trust. Moreover, this impact is increasing the longer their experience. One explanation for this finding could be that interacting competition with experience is significant because this measure has less noise than the competition measure on its own. Though possible, this seems unlikely as the experience we measure is, if anything, introducing more noise because its ability to proxy for time spent in a sector is weaker the longer the individual has been in the labor market. The results here suggest it is unlikely to be the case that competitive sectors are selecting individuals with high levels of trust.

Examining the Threshold Prediction

In addition to Comp50 being a positive determinant of trust, the model predicts a threshold relationship between competition and trust in the cross-section. Specifically, for low levels of competition, there should be essentially no relationship, only at higher levels of competition should we expect the positive correlation. We explore the shape of the relationship between trust and competition in two ways. Firstly, we create dummies for each of the competition variables corresponding to very low (bottom quintile), low (20-40 percentile), medium (40-60 percentile), high (60-80 percentile) and very high (above 80 percentile) competition sectors. Results are reported in Table 4. The omitted category is the very low competition category. Column 1 reports results for Comp50, column 2 for Comp50 interacted with experience, and colum 3 for Comp50 directly and interacted with experience. The results are consistent with a threshold. For column 1, the low category is not significantly different from the very low omitted category, the medium and high categories are significantly positive relative to very low and the very high category is also positive and significant at the 10% level. These results suggest a threshold at the low (20-40) category in Comp50. Column 2 of the table also reports results for the competition dummies interacted with experience and the same pattern emerges – no significant difference for low relatively to the very low omitted category, but a significantly higher slope on all of the remaining categories relative to the very low category. When the experience interactions are included as well as the direct experience measures, column 3, a similar pattern emerges. The non-experience interacted competition measures are never significantly different from the omitted low category, and the increasing slope finding is again present for the experience interacted competition measures. The signs of coefficients are as before and the shape is similar to that in the first two regressions but since standard errors are almost twice as high in this specification, only the very high category is significantly steeper than the very low.

[Insert Table 5]

One can visually depict this relationship by partialing out the effects of all other controls variables and observing the resulting two way relationship between competition and trust via a non-linear plot. To do this, we plot residuals obtained from regressing both competition and trust on all of the baseline explanatory variables.[34] Figure 3 depicts the outcome of a fractional polynomial prediction plot of the trust residual

[34] The shape here is consistent across all the specifications of these variables in the other columns as well.

against Comp50. The trust residuals are on the y axis. This figure reiterates the findings in Table 5 and is consistent with the threshold prediction. For very low levels of residuals, the error bands are extremely wide, so essentially nothing can be said about the relationship in these wide bands. However, beyond residuals of around -60 estimates become tighter and we see a pattern consistent with that predicted by the model, and seen in the previous table. The relationship is flat, upto around residuals of 0, and then positive beyond that.

[Insert Figure 3]

6 Conclusion

Two independent sets of banking de-regulation that were implemented at different times across differing US states had the effect of increasing the rate of new firm incorporations in these states. We show that both sources of increased competition also lead to state level increases in trust, as reflected in answers to the GSS generalized trust question. We then develop a model to explain this finding. The model is based on the disciplining effect that group level competition has on individual free-riding within members of a group. The model shows that free-riding does indeed fall with increases in competition, and thus provides an explanation for the initial empirical results. The model also predicts a positive correlation between competition and trust in the cross-section. We test this by analyzing an extremely detailed workplace module in the 2004 wave of the GSS. As the model predicted, individuals working in sectors that are more competitive have significantly higher levels of reported trust than individuals working in less competitive sectors. This relationship is robust, statistically significant and large. In variance normalized terms, it is slightly smaller than the effect of years of education on trust.

A tempting conclusion to draw from many recent studies that have established strong inter-generational persistence in trust (and other attitudes) is that such factors, to the extent that they matter for economic outcomes, are not amenable to policy influence, since trust is determined by the distant past. While the past clearly matters, our results cast doubt on a conclusion that policy does not. Policy clearly affects competition levels, and our evidence suggests that competition levels also affect trust. Given the centrality and magnitude of measured effects of social capital (and trust more narrowly) on development outcomes, such a previously ignored benefit from market competition has the potential to be as important for economic outcomes as the already well studied effects of competition in improving allocative efficiency.

This research raises two broad questions which we are continuing to explore. One concerns the general applicability of these findings to contexts outside the United States. Do increases in competition increase trust in other developed countries? Does this happen in LDCs? Is there a link between these findings and the increased pro-social behavior found in primitive societies that have experienced greater market penetration, as reported by Henrich et. al. (2001)? If so, this suggests that there exists another strongly pro-social benefit of market competition.

The second direction concerns the mechanism of effect. We think interactions in the workplace are key, as suggested by the model we have developed to explain our empirical findings. But this should be subjected to more rigorous scrutiny in other contexts. Other instances of dramatic change in sectoral competitiveness are a natural place to start. One candidate set of countries are the European ones. For these countries, trust attitudes could be explored using Eurobarometer data, which has been asked annually for 35 years in some cases. Specific events where large changes in market competition occurred for some sectors, and which can be used as quasi-experiments are; European Union trade harmonization and German Unification.

As far back as Montesquieu, it has been conjectured that markets may be instrumental in generating pro-social behavior. Liberal market structures can only work when built on the give and take of a functioning civil society. Do markets sustain themselves by replicating these civil values, as Montesquieu contended? Or does the process of market competition itself tend to undermine the very values necessary for markets to exist? As, for example, Marx and Schumpeter argued.[35] Our evidence, which is a first step, is consistent with Montesquieu's conjecture, and suggests further investigation in this direction may be fruitful.

7 References

Alesina, A. and E. La Ferrara (2002) Who trusts others?, Journal of Public Economics, vol. 85(2), pages 207-234.

Algan, Y. and P. Cahuc (2009) Culture Change and Economic Development, Mimeo, University of Paris 1.

Andrews, D. W. K. and J. H. Stock (2005) Inference with Weak Instruments. Cowles Foundation Discussion Paper n. 1530.

Arrow, K. (1972) Gifts and Exchanges, Philosophy and Public Affairs, vol 1, pp. 343-362.

Bacharach, M., G. Guerra and D. Zizzo (2007) The Self-Fulfilling Property of Trust: An Experimental Study, Theory and Decision, Volume 63, Number 4.

Banfield, E (1958), The Moral Basis of a Backward Society, Glencoe, IL: The Free Press.

Basu, K. (2006) Identity, Trust and Altruism: Sociological Clues to Economics Development, CAE Working Paper #06-05.

Berg, J., J. Dickhout and K. McCabe (1995) "Trust, Reciprocity and Social History", Games and Economic Behavior, 10(1) 122-142.

Bertrand, M., Duflo, E., and S. Mullainathan (2004). "How Much Should We Trust Difference-in-Differences Estimates?" Quarterly Journal of Economics, 119(1), pages 249-275.

Bisin, A. and T. Verdier (2001) "The Economics of Cultural Transmission and the Dynamics of Preferences," Journal of Economic Theory, 97(2), pages 298-319.

[35] See Hirschman (1982) for a review of this older literature. Shleifer (2004) also argues that markets may extend anti-social behavior. He identifies a type of race to the bottom that may accompany the spread of commercial practices: If morality is a normal good, the stress on profits that arises with increased competition, raises the opportunity cost of providing that good.

Bisin, A. and T. Verdier (2006) Cultural Transmission, in L. Blume and S. Durlauf (eds.), The New Palgrave, A Dictionary of Economics, Macmillan.

Black, S.E. and P.E. Strahan (2002) Entrepreneurship and Bank Credit Availability, Journal of Finance, vol. 57, 6, pp. 2807-2833

Bolton, G, C. Loebbecke and A. Oxenfels (2008) Does Competition Promote Trust and Trustworthiness in Online Trading? An Experimental Study, Journal of Management Information Systems, , 25,2.

Bowles, S. (1998) Endogenous Preferences: The Cultural Consequences of Markets and other Economic Institutions, Journal of Economic Literature, p. 75-111.

Brandts, J., A. Riedl and F. van Winden (2006) Competition and Well-Being, Mimeo, University of Amsterdam

Chernozhukov, V., and C. Hansen (2007) The Reduced Form: A Simple Approach to Inference with Weak Instruments". Economics Letters, 100(1), pages 68-71.

Cohen, D.J. and L. Prusak (2001) "In Good Company: How Social Capital Makes Organizations Work", Ubiquity, Volume 1 , Issue 42

Coleman, J., 1988, Social Capital in the Creation of Human Capital, American Journal of Sociology, vol 94, pp. 95-120.

Corneo, G. and O. Jeanne (2007) Symbolic Values, Occupational Choice, and Economic Development, mimeo, University of Berlin.

Doepke, M. and F. Zilibotti (2008) Occupational Choice and the Spirit of Capitalism, Quarterly Journal of Economics, 123(2) 747-793.

Fehr, E. U. Fischbacher, B. von Rosenbladt, J. Schupp, and G. Wagner, (2003) "A Nation-Wide Laboratory. Examining Trust and Trustworthiness by Integrating Behavioral Experiments into Representative Surveys", CESifo working paper 866.

Fernandez, R.(2007) Alfred Marshall Lecture: Women, Work, and Culture, Journal of the European Economic Association, 5 , 305-332.

Fischer, J. (2008) Is competition Good for Trust ? Cross-country evidence using micro-data, Economics Letters, , Economics Letter, 100 (1), 56-59.

Francois, P. and J. Zabojnik (2005) Trust Social Capital and Economic Development, Journal of the European Economics Association, 2005, 3(1) 51-94.

Fukuyama, F. (1995) Trust: The Making and Breaking of Cooperative Relations, New York, Free Press.

Glaeser, E., D. Laibson, J. Scheinkman, C. Soutter (2000) Measuring Trust, Quarterly Journal of Economics, p.811-846

Guiso, L., P, Sapienza and L, Zingales (2006) "Does Culture Affect Economic Outcomes?," Journal of Economic Perspectives, 20 , 23-49.

Guiso,L., P. Sapienza, L. Zingales (2009) "Long-Term Persistence." mimeo University of Chicago.

Hansen, C. (2007) Asymptotic Properties of a Robust Variance Matrix Estimator for Panel Data when T is

Large. Journal of Econometrics, 141(2), pages 597-620.

Harris J. and M. Todaro (1970). Harris J. and M. Todaro (1970). Migration, Unemployment & Development: A Two-Sector Analysis. American Economic Review, 60(1):126-42.

Helliwell, J. and R. Putnam (2007) Education and social capital, Eastern Economic Journal Vol. 33 (1)

Helpman, E.and O.Itskhoki (2009) Labor Market Rigidities, Trade and Unemployment: A Dynamic Model, mimeo Harvard University, Economics Department.

Helpman, E., O.Itskhoki and S. Redding (2008). Inequality and Unemployment in a Global Economy, mimeo Harvard University, Economics Department.

Henrich, J., R. Boyd, C. Camerer, E. Fehr, H. Gintis, R. McElreach (2001) In Search of Homo-Economicus: Behavioural Experiments in 15 Small Scale Societies, American Economic Review, Papers and Proceedings, 91(2) 73-78.

Henrich, J (2004) Cultural Group Selection, Coevolutionary Processes and Large-scale Cooperation. Journal of Economic Behavior and Organization, 53: 3-35 and 127-143.

Hirschman, A. (1982) Rival Interpretations of Market Society: Civilizing, Destructive or Feeble?, Journal of Economic Literature, XX, 1463-1484.

Huck, S., Lünser, G. and J.-R. Tyran, (2006) Competition Fosters Trust, CEPR Discussion Papers 6009

Karlan, D. (2005) "Using Experimental Economics to Measure Social Capital and Predict Financial Decisions," American Economic Review, vol. 95(5), pages 1688-1699.

Kerr, W. and R. Nanda (2009) Democratizing Entry: Banking Deregulations, Financing Constraints, and Entrepreneurship. Journal of Financial Economics, 94, pages 124-149.

Knack, S. and P. Keefer (1997) Does Social Capital Have An Economic Payoff? A Cross-Country Investigation, Vol. 112, No. 4, Pages 1251-1288

Kroszner, R. S., and P. Strahan (1999) What Drives Deregulation? Economics and Politics of the Relaxation of Bank Branching Restrictions. Quarterly Journal of Economics, 114(4), pages 1437-1467.

La Porta, R., F Lopez-de-Silanes, A. Shleifer & R. Vishny, (1997) "Trust in Large Organizations," American Economic Review Papers and Proceedings. 87(2), pages 333-38.

Leibenstein, H. (1987) X-efficiency Theory, The New Palgrave: A Dictionary of Economics, Macmillan, New York.

Levine, R., A. Levkov and Y. Rubinstein (2008). "Racial Discrimination and Competition," NBER Working Papers 14273, National Bureau of Economic Research, Inc.

Nunn, N. and L. Wantchekon (2008) The Slave Trade and the Evolution of Mistrust in Africa, mimeo, Harvard University.

Platteau, J.-P. (2000) Institutions, social norms, and economic development, Fundamentals of Development Economics, vol. 1. Reading, U.K.: Harwood Academic.

Putnam, R. (1993) Making Democracy Work: Civic Traditions in Modern Italy, Princeton, NJ., Princeton University Press.

Putnam, R. (2000) Bowling alone: The collapse and revival of American community. New York: Simon and Schuster.

Sapienza, P., A. Todra and L. Zingales (2007) Understanding Trust, NBER Working Papers 13387.

Scharfstein, D, (1988) The Disciplinary Role of Takeovers, Review of Economic Studies, 55, 185-199.

Schechter, L. (2007) Traditional Trust Measurement and the Risk Confound: An Experiment in Rural Paraguay,Journal of Economic Behavior and Organization

Shleifer, A. (2004) "Does Competition Destroy Ethical Behavior?" American Economic Review Papers and Proceedings, May

Simmel, G.[1908] (1955) Conflict and The Web of Group Affiliations, The Free Press, Glencoe Illinois.

Stock J. H., Wright, J.H. and M. Yogo (2002) A Survey of Weak Instruments and Weak Identification in Generalized Method of Moments. Journal of Business Economics and Statistics, 20(4), 518-529.?

Tabellini, G. (2007) Culture and Institutions: Economic Development in the Regions of Europe, mimeo, Bocconi University, forthcoming Journal of the European Economics Association.

Tabellini, G. (2008a) The Scope of Cooperation: Values and Incentives, forthcoming Quarterly Journal of Economics.

Tabellini G. (2008b) Institutions and Culture, Journal of the European Economic Association Papers and Proceedings, Vol.6(2-3)

Uslaner, E.M (1999) The Moral Foundations of Trust, New York: Cambridge University Press.

Uslaner, E.M. (2005), Trust as a Moral Value, in Dario Castiglione, Jan W. van Deth, and Guglielmo Wolleb, eds., Handbook of Social Capital, Oxford University Press.

Williamson, O. (1993) "Calculativeness, Trust, and Economic Organization," Journal of Law and Economics, 36, 453-486.

Appendix: Proofs

Proof of Lemma

Part A: Assume $\phi_j = 1$; i.e., all agents contribute effort. Then $\alpha_j = 1$, so that not contributing effort yields w_j which strictly exceeds $w_j - c$ if effort is contributed. Which contradicts all agents setting $\phi_j = 1$.

Part B. If $\phi_j = 0$, $\alpha_j = 0$ so that the probability of w_j being paid equals $1 - \gamma_j$. Therefore, for a given w_j, a participant sets $\phi_j = 0$ if and only if

$$\begin{aligned} w_j - c &< \left(1 - \gamma_j\right) w_j \\ w_j &< \frac{c}{\gamma_j}. \end{aligned} \tag{7}$$

It can be directly verified that when $\gamma_j \geq \frac{c}{W+c}$, (5) is not compatible with (7).■

Proof of Proposition (Equilibrium)

Consider the relationship between w_j^* and competition, γ_j. A simple examination of condition (6) shows that the RHS is a decreasing function of w_j^* and γ_j. So that w_j^* is a decreasing function of γ_j. The firm's optimal wage is then given by $\max\{w_j^*, W+c\}$. We define $\overline{\gamma}$, such that $\gamma_j = \overline{\gamma}$ implies that $w_j^* = W + c$. When $\gamma_j < \overline{\gamma}$, the firm pays w_j^* while when $\gamma_j > \overline{\gamma}$ the firm pays $W + c$.When $\gamma < \frac{c}{W+c}$, firm profits may be non convex, it is strictly decreasing for $w_j \in [\frac{W}{(1-\gamma_j)}, W+c]$ and may have a second maximum for $w_j > W + c$. Formally, the firm's problem is:

$$\begin{aligned} \max E(\Pi_j) \text{ subject to} \quad & : \\ w_j \quad & \geq \quad \frac{W}{(1-\gamma_j)} \end{aligned}$$

The firm chooses between paying w_j^* ensuring that some workers contribute effort or paying $\frac{W}{(1-\gamma_j)}$, foregoing effort contributions and minimizing wages. In the latter case, $\phi_j = 0$ and $w_j = \frac{W}{(1-\gamma_j)}$, and we denote expected profit by

$$\begin{aligned} \pi\left(W/\left(1-\gamma_j\right)\right) &= \left(R - Nw_j\right)\left(1-\gamma_j\right) \\ &= R\left(1-\gamma_j\right) - NW. \end{aligned} \tag{8}$$

which is clearly decreasing in γ_j. In the former case, we denote expected profit by $\pi\left(w_j^*\right)$. Using $E(\Pi_j)$ and applying the envelope theorem, we have that $\pi\left(w_j^*\right)$ is increasing in γ_j. Therefore, there necessarily exists a $\tilde{\gamma}$ such that $\pi\left(w_j^*\right) = \pi\left(W/\left(1-\gamma_j\right)\right)$. Where w_j^* is chosen if and only if $\gamma_j > \tilde{\gamma}$. The values of w_j and ϕ_j in the statement of the proposition, directly follow. The values of p_j ensure that condition (5) is satisfied with equality. Finally, note that using the implicit function theorem one can easily show that $\overline{\gamma}$ is an increasing function of R and $\tilde{\gamma}$ is a decreasing function of R. One can also easily verify that when $R = \tilde{R}$, $\frac{dE(\Pi_j)}{dw_j}|_{w_j=W+c,\ \gamma=c/W+c} = 0$ and $\pi(W+c) = \pi\left(W/\left(1-\gamma_j\right)\right)$. This implies that when $R = \tilde{R}$, $\overline{\gamma} = \tilde{\gamma} = \frac{c}{c+W}$.■

Proof of Proposition (Competition Reform)

Expression (4) determines the level of ϕ_j in sector j for any sector in which $\phi_j > 0$ in both cases. In Case 2, that ϕ_j rises with γ_j is immediate. Recall that this case is depicted in Figure 4b where wages are set to $W + c$ for all sectors in which $\phi_j > 0$. Since wages are constant, from direct inspection of (4), it is clear that ϕ_j rises with γ_j . Case 1 is more complicated as w_j now varies with γ_j. For this case, ϕ_j is increasing in γ_j if and only if $\gamma_j w_j$ is increasing in γ_j. Define the variable $x_j \equiv w_j\gamma_j$, then the equation implicitly defining w_j^* (6) becomes:

$$\left(\frac{R}{x_j} - \frac{1}{\gamma_j}\right)\left(\frac{1}{N-1}\left(\frac{c}{x_j}\right)^{\frac{N}{N-1}}\right) = 1$$

one can easily check that the LHS is decreasing in x_j and increasing in γ_j. This implies from (4) that $\frac{d\phi_j}{d\gamma_j} > 0$ here as well. Consequently, in both cases, economy wide increases in competition increase discretionary effort.■

Proof of Corollary (Cross-Section Prediction)

Clearly, in both cases, $\phi_j = 0$ below the respective threshold and is independent of γ_j. We have shown in the previous proposition that $\frac{d\phi_j}{d\gamma_j} > 0$ beyond a threshold in both cases.■

Table 1: Effects of Bank Branching Deregulation on Trust

Dependent Variable:	First-Stage Log(New Incorporations)			Reduced Form Can Trust		
	(1)	(2)	(3)	(4)	(5)	(6)
Post-interstate deregulation	-0.044	-	-0.029	-0.032	-	-0.014
	(0.051)		(0.030)	(0.014)**		(0.014)
Years since interstate deregulation	0.052	-	0.041	0.017	-	0.008
	(0.025)**		(0.018)**	(0.007)**		(0.07)
Post-intrastate deregulation	-	-0.036	-0.041	-	-0.018	-0.030
		(0.037)	(0.043)		(0.013)	(0.016)*
Years since intrastate deregulation	-	0.045	0.033	-	0.009	0.012
		(0.018)***	(0.019)*		(0.005)*	(0.008)
Impact after 10 years:	0.487	0.409	0.672	0.136	0.076	0.166
	[0.034]**	[0.086]*	(0.028)**	[0.029]**	[0.134]	[0.028]**
Individual Controls	Yes	Yes	Yes	Yes	Yes	Yes
Time Effects	Yes	Yes	Yes	Yes	Yes	Yes
State Fixed Effects	Yes	Yes	Yes	Yes	Yes	Yes
State-specific Time Trends	Yes	Yes	Yes	Yes	Yes	Yes
Observations	18960	18960	18960	18960	18960	18960

*** -Significant (1% level); **-Significant (5% level); *-Significant (10% level).

Robust standard errors clustered at the state level in parenthesis. Each column reports the estimate(s) from a regression using data on 40 states for the 1973-1994 period. Individual controls are a quadratic polynomial of age, indicators for completed high school and college education, population size of city/town of respondent, and a full set of dummies for race and marital status.

Table 2: Effects of Firm Entry on Trust: OLS and 2SLS

	Dependent Variable: Trust Indicator				
	OLS	2SLS			
	(1)	(2)	(3)	(4)	(5)
Log(New Incorporations per capita)	0.010	0.382	0.216	0.256	0.208
	(0.040)	(0.275)	(0.145)	(0.127)**	(0.117)*
	-	[0.025]**	[0.168]	[0.005]***	[0.078]*
Instruments					
Post-interstate deregulation	-	Yes	-	Yes	-
Years since interstate deregulation	-	Yes	-	Yes	Yes
Post-intrastate deregulation	-	No	Yes	Yes	-
Years since intrastate deregulation	-	No	Yes	Yes	Yes
Anderson-Rubin 95% CI†:	-	(0.035, 5.000)	(-0.100, 4.985)	(0.065, 2.005)	(-0.026,1.410)
F-Test of Excluded Instruments‡:	-	2.25	3.49	3.20	4.49
		[0.010]*	[0.031]**	[0.012]**	[0.011]**
Overidentification Test:	-	0.56	0.16	0.55	0.07
		[0.574]	[0.701]	[0.703]	[0.934]
Individual Controls	Yes	Yes	Yes	Yes	Yes
Time Effects	Yes	Yes	Yes	Yes	Yes
State Fixed Effects	Yes	Yes	Yes	Yes	Yes
State-specific Time Trends	Yes	Yes	Yes	Yes	Yes
Observations	18960	18960	18960	18960	18960

*** -Significant (1% level); **-Significant (5% level); *-Significant (10% level).

Robust standard errors clustered at the state level in parenthesis. P-Values based on a heteroskedascity-robust and state-level clustered version of the Anderson-Rubin statistic (Chernozhukov and Hansen, 2007) in brackets. Each column reports the estimate of the coefficient of log (new incorporations) on a dummy variable indicating if the respondent trusts from a regression using data on 40 states for the 1973-1994 period. Individual controls are a quadratic polynomial of age, indicators for completed high school and college education, population size of city/town of respondent, and a full set of dummies for race and marital status.

† Confidence intervals for the coefficient of log(new incorporations) based on the inversion of a heteroskedascity-robust and state-level clustered version of the Anderson-Rubin statistic (Chernozhukov and Hansen, 2007).

Table 3: Effects of Sectoral Concentration on Trust

	Dependent Variable: Trust Indicator							
	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)
Comp50		0.191	0.191	0.213	0.208	0.187	0.161	0.187
		(0.073)***	(0.073)***	(0.079)***	(0.079)***	(0.072)***	(0.078)**	(0.086)**
Education	0.025	0.026	0.026	0.026	0.026	0.026	0.022	0.021
	(0.008)***	(0.008)***	(0.008)***	(0.008)***	(0.008)***	(0.007)***	(0.009)**	(0.01)**
Age	-0.011	-0.010	-0.010	-0.011	-0.010	-0.011	-0.014	-0.017
	(0.007)	(0.007)	(0.007)	(0.007)	(0.007)	(0.007)	(0.007)**	(0.007)**
Age Squared/100	0.014	0.013	0.013	0.014	0.013	0.015	0.019	0.02
	(0.007)*	(0.007)*	(0.007)*	(0.007)*	(0.007)*	(0.007)**	(0.006)***	(0.006)***
Job Security			-0.003		-0.031			-0.056
			(0.041)		(0.051)			(0.061)
Union					-0.103			-0.102
					(0.108)			(0.109)
Arguments					-0.180			-0.137
					(0.077)**			(0.079)*
Skip Work					0.242			0.157
					(0.132)*			(0.129)
Supervisor						-0.036		-0.085
						(0.073)		(0.076)
More Good							-0.066	-0.087
							(0.061)	(0.062)
Optimism							0.006	0.025
							(0.058)	(0.051)
Workplace Size Dummies				Yes	Yes			Yes
Other Workplace Covariates					Yes			Yes
Observations	614	614	614	614	614	614	532	532
R2	0.195	0.202	0.202	0.207	0.236	0.207	0.226	0.269

*** -Significant (1% level); **-Significant (5% level); *-Significant (10% level).

Robust standard errors clustered at the industry level in parenthesis. The dependent variable is a dummy indicator if the respondent can trust. All specifications include income, gender, race, ethnicity, marital status, and religion dummies as well as city size (see text for details).

Table 4: Effects of Concentration on Trust by Experience

	Dependent Variable: Trust Indicator						
	(1)	(2)	(3)	(4)	(5)	(6)	(7)
Comp50	-0.076	-0.076	-0.061	-0.060	-0.090	-0.097	-0.071
	(0.149)	(0.149)	(0.146)	(0.152)	(0.149)	(0.155)	(0.156)
Comp50*Experience	0.009	0.009	0.009	0.009	0.010	0.009	0.009
	(0.005)**	(0.005)**	(0.005)**	(0.005)*	(0.005)**	(0.005)*	(0.005)*
Education	0.031	0.031	0.032	0.031	0.032	0.028	0.027
	(0.008)***	(0.008)***	(0.008)***	(0.009)***	(0.008)***	(0.009)***	(0.011)**
Age	-0.019	-0.019	-0.020	-0.020	-0.021	-0.025	-0.025
	(0.009)**	(0.009)**	(0.009)**	(0.009)**	(0.009)**	(0.009)***	(0.008)***
Age Squared/100	0.017	0.017	0.018	0.017	0.019	0.023	0.024
	(0.007)**	(0.008)**	(0.008)**	(0.007)**	(0.007)***	(0.007)***	(0.007)***
Job Security		0.004		-0.024			-0.054
		(0.042)		(0.051)			(0.061)
Union				-0.105			-0.115
				(0.108)			(0.109)
Arguments				-0.169			-0.128
				(0.074)**			(0.077)*
Skip Work				0.236			0.157
				(0.131)*			(0.129)
Supervisor					-0.041		
					(0.073)		
More Good						-0.070	-0.089
						(0.063)	(0.062)
Optimism						0.006	0.024
						(0.057)	(0.05)
Workplace Size Dummies			Yes	Yes			Yes
Other Workplace Covariates				Yes			Yes
Observations	612	612	612	612	612	530	530
R2	0.212	0.212	0.217	0.245	0.217	0.236	0.272

*** -Significant (1% level); **-Significant (5% level); *-Significant (10% level).

Robust standard errors clustered at the industry level in parenthesis. The dependent variable is a dummy indicator if the respondent can trust. All specifications include income, gender, race, ethnicity, marital status, and religion dummies as well as city size (see text for details).

Table 5: Nonlinear Regression of Concentration on Trust

	Dependent Variable: Trust Indicator		
	(1)	(2)	(3)
Low Comp50	-0.046		-0.178
	(0.049)		(0.113)
Medium Comp50	0.182		0.059
	(0.062)***		(0.11)
High Comp50	0.137		-0.006
	(0.055)**		(0.103)
Very High Comp50	0.087		-0.114
	(0.05)*		(0.106)
Low Comp50*Experience		-0.0004	0.004
		(0.002)	(0.004)
Medium Comp50*Experience		0.006	0.004
		(0.002)***	(0.003)
High Comp50*Experience		0.005	0.005
		(0.002)***	(0.003)
Very High Comp50*Experience		0.004	0.007
		(0.002)***	(0.004)**
Education	0.025	0.028	0.028
	(0.008)***	(0.007)***	(0.008)***
Age	-0.009	-0.015	-0.017
	(0.007)	(0.007)**	(0.008)**
Age Squared/100	0.013	0.016	0.016
	(0.007)*	(0.007)**	(0.007)**
Observations	614	612	612
R2	0.22	0.223	0.23

*** -Significant (1% level); **-Significant (5% level); *-Significant (10% level).

Robust standard errors clustered at the industry level in parenthesis. The dependent variable is a dummy indicator if the respondent can trust. All specifications include income, gender, race, ethnicity, marital status, and religion dummies as well as city size (see text for details).

Figure 1a: Firm Entry, Trust, and Timing of Interstate Bank Deregulation

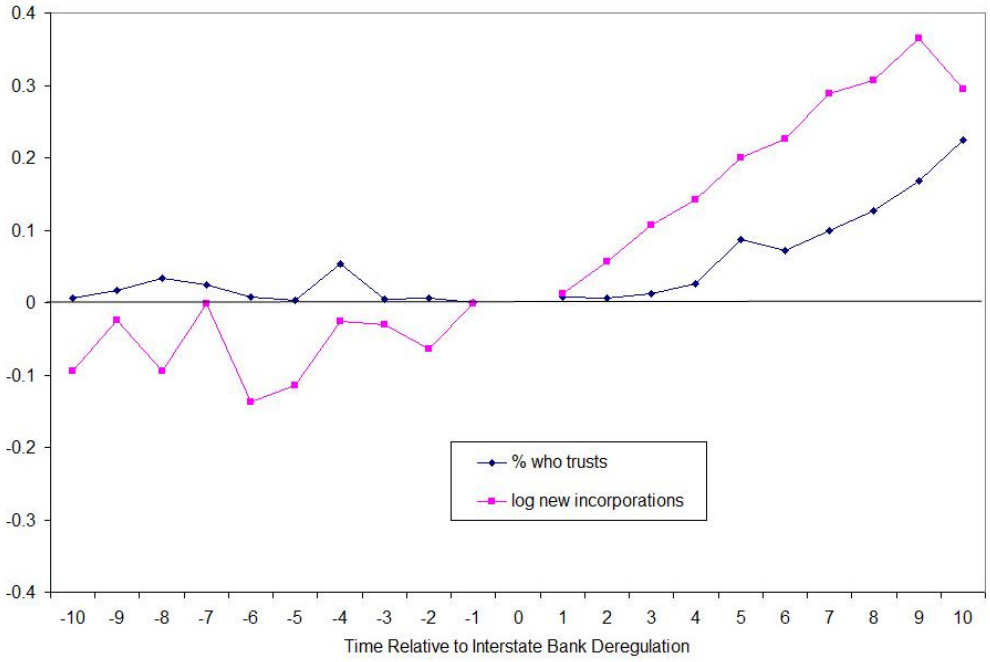

Figure 1b: Firm Entry, Trust, and Timing of Intrastate Bank Deregulation

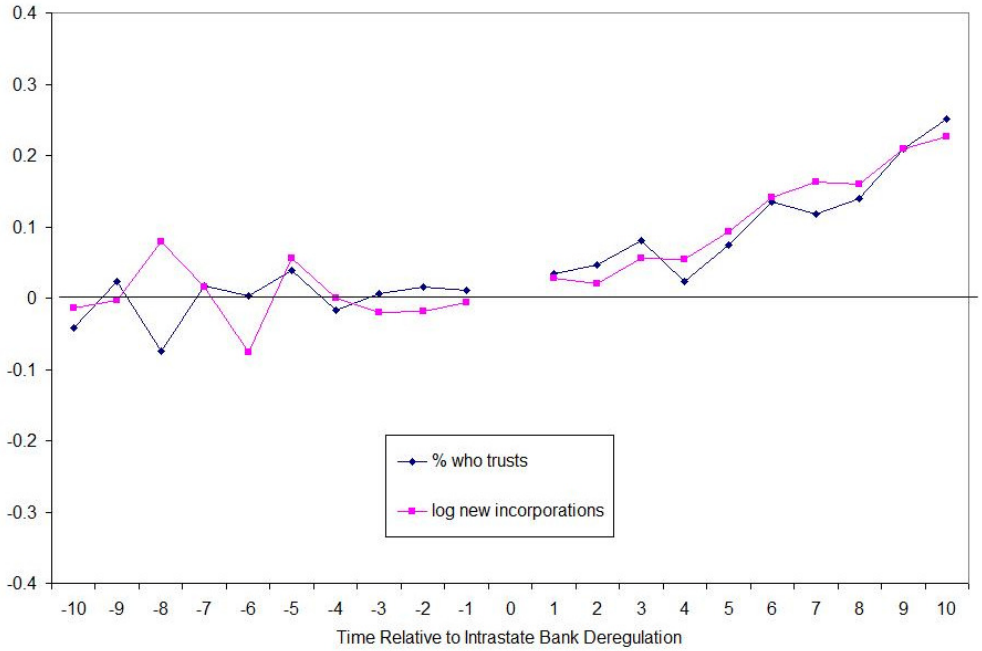

Figure 2a: Wages and Competition (Case 1)

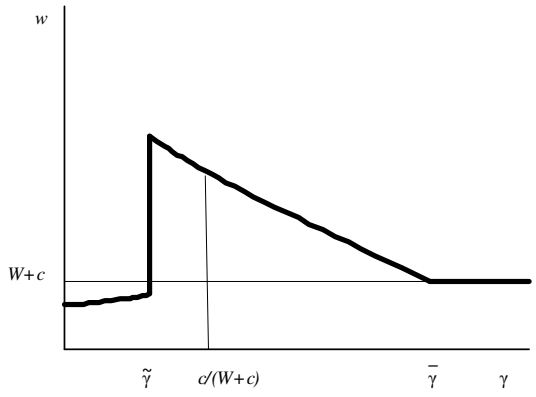

Figure 2b: Wages and Competition (Case 2)

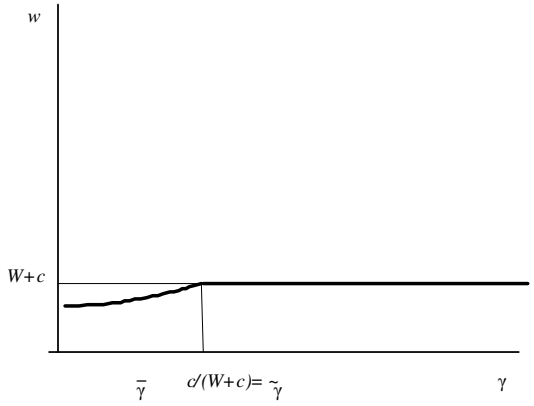

Figure 3: Fractional Polynomial Regression: Residual Trust and Sectoral Concentration