Doux Commerces: Does Market Competition Cause Trust?

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Abstract: This paper explores the relationship between market competition and cooperative behavior. We show that there is a strong positive relationship between a proxy for cooperation, individual trust levels, and the competititiveness of the sector in which a respondent works. This correlation is robust to the inclusion of all of the previously studied determinants of individual trust, e.g., income, education, age, sex, marital status, city size, religion, and is large; a one standard deviation increase in sectoral competitiveness makes respondents between ten and twenty five percent more likely to answer the canonical trust question with a "usually trust" as opposed to a "usually don't trust" response. The addition of a rich set of workplace module controls shows that this correlation is not likely to be driven by the size of the workplace, the amount of supervision, or measures of corporate culture. It also appears that it is not due to selection (i.e., trustworthy or trusting individuals selecting into competitive sectors) but instead seems to be due to individuals becoming more trustworthy the longer their experience in competitive sectors. We develop a simple model of cultural evolution to explain these findings. Cultural selection is between free-riding and trustworthiness, and sectoral level competition imposes additional costs to free-riding. Given firm performance, individuals always have incentive to free-ride. But since this can lead to poor firm performance, and firms in competitive sectors are more liable to be subject to market discipline, this generates a force selecting against free-riding. The model's unique equilibrium distribution of trustworthiness correlates positively with sectoral competitiveness, displays a threshold effect, suggests a non-monotonic relationship between competition and job security and predicts patterns for a set of interactions with competition. We return to the data and show that it displays a high degree of consistency with these predictions.

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"it is almost a general rule that wherever manners are gentle (moeurs douces) there is commerce, and wherever there is commerce, manners are gentle" Montesquieu (1749, cited in Hirschman 1982)

1 Introduction

For at least two hundred years social scientists have conjectured a relationship between market competition and cooperative behavior, both positive and negative, but relatively little evidence has been brought to bear on the issue. We first show that, for at least one widely used measure, a solid relationship exists. The United States General Social Survey (GSS) has asked a trust question on an annual basis for over thirty years. The question is: "In general, would you say that individuals can be trusted, or that you can't be too careful in dealing with people." The answer to this question is known to be predicted by individual characteristics such as income, education, age, sex, city-size and marital status.[2] Answers have also been shown to correlate with actions in strategic situations where monetary rewards are at stake.[3] The GSS also identifies the sector in which respondents work. By taking the 2004 wave of the GSS, we match these sectors to a measure of competition obtained from the 2002 wave of the US census survey of firms.[4] The census reports a type of concentration measure derived from sectoral sales' shares for each sector. From this, we construct two proxies for competition, each of which show a statistically significant and robust correlation with a positive answer to the trust question. This correlation is robust to the inclusion of controls for the measures that have been previously shown to predict trust, and is large: a one standard deviation increase in the competition measure is correlated with an approximately twenty percent increase in the probability that a respondent usually trusts individuals.

To further explore the mechanism of effect, we exploit the extremely detailed "Workplace Environment" module of the 2004 wave of the GSS which is focused specifically on the respondent's workplace. By doing so we find that the correlation is not arising because more competitive sectors have smaller workplaces, or high unionization rates, or more intense supervision in competitive sectors. It is also not arising in particularly congenial workplaces – as would be consistent with a corporate culture explanation.[5]

Is this relationship due to selection of trustworthy or trusting individuals into competitive sectors, or to the development of such traits through sectoral exposure? We find evidence for the latter. Individuals with low levels of experience exhibit no impact of sectoral competitiveness on reported trust, however, higher levels of experience interacted with working in a competitive sector are a strong predictor of reported trust.

[2] See Alesina and Ferrara (2002). Tabellini (2007) argues that the answers to this trust question are also likely to reflect the breadth of an individual's moral responsibility, and hence likely to affect the functioning of societal institutions.

[3] See Glaeser et. al. (2000) for a detailed study.

[4] http://www.census.gov/epcd/www/concentration.html

[5] Though variables that proxy for a poor corporate culture – the stresfulness of the work environment, the unreliability of coworkers in times of need, the existences of heated arguments in the workplace – have a significant and robust adverse effect on reported trust levels, the inclusion of these variables impacts on neither the size nor significance of the competition variable.

We next turn to explaining this correlation. Most work on the relationship between market competition and trust has predicted the opposite to what we observe. A survey by Bowles (1998) rehearses the main arguments in this literature: competition limits the possibility of repeated interaction; anonymity – a factor also thought to characterize atomistic competitive markets – doesn't allow reputations to be gained; the time and familiarity required to build trust is limited by the churning that characterizes competitive markets. Previous literature thus tends to suggest that the canonical anonymous, atomistic, competitive market is ill-suited to developing pro-social behavior, and thus unlikely to engender trust.[6]

But previous analyses of the role of competition in affecting behaviour have been concerned with the impact of increased competition amongst traders on the attitudes of traders themselves. Instead, as is consistent with the correlation we document, we study the impact of competition *across* firms on trust levels of agents *within* firms. Why should this matter? We hypothesize a relationship along the following lines that is derived from the logic of cultural selection acting across groups. Workers are joined together in groups, in which free-riding is always possible, and always beneficial for the individual. Conditional upon group performance, since free-riders save on effort, they do better than those who contribute costly effort. This creates a force favoring selection of free-riders. However, groups with more free-riders tend to under-perform, which affects all group members adversely. In sectors where groups (or firms, which are our unit of observation) are engaged in more intense competition, the punishment for under-performance is greater. Thus the group competition effect provides a force selecting against free-riders, and this force is stronger the stronger is sectoral level competition. Consequently, we show that, in equilibrium, more competitive sectors have lower levels of free-riding and hence higher levels of trust.[7] The model also predicts a nonlinearity in the relationship between competition and trust. Specifically, the effect of competition on trust should only occur for sufficiently high levels of competition. Intuitively, there is always a force favoring free-riding. This must be overcome by the competitive forces across firms in order to generate positive trust levels. When competition is too low, there is no trust, and below this threshold there is essentially no relationship between competition and trust. The model predicts that only above such a threshold should competition affect trust.

We return back to the data to explore the shape of the relationship between competition and trust. We do this by discretizing the competition measure and also plotting a non-parametric relationship between the residuals obtained from trust and competition measures after controlling for the other determinants. The overall positive relationship between competition and trust seems non-linear in its effects. At low levels of

[6] Bowles (1998) elaborates further on this literature, and also points to some of the caveats to these arguments and the empirical evidence – largely gleaned from experiments – in support.

[7] Henrich (2004) argues for a type of group based selection. The trait that we model as trustworthiness in what follows fits his schema very closely. Using Henrich (2004)'s terminology, ours is an example of a model of "genetic group selection". In equilibrium, 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 model's of "group selection" in the social sciences, and provides some context and comparison with their use in genetics and biology.

competition the relationship is essentially flat, and becomes positive only beyond a threshold, as is consistent with the model. The model also generates a rich set of additional predictions, some of which we are further able to explore in the data. We document a good degree of consistency between these predictions and the patterns displayed in the data.

Relationship to previous literature

By exploring the economic determinants of trust, we are examining a contrasting side of the trust phenomenon to that which has been the focus of much recent work. A number of recent studies have used the same trust question and compared answers of GSS respondents with those of the country of origin of their ancestors, obtained from the World Values Survey. These studies find that trust shows considerable cross-generational persistence. Controlling for many of the cross-sectional determinants of trust, individual levels are predicted by average trust levels in their parents' countries of origin; Fernandez (2007) , Guiso et al. (2006) and Algan and Cahuc (2006, 2007) among others.

While not denying the importance of the past, it is also clear that trust is not wholly determined by the distant past. For example, education has long been known to correlate with reported trust levels. In fact, in all of these studies listed above, the likelihood of trust itself being determined by one of: economic outcome variables, governance, or other institutions, has motivated the search for instruments, or exogenous sources of variation, so that causal relationships can be estimated.[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 (for which there seems to be strong evidence), we are interested in a relatively immediate impact of an economic factor on these same attitudes.

One reason to be interested in such a higher frequency source of impact is that, if it exists, it suggests an important avenue for policy. Accordingly, our findings temper against a type of policy nihilism that arises when cultural or attitudinal variables correlate with economic outcomes. When such attitudes or cultures are seen as deep immutable parameters of individual preferences there is little that can be done to affect outcomes through these channels.[9] However, as the findings here suggest, when such cultural variables are influenced by elements of the economic or institutional environment, it is possible for these to be directly influenced by policy, and thereby for policy aimed at culture to work.

This stance also implies a slightly different focus in our theoretical work to that which has formed the basis of most work on cultural evolution in economics. Our starting point is that, although individuals may bring differing core values with them upon entry to the labor force, they are moulded by their places of work. Previous models of cultural evolution, which primarily hinge on parent-to-child values transmission

[8] For example, Tabellini (2007) 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] This can be one interpretation of the inter-generational stability of trust attitudes as reported in the studies we reference above.

such as Bisin and Verdier (2001), are not the natural place to start to examine the effect of the workplace.[10] 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 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.

Since the focus of our model is explaining our findings in the GSS, where selection does not seem to play a big role, we abstract from issues arising due to parents inculcating their children to different behaviours. In the model that we develop individuals arrive in a sector with their type unformed. They have the possibility of acting in different ways, and the environment in which they work selects among those ways. We assume this happens in a rational and payoff directed way. Individuals consider the expected net lifetime gains to acting in a trustworthy versus a non-trustworthy manner in that sector. When the gains to being trustworthy are higher (lower), they are more (less) likely to be trustworthy. Once their attitude is in place, i.e., "trustworthiness" or its converse which we call "free-riding", it has persistence. While this shares many features of the other models of cultural evolution, a difference is that selection here is entirely driven by future economic rewards. To make this distinction stark, the attitudes of one's parents play no role in trait selection in our framework.

Our findings relate to a debate, dating back at least as far as Montesquieu, that centred around the question of whether markets "civilize"; encourage altruism, generosity and trustworthiness, or "debase"; lead to greed and narrowly pursued self interest. Eighteenth century thinkers, starting with Montesquieu, argued the former, Schumpeter, Marx and other nineteenth century writers argued the opposite. Hirschman (1982) contends that twentieth century work tended to ignore the whole question, leading to the conclusion that markets are largely irrelevant to the development of such traits. Our results weigh in strongly in favor of the eighteenth century thinkers, like Montesquieu cited earlier.

This has not generally been the case in experimental settings where competition has been studied. Experimental economists have explored the role of market setting on subject behavior in laboratory contexts. Roth et. al (1991) compare what they term "market" and "bargaining" outcomes in four societies. Markets, which are characterized by multiple buyers, and bargaining situations are interactions between a single buyer and seller. The experiments are designed to have distributionally extreme equilibria that allow all of the surplus to the seller. In the experiment, market interactions quickly converged to this distributional extreme, but this did not occur in the bargaining interactions. Bowles (1998) summarizes these studies and others in

[10] 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.

the earlier experimental literature:

> "The experimental results might be summarized by saying that the more the experimental situation approximates a competitive (and complete contracts) market with many anonymous buyers and sellers, the less other-regarding behavior will be observed." p.89

Recent experimental results are more mixed. Huck Lunser and Tyran (2007) study the effects of increased competition amongst sellers with an ability to build reputations for experience goods. The possibility of punishing sellers by shopping elsewhere increases trust in sellers (particularized trust) But in a similar environment Brandts Riedl and van Winden (2006) find increased competition has little positive effect.

A number of papers share a related interest to ours here in exploring the effects of policy on beliefs and norms of cooperation.[11] Aghion, Algan and Cahuc (2008) argue that government minimum wage policies can undermine the ability of firms and workers to learn about each others' cooperative attitudes, and that low cooperation in turn creates a demand for wage policies. They show that such interactions can precipitate both good (high trust, high unionization and low regulation) and bad equilibria. The model's patterns are shown to be consistent with cross-country patterns in these variables. Relatedly, Aghion, Algan, Cahuc and Shleifer (2008) show that government regulation is strongly negatively correlated with social capital. They explain this with a model in which economies converge to one of two types of equilibria: individuals do not invest in civic attitudes, create negative externalities in their business dealings, and demand high regulation of business actions, or they invest, impose fewer negative externalities, and regulation demand is low. A similar finding of substitutability between centralized government regulation of an activity and civic attitudes that would support it is studied in the case of trust and decentralized investment decisions by Carlin,Viswanathan and Dorobantu (2007). All of these papers are related to Alesina and Angeletos (2005) who showed a two way causation between policies and beliefs, in their case it was between the size of government, ensuing corruption levels and beliefs about what sort of corruption and rent-seeking levels are fair.

Laporta, Lopez, Shleifer, Vishny (2003) 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. A number of cross-country studies have explored the role of trust (amongst other attitudinal variables), as measured in the WVS, for growth and economic outcomes more generally across large groups of countries, Knack and Keefer (1997), and within the regions of Europe, Tabellini (2007) and Beugelsdijk and van Schaik (2005). In primitive societies, a related correlation to that found here is reported in a series of papers by Henrich et. al. (2001).

[11] Although competitiveness, and not competition policy, is the factor we measure, it is clear that if it can be established that competitiveness of a sector affects attitudes, it is a small step to then showing that competition policy also does so.

Market integration leads to higher average offers in the ultimatum game played in these societies. Though the contexts are very different, it is possible that similar forces are at work. We discuss these further, and in relation to our results, in the concluding discussion of this paper.

The advantage of cross-country studies is the possibility of exploring correlations to larger scale societal variables, which we cannot do with the GSS. Accordingly, two previous studies have examined the effect of competition on trust using cross-country survey data. The first, by Fischer (2007), using the same 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 has a larger impact on trust in competitive environments. But given the way that markets and competition are measured in that study, it is not clear that there is a direct relationship to the findings presented here. A more directly related study is Francois (2008). He also considers a country level measure of trust from the World Values' Survey trust question, and shows that it is positively correlated with country level measures of competition obtained from the World Economic Forum's annual surveys of executive perception. By instrumenting for competition using country level demographic information, he demonstrates a strong causal relationship from competition to trust. A key role in his explanation is institutional differences across countries that are both determinants of, and simultaneously affected by trust levels. Given that all respondents to the GSS are likely to be in similar institutional settings, his explanation for the cross-country finding cannot account for the effect of sectoral competition differences on trust reported here.

Finally Glaeser (2000) and Alesina and La Ferrara (2003) 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 will carry throughout the analysis. 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 neibourhood effects. They documented such effects on trust arising from equality and heterogeneity and showed that homogeneity can be an important determinant of trust.

No previous study has examined the effect of competition on trust using micro data. Our matching of competition data from the census of firms to the General Social Survey is, to our knowledge, the first such attempt to do so.

The Paper proceeds as follows. Section 2 establishes the basic relationship between trust and competitiveness using the GSS and census data sources, and controlling for the usual determinants and an extended set of controls. It also explores experience interactions. Section 3 develops a model to explain this relationship and extracts a set of additional implications from the model that can be empirically scrutinized. Section 4

[12] Though, somewhat surprisingly, he 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.

returns to the data to examine these predictions. Section 5 concludes, discusses the results obtained here in reference to the current literature, and suggests future directions of research.

2 The Relationship between Trust and Competitiveness using the GSS

Summary

This section is organized as follows. Firstly, we describe the data, specifically the trust question, and its four-fold response category that was used for the extended module of the 2004 GSS sample. We also detail the construction of our competition measure from the 2002 census. We then show that our constructed sectoral competition measure is positively correlated with reported trust, and that this correlation persists in the presence of previously known determinants of trust; income, education, city size, sex, age, religion, and it is also unaffected by including race, self-reported ethnicity and occupational dummies.

We then add all of the additional variables that utilize the rich workplace information obtained in the 2004 wave of the GSS. Some of these also strongly correlate with trust, but neither the magnitude nor significance of the competition effect is diminished with the inclusion of these variables. We explore the possibility of selection (i.e., high trust individuals congregating in high competition sectors) causing these results. We do this by introducing an interaction term between experience and competition. The interaction term is positive and highly significant, moreover introducing this term makes the direct competition term insignificant. This suggests that sectoral effects take time to surface, which we interpret as evidence against the selection hypothesis. Finally, by utilizing information on supervision activity, we show that this effect does not seem to be due to supervision being higher in competitive sectors.

Data Description

We use the 2004 wave of the US General Social Survey, in order to exploit its uniquely detailed workplace information. The survey was first implemented in 1973, and at least every other year since then. Since 1994 there have been two samples in even numbered years with a target sample of 1500 each. The survey is asked of one adult per household and the sampling reflects regional population densities.[13] The dependent variable of interest is "Can Trust" which is a 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?" There are four categories of response: 1 ALWAYS TRUSTED, 2 USUALLY TRUSTED, 3 USUALLY NOT TRUSTED, 4 ALWAYS NOT TRUSTED. The unconditional distribution of responses is depicted in Figure 1. Most waves of the General Social Survey have not included a four-fold response category. Instead, they allow either "yes" "no" responses to the same trust question as asked above.[14]

[13] 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 upto 2006.

[14] As a check on our results we shall also report results obtained when the trust responses are coded into binary categories as

[Insert Figure 1]

The literature on trust has established a set of individual characteristics to be used as explanatory variables. The other variables that we include are those that have been previously shown to predict trust: Income, which is a categorical variable with 24 categories; Education, measured in years of completed schooling; Age, Marital status; Sex; and City size.[15] 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 data appendix. Table 1 a reports the sample means and standard deviations for each of these variables.

[Insert Table 1a]

The Competition Measure

We match individual sector of employment with a sectoral measure of competition. Every five years, the census office 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.[16] 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. It is possible to check the robustness of results here on the smaller sample of manufacturing firms using this measure, but for the main results we persist with the percentage of sales measures.

Since the GSS reports sector, or industry, 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 leads to the loss of some observations as industry classification systems change.

Once a NAICS measure is obtained for each household observation it is matched with the census percentage sales measures. We do this for the largest and smallest census measures, i.e., $n = 4$ and $n = 50$. The final variables, which are our measures of competition, "Comp4" and "Comp50" are computed by subtracting the respective concentration measures from 100. Thus Comp4 for sector x is the percentage of total sales in x that is NOT covered by the largest 4 firms in that sector; similarly for Comp50. A higher measure for each of these variables corresponds to a more competitive sector.

well. In addition to presenting results for the categorical variables in the four-fold category, we shall present results obtained when "usually trusted" and "always trusted" are collapsed to variable set to yes=1, and "usually not trusted" and "always not trusted" are collapsed to no=0.

[15] 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 (2003) analyze a richer set of regional measures than we do, and connect these to regional income Ginis and fragmentation measures.

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

The average sector in our sample has measures of 82.65 for Comp4 and 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", with Comp4 = 92.9 and Comp50 = 87. A particularly uncompetitive sector is NAICS # 31132 "Chocolate and Confectionery Manufacturing from Cacao Beans", with Comp4 = 31.0 and Comp50 = 1.2. Figures 2a and 2b plot the distribution of Comp50 and Comp4 respectively, and Table 1b reports sectoral averages for highly aggregated sectoral constructs.[17] In general, most services are more competitive than both manufacturing and retailing.

[Insert Figures 2a and b]

[Insert Table 1b]

Estimation Procedure

In order to explore the impact of competition on trust we run regressions of the following form:

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

where we use both $x = 4$ and $x = 50$ in different estimations, and where $\widetilde{Z}$ is a vector of independent variables. The vector $\widetilde{\beta}$ corresponds to their coefficients.

We first show that the data conform to the usual patterns seen when trust is regressed on individual characteristics. Table 2 reports regressions with the trust dependent variable run on the usual set of individual regressors without the inclusion of any competition measures. Household income, years of education and being male all positively correlate with reporting a higher level of trust, while being black relative to the omitted racial category (other) negatively predicts trust. The regressions reported here also included ethnicity and marital status dummies, none of which were significant predictors of trust, and which are not reported in the table.

[Insert Table 2]

The difference across the columns of the table is as follows. Columns 1 and 2 do not include occupation dummies, columns 3 and 4 do include occupation dummies, and columns 5 and 6 include occupation dummies and age dummies instead of age as a continuous variable. The effects of income, education and gender are not significantly different across these specifications. For each set of regressors, the odd columns report the results from a probit estimation on trust treated as a binary variable. 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 corresponds to the usual formulation of the trust question in most

[17] There are almost 200 different sectors reported by respondents in the full sample. The numbers in Table 1b correspond to two digit NAICS sectoral classification numbers.

surveys (both previous rounds of the GSS, and usual rounds of the World Values' Survey). Additionally, we report multinomial logit results in the even columns of this table. Multinomial logit estimates the impact of each member of the set of regressors on each response possibility, in reference to an omitted category. The omitted category that will be used throughout the paper is "usually don't trust", and the category of comparison reported is "Usually Trust". Since over 85% of the sample falls within these two categories, this is the most interesting margin to report. Results for transitions across other categories are not reported.

It is conceptually possible to run an ordered logit specification instead, and we have done this, but a Brant test of this specification rejects the parallel regressors assumption which is 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 extremely 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.

Table 3 adds the sectoral competitiveness variables to the baseline set of regressors. It repeats the specifications for the first two columns in Table 2 which do not include occupation dummies. The competition variables are added separately for each regression Comp50 in columns 1 (probit) and 2 (multinomial logit), and Comp4 in columns 3 (probit) and 4 (multinomial logit). In each regression reported here, and in all throughout the paper that include the sectoral competition variables, errors are clustered at the sectoral level. The table shows that Comp50 is more strongly significant than Comp4 in all estimations. The estimate for Comp50 is larger in the multinomial specification where it describes the impact on answering "usually trust" as opposed to "usually don't trust" (coefficient of .009, significant at the 1% level), than it is on the binary trust variable (coefficient of .004, significant at the 5% level). A coefficient of .009 implies that a 1% increase in the competitiveness of the sector in which the respondent works increases the likelihood of the respondent answering "usually trust" as opposed to "usually don't trust" by about 1%. A standard deviation increase in the respondent's sector's Comp50 measure thus implies about a 25% increase in the probability of the respondent answering "usually trust" as opposed to "usually don't trust" in response to the trust question. Similarly, a coefficient of .004 suggests that the probability of answering yes to the trust question treated as a binary variable is increased by about one half of one percentage point if one's sector has a one percentage point increase in the competition variable; suggesting an approximately 12% increase in answering "yes" as opposed to "no" to the binary trust question . Though the point estimates are similar for Comp4 its significance is marginal. It is just significant in the logit specification at the 10% level, but not in the probit. The standard deviation in Comp4 is smaller at approximately 17%. The other regressors enter in a similar direction to the previous table: income and schooling remain significant determinants of trust, however being

male or black are no longer significant once sectoral competitiveness measures are included. Now, city size negatively effects trust and the coefficient on being Jewish also enters significantly negatively in the logit specifications, although it is barely significant at the 10% level. Ethnicity and marital status dummies remain insignificant.

[Insert Table 3]

Table 4 reports results from regressions which all include Comp50 as a regressor, for reduced sets of controls, that are sequentially increased. It can be seen from that table in both the binary trust case (Panel A) and the Usually Trust versus Usually Don't Trust case (Panel B) that the simple correlation between Trust and Comp50 is not significant. However, once controlling for income in the Usually Trust v. Usually Don't Trust case, and Income, Schooling, Sex and Age in the Binary Trust case, Comp50 becomes significant. As can be seen by the increase in magnitude and significance with the addition of the usual controls, the Comp50 variable seem to be operating through a channel that is either orthogonal to, or slightly negatively correlated with the usual ones that determine trust.

[Insert Table 4]

Table 5 runs similar regressions to those in Table 3, but now includes categorical age dummies instead of age as a continuous variable in all eight columns. Once again, for each differing specification there are four separate regressions, the first 4 columns report regressions that do not include occupation dummies, while the last four include occupation dummies. Comp50 and Comp4 are each separately estimated on trust collapsed to a binary variable in the odd numbered columns. The dependent variable "usually trust" versus "usually don't trust" is reported in the even columns.

The addition of these extra controls reiterates the story told in Table 3. Comp50 is highly significant in all specifications. Comp4 is marginal in significance. The point estimates for both measures remain about the same (around .005 in the binary specifications of the dependent variable, and around .010 in the Usually Trust versus Usually Don't Trust specification). In some specifications, a reported "Anglo" ethnicity (relative to the omitted category which is Southern European) is correlated with trust, and it is also the case that being Jewish again negatively affects trust (at the 10% level).

[Insert Table 5]

Additional Workplace Variables

The advantage of using the 2004 wave of the General Social Survey is that this wave added a module that asked a rich set of workplace related questions. These are briefly described in Table 6 with details (means, standard deviations, response categories) elaborated in the appendix. With the exception of the

unionization variable, these variables are based on a question with a pre-statement by the interviewer which was "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." Most variables in the table are directly concerned with exploring the respondent's perceptions of the congeniality of 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.

[Insert Table 6]

Table 7 reports the relationship between the same sets of variables used before and trust, after the addition of these extra workplace variables. The first four columns report results when all of the additional workplace module variables are added. The first thing to note is that for both measures of competition, the picture that emerged previously persists largely unchanged, though the addition of these variables has reduced the role of household income to insignificance. The statistical significance of both competition measures for all specifications also rises despite the fact that the sample size falls by more than a third with the addition of the workplace module questions, since this module was not asked of all respondents. The magnitude of Comp50's effect is increased, (.0068 and .0154 for the full set of regressors in the Multinomial Logit estimation and the Probit estimations respectively) and it is still significant at the 1% level. Comp4 is also increased (.070 and .0173 for the multinomial logit and probit estimations respectively) and it is now of greater statistical significance.

[Insert Table 7]

We have run similar regressions for multiple combinations of these additional variables, and both competition measures always enters significantly. Of these additional workplace variables, the three that usually enter significantly are: "Helpful", "Work Stressful" and "Heated Arguments". The others workplace variables are rarely significant. These variables all enter in intuitive ways, namely individuals are more likely to trust when they perceive their work colleagues will help when they are in need, when the workplace is NOT stressful, and when heated arguments rarely occur in their workplace. The final four columns report results for both competition variables under both specifications when just these three extra workplace variables are included together with union membership and the size of the workplace. Both competition variables are again barely affected by the inclusion of this smaller set of variables.

One might have conjectured that the employer being situated in a competitive environment may have been affecting reported trust through its effect on these workplace variables. The fact that competition enters independently from these suggests that it is not the case. Moreover the workplace variables that are significant in raising trust would, if anything, seem to be those that are likely to characterize uncompetitive situations; low stress, an absence of heated arguments, and helpful employees.

This finding highlights the importance of measuring competition at the right level. It is entirely possible that the within workplace effect of competition is the opposite to the across firm effect we are documenting here. Specifically, although we cannot directly measure this, if the workplace itself being more competitive is the cause of more stress, more arguments and less helpful employees, (which is at least plausible but for which we have no direct evidence) then we would find a negative correlation between within firm competitiveness and trust. In any case, what we can conclude with confidence is that there is essentially no correlation between the competitiveness of the sector in which a firm is located, and these indicators of employee relations within the workplace. The effect of sectoral level competition on employee trust seems to operate through an entirely independent channel.

Selection of Trusting into Sectors or Effect of Sector on Trust

Competition at the sectoral level does seem to correlate with reported trust. We now ask whether this is because individuals who are more trusting happen to be selected into these more competitive sectors, or whether essentially identical individuals working in competitive sectors tend to trust more. We do this 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 include age dummies instead of age as a continuous variable so that we are then able to include our constructed measure of experience as a control as well.

Ideally, we would have liked a variable that measures the actual length of experience in a sector, but since we do not have historical information for respondents, this is not available. The fact that we are attributing accrued experience to the current sector of employment for individuals who may have switched sectors throughout their career will tend to introduce noise into the analysis, but not an obvious bias. Since there are more chances for switching for individuals who have longer experience, the noise should be worse for these individuals.

Table 8 reports the results obtained when adding the experience interaction for the extended set of variables reported in the previous regression. The first four columns include identical sets of regressors to the last four columns of Table 5 with the addition of the experience variable directly, and its interaction with competition. That is, these regressions include all of the baseline regressors as well as occupation dummies, age dummies, marital dummies, ethnicity dummies and race. For the first four columns, none of the additional workplace controls are added. Columns 1 and 2 add experience interactions to the Comp50 variable, for both the probit and multinomial logit estimations respectively. Columns 3 and 4 do the same

for the Comp4 variables.

[Insert Table 8]

The results are striking. Adding the interaction term makes both competition variables on their own insignificantly different from zero. The interaction term itself is positive but not significant for the Comp50 measure under the probit estimation (columns 1) but it is positive and significant at the 10% level for Comp4 under the probit (column 3). A similar story applies for the multinomial logit estimations (columns 2 and 4). Now however, both measures are positive and significant at the 10% level. The other variables are only marginally changed by the introduction of the interaction term. Columns 5 and 6 also include the five additional workplace controls. We report only the multinomial logit regressions for these, as none of the competition measures, or their interactions, are significant in the probit cases for this smaller sample. In both columns 5 and 6 the implications for competition entering directly are unaltered. That is, it no longer has a significant impact on trust. However, though the sample size falls by over one third, introducing these additional workplace controls increases both the significance and magnitude of the interaction term for Comp4 (.00151 in Column 6, significant at the 1% level) The point estimate for the effect of Comp50 also rises, and remains significant at the 10% level.

This seems to be evidence against the selection hypothesis. Individuals without experience are no more likely to respond positively to the trust question if they happen to work in competitive sectors. However, as individuals increase their experience in the labor market, working in a competitive sector has a significant and positive impact on their reported trust. This is independent of any age effect as age is being controlled for through the age dummies. 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.

Supervision

Is it the case that sectoral competition is increasing trust by leading to a greater degree of supervision of employees? That is, one possible hypothesis is that sectoral competition, by increasing the costs to firms from poor performing employees, induces them to employ proportionately greater supervisory resources. This makes individuals seem more trustworthy and leads to higher reported trust levels. In order to examine this possibility, another part of the survey asks the following question: "Does the Respondent (or spouse if applicable) have a supervisor on your job to whom you are directly responsible." This question was not asked of the full sample, so this variable cannot be added with the extended work environment variables.[18]

[18] The sample becomes small, so that if this variable is included together with the full set of regressors, all variables on the right hand side lose significance.

In order to examine its effect then, it is only possible to include it as an additional variable with the basic regressors reported in tables 2 and 3 and then not with the age dummies, so age and age squared are now entered continuously. The results are reported in Table 9 for which there are now only 336 observations. The first thing to note is that, in all the specifications reported, the supervision variable never enters as a significant determinant of trust. Columns 1 and 3 report the results for the probit estimations on the binary trust variable. The point estimates on both Comp50 and Comp4 are comparable to those in the first two columns of Table 3, which is the relevant comparison, but are now not significant. The multinomial logit estimates for the same specification (columns 2 and 4) are both significant, and again comparable in size to those obtained in the relevant comparison without the supervision variable (columns 2 and 4 of Table 3). The final two columns of Table 9 report the effect of introducing experience interactions together with the supervision variable. Once again, the same pattern emerges. When experience interactions are introduced, competition no longer enters significantly directly, and the experience interaction term is highly significant. The point estimates are also similar to those reported in the relevant comparison tables without supervision (i.e., columns 2 and 4 of Table 8).

[Insert Table 9]

Thus there seems to be no evidence that sectoral competition is working through its effect on firms' supervisory activities. Though the sample size falls by more than one half when this variable is included, both competition variables remain significant in the specifications where they did without supervision, with similar point estimates both with and without experience interactions.

Extensions

The appendix also reports the results obtained when other workplace variables (asked in a different module of the 2004 GSS) are included (whether the respondent intends to try a new job within one year, how easy it is to find a comparable job). Since this other module was asked of a smaller number of respondents, these variables cannot be run in the main regressions without reducing the sample size too greatly. But running them separately does not in any way alter the findings reported here.

For a sub-set of sectors (manufacturing) the census makes available concentration indices as well as proportions of sales covered. So, for these, we have the Hirschman/Herfindahl index, and it is possible to replicate the procedure above for this sub-sample. The problem is that the number of observations in the baseline regressions drops dramatically (#obs = 124) so that it is necessary to drop occupation dummies when running these regressions. The coefficient on these indices do, however, enter with a consistent sign and size, though they are only significant at the 15% level. This is also reported in the appendix.

Summary of empirical results

The Comp50 and Comp4 measures of the competitiveness of a worker's sector of employment are a very robust predictor of a workers propensity to trust. They do not seem to be picking up occupation, worker characteristics or the number of workers in the workplace. Moreover, competition is working independently of factors related to the internal running of the workplace, including the congeniality of worker relationships, their relationship to management and the extent of supervision. Competition is only important for individuals with significant experience, suggesting that selection of trustworthy individuals into competitive sectors is not likely to be the cause. We now develop a model to explain these findings.

3 The model

As discussed earlier, most of the previous literature has been concerned with the effect of competition between individuals on trust between them. Here, our measure of competition is at the sectoral level, and thus acts upon firms. This suggests that the intensity of competition across firms may be exerting influence on individuals within firms via some process of group selection. This is the avenue that we shall explore in the theory developed here. We first informally describe the model and the forces generating a positive correlation between competition and trust. We then develop the model formally, though leaving much of the detail to the appendix. In addition to clarifying the informal description, the advantage of formal characterization is that we obtain a number of auxiliary predictions which we can then take back to the data.

3.1 Informal Description

In each sector there are multiple firms, each of which is composed of multiple long-lived workers, who are drawn together randomly to produce for one period only. After production, the workers will be randomly re-drawn to another firm and the procedure that follows will be repeated. Each worker has a costly, unverifiable and independent effort decision to make. These decisions are made according to type and there are only two types; free-riders and trustworthy. Free-riders never contribute unverifiable effort, trustworthy always do. Types are determined as follows. Workers are born without type, and decide, in the first period of their life which sector they will work in. At the time of entering their sector, they decide their type based on expected future returns. If, in their sector of employment, the lifetime expected returns to free-riding exceed those to trustworthiness, they become a free-rider, and vice versa. If the returns to each type are equivalent in their sector, then they are indifferent, and they will become the same type as the first worker they randomly meet at their firm. Once a worker's type is determined, it can change only seldomly in future.

Each type has its advantages. Free-riding is good for the individual, but bad for the group. A firm with too many free-riders will perform poorly, but if enough others are contributing, then free-riding will not have a discernible effect on firm performance. The effect of poor firm performance varies by sector. The more

competitive the sector, the more likely are the poorly performing firms forced to shut down. Shut downs are costly to the workers, and the key feature of shut downs is that they affect all workers equally. Since free-riders save on effort contributions, and since, in the event of shut down, they do no worse than the trustworthy, these considerations favour becoming a free-rider. We call this effect the "individual selection" effect. It is pervasive whenever free-riding is possible. Conditional on the performance of one's group, any single individual always prefers to contribute as little as possible.

However, an advantage of being trustworthy and contributing effort is that one is less likely to be involved in a shut down, ceteris parabus. A worker contributing effort, at least weakly, lowers the probability of his firm being forced to shut down. We call this effect the "group selection" effect. Though the trustworthy benefit all members of their group equally, they also lower their own personal chances of being in a group that performs poorly. This benefit is greater the stronger the forces of selection acting across groups.

The equilibrium distribution of types in any particular sector reflects the relative strengths of these "individual" and "group" selection effects. For sectors that are very competitive, the probability of shut down in case of poor firm performance is high, and the "group selection" effect is strong. In sectors with low competition, even if the firm performs poorly, shut down is unlikely and "group selection" is weak. In contrast, the "individual selection" effect is constant across sectors of varying competition levels. The outcome then is that highly competitive sectors will have high levels of trustworthiness which fall as competition declines. The model will also generate a number of additional predictions which are developed after the model's formalities.

Notation

There are J sectors and a firm in each sector requires N workers to produce. Firms produce for one period only and are either high quality (H) or low quality (L), depending on the composition of their selected workers. There are no other factors of production. There are potentially two types of worker: trustworthy (T) workers, who always contribute costly non-contractible and non-verifiable effort; and free-riders (F) who never contribute non-contractible, non-verifiable effort. A worker's type is non-observable but known to the worker. Time is discrete, and the discount rate across periods is r. Workers die with probability δ, at which point a new worker is born as replacement, so that the population stays fixed. New born workers are initially without type. Newborns choose a sector of employment, which is then fixed from then on.[19] Workers of either type have (indirect) utility which is linearly increasing in income and linearly decreasing in effort. Workers also have a constant opportunity cost activity which is always available (unemployment or self-employment). This activity pays a wage w with effort cost normalized to 0.

Production technology

Once employed in a firm, workers independently and simultaneously do one of the following. Either they

[19] This can be relaxed, but it is necessary that workers cannot change instantaneously at low cost. The reasons for this are discussed subsequently.

contribute non-contractible and non-verifiable effort, or they do not. This effort imposes on the worker a disutility of c. If not contributed, working at the firm incurs zero disutility. If effort at the firm is contributed by at least one of the N workers, the firm is H, otherwise it is L.

Competition

Competition is modeled as 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 denoted by the term γ_j.

Cultural Evolution

Once an individual chooses a sector of work, the worker's type is "selected" to be either T or F. The individual can change type in a subsequent period with probability $\mu < 1$ per period. Type is determined by a cultural evolution process that is a combination of "Payoff Dependent" and "Oblique" components. It is "Payoff Dependent" because both the new-borns and potential changers consider the expected lifetime returns to both types in their sector when deciding on type. If it is strictly better, in an expected lifetime utility sense, to be one of the types, that type is chosen with probability one. If individuals are indifferent to type, then they are socialized to be the same type as a randomly chosen member of their sector. This is the "Oblique" component.[20]

Let V_{jt}^T denote the lifetime expected utility of being a trustworthy type working in sector j at time t, and the corresponding value function denoting the utility for a free-rider is V_{jt}^F. These are explicitly derived in the appendix. R_{jt} denotes the net difference in the value functions: $R_{jt} \equiv V_{jt}^T - V_{jt}^F$. Let ϕ_{jt} denote the time t proportion of individuals in sector j who are T type. We thus have that in any sector j at time t, the probability of an individual without type becoming trustworthy is given by the function $\eta(R_{jt})$, with $\eta : \{\mathbb{R}\} \rightarrow [0,1]$ and:

$$\begin{aligned} \eta(R_{jt}) &= 1 \text{ if } R_{jt} > 0 \\ \eta(R_{jt}) &= 0 \text{ if } R_{jt} < 0 \\ \eta(R_{jt}) &= \phi_{jt} \text{ if } R_{jt} = 0. \end{aligned} \tag{1}$$

Sectoral allocation for newborns

Individuals are born without a type, so they choose sectors based on expected lifetime utility considerations. They weight the respective utility outcomes in a sector by the probability of becoming a particular type in that sector. Since they are rational and forward looking, they anticipate the effect of being in a particular sector on the likelihood of becoming a particular type. Individuals choose sector j over i if and only if $V_j \geq V_i$, where V_i (without a superscript) denotes the lifetime expected value to entering sector i

[20] We apply the law of large numbers within a sector to maintain constant proportions in steady states.

before type is selected. We allow only a limited set of contracting possibilities. As Williamson (1993) has pointed out, if contracts are complete, the type of trading partners essentially becomes unimportant, as all types can be forced into choosing the same sets of actions, so some limits on contracting are needed.

Firms

We take as given the distribution of firms in each sector. Each firm in every sector requires N workers and their only decision is the wage, w_i^j, (for firm i in sector j) to call. Firms are not able to make wages contingent on either the firm or workers' types, but wages are contingent on production occurring. If firms are H type, they produce for certain, and receive profits that are potentially varying by sector and firm, $\pi(H)_{ij}$, for firm i in sector j. Net profits are then $\pi(H)_{ij} - Nw_i^j$. If they are L type, they produce with probability γ_j and hence receive some lower level of net profits $\pi(L)_{ij} - Nw_i^j$ or shut down and receive 0. We do not allow a rich set of contracting possibilities here precisely to allow for the possibility that trustworthiness may be important in determining economic outcomes.

Timing

At the start of each period, newborns choose the sector in which to work. Types are then selected. Wage offers are made. The wage is contractible, but paid conditional upon the firm not shutting down. Workers in sector j independently apply to firms. Applications are costless and multiple applications are possible. If more workers apply than the N openings at a firm, positions are randomly allocated to the applicants. Applicants not hired at any firm consume reservation utility. Non-contractible efforts are then allocated by the employed workers. If at least one worker contributes effort at a firm, the firm is H type, there is no shut-down and all workers are paid. If no worker contributes effort, then the firm is L type and it shuts down with probability γ_j. If it shuts down, no workers are paid. With probability $1-\gamma_j$ an L firm produces nonetheless, and workers receive promised wages.[21] The timing is shown in Figure 3.

[Insert Figure 3]

Discussion

A key feature of the model's timing is that firms choose their wage offers after workers have made their sectoral decisions, and that firms cannot pre-commit to a specific wage structure into the future. This assumption greatly simplifies the model, but is also made for reasons of realism. The model is simplified because, at the time of making a wage setting decision, firms take as given the current composition of types within their sector's labor pool. Changing their wages will not affect the types of the workers in the pool of potential employees; though firms would like to attract applications from only the T types in a given

[21] This probability of shutdown does not depend on promised wages because promised wages are never so high as to make net profits negative in case of production, that is $\pi(L_{ij}) > Nw_i^j$.

pool, this may not be possible. This simplifies the analysis greatly because firms only consider the effect of wage offers on participation. In our view, this is also realistic. Firms do not set wages with the aim of improving the pool of employees in their sector. They may set them so as to induce the right type of worker to apply, but they are not generally be able to affect the underlying population of workers from which such applications will arise. This is also the reason why we assume that worker sectoral decisions are made only on entry, and not continuously revisited each period. This feature will be preserved when allowing workers to switch, if costs of switching are non-negligible.

The alternative to our assumption, namely that firms choose their wages before workers choose a sector, and that firms are able to commit to these, will lead firms to consider the impact that their wage choices have on the influx of newborns into their sector, and on the probability that a newborn becomes a trustworthy type versus a free-rider. Our timing and commitment assumptions shut these considerations down, as is most realistic.

Stationary steady state

Denote the equilibrium steady state proportion of trustworthy workers in industry j by ϕ_j^*. Let Φ^* be the steady state distribution of the ϕ_j^* across all sectors. In a stationary steady state we have:

S1. The value of being either type in any sector is constant through time, i.e., V_{jt}^i is fixed for all t.

S2. In any sector with a positive proportion of both types, values must be equivalent across type, i.e., for j such that $0 < \phi_j^* < 1 : V_j^T = V_j^F$.

S3. In any sector with a unique type, returns to that type strictly exceed returns to the other, i.e., for j such that $\phi_j^* = 0 : V_j^T < V_j^F$, and for j such that $\phi_j^* = 1 : V_j^F < V_j^T$.

S4. In all sectors, either newborns do not enter, or if they do, participation is rational for at least one type, i.e., $V_j^i \geq \frac{w}{r+\delta}$, for at least one of $i = T$ or F.

We are now ready to state the main result

Proposition 1 *Part 1. There exists a stationary steady state in which, for sectors with competition levels beyond some cut-off, there is a strictly positive proportion of trustworthy types, and the proportion of trustworthy types is increasing in competition. For sectors with competition levels below this cut-off, there are no trustworthy types.*
Wages are higher for firms above the cut-off than below, and equivalent for all firms above the cut-off. Wages below the cut-off are monotonically increasing in the level of competition.

Formally:

$$\phi_j^* = \begin{cases} 0 & \text{for } \gamma_j \leq \frac{c}{w+c} \\ 1 - \left(\frac{c}{(w+c)\gamma_j}\right)^{\frac{1}{N-1}} > 0 & \text{for } \gamma_j > \frac{c}{w+c} \end{cases} \quad (2)$$

$$w^* = \begin{cases} w/\left(1-\gamma_j\right) & \text{for } \gamma_j \leq \frac{c}{w+c} \\ w+c & \text{for } \gamma_j > \frac{c}{w+c} \end{cases} . \quad (3)$$

Part 2. The equilibrium distributions of Φ^* and w_j^* are unique.

Proof in Appendix.

Discussion

The logic of a positive relationship between sectoral trust and competitiveness follows simply from the cultural evolutionary framework. In such a framework, a steady state requires both that there exist a balance between rewards to T and F in sectors where both are present, and equivalence in returns to entering each sector. In sectors with a positive proportion of trustworthy types, since the trustworthy receive $w_j^* = w + c$ for certain but bear effort costs c, this balance can only be achieved if free-riders, who incur no effort costs, can receive the same wage only with a strictly lower equilibrium probability. Equivalence, in expectation, of utility across types and across sectors implies that all free-riders must receive the same expected utility irrespective of their sector. Consequently, since wages equal $w+c$ for all $\gamma_j > c/\left(w+c\right)$, the probability of a free-rider entering a firm that shuts down must be equivalent across these sectors. Intuitively, for this balance to be achieved, it must be the case that if there is a high likelihood of shutting down a low quality firm, i.e., the sector has a high $\left(\gamma_j\right)$, then the chance of the firm being low quality must be low (ϕ_j^*, or the proportion of trustworthy in the sector, must also be high). For the low competitiveness sectors, $\gamma_j \leq c/\left(w+c\right)$, the forces of competition are not strong enough to support any trustworthy individuals. That is, if in steady state there were even one trustworthy individual in one of these sectors, free-riding would strictly dominate trustworthiness there, and also lead to higher expected utility than in any other activity. Consequently, equilibrium can be sustained in these sectors only without the trustworthy, and when being a free-rider there yields the same expected lifetime utility as consuming the outside option or being in a sector above the cut-off. Since these sectors below the cut-off have lower probability of shut-down, wages there are below those in sectors above the cut-off.

The main implication of this proposition is that, for γ_j high enough, ϕ_j is increasing in γ_j. This is sketched in Figure 4.

[Insert Figure 4]

Predictions 1 and 2 below summarize the direct implications of the model.

Prediction 1. *There should be a threshold in the effect of competition on trust. Below this threshold level of competitiveness, the model predicts essentially no relationship between competition and trust. Beyond it, competition and trust should be positively correlated.*

Prediction 2. *There should be a threshold in wages which is the reciprocal of that in competition. Wages should be increasing up to the threshold, after which they should be constant.*

Relatedly, the model tells us what to expect if we perform sectoral decompositions of the effect of competition on trust. An interesting set of decompositions is to interact the competition measures with sectoral dummies, where sectors are grouped up to sectoral aggregates. We thus construct a set of such aggregates based on two sector NAICS headings. As seen in Table 1b, these sectoral aggregates vary considerably in competition levels. Food and Accommodation being the most competitive group, and manufacturing/transport/wholesaling the least. The model predicts that, since increases in competition have no effect in sectors below the cut-off level of competitiveness, we should expect the effects of competition to be most pronounced where competition is relatively high.

Prediction 3. *Increases in competition should have a larger effect on trust levels in sectors where overall competition levels are high.*

Since there are always some free-riders in all sectors, their necessary equivalence in expected utility outcomes generates a prediction about the relationship between firm shut-down and competition levels. Since sectors vary in their levels of competition, for free-riders to be indifferent across sectors implies that, in highly competitive sectors, the increased chance of shutdown in case of poor firm performance must be just offset by there being many trustworthy types in the sector, so that the chances of poor firm performance are low. Thus, conditional upon being a free-rider, the chances of firm shutdown are equivalent for all firms beyond the threshold. But conditional upon being trustworthy, the chances of shut-down are zero, so that since the proportion of free riders is monotonically decreasing beyond the threshold, the chances of a firm shutting down should be falling with the competitiveness of the sector. Since there are only free-riders up to the threshold, the chances of shut down there are rising in sectoral competitiveness. Overall, this suggests a non-monotonic relationship between competition and the chances of shut-down. Specifically.

Prediction 4. *Firm shut-down chances are non-monotonic in sectoral competitiveness levels. For sectors below the threshold, the chances of firm shut-down are increasing in sectoral competitiveness. For sectors above the threshold, the chances of firm shut-down are decreasing in sectoral competitiveness.*

Finally, while not directly addressing government, the model has clear implications for what we should expect to see of government employees. Government employees have greater job security than private sector employees. Consequently, the "group selection" effect for this sub-set of individuals should be weaker, while the "individual selection" effect is unchanged. Levels of trustworthiness should therefore be lower for these individuals.

Prediction 5. *Government employees should have lower trust levels.*

We now test these predictions.

4 Examining the Predictions

Many of these predictions can be examined in the GSS data. Though it is the case that, for many of these, the precise variable of interest is not directly included in the GSS, we are able to use proxies to get at some of the predicted relationships.

Prediction 1. Figure 4 predicts a threshold below which there is no relationship between competition and trust and above which it is positive. 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. The omitted category is the very low competition category. Results are reported in Table 10. The first two columns report these for the Comp50 measure under the probit (column 1) and multinomial logit (column 2) cases respectively. In both case, the medium and high categories are significantly positive relative to very low, the very high category is also positive but not significant, and the low category is not significantly different from the very low omitted category. These results are consistent with a threshold at the low category in Comp50. The results for Comp4 are in the third and fourth columns. These also suggest the possibility of a threshold but are weaker. Now all categories are positive relative to the omitted category very low category, but only the high (60-80 percentile) category is significant.

[Insert Table 10]

Another way to analyze this prediction is to plot residuals obtained from regressing both competition and trust on all of the main explanatory variables. That is, each one of the competition measures and trust are regressed on household income, education, age, age squared, sex, occupational, ethnicity, race, marital, and religious dummies, union membership and a constant. Figures 5 and 6 depict the relationship between trust and competition for Comp50 and Comp4 respectively. The plots depict the trust residuals on the y axis plotted on each of the competition residuals respectively. The model predicts a threshold below which

competition should have no effect on trust and above which competition and trust should be positively related. Both figures are consistent with such a prediction, although the error bands drawn at the 95% level, suggest that the relationship is not precisely estimated at low values of residual competition.

[Insert Figures 5 and 6]

Prediction 2. This prediction is not possible to directly test as the GSS has no information on wages. However, it is perhaps possible to proxy these using "household income" divided by "hours worked last week". Figures 7 and 8 perform the same residual plots as in Figures 5 and 6 for this proxy of wages on competition for Comp50 and Comp4 respectively. The model predicts a positive relationship between wages and competition as in Figure 4 up to a threshold, beyond which it should be flat.

This prediction does not receive strong support. The relationship is reasonably consistent for the Comp50 variable – increasing up to a residual competition of approximately 20, after which, the point estimates turn down. The relationship with Comp4 is less consistent with the model's predictions, our proxy for household incomes seems to increase beyond the threshold. As mentioned earlier, however, household income divided by the respondent's hours worked last week is likely to be a weak proxy for respondent's wages.

[Insert Figures 7 and 8]

Prediction 3. Increases in trust should have larger effects in sectors where competition is high. In order to test this, we run a set of industry interactions. Table 1b specifies the industry breakdown. The highest competition sector is "Accommodation and Food" with 87.09 and 95.43 being the measures for Comp50 and Comp4 respectively. We run our industry interactions with "Accommodation and Food" omitted. The model predicts that, relative to the omitted industry, the remaining lower competition industries should exhibit a lower effect of competition on trust. The first two columns in Table 11 report this for Comp50 for the probit and multinomial logit specifications. The signs of the coefficients are all consistent with the predictions of the model; i.e., negative relative to the omitted high competition industry. Though consistent with the theory in sign, none of the interactions are significant in the probit or multinomial logit cases. The results for the interactions using Comp4 are more strongly supportive of the theory. Once again, in the probit case, column 3, signs are negative but none are significant. However, in the multinomial logit case, the signs are consistently negative and significant. The only sector not significantly less likely to see an effect of competition on trust relative to the most competitive sector is the second most competitive one – advanced services – which is not surprising given that this sector's measure of Comp4 = 91.97.

[**Insert Table 11**]

Prediction 4. We now examine whether there is evidence of a non-monotonic relationship between the probability of shutdown and competition. Recall that the model suggests this should be first increasing then decreasing with competition measures. Once again, the probability of firm shut down is not measured in the GSS, however the GSS does ask respondents a question regarding job security, which may reasonably proxy shut down chances. The measure of job security is the GSS question "gdjobsec" which states to respondents "Job Security at your Place of Employment is Good." To which respondents choose one of: 1. Very True, 2. Somewhat True, 3. Not too True, 4. Not at all True.

Figures 9 and 10 plot the relationships between the residual variation in "gdjobsec" and the residual variation in both competition measures, together with 95% confidence intervals. Once again, these residuals are obtained by regressing the full set of controls listed above on each of "gdjobsec" and the competition measures separately. The plots are again consistent with the relationship predicted by the model. Job insecurity increases with both Comp50 and Comp4 initially, reaches a peak, and then declines. Once again, the error bands are relatively large for low values of residual competition. The upward sloping point estimate for low values of the residuals is not statistically significantly different from a flat line, however the downward sloping part at higher values is. Though not extremely tightly estimated, the relationship is consistent with the model's predictions, and is a relationship that would not be expected on prior grounds.

[**Insert Figures 9 and 10**]

Prediction 5. The final prediction we consider is that related to government employees. Since the effect of competition is to make it less likely that poor performing groups of workers will survive, we should expect this effect to be weaker amongst government workers. These individuals have greater job security than their private sector counterparts. In the GSS, of the 1400 or so respondents for whom we have a sectoral competition measure 95 are government workers. Table 12 reports the results from introducing a government employee dummy variable. It is included in a variety of different specifications: directly (column 1), interacted with the competition variable (column 2), and interacted with both the competition and experience variables separately (column 3) and interacted with both of these variables separately jointly in a three way interaction (column 4). In all specifications, the government dummy enters negatively, though it is generally not significant. The final four columns repeat the same ordering with Comp4, which enters with the same sign but again lacks significance. Once again, the statistical significance of the result is marginal with regards this prediction, but the data at least seem consistent with the predictions generated by the model.

[Insert Table 12]

5 Concluding Discussion

Overall it seems hard to refute the findings established in the first part of this paper: individuals working in sectors that are more competitive have significantly higher levels of reported trust than individuals working in less competitive sectors. To our knowledge, this is the first time such a relationship has been documented. This correlation persisted in all specifications, and is not due to competitive sectors having more supervision, smaller workplaces, or more congenial relations between work colleagues. It also does not appear to be due to individuals with high trust being selected into competitive sectors. The existence of this relationship is robust, statistically significant and large – i.e., an increase in the probability of usually trusting versus usually not trusting ranging from 10 -25% for a one standard deviation increase in competition. It seems highly unlikely that causation could be going the other way (i.e., from high levels of trust to high sectoral competition).

We explain these patterns with a model of cultural evolution in which free-riding and trustworthiness are differential traits subject to returns based selection. This model generates a positive correlation between competition and trust at the sectoral level, but only for sufficiently high levels of trustworthiness. That pattern is also seen in the data. The model also generates a number of other predictions relating to job-security, wages, sectoral interactions and government employees. The data is consistent with all of these predictions except those relating to wages (which is not directly measured in the GSS and likely to be poorly proxied). Though we hasten to add that the consistency of the model's additional predictions and the patterns in the data is of much weaker significance than the basic competition and trust relationship itself. Though consistent with the model in the point estimates, the large error bands on many of the estimates means that establishing relationships of statistical significance is not possible.

In some ways, the findings here resemble those reported for primitive societies by Henrich et. al. (2001). They found there that "dictatorial" allocations to recipients in the canonical dictator game were positively correlated with the degree to which a primitive society engaged in market transactions. It seems that people living in societies that are highly integrated into market economies are more willing to be fair to strangers in economic exchanges than people living in societies less integrated into market economies. Though it is consistent in direction, the factors of salience in these societies would appear highly non-comparable to competition amongst firms in the American workplace that drives trust here. Firstly, their measures of market integration and ours of competition may be picking up very different effects. Secondly, we know of no studies reporting on the correlation between answers to the trust question and allocations in the

dictator game. However, given these caveats, some similarities are possible. As in more competitive US sectors, if market interactions impose greater costs on poor performance in primitive societies, then the same mechanism may be leading to declines in anti-social behaviour where markets are prevalent. Interestingly, this is consistent with an evolutionary model of pro-social behavior that Henrich (2004) has argued for in an unrelated setting.

The results here are generally NOT consistent with the findings from most previous experimental literature, surveyed by Bowles (1998). There, increased competition has tended to undermine trust. But those studies have all been concerned with competition between individuals affecting trust between them. We instead document the relationship between the competitiveness of the environment in which groups of individuals interact, and trust within the group. The experimental literature, to our knowledge, has not explored such settings, and it would be interesting to see if our broad direction of effect was also replicated in such settings.

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. Our results cast considerable doubt on this type of conclusion. Policy clearly affects competition levels, and our evidence suggests that competition levels affect trust.

Can we generalize about the effects of competition on social capital from this study? As many have argued before, see for example Laporta et. al. (1997), trust in the unknown other as opposed to someone with whom one interacts frequently and repeatedly, is likely to be important for sustaining greater social cooperation. It is this notion of trust, which is strongly linked to that in Fukuyama (1995) and the view of social capital forwarded by Putnam (1993), that has been forwarded as important for understanding the function of institutions, civic groups, organizations and even the process of economic development. But is this what we are picking up? There are two aspects to this question. (1) Is competition disciplining people to act in trustworthy ways through fear of punishment, or is something more profound happening to peoples' preferences, attitudes or beliefs through enculturation in competitive markets? (2) Is the effect we are picking up peculiar to the workplace, or is it representative of respondents' trusting attitudes more generally?

If fear of punishment is at the root of what we have measured, then the trust we document is situation specific, and in this respect not distinct from trust generated by repeated interaction. Once punishment threats are withdrawn, so too would be trust. An argument against this interpretation is our finding that including information about the degree to which individuals are supervised in their activities does not seem to temper the correlation between competition and trust. It does not seem likely that the relationship we document is due to increased supervision. However, other controls on worker behavior (perhaps contractual) that we cannot observe may be playing a role, and since the data does not identify these it is not possible

for us to rule them out. It would be interesting to try and explore these factors in data sets with even more workplace details, but we can say nothing further about them at present given the limitations of the GSS.

With respect to the second issue, although our evidence suggests the workplace is having an important determining effect, the context in which people are asked to imagine their trusting behavior in the canonical trust question is clearly intended to be broader than the workplace. Respondents answer that they *generally* trust people more if their work sector is more competitive, where this notion of "general" presumably captures interactions that are broader than either their own firm or their sector. It might still be the case that, since many interactions outside the household do occur with work colleagues, when one thinks of the notion "general" a heavy weight is put on workplace interactions. However, this too seems unlikely to be the cause of the correlation as the inclusion of the variable "helpful", which connotes a workplace in which people can be relied on when someone needs help, affects neither the magnitude nor significance of competition's effect on trust. If the trust here were due to the respondent directly reporting about his or her colleagues only, the inclusion of such a variable should remove, or at least weaken, the effect of competition on trust. We thus tentatively conclude that the effect we are picking up is not due to greater workplace supervision in competitive environments, and also seems to suggest an attitude that is extended to scenarios that are broader than just the workplace.

Notwithstanding these considerations, a further question is how trust built in the workplace would contribute to social capital more generally. One way would be in solving chicken and egg problems between trust and investment (or some other complementary activities), that have been highlighted in many of the theoretical models of social capital formation. Such problems generically arise when the social capital is complementary with an economic activity, and lead to the coexistence of both high and low social capital equilibria as in: Francois and Zabojnik (2005), Carlin, Dorobantu, Viswanathan (2007), Francois (2007), Tabellini (2008), Aghion, Algan and Cahuc (2008) and Aghion, Algan, Cahuc and Shleifer (2008). With sufficient trust generated by the work environment, economies would then be more likely to converge to the (usually) higher welfare, high social capital equilibria that these models exhibit.

It is prudent to hold off these broader speculations about social capital until the relationship between trust and competition has been tested in other environments. It would be of considerable interest to explore the relationship between trust and competition within countries that have experienced dramatic changes in the competitiveness of their sectors. One candidate set of countries are the European ones under the expansion of EU competition and trade laws. For these countries, trust attitudes could be explored using Eurobarometer data, which has been asked annually for 35 years of residents of some European Union countries. This covers specific events where large changes in market competition occurred for some sectors, and which can be used as quasi-experiments; some examples are European Union trade harmonization, German Unification and Eastern European liberation from Soviet Russia.

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Appendix A: Data

Ethnicity Dummies

The dummies are derived from the response to the variable ETHNIC which is the answer to "From what countries or part of the world did your ancestors come? If more than one country named, which one of these countries do you feel closer to? Approximately 80% of the sample responded to this. We constructed the following regional dummies:

1. Northern Europe 21% (Austria, Czechoslovakia, Denmark, Finland, Germany, Hungary, Netherlands, Norway, Poland, Sweden, Switzerland, Lithuania, Yugoslavia, Rumania, Other European)
2. Southern Europe 8% (France, Greece, Italy, Spain, Portugal, Belgium, French Canada),
3. Anglo 23% (Other Canada, England, Wales, Ireland, Scotland)
4. Africa 8%
5. Asia 5% (China, Japan, Philippines, India, Arabic, Other Asian),
6. Hispanic 7% (Mexico, Puerto Rico, Other Spanish)
7. Amero-Carribean 7% (West Indies, American Indian, Non-Spanish West Indies, American Only)
8. Other 21%

Occupational Dummies

These nine occupational dummies are created using the sectional heads from the 1980 Census occupation classification scheme.

1. Professional, Technical and Kindred Workers 33% (Occupation codes 001-196)
2. Managers and Administrators Except Farm 14% (Occupation codes 201-296)
3. Clerical and Kindred Workers 12% (Occupation codes 301-396)
4. Craftsmen and Kindred Workers 21% (Occupation codes 401-590a)
5. Operatives Except Transport 2% (Occupation codes 601-696)
6. Transport Equipment Operatives 5% (Occupation codes 701- 796)
7. Farmers, Farm Managers, Farm Laborers and Farm Foreman 6% (Occupation codes 801-846)
8. Other Service Workers 6% (Occupation codes 900+)

Race Dummies

There are three categories, White (79%), Black (13%) and Other (8%)

Means, Response Categories and Standard Deviations for extended workplace variables:

Variable	Response Categories	Mean (SD)
Others Credit	1. Often, 2. Sometimes, 3. Rarely, 4. Never	3.10 (0.96)
Put Down	1. Often, 2. Sometimes, 3. Rarely, 4. Never	3.43 (0.92)
Heated Arguments	1. Often, 2. Sometimes, 3. Rarely, 4. Never	3.21 (0.89)
Lack Information	1. Often, 2. Sometimes, 3. Rarely, 4. Never	2.93 (0.97)
Helpful	1. V. True, 2. Somewhat T. 3. Not too True, 4. Not at all	1.46 (0.66)
Treat Respect	1. Strong Agree, 2. Agree, 3. Disagree, 4. S. Disagree	1.70 (0.66)
Act Upset	1. Often, 2. Sometimes, 3. Rarely, 4. Never	3.76 (0.62)
Shout	1. Often, 2. Sometimes, 3. Rarely, 4. Never	3.68 (0.68)
Look Away	1. Strong Agree, 2. Agree, 3. Disagree, 4. S. Disagree	3.18 (0.78)
Work Stressful	1. Always, 2. Often, 3. Sometimes, 4. Hardly Ever, 5. Never	2.74 (1.00)
Skip Work	1. Often, 2. Sometimes, 3. Rarely, 4. Never	3.75 (0.57)
Personal Space	1. Often, 2. Sometimes, 3. Rarely, 4. Never	3.57 (0.75)
Standards	1. Often, 2. Sometimes, 3. Rarely, 4. Never	2.38 (1.10)
Report Probs	1. Often, 2. Sometimes, 3. Rarely, 4. Never	1.74 (0.94)
Harm Threat	1. Often, 2. Sometimes, 3. Rarely, 4. Never	3.88 (0.43)
Job Secure	1. V. True, 2. Somewhat T. 3. Not too True, 4. Not at all	1.64 (0.82)
Work Size	7 categories (1-9, 10-49, 50-99, ..,2000+)	2.92 (1.82)
Union Member	1. Yes, 2. No	1.90 (0.29)

Using the Herfindahl/Hirschman Index (HH Index) instead of Comp4/Comp50

The HH index is calculated by squaring the market share of each firm competing in the sector and then summing the resulting numbers. It is defined in the opposite direction to Comp50 and Comp4, i.e., the index approaches zero if the sector consists of a large number of firms of equal size. The US census reports this index for manufacturing sectors only (sectors 31-33). Consequently the sample size falls to 124 not allowing the full set of controls to be run. The table below reports on multinomial logit regressions similar to those in Table 2, with the omission of the occupation dummies specification due to insufficient observations.

Variable	U. Trust. / U. Not	U. Trust. / U. Not	U. Trust. / U. Not
HH Index	-0.00065 (.238)	-0.00074 (0.173)	-0.00078 (0.148)
Income	.053 (.296)	.054 (.290)	.054 (.341)
Education	.115* (.097)	0.106 (.139)	0.108 (.143)
Marital	-.066 (.706)	-.067 (0.735)	-.072 (0.727)
Age	.0016 (.919)	-.0018 (.910)	-.0008 (.959)
City Size	-.0000 (.938)	-.0004 (.631)	.0002 (.708)
Race Dummies	No	Yes	Yes
Ethnicity Dummies	No	No	Yes
Observations	124	124	124
Psuedo R^2	.09	0.113	0.165

Multinomial logit regressions, errors clustered at sectoral level, including a constant

Appendix B: Proof of Proposition

Preliminaries:

Let α_j denote the probability that at least one other worker in a randomly drawn firm is a trustworthy type. This clearly depends on the equilibrium object ϕ_j; the proportion of trustworthy individuals in a

sector. Let p_j denote the probability of obtaining a job in sector j. As above, V_{jt}^T denotes the value of being a T type in sector j at time t; with the corresponding value function for an F type being V_{jt}^F. The value function solves:

$$\begin{aligned} & rV_{jt}^T \\ = \; & p_{jt}(E(w_{jt}) - c) + (1 - p_j)w - \delta V_{jt}^T + \\ & (1-\delta)\mu(V_{jt+1} - V_{jt+1}^T) + (1-\delta)(1-\mu)(V_{jt+1}^T - V_{jt}^T) \end{aligned} \tag{4}$$

where $V_{jt} = \max\{V_{jt}^T, V_{jt}^F\}$.[22] In words, with probability p_{jt} the worker obtains a job paying the expected wage and contributes effort at cost c. With the reciprocal probability, the worker consumes the reservation, w at no effort cost. At the end of the period, with probability δ the worker dies, and with probability $(1-\delta)$ he or she lives and either has the ability to change type (with probability μ) or remain the same $(1-\mu)$. If able to change, he or she chooses $\max\{V_{jt}^T, V_{jt}^F\}$. Similarly, the valuation for the free-rider is given by:

$$\begin{aligned} & rV_{jt}^F \\ = \; & p_{jt}E(w_{jt})((1-\gamma_j)(1-\alpha_{jt}) + \alpha_{jt}) + (1-p_j)w - \delta V_{jt}^F + \\ & (1-\delta)\mu(V_{jt+1} - V_{jt+1}^F) + (1-\delta)(1-\mu)(V_{jt+1}^F - V_{jt}^F). \end{aligned} \tag{5}$$

Note that the difference here is that, since free-riders do not contribute effort, receiving a wage requires either one other worker to contribute effort (α_j), or if this does not happen, the firm being low quality but not shutting down $(1-\alpha_j)\left(1-\gamma_j\right)$. The net difference in lifetime valuations between types, which recall plays a critical role in the cultural evolution process in (1) and is denoted R_{jt}, is given by:

$$\begin{aligned} & r(V_{jt}^T - V_{jt}^F) \qquad (6) \\ = \; & p_{jt}(E(w_{jt})(1-\alpha_{jt})\gamma_j - c) - \delta(V_{jt}^T - V_{jt}^F) + (1-\delta)\mu(V_{jt+1}^F - V_{jt+1}^T) \\ & +(1-\delta)(1-\mu)(V_{jt+1}^T - V_{jt+1}^F + V_{jt}^F - V_{jt}^T) \\ \Leftrightarrow & \\ & R_{jt} \equiv (V_{jt}^T - V_{jt}^F) \\ = \; & \frac{\left(p_{jt}(E(w_{jt})(1-\alpha_{jt})\gamma_j - c) + (V_{jt+1}^T - V_{jt+1}^F)((1-\delta)(1-2\mu))\right)}{1 + r - (1-\delta)\mu} \qquad (7) \end{aligned}$$

The steady state conditions have the following implications:

[22] We proceed by assuming that the probability of finding a job is independent of the wage called by the firm, so that the expectation operator can be simply multiplied by the probability. In equilibrium, this turns out to be the case as all firms in a sector set the same wages. So we have not complicated the notation by allowing this when writing down the value function, though we do consider deviations in wages in proving the existence of equilibrium.

Condition S2 implies:

$$\begin{aligned} & V_j^T - V_j^F \\ = \quad & \frac{p_j\left(E(w_j)(1-\alpha_j)\gamma_j - c\right)}{\delta + r + (1-\delta)\mu} = 0. \end{aligned}$$

Also, since a trustworthy type knows for sure that there will be at least one trustworthy worker in any firm she works we have:

$$V_j^T = \frac{p_j(E(w_j) - c) + (1-p_j)w}{r+\delta}. \tag{8}$$

For sectors without T types (j with $\phi_j^* = 0$) condition S3 implies:

$$\frac{p_j(E(w_j) - c) + (1-p_j)w}{r+\delta} = V_j^T < V_j^F = \frac{p_j E(w_j)(1-\gamma_j) + (1-p_j)w}{r+\delta}$$

Existence:

Consider j: $\gamma_j > \frac{c}{w+c}$, $V\left(U_j^T\right) = V\left(U_j^F\right)$ implies

$$\begin{aligned} \frac{p_j\left(w_j^*(1-\alpha_j)\gamma_j - c\right)}{\delta + r + (1-\delta)\mu} &= 0 \\ w_j^* &= \frac{c}{(1-\alpha_j)\,\gamma_j}. \end{aligned} \tag{9}$$

Firm profit maximization implies that participation constraints bind: i.e. $V_j^T = \frac{w}{r+\delta} = \frac{p_j(w_j^* - c) + (1-p_j)w}{r+\delta}$ which implies

$$w_j^* = w + c. \tag{10}$$

Combining (9) and (10) yields

$$\alpha_j = 1 - \frac{c}{(w+c)\,\gamma_j}. \tag{11}$$

It is immediate from (11) that given $\gamma_j > \frac{c}{w+c}$necessarily $\alpha_j > 0$, and also since $\gamma_j \leq 1$, necessarily $\alpha_j < 1$. Since firms allocate positions randomly amongst the pool of applicants, if more than N apply, this yields a binomial distribution within firms with parameter ϕ_j; hence the probability of M trustworthy amongst the $N-1$ employees is:

$$p_j(M) = \left(\begin{array}{c} N-1 \\ M \end{array}\right) \phi_j^M \left(1-\phi_j\right)^{N-M-1}.$$

Since, the term α_j above is the probability of at least one other success, i.e., $1 - p_j(0)$:

$$\alpha_j = 1 - \left(1-\phi_j\right)^{N-1}.$$

Substituting this into equation (11) yields a unique solution for ϕ_j :

$$\begin{aligned} 1 - \left(1-\phi_j\right)^{N-1} &= 1 - \frac{c}{(w+c)\,\gamma_j} \\ \phi_j^* &= 1 - \left(\frac{c}{(w+c)\,\gamma_j}\right)^{\frac{1}{N-1}}, \end{aligned} \tag{12}$$

which is the value stated in the proposition.

Consider $j : \gamma_j \leq \frac{c}{w+c}$. It is immediate from the above that for sectors such that $\gamma_j \leq \frac{c}{w+c}$ there does not exist a $\phi_j > 0$ such that $V\left(U_j^T\right) \geq V\left(U_j^F\right)$. Setting $\phi_j = 0$, we have $V\left(U_j^T\right) < V\left(U_j^F\right) = \frac{w}{r+\delta}$, which implies

$$w_j^* = w/\left(1-\gamma_j\right) < w + c. \tag{13}$$

For these sectors, $\phi_j^* = 0$, and the wage given in (13) are the unique wages such that the participation constraint of the free-riders binds. A higher value of wages will not be profit maximizing, and lower values will not induce participation.

Uniqueness:

First note that the steady state is only unique up to the distribution of trustworthy types, Φ^* and the wages in each sector. Since, in the constructed steady state, workers are indifferent between entering production and consuming the outside option, the probability of obtaining a job, p_j although strictly between zero and one, is not further pinned down.

In order for any individuals to enter a sector, expected lifetime utility of at least one of the types must be at least as great as the outside option of w per period. Consider sectors $j : \gamma_j > w/(w+c)$, and consider the possibility of a steady state in which $\phi_j^* = 0$ for any one of these sectors. Necessarily, participation for the F types requires that:

$$V_j^F(t) \geq \frac{w}{\delta + r} \text{ for all } t. \tag{14}$$

Suppose that this holds with equality in the posited steady state, then using (5) and the fact that in the posited steady state, since only free-riders exist in such a sector j then $\max\{V_j^T, V_j^F\} = V_j^F$. Equation (14) binding implies that $w_j^* = \frac{w}{1-\gamma_j}$. Now consider the value to being trustworthy under such a posited wage, $V_j^T(t)$. Using expression (8) this equals: $V_j^T(t) = \frac{p_j(w/\left(1-\gamma_j\right)-c)+(1-p_j)w}{r+\delta}$, which since $\gamma_j > w/(w+c)$ implies that $V_j^T(t) > \frac{w}{r+\delta}$. But this contradicts $\max\{V_j^T, V_j^F\} = V_j^F$. So it is not possible for $\phi_j^* = 0$ for any sector j such that $\gamma_j > w/(w+c)$. Hence for any $j : \gamma_j > w/(w+c)$, necessarily $\phi_j^* > 0$. But from (12) we have already demonstrated that the unique solution for which $V_j^T = V_j^F$ given $\gamma_j > w/(w+c)$ is that given by (12).

Now consider $j : \gamma_j \leq \frac{c}{w+c}$. For these sectors it has already been established that there does not exist a $\phi_j > 0$ such that $V_j^T = V_j^F$. And for $\phi_j^* = 0$ condition (13) established the unique value of the wage at which participation constraints bind, consequently for these low γ sectors, necessarily $\phi_j^* = 0$ and $w_j^* = w/\left(1-\gamma_j\right)$.■

Table 1a

VARIABLE	Means (SD)
Can Trust (1-4)	2.578 (0.716)
Household Income (1-24 categories)	17.03 (5.65) (Mean cateogry $35000-39000)
Education (Years of School completed, 0-20)	13.70 (2.89)
City Size 1000's (0-8008)	309 (1166)
Age Years	45 (16)
MARITAL DUMMIES	
Married	51%
Widowed/Divorced/Seperated	27%
Never Married	22%
RACE	
White	79%
Black	13%
Other Race	8%
ETHNICITY DUMMIES	
Nth Eur	20%
Anglo	22%
Hisp	7%
Sth Eur	8%
Asian	5%
African	8%
Amero-Carribean	8%
Other	21%
RELIGION DUMMIES	
Protestant	54%
Catholic	22%
Jewish	2%
No Religion	14%
Other	8%
COMPETITION	
Comp4 (11.1 – 98.8)	82.65 (17.53)
Comp50 (0 - 95.9)	60.53 (26.41)

Sector	Comp50	Comp4	Observations
"Mantranspwarehouse" (31-33 Manufacturing and 48-49 Transport and Warehousing)	33.84	67.85	293
"Retail" (44-45 Retail Trade)	47.94	72.12	209
"Infofinance" (51 Information and 52 Finance)	35.58	77.90	105
"Advanced Services" (53 Real Estate, 56 Administrative/Waste/Management, 61 Educational Services 71 Arts, Entertainment, Recreation)	77.91	91.97	138
"ProfSci" (54 Professional, Scientific, Technical)	71.76	89.21	150
"HealthSector" (62 Health)	71.66	89.07	287
"Accommodationfood" (72 Accommodation and Food)	87.09	95.43	171
"Other Services" (81 Other Services)	80.49	91.45	84

Table 1b. Competition Measures by NAICS two digit categories

Table 2: Trust Regressions Without Competition Variables

	(1)	(2)	(3)	(4)	(5)	(6)
Dependent Variable	Binary Trust	Usually Trust/ Usually Not	Binary Trust	Usually Trust/ Usually Not	Binary Trust	Usually Trust/ Usually Not
income	0.028***	0.048***	0.025***	0.045***	0.022**	0.039***
	(0.009)	(0.015)	(0.009)	(0.015)	(0.009)	(0.015)
School (yrs)	0.102***	0.170***	0.079***	0.135***	0.082***	0.137***
	(0.015)	(0.027)	(0.015)	(0.025)	(0.015)	(0.025)
sex	-0.143**	-0.251**	-0.190***	-0.313***	-0.198***	-0.321***
	(0.064)	(0.113)	(0.068)	(0.121)	(0.069)	(0.121)
Occupation Dummies	NO	NO	YES	YES	YES	YES
age	0.005	-0.014	0.005	-0.013		
	(0.012)	(0.021)	(0.012)	(0.021)		
Age squared	0.000	0.000	0.000	0.000		
	(0.000)	(0.000)	(0.000)	(0.000)		
Age Dummies	NO	NO	NO	NO	YES	YES
northeur	0.099	0.095	0.082	0.081	0.076	0.071
	(0.096)	(0.164)	(0.099)	(0.168)	(0.099)	(0.167)
anglo	0.215**	0.277	0.198**	0.254	0.213**	0.277*
	(0.098)	(0.169)	(0.097)	(0.167)	(0.095)	(0.163)
africa	-0.096	-0.038	-0.063	0.015	-0.097	-0.040
	(0.208)	(0.382)	(0.212)	(0.389)	(0.218)	(0.399)
asia	-0.041	-0.349	-0.059	-0.372	-0.050	-0.356
	(0.180)	(0.309)	(0.185)	(0.318)	(0.185)	(0.316)
hisp	-0.168	-0.636	-0.187	-0.667	-0.189	-0.657
	(0.199)	(0.401)	(0.203)	(0.409)	(0.202)	(0.404)
Amero-Carib.	-0.016	-0.086	-0.003	-0.061	-0.022	-0.085
	(0.145)	(0.262)	(0.143)	(0.256)	(0.147)	(0.261)
black	-0.448*	-1.024**	-0.456*	-1.037**	-0.459**	-1.042**
	(0.235)	(0.425)	(0.233)	(0.420)	(0.234)	(0.427)
white	-0.065	-0.334	-0.051	-0.322	-0.063	-0.337
	(0.201)	(0.358)	(0.200)	(0.357)	(0.198)	(0.353)
size 1000s	0.000	0.000	0.000	0.000	0.000	0.000
	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)
Constant	-1.910***	-2.373***	-1.615***	-1.937***	-0.800	-1.298
	(0.365)	(0.700)	(0.408)	(0.749)	(0.807)	(1.375)
Observations	1318	1318	1318	1318	1318	1318

Robust standard errors in parentheses, errors clustered at the sectoral level, * significant at 10%; ** significant at 5%; *** significant at 1%. Regressions with a constant, religious dummies, marital dummies. Odd numbered columns are probit estimates with the dependent variable a binary measure of trust. The measure is constructed by collapsing "usually trusted" and "always trusted" to a variable "Binary Trust" = 1, and "usually not trusted" and "always not trusted" are collapsed to "Binary Trust" = 0. Even columns are one set of results from multinomial logit regressions. The category of comparison reported is a respondent answering "usually trusted" as opposed to the omitted category "usually not trusted".

Table 3: Competition and limited controls

	(1)	(2)	(3)	(4)
	Binary Trust	Usually Trust/ Usually Not	Binary Trust	Usually Trust/ Usually Not
Comp50	0.004**	0.009***		
	(0.002)	(0.003)		
Comp4			0.004	0.009*
			(0.003)	(0.005)
Hhold Income	0.030**	0.055**	0.030**	0.053**
	(0.013)	(0.023)	(0.013)	(0.023)
schooling	0.107***	0.192***	0.106***	0.189***
	(0.021)	(0.037)	(0.021)	(0.038)
age	-0.016	-0.049	-0.017	-0.052*
	(0.016)	(0.030)	(0.017)	(0.031)
age squared	0.000	0.001**	0.000	0.001**
	(0.000)	(0.000)	(0.000)	(0.000)
sex	-0.091	-0.140	-0.081	-0.121
	(0.092)	(0.162)	(0.091)	(0.161)
black	-0.319	-0.503	-0.324	-0.503
	(0.351)	(0.612)	(0.350)	(0.605)
white	0.030	-0.076	0.034	-0.060
	(0.287)	(0.496)	(0.285)	(0.489)
size mill.	-0.090*	-0.205**	-0.087*	-0.197**
	(0.050)	(0.082)	(0.050)	(0.084)
protestant	0.011	0.158	0.002	0.133
	(0.195)	(0.336)	(0.193)	(0.334)
catholic	-0.102	-0.036	-0.117	-0.075
	(0.200)	(0.324)	(0.198)	(0.321)
jewish	-0.588	-0.964*	-0.572	-0.931*
	(0.363)	(0.554)	(0.361)	(0.548)
noreligion	0.089	0.436	0.081	0.412
	(0.221)	(0.353)	(0.222)	(0.354)
Constant	-2.13***	-3.25***	-2.14***	-3.30***
	(0.535)	(1.026)	(0.569)	(1.061)
Observations	719	719	719	719

Robust standard errors in parentheses, errors clustered at the sectoral level, * significant at 10%; ** significant at 5%; *** significant at 1%, includes ethnicity and marital status dummies. Odd numbered columns are probit estimates with the dependent variable a binary measure of trust. The measure is constructed by collapsing "usually trusted" and "always trusted" to a variable “Binary Trust” = 1, and "usually not trusted" and "always not trusted" are collapsed to “Binary Trust” = 0. Even columns are one set of results from multinomial logit regressions. The category of comparison reported is a respondent answering “usually trusted” as opposed to the omitted category “usually not trusted”.

Table 4 (Panel A)

	Probit	Probit	Probit	Probit	Probit
Dependent Variable	Binary Trust	Binary Trust	Binary Trust	Binary Trust	Binary Trust
comp50	0.00203	0.00236	0.00251	0.00271	0.00348**
	(0.00234)	(0.00199)	(0.00175)	(0.00175)	(0.00175)
income		0.051***	0.037***	0.035***	0.037***
		(0.009)	(0.011)	(0.010)	(0.011)
school			0.090***	0.089***	0.099***
			(0.020)	(0.019)	(0.019)
sex				-0.109	-0.098
				(0.097)	(0.097)
age					-0.013
					(0.017)
Age sq					0.000
					(0.000)
Constant	-0.237*	-1.082***	-2.078***	-1.881***	-2.050***
	(0.125)	(0.207)	(0.273)	(0.294)	(0.485)
Observations	750	722	721	721	719

Probit estimations with the dependent variable a binary measure of trust. The measure is constructed by collapsing "usually trusted" and "always trusted" to a variable "Binary Trust" = 1, and "usually not trusted" and "always not trusted" are collapsed to "Binary Trust" = 0. Robust standard errors in parentheses, errors clustered at the sectoral level, * significant at 10%; ** significant at 5%; *** significant at 1%

Table 4 (Panel B)

	M.Logit	M.Logit	M.Logit	M.Logit	M.Logit
Dependent Variable	Usually Trust/ Usually Not	Usually Trust/ Usually Not	Usually Trust/ Usually Not	Usually Trust/ Usually Not	Usually Trust/ Usually Not
comp50	0.00540	0.00545*	0.00564**	0.00603**	0.00722**
	(0.00339)	(0.00297)	(0.00274)	(0.00276)	(0.00282)
income		0.080***	0.055***	0.053***	0.060***
		(0.015)	(0.018)	(0.018)	(0.019)
school			0.156***	0.154***	0.172***
			(0.035)	(0.035)	(0.033)
sex				-0.190	-0.165
				(0.167)	(0.166)
Age					-0.040
					(0.032)
Age sq					0.001*
					(0.000)
Constant	-0.378*	-1.696***	-3.408***	-3.068***	-2.992***
	(0.196)	(0.344)	(0.484)	(0.511)	(0.936)
Observations	750	722	721	721	719

Multinomial logit estimation. The category of comparison reported is a respondent answering "usually trusted" as opposed to the omitted category "usually not trusted". Robust standard errors in parentheses, errors clustered at the sectoral level, * significant at 10%; ** significant at 5%; *** significant at 1%

Table 5

	1 Binary Trust	2 Usually Trust / Usually Not	3 Binary Trust	4 Usually Trust / Usually Not	5 Binary Trust	5 Usually Trust / Usually Not	5 Binary Trust	8 Usually Trust / Usually Not
comp50	0.004**	0.009***			0.005**	0.011***		
	(0.002)	(0.003)			(0.002)	(0.003)		
comp4			0.004	0.009*			0.004	0.010*
			(0.003)	(0.005)			(0.003)	(0.005)
Hhold Inc.	0.028**	0.053**	0.028**	0.051**	0.025*	0.046*	0.025*	0.045*
	(0.013)	(0.024)	(0.013)	(0.024)	(0.013)	(0.023)	(0.013)	(0.020)
School yrs	0.106***	0.186***	0.105***	0.183***	0.086***	0.146***	0.084***	0.142***
	(0.020)	(0.036)	(0.020)	(0.037)	(0.020)	(0.034)	(0.019)	(0.034)
sex	-0.097	-0.157	-0.087	-0.138	-0.130	-0.203	-0.118	-0.180
	(0.093)	(0.167)	(0.093)	(0.165)	(0.090)	(0.162)	(0.090)	(0.162)
Occupation Dummies	NO	NO	NO	NO	YES	YES	YES	YES
anglo	0.296**	0.370	0.285**	0.347	0.281**	0.351	0.267*	0.320
	(0.140)	(0.236)	(0.142)	(0.238)	(0.140)	(0.238)	(0.141)	(0.239)
Size	-0.089*	-0.194**	-0.086*	-0.188**	-0.093*	-0.203**	-0.088*	-0.194**
(millions)	(0.049)	(0.083)	(0.049)	(0.084)	(0.049)	(0.085)	(0.050)	(0.086)
protestant	0.006	0.160	-0.005	0.132	0.017	0.192	0.006	0.158
	(0.197)	(0.338)	(0.194)	(0.335)	(0.198)	(0.341)	(0.194)	(0.335)
catholic	-0.099	-0.022	-0.117	-0.065	-0.085	0.009	-0.104	-0.040
	(0.207)	(0.337)	(0.206)	(0.334)	(0.210)	(0.337)	(0.206)	(0.329)
jewish	-0.631*	-0.992*	-0.620*	-0.967*	-0.634*	-0.997*	-0.622*	-0.969*
	(0.368)	(0.570)	(0.366)	(0.566)	(0.369)	(0.572)	(0.367)	(0.568)
noreligion	0.083	0.437	0.074	0.411	0.098	0.466	0.088	0.435
	(0.220)	(0.351)	(0.220)	(0.351)	(0.229)	(0.362)	(0.227)	(0.355)
Constant	-1.361**	2.756***	1.466***	2.982***	-1.342	-2.745*	-1.313**	-2.713**
	(0.543)	(0.993)	(0.566)	(1.033)	(0.918)	(1.411)	(0.595)	(1.072)
Obs.	721	721	721	721	721	721	721	721

Robust standard errors in parentheses, errors clustered at the sectoral level, * significant at 10%; ** significant at 5%; *** significant at 1%, includes Age Dummies, Marital Dummies, Race Dummies, ethnicity dummies (exluded category is Southern Europe),

"**Others Credit**"	Other people take credit for my work or ideas.
"**Put Down**"	People at work treat me in a manner that puts me down or address me in unprofessional terms, either publicly or privately
" **Heated Arguments**"	Heated arguments occur in my workplace.
"**Lack Information**"	People at work fail to give me information that is necessary for me to do my job.
"**Helpful**":	People at work with can be relied on when someone needs help.
"**Treat Respectfully**"	At work, people are treated with respect.
"**Act Upset**":	People at work throw things, slam doors, or hit objects when they are upset with me.
"**Shout**"	People at work shout or yell at me in a hostile manner.
"**Look Away**"	In my workplace, people "look the other way" when others. are threatened, intimidated, or put down
"**Work Stressful**":	How often do you find your work stressful?
"**Skip Work**"	During the past 3 months, how often did you stay at home or leave work early because you were unhappy about your work situation?
"**Personal Space**"	People at work get in my personal space in an attempt to intimidate me.
"**Work Size**"	The number of people working at the location of employment.
'Job Secure'	Job security is good
'Standards'	Some people hold standards in workplace that others don't
'Report Probs'	People feel free to report problems in workplace
'Harm Threat'	Respondent has been threatened with physical harm at work
"**Union Member**"	Are you a union member?

Table 6

Table 7

Dependent Variable	(1) Binary Trust	(2) U.Trust/ U. Not	(3) Binary Trust	(4) U.Trust/ U. Not	(5) Binary Trust	(6) U.Trust/ U. Not	(7) Binary Trust	(8) U.Trust/ U. Not
comp50	0.0068***	.0154***			0.0058**	.0137***		
	(0.0025)	(0.0049)			(0.0024)	(0.0041)		
comp4			0.0070*	0.0173**			0.0061*	.0163**
			(0.0041)	(0.0076)			(0.0036)	(.0063)
Family inc.	0.033	0.052	0.031	0.044	0.031	0.053	0.030	0.049
	(0.020)	(0.036)	(0.020)	(0.036)	(0.019)	(0.035)	(0.019)	(0.035)
Schooling	0.048**	0.104**	0.047*	0.101**	0.053**	0.095**	0.051**	0.089**
	(0.025)	(0.047)	(0.025)	(0.048)	(0.024)	(0.042)	(0.024)	(0.042)
Sex	-0.149	-0.262	-0.143	-0.246	-0.215*	-0.377*	-0.211*	-0.364*
	(0.144)	(0.255)	(0.145)	(0.253)	(0.127)	(0.220)	(0.127)	(0.220)
Union Memb.	0.280	0.381	0.302	0.423	0.312	0.367	0.331	0.401
	(0.223)	(0.415)	(0.225)	(0.413)	(0.224)	(0.413)	(0.224)	(0.409)
Work Size	0.056	0.087	0.044	0.078	0.052	0.088	0.042	0.067
	(0.038)	(0.064)	(0.038)	(0.065)	(0.034)	(0.057)	(0.035)	(0.057)
Heated	0.191**	0.392**	0.193**	0.406***	0.167**	0.212	0.169**	0.220
	(0.082)	(0.154)	(0.082)	(0.154)	(0.082)	(0.147)	(0.081)	(0.147)
Help	-0.164	-0.418**	-0.172*	-0.435**	-0.207**	-0.395*	-0.211**	-.401**
	(0.105)	(0.211)	(0.103)	(0.209)	(0.103)	(0.204)	(0.103)	(0.201)
Stressful	0.091	0.273**	0.094	0.288**	0.065	0.176	0.067	0.183
	(0.067)	(0.133)	(0.067)	(0.131)	(0.061)	(0.120)	(0.061)	(0.119)
Standards	0.002	-0.036	0.009	-0.013				
	(0.070)	(0.124)	(0.071)	(0.126)				
Report Prob	-0.093	-0.130	-0.099	-0.148				
	(0.097)	(0.178)	(0.097)	(0.176)				
Take Credit	-0.168*	-0.255	-0.165*	-0.242				
	(0.097)	(0.178)	(0.097)	(0.175)				
Put Down	-0.058	-0.101	-0.063	-0.108				
	(0.098)	(0.173)	(0.098)	(0.172)				
No Info	-0.129	-0.260	-0.129	-0.257				
	(0.094)	(0.171)	(0.093)	(0.169)				
Pers. Space	0.085	0.048	0.087	0.035				
	(0.119)	(0.243)	(0.119)	(0.245)				
Harm Threat	0.120	0.302	0.118	0.296				
	(0.266)	(0.472)	(0.267)	(0.472)				
Throw	0.014	-0.185	0.008	-0.220				
	(0.152)	(0.264)	(0.154)	(0.268)				
Shout	0.082	0.068	0.094	0.111				
	(0.194)	(0.365)	(0.195)	(0.371)				
Job Secure	-0.059	-0.045	-0.061	-0.043				
	(0.089)	(0.134)	(0.088)	(0.133)				
Respect	-0.211	-0.199	-0.197	-0.189				
	(0.139)	(0.265)	(0.141)	(0.277)				
Look Away	0.018	0.049	0.016	0.044				
	(0.112)	(0.181)	(0.111)	(0.178)				
Skip Work	-0.133	-0.388	-0.137	-0.402				
	(0.139)	(0.278)	(0.139)	(0.281)				
Observations	451	453	451	453	466	468	466	468

Robust standard errors in parentheses, errors clustered at the sectoral level, * significant at 10%; ** significant at 5% *** significant at 1%, includes a constant, Household Income, Years Schooling, Sex, Occupation, Ethnicity, Age, Race, Religion and Marital Status Dummies, 'Union Member' denotes membership in labor union, `standards' denotes some people hold

Table 8

Dependent Variable	(1) Binary Trust	(2) U.Trust/ U. Not	(3) Binary Trust	(4) U.Trust/ U. Not	(5) U.Trust/ U. Not	(6) U.Trust/ U. Not
Comp50	-0.00077	-0.00083			-0.00219	
	(0.00378)	(0.00654)			(0.00976)	
Comp50*exp	0.00020	0.00042*			0.00073*	
	(0.00012)	(0.00021)			(0.00038)	
Comp4			-0.00721	-0.01108		-0.01714
			(0.00692)	(0.01228)		(0.01594)
Comp4*exp			0.00043*	0.00077*		0.00151***
			(0.00024)	(0.00041)		(0.00058)
Experience	-0.026	-0.048	-0.048	-0.085	-0.021	-0.109
	(0.029)	(0.052)	(0.035)	(0.063)	(0.075)	(0.083)
Hhold Income	0.026**	0.049**	0.027**	0.049**	0.051	0.047
	(0.013)	(0.024)	(0.013)	(0.024)	(0.034)	(0.035)
Schooling	0.074**	0.130**	0.074**	0.129**	0.117	0.106
	(0.032)	(0.054)	(0.031)	(0.054)	(0.072)	(0.071)
Sex	-0.118	-0.191	-0.106	-0.168	-0.355	-0.322
	(0.091)	(0.166)	(0.092)	(0.168)	(0.219)	(0.218)
City Size	-0.093*	-0.206**	-0.090*	-0.199**	-0.187*	-0.168
	(0.050)	(0.087)	(0.051)	(0.089)	(0.109)	(0.113)
Jewish	-0.669*	-1.088*	-0.649*	-1.047*	-0.260	-0.279
	(0.371)	(0.584)	(0.370)	(0.584)	(0.794)	(0.806)
Union Member					0.371	0.406
					(0.413)	(0.410)
Work Size					0.099*	0.080
					(0.058)	(0.057)
Heated					0.191	0.207
					(0.148)	(0.148)
Help					-0.391*	-0.401*
					(0.210)	(0.207)
Stressful					0.188	0.192*
					(0.117)	(0.116)
Constant	0.399	0.441	0.824	1.125	4.180	3.575
	(2.111)	(3.852)	(2.160)	(3.942)	(0.000)	(0.000)
Observations	719	719	719	719	467	467

Robust standard errors in parentheses, errors clustered at the sectoral level, * significant at 10%; ** significant at 5%; *** significant at 1%, includes a constant, Occupation Dummies, Ethnicity Dummmies, Age Dummies, Race, Religion and Marital Status Dummies, 'Union Member' denotes membership in labor union, `Heated' heated arguments occur in workplace, `Help' people at work can be relied on when needs help, `Stressful' how often respondent finds her work stressful, `Work Size' number of employees at respondent's work site

standards in workplace that others don’t, `report probs’ denotes people feel free to report problems in workplace, `Take Credit’ denotes other peple take credit for respondent’s work or ideas,`Put Down’ denotes people at work treat respondent in a manner putting respondent down, `No Info’ people at work fail to give respondent necessary information to do job,`Pers Space’ people at work get in respondent’s personal space to intimidate, `Harm Threat’ respondent has been threatened with physical harm at work, `Throw’ people at work throw things when upset with respondent, `Shout’ people at work shout at respondent in hostile manner, `Heated’ heated arguments occur in workplace, `Help’ people at work can be relied on when needs help, `Job Secure’ job security is good, `Respect’ people are treated with respect, `Look Away’ people look the other way when others are threatened, `Stressful’ how often respondent finds her work stressful, `Skip Work’ how often respondent stayed at home or left work early, `Work Size’ number of employees at respondent’s work site

Table 9 supervision

	(1) Binary Trust	(2) U.Trust/ U. Not	(3) Binary Trust	(4) U.Trust/ U. Not	(5) U.Trust/ U. Not	(6) U.Trust/ U. Not
comp50	0.005	0.011*			-0.008	
	(0.003)	(0.006)			(0.011)	
comp4			0.007*	0.015**		-0.014
			(0.004)	(0.007)		(0.016)
comp50exp					0.00078**	
					(0.00036)	
comp4exp						0.00127**
						(0.00055)
experience					-0.097	-0.153*
					(0.080)	(0.093)
supervisor	0.114	0.067	0.131	0.099	0.027	0.082
	(0.227)	(0.406)	(0.229)	(0.410)	(0.418)	(0.420)
family inc.	0.020	0.019	0.018	0.016	0.020	0.015
	(0.022)	(0.041)	(0.022)	(0.041)	(0.041)	(0.042)
schooling	0.069**	0.116**	0.068**	0.113*	0.070	0.073
	(0.031)	(0.059)	(0.031)	(0.058)	(0.084)	(0.084)
Age	0.032	-0.019	0.027	-0.028		
	(0.036)	(0.065)	(0.037)	(0.066)		
Age squared	-0.000	0.000	-0.000	0.000	0.001	0.001
	(0.000)	(0.001)	(0.000)	(0.001)	(0.001)	(0.001)
sex	-0.206	-0.306	-0.208	-0.308	-0.297	-0.272
	(0.175)	(0.306)	(0.174)	(0.306)	(0.315)	(0.310)
Size	-0.098**	-0.174**	-0.094**	-0.167**	-0.159**	-0.152**
(millions)	(0.043)	(0.071)	(0.044)	(0.072)	(0.068)	(0.069)
Observations	336	336	336	336	336	336

Robust standard errors in parentheses, errors clustered at sectoral level, * significant at 10%; ** significant at 5%; *** significant at 1%, includes a constant, occupation dummies, ethnicity dummies, race, marital dummies, religious dummies. Columns 1 and 3 are probit estimates with the dependent variable a binary measure of trust. The measure is constructed by collapsing "usually trusted" and "always trusted" to a variable “Binary Trust” = 1, and "usually not trusted" and "always not trusted" are collapsed to “Binary Trust” = 0. Columns 2,4,5 and 6 are one set of results from multinomial logit regressions. The category of comparison reported is a respondent answering “usually trusted” as opposed to the omitted category “usually not trusted”.

Table 10.

	(1)	(2)	(3)	(4)
Dependent Var	Binary Trust	U.Trust/ U. Not	Binary Trust	U. Trust/ U. Not
comp50low	-0.177	-0.250		
	(0.116)	(0.197)		
comp50med	0.384**	0.866***		
	(0.175)	(0.309)		
comp50hi	0.353**	0.670***		
	(0.137)	(0.227)		
comp50vhi	0.088	0.258		
	(0.102)	(0.175)		
comp4low			0.079	0.274
			(0.160)	(0.281)
comp4med			0.107	0.314
			(0.148)	(0.258)
comp4hi			0.364***	0.630***
			(0.138)	(0.241)
comp4vhi			0.096	0.274
			(0.111)	(0.195)
family income	0.028***	0.049***	0.026***	0.046***
	(0.009)	(0.015)	(0.009)	(0.015)
schooling	0.081***	0.139***	0.080***	0.137***
	(0.015)	(0.026)	(0.015)	(0.025)
male	0.204***	0.337***	0.206***	0.335***
	(0.065)	(0.118)	(0.065)	(0.116)
Observations	1318	1318	1318	1318

Robust standard errors in parentheses, * significant at 10%; ** significant at 5%; *** significant at 1%, Very Low category omitted, Includes a constant, occupation dummies, union membership, size of city, ethnicity dummies, race dummies

Table 11

	Probit Binary Trust	M. Logit U.Trust/ U.Not	Probit Binary Trust	M. Logit U.Trust/ U.Not
comp50	0.004	0.015***		
	(0.002)	(0.005)		
comp50mantranspwarehouse	0.001	-0.001		
	(0.007)	(0.013)		
comp50retail	0.001	-0.005		
	(0.005)	(0.009)		
comp50infofinance	-0.015	-0.031		
	(0.017)	(0.025)		
comp50profsci	-0.007	-0.035*		
	(0.007)	(0.018)		
comp50healthsector	-0.005	-0.007		
	(0.011)	(0.022)		
comp50othersector	-0.014	-0.023		
	(0.012)	(0.017)		
comp50advancedservices	0.009	0.019		
	(0.017)	(0.028)		
comp4			0.014	0.061***
			(0.009)	(0.013)
comp4mantranspwarehouse			-0.012	-0.055***
			(0.010)	(0.017)
comp4retail			-0.011	-0.054***
			(0.011)	(0.018)
comp4infofinance			-0.013	-0.057***
			(0.013)	(0.019)
comp4profsci			-0.026	-0.107***
			(0.017)	(0.037)
comp4healthsector			-0.037	-0.107**
			(0.028)	(0.052)
comp4othersector			-0.024	-0.066*
			(0.024)	(0.037)
comp4advancedservices			0.021	0.006
			(0.024)	(0.036)
mantranspwarehouse	0.107	0.493	1.155	5.145***
	(0.270)	(0.584)	(0.844)	(1.384)
healthsector	0.737	1.098	3.731	10.284**
	(0.831)	(1.666)	(2.486)	(4.626)
retail	0.198	0.802	1.271	5.368***
	(0.351)	(0.662)	(0.933)	(1.565)
infofinance	0.681	1.683	1.263	5.360***
	(0.691)	(1.092)	(1.069)	(1.621)
profsci	0.821*	3.032**	2.676*	10.261***
	(0.492)	(1.422)	(1.474)	(3.284)
advancedservices	-0.130	-0.667	-1.338	0.411
	(1.374)	(2.239)	(2.165)	(3.239)
othersector	1.135	1.779	2.196	6.187*
	(0.976)	(1.480)	(2.271)	(3.434)
Observations	721	721	721	721

Robust standard errors in parentheses, errors clustered at sectoral level, * significant at 10%; ** significant at 5%; *** significant at 1%Includes, Income, Sex, Size, a Constant and dummies for Age, Occupation, Religion, Marital Status,

Table 12

Dep Variable	(1) U. Trust U. Don't	(2) U. Trust U. Don't	(3) U.Trust U.Don't	(4) U.Trust U.Don't	(5) U.Trust U.Don't	(6) U.Trust U.Don't	(7) U.Trust U.Don't	(8) U.Trust U.Don't
comp50	0.011***	0.010***	-0.002	-0.002				
	(0.004)	(0.004)	(0.007)	(0.007)				
comp4					0.010*	0.010*	-0.011	-0.012
					(0.005)	(0.005)	(0.012)	(0.012)
Gov.employee	-0.215	-2.322	-2.834	-4.184*	-0.221	-0.070	-1.227	-5.504
	(0.380)	(1.801)	(1.862)	(2.289)	(0.396)	(3.906)	(4.012)	(8.631)
Govemploy*comp50		0.035	0.035	0.057				
		(0.029)	(0.029)	(0.039)				
Govemploy* experience*comp50				-0.001 (0.001)				
comp50*experience			0.000**	0.000**				
			(0.000)	(0.000)				
Govemploy*comp4						-0.002	0.005	0.056
						(0.045)	(0.045)	(0.099)
comp4*experience							0.001*	0.001**
							(0.000)	(0.000)
Govemploy *experience*Comp4								-0.002
								(0.003)
Govemploy *experience			0.016	0.092			0.023	0.204
			(0.023)	(0.076)			(0.024)	(0.264)
experience			-0.043	-0.047			-0.080	-0.082
			(0.053)	(0.054)			(0.064)	(0.064)
Observations	715	715	713	713	715	715	713	713

Robust standard errors in parentheses, * significant at 10%; ** significant at 5%; *** significant at 1%, includes a constant, age, sex, marital status, race, occupation, ethnicity and religious dummies, city size, income, education

Figure 1

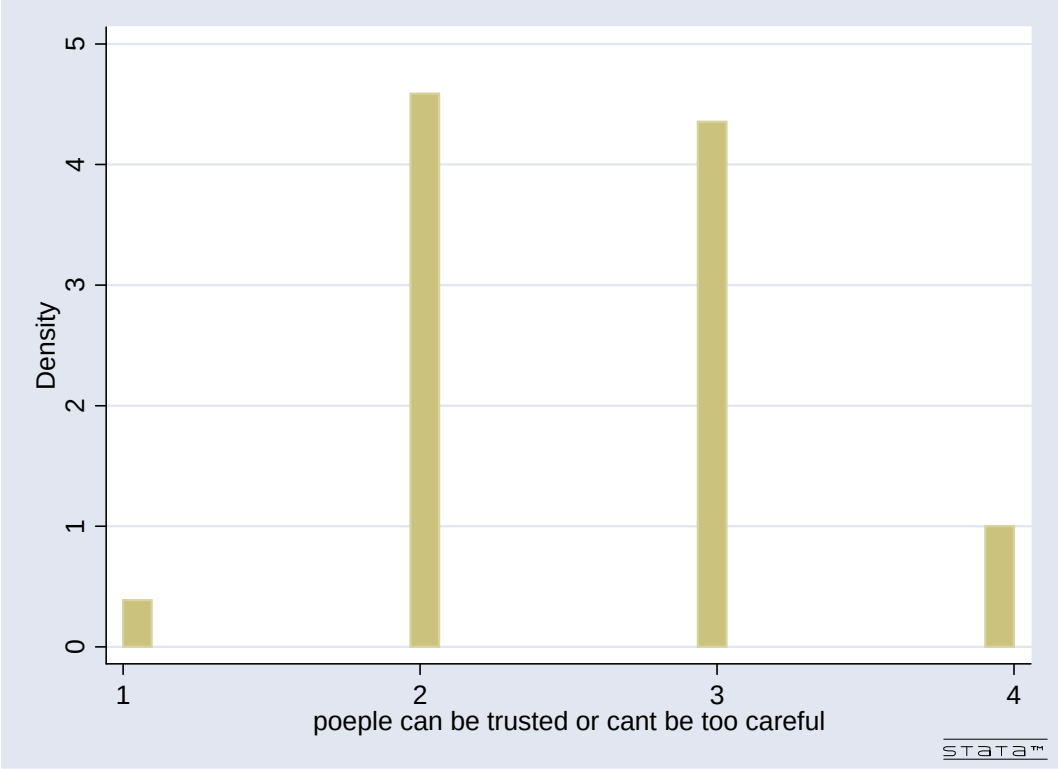

Density
0
1
2
3
4
5
1
2
3
4
poeple can be trusted or cant be too careful
Stata™

Figure 2a

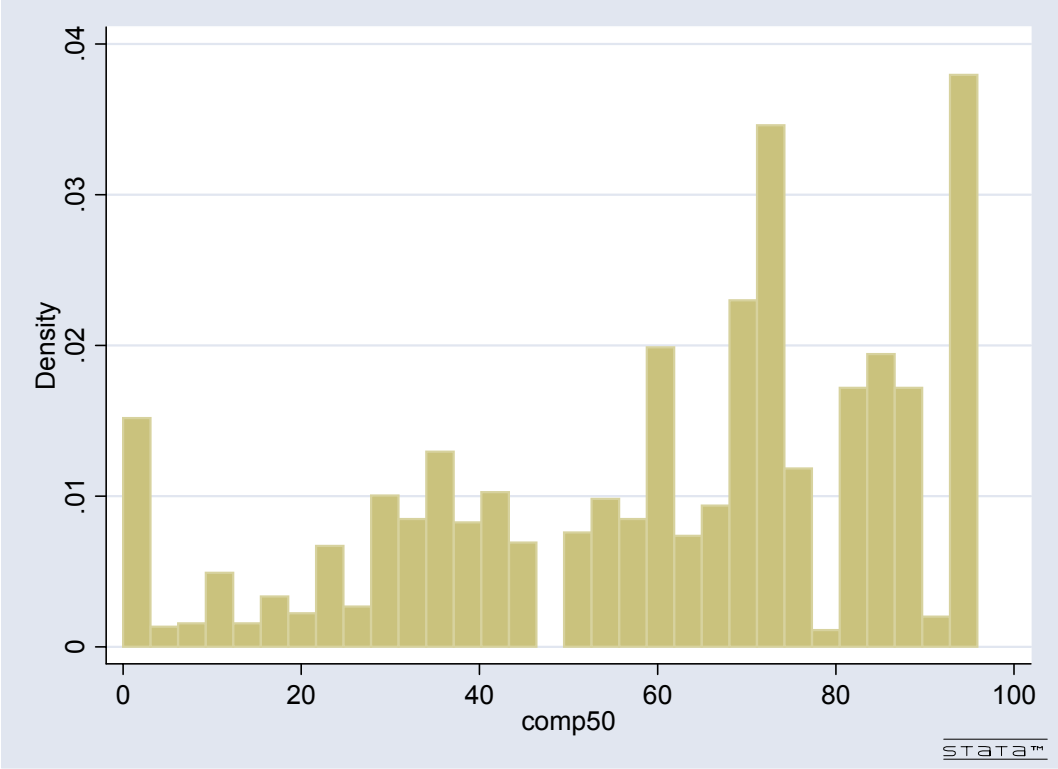


Figure 2b

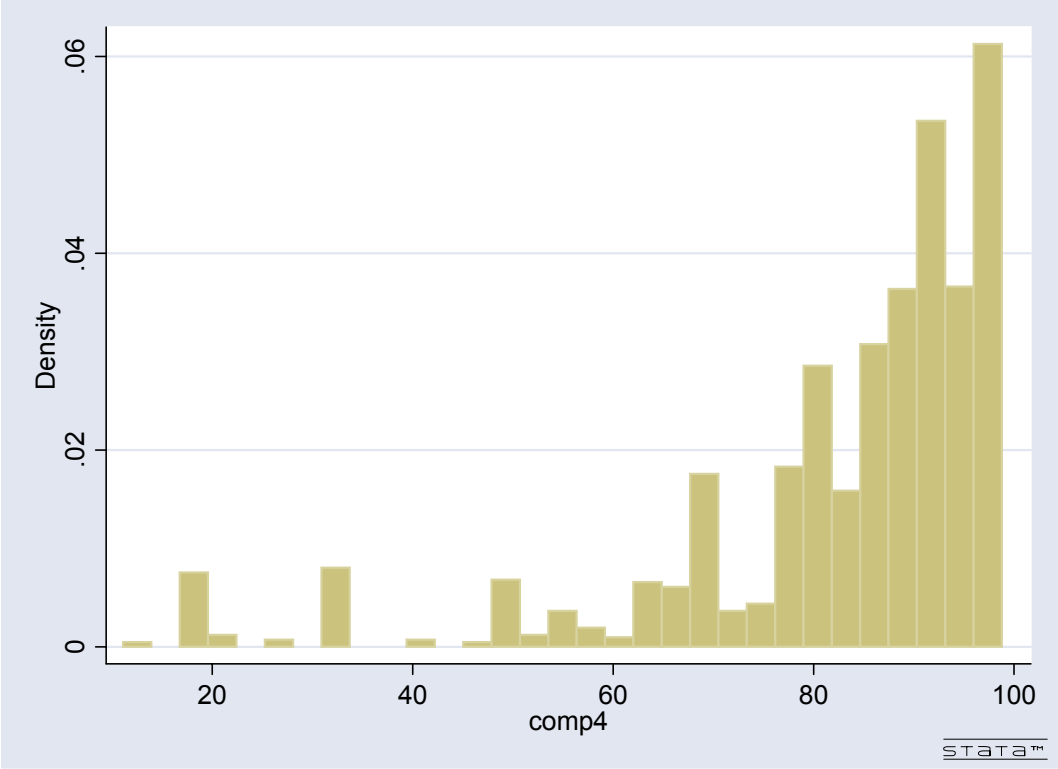


Figure 3.

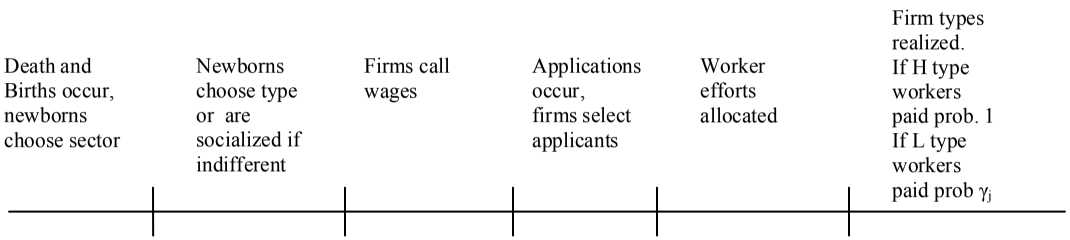

Death and Births occur, newborns choose sector
Newborns choose type or are socialized if indifferent
Firms call wages
Applications occur, firms select applicants
Worker efforts allocated
Firm types realized. If H type workers paid prob. 1 If L type workers paid prob γ_j

Figure 4

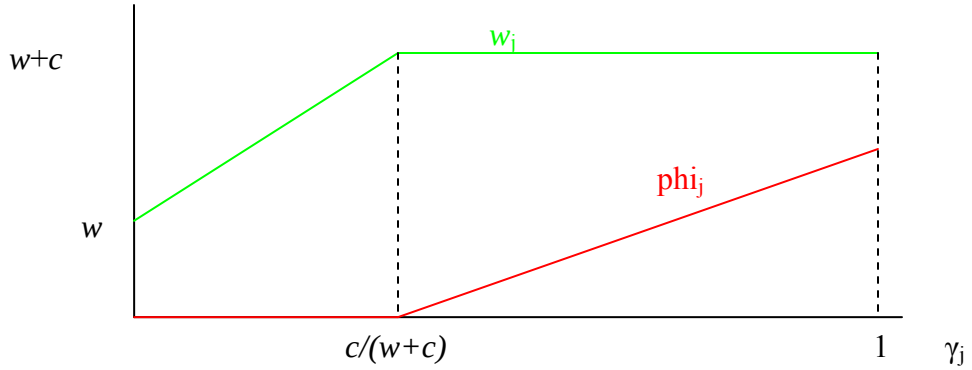


Figure 5

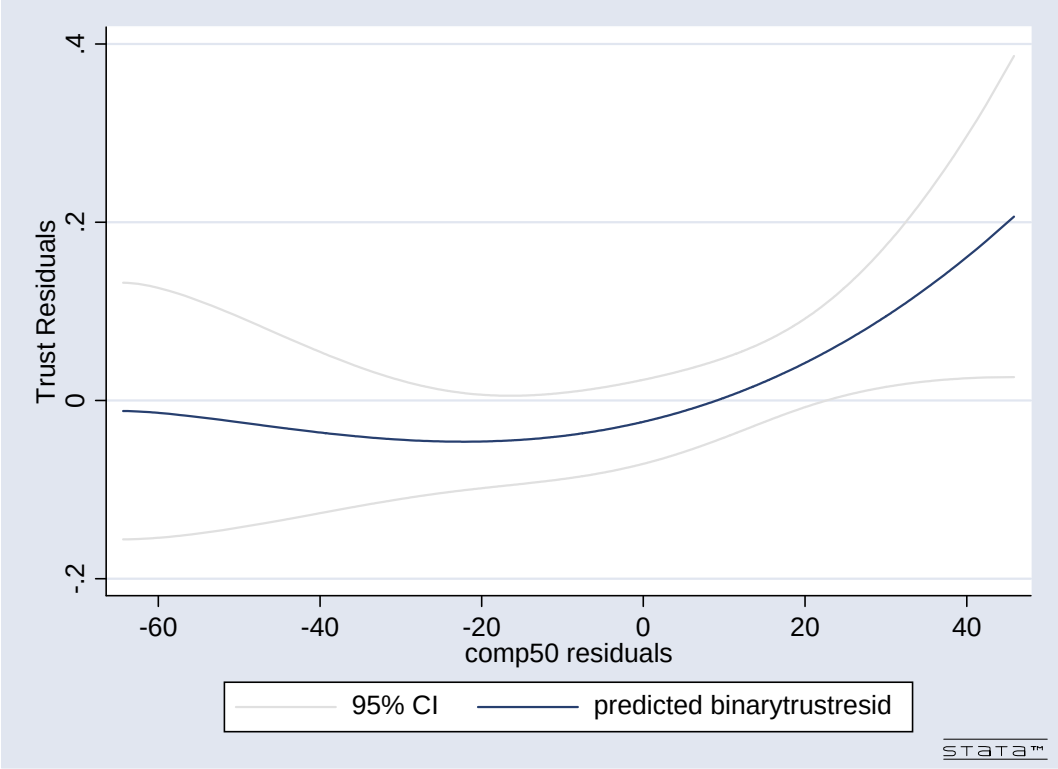

Trust Residuals
.4
.2
0
-.2
-60
-40
-20
0
20
40
comp50 residuals
95% CI
predicted binarytrustresid
Stata™

Figure 6

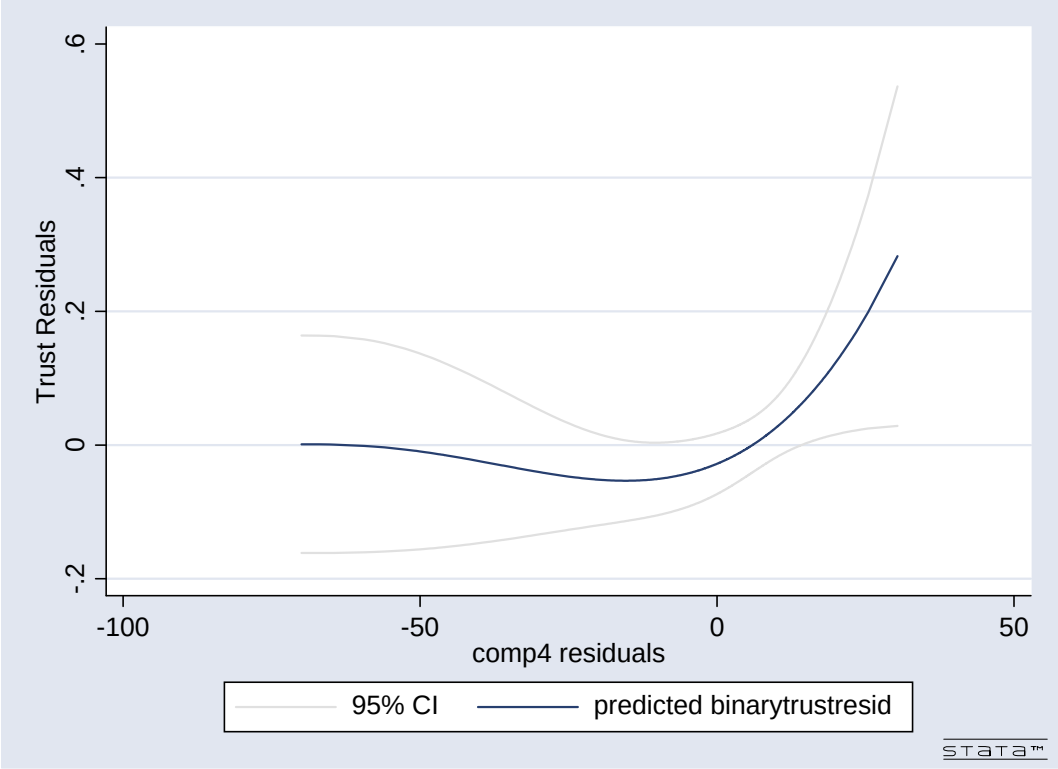

Trust Residuals
-.2
0
.2
.4
.6
-100
-50
0
50
comp4 residuals
95% CI
predicted binarytrustresid
Stata™

Figure 7

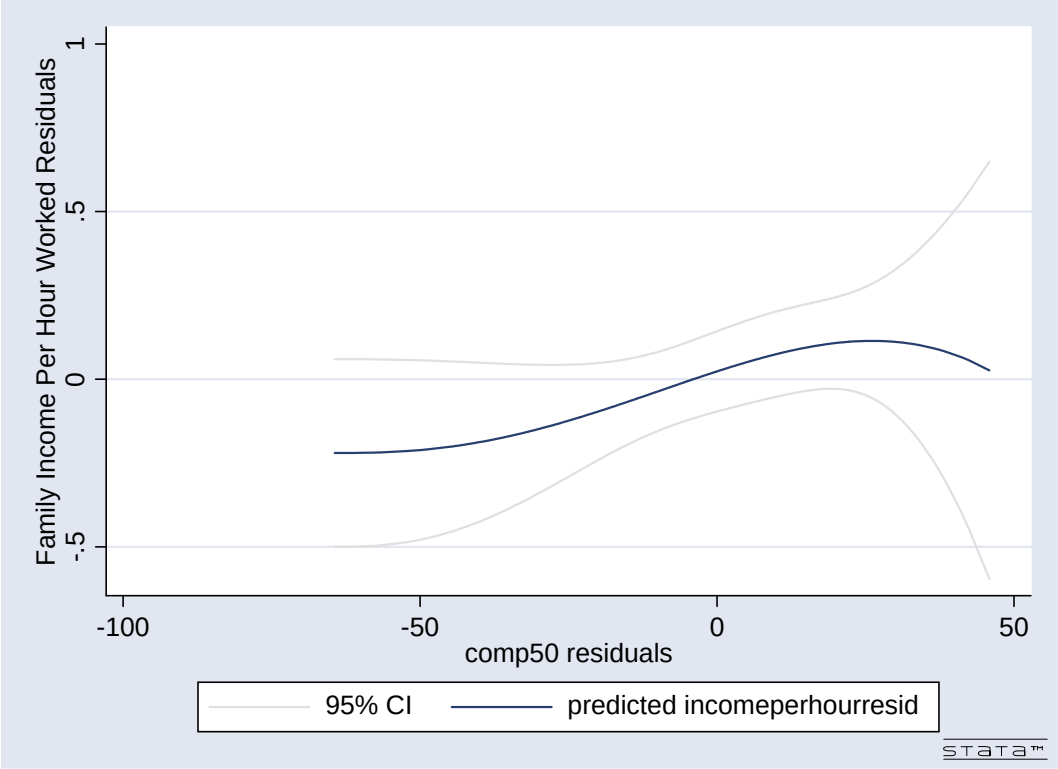

Family Income Per Hour Worked Residuals
1
.5
0
-.5
-100
-50
0
50
comp50 residuals
95% CI
predicted incomeperhourresid
Stata™

Figure 8

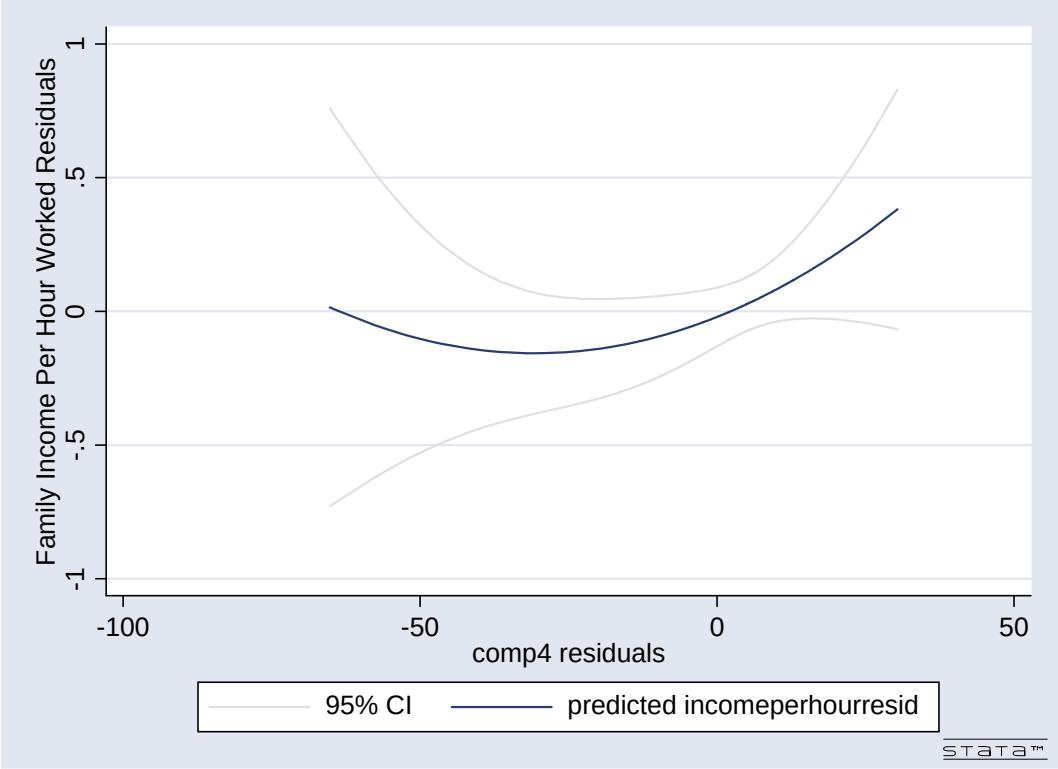

Family Income Per Hour Worked Residuals
-1
-.5
0
.5
1
-100
-50
0
50
comp4 residuals
95% CI
predicted incomeperhourresid
Stata™

Figure 9

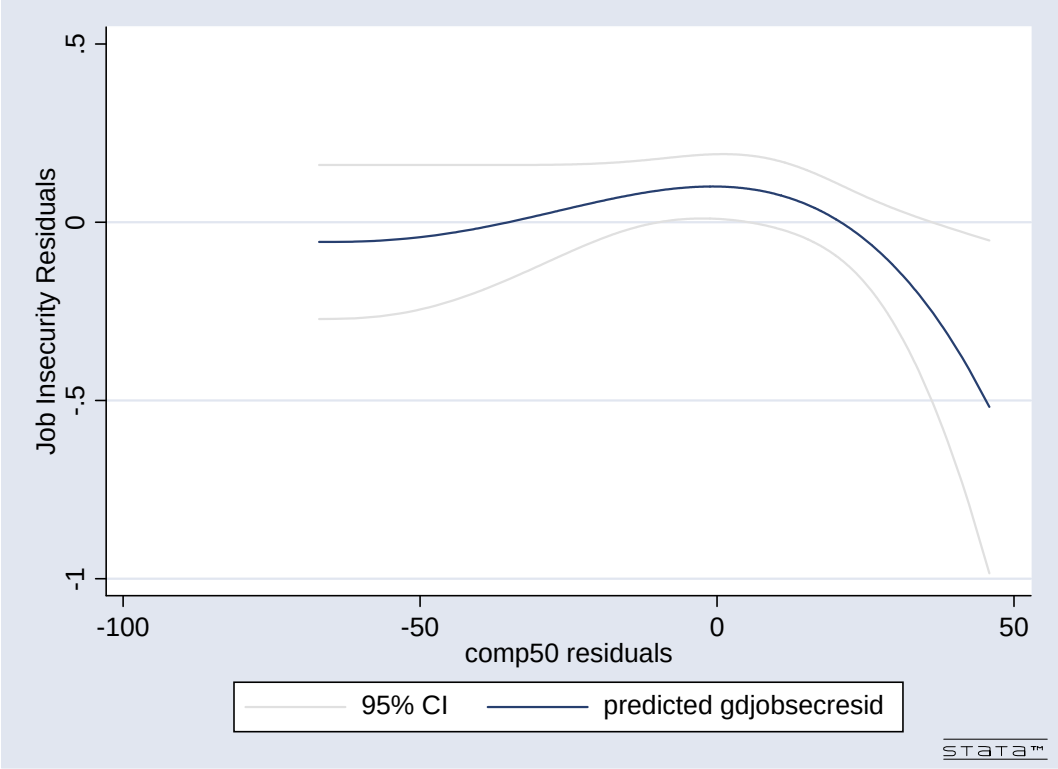
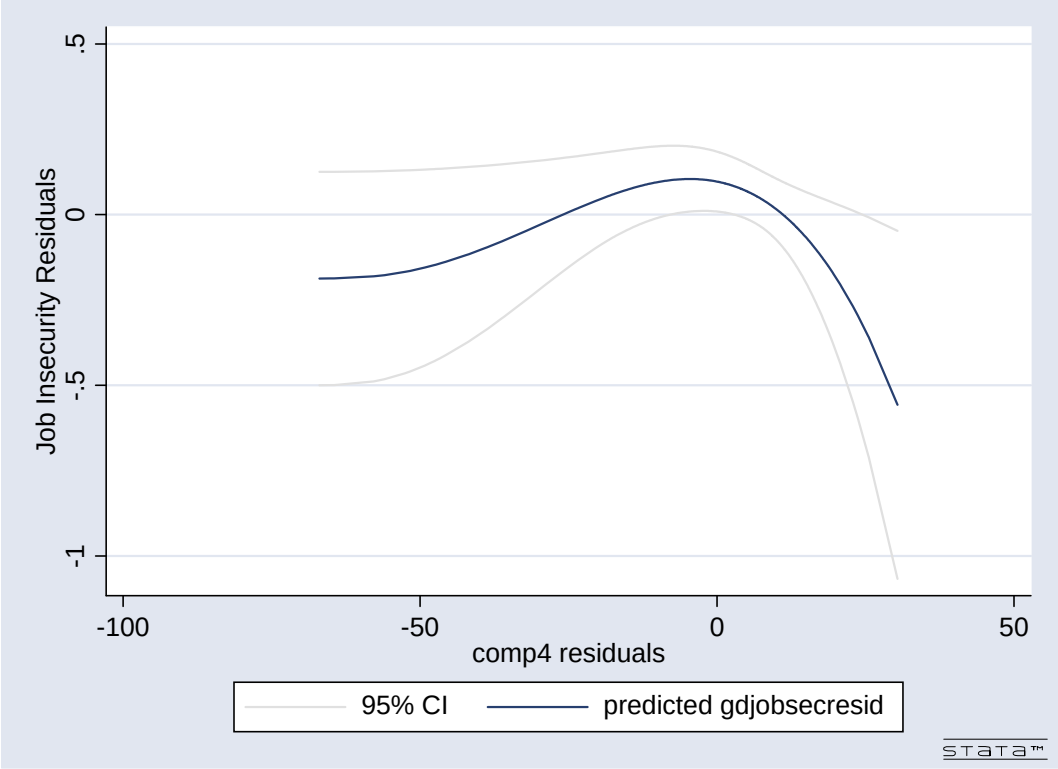

Job Insecurity Residuals
.5
0
-.5
-1
-100
-50
0
50
comp50 residuals
95% CI
predicted gdjobsecresid
Stata™

Figure 10


Job Insecurity Residuals
.5
0
-.5
-1
-100
-50
0
50
comp4 residuals
95% CI
predicted gdjobsecresid
Stata™