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Trust and macroeconomic performance: A two-step approach

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ABSTRACT

We reexamine the role of trust in macroeconomic performance using a new econometric method, a two-step approach adopted by Di Tella et al. (AER, 2001). In the first step, the measure of trust is constructed from the micro-regression of trust. This method allows us to extract the component of trust that is not influenced by individual-level socio-economic factors. In the second step, measures of macroeconomic performances are regressed on this improved measure of country-level trust. We find a strong positive relationship between the level of trust and real GDP per person stipulated by an increase in investment. Our results also indicate that the impact of trust on macroeconomic variables estimated by previous studies is biased upwards.

1. Introduction

The empirical literature on economic growth has identified factors that play important roles in explaining the economic performance of contemporary societies ranging from, but not limited to, human capital, natural resources, colonial origins, geography, institutions, and financial development (Acemoglu et al., 2001, 2002; Arestis and Demetriades, 1997; Gallup et al., 1999; Sachs and Warner, 1999). More recently, the link between social capital (defined as the interpersonal trust of citizens) and economic growth has attracted increasing attention of economists, as some recent contributions attest (Temple and Johnson, 1998; Coleman, 1988; Putnam, 1995; Whiteley, 2000; Zak and Knack, 2001; Deng et al., 2012; Tabellini, 2010; Algan and Cahuc, 2010).

Social capital is an element inherent in every commercial transaction; its existence works to reduce transaction costs, minimize the deadweight burdens of enforcing agreements, and lessen the risks of fraud and theft. These benefits enable economic agents to efficiently negotiate solutions to collective action problems while greatly diminishing principal-agent problems, which directly influences economic outcomes (Arrow, 1972; Whiteley, 2000). The indirect effects of social capital on growth work through the agency of other growth-enhancing factors. For instance, a high-trust environment is arguably conducive to greater investment in both physical and human capital, which in turn leads to better economic performance (Zak and Knack, 2001). Using panel data, Dearmon and Grier (2009) show that while generalized trust does explain income differences across countries, it does not directly influence investment. Bjørnskov (2012) shows that trust affects growth through its effect on schooling and the rule of law. Bjørnskov (2017) provides a survey of literature outlining main channels through which social trust affects economic growth, with collated empirical evidence supporting these arguments. Trust can affect economic growth through its effect on education, investment, innovation or institutions, and/or it can affect economic growth directly by reducing the transaction costs.

While the relationship between trust and income is clear, an important but difficult aspect shared by all the existing studies on trust is how trust should be measured at the country level, as we generally get information about an individual's level of trust through surveys. As this variable is not available at the country level, many studies including those by Zak and Knack (2001), Dearmon and Grier (2009), and Bjørnskov (2012) resort to averaging individuals' responses in a survey conducted in a particular country and use these as a measure for that country. This method, however, may not yield a good measure for country-level trust because individuals' perception regarding interpersonal trust is influenced by their personal characteristics and their personal experiences. For instance, divorced individuals are more likely to express lower trust than those in a stable marriage. Levels of trust also differ among individuals according to their levels of education and income (Dinesen, 2013).

Algan and Cahuc (2010) addressed this problem by extracting the inherited component of country-level trust from the trust levels of immigrants of those countries to the U.S. They used the country fixed effects in micro-regressions as a proxy for trust in the immigrants' home countries. However, the trust measure obtained in this way is plagued

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with a number of shortcomings. First, the trust of immigrants to the U.S. may diverge from their level of trust in their home countries due to temporary shocks or traumatic experiences encountered over time or at the time of migration. Studies on the determinants of trust confirm that temporary shocks substantially alter an individual's level of trust (Alesina and La Ferrara, 2002; Guiso et al., 2008; Nunn and Wantchekon, 2011). Also, Helliwell et al. (2016) show that the footprint effect of trust is about one-third as large in immigrants' destination countries as compared to their trust level in their home countries. They also show that immigrants from a high-trust country tend not to carry their high level of trust to their new country of residence. Second, obtaining country-level trust by incorporating country fixed effects produces a relative rather than an absolute value for a measure of trust. That is, as Algan and Cahuc (2010) used Sweden as a reference group, the inherited trust of all countries in their sample consists essentially of a measured level of trust for each country relative to that of Sweden. For that reason, any changes of trust on the part of Swedish immigrants to the U.S. may potentially distort the measure of trust for immigrants from all other countries, even if their levels of trust have not altered after migration.

The objective of this paper is to obtain a measure of trust at the country level which is independent of individual-level socio-economic factors such as employment status, income, education, marital status, or religious affiliation. In this paper, we address all these concerns by applying the two-step methodology used by Di Tella et al. (2001) and Wolfers (2003). Di Tella et al. (2001) propose a two-step approach to use individual-level survey data to obtain a country-level life satisfaction measure. Wolfers (2003) examines the cost of business cycle volatility by using individual-level survey data to calculate various country-level measures of life satisfaction and suggests that the two-step approach is a preferable alternative. We adopt their methods to extract a measure of country-level trust from individual-level survey data and then reexamine the causal impact of trust on cross-country income and investment. In the first step, a trust variable is constructed by regressing individuals' perception of trust on their corresponding characteristics to obtain averaged residuals for each country and each year using individual country survey data. Then, using the classical growth model, the relationships between the estimated measure of trust and per capita income and investment are examined after controlling for the other macro variables that have been found to be important in the growth literature. We find strong evidence of a positive effect of trust on income and investment. After correcting for various possibilities of endogeneity, we find that a one standard deviation improvement in trust accounts for an approximately 12 percent rise in real GDP per person, which qualitatively confirms the findings of Arrow (1972) and Whiteley (2000). However, unlike Dearmon and Grier (2009), we find a positive relationship between trust and investment.

This paper contributes to the extant literature in a number of ways. First and foremost, we construct a new and improved measure of trust obtained from individual survey responses. Unlike the trust variable used by Zak and Knack (2001), Dearmon and Grier (2009), and Bjørnskov (2012), our approach has an important advantage which addresses the measurement problem by removing the variations in trust due to individual-level socio-economic factors. With this improved measure, we are able to reduce the bias in the estimate of the impact of trust on economic performance. Second, through the use of combined datasets from the World Values Survey (2009) and the European and World Values (2006), we have been able to cover a larger sample of countries than those examined by Zak and Knack (2001) and Dearmon and Grier (2009).[1]

The rest of this paper is structured as follows: Section 2 sets up a simple theoretical model that links social trust to macroeconomic performance closely following Zak and Knack (2001). Section 3 specifies the estimation methods used and the details of the data presented in this paper. The analysis of the micro-regressions used to construct the trust measure for each country is presented in Section 4. In Section 5, we show evidence of the relationship between trust and macroeconomic variables followed by an extensive stability analysis. Finally, some concluding remarks and policy implications are presented in Section 6.

2. Theory

To understand the link between trust and the macroeconomic performance, we construct a simple representative agent model following Zak and Knack (2001). The agent enters an investment contract with an investor who produces goods and services for the economy. The moral hazard problem manifests in the form that the actual return is known to the investor, but not the agent. The investor can deviate from the agreed contract and cheat. However, the agent can investigate the trustworthiness of the investment in order to reduce the risk. Thus, in a society with higher level of interpersonal trust, the agent will devote less resources in investigating trustworthiness of the investor and thus more resources are used for production, instead. To formalize the model, we assume that a representative agent chooses consumption (c), assets (A) and time for investigation (i) in order to maximize a lifetime utility given by

$$Max_c \int_0^\infty U(c)e^{-\beta t}dt \tag{1}$$

where β is the rate of time preference. $U_c > 0$ and $U_{cc} < 0$. For simplicity, we assume that the supply of labor is inelastic and the agent is endowed with one unit of time every period. Thus, labor supply, n, can be written as:

$$n = 1-i \tag{2}$$

where i is the amount of time spent in investigating trustworthiness of the investor. The agent's budget constraint is given by

$$\dot{A} = wn + AR\varphi(i, T) - c \tag{3}$$

where wn is labor income, $AR\varphi(i, T)$ is income from the investment contract, A is assets invested under the contract, R is the gross return from the investment, and $\varphi(i, T) \in (0, 1)$ is an investigation technology which allows the agent to detect the accuracy of return reports by the investor. We assume that the return to investigation rises with investigation time, but exhibits a diminishing return $\varphi_i > 0$ and $\varphi_{ii} < 0$. T denotes the exogenous social trust or the existing social capital.[2] We also assume that the return to investigation rises with social trust ($\varphi_T > 0$), but the marginal return falls with social trust ($\varphi_{iT} < 0$). In a perfectly trustworthy society where $T \to \infty$, $\varphi = 1$ and $i = 0$.

The Lagrangian function for the optimization problem can be written as

$$L = U(c)e^{-\beta t} + \lambda e^{-\beta t}[w(1-i) + AR\varphi(i, T) - c - \dot{A}] \tag{4}$$

The optimality conditions are

$$U_c(c) = \lambda \tag{5}$$

$$R\varphi(i, T) = \beta - \frac{\dot{\lambda}}{\lambda} \tag{6}$$

$$w = AR\varphi_i(i, T) \tag{7}$$

Eq. (5) equates the marginal utility of consumption to the shadow price of wealth. Eq. (6) is the Keynes-Ramsey rule which describes the intertemporal allocation of consumption. Eq. (7) presents the optimal allocation of time between working and investigating the trustworthiness of the investor.

[1] Zak and Knack (2001) used the WVS to obtain trust levels for 41 countries while Dearmon and Grier (2009) obtained trust levels for 51 countries. We estimate the level of trust for 94 countries and territories.

[2] Unlike Zak and Knack (2001), we assume social trust is an exogenous variable.