The transmission of trust through generations*

Corrado Giulietti† Enrico Rettore‡ Sara Tonini§

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Abstract

Understanding the formation of trust at the individual level is a key issue given the impact that it has been recognized to have on the economic development and the wealth of nations since Arrow (1972). Recent research highlights the role of the transmission of values - trust, in particular - from parents to their children (Bisin and Verdier, 2001, among others). So far, attempts to empirically measure the strength of this transmission relied on the *cross-sectional* regression of the trust of children on the contemporaneous trust of their parents (Dohmen et al., 2012, among others). We introduce a new identification strategy relying on a *panel* sample of parents and of their children drawn from the German Socio Economic Panel. As a result, we show that 1) one half to two thirds of the observed variability of trust is pure noise irrelevant to the transmission process; 2) this noise strongly biases the OLS estimate of the parameters of the regression of children's trust on parents' trust but an IV estimate straightforwardly emerges from the analysis; 3) the dynamics of the component of trust relevant to the transmission process shed light on the structural interpretation of the parameters of this regression; 4) the strength of the flow of trust that parents pass on to their children is easily summarised by the conventional R^2 of a latent equation. As applied to our sample, only one fifth of the variability of children's trust is inherited from their parents.

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†Institute for the Study of Labor (IZA). E-mail: giulietti@iza.org

‡University of Trento, FBK-IRVAPP and Institute for the Study of Labor (IZA). E-mail: enrico.rettore@unitn.it

§University of Trento. E-mail: sara.tonini-1@unitn.it

1 Introduction

The role of culture on economic choices and its effect on the economic development and the wealth of nations is the subject of a lively debate in recent research. Among the cultural traits, generalized trust towards others[1] is the most studied by social scientists (Alesina and Giuliano, 2016). It does not come as a surprise that also economists started demonstrating some interest in the linkage between trust and economic development decades ago, mainly for the reason stated by Arrow (1972): "Virtually every commercial transaction has within itself an element of trust, certainly any transaction conducted over a period of time. It can be plausibly argued that much of the economic backwardness in the world can be explained by the lack of mutual confidence." Following his reasoning, the absence of markets or their malfunctioning, the misallocation of resources and, more generally, the differences in economic performance, could be ultimately attributed to the lack of trusting behaviour.

Starting with the contributions of Banfield (1958), Coleman (1988, 1990) and Putnam (1993, 2000), trust has been considered as a key factor of many social and economic outcomes. Trust affects economic development (Knack and Keefer, 1997), innovation (Fukuyama, 1995), individual performance (Butler et al., 2016), financial development and trade (see Guiso et al., 2004, 2008c, 2009), and firm productivity (Bloom et al., 2012; La Porta et al., 1997). For a comprehensive review of the role of trust in economics, see Alghan and Cahuc (2013).

Notwithstanding the acknowledgement that trust has an impact on various economic outcomes, its formation at the individual level is still largely unexplored in the economic literature. Recently, the intergenerational transmission process of trust has been the focus of few works, which contribute to better understand the power of attitude transmission for explaining diverse economic outcomes.[2] In particular, scholars have used different approaches to estimate the strength of transmission of trust from one generation to the next one. Using German data, Dohmen et al. (2012) analyse the transmission of attitudes, namely trust and risk behaviour, from parents to children by regressing the children's attitude on the corresponding attitude as measured at the same time on mother and father, adding various observable characteristics as controls. Their findings indicate the presence of a positive intergenerational correlation. An alternative strategy to identify the role of intergenerational transmission of values is to look at the way immigrants from different countries react to the environment they find in a common destination country. In order to mitigate issues of self-selection and disruption, the literature favours the use of second-generation immigrants. Ljunge (2014) estimates the intergenerational transmission of trust by analysing children of immigrants in

[1] Generalized trust concerns our beliefs about the anonymous other. In other words, it refers to the relations among individuals who are not bound by the kind of personal ties that bind members of the same family, or fellow workers (Alghan and Cahuc, 2013).

[2] Models of transmission from one generation to the next one have been used to shed light on, for example, the persistence of ethnic differences in the U.S. (Bisin and Verdier, 2001); the persistence of different fertility and work practises across cultures (Fernández and Fogli, 2009; Guiso et al., 2006; Fernández, 2008).

29 European countries with ancestry in 87 nations. His approach entails running regressions where the left-hand-side variable is the individual level of trust among second-generation immigrants and the explanatory variable is the average trust in the country of origin. Results suggest that trust transmission is significant only on the mother's side. Moschion and Tabasso (2014) use a similar approach with data on second generation immigrants in Australia and the United States to study how the mechanism of the transmission process varies in the two host countries.

This paper provides new insights on the intergenerational transmission process, first of all by testing one of the main implicit hypothesis upon which previous works to date have relied: the invariance of the individual level of trust over time. Exploiting a three-wave panel dataset, we model the dynamics of the individual level of trust over a decade, distinguishing between its *permanent* and its *transient* component. We argue that only permanent trust matters for transmission and the evidence we provide is consistent with this view. Then, using the lagged level of trust of parents as an instrument for their corresponding current level, we estimate the structural parameters of the transmission of permanent trust from parents to children. Lastly, relying on the distinction between permanent and transient trust we show how to evaluate the relative importance of the transmission process with respect to other mechanisms at work.

The contribution of our study is threefold: 1) From a methodological point of view, we provide a setup for the study of the evolution over time of the individual trust level - as well as of its intergenerational transmission - which can be adapted to other attitudes and cultural values; 2) We contribute to the debate on the intergenerational transmission of trust, by clarifying the conditions required to attach a structural interpretation to the estimate of the parameters of a regression of the trust of children on the contemporaneous trust of their parents; 3) Finally we derive a simple measure to summarize the strength of the transmission process between generations. This is particularly important, we believe, because the possible role of public policy to shape the level of trust of the next generation depends on the relative weigth of parents into the tramsmission process.

The remainder of the paper is organised as follows. Section 2 describes the data and the model used for our analysis. Section 3 presents the results of the test for invariance of trust over time and of the intergenerational transmission parameters. Section 4 discusses the findings and concludes.

2 Econometrics

2.1 Data

Our panel of parents and their children is drawn from the German Socio-Economic Panel (SOEP). We included in the sample all couples who took part into the survey in the waves 2003, 2008 and 2013 with at least one child aged 17 or more in 2013. Crucial to our analysis, this way we observe the trust of both fathers and mothers in *three* time periods. The trust of all children included in

the sample is observed in 2013. It is also observable in the previous waves provided they were at least 17.

The key variable we use in our analysis is the *generalized trust*. It is recorded as the level of agreement on a four-point scale with the statement 'On the whole, one can trust people'.

The resulting panel is made up of 1646 three-person groups, consisting of two parents and their child, and 1087 households (some of the parents have more than one child).

Table 1 presents the autocovariance matrices of trust over the three calendar years included in our window of observation. The results are reported separately for fathers, mothers and children[3]. A cursory inspection of these matrices immediately reveals that the observable trust is far from stable over time. The autocorrelation of order one is in the range 0.35 - 0.40. This is in stark contrast with the assumption implicit in all the previous literature on the transmission of trust according to which trust is stable over time. In the following we argue that the low degree of persistence we observe in our data is due to a *transient* component of trust. Then - our argument goes on - the issue is establishing whether the *permanent* component of trust - i.e. the one relevant for the intergenerational transmission, we argue - is invariant over time. The evidence in Table 1 will be the basis for our test for the invariance of permanent trust over the years (see Section 2.2).

2.2 The model

Let the *observable* level of trust for father i at time t be:

$$Tf_{it} = Tf^p_{it} + vf_{it} \tag{1}$$

where Tf^p_{it} is his *permanent* level of trust at time t and vf_{it} is a zero mean *transient* shock uncorrelated over time and unrelated to past, current and future values of the permanent trust. Let the evolution of the permanent level of trust over time be driven by an AR(1) model:

$$Tf^p_{it} = \rho Tf^p_{it-1} + uf_{it} \tag{2}$$

where uf_{it} is a *permanent* shock hitting Tf^p_{it} at time t. The permanent shock is uncorrelated over time and uncorrelated to past values of the permanent trust.

The intuition motivating this model is as follows. Tf^p_{it-1} is the level of *permanent* trust of father i at time $t-1$ summarizing past and current events as well as expected future events relevant to his lasting belief on whether one can trust people. At time t he is hit by the *unpredictable* shock $uf_{it} + vf_{it}$. The component uf_{it} of this shock is deemed to bring in news relevant to his lasting belief, therefore he updates his permanent trust according to equation (2). While the component vf_{it} affects his *current* level of the observable trust but is not deemed to bring in any news relevant

[3]The sample size for children is smaller than for parents because some of them were not yet 17 in 2008 and/or in 2003.

to his lasting belief. Accordingly, it does not leave any sign on future belief of the subject.

The novelty we introduce here is twofold. First, we distinguish between *observable* and *permanent* trust. All the previous literature does not allow for a transient component of trust implicitly assuming that the transient shock vf_{it} is negligible. Presumably, only permanent trust is relevant for the transmission to children in that transient shocks deemed to be uninformative to the updating process of father are unlikely to be transfered to children. In the following we shall show this is a testable implication of the model. Permanent trust of the father is observable only up to vf_{it}. To the purpose of the econometric identification of the process driving the dynamics of permanent trust and of its transmission to children the transient shock raises the classic measurement error problem.

Second, we do *not* impose from the outset that the permanent trust is invariant over time. All the previous literature by implicitly assuming that the measurement error vf_{it} is negligible implicitly imposes the following invariance restriction:

$$\rho = 1 \tag{3}$$

$$var\{uf_{it}\} = 0. \tag{4}$$

In this sense the AR(1) model we consider for the permanent trust - despite its lack of generality - is the simplest model nesting as a special case the invariance of the permanent trust. Within this model we derive a test for conditions (3)-(4) (see below). Key to the feasibility of this test is the availability of panel of observation with at least three time periods.

The observable trust for mothers and children, Tm_{it} and Tc_{it}, their permanent trust, Tm^p_{it} and Tc^p_{it}, the transient and permanent shocks hitting them, vm_{it}, vc_{it}, um_{it} and uc_{it}, as well as the equations linking the permanent trust to the observable one and driving its dynamics are defined the same way as for fathers.

Turning to the transmission process, the equation linking the permanent trust of children to the *contemporaneus* permanent trust of their parents is:

$$Tc^p_{it} = \beta_0 + \beta_1 Tf^p_{it} + \beta_2 Tm^p_{it} + \epsilon_{it} \tag{5}$$

This is in our notation an equation akin to those maintained in the literature on transmission of trust the novelty being that here we stress that it is the permanent trust that parents pass on to their children.

The strength of the transmission process as measured by the variance of Tc^p explained by (Tf^p, Tm^p) depends both on the size of the coefficients β_1 and β_2 and on the degree of correlation between the permanent trust of parents:

$$\beta_1^2 var\{Tf^p_{it}\} + \beta_2^2 var\{Tm^p_{it}\} + 2\beta_1\beta_2 cov\{Tf^p_{it}, Tm^p_{it}\}. \tag{6}$$

. Distinguishing between observable and permanent trust is crucial here to properly assess the extent to which children inherit trust from their parents. Even leaving aside the issue of how to estimate the coefficient β_1 and β_2 (see below) it is clear that the relevant R^2 here should be evaluated with respect to the variance of Tc^p not of Tc.

Since in SOEP we observe (up to measurement errors) the permanent trust of children when they are at least 17 there is no way of modelling the mechanism of transmission from the early childhood to the late adolescence of children. A feasible and still interesting alternative is to model the link between the level of permanent trust children reach at 17 by the time the transmission is presumably completed and the input of trust parents put into the process up to that time. This is a sort of reduced form model linking inputs to the output silently skipping over the details inside the black box of the transmission process.

Even recasting the problem this way, there is a bunch of issues one needs to carefully take into account to attach a structural interpretation to the coefficients in (5) and to consistently estimate them. First, the input of trust parents put into the transmission process is the one over the age window of the child during which transmission took place, *not* the one we observe at the time we collect our survey data. To end up with a meaningful structural interpretation of the parameters in (5) one needs to explicitly account for the dynamics of the permanent trust of parents over time.

Second, to our purpose we should use the trust of children at age 17 (or immediately after it), i.e. by the age at which the transmission is presumably completed. To gain precision we include in our sample *all* the children available in SOEP no matter for their age in 2013 at the time of the interview, i.e. all the individuals whose parents is included in the sample according to the selection rule specified in Section 2.1. As an implication the trust we observe on them refers to their age in 2013, not at 17. Again, one needs to explicitly account for the dynamics of the permanent trust from age 17 onwards.

Third, even in case the parameters in (5) deserved a structural interpretation their identification would be problematic in case the permanent trust of children and of their parents were affected by correlated permanent shocks since those shocks would induce the endogeneity of the permanent trust of parents. An additional source of problems pointed out in the literature would be a reversed causal link running from the trust of children to the trust of their parents. In both cases the OLS estimate would be inconsistent.

There is at least one special case in which all these problems do not arise, though. If the permanent trust of parents and children is time invariant then observing them (up to measurement errors) at the time of the survey provides a valid measure for the trust at the time at which the transmission took place for parents and for the trust at age 17 for children, respectively. Moreover, invariance of permanent trust would be enough to rule out the endogeneity of Tf_{it}^p and of Tm_{it}^p in (5) since if they are time-invariant there is no room for permanent shocks correlated between children and parents nor for reversed causality. This is why we start our analysis testing whether

the invariance hypothesis holds before turning to the estimation of the transmission equation.

Fourth, note that to get a *feasible* version of the transmission equation it takes replacing the unobservable permanent trust of children and of their parents by their error-ridden observable counterparts:

$$Tc_{it} = \beta_0 + \beta_1 Tf_{it} + \beta_2 Tm_{it} + \epsilon_{it} + vc_{it} - \beta_1 vf_{it} - \beta_2 vm_{it} \tag{7}$$

Then the additional problem is how to estimate this feasible equation taking into account the endogeneity problem rised by the measurement errors in the observable trust of parents (as well as by the possible correlation between the measurement errors of parents and of their children).

Finally, key to the identification of the structural parameters in (5) is controlling for possible confounders, i.e. characteristics of the parents and/or of the environment correlated both to the parents' trust and to the children's one. We check the sensitivity of the estimate of (7) to the inclusion in the model of dummies for geographical area as well as a set of parents characteristics.

2.3 Specification testing and estimation

The *feasible* version of the AR(1) equation (2) is:

$$Tf_{it} = \rho Tf_{it-1} + uf_{it} + vf_{it} - \rho vf_{it-1} \tag{8}$$

The OLS estimate of ρ is biased towards zero due to the measurement error vf_{it-1}. Note however that Tf_{it-2} is a valid instrumental variable provided that the transient shock vf_{it} is uncorrelated over time. The resulting IV estimate is feasible as long as at least *three* longitudinal observations are available on each sample unit as it is the case with the SOEP panel we make use of.

On accepting the null hypothesis $\rho = 1$, for the permanent trust to be invariant over time it must be that $var\{uf_{it}\} = 0$. To test it note that:

$$cov\{Tf_{it}, Tf_{it-1}\} - cov\{Tf_{it-1}, Tf_{it-2}\} = var\{Tf^p_{it-1}\} - var\{Tf^p_{it-2}\} = var\{uf_{it-1}\} \tag{9}$$

Therefore, to test for the presence of the permanent shock run the regression of $Tf_{it} - Tf_{it-2}$ on Tf_{it-1}. The regression coefficient is zero if and only if $var\{uf_{it-1}\} = 0$. A panel of observations of length at least three is needed to perform this test[4]. Note that we test both condition (8) and condition (9) conditional on the same set of covariates included in (7). This is because the invariance of permanent trust conditional on those covariates is enough to secure the identification of the structural parameters in (7).

The decomposition of the variance of the observable trust into its components due to the

[4]Note that if $\rho < 1$ this test has no power against the alternative hypothesis $var\{uf_{it}\} > 0$.

permanent trust and to the transient shock, respectively, proceeds the following way:

$$cov\{Tf_{it}, Tf_{it-1}\} = \rho var\{Tf^p_{it-1}\} \tag{10}$$

$$var\{vf_{it-1}\} = var\{Tf_{it-1}\} - var\{Tf^p_{it-1}\}. \tag{11}$$

Plugging into these equations the value of ρ derived from the inference on equation (8) the variances of the permanent trust and of the transitory shock follow.

To estimate the parameters of the feasible transmission equation (7) note that Tf_{it-1} and Tm_{it-1} are valid instrumental variables for Tf_{it} and Tm_{it} again provided that the transient shock is not correlated over time. Also note that having available a panel of length three the model is *overidentified* since Tf_{it-2} and Tm_{it-2} are valid instruments as well. This provides the basis to test the hypothesis of no autocorrelation of the transient shock. Under the alternative hypothesis of autocorrelated shocks the IV dated $t-1$ is more correlated to the disturbance term in (7) than the IV dated $t-2$. Therefore, the overidentification test should detect a violation of the null hypothesis.

The same overidentification test is in principle useful also to detect a violation of our conjecture that transient shocks to the trust of parents are irrelevant for the transmission process. A violation of this conjecture would mean that the exclusion restriction on our candidate IV's does not hold in that past values of the parents observable trust would matter for the current value of the child observable trust even conditional on the current value of parents permanent trust. Since the degree of violation of the exclusion restriction is likely to vary with the lag of the instrument the overidentification test should detect a violation of the null hypothesis.

To summarise the strength of the transmission of trust from parents to children we use the conventional R^2 of the equation (5). The variance of Tc^p explained by the regression is in (6). The variance of Tc^p_{it}, of Tf^p_{it} and of Tm^p_{it} are derived as in (10). A convenient way to recover the covariance between the permanent trust of parents is to run the regression of Tf_{it} on Tm_{it} using Tm_{it-1} as an IV to get rid of the bias due to the measurement error. This is a consistent estimate of the regression coefficient of Tf^p_{it} on Tm^p_{it}. Then rescale the estimated regression coefficient by $var\{Tm^p_{it}\}$ to get the covariance between the trust of parents.

3 Results

3.1 Testing for invariance of permanent trust

Table 2 presents the results of the test for invariance of permanent trust separately for fathers, mothers and children. Strictly speaking the panel we use allows to test whether it is invariant over the time span 2008 to 2013.

There is clear evidence of time invariance both for mothers and for children. The autocorrelation coefficient is not significantly different from one and there is no evidence at all of a non zero variance

of the permanent shock. This result holds true even after stratifying by age (not reported here). As for fathers the AR(1) parameter turns out significantly smaller than 1. The implied variance of the permanent shock uf_{it} is:

$$var\{uf_{it}\} = (1 - \rho^2)var\{Tf^p_{it}\} \tag{12}$$

i.e. it accounts for a fraction as large as $(1 - .8408^2) = .2931$ of the variance of the permanent trust of fathers. Overall, even if time-varying the permanent trust of fathers turns out stationary with a pretty high degree of persistence. In addition, after stratifying by age it seems that this result is driven by fathers older than the median age in the sample, while the permanent trust of younger fathers is much more persistent over time (even if the sample size is not large enough to draw a firm conclusion on this).

All these results hold true even after controlling for a bunch of variables related to time-invariant characteristics of the parents and geographical factors [5]

The bottom line relevant to the identification of the transmission parameters is that by age 17 (and more) - i.e. the age at which the transmission of trust presumably is already completed - the permanent trust of children is *not* hit by permanent shocks at least over the time span 2008 to 2013, no matter for their age. Given the available data there is no way of directly testing whether this is happening also before age 17. Still, this evidence provide us a firmer basis to speculate that they are not hit by permanent shocks even *before* age 17. If this were the case then it would be enough to rule out the endogeneity of Tf^p in the transmission equation driven by permanent shocks correlated between parents and their children.

Table 3 presents the decomposition of the variance of the observable trust into its components due to the permanent trust and to the transient shock. The main evidence here is that for mothers and children the permanent trust accounts for approximately *one third* of the variance of the observed trust the remaining two thirds being due the noise brought in by the transient shock. It is a bit larger for fathers accounting for approximately half of the variance of the observable trust.

3.2 Estimating the transmission parameters

Table 4 presents the results of the estimation of the feasible transmission equation (7). The second column presents the overidentified IV estimate, the OLS is in the first column. The overidentification test does not reject the null hypothesis bringing support to the validity of our assumption of no autocorrelation for the transient shock.

[5] In the analyses, we included as control variables: cohort of birth of the parents, nationality of the parents (whether father/mother has German nationality), level of education of the parents, siblings of the parents (whether father/mother has siblings); in order to take into account some geographical aspects, we also included: the place where the parents were raised to age 15 (small/medium/big city or countryside), whether the parents moved from the place the grew up in, whether the family leaves in West or in East Germany, the place where kids were raised to age 15.

Despite the usual loss of precision with respect to the OLS the IV estimate for the coefficient of mothers turns out strongly significant and three times larger than the OLS estimate. On the other hand the estimate for the coefficient of father is nearly the same with IV and OLS (with the latter much more precise). Presumably this is happening because the bias towards zero due to the measurement error vf_{it} is offset by the positive bias due to the correlation between the transient shocks for fathers and children.

We replicated the analysis, introducing a bunch of control variables [6]. The results are not affected. In fact, the transmission coefficients remain essentially unchanged, and none of the coefficients related to any of the control variables turn out to be statistically significant.

As a result a clear hierarchy emerges between the respective roles of the mother and the father with the former three times more relevant in the transmission process. The order of magnitude of the estimated coefficients are in line with those found by Dohmen et al. (2012) even if here the difference between mothers' and fathers' weigth is a bit sharper.

As for the strength of the transmission from parents to children we summarize it as the fraction of the variance of Tc^p_{it} explained by the permanent trust of parents. It turns out as large as .20, i.e. 80% of the variability of the permanent trust of children is *not* due to their parents' permanent trust.

4 Discussion

Our results imply that the transmission of trust from parents to their children is weak. Simple calculations based on our estimated coefficients show that the level of trust of a specific generation keeps only a vague memory of the level of trust of the grandparents of that generation not to say of previous generations. Then the issue is how to riconcile this result to those coming from the literature on long term persistence of trust.

Guiso et al. (2008a) show that an event dating back to the Italian medioeval age - the establishment of free cities in Center-North Italy - and claimed to have brought in a positive shock to the accumulation of social capital in the municipalities affected by that event left an heritage in the amount of social capital detectable even nowdays in those municipalities. In a companion paper they develop a model to show how the transmission of trust from one generation to the other might result in the evidence of long run persistence they got (Guiso et al., 2008b). How could it happen if the transmission is so weak as the one we find in our data?

[6] In the analyses, we included as control variables: cohort of birth of the parents, nationality of the parents (whether father/mother has German nationality), level of education of the parents, siblings of the parents (whether father/mother has siblings); in order to take into account some geographical aspects, we also included: the place where the parents were raised to age 15 (small/medium/big city or countryside), whether the parents moved from the place the grew up in, whether the family leaves in West or in East Germany, the place where kids were raised to age 15.

A possible way to reconcile the two results comes from the literature on intergenerational mobility of income and wealth. Building on Güell et al. (2014), Barone and Mocetti (2015) argue that intergenerational mobility of earnings might have been much lower in the past up to the end of the 19th century. A possible explanation for this - they argue - is that in an immobile society like the one prevailing in the pre-industrial age intergenerational transmission took place through a variety of social institutions not only through the direct parents-children transmission.

5 Summary and conclusion

We study the transmission of trust from one generation to the next using a *longitudinal* sample on the parents-child triple drawn from the German SOEP. Children are at least 17 years old - the age at which by design of the survey they start answering questions on trust - in 2013 the last year of our longitudinal sample.

The first point we make is that having available longitudinal information is crucial to distinguish between two components of the observable individual trust namely the permanent trust and a transient shock. This is important because it is entirely plausible that parents transmit to their children only their permanent trust, i.e. their lasting belief on whether one can trust other people, while the transient shock being irrelevant to their lasting belief is definitely unlikely to be passed on to their children. We show that permanent trust accounts only for *one half* to *one third* of the observed cross sectional variability of trust. To the purpose of the econometric identification of the transmission parameters the remaining part of the variability rises the classic measurement error problem.

The second point we make is that having available a longitudinal sample the invariance of trust over time implicitly maintained in the previous literature is testable. In particular, our three wave panel allows to test the invariance of the permanent trust over the time window 2008 to 2013. We show that the permanent trust is invariant for mother and for children while it is stationary with a high degree of persistence - even if not invariant - for fathers.

Then we study the link between the permanent trust of children as of 2013 and the *contemporaneous* permanent trust of their parents. Based on the evidence from testing the invariance of permanent trust the structural interpretation we propose for the parameters in this equation is that they pick up the link between the input of trust parents put into the transmission process up to age 17 of their children and the level of permanent trust of their children at completion of transmission. We also argue that the results of the invariance test are consistent with the exogeneity of the permanent trust of parents in the transmission equation.

The estimation of these structural parameters requires replacing the unobservable permanent trust of children and of their parents by their error-ridden observable counterpart. Given the size of the variance of the measurement error - two thirds of the variance of the observable trust - the OLS are likely to be badly biased. The value of the longitudinal information show up again here

since the lagged trust of parents is a valid instrumental variable provided that the transient shock is not correlated over time. The main empirical results are that mothers play a much stronger role than fathers in driving the transmission. This is in line with previous findings (see for instance Dohmen et al., 2012) but the difference we find between mothers and fathers is even stronger.

Finally, relying on our empirically feasible distinction between permanent trust and transient shock we evaluate the strength of the transmission process. We measure it as the fraction of the variability of the permanent trust of children explained by their parents permanent trust. It turns out as large as .20 not a particularly strong link between two subsequent generations.

Given its relevance for economic development, trust maximization is a desirable policy target for social planners. It is hence fundamental to understand how trust is formed and transmitted between individuals? especially over generations. Understanding how much trust can be transmitted from parents to children vis--vis the part that is influenced by shocks is a key prerogative in order to efficiently plan the type and scope of public policy aiming at impacting the level and the distribution of trust. The results of our analysis speaks for a result that is somewhat in between, in the sense that transmission is partial and – puzzlingly to us – with spark divergences between mother and fathers. This suggests the existence of sharp differences in how fathers and mothers interact with their children and in how they pose themselves as role models during the process of children?s social capital formation.

6 Tables

Table 1: Autocovariance matrices for the observable trust of fathers, mothers and children; SOEP years 2003, 2008 and 2013.

	Fathers			**Mothers**			**Children**		
	2003	**2008**	**2013**	**2003**	**2008**	**2013**	**2003**	**2008**	**2013**
2003	0.4412	0.1678	0.1423	0.4093	0.1396	0.1369	0.4409	0.1307	0.1262
2008		0.4398	0.1709		0.4181	0.1484		0.3761	0.1334
2013			0.3923			0.3802			0.3584
sample size		**1087**			**1087**			**801** [1]	

[1]This is the number of children in the sample since 2003. It is smaller than the total number of children in our panel because some of them turned 17 after 2003.

Table 2: Testing the invariance of permanent trust for fathers, mothers and children (standard errors in parentheses).

	AR(1) parameter	**Variance of the permanent shock**	**Sample size**
Fathers	0.8408**		1087
	(0.0771)		
Mothers	0.9852	0.0025	1087
	(0.0980)	(0.0123)	
Children	0.9474	0.0032	801
	(0.1702)	(0.0087)	

[1] Figures in column 1 are the IV estimate of equation (8), those in column 2 are based on equation (9)

[2] ** Statistically different from 1 at the 0.05 level. Once we split the sample into fathers, whose ages are below and above the median, the parameters are, respectively, 0.877 (0.110) and 0.805 (0.109).

Table 3: Variances of the permanent trust and of the transient shock of fathers, mothers and children

	Permanent trust		**Transient shock**	
	2003	**2008**	**2003**	**2008**
Fathers	0.1998	0.2035	0.2414	0.2363
Mothers	0.1396	0.1484	0.2697	0.2697
Children	0.1307	0.1334	0.3102	0.2427

[1] Derived from Table 1 using equations (10) and (11)

Table 4: The intergenerational transmission

	OLS	**IV**
Intercept	1.754***	1.234***
	(0.071)	(0.144)
Father's trust	0.107***	0.112
	(0.025)	(0.076)
Mother's trust	0.122***	0.342***
	(0.026)	(0.084)
Sample size	1646	1646
Overidentification test	p-value Hansen statistic = 0.35	
$\mathbf{R^2}$	0.0577	0.1990[3]

[1] *** Statistically significant at the level 0.01. Clustering for siblings included

[2] Observable trust of parents in 2013 instrumented by their observable trust in 2008 and 2003

[3] This is the R^2 of the unfeasible regression for the permanent trust (5) (see equation)

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