

IFN Working Paper No. 1039, 2014

Trust Us to Repay: Social Trust, Long-Term Interest Rates and Sovereign Credit Rating

Andreas Bergh and Christian Bjørnskov

Trust Us to Repay: Social Trust, Long-Term Interest Rates and Sovereign Credit Ratings

Andreas Bergh⁺

Christian Bjørnskov^{*}

Abstract: This paper asks whether the sensitivity of market long-term interest rates and credit ratings is associated with cross-country differences in informal institutions, measured by social trust. We note a number of theoretical mechanisms that could imply that similar objective problems are more likely to be effectively dealt with in higher-trust societies. A set of panel estimates across middle and high-income countries reveal that interest rates and ratings are substantially more sensitive to inflation and growth problems in low-trust countries. This finding sheds light on the differential market reactions to economic problems in seemingly comparable countries.

JEL-codes: G12, A13

Keywords: Trust, credit ratings, interest rates, economic reforms

⁺ The Research Institute of Industrial Economics, Grevgatan 64, SE-102 15 Stockholm, Sweden, and Lund University, email: andreas.bergh@ifn.se.

^{*} Department of Economics and Business, Aarhus University, Fuglesangs Allé 4, DK-8210 Aarhus V, Denmark; e-mail: ChBj@asb.dk. We thank Edith Neuenkirch, Eelke de Jong and participants of the 2014 meetings of the European Public Choice Society (Cambridge) and at a seminar at the University of Trieste for helpful comments. All remaining errors are entirely ours. Bergh thanks the Swedish Research Council, the Jan Wallander and Tom Hedelius Foundation and the Crafoord Foundation for financial support.

The 2008 financial crisis was followed by an international debt crisis, during which markets and credit rating agencies came under attack. Among other things, it was argued that countries with similar problems were unfairly given different credit ratings and market evaluations. For example, long term interest rates in Greece fell sharply when the country joined the Euro, despite very small (if any) changes in economic fundamentals.

On two occasions, in December 2011 and November 2013, the British triple-A rating at Standard and Poor's (S&P) remained unchanged when that of France was lowered. French politicians complained vociferously in 2011 when agencies downgraded France but remained confident in the British economy and its political system, and suggested EU regulations and political control of rating agencies. At the supranational level, the Portuguese head of the EU Commission Manuel Barroso also complained about rating agency behaviour and called for EU regulations (Reuters, 2011). Yet in November 2013, S&P again cut the rating from the previous AA+ to AA, arguing that government reforms would not raise medium term prospects and that lower economic growth was constraining the government's ability to consolidate public finances. Prime Minister Jean-Marc Ayrault commented that the agency "does not take into account all the reforms" (France 24, 2013). Paul Krugman likewise suggested that France was being punished for doing the wrong type of austerity reforms (tax increases rather than spending cuts), and that S&P are "using debt fears to advance an ideological agenda" (Krugman, 2013). Similarly, Italian and Hungarian politicians have been adamant that their countries did not suffer any fiscal problems and that the turmoil in sovereign bonds markets was irrational, or at least not fully warranted by economic fundamentals.

The common theme of the claims described above, is that market reactions and international credit ratings are based on something more than easily measurable economic fundamentals. However, whether these factors are irrational or ideological, as argued by the

opponents of rating agencies, or founded in other non-economic fundamentals, is an open question. It is indeed plausible that market reactions and ratings also contain a conscious or subconscious evaluation of the ability and willingness of voters and government institutions to identify and address fiscal problems, based on history and other factors that inform about pertinent structural and political differences. In other words, heterogeneity is possible, such that seemingly similar debt and deficit problems do *not* lead to similar rational market reactions or changes in credit ratings.

A series of studies have provided tentative evidence for some kind of heterogeneity (Cantor and Packer 1996, Afonso 2003, Bissoondoyal-Bheenick 2005, Bützer et al. 2013) but the crucial factor has not been identified. In this paper we show that trust differences across countries cause markets and rating agencies to react systematically differently to basic economic indicators such as growth, inflation, debt and deficits. Specifically, countries with lower levels of social trust exhibit long-term interest rates and credit ratings that are more sensitive to objective fiscal problems.

The analysis of the determinants of credit ratings goes back to Cantor and Packer (1996) who noted that the ratings of Moody's and S&P can be explained by a small number of well-defined criteria: per capita income, GDP growth, inflation, external debt, and an indicator variable for default history. They also noted that rating agencies appear to factor a threshold effect into the relationship between economic development and risk, such that once countries reach a certain level of development, they are less likely to default. The findings of Cantor and Packer have been confirmed in more recent research, such as Afonso (2003). Using sample division, Bissoondoyal-Bheenick (2005) show that economic variables are less important for highly rated countries with a history of financial stability than they are for poorly rated countries.

More recently, Afonso et al. (2011) study the determinants of sovereign debt ratings from the three main rating agencies, for the period 1995–2005. They confirm that growth, government

debt and budget deficits have the expected short-run impact on a country's credit rating, and also that government effectiveness, external debt, foreign reserves, and default history only have a long-run impact on ratings. Similarly, Mellios and Paget-Blanc (2011) find that ratings are mostly influenced by government income, real exchange rate changes, inflation rates, and domestic savings. Also, default history and corruption are crucial factors. Finally, the standard findings regarding GDP per capita, inflation, foreign debt per GDP, previous defaults, and general development also appear in Butler and Fauver (2006) and Biglaiser and Staats (2012) who additionally stress that the quality of legal and political institutions matter for ratings, and in Gehring and Fuchs (2014) who find evidence of home bias in credit ratings.

Except for the threshold pattern noted by Cantor and Packer (1996) and confirmed by others, no studies have probed deeper into examining the heterogeneity in how ratings depend on economic indicators. The importance of property rights and the rule of law is examined by Biglaiser and Staats (2012) in levels rather than as something moderating the effect of other factors.¹ In contrast, we are suggesting that the effects of any economic factor are moderated by less tangible informal institutions affecting the quality of formal political, regulatory and economic institutions. Specifically, we argue that the perceived trustworthiness of a country is a good measure for such institutions, and that country level trust is a good proxy for this trustworthiness.

The paper contains another innovation relative to previous literature in that we focus on the dynamics of long-term interest rates and credit ratings instead of levels. In other words, we ask whether interest rates and ratings *respond* differently to similar objective changes in

¹ Their results indicate that rule of law, strong and independent courts, and protection of property rights have significant positive effects on bond ratings, based on regression results for up to thirty-six developing countries rated by Fitch, Moody's, and S&P from 1996 to 2006. Importantly, these results are consistent with information about methodologies published by the credit rating agencies.

fundamentals in some countries than in others. A set of panel estimates including up to 38 high and middle-income countries confirm that the interest rates and ratings of low-trust countries are relatively more sensitive to objective problems.

The rest of the paper is structured as follows. Section 1 discusses relevant theoretical considerations. We present our data and empirical strategy in Section 2 while Section 3 reports the empirical results. Section 4 discusses the findings and concludes.

1. Theoretical considerations on trust and default risks

Both credit ratings and long-term interest rates depend on the perceived default risk for a given issuer of sovereign debt. Interest rates capture the perceptions of market actors while credit ratings reflect expert assessments. A main question is why these perceptions would differ depending on trust?

On a micro level, trust is an indication of a belief about the behaviour of others. In the well-known trust game (Berg, Dickhaut, and McCabe 1995), the first player (the trustor) can make an investment that increases the payoff of the second player (the trustee). The trustee can return the favour by voluntarily sending at least something back to the trustor. Because the investment is multiplied when it reaches the trustee, the total payoff is maximized if and only if the trustor invests the full endowment. The catch is that a selfish trustee will not reciprocate and should thus not be trusted. The combination of trust and trustworthiness help pairs avoid being stuck in suboptimal Nash equilibria.

On a social level, high levels of trust and trustworthiness have important economic consequences by enabling agents to engage in transactions that are similar to the trust game, i.e. transactions that entail an incentive for one part to engage in opportunistic behaviour. Such trust-intensive transactions include principal-agent problems with incomplete monitoring, situations with uncertainty and, more generally, any situation with incomplete contracts. As noted by

Schmidt (2011), attitudes such as trust and trustworthiness matter in particular in labour markets (where contracts are incomplete when, for example, effort cannot be contracted upon) and in financial markets due to uncertainty. As phrased by Schmidt (2011, p. 228), “an incomplete contract transforms a market relationship that is governed by competition into a bilateral relationship that is governed by trust and reciprocity”. As a result, markets with incomplete contracts can be expected to be more efficient in high-trust countries (cf. Knack and Keefer 1997).

Trust is also likely to affect economic outcomes by increasing information sharing. The positive association between trust and information sharing on an individual level is well-documented (cf. Sherchan et al., 2013, Chai et al. 2011, Tsai and Cheng 2012). Moreover, Brown and Zehnder (2007) use a laboratory credit market to show that information sharing increases repayment rates, because borrowers anticipate that a good credit record improves their access to credit. Consequently, there is a link from trust via information sharing to higher loan repayment rates. Similarly, Duarte et al. (2012) find that borrowers who are perceived as less trustworthy are economically and statistically significantly less likely to have their loan requests filled, even in environments with extensive contract enforcement mechanisms. They conclude that trust could play a causal role in the lack of diversification in investors’ asset allocation, as well as the pattern of cross-border investments. By minimizing problems with incomplete contracts, and by increasing loan repayment rates through information sharing, trust should influence economies in ways that matter for credit ratings and financial markets.

Finally, a link from trust to default risks runs via political institutions and state capacity, as risk assessments must rely on both the willingness and ability of governments to repay their debts (cf. Boix and Posner 1998, Besley and Persson 2009, Bützer et al. 2013). Essentially, governments in high trust countries can more easily collect the tax revenue needed to pay debts. Boix and

Posner elaborate on five mechanisms through which social capital and what they interpret as the co-operative capacity of society should affect the performance of its political institutions:

1. Social trust will produce good governance to the extent that it makes citizens ‘sophisticated consumers of politics’ (e.g. Bjørnskov, 2010).
2. Social trust reduces the costs of enforcing and implementing governmental policies and regulations (e.g. Knack and Keefer, 1997).
3. Social trust promotes good governance by shifting community tastes from particularistic interests to more community-oriented concerns (e.g. Aghion et al., 2010; Bergh and Bjørnskov, 2011).
4. Social trust leads to higher bureaucratic efficiency (e.g. Uslaner, 2002; Bjørnskov, 2010).
5. Social trust fosters accommodative practices among otherwise antagonistic elites (e.g. Knack, 2002).

Figure 1 summarizes the hypothesized links from trust to lower default risks.

Insert Figure 1 about here

One can of course question the importance of some of the links described above. Importantly, however, it is arguably difficult to find plausible mechanisms that suggest a positive relationship between trust and default risks. Thus, as a result, we expect the cross-country correlation between trust and perceived default probabilities as captured by long-term interest rates and credit ratings, to be negative. On the other hand, the links do not suggest different default probabilities conditional on economic fundamentals: the unconditional correlation appears if low-trust societies are more likely to experience economic problems. Most importantly, the links suggest heterogeneity in how countries respond to adverse macro-economic shocks, also when these are completely exogenous. Regardless if the best response to a macro-economic shock involves demand-side management, supply-side politics or some kind of austerity-

measures, high-trust countries are more likely to succeed with such policies, and low-trust countries are more likely to resort to debt accumulation and/or inflationary measures.

In all, our theoretical considerations generate three predictions:

H1 A Negative unconditional correlation between trust and long term interest rates (and a positive unconditional correlation between trust and credit ratings).

H2 No significant correlation between trust and long term interest rates (or credit ratings) conditional on economic observables, i.e. in the absence of problems.

H3 Heterogeneity such that economic problems have a bigger impact on credit ratings and interest rates in low-trust countries.

2. Data

Our two main dependent variables are sovereign bond credit ratings from Standard and Poor's (2013) and long-term interest rates, measured as 10-year sovereign bond rates, from OECD (2013) supplemented by EuroStat (2013) and cross-checked with information in ECB (2013).²

Our overall data are summarized in Table 1. We first note that while a few countries have retained perfect Triple-A ratings throughout the entire period 1990-2012, long-term interest rates have decreased substantially. German ten-year sovereign bonds, usually considered virtually risk-

² We note that the alternative credit ratings from Fitch and Moody's in general respond in similar ways as those from S&P. While Hill et al. (2010) show that differences between rating institutes are small, and Alsakka and Gwilym (2010) find that both upgrade and downgrade probabilities are much higher for a sovereign issuer with a recent upgrade or downgrade by another agency, the S&P ratings have two main advantages. First, S&P is often the first agency to change the rating of a country and thus seems to be the market leader in most cases. Second, estimating determinants of all three rating schemes, we note that Fitch ratings in particular seem driven by slightly different factors than those of S&P and Moody's. As the available sample is also somewhat larger with S&P, we opt for using this source although our main findings in the following also hold for alternative ratings.

free assets, were traded at an interest rate of 8.7 % ultimo 1990, which had decreased to 1.5 % ultimo 2012. As we include a full set of annual fixed effect, all interest rate changes occur around that trend while all rating changes occur relative to a fixed optimal rating.

Across the 572 year-to-year changes to long-term interest rates available in the data, 297 differ by less than plus or minus $\frac{1}{2}$ % from Germany, and 164 of those differ by less than one quarter of a percent. Evidently, there is substantial persistence in market evaluations of country risk. Likewise, of all year-to-year changes in credit ratings, 509 observations are without changes to their S&P rating while we observe 50 one-point upgrades and 35 one-point downgrades. The remaining rating changes are more dramatic changes that involve either multiple-point changes or more often several adjustments within a year.

Insert Table 1 about here

We add a number of control variables suggested by either previous studies or theoretical considerations, listed in Table 1. The share of young people (below 16) in the population, inflation measured as changes to the consumer price index, the gross savings rate, the annual growth rate of GDP per capita (purchasing-power adjusted), government final consumption as a per cent of GDP, and claims on central government as per cent of GDP, exports and imports as per cent of GDP – and hence the trade balance – are all from the World Development Indicators database (World Bank 2013). Although the first, the share of young people in the population, is a non-standard factor in the present literature, we include it as it may have two effects. First, a larger share of young people in the economy will increase the dependency burden and thus place a burden on public finances to the degree that the state supports this group. Second, as a larger share of young people means a larger potential labour force in the future, governments may be more susceptible to borrowing money and relaxing budget constraints, as the room for intergenerational transfers (from the future young to the present old) is larger.

A set of characteristics of political institutions and policies include government ideology and dummies for minority and coalition government, EU member, and fixed exchange rate regimes; all are coded on the basis of Political Yearbooks since 1990 and other available information. The government ideology index follows work in Bjørnskov (2008), but is based on a more fine-grained division of parties in five categories: -1 are unreformed socialist or communist parties, -.5 denote modern socialist parties, 0 social democrat or other centre parties, +.5 denote conservative and other moderately right-wing parties, and +1 denotes libertarian and other economically right-wing parties. The index weighs this information with the number of seats in parliament held by each party represented in the cabinet.³

Finally, we include social trust as our preferred measure of the strength of informal institutions. As is standard, trust is measured through the question “In general, do you think most people can be trusted?” as the share of respondents answering that most people can be trusted. We use the average of all available data in the World Values Survey and the EuroBarometer since 1981. This choice follows a large, recent literature as does our basic assumption that trust is approximately time-invariant across the 23 years covered in this paper (cf. Bergh and Bjørnskov 2011, Uslaner 2008). Our trust data derive from the large dataset used by Bjørnskov and Méon (2013) and covers all 38 countries in the OECD or similar countries. We note that these data are good proxies for both trust and trustworthiness across countries, as revealed by return rates in wallet-drop experiments, good test-retest statistics, and as predictors of behaviour in economic experiments (Brühlhart and Usunier 2012, Cox et al. 2009, Knack and Keefer 1997, Nannestad 2008). Furthermore, the measure of social trust differs fundamentally from measures of trust in specific others or in particular government institutions (cf. Naef and Schupp 2009, Uslaner 2002).

³ The full index data as well as the underlying party categorization and election results are available on request from the authors.

As a first test of the credibility of the overall implications, the expected cross-country correlation suggested by H1 is easily verified, as can be seen in Figures 2 and 3: High-trust countries do indeed have lower long-term interest rates and better credit ratings.

Insert Figure 2 about here

Insert Figure 3 about here

The full data form an unbalanced panel, consisting of observations between 1990 and 2012 from 38 countries in the Western hemisphere, including Japan and South Korea, and Latin America. Table 2 summarizes the data by providing trust scores and average long-term interest rates (as deviations from the German interest rate) and credit ratings between 2002 and 2012 for all 38 countries. We estimate the determinants of interest rate and credit ratings by GLS with random effects, including the lagged dependent variable. Although the inclusion of a lagged dependent implies that estimates will suffer from Nickell bias, we note that this bias will be almost negligible as the average country is observed across an unbroken 15-year period. While the downside of this particular choice is thus limited, it comes with the additional benefit that potential effects of omitted variables correlated with the *level* of interest rates and credit ratings are captured by the lagged dependent. Furthermore, including the lagged dependent variable also alleviates endogeneity concerns as the effect of, e.g., credit ratings on trust, growth or other factors must logically be an effect of the *already* known or anticipated risk assessment, i.e. the lagged dependent. We estimate the determinants of year-to-year changes, and the lagged dependent allows us to calculate effects in the long run in the absence of substantial J-curve adaption patterns. We note that such patterns are not readily observable in the data that instead exhibit clear persistence of changes.

Insert Table 2 about here

3. Results

With a baseline specification consisting of a lagged dependent variable, the share of the young population, inflation, government ideology, the gross savings rate, the GDP growth rate, and social trust, Table 3 present our basic results for long-term interest rates; Table 4 reports the corresponding results for S&P credit ratings.

Insert Table 3 about here

Insert Table 4 about here

3.1. Basic results

As a first, Table 3 documents the substantial persistence of long-term interest rates through a large and highly significant lagged dependent term. We also observe increasing interest rates with younger populations, higher inflation, lower gross savings rates and higher economic growth rates, and persistently higher interest rates in post-communist countries and countries with relatively left-wing governments.

As expected, the overall dynamics of interest rates are not significantly different in high-trust than in low-trust societies once economic fundamentals are controlled for. Surprisingly, we find evidence of a negative significant association between claims on government and interest rates. Further tests reveal that this association is driven entirely by the inclusion of Japan, with claims above 100 % despite having relatively low interest rates. Conversely, neither political characteristics (minority and coalition governments and fixed exchange rate regimes), trade, nor government expenditures are associated with the dynamics of long-term interest rates. We also note (not shown) that the main findings are robust to excluding observations with either particularly high or low interest rates.

In Table 4, we repeat these exercises with the dynamics of credit ratings. We find significantly higher persistence in credit ratings than interest rates, suggesting that most changes will likely be permanent. Conversely, none of the baseline variables or additional control variables

are significant, with the exception of three factors: government ideology, gross savings rates and economic growth rates. As such, despite the specification capturing three quarters of the within-country variation, credit ratings appear substantially less sensitive to objective changes than long-term market interest rates. As is the case with interest rates, the main findings are robust to excluding observations with extreme credit ratings in either a positive or negative direction. On average, countries with higher growth rates, higher gross savings rates and right-wing governments tend to be better rated.

3.2. Heterogeneous findings

To test our main hypothesis (H3) that the risk evaluations of low-trust countries are more sensitive to objective problems than otherwise comparable higher-trust countries, we include a set of interaction effects in Tables 5 (interest rates) and 6 (credit ratings). In both tables, the full baseline specification from Tables 3 and 4 is included but not shown. We emphasize that with interaction terms, the single terms cannot be interpreted per se. Instead, for interactions that turn out to imply significantly heterogeneous sensitivities, we plot the relation against trust (the interacting factor) in subsequent graphs, including 95 % confidence intervals.

Insert Table 5 about here

Insert Table 6 about here

We first of all note in column 1 that the effect of growth changes on long-term interest rates is highly heterogeneous in trust. At low levels of trust, relatively small growth declines tend to result in higher interest rates. Conversely, beyond a trust level of approximately 50 %, growth effects become insignificant and small or positive. Likewise, we find a heterogeneous interest rate response to inflation, which is substantial for low-trust societies but becomes insignificant above trust levels of about 40 %. The heterogeneous response to changes in gross savings is comparable to that of inflation changes and becomes insignificant above trust levels of roughly 45 %.

Conversely, neither effects of claims on government nor government expenditures turn out to be significant at any levels of trust. We thus observe no response, despite allowing them to be systematically heterogeneous. In Figures 4-6, we therefore plot the point estimates of growth, inflation and gross savings, conditional on any trust level between 9 and 68 %, as we observe in the present sample.

Insert Figure 4 about here

Insert Figure 5 about here

Insert Figure 6 about here

In Table 6, we repeat the same exercises with credit ratings from S&P. We find a strongly heterogeneous response to growth changes in column 1, although with an insignificance cut-off substantially higher than in Table 4: the only countries above this cut-off for which growth is insignificant are Denmark and Sweden. The response to gross savings is likewise significantly heterogeneous with a trust cut-off at which the factor becomes insignificant very close to that in Table 4. Conversely, neither inflation rates, claims on government, nor government expenditures are robustly significant at any levels of social trust. We thus plot the two significantly heterogeneous factors in Figures 7 and 8 below.

Insert Figure 7 about here

Insert Figure 8 about here

In general, we find that our main results are robust to a number of additional tests. In particular, with the exception noted above, they are robust to a full jackknife test in which we exclude all 38 countries at a time. The findings are thus not likely to be driven by single outlier countries. Likewise, we have ensured that no result is driven by extreme observations by excluding observations in the 10 % top and 10 % bottom of the distributions of long-term interest rates and credit ratings. A number of other factors mentioned in the literature on credit ratings and long-term interest rates, such as debt levels, market capitalization, the money stock,

industrial structure and interest payments, also turned out to become insignificant in the dynamic context adopted here. It should be noted that interactions with the log to population size sometimes reveal systematically heterogeneous sensitivity to objective economic problems. However, the inclusion of these variables does not negatively affect our main findings and in some cases amplifies the trust effect. In addition, the additional interactions tend to generate inconsistent results. For example, more populous countries seem to have interest rates more sensitive to growth declines but credit ratings that are less sensitive.

Finally, one might want to consider the extent to which the effect of trust operates via formal institutions such as economic freedom function. Regressions (available from the authors) using the Heritage economic freedom index suggest that this is the case, but a deeper analysis is left for future research.

3.3. Effect sizes

We examine the size (both statistically and economically) of identified effects by outlining the five statistically heterogeneous responses at the minimum trust level within the sample (9 % in Turkey), at the 25th percentile (23.5 % in France), the median (37.5 % in Germany), the 75th percentile (47 % in Australia) and the maximum trust level (68 % in Denmark).

At Turkish trust levels, a one-standard deviation decrease of the growth rate (a 3.2 percentage point decrease) induces a long-term interest rate approximately 0.8 percentage points higher. If persistent, the growth decline seems to result in an increase of almost three percentage points. At French levels of trust, the corresponding responses are .6 and 2.1 percentage points; at German levels, .3 and 1.2 percentage points; at Australian trust levels .2 and .7 percentage points; while they are not significantly different from zero at Danish (or other Nordic) trust levels.

A similar one-standard deviation increase of the inflation rate (a two percentage point increase) induces approximately a .3 percentage points increase in long-term interest rates within

the first year and, if persistent, a one percentage point increase in the long run, as evaluated at Turkish trust levels. At French levels, the corresponding numbers are .2 and .7 percentage points; at German levels, .1 and .4 percentage points, while the effects are insignificant at Australian trust levels and higher.

Focusing instead on credit ratings, a one-standard deviation decrease of the gross savings rate (about 4.8 percentage points) causes about a .2 percentage point increase in the long-term interest rate within the first year and a .9 percentage point increase in the long run. At French levels, the corresponding numbers are .2 and .6 percentage points; at German trust levels, .1 and .4 percentage points while the point estimates turn very small and insignificant at trust levels somewhat lower than that of Australia.

Calculating similar responses for credit ratings may nevertheless be relatively meaningless, as ratings appear so persistent that long-run responses – calculated from the point estimate of the lagged dependent variable – become very large. However, immediate year-to-year changes and somewhat longer-term changes can be easily gauged from the point estimates. Doing so for growth declines, the estimates imply that a one-standard deviation change, evaluated at Turkish trust levels, tends to result in a one-point downgrade of the S&P credit rating within two years. At French levels, the expected waiting time for a one-point downgrade – i.e. how long a growth decline would have to last before resulting in a downgrade of the credit rating – is approximately 2.8 years. At German levels, the corresponding time 3.5 years, at Australian levels four years while at Danish or Swedish trust levels, the calculated waiting time would be almost seven years as the point estimate is insignificant.

The same exercise, focusing on a one-standard deviation deterioration of the gross savings rate, implies an expected waiting time for a one-point downgrade of 3.7 years at Turkish trust levels. At French levels, a similar deterioration seems to have to persist for five years before

resulting in a downgrade and 7.7 years at German trust levels. Above that level of social trust, credit ratings do not seem sensitive to any changes to the gross savings rate.

As such, the sensitivity of market risk assessments of sovereign bonds to objective, fundamental problems is meaningful at relatively low trust levels. Growth declines in particular seem important to market evaluations in most countries, as both long-term interest rates and credit ratings are quite sensitive to growth rates in most countries. In the long run, a permanent increase of more than one percentage point to the long-term interest rate at approximately German, Irish or British trust levels may be clearly visible and problematic to public budgets. Yet, as the estimates clearly show substantially worse potential problems in low-trust countries and virtually no sensitivity in the highest-trust countries, we turn to discussing the overall implications, how such differential effects might occur, and our conclusions.

4. Conclusions

Our starting point of this paper was that both long-term market interest rates and credit ratings of sovereign debt rely on the severity of objective economic problems as well as an evaluation of the ability and willingness of governments and political systems to deal with these problems. Several recent studies have shown that the quality, accountability and responsiveness of political institutions depend on the quality of informal institutions, and in particular on social trust. We therefore combine these two literatures to ask if cross-national differences in social trust affect country risk sensitivity to objective problems, as revealed in risk evaluations of markets and credit rating agencies.

We start by noting two things. First, we note that interest rates and credit ratings both reflect the weight of objective problems and an evaluation of the probability that political institutions will properly address those problems in a timely fashion. Second, we note that the literature provides evidence of both micro-level mechanisms (such as a link from trust to higher

loan repayment rates and more information sharing) as well as five consequences of social trust for political institutions: 1) trust makes citizens more ‘sophisticated consumers of politics’; 2) trust reduces the costs of enforcing and implementing governmental policies and regulations; 3) trust promotes good governance by shifting community tastes from particularistic interests to more community-oriented concerns; 4) trust positively affects bureaucratic efficiency; and 5) trust fosters accommodative practices among otherwise antagonistic elites. All five elements would make it more likely that governments handle economic problems in a timely and reasonable fashion, thus reducing the country risk premium charged by a free market.

Exploring long-term interest rates and credit ratings from 38 countries observed between 1990 and 2012, we find consistent evidence that risk sensitivity to changes in economic growth, inflation and gross savings rates is systematically heterogeneous in social trust: the market responds more strongly to reduced growth and savings and higher inflation in low-trust countries. In a small group of countries with some of the highest trust levels in the world, which includes the Nordic countries and the Netherlands, we find no significant response to these problems in long-term interest rates and sovereign credit ratings.

While certain countries have been adamant that their credit ratings ought not to be downgraded since other countries with similar economic problems retain their rating – i.e. that the market and credit rating agencies are simply wrong – our evidence here suggests that both markets and agencies *de facto* apply more sophisticated risk assessments than can be gauged from immediately observable country differences. Seemingly similar countries need not be similar in the responsiveness and responsibility of their political institutions due to differences in informal institutions, and international credit markets evidently also factor in such differences.

References

- Afonso, António. (2003). „Understanding the Determinants of Sovereign Debt Ratings: Evidence for the Two Leading Agencies.“ *Journal of Economics and Finance* 27, 56-74.
- Afonso, António, Pedro Gomes, and Philipp Rother. (2011). „Short- and Long-Run Determinants of Sovereign Debt Credit Ratings. *International Journal Of Finance And Economics* 16, 1–15.
- Aghion, Philippe, Yann Algan, Pierre Cahuc, and Andrei Shleifer. (2010). Regulations and Distrust. *Quarterly Journal of Economics*, 25, 1015-1049.
- Alsakka, Rasha, and Owain ap Gwilym. (2010). „Leads and Lags in Sovereign Credit Ratings.“ *Journal of Banking & Finance* 34, 2614–2626.
- Bergh, Andreas, and Christian Bjørnskov. (2011). “Historical Trust Levels Predict the Current Size of the Welfare State.” *Kyklos* 64, 1-19.
- Biglaiser, Glen, and Joseph L. Staats. (2012). „Finding the 'Democratic Advantage' in Sovereign Bond Ratings: The Importance of Strong Courts, Property Rights Protection, and the Rule of Law.“ *International Organization* 66, 515-35.
- Bissoondoyal-Bheenick, Emawtee. (2005). „An Analysis of the Determinants of Sovereign Ratings.“ *Global Finance Journal* 15, 251– 280.
- Bjørnskov, Christian. (2010). “How does Social Trust lead to Better Governance? An Attempt to Separate Electoral and Bureaucratic Mechanisms.” *Public Choice* 144, 323-346.
- Bjørnskov, Christian, and Pierre-Guillaume Méon. (2013). “Is Trust the Missing Root of Institutions, Education, and Development?” *Public Choice* 157, 641-669.
- Boix, Carles, and Daniel N. Posner. (1998). „Social Capital: Explaining Its Origins and Effects on Government Performance.“ *British Journal of Political Science* 28, 686-693.
- Brühlhart, Marius, and Jean-Claude Usunier. (2012). “Does the Trust Game Measure Trust?” *Economics Letters* 115, 20-23.

Buchanan, James M. (1975). "The Samaritan's Dilemma." In *Altruism, Morality, and Economic Theory*, edited by Edward S. Phelps, pp 71-85. New York: Russell Sage Foundation.

Butler, Alexander W., and Larry Fauver. (2006). „Institutional Environment and Sovereign Credit Ratings.“ *Financial Management* 35, 53-79.

Bützer, Sascha, Christina Jordan, and Livio Stracca. (2013). „Macroeconomic Imbalances: A Question of Trust?“ Working Paper no. 1584, European Central Bank.

Cantor, Richard, and Frank Packer. (1996). „Determinants and Impact of Sovereign Credit Ratings.“ *Economic Policy Review* 2, 37-54.

Cox, James C., Elinor Ostrom, James M. Walker, Antonio Jaime Castillo, Eric Coleman, Robert Holahan, Michael Schoon, and Brian Steed. (2009). "Trust in Private and Common Property Experiments." *Southern Economic Journal* 75, 957–975.

Duarte, Jefferson, Stephan Siegel, and Lance Young. (2012). "Trust and Credit: The Role of Appearance in Peer-to-Peer Lending." *Review of Financial Studies* 25, 2455-2484.

France 24. (2013). "French credit rating at 'AA' after new S&P downgrade". Press release, France 24, November 8. Available at <http://www.france24.com/en/20131108-standard-poors-downgrade-france-credit-rating/> (accessed November 2013)

Gehring, Kai, and Andreas Fuchs. (2013). "The Home Bias in Sovereign Ratings." Department of Economics Discussion Paper Series No. 552, University of Heidelberg.

Hill, Paula, Robert Brooks, and Robert Faff. (2010). „Variations in Sovereign Credit Quality Assessments Across Rating Agencies.“ *Journal of Banking & Finance* 34, 1327–1343.

Knack, Stephen. (2002). "Social Capital and the Quality of Government: Evidence from the States." *American Journal of Political Science* 46, 772-85.

Knack, Stephen, and Philip Keefer. (1997). "Does Social Capital Have an Economic Pay-Off? A Cross-Country Investigation." *Quarterly Journal of Economics* 112, 1251–1288.

Krugman, Paul. (2013). "The Plot against France." *New York Times*, November 10.

Mellios, Constantin and Eric Paget-Blanc. (2011). „The Impact of Economic and Political Factors on Sovereign Credit Ratings.“ In *Sovereign Debt: From Safety to Default*, edited by Robert W. Kolb, chapter 36. Hoboken: John Wiley.

Naef, Michael, and Jürgen Schupp. (2009). “Measuring Trust: Experiments and Surveys in Contrast and Combination.” SOEP working paper 167, DIW Berlin.

Nannestad, Peter. (2008). “What Have We Learned About Generalized Trust, If Anything?” *Annual Review of Political Science* 11, 413-437.

OECD. (2013). “OECD Datalab.” Online database, OECD, Paris. Available at <http://www.oecd.org/statistics/datalab/> (accessed November 2013).

Persson, Torsten, and Guido Tabellini. (2009). “Democratic Capital: the Nexus of Political and Economic Change.” *American Economic Journal: Macroeconomics* 1, 88-126.

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

Reuters. (2011). “EU's Barroso Attacks Credit Rating Agencies' Role.” Press release, July 6, 2011. Thomson Reuters News. Available at <http://www.reuters.com/article/2011/07/06/eurozone-ratings-barroso-idUSB5E7HL07O20110706> (accessed May 2014).

Robbins, Blaine. (2012). “Institutional Quality and Generalized Trust: A Nonrecursive Causal Model.” *Social Indicators Research* 107, 235-258.

Sapienza, Paola, Ana Toldra, and Luigi Zingales. (2007). “Understanding Trust.” NBER Working Paper no. 13387.

Schmidt, Klaus M. (2011). “Social Preferences and Competition.” *Journal of Money, Credit and Banking* 43, 207-231.

Uslaner, Eric M. (2002). *The Moral Foundations of Trust*. Cambridge, UK: Cambridge University Press.

Uslaner, Eric M. (2008). "Where You Stand Depends on Where Your Grandparents Sat: The Inheritability of Generalized Trust." *Public Opinion Quarterly* 72, 725-740.

World Bank. (2013). "World Development Indicators." Online database. Washington DC: the World Bank.

Table 1. Descriptive statistics

Variable	Mean	Standard deviation	Observations
Interest rate	5.717	2.549	662
Credit rating, S&P	3.479	3.240	662
Credit rating, Fitch	3.656	3.176	576
Credit rating, Moody's	3.192	3.015	625
Young population	27.096	5.611	626
CPI inflation	2.527	2.053	602
Government ideology	.303	.325	662
Gross savings	21.259	5.766	649
Postcommunist	.154	.362	662
Growth rate	.019	.032	608
Social trust	37.544	15.089	662
Claims on government	13.655	16.933	606
Minority government	.355	.479	662
Coalition government	.607	.489	662
EU member	.612	.488	662
Fixed exchange rate	.461	.499	662
Exports	44.149	26.862	624
Imports	42.620	23.371	624
Government expenditures	19.507	3.869	624

Note: the average value of credit ratings from S&P and Fitch of approximately 3.5 corresponds to a rating between AA and AA-; that of Moody's is slightly above AA.

Table 2. Main results, long-term interest rates

	1	2	3	4	5
	All	All	All	All	All
Lagged dependent	.731*** (.026)	.721*** (.026)	.729*** (.026)	.735*** (.026)	.731*** (.026)
Young population	.034*** (.008)	.031*** (.009)	.035*** (.009)	.035*** (.009)	.035*** (.008)
CPI inflation	.092*** (.026)	.088*** (.026)	.091*** (.026)	.085*** (.027)	.089*** (.026)
Government ideology	-.333*** (.118)	-.325*** (.122)	-.345*** (.122)	-.339*** (.119)	-.349*** (.119)
Gross savings	-.018** (.007)	-.019*** (.008)	-.018** (.008)	-.015 (.009)	-.020** (.008)
Postcommunist	.505*** (.146)	.438*** (.157)	.537*** (.169)	.461*** (.156)	.529*** (.149)
Growth rate	-14.879*** (1.702)	-15.362*** (1.734)	-14.957*** (1.726)	-15.282*** (1.772)	-14.988*** (1.713)
Social trust	-.003 (.003)	-.004 (.003)	-.002 (.003)	-.001 (.003)	-.001 (.003)
Claims on government		-.005** (.003)			
Minority government			-.072 (.084)		
Coalition government			-.019 (.092)		
Fixed exchange rate			.012 (.009)		
Exports				-.007 (.010)	
Imports				.009 (.013)	
Government expenditures					-.009 (.012)
Period FE	Yes	Yes	Yes	Yes	Yes
Observations	572	553	572	570	570
Countries	38	38	38	38	38
R squared within	.795	.793	.796	.795	.796
R squared between	.971	.975	.971	.971	.971
Wald Chi squared	3118.06	3031.80	3105.85	3103.52	3107.71

Note: *** (**) [*] denote significance at $p < .01$ ($p < .05$) [$p < .10$]. All regressions include country fixed effects.

Table 3. Main results, S&P credit ratings

	1	2	3	4	5
	All	All	All	All	All
Lagged dependent	.991*** (.017)	.989*** (.018)	.991*** (.017)	.993*** (.018)	.988*** (.017)
Young population	-.044 (.027)	-.031 (.031)	-.049* (.029)	-.048* (.029)	-.039 (.027)
CPI inflation	-41.184 (5.857)	.115 (.088)	.123 (.085)	.126 (.087)	.102 (.085)
Government ideology	-1.066*** (.403)	-1.126*** (.416)	-1.153*** (.414)	-1.050*** (.404)	-1.153*** (.405)
Gross savings	-.085*** (.025)	-.089*** (.026)	-.097*** (.026)	-.097*** (.031)	-.094*** (.027)
Postcommunist	-.228 (.536)	-.051 (.587)	-.688 (.599)	-.116 (.558)	-.011 (.544)
Growth rate	-41.184*** (5.857)	-41.643*** (5.992)	-39.776*** (5.913)	-40.399*** (6.053)	-41.489*** (5.842)
Social trust	.001 (.012)	.001 (.012)	-.004 (.012)		
Claims on government		.005 (.009)			
Minority government			.214 (.288)		
Coalition government			.574* (.312)		
Fixed exchange rate			-.152 (.302)		
Exports				.025 (.036)	
Imports				-.026 (.043)	
Government expenditures					-.045 (.039)
Period FE	Yes	Yes	Yes	Yes	Yes
Observations	573	554	573	571	571
Countries	38	38	38	38	38
R squared within	.599	.601	.601	.600	.599
R squared between	.997	.997	.997	.997	.997
Wald Chi squared	8624.99	8308.46	8638.01	8653.58	8678.29

Note: *** (**) [*] denote significance at $p < .01$ ($p < .05$) [$p < .10$]. All regressions include country fixed effects.

Table 4. Trust interactions, long-term interest rates

	1	2	3	4	5
	All	All	All	All	All
Social trust	-.010*** (.003)	.003 (.004)	-.019* (.010)	-.001 (.004)	-.032* (.017)
Growth rate	-29.608*** (2.899)				
Growth * trust	.509*** (.083)				
Inflation		.162*** (.047)			
Inflation * trust		-.003* (.002)			
Gross savings			-.047** (.018)		
Savings * trust			.001 (.000)		
Claims on government				.007 (.011)	
Claims * trust				-.000 (.000)	
Government expenditures					
Expenditures * trust					
Period FE	Yes	Yes	Yes	Yes	
Observations	572	572	572	553	570
Countries	38	38	38	38	38
R squared within	.809	.797	.796	.793	.797
R squared between	.967	.969	.969	.973	.974
Wald Chi squared	3369.17	3134.21	3132.03	3034.64	3125.13

Note: *** (**) [*] denote significance at $p < .01$ ($p < .05$) [$p < .10$]. All regressions include country fixed effects and the full baseline.

Table 5. Trust interactions, S&P credit ratings

	1	2	3	4	5
	All	All	All	All	All
Social trust	-.008 (.016)	.027* (.015)	-.077** (.036)	.004 (.014)	.029 (.058)
Growth rate	-57.599*** (10.251)				
Growth * trust	.571** (.293)				
Inflation		.456*** (.160)			
Inflation * trust		-.013** (.005)			
Gross savings			-.218*** (.063)		
Savings * trust			.003** (.002)		
Claims on government				.008 (.039)	
Claims * trust				-.000 (.001)	
Government expenditures					-.006 (.113)
Expenditures * trust					-.001 (.002)
Period FE	Yes	Yes	Yes	Yes	Yes
Observations	573	573	573	554	571
Countries	38	38	38	38	38
R squared within	.603	.606	.602	.601	.599
R squared between	.997	.996	.997	.997	.997
Wald Chi squared	8673.14	8718.27	8697.32	8292.67	8664.60

Note: *** (**) [*] denote significance at $p < .01$ ($p < .05$) [$p < .10$]. All regressions include country fixed effects and the full baseline.

Figure 1. Links from trust to default risks

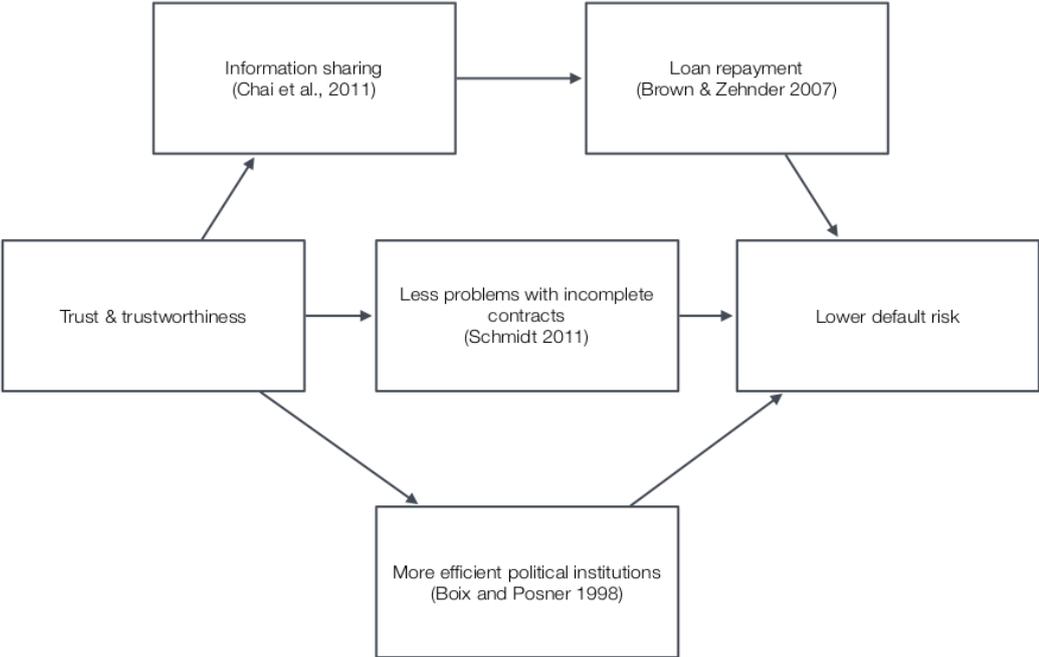


Figure 2. Trust and long-term interest rates, ultimo 2012

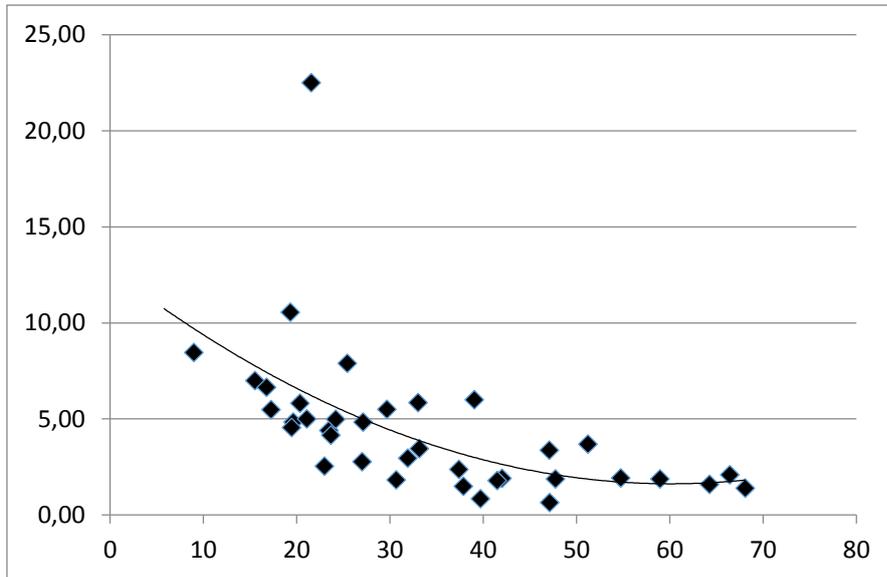


Figure 3. Trust and S&P credit ratings, ultimo 2012

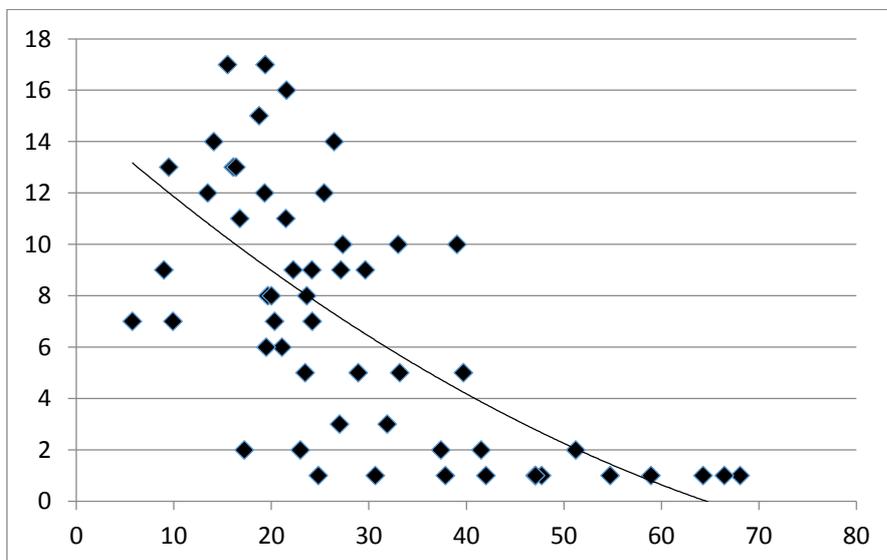


Figure 4. Conditional growth responses, interest rates

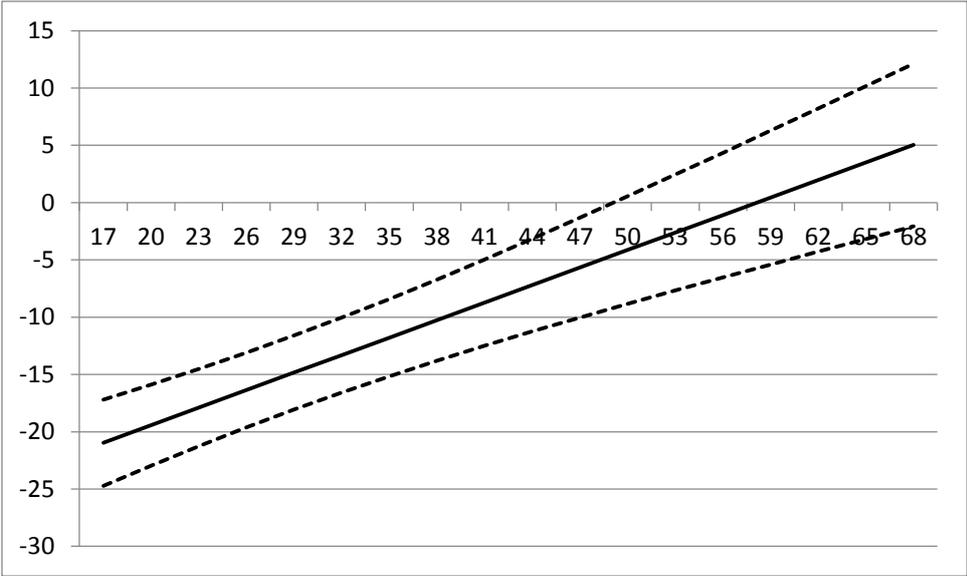


Figure 5. Conditional inflation responses, interest rates

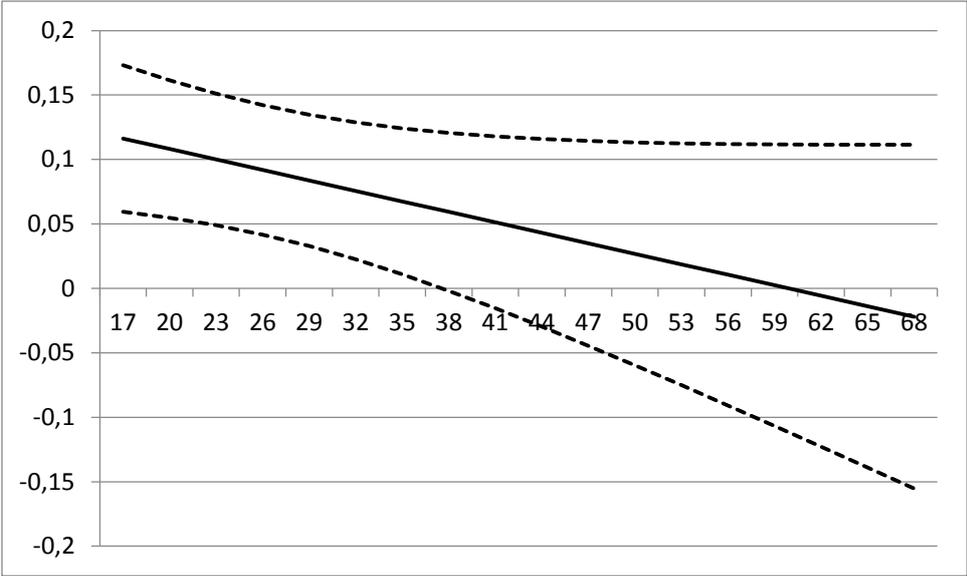


Figure 6. Conditional gross savings responses, interest rates

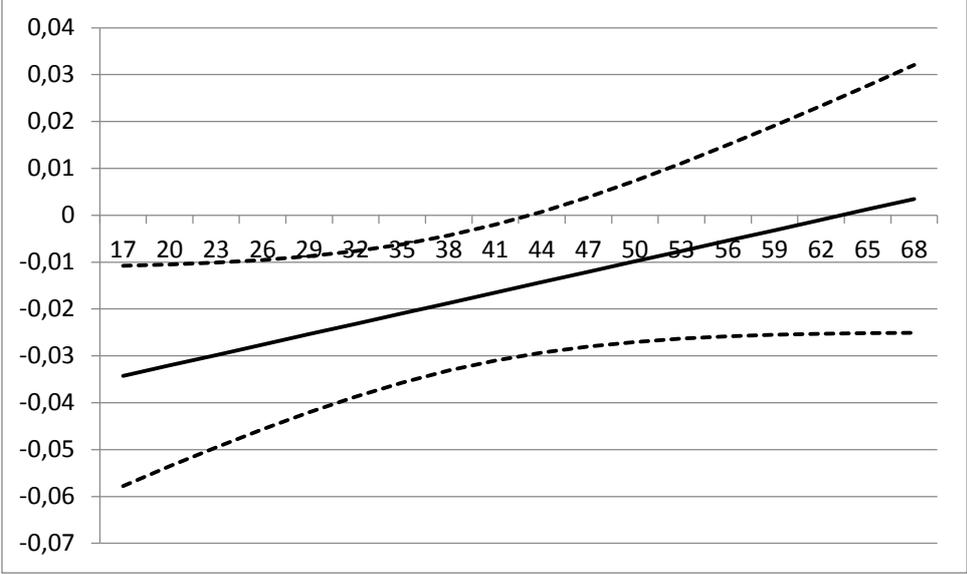


Figure 7. Conditional growth responses, credit ratings

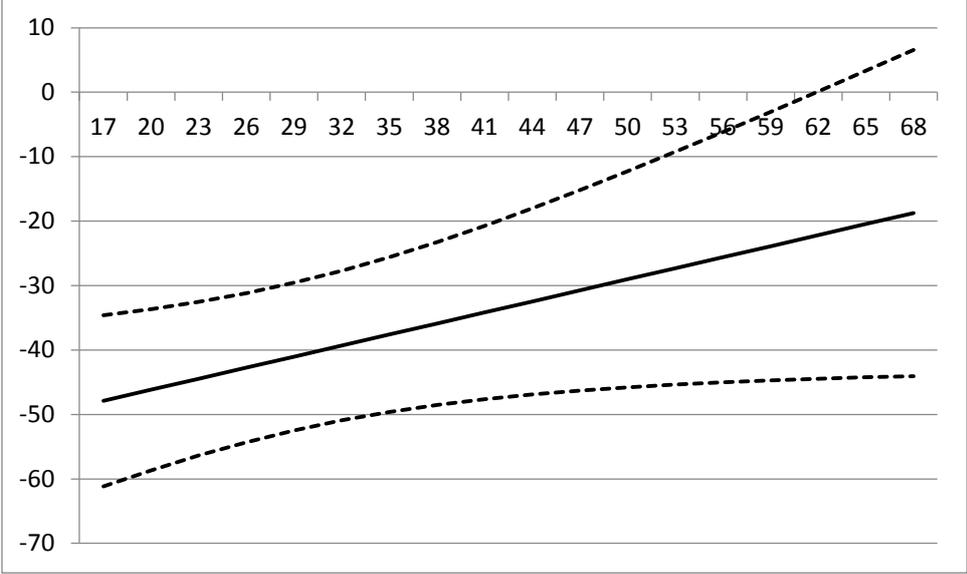


Figure 8. Conditional gross savings responses, credit ratings

