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IFN Working Paper No. 1119, 2016

Burying the Bumblebee Once and for All: Does Big Government Hurt Growth Less in High-Trust Countries?

Andreas Bergh and Christian Bjørnskov

Burying the bumblebee once and for all: Does big government hurt growth less in high-trust countries?

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Abstract: High levels of social trust has been linked to both public sector size and long term economic growth, thereby helping to explain how some countries are able to combine high taxes and relatively high levels of economic growth. This paper examines if social trust as a background factor also insulates countries against negative effects of public sector size on growth, as government size and growth are found to be negatively associated in several recent studies. We note that the effect is theoretically ambiguous. In panel data from 66 countries across 40 years, we find little robust evidence of insulating effects. Instead we find robust evidence that high trust aggravates the crowding out effects of public sector size on private investments.

JEL Codes: H10, O11, P16, Z10

Keywords: trust, economic growth, government consumption

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1. Introduction

The literature on the relationship between government size and economic growth contains two seemingly contradictory findings. On the one hand, the size of the public sector is positively correlated with GDP per capita, and some (mainly Northern European) countries seem particularly successful in combining relatively generous welfare states with high levels of economic affluence. On the other hand, when the relationship between government size and economic growth is examined for rich countries using panel data with country fixed effects, studies tend to find that an increase in government size is associated with lower growth rates (typically averaged over 5 years).¹ This seemingly paradoxical situation is sometimes referred to as a bumblebee paradox (Thakur et al., 2003) suggesting that countries with large government spending and relatively solid growth somehow defy economic laws, alluding to the misconception that flying bumblebees defy the laws of gravity.

A growing body of research suggests that social trust plays a key role in reconciling these two patterns, solving the paradox. Historical trust levels have been causally linked to both economic growth (Algan and Cahuc, 2010; Bjørnskov, 2012) and to current welfare state size (Bergh and Bjørnskov, 2011; Bjørnskov and Svendsen, 2013; Algan et al., in press). Several studies also document that trust is associated with better institutional quality and regulations (Knack, 2002; Bjørnskov, 2010; Leibrecht and Pitlik, 2015) and to macroeconomic stability (Sangnier, 2013). However, it remains unknown if social trust as a background factor actually dampens or aggravates the negative impact of public sector size on growth. The present paper aims to fill this gap in the literature. Given the findings in Oto-Peralías and Romero-Ávila

¹ Bergh and Henrekson (2011) find that an increase in government size by ten percentage points, measured either as total taxes or total revenue relative to GDP, is on average associated with a 0.5 to 1 percent lower annual growth rate. This pattern holds when government size includes both productive and unproductive activities, as opposed to studies that only consider government activities that are considered „productive spending“ (cf. Lindert 2004).

(2013), that government size is less harmful for growth when the quality of formal institutions is high, one might expect social trust to similarly dampen the adverse growth effects of big government. The findings in Berggren et al. (2015), that government legitimacy exacerbates the negative growth effect of government size in the long run, rather suggests the opposite. As will be shown in section 2, it is theoretically ambiguous how social trust moderates the negative relationship between government size and growth.

To settle the issue empirically, this paper examines how government size affects investments, as well as growth when investments are controlled for, at different levels of trust. Results indicate that when the investment rate is held constant, government spending decreases growth, but less so when trust is higher. This result is however statistically fragile. On the other hand, we also find that government spending robustly decreases the investment rate, and more so when trust is higher. When these effects are weighed together, the total insulation effect of trust is very small and statistically fragile while the effect of higher government final expenditure on growth remains robust and negative for all observed values of trust in the sample. The negative effect on investments is driven by public consumption decreasing private investments, and more so in high trust countries. In short, high trust levels may potentially have a mitigating effect on how the public sector affects total factor productivity, but high trust at the same time aggravates the problem that public spending crowds out private investment.

The rest of the paper is structured as follows. We first outline a set of theoretical considerations in section 2, showing how the theoretical situation is ambiguous. Section 3 presents our sample, data and estimation strategy, which we employ in section 4. Section 5 discusses the results and concludes.

2. Theoretical considerations

Figure 1 summarizes a number of findings regarding the trust-government size-growth nexus. As mentioned, trust increases economic growth (Knack and Keefer, 1997; Algan and Cahuc, 2010; Bjørnskov, 2012) as well as government size (Bergh and Bjørnskov, 2011; Bjørnskov and Svendsen, 2013).

Importantly, the arrows running from trust all come from studies that claim to have found a causal effect, either by using instrumental variable analysis or by relying on historical immigration to the US.

In studies that examine the relationship between government size and growth with country fixed effects (such as those surveyed by Bergh and Henrekson, 2011), the effect of trust is picked up by the country fixed effect, as trust in most countries is approximately constant over time (Uslaner, 2008; Bjørnskov and Svendsen, 2013). It is obvious from Figure 1, however, that cross-country comparisons of outcomes related to growth and public sector size will suffer from omitted variable bias if they do not control for trust (as discussed by Bergh, 2015).

Insert Figure 1 about here

The question at stake in this paper is to examine if trust is also moderating the link from government size to growth, as indicated by the bold arrow in Figure 1. If it does so in a positive way, it implies what we will refer to as an **insulation effect**, such that high-trust countries with large public sectors are less vulnerable to the negative growth effects of government size noted in studies using country fixed effects, such as Bergh and Karlsson (2010), Afonso and Furceri (2010) and Romero-Avila and Strauch (2008). If, on the other hand, high-trust countries are more vulnerable to negative growth effects

from large public sectors, there is instead an **aggravation effect**. As will be shown, there is little reason to expect either of these two effects to dominate the other.²

2.1 The aggravation effect vs. the insulation effect: theoretical considerations

Bergh and Henrekson (2010) provide an overview of theoretical mechanisms by which a large public sector can affect growth. There are three major paradigms in growth research: neo-classical growth theory, endogenous growth theory and institutions as fundamental determinants of growth. The three paradigms identify a crucial role for savings and investments, education and the institutional environment, respectively. In addition, Bergh and Henrekson discuss market failure, political failure (mainly rent seeking), distortive taxation and crowding out caused by public consumption and public investment. It is clear that there are plenty of theoretical mechanisms suggesting that public spending boosts growth, but there are also a number of mechanisms suggesting the opposite. The issue at stake here is how the relative importance of the different channels varies with social trust, ie whether trust aggravates or dampens the negative growth effects of government size.

Table 1 below summarizes the main theoretical considerations. One may have different views on the plausibility and importance of the mechanisms described in the table and while more channels could

² Some heterogeneity in the government size - growth relationship is documented by the random effects of Dar and AmirKhalkhali (2002) that find a significant negative effect of government size on growth in 16 out of 19 OECD countries. The exceptions were the high-trust countries Norway and Sweden, where the effect was negative but insignificant. They also found a positive but insignificant effect for the US, which (although very diverse across states) has an average trust level about one standard deviation above the global average.

probably be added, we believe it covers the main mechanisms. The table clearly suggests that there can be no strong theoretical prior as to whether high trust levels moderate the size–growth relationship towards aggravation or insulation.

Insert Table 1 about here

The overview of separate theoretical mechanisms in the table informs us about what the evidence can reveal. In particular, if government spending is in some way either directly productive or complementary to private investments in higher-trust countries – as for example in the case of effective infrastructure spending – we would expect to observe a crowding-in effect on private investments, as their private marginal productivity is likely to be increasing in public spending. If government spending is primarily non-productive and structured in a different way, and if government spending largely consists of the public provision of private goods, we instead expect to observe crowding-out effects on private investments. While we cannot make any theoretical predictions in the following, we can to some extent use the empirical results to infer information about the effective structure of government spending across high- and low-trust countries.

3. Data and empirical strategy

We employ what has become the standard trust measure in the literature, invented by Elisabeth Noelle-Neumann and popularized by the US General Social Survey. This measure is the share of respondents answering “can be trusted” in the standard question “In general, do you think most people can be trusted or can’t you be too careful?” Although it has been criticized for being conceptually vague, the measure is documented to correlate with a number of behavioural characteristics of countries around the world. Not least, Knack and Keefer (1997) tested its validity by noting that return rates in wallet-drop experiments around the world correlate strongly with survey trust (Felton, 2001; Bjørnskov 2010). Experimental

evidence associating observed behaviour with stated trust also finds trust to correlate with behaviour in trust-sensitive, anonymized economic experiments such as dictator and public goods games (Cox et al. 2009; Sapienza et al. 2013). In addition, several studies suggest that trust scores are remarkably stable over time in most countries (Algan and Cahuc, 2010; Bjørnskov, 2010; Uslaner, 2008).

3.1. The sample and control variables

To maximize the number of observations, we use the data on OECD countries, OECD-like countries and Latin America in Bjørnskov and Méon (2013), which is compiled by using all information in the six waves of the World Values Survey between 1981 and 2010, data from the 1995-2012 LatinoBarometro, the 2002–2004 Danish Social Capital, and recent observations from the LaPop surveys. We treat the trust scores as approximately time invariant such that the observations we use throughout correspond to the values reported in Appendix Table A1.

Our other main variable is government size, which we capture in two different ways. We first employ the standard measure of government final consumption expenditure, measured as a percent of GDP. These data derive from the World Development Indicators database (World Bank, 2015), which we supplement with observations from various editions of the IMF's *World Economic Outlook* from the 1990s (IMF, vd). As stressed by several studies, this measure is subject to endogeneity (Bergh and Henrekson, 2011). We therefore supplement it with data on government consumption as percent of total consumption, and transfers and subsidies as percent of GDP; both are from Gwartney et al. (2015).

Our two dependent variables are the annual growth rate of real (purchasing power) GDP per capita and the investment rate as percent of GDP, both from Heston et al. (2012). In additional tests, we use information in Gwartney et al. (2015), supplemented by data from IMF (vd), to separate public and private investment rates. From the same source as our main growth data, we supplement the baseline with

openness (trade volumes as percent of GDP) and the relative investment price (the price of capital goods as share of the total price level) in the investment specification.

Since we are not mainly interested in the effects of social trust that are not associated with government size, we include economic freedom and education, shown by previous research to be likely to transmission mechanisms of social trust (Papagapitos and Riley, 2009; Dearmon and Grier, 2011; Bjørnskov, 2012). Education is the average number of years of schooling in the population (Barro and Lee, 2010) while we use the economic freedom index from Gwartney et al. (2015), but excluding area 1, which captures government size. The economic freedom index in the tables thus captures legal quality, sound money, trade policy and regulatory freedom. We also add a set of regional controls for Asia, Latin America and the post-communist countries, a full set of period dummies, and an indicator of whether or not a coup occurred in the country within a given period.³ All data are summarized in Table 2.

Insert Table 2 about here

All variables are aggregated into the six five-year periods for the time between 1970 and 2010. Effects are estimated using a generalized least squares random effects estimator with a full set of period fixed effects. The motivation is that since social trust is approximately time-invariant, any fixed effects estimator will effectively capture the main effects of trust, but leave us without any way of ascertaining the interactions between trust and government spending. While the interaction term is not time-invariant, parts of the comparison basis – trust effects at zero government spending – are, which leaves one with random effects estimators as the only practical choice.

3.2. Coping with endogeneity

³ The coup data derive from a new database developed by Rode and Bjørnskov, covering 188 countries in the entire period 1950-2010. The coup data are described in Bjørnskov (2015).

Endogeneity is a perennial problem in economics, yet it is particularly easy to argue for biased estimates when assessing the influence of government spending on economic growth. The reason is that spending varies mechanically with growth and in particular when measured as a percentage of GDP. With poor growth performance, automatic stabilizers increase transfer payments, governments may conduct Keynesian stabilization policy, and corporatist government may increase industrial subsidies. If these effects persist for a prolonged period of time, the spending *reactions* to low growth induce a downward bias in the estimates. However, according to a reasoning introduced by Romero-Avila and Strauch (2008) and elaborated in Bergh and Henrekson (2011), it is possible to get a sense of the bias since revenue-based measures of the size of government exhibit the opposite bias: due to profit taxation and tax progressivity, tax revenue tends to increase when growth is above its trend, not because high tax revenue cause above average growth, but because growth increases tax revenue. Measuring the size of government by revenue-based indicators thus induces an upward bias in estimates and a ‘true’ estimate of the causal effect must therefore lie in between estimates based on spending and revenue data.

We note a similar structure in our data in the sense that the measure of transfers and subsidies is substantially more subject to endogeneity bias than either government spending as percent of GDP or government consumption, measured as percent of total consumption. First, the use of government consumption as a share of total consumption instead of the more standard scale as a share of GDP in itself reduces endogeneity concerns. The reason is that a decrease in investments is likely to be associated with a decrease in the growth rate. As investments are necessarily part of GDP, there is a mechanical association between a lower investment rate and larger government consumption as share of GDP, due to the effective inclusion of investments in the nominator. This problem does not arise when scaling government consumption with total consumption. Second, most automatic stabilizers and corporatist subsidies will enter directly into any measure of transfers and subsidies while measures based on final expenditures are

only indirectly affected. Any endogeneity bias must therefore be substantially larger for the transfers and subsidies indicator.

A second reason to be less worried about endogeneity is the use of interactions, which Nizalova and Murtazashvili (2012) show under fairly general conditions alleviates the standard concern. As Nunn and Qian (2012, 13) state, “interacting an arguably exogenous term [social trust] with one that is potentially endogenous [government spending], can be interpreted as exogenous since we directly control for the main effect of the endogenous variable.” In other words, even though government spending per se might be endogenous, the interaction and therefore the heterogeneity of the estimate and the difference between estimates at low and high trust levels can be considered exogenous.

While we cannot rule out that the estimates in the following are biased, we note that if endogeneity bias is a substantial concern, we should first of all observe that transfers-based estimates are more negative than spending-based measures. If not, it is unlikely that our estimates are substantially biased. Second, even with endogeneity bias, we are still able to yield information that sheds exogenous light on the bumblebee hypothesis. With these insights, we proceed to a first look at the data.

4. Results

A first glance at the data is provided by splitting the sample into above/below median social trust and government spending, respectively, and calculating average growth for the resulting four country categories. Results are shown in Figure 2 where the group that clearly differs from the rest is the high trust/low spending combination, which on average grew by 3.1 percent annually over the 1975-2010 period. In comparison, the low trust / high spending combination grew on average 1.4 percent while the remaining two groups grew by 1.8 percent. The raw data exhibit a similar difference in investment rates

with an average of 27 percent in the high trust / low spending group and a 22-23 percent in the other three groups. Similarly, private investments are on average 21 percent of GDP in the high trust / low spending group and 15-17 percent in the remaining groups. In all cases, the high trust / low spending group is different from the rest at any conventional level of significance.

Insert Figure 2 about here

4.1. Main results

The main results in Table 3 tell a somewhat different story than the indications of substantial differences in the figure. Focusing on growth rates, we find first a set of standard results: initial GDP per capita is significantly negatively associated with growth, investment rates are positively so, and coups tend to lower growth. In column 2, in which we control for two well-established direct transmission mechanisms of social trust, we also find that economic freedom (excluding indicators of government size) and education are both significantly associated with higher growth rates.

Insert Table 3 about here

Turning to the main purpose of the paper, the inclusion of social trust, government spending and an interaction term between the two means that we must evaluate the marginal effect of spending conditional on the level of trust with the correct conditional standard errors (Brambor et al., 2006). We do so in the bottom panel of the table, which shows that government spending is strongly negatively associated with growth at low-to-medium levels of social trust, but not at high levels. The results indicate that at trust levels higher than about 45 percent – approximately the level of Switzerland or Canada – government spending no longer significantly lowers growth. When studying the direct effects of public spending we thus find evidence for an insulation effect. The opposite results are observed, interestingly, when estimating the determinants of investment rates. As expected, openness to trade and relative investment prices are

significant predictors of investments. The interaction of spending and trust suggests that the crowding out effects of spending are strongly increasing in social trust. The point estimate increases four-fold from the least to the most trusting nations and becomes significant at trust levels above eight percent.

As we note in section 3, one way of alleviating endogeneity and of getting a sense of its importance is to replace government spending with measures of either government consumption (as a share of total consumption) or transfers and subsidies. If endogeneity bias is a real issue, we should observe substantially stronger associations with the latter than the former. Yet, the results in Table 4 suggest the opposite: Using the transfers and subsidies index, we find no evidence of any effects on growth or investments while the findings pertaining to growth are similar to those in Table 3 when using government consumption. We also find a similar increase in the point estimate on investments as in Table 3, but surrounded by substantially larger standard errors.

Insert Table 4 about here

4.2. Separating private and public investments

As such, the evidence appears to be inconclusive. Yet, we note that almost all arguments in section 2 actually pertain to *private* investments and not public investments. In Table 5, we therefore employ both types and estimate their determinants separately, allowing them to differ. We first find that the positive effects of openness and economic freedom are strongly significant for private investments, and that they are substantially more sensitive to the prices of capital goods than public investments. We also find an approximately offsetting negative effect of economic freedom on public investments, indicating that freedom mainly affects the mix instead of the total volume of investments. As expected, we also find that formerly communist countries tend to have larger public investments.

Insert Table 5 about here

Most pertinently, we find that the effects of both government spending and government consumption on private investments are significant and strongly heterogeneous in social trust. With government spending, measured as a percent of GDP, effects are significant at all trust levels observed in the sample, but with an estimate increasing from -0.23 at the minimum to -0.79 at the maximum. With government consumption, measured as a share of total consumption, the effect becomes significant at around a trust level of 20 percent, and also increases through the significant range by approximately a factor four. As such, while the average estimates on government spending may suffer from endogeneity bias, our results still reflect the phenomenon described by Nizalova and Murtazashvili (2012) as the degree of heterogeneity is not affected by the choice of measure and can therefore be treated as exogenous. For transfers and subsidies, we simply find a negative homogeneous effect on private investments that is not associated with trust, and a similarly homogeneous and significant positive effect on public investments. While many results in Tables 3 and 4 are mixed, the consistent finding is an unambiguously negative effect of government spending on private investments, which is more negative at higher trust levels.

4.3. Robustness

However, if our main results are driven by extreme observations of social trust, they do not generalize to most countries. In that case, the results must be driven by some omitted variable that is particularly salient in either very low-trust countries or in Scandinavia. A similar problem arises if the trust scores from several national surveys vary substantially, indicating that data quality is also poor in other areas other than trust.⁴ In addition, we would also get spurious results if all of our identified effects were driven by events in a

⁴ Hollyer et al. (2011) show that data quality and in particular the availability of policy data varies with democracy. We argue that since social trust is associated with the quality of bureaucratic institutions, data quality is also likely to vary with such institutions as well as their determinants, which include trust.

single time period. To examine these concerns, we have subjected our results to a number of robustness tests.

As it turns out, excluding uncertain trust scores does change some findings. When excluding countries with either only one survey observation (Belize, Guyana, Haiti, and Israel) and countries in which the smallest and largest trust observation differ by more than a factor two (Brazil, Colombia, Costa Rica, Cyprus, Dominican Republic, Peru, Poland, Suriname, Trinidad and Tobago, and Turkey), the point estimate of government spending in the growth regressions is no longer conditional on social trust. While spending is insignificant among the highest-trust countries, the conditional point estimates across all trust scores only vary from $-.090$ to $-.072$. In other words, we find no robust and significant evidence in favour of an insulation effect. We also continue to find no evidence of trust effects on public investments.

Conversely, our main results pertaining to the overall investment rate as well as to private investments are robust to the exclusion of uncertain trust observations. While we find a quantitatively slightly smaller effect of government spending, but an unchanged effect of government consumption, the main findings for investments remain the same.

Our results must also be examined against the results reported by Oto-Peralías and Romero-Ávila (2013) that the growth effects of government spending depend on the quality of formal institutions, which they measure using bureaucracy quality from the International Country Risk Guide (ICRG). We first confirm and extend their result by using two other measures of institutional quality: area 2 (legal quality) of the EFW index and an average of area 2 to 5 (resulting in a combined institutional and policy quality measure). To check whether the moderating effects of trust that we have found are either 1) evidence of *direct* effects of differences in trust, or 2) occur because trust influences the quality of formal institutions, Table A3 in the appendix shows the results of adding an interaction term between economic freedom and

government spending. This robustness test can be interpreted as a ‘beauty contest’ between the trust interaction and the institutional quality interaction.

We first observe that the direct effects of government spending on growth are substantially more heterogeneous in trust than in economic freedom (area 2 to 5). Moving from the 10th to the 90th percentile of economic freedom – i.e. moving from very poor to very good formal institutions – only yields an insignificant 30 % difference in the marginal effect of spending. The addition of an interaction with economic freedom does not affect the observed heterogeneity in trust, although we must emphasize that this particular result is not robust. When focusing on overall investment rates, the results indicate more support for an indirect channel for trust, since the point estimate on government spending varies by about 44 percent between the 10th (low) and 90th (high) deciles of the distribution of trust, but 87 percent between particularly low and high economic freedom. However, when estimating the determinants of private investments, the similar differences across the trust distribution are 53 percent and 59 percent across the distribution of economic freedom. Again, we observe no real effects for public investments. The particular results therefore do not support any clear interpretation, but mostly suggest that about half of the investment effect occurs directly and about half derives from the indirect effects of trust through economic freedom. Interacting instead with only area 2 of the EFW-index produces results more in line with Oto-Peralías and Romero-Ávila (2013), but still does not change our results regarding trust. In all, when it comes to moderating the negative growth effect of government size, social trust and institutional quality differs a lot.

Finally, we have also run a number of robustness tests (not shown) that turn out to not affect the main findings: excluding the lowest trust scores in the sample – Trinidad and Tobago, Brazil and Belize – and the three highest trust countries – the Scandinavian countries Denmark, Norway and Sweden. Doing so yields effects that are qualitatively unchanged and quantitatively very similar to those in previous tables.

Similarly, a full period jackknife (i.e. excluding each of the eight time periods one at a time), reveals no significant differences in the main results. We have also excluded observations with particularly high government spending without observing a significant change in our main results.

Summarizing, the robustness tests indicate that while the directly growth-related findings are fragile and seem to be driven by questionable trust data, the conditional crowding out effects of government spending on private investments are robust to all additional tests we have tried. We therefore proceed to assessing the full quantitative effect of government spending at different levels of social trust, regardless of their particular channel.

4.4. Total effect

Our last exercise is to provide a quantitative assessment of the full effect of social trust on the influence of government spending on long-run economic growth. Because our robustness tests indicate a number of uncertain trust observations seem to influence some of our results, we focus on the results that are robust to the exclusion of these observations. These findings can be summarized as follows:

- At the very lowest trust levels, we find no significant effects of government spending on growth.
- At social trust levels above approximately 13 percent, i.e. for all but the ten least trusting countries in the sample, the negative effect becomes statistically significant.
- At the 90th decile of trust, i.e. around the trust level of Canada or Australia, a one-standard deviation increase in government spending is associated with a long-run growth decline of about 15 percent of a standard deviation.

The economic significance of the effect is not huge, but also far from trivial. Evaluated at the German trust level, a 10 percentage point increase in government size associates with 0.67 percentage units lower annual growth rate. In other words, for medium to high trust levels, the size of the effect is similar to

the one reported in the survey by Bergh and Henrekson (2011), that most studies of rich countries find that 10 percentage units bigger public sector correlate with 0.5 to 1.0 percentage unit lower annual growth rate. Interestingly, this similarity appears despite the differences in sample (the survey Bergh and Henrekson (2011) is focused on studies of developed countries only).⁵

When including the uncertain trust observations, results change slightly towards supporting an insulation effect. At trust levels around 10 percent, the full marginal effect of a one-standard deviation shock to government spending on growth is about 30 percent of a standard deviation of growth, mostly driven by a direct effect on growth of about a fourth of a standard deviation. At levels of trust around 45 percent and higher, (approximately the level of Australia), the corresponding full effect is zero although the investment rate is reduced by a third of a standard deviation. At high levels of social trust, the direct and indirect effects may thus approximately cancel each other out. With these examples, we next discuss the main findings.

5. Discussion and conclusions

Social trust enables some countries to combine large public sectors with good economic performance, but within these countries the correlation between government size and growth is still negative. To analyze whether high levels of social trust dampen or aggravate the adverse effects of big government on growth, this paper analyzed panel data from a sample of 66 countries to examine how social trust moderates the

⁵ Another illustration of the size would be to say that the growth decline of a three percentage point increase in government spending – that is, from a balanced budget to the maximum allowed increase within the current EU fiscal rules – is associated with an annual growth decline of about .2 percentage points. Evaluated around average growth, this amounts to reducing the cumulative income increase within a five-year period by three fourths.

relationship between government size and economic growth. We find evidence of an insulation effect only when investments are controlled for, and robustness tests suggest that this result is driven by few countries with a priori uncertain trust observations. On the other hand, we found robust evidence that government spending is crowding out private investments, and more so when trust is higher.

One interpretation of our results is that trust enables governments to spend more on areas where crowding out is more likely to be a problem. This interpretation fits well with the findings of Afonso and Jalles (2015) that social security spending has a negative effect on private investment, whereas the opposite holds true for government health spending. As noted by Pitlik and Kouba (2015), social security and untested social benefits are likely to be among the spending components most affected by social trust.

Overall, our results conversely provide little support for any ‘bumblebee explanations’ of Nordic countries such that these countries would be fundamentally different or immune to the downsides of excessive scope of government. While high levels of social trust do enable these countries to enjoy a combination of large public sector spending and relatively high rates of economic growth, growth rates will still suffer if the public sector becomes too large. Moreover, our findings suggest that the crowding out of private investment is an important mechanism by which public spending dampens growth in high trust countries. As such, the welfare state is not a free lunch, not even in Scandinavia.

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Table 1. Theoretical mechanisms

Mechanism	Why would a larger public sector affect growth?	Does higher social trust moderate the size – growth relationship to create an aggravation effect or an insulation effect?
Savings and investment – quality	A larger public sector may affect the quality of investments, both through regulation and taxation of private investments and by crowding out private investment (and replacing it with politically preferred projects).	Higher trust gives public decision-makers more discretionary power over investment but also imply more civic voters. The consequences for growth are ambiguous. Higher trust means more state capacity and therefore more crowding out of private investment.
Savings and investment – quantity	A larger public sector may affect the total level of investments in the economy.	Trust affects the income distribution, partly through welfare state policies (Bergh and Bjørnskov, 2014). Because wealthy households have higher savings rates (Kaldor 1956, 1957), trust may lower investments through its effect on the income distribution.
Education	The more positive externalities are associated with education, the more likely that the public sector can foster growth through education spending. Without externalities, education is basically a private investment decision, potentially affected by the same mechanisms as described for capital investments above.	More trust means more state capacity, which crowds out private education. High trust countries may trust decision makers not only with primary, but also higher education. Assuming that the human capital effect is more important for primary education, and that signalling is more important for higher education, public spending on education is likely to be more growth promoting in low trust countries.
Institutional quality	Institutional quality is beneficial for economic development, but also aids countries in developing larger public sectors.	High trust countries develop better institutions, which may allow larger public sectors. The consequences for growth are ambiguous.
Public sector nature (market failure vs political failure)	Higher taxes and expenditure likely imply both a bigger risk for political failure (such as rent seeking and corruption), as well as more severe consequences of political failure.	If trust is balanced by trustworthiness, and the knowledge problem is less severe, the public sector in high trust countries should have a higher ability to deal with genuine market failure, and suffer less from political failure. If trust exceeds trustworthiness, or if the knowledge problem is more severe, an aggravation effect is more likely.
Tax structure	Larger public sector means higher taxes, and thus more distortions (<i>vet. par.</i>) On the other hand, countries with higher taxes may be forced to use less distortive tax schemes.	High-trust voters are more likely to accept higher and more progressive taxes, suggesting an aggravation effect.
Afonso and Jalles (2015)	The adverse impact on growth from government size can be mitigated using fiscal rules (such as the Stability and Growth Pact in the EU).	Because trust decreases the amount of regulations in the economy, high trust countries might be less willing to submit to fiscal rules of this type, suggesting an aggravation effect.

Table 2. Descriptive statistics

	Mean	Std. deviation	Minimum	Maximum	Observations
Annual growth rate	1.995	2.932	-16.565	13.221	502
Investment rate	23.771	6.685	8.176	51.733	502
Initial log GDP per capita	9.259	.835	7.146	11.202	502
Openness	.808	.551	.115	4.306	502
Investment price	.981	.172	.577	1.618	502
Coup d'états	.064	.296	0	3	502
Post-communist	.156	.363	0	1	502
Economic freedom	6.709	1.547	1.650	9.179	492
Education	7.497	2.566	.898	13.086	494
Social trust	26.989	15.429	5.675	68.075	502
Government spending	16.146	5.247	4.135	37.979	477
Government consumption	20.358	6.999	6.001	43.151	494
Transfers and subsidies	12.634	8.469	0	34.100	462
Private investment	17.058	6.092	.933	39.21	457
Public investment	6.519	3.779	.599	25.257	457

Table 3. Main results

<i>Sample Dependent</i>	All Growth 1	All Growth 2	All Investment rate 3	All Investment rate 4
Initial log GDP per capita	-1.363*** (.273)	-1.644*** (.268)	-1.695** (.744)	-1.659** (.746)
Openness	.586** (.239)	.297 (.222)	2.206*** (.007)	1.808*** (.647)
Investment rate	.157*** (.021)	.138*** (.019)		
Investment price			-18.247*** (1.912)	-18.650*** (1.883)
Coup d'états	-1.851** (.666)	-1.300** (.620)	1.241 (1.270)	1.269 (1.295)
Post-communist	-.996** (.471)	-.615 (.473)	.207 (1.412)	1.067 (1.377)
Economic freedom		.684*** (.121)		.226 (.271)
Education		.190** (.082)		.192 (.233)
Social trust	-.054 (.039)	-.108*** (.036)	.207** (.103)	.152 (.099)
Government spending	-.180*** (.052)	-.190*** (.048)	-.105 (.125)	-.108 (.124)
Trust * spending	.004** (.002)	.004*** (.002)	-.009* (.005)	-.007 (.004)
Period effects	Yes	Yes	Yes	Yes
Regional effects	Yes	Yes	Yes	Yes
Observations	452	442	452	442
Countries	66	66	66	66
Within R squared	.395	.432	.220	.219
Between R squared	.262	.355	.618	.663
Wald Chi squared	224.75	281.86	210.04	238.91
<i>Spending effect at:</i>				
Minimum (BRA)	-.159*** (.043)	-.165*** (.041)	-.154 (.103)	-.149 (.103)
10th percentile	-.141*** (.036)	-.142*** (.034)	-.198** (.086)	-.187** (.086)
25th percentile	-.118*** (.030)	-.114*** (.029)	-.252*** (.070)	-.232*** (.071)
Median	-.095*** (.027)	-.085*** (.026)	-.307*** (.066)	-.279*** (.065)
75th percentile	-.045 (.036)	-.023 (.033)	-.426*** (.095)	-.379*** (.089)
90th percentile	-.006 (.052)	.025 (.047)	-.518*** (.136)	-.457*** (.128)
Maximum (DEN)	.066 (.085)	.115 (.077)	-.691*** (.224)	-.603*** (.211)

Note: Standard errors in parentheses. *** (**) [*] denote significance at $p < .01$ ($p < .05$) [$p < .10$]. Marginal effects in the bottom panel are calculated by the Delta method (Brambor et al., 2006).

Table 4. Additional results, alternative indicators

<i>Sample</i> <i>Dependent</i>	All Growth 1	All Growth 2	All Investment rate 3	All Investment rate 4
Initial log GDP per capita	-1.600*** (.271)	-1.879*** (.319)	-1.626** (.778)	-1.321 (.819)
Openness	.313 (.225)	.259 (.249)	1.858*** (.679)	1.569** (.694)
Investment rate	.142*** (.019)	.156*** (.019)		
Investment price			-17.543*** (1.804)	-17.569*** (1.867)
Coup d'états	-1.207*** (.466)	-1.229** (.614)	.489 (.974)	1.587 (1.269)
Post-communist	-.428 (.460)	-.252 (.536)	.867 (1.4261)	1.433 (1.503)
Economic freedom	.688*** (.118)	.730*** (.124)	.263 (.266)	.454* (.273)
Education	.149* (.081)	.142 (.087)	.121 (.241)	.101 (.240)
Social trust	-.071** (.035)	-.033 (.027)	.057 (.096)	.004 (.070)
Government consumption	-.099*** (.036)		-.037 (.091)	
Transfers and subsidies		-.043 (.046)		-.059 (.112)
Trust * consumption	.002* (.001)		-.002 (.003)	
Trust * transfers		.001 (.001)		-.001 (.003)
Period effects	Yes	Yes	Yes	Yes
Regional effects	Yes	Yes	Yes	Yes
Observations	458	433	458	433
Countries	66	65	66	65
Within R squared	.422	.438	.196	.218
Between R squared	.413	.357	.647	.663
Wald Chi squared	292.25	274.33	213.96	218.56
<i>Spending effect at:</i>				
Minimum (BRA)	-.088*** (.030)	-.038 (.039)	-.049 (.077)	-.065 (.097)
10th percentile	-.077*** (.026)	-.033 (.035)	-.061 (.065)	-.069 (.084)
25th percentile	-.065*** (.022)	-.027 (.029)	-.074 (.055)	-.076 (.071)
Median	-.052*** (.019)	-.022 (.025)	-.088* (.049)	-.083 (.060)
75th percentile	-.023 (.023)	-.009 (.024)	-.118* (.062)	-.096 (.059)
90th percentile	-.001 (.032)	.001 (.030)	-.141 (.087)	-.107 (.077)
Maximum (DEN)	.039 (.051)	.019 (.051)	-.185 (.142)	-.127 (.129)

Note: Standard errors in parentheses. *** (**) [*] denote significance at $p < .01$ ($p < .05$) [$p < .10$]. Marginal effects in the bottom panel are calculated by the Delta method (Brambor et al., 2006).

Table 5. Separating private and public investments

<i>Sample</i>	All	All	All	All	All	All
<i>Dependent</i>	Private	Private	Private	Public	Public	Public
	investment	investment	investment	investment	investment	investment
	1	2	3	4	5	6
Initial log GDP	-1.228*	-1.238*	-.790	-.490	-.388	-.486
per capita	(.726)	(.743)	(.787)	(.515)	(.531)	(.521)
Openness	1.595**	2.036***	1.665**	.029	.018	.111
	(.635)	(.643)	(.652)	(.457)	(.469)	(.434)
Investment price	-13.051***	-11.735***	-11.517***	-4.906***	-3.960***	-4.436***
	(1.954)	(1.849)	(1.907)	(1.361)	(1.286)	(1.257)
Coup d'états	.976	.515	1.560	.511	.136	.172
	(1.224)	(.927)	(1.229)	(.837)	(.629)	(.806)
Post-communist	-2.007	-2.968**	-1.504	2.266**	2.538**	1.975**
	(1.413)	(1.408)	(1.474)	(1.017)	(1.030)	(.981)
Economic freedom	.772***	.722***	.897***	-.461**	-.492***	-.466***
	(.265)	(.261)	(.272)	(.182)	(.179)	(.179)
Education	.151	.071	.128	-.022	-.002	-.084
	(.230)	(.232)	(.229)	(.164)	(.167)	(.153)
Social trust	.197**	.144	.003	-.021	-.031	.012
	(.098)	(.092)	(.066)	(.069)	(.065)	(.044)
Government spending	-.175			.049		
	(.123)			(.086)		
Government consumption		-.007			.035	
		(.089)			(.063)	
Transfers and subsidies			-.199*			.154**
			(.110)			(.073)
Trust * spending	-.009**			.001		
	(.004)			(.003)		
Trust * consumption		-.005*			.001	
		(.003)			(.002)	
Trust * transfers			-.000			-.001
			(.003)			(.002)
Period effects	Yes	Yes	Yes	Yes	Yes	Yes
Regional effects	Yes	Yes	Yes	Yes	Yes	Yes
Observations	411	424	404	411	424	404
Countries	65	65	64	65	65	65
Within R squared	.219	.191	.203	.300	.293	.338
Between R squared	.622	.623	.620	.277	.279	.256
Wald Chi squared	204.16	195.34	191.71	162.75	164.27	181.88
<i>Spending effect at:</i>						
Minimum (BRA)	-.226**	-.035	-.200**	.055	.041	.148**
	(.103)	(.077)	(.096)	(.072)	(.053)	(.063)
10th percentile	-.272***	-.062	-.202**	.060	.046	.142***
	(.088)	(.066)	(.083)	(.061)	(.046)	(.055)
25th percentile	-.328***	-.093*	-.204***	.067	.052	.136***
	(.074)	(.056)	(.070)	(.052)	(.038)	(.047)
Median	-.385***	-.126**	-.206***	.073	.058*	.129***
	(.070)	(.050)	(.060)	(.049)	(.035)	(.039)
75th percentile	-.509***	-.196***	-.210***	.088	.072	.114***
	(.095)	(.061)	(.057)	(.067)	(.043)	(.038)

90th percentile	-.605*** (.132)	-.250*** (.083)	-.214*** (.074)	.099 (.093)	.082 (.059)	.103** (.049)
Maximum (DEN)	-.785*** (.213)	-.352*** (.136)	-.219* (.123)	.121 (.151)	.102 (.096)	.082 (.082)

Note: Standard errors in parentheses. *** (**) [*] denote significance at $p < .01$ ($p < .05$) [$p < .10$]. Marginal effects in the bottom panel are calculated by the Delta method (Brambor et al., 2006).

Table A1. Country averages

Country	Social trust	Investment rate	Growth rate	Government spending
Albania	20.66	35.12	1.99	10.75
Argentina	19.39	21.55	1.21	10.15
Australia	48.01	27.03	1.71	16.94
Austria	37.38	25.83	2.24	17.71
Belgium	31.90	26.42	2.05	21.05
Belize	7.45	24.58	2.03	16.09
Bolivia	19.25	11.99	0.83	12.33
Brazil	5.77	23.47	1.93	14.40
Bulgaria	27.12	22.32	3.29	16.28
Canada	47.73	21.63	1.85	20.91
Chile	16.68	23.67	2.60	12.15
Colombia	13.85	19.45	1.80	12.16
Costa Rica	13.47	19.95	1.48	14.07
Croatia	21.01	21.92	0.68	21.28
Cyprus	13.54	30.89	2.85	15.90
Czech Rep.	27.01	25.01	1.98	20.42
Denmark	68.08	22.77	1.61	23.67
Dominican Republic	26.45	19.35	3.22	7.74
Ecuador	13.87	27.65	1.90	12.85
El Salvador	16.38	14.41	1.04	11.10
Estonia	30.52	23.58	3.02	20.30
Finland	58.93	29.11	2.16	19.40
France	22.98	22.34	1.68	21.04
Germany	38.69	23.95	1.82	19.03
Greece	21.57	27.47	1.80	16.32
Guatemala	21.50	17.05	1.06	7.44
Guyana	17.06	23.75	1.30	20.58
Haiti	14.02	11.66	0.18	8.20
Honduras	18.75	23.08	1.07	12.70
Hungary	25.43	20.09	1.89	22.62
Iceland	45.34	24.61	1.54	19.04
Ireland	39.03	27.41	2.90	17.84
Israel	23.46	24.90	1.88	30.75
Italy	29.65	26.29	1.72	17.87
Jamaica	37.30	24.68	0.02	14.77
Japan	39.59	31.47	2.06	14.73
Korea, Republic	32.22	34.24	5.62	11.18

Latvia	19.63	18.68	4.86	21.45
Lithuania	24.18	14.87	4.39	18.83
Luxembourg	30.67	24.13	2.97	14.59
Macedonia	10.86	19.98	0.87	19.05
Malta	23.65	27.28	4.42	17.95
Mexico	22.74	23.20	1.40	10.04
Montenegro	30.31	22.18	-0.42	23.87
Netherlands	56.32	21.73	1.67	21.89
New Zealand	52.62	19.60	1.25	17.62
Nicaragua	18.65	24.70	-1.05	14.96
Norway	66.44	30.05	2.58	19.22
Panama	22.25	24.64	2.91	15.79
Paraguay	9.50	18.82	1.76	9.39
Peru	9.66	20.84	1.02	11.12
Poland	21.30	19.52	2.55	19.90
Portugal	19.31	26.60	2.34	15.47
Romania	15.49	29.38	2.89	10.63
Serbia	18.51	14.55	-1.06	18.98
Singapore	27.98	42.42	5.12	10.37
Slovakia	19.47	23.30	2.40	20.56
Slovenia	20.31	26.88	2.37	18.38
Spain	31.34	27.36	2.03	14.86
Sweden	63.91	18.88	1.53	24.55
Switzerland	47.10	28.12	0.76	12.40
Taiwan	33.65	26.42	5.51	16.11
Trinidad & Tobago	6.19	27.12	2.54	13.72
Turkey	9.66	17.81	2.20	11.10
United Kingdom	36.45	17.61	2.27	19.17
United States	40.45	20.64	1.76	15.97
Uruguay	24.91	21.65	2.10	12.92
Venezuela	14.11	24.91	-0.08	11.13

Table A2. Main results, no extreme trust scores

<i>Sample Dependent</i>	All Growth 1	All Investment rate 2	All Private investment rate 3	All Public investment rate 4
Initial log GDP per capita	-1.873*** (.296)	-2.068** (.809)	-1.460* (.789)	-.669 (.530)
Openness	.336 (.235)	1.534*** (.683)	1.606** (.668)	.039 (.445)
Investment rate	.141*** (.020)			
Investment price		-17.678*** (1.974)	-12.532*** (2.088)	-3.894*** (1.418)
Coup d'états	-1.157* (.610)	1.669 (1.295)	1.235 (1.254)	.595 (.860)
Post-communist	-.706 (.494)	.768 (1.449)	-2.240 (1.479)	2.155** (.987)
Economic freedom	.698*** (.125)	.403 (.283)	.877*** (.282)	-.405** (.193)
Education	.171* (.089)	.084 (.252)	.184 (.249)	-.169 (.167)
Social trust	-.047 (.046)	.214* (.122)	.269** (.123)	-.002 (.083)
Government spending	-.113* (.060)	-.024 (.154)	-.103 (.155)	.088 (.105)
Trust * spending	.001 (.002)	-.011* (.006)	-.013** (.006)	.000 (.004)
Period effects	Yes	Yes	Yes	Yes
Regional effects	Yes	Yes	Yes	Yes
Observations	397	397	367	367
Countries	60	60	59	59
Within R squared	.458	.238	.243	.275
Between R squared	.338	.641	.610	.312
Wald Chi squared	264.63	215.36	192.62	136.80
<i>Spending effect at:</i>				
Minimum (BRA)	-	-	-	-
10th percentile	-.098** (.039)	-.146 (.099)	-.248** (.101)	.089 (.069)
25th percentile	-.089*** (.031)	-.215*** (.077)	-.331*** (.081)	.089 (.055)
Median	-.081*** (.027)	-.287*** (.069)	-.417*** (.076)	.089* (.052)
75th percentile	-.063 (.044)	-.442** (.114)	-.602*** (.122)	.091 (.082)
90th percentile	-.048 (.065)	-.562*** (.171)	-.745*** (.179)	.091 (.121)
Maximum (DEN)	-	-	-	-

Note: Standard errors in parentheses. *** (**) [*] denote significance at $p < .01$ ($p < .05$) [$p < .10$]. Marginal effects in the bottom panel are calculated by the Delta method (Brambor et al., 2006). The sample excludes Trinidad and Tobago, Brazil and Belize (the bottom) and Denmark, Norway and Sweden (the top).

Table A2. Main results, no extreme trust scores

<i>Sample Dependent</i>	All Growth 1	All Investment rate 2	All Private investment rate 3	All Public investment rate 4
	Full baseline included			
Economic freedom	.745*** (.269)	1.0124* (.583)	1.496*** (.617)	-.335 (.426)
Social trust	-.114*** (.041)	.087 (.109)	.129 (.113)	-.034 (.079)
Government spending	-.175** (.076)	.069 (.171)	.008 (.186)	.079 (.128)
Trust * spending	-.005** (.002)	-.004 (.005)	-.005 (.005)	.002 (.004)
Freedom * spending	-.004 (.014)	-.048 (.032)	-.046 (.036)	-.008 (.025)
Period effects	Yes	Yes	Yes	Yes
Regional effects	Yes	Yes	Yes	Yes
Observations	442	442	411	411
Countries	66	66	65	65
Within R squared	.433	.225	.224	.300
Between R squared	.353	.662	.617	.278
Wald Chi squared	280.93	239.30	204.11	162.49
<i>Spending effect at:</i>				
Minimum (BRA)	-.174*** (.053)	-.279** (.135)	-.341** (.137)	.034 (.096)
10th percentile	-.149*** (.045)	-.297*** (.113)	-.368 (.115)	.043 (.080)
25th percentile	-.119*** (.036)	-.319*** (.092)	-.400*** (.093)	.054 (.065)
Median	-.089*** (.030)	-.342*** (.077)	-.434*** (.079)	.065 (.056)
75th percentile	-.023 (.033)	-.391*** (.091)	-.506*** (.096)	.089 (.067)
90th percentile	.029 (.047)	-.429*** (.130)	-.562*** (.138)	.108 (.097)
Maximum (DEN)	.125 (.082)	-.499** (.224)	-.667*** (.235)	.143 (.165)

Note: Standard errors in parentheses. *** (**) [*] denote significance at $p < .01$ ($p < .05$) [$p < .10$]. Marginal effects in the bottom panel are calculated by the Delta method (Brambor et al., 2006). The sample excludes Trinidad and Tobago, Brazil and Belize (the bottom) and Denmark, Norway and Sweden (the top).

Figure 1. How trust affects government size and growth

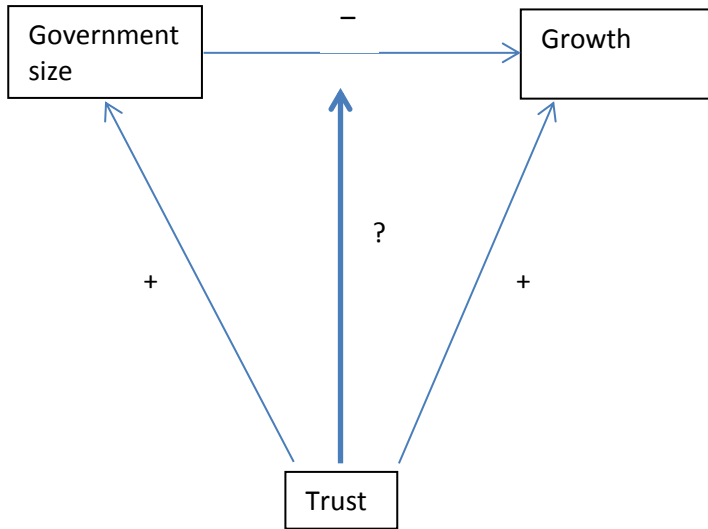
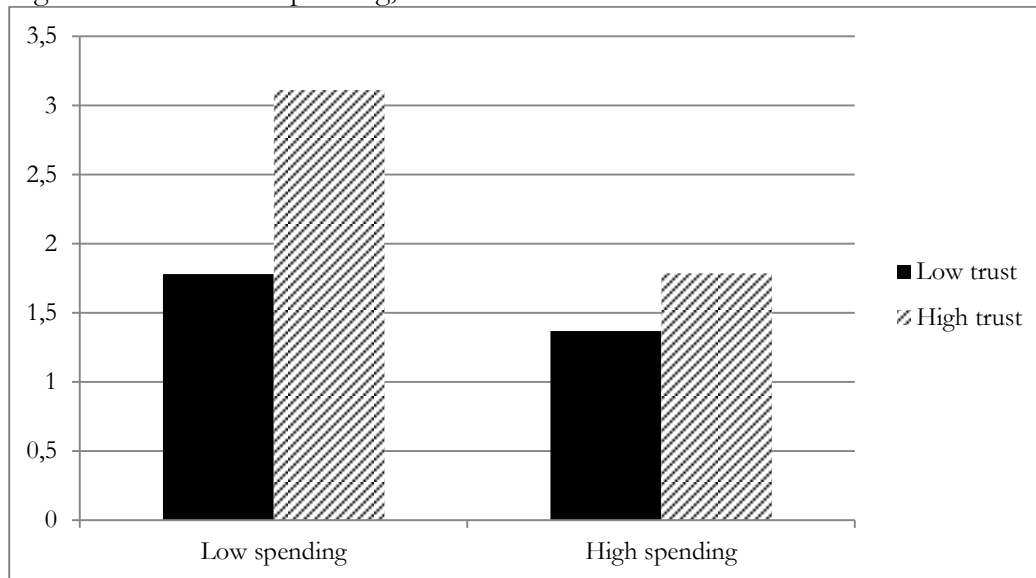


Figure 2. Growth and spending, conditional on trust



Note: the difference between spending in the low-trust group is insignificant at $p < .32$; the difference in the high-trust is significant at $p < .001$.