SPEAKING OF DEBT: FRAMING, GUILT, AND ECONOMIC CHOICES*

Cevat Giray Aksoy,
Mathias Dolls,
Justyna Klejdysz
Andreas Peichl,
Lisa Windsteiger

March 26, 2026

Abstract

Debt aversion varies widely across countries, shaped by economic, institutional, and cultural factors. In several Germanic languages, including German, Dutch, and Swedish, the common word for "debt" also means "guilt". While this semantic overlap has long been suspected to influence borrowing behavior, existing evidence is purely correlational, leaving open whether language shapes attitudes or merely reflects pre-existing norms. We employ large-scale survey and incentivized choice experiments to provide the first causal evidence that guilt-connoted language reduces willingness to borrow. Across seven countries, randomizing whether debt is described using a guilt-connoted term or a neutral synonym shows that moral connotations significantly lower approval of public borrowing, decrease stated and actual willingness to take on personal debt, and influence firm-level financing plans. We further use text analysis to show that German politicians opposing public borrowing disproportionately employ guilt-connoted terms in parliamentary speeches, and that commercial lenders use such terms selectively in debt-relief advertising. Together, our findings demonstrate that language can activate moral frames without explicit moral appeals – shaping economic decisions in measurable and policy-relevant ways – and is strategically employed in political and commercial discourse.

Keywords: public debt, private debt, linguistic framing, survey experiment, NLP
JEL-Codes: D83, H63, G51, Z13
Ethics clearance: Department of Economics, University of Munich, 2021-13 and 2023-08
Pre-registration: AEARCTR-0007949 and AEARCTR-0011506

---

*Aksoy: EBRD, King's College London and CEPR (aksoyc@ebrd.com); Dolls: ifo Institute and CESifo (dolls@ifo.de); Klejdysz: LMU Munich and ifo Institute (klejdysz@ifo.de); Peichl: LMU Munich, ifo Institute and CESifo (peichl@econ.lmu.de); Windsteiger: University of Salzburg, ifo Institute and CESifo (lisa.windsteiger@plus.ac.at). We thank Benjamin Arold, Rudi Bachmann, Charlotte Bartels, Sascha Becker, Felix Bierbrauer, Benjamin Born, Pierre Boyer, Alexander Cappelen, Georg Dürnecker, Dirk Engelmann, Oliver Falck, Antoine Ferey, Guido Friebel, Emanuel Hansen, Stephan Heblich, Henning Hermes, Dan Hungerman, Claus Kreiner, Alfred Lameli, Manuel Menkhoff, Ben Moll, Gernot Müller, Jim Poterba, Matthias Rodemeier, Dominik Sachs, Florian Scheuer, Antoinette Schoar, Laura Seelkopf, Andrei Shleifer, Sebastian Siegloch, Juan Carlos Suarez Serrato, Morten Støstad, Eve Sweetser, David Thesmar, Silvia Vanutelli and Francis Wong, as well as participants of various seminars and conferences, for helpful comments and suggestions. Victoria Brötling, Jonas Hennrich, Pauline Krümpel, Marina Joerg, Aditya Pal, Tommaso Ruzzon, Annette Schantz, and Theresa Winner provided excellent research assistance. Peichl gratefully acknowledges financial support from the German Science Foundation (DFG) via CRC TRR 190 (project number 280092119). The views expressed are those of the authors and do not necessarily reflect those of the European Bank for Reconstruction and Development (EBRD) or any other institution.

> "In Germany, debt is 'die Schuld'. It's both the financial debt and the fault. There's a kind of guilt in debt. A moral guilt and this moral connotation of debt is very deep in Germany, it doesn't exist in France."
>
> Bruno Le Maire (2022), (then) French Minister of Finance[1]

1 Introduction

Can a single word affect how people think about debt? Debt aversion is a multifaceted phenomenon shaped by economic circumstances, institutional structures, and cultural values (Almenberg et al. 2021; Martínez-Marquina and Shi 2024).[2] One potential but less examined determinant is language. Language does more than merely describe reality – it shapes how individuals perceive and respond to (economic) choices (Wittgenstein 1922). In several Germanic languages, including German, Dutch, and Swedish, the commonly used word for "debt" also means "guilt" ("Schuld" in German), embedding a moral connotation in everyday references to borrowing. Policymakers and commentators have long suspected that such linguistic framing influences economic attitudes and behavior. The former French finance minister, quoted above, invoked this idea to explain Germany's fiscal conservatism, pointing to the moral weight carried by the word "debt" in German discourse. His observation resonates beyond politics: as one commentator observed: "...this mental link helps explain Germany's peculiar concern with saving governments from the imagined sin of borrowing money" (The Economist 2023).[3] This raises a fundamental question with broad economic and policy implications: Does language causally shape economic perceptions, preferences, and behavior?

[1] Original quote: "En Allemagne, la dette c'est 'die Schuld'. C'est à la fois la dette financière et c'est la faute. Il y a une forme de culpabilité dans la dette. Une culpabilité morale et cette connotation morale de la dette elle est très profonde en Allemagne, elle n'existe pas en France."

[2] Across the globe, cultural norms influence how individuals perceive and engage with borrowing. Confucian cultures often emphasize thrift (*jian*) and frugality, reducing willingness to rely on credit (Hofstede and Bond 1988; Waley 2012). In many Latino communities, historical distrust of financial institutions leads to reluctance to take on formal debt (Mills et al. 2018; Elengold et al. 2020). In Islamic contexts, moral injunctions against certain types of interest-bearing debt frame borrowing as not just an economic but also a moral act, influencing repayment behavior (Bursztyn et al. 2019). In Germany, the cultural archetype of the "Swabian housewife", who is praised for her frugality, plays an important role in both private and public financial behavior (The Guardian 2012; Financial Times 2023).

[3] The semantic overlap between debt and guilt in German has been widely discussed, particularly during the Greek debt crisis. Journalists and policymakers, including former Greek finance minister

This paper is the first to provide causal evidence that language indeed affects attitudes and behaviors related to household, business, and public debt. We combine multiple empirical strategies, including randomized survey experiments embedded in three household and one business survey across seven countries, incentivized borrowing-to-invest decisions, and text analysis of political speeches and financial advertising, to address this question. Across these settings, we show that moral connotations embedded in debt-related language systematically reduce individuals' willingness to borrow and their approval for public debt, shape firm-level financing plans and their advertising behavior, and influence how policymakers frame public borrowing.

We begin by documenting novel descriptive patterns consistent with a linguistic framing effect: in addition to macro-level evidence,[4] we show in two different settings on the subnational level that a higher share of residents who speak German (in Switzerland) or report Germanic ancestry (in the US) is negatively associated with debt-related outcomes. First, in Switzerland, municipalities on the German-speaking side of the sharply defined language border exhibit substantially lower household debt default rates and stronger support for fiscal discipline than Romance-speaking counterparts.[5] Second, US counties with a higher share of residents reporting Germanic ancestry show significantly lower rates of debt in collections and delinquencies, as well as higher credit scores.

However, these descriptive patterns cannot establish causality, as debt-averse cultures may have influenced language more than language has influenced attitudes. If causality only ran from culture to language, our findings would still be intriguing but would have few actionable policy implications. In order to causally identify the impact of language on attitudes and behaviors, one needs to randomly assign words to individuals. This is not possible with real-world observational data. Survey experiments allow the

Yanis Varoufakis, have noted how linguistic framing shaped both political rhetoric and public sentiment (The Economist 2015; Politico 2015; BBC 2015; Varoufakis 2015).

[4] Among highly developed countries, those in which the dominant language exhibits a semantic overlap between debt and guilt tend to have lower public debt and household debt (excluding mortgage loans) relative to GDP than those with a different main language (see Figure A.1b).

[5] Previous research has used the Swiss language border as a proxy to analyze the role of "culture" in household savings decisions (Guin 2016), unemployment spells (Eugster et al. 2017), attitudes toward money (Henchoz et al. 2019), preferred tax rates (Eugster and Parchet 2019), patience (Herz et al. 2021), retirement savings, continuing education and training, gambling behavior, and disposed wealth (Leisibach and Schaltegger 2022). While we show that this border also matters for private and public debt, these effects cannot be attributed to linguistic differences alone.

researcher to create their own identifying and controlled variation and to elicit otherwise invisible factors such as attitudes (Stantcheva 2023). Hence, motivated by the descriptive patterns, we designed and implemented a series of survey experiments to causally identify the effect of language on debt-related attitudes and behavior.

We conducted large-scale surveys in seven countries. In four of these countries (Germany, the Netherlands, Sweden, and the German-speaking part of Switzerland), the term for "debt" carries a connotation of guilt. In these surveys, respondents were randomly assigned to questions about debt that differed only in wording: one version framed debt using the standard term (with its moral overtones), while an alternative version used a neutral synonym. By comparing responses across these randomized conditions, we identify the influence of linguistic framing within the same country, i.e., holding culture fixed. In addition, three English-speaking countries (Australia, the UK, the US) serve as a placebo group, with respondents randomly assigned to questions using two different neutral terms for debt.

The experimental evidence provides direct causal identification, suggesting that the observed associations in the descriptive analysis reflect a genuine effect of guilt-connoted terminology on borrowing attitudes and behavior. Using a guilt-laden term for "debt" significantly reduces individuals' willingness to incur personal debt and their approval of public borrowing. For example, simply phrasing a question eliciting the willingness to incur debt for consumption expenditures with the word "Schuld" (debt/guilt) instead of a neutral term results in a substantially lower share of respondents willing to take out a loan. The willingness to borrow falls by approximately seven percentage points in the pooled sample comprising Germany, the Netherlands, and Sweden (an 18% decline relative to the neutral wording in the control group). We interpret this as evidence that invoking the concept of "guilt" induces debt aversion by increasing the psychological cost of borrowing. Importantly, because all respondents answered the same questions and only the wording of the term "debt" was varied – using either a guilt-laden or a neutral synonym – we can attribute the observed differences in attitudes to the language used, rather than to unobserved characteristics or omitted variables.

We also examine how linguistic framing affects attitudes toward public debt. In our German sample, we find that support for government borrowing is approximately five

percentage points (11% in relative terms) lower when the survey question refers to public debt using a guilt-connoted term, compared to an otherwise identical question using neutral language. Notably, this negative framing effect disappears when the purpose of the debt is explicitly mentioned (for example, when respondents are informed that the debt will finance a specific investment such as infrastructure or education). This pattern suggests that while moral language can sway general attitudes against public debt, a concrete context can offset the semantic bias. Consistent with this interpretation, in Switzerland – where citizens regularly vote on fiscal referenda – we presented respondents with hypothetical policy reforms that could increase public debt without specifying the purpose of the debt. In line with the German findings on general attitudes towards public debt in the absence of purpose framing, we again observe that the use of a guilt-connoted term significantly reduced support for public debt in hypothetical referenda relative to neutral language.

Beyond survey responses, linguistic framing also influences real financial decision-making. In our Swiss experiment, participants made an incentivized borrowing-to-invest decision. We randomized the description of the borrowing opportunity, again varying only the terminology for debt. Even with real stakes involved, the group exposed to guilt-laden debt language was approximately nine percentage points less likely to borrow for financial gain (16% reduction relative to the control group) and, on average, borrowed 23% less than those in the neutral-language group. In other words, guilt-connoted language altered their economic behavior and made them more likely to leave money on the table. This evidence reinforces the notion that the effect of words is not confined to abstract opinions – it extends to consequential decisions, likely by activating moral considerations that impose an additional psychological cost on borrowing (in addition to general debt aversion).

To complement our general population experiments, we conducted a survey among German firms to study business debt. We find that guilt-connoted wording significantly reduces the likelihood that managers report plans to expand debt financing and increases the stated importance of repaying debt quickly. These results show that guilt-connoted wording affects both general attitudes toward business debt as well as firms' stated financing plans.

Having established a causal link between language and debt attitudes and borrowing behavior, we turn to the political arena to investigate whether this link is recognized and exploited by policymakers. We assemble a novel dataset of parliamentary speeches from the German *Bundestag* (federal parliament), spanning more than three decades since reunification. Using natural language processing methods, we quantify the relative use of guilt-related terms versus neutral terms in speeches discussing fiscal policy and public debt. Our analysis reveals a clear pattern of strategic linguistic usage. Speeches by politicians who oppose increasing public debt (e.g., advocating fiscal consolidation or strict budget rules) systematically employ the guilt-connoted word *Schulden* and related terms more frequently than those by politicians favoring more expansive fiscal policy. The evidence strongly suggests that elected officials consciously leverage the moral undertone of language to sway public opinion against debt – strategically framing borrowing as an immoral or irresponsible act. Such strategic framing resonates with Germany's long-standing narrative of fiscal rectitude and aversion to debt, and it illustrates how language and ideology intersect in the policy discourse.[6]

We also examine the strategic use of language in the context of private debt. Specifically, we examine linguistic patterns in commercial advertising for financial services across Meta platforms in German, Dutch, and Swedish. Our results show that advertisements using guilt-connoted terms are relatively rare and primarily used in the context of debt reduction and relief. Such usage frames debt as a problem or burden to be eliminated. By contrast, neutral terms are more commonly used in transactional or promotional contexts, such as loan applications.

Taken together, our key findings demonstrate that guilt-laden wording significantly depresses willingness to incur debt both among households and business managers, reduces support for public borrowing, and lowers actual borrowing in incentivized settings. Moreover, politicians opposing borrowing disproportionately use guilt-connoted terms, and commercial lenders employ such terms selectively, suggesting conscious rhetorical framing. These results underscore a causal channel through which language shapes eco-

[6] German policymakers are aware that debt-related words can be used strategically. For example, former German Minister of Economic Affairs, Robert Habeck, has highlighted the morally charged nature of discussions about Germany's debt brake ("Schuldenbremse"), noting the association of debt with guilt (Süddeutsche Zeitung 2021). He argued for using the term "Kredite" (loans) instead of "Schulden" because of the negative connotation of the latter when arguing for more public debt.

nomic choices within a culture, offering actionable insights for financial communication policy and commercial strategy.

Literature review and our contributions. Our analysis connects to several strands of literature. First, there is work on linguistic relativity, or the Sapir-Whorf hypothesis, suggesting that language shapes how individuals perceive and interpret reality (Sapir 1929; Whorf 1956). Empirical studies have shown mixed evidence regarding linguistic influence on economic behavior. For instance, Chen (2013) finds correlational evidence linking future-oriented language to savings behavior, but later experimental tests yield inconsistent results (Chen et al. 2019; Ayres et al. 2023). Epidemiological approaches examining immigrant populations provide evidence linking gendered languages to gender norms (Hicks et al. 2015; Gay et al. 2018). Experimental evidence among bilingual speakers also shows that using gender-neutral language promotes egalitarian attitudes (Pérez and Tavits 2019). In the context of debt, Djankov et al. (2008) find a significant negative correlation between a country's ratio of private credit to GDP and "German legal origin".[7] Bogatzki et al. (2024) document a correlation between guilt-debt linguistic overlaps and conservative financial behavior using observational data. Our paper contributes directly to this literature by providing novel descriptive as well as causal evidence through experimentally varying guilt-related terminology and demonstrating its direct effects on debt aversion and financial decision-making.

Second, our work relates to research on consumer and corporate financial decision-making (Myers 2001; Tufano 2009) and debt aversion, documenting how framing and labeling can influence financial decisions. For instance, experimentally labeling accounts as "debt" instead of "savings" reduces borrowing and leads to suboptimal financial decisions (Martínez-Marquina and Shi 2024). Similar framing effects have been documented for education-related loans (Caetano et al. 2019; Evans et al. 2019). Survey evidence further highlights that individuals who report discomfort with debt hold lower levels of mortgage and consumer debt (Almenberg et al. 2021; Wong 2023). An important question is what drives debt aversion, and which factors explain the substantial variation

[7] Djankov et al. (2008) use the origin of bankruptcy laws in the countries that they analyze and identify four main legal origins of insolvency law: English, French, German, and Nordic. Note that the group with "German legal origin" does not only contain countries with a Germanic official language while some of the other country groups do (e.g. Nordic legal origin).

in debt levels across countries (Zinman 2015). One explanation points to cultural values (Badarinza et al. 2016).[8] We extend this literature by experimentally showing that guilt-connoted linguistic framing significantly exacerbates debt aversion, influencing attitudes toward household, business and public borrowing as well as actual financial decisions in an incentivized setting.

Previous research has shown that household credit constraints can depress consumption and limit households' ability to undertake productive expenditures (e.g., education, home improvements, small business capital); and even small changes in borrowing costs can have sizable effects (Gross and Souleles 2002; Karlan and Zinman 2019; Lukas et al. 2022). Access to debt financing is not only critical for households but also for firm investment and economic growth (Rajan and Zingales 1998). Credit supply shocks that reduce lending lead to sizable declines in firm-level investment, employment, and output (Khwaja and Mian 2008; Chodorow-Reich 2014; Greenstone et al. 2014), and financial frictions can generate persistent capital misallocation and lower aggregate productivity (Moll 2014). Our business-survey results suggest a novel channel: even without external credit constraints, the way debt is framed influences how managers say they would approach debt financing. If moral connotations embedded in debt language reduce stated willingness to borrow, this could, in principle, contribute to investment shortfalls akin to those caused by conventional credit frictions. Our results from the incentivized borrowing-to-invest experiment show that even without credit constraints, risk or uncertainty, guilt-framing has a negative effect on actual choices. A back-of-the-envelope calculation implies that offsetting this framing effect would require nearly a one-percentage-point interest rate cut – comparable to changes known to materially affect real investment (Curtis et al. 2021; Best et al. 2024).

Third, we contribute to research examining how language and framing affect political attitudes, particularly in the context of public finance. Previous studies demonstrate that beliefs about debt-to-GDP ratios and media framing significantly impact public support for austerity measures and government spending (Barnes and Hicks 2018; Roth et al. 2022). Additionally, research indicates that issue labels themselves can shape public opinion; support varies significantly depending on how policy initiatives are described

[8] For example, Guiso et al. (2006) find that cultural differences in the preference for teaching thriftiness explain a significant portion of national saving rates. See also Footnotes [2] and [5].

(e.g., "assistance to the poor" vs. "welfare", see, e.g., Smith 1987; Rasinski 1989). Our paper contributes to this literature by analyzing parliamentary speeches to show that politicians systematically use guilt-laden terminology to frame discussions about public debt, thereby shaping public perceptions and attitudes.

Finally, our findings relate to literature exploring moral accounting, where moral actions and obligations are conceptualized through financial metaphors – positive actions accumulate "moral credit", while negative actions incur "moral debt" (Lakoff 1995). Religious metaphors reinforce these associations, particularly through the portrayal of debt as sin (Anderson 2009). Moral values are found to shape preferences for different debt contract designs and enforcement rules (Paine et al. 2025), and to influence major economic decisions, such as strategic default on mortgages (Guiso et al. 2013). Bursztyn et al. (2019) demonstrate that explicit moral appeals – reminding borrowers of religious obligations – increase credit card repayment in an Islamic context. Our contribution is to show that language can substitute explicit appeals: in Germanic languages, guilt-connoted terms for debt automatically activate moral frames, influencing economic attitudes and decisions even when no moral argument is made. In other words, language itself can serve as a subtle yet potent moral prime, reducing individuals' willingness to borrow even when the underlying financial conditions remain unchanged.

The remainder of the paper is structured as follows. Section 2 provides etymological background on the guilt-connotation of debt in Germanic languages and its link to economics. Section 3 presents novel descriptive evidence on the associations between guilt-laden language, borrowing behavior, and attitudes toward debt. Section 4 presents causal evidence from our survey experiments. Section 5 analyzes guilt framing around the discussion of public debt in German parliamentary speeches as well as in financial advertising. The final section concludes.

2 Etymological background of "Schuld" and its link to economics

The dual meaning of the word *Schuld* in (Indo-)Germanic languages has deep historical roots influenced by both cultural and religious factors. Etymologically, *Schuld* originates

from the Proto-Germanic roots **skal-* and **skul-*, denoting the concept of obligation or debt. This root also gave rise to the modern German *sollen* and English *shall*, each signifying an obligation (Grimm and Grimm 1854; Oxford University 2023). The broader interpretation of *Schuld* encompassing guilt, debt, and sin emerged prominently in Old High German (500–1050 AD, see Kluge 1891). Old English (until approximately 1100 AD) similarly possessed words like *scyld* and *gylt*, each referring to debt and guilt. However, after the Norman Conquest in 1066, Old English absorbed significant Norman French vocabulary, introducing "debt" from Old French *dette* (from Latin *debitum*), causing *scyld* to vanish while *gylt* retained its moral connotation (Baugh and Cable 2013).[9]

Financial and moral obligations were deeply intertwined across many ancient and medieval societies. Non-repayment of debt was perceived as both an economic failure and a moral shortcoming, damaging one's social reputation (Graeber 2012). During the Middle Ages, the Christian Church significantly reinforced the link between financial indebtedness and moral culpability, often employing financial metaphors to convey moral teachings. The German version of the Lord's Prayer explicitly uses *Schuld* to refer to sins, underscoring this connection: "*Und vergib uns unsere Schuld, wie auch wir vergeben unseren Schuldigern*".[10] The concept of original sin was similarly framed as inherited debt, stressing a moral imperative for redemption (Hamacher 2002). This religious framing firmly entrenched the dual meaning of *Schuld* in German culture. Philosopher Friedrich Nietzsche further argued that concepts of justice and punishment evolved from economic creditor-debtor relationships: "Have these genealogists of morality up to now ever remotely dreamt that, for example, the main moral concept "guilt" [Schuld] derives from the very material concept of "debt" [Schulden]?" (Nietzsche 1994, p. 39).

Debt plays a central role in economics (Graeber 2012). Classical economists were, in general, against public debt – not only in Germany. For example, Adam Smith argued that public borrowing does not increase the productive capital stock of a nation,

[9] While historically (Old-)English is also a (West-)Germanic language, Modern English has incorporated many words from Latin and French. Hence, the dual meaning of debt and guilt does not exist in English anymore, while it still exists in the other Germanic languages such as German, Dutch (Flemish in Belgium, Afrikaans in South Africa and Namibia), Danish, Swedish, Icelandic, Norwegian, Faroese, and the now extinct Gothic. In the remainder of the paper, we therefore exclude English from our definition of "Germanic languages".

[10] Translation: "And forgive us our debts, as we also have forgiven our debtors".

but merely transfers existing private capital to the state. He warned that once public debt reached a certain level, it was rarely, if ever, fully repaid (Smith 1776, vol. II, Book V, Chapter 3). Along those lines, the theory of Ricardian equivalence, attributed to Ricardo (1817) and formalized by Barro (1974), argues that government borrowing does not affect overall demand in the economy because rational households anticipate future tax liabilities and increase their savings accordingly. This concept was (and still is) particularly influential among German (public) economists. Mann (1959) used the concept of an "irrational fear" or "collective fear psychosis" ("Angstpsychose") to describe German economists' exaggerated aversion to public debt. And indeed, Germany's financial conservatism is also reflected in the broad consensus today among (most) economists in Germany in favor of the debt brake.[11] – despite many calls for a reform not only from within Germany but also from abroad (e.g. Krugman 2025)

Could language be a plausible contributing mechanism to Germany's fiscal conservatism, as suspected by, e.g., Krugman (2012)?[12] In the 19th century, Dietzel (1855), an academic economist and Member of Parliament at the same time, provided one of the first systematic justifications for the use of public debt (Buggeln 2022). By distinguishing between productive and unproductive debt, he paved the way for the notion that state borrowing can be a rational means of financing long-term investments that will benefit future generations. In terms of language usage, it is worth noting that Dietzel did not use "Schulden" to talk about public debt; he used "Staatscredit" (credit) instead. And he was well aware of the semantics: "Public borrowings ("Staatsanleihen") according to the true principles of the "Staatscredit" are not debt ("Schulden") for the nation, but rather a nation's capital" (Dietzel 1855, p. 181). When Germany introduced its debt brake to limit public borrowing in 2009, the term "Schuldenbremse" was used.[13] In contrast, when the German parliament approved the biggest fiscal expansion in post-war history in March 2025, the additional debt (and exemption from the debt brake) was labeled

[11] Fuest et al. (2024) surveyed 187 German economists. Only 6% wanted to abolish the debt brake, 48% wanted to keep it as is, and 44% wanted to keep it with some modifications.

[12] Note that already Adam Smith recognized a connection between language and the economy. In his opinion, both are expressions of human nature that evolve through use, necessity, and social interaction and are based on spontaneous order, convention, and moral foundations (Smith 1853).

[13] The official technical terminology in Articles 109 and 115 of the German Constitution is "Haushaltswirtschaft" (budget management) and "Grenzen der Kreditaufnahme" (limits on borrowing). Yet, the term "Schuldenbremse" is the one used in public and economic discourse.

not as "Schulden", but as "Sondervermögen" (special wealth/assets).[14]

3 Descriptive evidence on language and debt

Before turning to the causal analysis, we first present novel descriptive evidence from two settings: (i) the Swiss linguistic border at the municipal level and (ii) the United States with information about European ancestry at the county level. We summarize the key insights below, with most exhibits reported in Appendix A. In addition, Appendix Figure A.1 (Panel B) shows that among developed countries, those whose primary language links the words for "debt" and "guilt" tend to have lower levels of public debt and household debt (excluding mortgage loans) as a share of GDP, compared to countries whose main language does not have this semantic overlap.[15]

First, Switzerland offers a compelling setting due to its sharply defined linguistic boundary between German-speaking and Romance-speaking regions (French, Italian, and Romansh), which cuts across geographic and cantonal borders (see Appendix A.2 for details). This linguistic division correlates with notable differences in attitudes, norms, and behaviors (e.g., Eugster et al. 2011, 2017; Eugster and Parchet 2019). We examine the extent of household overborrowing and attitudes towards public debt across this divide, considering that Romance languages lack the guilt association present in German. Specifically, we analyze the 2022 rates of defaulting debtors for household debt and the 2001 referendum on the debt brake for public debt.[16]

[14] The term "Sondervermögen" is very misleading as it does not contain any wealth, but rather earmarked borrowing, which is not covered by normal budget management and debt brake rules.

[15] Note that we do not observe a comparable cross-country pattern in general household debt including mortgages. Private borrowing decisions are influenced by a range of institutional factors, such as credit availability, housing market institutions, and insolvency regulations, that vary widely across countries. Indeed, mortgages account for the majority of household debt and are likely driven more by housing market institutions than by borrowing attitudes per se – see also our survey experiment results on this question in column 4 of Table 2 below). Among the countries in A.1 (Panel A), Switzerland, the Netherlands and the Scandinavian countries have relatively high shares of household mortgage debt. In those countries, mortgage interest on owner-occupied housing is tax-deductible, creating a tax incentive to delay mortgage repayment.

[16] The rate of defaulting debtors in 2022 is the only data on household debt available at the municipal level. For other years, data on the defaulting debtor rate are available only at the canton level. The canton-level correlations between the 2022 rate and those for 2019, 2020, 2021, 2023, and 2024 all exceed 0.99, indicating strong persistence and suggesting that the values were not materially influenced by the COVID-19 pandemic. At the time of writing this paper, the 2001 public vote is the only one directly related to public debt.

Appendix Figure A.2 illustrates the sharp geographic concentration of German speakers to the north and east of the language border, with the Romance-speaking population concentrated to the south and west. This discontinuity is confirmed quantitatively in Appendix Figure A.3, which plots the share of the population speaking German as a function of distance to the language border. There is a steep and discrete jump in linguistic composition exactly at the boundary, implying the plausibility of treating the border as a quasi-experimental setting.

Turning to economic behavior, Appendix Figure A.4 shows that municipalities on the Romance-speaking side exhibit systematically higher rates of debt default. A similar pattern emerges in Appendix Figure A.5, which documents higher opposition to the debt brake among Romance-speaking municipalities. These descriptive patterns align closely with the proposed mechanism: the guilt-laden connotation of debt in the German language appears to correlate with more fiscally conservative attitudes and behaviors.

Following Eugster et al. (2011), we regress municipal debt outcomes on the distance to the language border. Figure 1 clearly shows that municipalities on the German-speaking (right-hand) side exhibit significantly lower default rates (Panel A) and less opposition to the debt brake (Panel B). These findings, confirmed statistically in Appendix Table A.1, indicate that German-speaking municipalities near the border have a 1.4 percentage point (23.7%) lower default rate and a 5.1 percentage point (32%) lower opposition to the debt brake compared to Romance-speaking areas. These differences are both sizable and statistically significant.

[INSERT FIGURE 1 ABOUT HERE]

Second, we present descriptive evidence from the United States using county-level data (see Appendix A.3 for details). Appendix Figure A.6 displays the spatial distribution of the share of individuals with German ancestry (Panel A) and broader Germanic (in terms of language) ancestry (Panel B) across US counties.[17] Appendix Figure A.7 shows the distribution of the share of individuals with any debt in collections, as a

[17] We focus on people reporting a single ancestry. According to the 2022 American Community Survey (ACS) 5-year estimates, 5% of the US population reports Germanic, 6.7% reports British, 0.64% reports French, and 1.7% reports Italian as their sole ancestry. Germanic ancestry includes German, Austrian, Dutch, Swedish, Icelandic, Swiss, Norwegian, Danish, Luxembourgish, or Belgian. British ancestry includes English, Scottish, Scotch-Irish, Welsh, British, British West Indian, and Irish. French ancestry includes French and French Canadian.

measure similar to the defaulting debtor rate used in the analysis leveraging the Swiss linguistic border. In Figure A.8, we correlate these variables and find a strong negative relationship between the debt measure and the share of individuals with German (Panel A) and broader Germanic (Panel B) ancestry.

[INSERT TABLE 1 ABOUT HERE]

Table 1 presents regression estimates of this correlation that account for potential confounders. Column (1) includes state fixed effects, while column (2) adds average income (in logs) and the share of the white population as controls. In both cases, the negative association between debt and Germanic ancestry remains large and statistically significant. Columns (3) to (8) provide placebo tests using other major European ancestries (i.e., British, French, and Italian). While the raw correlations (odd-numbered columns) for these groups are also negative, they disappear once income and race are controlled for (even-numbered columns), suggesting that the Germanic association with debt is not simply driven by socioeconomic or demographic factors. In the Appendix, we replicate this analysis using data from Hendren et al. (2025) on the county-level on the VantageScore 4.0 credit score and the 90+ day delinquency rate. The results in Tables A.2 and A.3 confirm our findings from Table 1: Germanic ancestry is positively correlated with the credit score variable and negatively with the delinquency rates. We do not find such a systematic correlation for the other European ancestries once we control for income and race.

Collectively, these descriptive analyses highlight a clear negative relationship between speaking a language in which debt terminology connotes guilt (or, in the case of the US, being descended from a culture with such a language) and both attitudes toward and behaviors regarding debt. However, since these analyses cannot isolate the impact of language from broader cultural factors, we proceed in the next section to randomized experiments designed explicitly to identify the causal impact of linguistic framing on debt perceptions and decisions.

4 Survey experiments on attitudes toward debt and borrowing decisions

This section details our data collection process, experimental design, hypotheses, and the estimation strategy used to identify treatment effects before presenting the results of the various survey experiments.

4.1 Survey and experimental design

Data collection. We conducted four survey experiments – three in household surveys and one in a firm survey – to examine whether guilt-connoted wording influences respondents' attitudes toward debt, their borrowing behavior, and firms' stated plans regarding debt financing.[18] The first (household) experiment was conducted between July and August 2021 with respondents from six countries: three in which the commonly used word for "debt" carries a guilt connotation (Germany, the Netherlands, and Sweden), and three English-speaking countries (Australia, the UK, and the US) where this connotation is absent. The first experiment examined respondents' attitudes toward incurring household debt to finance consumption.

To test the robustness of our findings, we ran a second experiment in Germany during January and February 2022. This experiment followed the same structure and design as the first, with modifications and additions to the outcome variables of interest, which included questions eliciting attitudes towards both household and public debt.

The third household survey experiment was conducted in Switzerland in May and June 2023. This round focused again on attitudes toward public debt but also introduced an incentivized borrowing-to-invest decision to measure respondents' actual willingness to incur debt. The Swiss survey was administered in German only, as the guilt association with the word for "debt" does not exist in the other national languages.

All three household surveys were implemented by the professional survey firm Bilendi & Respondi, which is widely used in the social sciences (Haaland et al. 2023). Participation was voluntary. Respondents first completed a consent form and initial screening

[18] Pre-registrations are available under AEARCTR-0007949 and AEARCTR-0011506.

questions to ensure quota alignment. All respondents in our samples passed attention checks, completed the full survey, and received a baseline remuneration of approximately 3 euros (or the local currency equivalent). The first two surveys targeted samples broadly representative of full-time employees by age, gender, and education. The third survey targeted the general German-speaking population in Switzerland, with representativeness in terms of age and gender.

A fourth survey experiment was conducted in a large-scale firm survey in June 2025. Our experimental questions were added to the ifo Business Survey (IBS), a well-established monthly panel of German firms. The IBS is representative (across industries and size) of the universe of private sector firms in Germany (Hiersemenzel et al. 2022) and is typically completed by the CEO or the owner of the firm (Hennrich et al. 2023). The IBS has been extensively used to study firms' business expectations and price setting behavior (e.g., Link et al. 2023; Link 2024; Bachmann et al. 2024), and it provides the basis for the renowned ifo Business Climate Index, the most recognized leading indicator of the German business cycle (among the "12 Global Economic Indicators to Watch" according to Bloomberg). We designed a module to test whether guilt-connoted wording affects firms' plans and strategies regarding debt financing of investment.

Experimental design and hypotheses. In each survey, respondents were randomly assigned to either a treatment group or a control group, with both groups comprising equal shares of the national sample. All participants were asked a series of questions about their attitudes toward household debt (Surveys 1-3), public debt (Surveys 2-3), and business debt (Survey 4), which are detailed below. An overview of the four surveys, including the outcome variables elicited in each survey and the treatment/control wordings used in each language, is provided in Table B.1 in the Appendix.[19]

The key experimental variation lies in the wording used to describe "incurring debt". In Germany, the Netherlands, Sweden, and Switzerland, the treatment group received the commonly used guilt-connoted term for "debt", while the control group received a neutral alternative. In the three English-speaking countries (Australia, UK, and US),

[19] The exact wording of the experimental questions and (where applicable) the English translated version for all four surveys can be found here.

both treatment and control groups were presented with different versions of neutral wording – that is, neither group received guilt-connoted language.

The English-speaking countries serve as a placebo group. Although they are not necessary to identify the causal effect of guilt-related wording in our experimental design, the placebo group allows us to test whether alternative neutral expressions (absent any guilt connotation) may nonetheless elicit different responses. This helps us to assess whether variation in phrasing alone, independent of semantic associations, can influence debt attitudes.

We hypothesize that in countries where the word for "debt" carries a guilt connotation, respondents in the treatment group will report more negative attitudes toward debt and, in the Swiss case, exhibit less willingness to borrow in the incentivized debt game. In contrast, we do not expect to find significant differences between treatment and control groups in English-speaking countries.

Household debt. In Survey 1, respondents were asked whether they would be willing to incur debt to finance private consumption – for both small and large purchases (e.g., a mobile phone or a car). In Survey 2, this question was supplemented with two additional outcome questions eliciting the general willingness to incur debt and the willingness to borrow for real estate (e.g., to purchase a house or an apartment). This allows us to test whether treatment effects depend on whether the debt is tied to a specific purpose and whether that purpose matters. The general question was always asked first, while the order of the two purpose-specific questions was randomized.

In Survey 3, we introduced an incentivized borrowing-to-invest decision. Respondents were informed in advance that they would make a decision later in the survey and that 100 participants would be randomly selected to receive a bonus payment based solely on their choice. Participants were told they had invested 100 CHF in an investment opportunity yielding a safe return of 10% (i.e., a 10 CHF gain), and were offered the option to borrow and invest up to an additional 100 CHF at a 5% interest rate. The net payoff would be the return on the total investment (endowment of 100 CHF + borrowed amount) minus the interest paid on the borrowed amount.[20] The experiment

[20] The initial endowment ensured a positive return for all selected participants, regardless of whether they borrowed additional funds.

was designed and presented as simply as possible. That is, it did not include any risk or uncertainty. The rational choice to maximize the payout – if the respondent was randomly selected – was to borrow and invest the maximum amount of 100 CHF. Two comprehension checks followed, asking respondents about the potential payouts (if randomly selected) resulting from different borrowing decisions. Respondents were required to pass these checks in order to proceed with the survey. The checks ensured that respondents understood the experimental setting, after which they chose how much (between 0 and 100 CHF) they wished to borrow and invest.

Public debt. In Survey 2, we included three questions regarding public debt. The first question (always asked first) gauged general support for new government borrowing without specifying its purpose. The other two questions – presented in random order – elicited support for government borrowing to fund (i) social transfers, such as pensions or unemployment benefits, and (ii) infrastructure projects, like schools and roads.[21]

In Survey 3, public debt attitudes were measured through three questions: (i) general support for new government borrowing, (ii) voting intention in a hypothetical referendum on Switzerland joining the EU if EU bonds were used to finance joint expenditures, and (iii) support for a referendum reforming the Fiscal Budget Act ("Finanzhaushaltsgesetz", the Swiss debt brake) to allow greater government borrowing. These three questions were also presented in random order.

Business debt. In Survey 4, we asked participants in the ifo Business Survey (i) whether their company will likely expand or reduce debt financing in the current year (2025 compared to 2024) and (ii) how important it is for their company to repay its debt as quickly as possible. These questions allowed us to test whether guilt-framed wording influences firms' stated plans and attitudes toward debt financing.

[21] We deliberately chose these two distinct types of expenditure, as it is often argued that incurring public debt to finance public investment – such as infrastructure – is justifiable, whereas public consumption – such as social transfers – should generally not be financed through public borrowing.

Average treatment effects. To estimate average treatment effects, we use the following ordinary least squares regression model:

$$Y_i = \alpha + \beta T_i + \gamma X_i + \varepsilon_i, \tag{1}$$

where Y_i denotes the outcome variable related to private or public debt, T_i is a binary indicator for treatment assignment, and X_i is an optional vector of control variables – such as age, gender, education, household income, political orientation, and religion in the household surveys, or company size and sector in the firm survey.[22] The coefficient β captures the average treatment effect of exposure to guilt-connoted language.

While the main text reports results without controls, Appendix Tables B.12–B.17 show that these findings are robust to the inclusion of covariates, supporting the validity of our randomization strategy. Additional evidence of balance between treatment and control groups is presented in Appendix Tables B.2–B.5.

Across all surveys, we also extensively check for treatment effect heterogeneity and find little evidence of it. Therefore, these results are not reported here but are available online in the Supplementary Material for interested readers.[23]

4.2 Survey experiment results

Household debt. We begin by presenting results on the effect of guilt-connoted wording on attitudes toward household debt from our first survey. Column 1 of Table 2 shows that, in the pooled sample of Germany, the Netherlands, and Sweden, exposure to guilt-connoted language significantly reduces respondents' willingness to incur debt for consumption by 7 percentage points (18% of the control group mean). Appendix Table B.6 confirms that this negative treatment effect is statistically significant in all three countries when analyzed separately. For example, in the Dutch sample, 26% of respondents in the control group express a willingness to borrow for consumption, while the treatment reduces this probability by 8 percentage points – amounting to 31% of the

[22] We also check for treatment effect heterogeneity by interacting the treatment indicator with the control variables.

[23] The Online Supplementary Material, which presents the heterogeneity results, is available here.

control group mean. The corresponding treatment effects in the German and Swedish samples represent 16% and 13% of their respective control group means.

[INSERT TABLE 2 ABOUT HERE]

In contrast, we find no significant differences in debt attitudes across treatment and control groups in the placebo countries – Australia, the UK, and the US, where all wordings were neutral. While the English-speaking placebo countries are not necessary to test our hypothesis that guilt connotation has an effect compared to a wording without that connotation, not finding an effect for these countries suggests that the effects observed in the main sample are not driven by variations in phrasing more generally.[24]

Because multiple German expressions exist for "borrowing" or "incurring debt", we conducted a second survey in Germany to test the robustness of our findings. In Survey 1, the treatment group received the term "verschulden," while the control group saw "Geld leihen". In Surveys 2 and 3, we replaced these rather colloquial terms with more closely matched (and more formal) terms: the treatment group saw "Schulden aufnehmen" and the control group saw "Kredite aufnehmen". Here, only the noun differs ("Schulden" vs. "Kredite"), while the verb ("aufnehmen") is held constant. This design allows us to isolate the effect of the guilt-connoted noun. Results from this second survey (Columns 2–4 of Table 2) confirm our earlier findings. The treatment effect on willingness to borrow for consumption (Column 3) is again statistically significant and similar in magnitude to the effect found in Survey 1 (despite the different wording).

In addition to varying the expression for debt, we also added two further questions with different contexts for taking on debt. First, we find that guilt-connoted wording reduces the general willingness to borrow by 12 percentage points, or 20% of the control group mean (Column 2). Second, however, we do not find a significant effect of guilt-connoted wording on the willingness to borrow for real estate (Column 4). One likely

[24] Appendix Table B.6 also shows that the baseline willingness to incur debt is lower in Germany and the Netherlands than in the English-speaking countries, while the Swedish control group falls between the UK/Australia and the US. These patterns are consistent with findings from Bogatzki et al. (2024) based on World Values Survey data. We included a question in our survey similar to the one from the WVS, without randomized wording, asking whether the household typically uses savings or borrows money to get by. Appendix Table B.7 shows that stated borrowing rates in Germany, the Netherlands, and Sweden – elicited through this alternative, untreated question – are again lower than in the English-speaking countries.

explanation is that taking on a mortgage is widely considered a normal and acceptable form of debt. Consistent with this, both treatment and control group participants reported significantly higher willingness to borrow for real estate than for consumption. This aligns with existing evidence showing that people are more comfortable with debt when it is used to finance long-term investments such as housing or education (Almenberg et al. 2021; Wong 2023). In contrast, taking on debt for consumption, whether for durable or non-durable goods, is often perceived as financially imprudent. If this perception is widespread, the negative priming effect of guilt-connoted wording may be stronger when the social acceptance of borrowing is lower. An additional explanation is that the salience of a specific, *justifiable* purpose for borrowing may attenuate the effect of the negative wording, as respondents focus more on the reason for incurring debt rather than the act itself.

Turning to the incentivized experiment conducted in Switzerland, Columns 5–7 of Table 2 show that guilt-connoted wording significantly affects borrowing behavior. The investment opportunity offered participants a guaranteed, risk-free return that exceeded the cost of borrowing.[25] A payoff-maximizing respondent would have borrowed the full amount to maximize earnings. However, even in the control group, only 56% of respondents chose to borrow a positive amount, suggesting the presence of debt aversion, which we discuss further below.

Column 5 shows that respondents in the treatment group were 9 percentage points less likely to borrow any amount, corresponding to a 16% reduction relative to the control group mean. The unconditional average treatment effect was 10.3 CHF – a 23% decrease relative to the control group (Column 6). Among those who did choose to borrow (intensive margin), the average amount borrowed was 7.2 CHF lower in the treatment group, equivalent to a 9% reduction relative to the control group (Column 7).

These results provide strong evidence that the priming effect of guilt-connoted wording also persists in an incentivized environment. Our post-experimental questions help us shed light on why respondents left money on the table.[26] Appendix Table B.8 reveals that

[25] As noted by Martínez-Marquina and Shi (2024), situations where investment returns exceed borrowing costs are common in practice but underexplored in the literature.

[26] Note that in the post-experimental questions, respondents in the treatment group still were confronted with the negatively connoted wording, while respondents in the control group continued to see the neutral wording.

when asked why they did not borrow at all or less than the maximum possible amount in the previous decision situation, a majority of respondents stated their general reluctance to take on debt as the main reason. Considerably fewer respondents expressed that they felt uncertain about how the borrowing would affect their compensation, or chose the wrong answer option stating that (more) debt would have lowered their compensation. In line with the decisions made in the experiment, respondents in the treatment group were more likely to mention their general discomfort with incurring debt as the main reason (Appendix Table B.9). This suggests that the negatively connoted wording affected both their revealed and their stated preferences (debt aversion) in the experiment.

Evidence from our post-experimental comprehension check question asking respondents whether they think that incurring debt would have led to a higher compensation supports the interpretation that respondents did not abstain from borrowing the payoff maximizing amount of 100 CHF because of a lack of understanding of the decision situation, and that treatment effects are not driven by differences in understanding between the treatment and the control group. Even respondents who correctly answered the comprehension check only borrowed 55.3 CHF on average, compared to an average amount of 23 CHF borrowed by respondents who answered it incorrectly (Appendix Table B.10). Appendix Table B.11 shows that the probability of answering the post-experimental comprehension check correctly does not differ between respondents in the treatment and the control group. Moreover, we do not find treatment effect heterogeneity between respondents who answered the post-experimental comprehension check correctly or not. Remember that the pre-experimental comprehension checks had to be passed by all respondents in order to be able to continue with the survey (cf. Section 4.1).

These results are in line with Martínez-Marquina and Shi (2024), who experimentally show that debt aversion can lead to suboptimal financial decisions. Beyond general debt aversion, the negative wording further discourages borrowing in our experiment – in a setting where failing to borrow leads to a strictly lower payoff.

To illustrate the economic significance of the priming effect, we calculate the interest rate reduction in the treatment group that would be required to offset the effect.[27]

[27] Using the definition of the debt elasticity with respect to the interest rate, we calculate the required interest rate r^* such that the treatment group borrows as much as the control group as $\log(r_1^*) = \frac{\log(Y_0)-\log(Y_1)}{\varepsilon} + \log(r_0)$, where $r_0 = 0.05$ is the interest rate in the experiment and ε is the elasticity

We use the long-run elasticity of debt to the interest rate of -1.3, as estimated by Gross and Souleles (2002) using U.S. credit card account data. This estimate implies that the interest rate would need to decline by approximately 0.9 percentage points to encourage the treatment group to behave like the control group.[28] To put these effects in perspective, Best et al. (2024) find that a decrease of the interest rate on loans of 1 percentage point leads to an increase of investment by German firms of 7%.[29]

Public debt. Starting with the results from Survey 2 – where we introduced questions on attitudes toward public debt – Column 1 of Table 3 shows that in the German sample guilt-connoted wording significantly reduces support for new government debt (without mentioning any specific purpose) by 5 percentage points, corresponding to 11% of the control group mean. However, we find no significant effect of the treatment on respondents' approval of government borrowing to finance social transfers (Column 2) and public infrastructure (Column 3). The priming effect of guilt-associated language on attitudes toward public borrowing is thus most pronounced when the purpose of the debt is not specified. Once respondents consider concrete purposes for government borrowing, the effect disappears, regardless of the nature of that purpose.[30]

Turning to Survey 3 in Switzerland, Columns 4–6 of Table 3 show that the guilt-connoted wording substantially lowers support for public debt across all three outcomes.

---

parameter. Y_0 and Y_1 denote the mean amount of debt incurred in the Debt Game in the control and treatment groups, respectively, as reported in Column (6) in Table 2. Several assumptions apply. First, the elasticity estimate by Gross and Souleles (2002) is estimated for credit card borrowing and may not directly translate to the investment decision examined in our experiment. Second, the calculation assumes that the treatment effect scales proportionally across debt levels and is independent of the spread between the interest rate and the return on investment.

[28] Elasticity estimates in the literature vary by context, ranging from -2.9 (Karlan and Zinman 2019) to -0.44 (intensive margin estimate of Lukas and Nöth (2022) for Germany). This range of elasticities implies that the interest rate would need to decline by between 0.44 and 2.2 percentage points.

[29] Curtis et al. (2021) find that a 1% decrease in the cost of capital leads to approximately a 1.45% increase in capital investment in the US.

[30] This is in contrast to the results for household borrowing above, where a negative effect persists in respondents' willingness to incur debt for consumption, but not for real estate purchases. This disparity is likely attributable to the widespread social acceptance of borrowing to finance homeownership in contrast to consumption-related debt. Conversely, the absence of a priming effect on attitudes toward public debt once respondents are presented with specific purposes for government borrowing remains consistent regardless of the type of expenditure. A plausible explanation is that respondents view both categories as legitimate grounds for borrowing, without making the public finance distinction between expenditures that should be funded from current revenues (e.g., social transfers) and those that yield long-term benefits and may justify intertemporal financing (Dietzel 1855).

Respondents in the treatment group are 15 percentage points less likely to support new government borrowing, corresponding to 39% of the control group mean (Column 4).

[INSERT TABLE 3 ABOUT HERE]

Unlike in Survey 2 in Germany, where we varied the purpose of public borrowing, the Swiss survey varied the political context without mentioning a specific purpose: respondents were asked about national and joint EU debt. The treatment group is significantly less likely to support Switzerland's accession to the EU if this would entail issuing joint debt (Column 5), and also less likely to support reforming the Swiss Fiscal Budget Act ("Finanzhaushaltsgesetz") to permit more public borrowing (Column 6). The latter two questions use a 5-point Likert scale ranging from 1 ("definitely against") to 5 ("definitely in favor"), with a midpoint of 3 indicating that a respondent would abstain. The treatment effect on support for Switzerland joining the EU, with the possibility of incurring joint debt, and the Fiscal Budget Act reform, thus lowers average support from a level between "probably against" and "would not participate" to "probably against."

Business debt. Table 4 shows that guilt-connoted wording significantly reduces the likelihood that managers say their firm plans to expand debt financing this year or that repaying business debt quickly is unimportant. Both questions use a 5-point Likert scale with a midpoint of 3. The control group mean is 2.9 for the question on firms' debt financing plans for the current year, and 2.5 for the question eliciting the perceived importance of rapid debt repayment. The treatment effects correspond to 4% for the former and 9% for the latter, thus slightly shifting responses in the treatment group toward the next lower answer category ('reduce' and 'rather important'). Importantly, the treatment effect on the question eliciting debt financing plans for the current year demonstrates that guilt-connoted wording affects not only general attitudes toward business debt, but also the stated plans for respondents' own firms.[31]

[INSERT TABLE 4 ABOUT HERE]

[31] Evidence from the ifo Investment Survey reveals that firms revise their investment plans - typically at least partly debt-financed - within the course of a year (Bachmann and Zorn 2020; Link et al. 2024).

5 Strategic use of words in parliamentary speeches

In this section, we investigate whether politicians strategically use morally charged language when debating public debt in the German Parliament. Given the dual meaning of the German word *Schuld* (debt/guilt), we examine whether guilt-related terms are used more frequently by speakers opposing public borrowing – a pattern that would suggest a deliberate rhetorical effort to frame debt in moral terms and influence public opinion. To do so, we follow a three-step approach. First, we extract all speeches related to public debt from the full corpus of Bundestag transcripts. Second, we classify each speech based on its stance – either supportive of or opposed to public debt. Third, we measure the prevalence of guilt-connoted language and compare its intensity across the two categories. Finally, we extend our textual analysis to private debt and examine the linguistic patterns in commercial advertising for financial services in Subsection 5.5.

5.1 Data preparation

We use the OpenDiscourse dataset (Richter et al. 2023) to analyze how German politicians talk about public debt in parliamentary speeches.[32] Our analysis focuses on speeches delivered over nine electoral terms between 1990 and 2025. We exclude speeches by members of the Presidium, as their contributions are primarily procedural.

Dictionary of debt-related keywords. We construct a dictionary of terms related to public debt and debt management. To this end, we selected all words with the stem "schuld" (i.e., "Schulden", "Verschuldung", "Staatsverschuldung") or "kredit" (i.e., "Kredite", "Nettokreditaufnahme", "Kreditaufnahme") that appeared at least twice in the lemmatized corpus of parliamentary speeches. Next, three of the authors (MD, AP, and LW) selected the terms most relevant to the context of public debt. We extended the dictionary by adding expressions such as "Staatsanleihen" (government bonds), "Bundeswertpapiere" (federal securities), and "schwarze Null" (black zero), a

[32] The dataset was first accessed on January 24, 2023, and updated on February 16, 2024, and May 5, 2025.

phrase symbolizing a political commitment to avoiding further debt.[33] We classify words containing the "schuld" stem as guilt-connoted and the remainder as neutral.

Speech selection. To identify speeches relevant to (German) public debt, we employ a two-step filtering process: (i) we perform a keyword search using our debt-related dictionary, and (ii) we retain speeches delivered in sessions where debt-relevant terms (e.g., budget, financial plan, loans) appear in the official table of contents. Appendix C.1 describes the construction of the dictionary, the speech selection criteria, and various validation exercises using topic modeling and word embeddings.

Our final data set includes over 283,000 parliamentary speeches between December 20, 1990 and March 18, 2025. From these, we pre-select more than 15,000 potentially relevant speeches. Appendix Figure C.2 shows the distribution of pre-selected speeches over time. We manually annotate a stratified subset of 47%, focusing on key budget debates surrounding the readings of the Budget Act ("Haushaltsgesetz"). The manual annotation was completed in February 2024, resulting in an annotated sample covering the period from December 20, 1990 to February 2, 2024.

Stance annotation. We instructed four research assistants to annotate a total of 7012 speeches. Of these, 98% were rated by two annotators, and 2% by more than two. Each annotator first assessed whether the speech was relevant to the topic of German public debt. If deemed relevant, they then classified the speaker's stance as one of the following: "Against public debt", "Public debt is acceptable or justifiable under certain conditions", or "Neutral, ambiguous, or mixed stance".

Stance annotation is a complex task, but the annotators achieved a good level of agreement. Krippendorff's alpha is 0.78 for relevance and 0.58 for stance.[34] Inter-rater agreement was stable across different time periods and consistent among annotators (see Appendix Tables C.7 and C.8 in Appendix C.2). We aggregated the annotations using the Bayesian model of Dawid and Skene (1979).[35]

[33] In total, the dictionary contains 1127 debt-related terms, of which 693 are guilt-connoted (i.e., based on the root "schuld").

[34] Krippendorff's alpha ranges from –1 to 1, with 0 indicating chance-level agreement and 1 indicating perfect agreement. For comparison, Card et al. (2022) report alphas of 0.76 for relevance and 0.48 for tone in their stance annotation of US congressional speeches on immigration.

[35] Appendix C.5 demonstrates that our main findings are robust to alternative aggregation methods.

To test the scalability and robustness of our approach, we also implemented automated stance classification. Using the annotated data as training input, we fine-tuned GPT-4 to predict stances. Appendix C.4 provides details on model training and evaluation. For our main analysis, we rely on the human-annotated dataset, while we use the machine-annotated dataset for robustness checks.

In total, 4981 speeches (71% of the annotated dataset) were identified as relevant to German public debt. Our primary analysis focuses on the subset of speeches that express a clear position – either in favor of or against public debt. This subset includes 3427 speeches delivered by 737 unique speakers across 560 parliamentary days. Appendix Figure C.3 shows the distribution of annotated speeches by year and stance.

5.2 Measurement and hypotheses

Formally, we define two measures to capture the degree of guilt-related language used in parliamentary speeches on public debt:

$$\textit{Intensity} = \frac{\text{Number of guilt-connoted words}}{\text{Total number of words}} \times 10{,}000 \tag{2}$$

$$\textit{Relative frequency} = \frac{\text{No. of guilt-connoted words}}{\text{No. of guilt-connoted words} + \text{No. of neutral words}} \tag{3}$$

Intensity measures how frequently guilt-connoted words appear in a speech, scaled per 10,000 words. *Relative frequency* measures the proportion of guilt-connoted words among all debt-related words in the speech. While intensity captures the overall density of guilt-related language, relative frequency isolates rhetorical choices specific to debt-related vocabulary, independent of how much of the speech is devoted to the topic.

We hypothesize that speeches opposing public debt use more guilt-connoted language than those supporting it. To test this hypothesis, we estimate the following regression:

$$Y_{its} = \alpha_s + \beta \cdot \textit{Against}_{its} + \varepsilon_{its}, \tag{4}$$

where Y_{its} denotes either the intensity or relative frequency of guilt-connoted language in speech i given on day t by politician s; α_s is a speaker fixed effect; and $\textit{Against}_{its}$ is a binary variable indicating whether the speech opposes public debt. This specification

leverages within-speaker variation and compares how the same politician uses language differently when speaking against versus in favor of public debt. We extend this baseline model to examine how political context moderates guilt rhetoric by introducing interaction terms for economic conditions (recession periods), political position (belonging to a governing coalition), and speaker experience.

5.3 Results

Descriptive patterns in debt-related language. We begin by documenting key patterns in how public debt is discussed in the German Parliament. Our baseline sample consists of 3427 speeches between 1990 and 2024, with 83% classified as opposing public debt and 17% as supporting it.

Table 5 shows that anti-debt speeches rely more heavily on guilt-connoted terms, both in absolute usage and relative to neutral alternatives, indicating a systematic difference in rhetorical framing depending on the speaker's stance. On average, speeches opposing public debt use guilt-connoted language with over 50% higher intensity than those supporting it.

Table 5 also shows the strategic use of guilt-connoted language across political parties, arranged along the left-right economic spectrum (from top to bottom). When opposing public debt, parties across the spectrum employ similarly high rates of guilt-related terminology, with the exception of the right-wing extremist AfD which exhibits a much higher intensity of guilt-slant than all other parties. However, when advocating for public borrowing, left-leaning parties (The Left, Greens, SPD) are substantially less likely to use guilt-connoted language than right-leaning parties. This suggests a rhetorical strategy that aims to circumvent the moral stigma associated with loose fiscal policy.

[INSERT TABLE 5 ABOUT HERE]

Another descriptive result is that the strategic use of guilt-connoted language in debt debates has evolved over time. Figure 2 plots the average intensity of guilt-related terms separately for speeches opposing and supporting public debt, by electoral term (lines), along with the share of speeches in favor of public debt (bars). Two main patterns emerge. First, attitudes toward public debt have gradually shifted. While the majority

of speeches opposed public borrowing throughout our sample period, support for debt has increased in the two most recent electoral terms spanning the period 2017-2025, with pro-debt speeches rising from about 15% to 40%. This shift occurred against the backdrop of low interest rates and Germany's declining debt-to-GDP ratio until 2019, following the implementation of the constitutional debt brake in 2016. Second, as a positive stance towards public debt became more common, the language used in pro-debt and anti-debt speeches diverged. Anti-debt speeches consistently used guilt-connoted language at high rates across all periods. In contrast, pro-debt speeches increasingly avoided guilt-connoted terms. Overall, the gap in guilt slant intensity only widened when a meaningful share of speeches began supporting public debt in recent terms.

[INSERT FIGURE 2 ABOUT HERE]

Within-politician analysis of language and stance. Table 6 presents our main results on the relationship between a politician's stance on public debt and their use of guilt-connoted language in parliamentary speeches.

Column (1) reports estimates from a baseline model that regresses guilt slant on stance toward debt. Consistent with the descriptive statistics, speeches opposing public debt exhibit significantly higher use of guilt-connoted language. Columns (2)–(6) leverage within-speaker variation by including politician fixed effects – i.e., these specifications focus on politicians switching stance across speeches. The results show that even after controlling for all time-invariant characteristics of individual politicians, such as ideology or time-invariant rhetorical style, changes in stance are systematically associated with changes in guilt slant intensity.

Column (3) additionally includes electoral term fixed effects. The effect of stance remains significant, suggesting that language use shifts with position also within a given political environment. However, including a full set of term fixed effects limits the identifying variation, especially in earlier terms, where speeches in favor of public debt are rare (as shown in Figure 2).

[INSERT TABLE 6 ABOUT HERE]

Columns (4) and (5) introduce interactions with institutional conditions. Column (4) controls for whether a recession occurred during the electoral term, using recession

dates identified by the German Council of Economic Experts.[36] The negative interaction term indicates that in crisis periods, the guilt slant in anti-debt speeches is lower. Some politicians also move between the opposition and the governing coalition across electoral terms. Several major shifts in coalition composition occurred during the sample period.[37] Column (5) examines whether the use of guilt-related language varies with political role. The negative interaction term reveals that politicians who oppose public debt while in government use significantly less guilt-framed language than when they are in opposition. Column (6) controls for a proxy of parliamentary experience, measured by the sequence number of the speech within a politician's full set of speeches concerning public debt. The inclusion of this control does not affect the main results, and we find little evidence that the use of guilt-related language varies with parliamentary experience.

Overall, our results suggest that the gap in guilt slant intensity between speeches in favor of and against public debt is mainly driven by speakers who are part of the opposition and by parliamentary debates in non-recession years.

5.4 Robustness

We conduct several robustness checks to assess the validity of our main findings. First, we test whether the results hold under alternative aggregation methods for determining a speech's stance based on human annotations. Second, we refine the definitions of intensity and relative frequency by narrowing the keyword list to a smaller set of frequently used and unambiguous debt-related terms: "Kredit," "Nettokreditaufnahme," "Kreditaufnahme," "Schulden," "Neuverschuldung," and "Verschuldung." Third, we apply our fine-tuned GPT model to predict stance labels for the baseline sample (for further details on the GPT fine-tuning procedure, see Appendix C.4). Fourth, we expand the dataset to include additional speeches identified through keyword searches that were not manually annotated and classify these using the GPT model.

[36] The Council's recession identification follows the methodology of the NBER and CEPR. Recession years include 1992–1993, 2001–2003, 2008–2009, and 2019–2020, comprising the 12th, 14th–16th, and 19th electoral terms.

[37] These included center-right coalitions between the Christian Democrats (CDU/CSU) and Free Democrats (FDP) in terms 12, 13, and 17; center-left coalitions between the Social Democrats (SPD) and Greens in terms 14 and 15; three "grand coalitions" between the Christian Democrats and Social Democrats in terms 16, 18, and 19; and a three-party coalition of Social Democrats, Greens, and Free Democrats in term 20.

Appendix Table C.12 and Appendix Figures C.5–C.6 demonstrate that our main results are robust across all these specifications. Although GPT tends to misclassify some neutral speeches as supportive of public debt, which slightly attenuates effect sizes, the overall patterns remain intact.

In addition, we verify that the stance annotations are not systematically driven by the specific wording used in the speeches. In a dedicated validation experiment (Appendix C.2.3), one group of annotators rated the original speeches, while another group evaluated modified versions of the same speeches, with one subset in which guilt-connoted terms were replaced with neutral alternatives and another in which neutral terms were replaced with guilt-connoted alternatives. The results show no significant differences in their assessments, confirming that the stance ratings are not driven by word choice.

5.5 Extension: strategic wording in commercial advertising

Building on our descriptive findings and survey experiments, we further explore how language is strategically used in the context of private debt. Specifically, we examine linguistic patterns in commercial advertising by analyzing financial services advertisements shown across Meta platforms (e.g. Facebook, Instagram). Our dataset covers ads published between July 2024 and July 2025 in Germany, the Netherlands, Sweden, the UK, and the US, collected via Meta's Ad Library API.[38]

First, we assess the frequency of guilt-connoted terms (those containing the stem "schuld" or "skuld") versus neutral terms (e.g., those containing "kredit" or "darlehen" in German). Appendix Table D.1 shows that advertisements using guilt-connoted terms are relatively rare across all countries studied.

Second, we analyze the semantic context in which debt- and credit-related terms are used. Appendix Figure D.1 displays word clouds for the most frequently used neutral and guilt-connoted terms in German-language advertisements. Appendix Table D.2 presents

[38] We identified relevant ads using country-specific keywords related to debt and credit: "debt," "loan," and "credit" for English-speaking countries (US and UK); "schulden," "kredit," and "darlehen" for Germany; "schulden," "lening," and "krediet" for the Netherlands; and "skuld," "lån," and "kredit" for Sweden. Among these, we specifically classify terms with guilt connotations – "schulden" in German and Dutch, and "skuld" in Swedish – to examine their prevalence relative to neutral alternatives. We restrict the analysis to ads containing textual content.

the most common noun and verb collocations associated with these terms, identified using spaCy's part-of-speech tagger and dependency parser.

Guilt-connoted terms tend to appear in the context of debt reduction and relief – for example, "Schulden abbauen" (reduce debt), "Schuldenfrei werden" (become debt-free), and "Entschuldungsversuch" (debt relief attempt). These associations frame debt as a problem or burden to be eliminated. In contrast, neutral terms frequently appear in transactional or promotional contexts, such as "Kredit beantragen" (apply for a loan) or "Sofortkredit erhalten" (receive an instant loan).

This divergence in linguistic framing suggests that, in commercial advertising, guilt-connoted terminology is selectively used to frame debt as a financial problem, while neutral terminology is employed to present borrowing as a standard financial service.

6 Conclusion

Debt aversion is a complex phenomenon, shaped by an interplay of economic conditions, institutional structures, and cultural norms. This paper isolates one specific but powerful channel within this broader mosaic: the moral connotations embedded in language. In several Germanic languages, the common word for "debt" also means "guilt", and we provide the first causal evidence that this semantic feature directly influences borrowing attitudes and behavior. Across large-scale survey experiments, incentivized borrowing decisions, and multiple real-world contexts, we show that guilt-laden terminology reduces individuals' willingness to incur personal debt, lowers support for public borrowing, and alters firms' stated financing plans. These effects are substantial, persistent across settings, and extend beyond hypothetical survey responses to consequential economic choices.

Our findings also suggest that this linguistic channel is strategically employed in both political and commercial contexts. Politicians opposing public borrowing disproportionately deploy guilt-connoted terms in parliamentary debates, while commercial lenders use them selectively – most often in debt-relief advertising – thereby framing borrowing as morally problematic in ways that align with their strategic objectives. This pattern underscores that moral framing can be activated without explicit moral appeals: the

language itself can cue moral considerations, shaping preferences and decisions.

The policy implications are twofold. First, our results suggest that cross-country differences in debt levels may, in part, be rooted in linguistic framing, adding a new dimension to the determinants of fiscal and financial behavior. Second, the findings highlight the potential for carefully chosen language to influence borrowing decisions in contexts where debt aversion may be either beneficial – by reducing over-indebtedness – or detrimental – by constraining productive investment. Understanding and potentially harnessing these linguistic effects could inform communication strategies for policymakers, regulators, and financial institutions seeking to guide borrowing toward socially optimal levels.

More broadly, our study contributes to the literature on culture and economic behavior by demonstrating that even a single word, when imbued with moral connotations, can measurably shape economic attitudes and actions. Language is not merely a neutral medium for describing economic reality; it is an active force in its construction.

References

Almenberg, J., A. Lusardi, J. Säve-Söderbergh, and R. Vestman. 2021. "Attitudes towards debt and debt behavior." *The Scandinavian Journal of Economics* 123 (3): 780–809.

Anderson, G. A. 2009. *Sin: A history.* Yale University Press.

Ayres, I., T. K. Katz, and T. Regev. 2023. "Languages and future-oriented economic behavior—Experimental evidence for causal effects." *Proceedings of the National Academy of Sciences* 120 (7): e2208871120.

Bachmann, R., K. Carstensen, S. Lautenbacher, M. Menkhoff, and M. Schneider. 2024. *Uncertainty and change: Survey evidence of firms' subjective beliefs.* NBER Working Paper No. 29430.

Bachmann, R., and P. Zorn. 2020. "What drives aggregate investment? Evidence from German survey data." *Journal of Economic Dynamics and Control* 115 (103873).

Badarinza, Cristian, John Y Campbell, and Tarun Ramadorai. 2016. "International comparative household finance." *Annual Review of Economics* 8 (1): 111–144.

Barnes, L., and T. Hicks. 2018. "Making austerity popular: The media and mass attitudes toward fiscal policy." *American Journal of Political Science* 62 (2): 340–354.

Barro, R. J. 1974. "Are government bonds net wealth?" *Journal of Political Economy* 82 (6): 1095–1117.

Baugh, A. C., and T. Cable. 2013. *A history of the English language.* 6th ed. Routledge. ISBN: 978-0-415-65596-5.

BBC. 2015. "Inside the Germans' debt psyche: What makes them tick?," February. Accessed August 7, 2025. https://www.bbc.com/news/business-31369185.

Best, L., B. Born, and M. Menkhoff. 2024. *The impact of interest: Firms' investment sensitivity to interest rates.* Technical report. Working Paper.

Blei, D. M., A. Y. Ng, and M. I. Jordan. 2003. "Latent Dirichlet allocation." *Journal of Machine Learning Research* 3 (Jan): 993–1022.

Bogatzki, T., D. Stadelmann, and B. Torgler. 2024. "Guiltily indebted? How a word is linked to individual borrowing." *Applied Economics Letters,* 1–4.

Buggeln, M. 2022. *Das Versprechen der Gleichheit: Steuern und soziale Ungleichheit in Deutschland von 1871 bis heute.* Berlin: Suhrkamp. ISBN: 978-3-518-29938-8.

Bursztyn, Leonardo, Stefano Fiorin, Daniel Gottlieb, and Martin Kanz. 2019. "Moral incentives in credit card debt repayment: Evidence from a field experiment." *Journal of Political Economy* 127 (4): 1641–1683.

Caetano, G., M. Palacios, and H. A. Patrinos. 2019. "Measuring aversion to debt: An experiment among student loan candidates." *Journal of Family and Economic Issues* 40:117–131.

Card, D., S. Chang, C. Becker, J. Mendelsohn, R. Voigt, L. Boustan, R. Abramitzky, and D. Jurafsky. 2022. "Computational analysis of 140 years of US political speeches reveals more positive but increasingly polarized framing of immigration." *Proceedings of the National Academy of Sciences* 119 (31): e2120510119.

Chen, J. I., T.-S. He, and Y. E. Riyanto. 2019. "The effect of language on economic behavior: Examining the causal link between future tense and time preference in the lab." *European Economic Review* 120:103307.

Chen, M. K. 2013. "The effect of language on economic behavior: Evidence from savings rates, health behaviors, and retirement assets." *American Economic Review* 103 (2): 690–731.

Chodorow-Reich, Gabriel. 2014. "The employment effects of credit market disruptions: Firm-level evidence from the 2008–09 financial crisis." *Quarterly Journal of Economics* 129 (1): 1–59. https://doi.org/10.1093/qje/qjt031.

Curtis, E. M., D. G. Garrett, E. C. Ohrn, K. A. Roberts, and J. C. Suárez Serrato. 2021. *Capital investment and labor demand.* Technical report. National Bureau of Economic Research.

Dawid, A. P., and A. M. Skene. 1979. "Maximum likelihood estimation of observer error-rates using the EM algorithm." *Journal of the Royal Statistical Society: Series C (Applied Statistics)* 28 (1): 20–28.

Dietzel, C. 1855. *Das System der Staatsanleihen im Zusammenhang der Volkswirthschaft betrachtet.* Frankfurt am Main: J. D. Sauerländer.

Djankov, S., O. Hart, C. McLiesh, and A. Shleifer. 2008. "Debt enforcement around the world." *Journal of Political Economy* 116 (6): 1105–1150.

Elengold, K., J. Dorrance, and R. Agans. 2020. "Debt, Doubt, and Dreams: Understanding the Latino College Completion Gap." *Available at SSRN 3733738.*

Eugster, B., R. Lalive, A. Steinhauer, and J. Zweimüller. 2017. "Culture, work attitudes, and job search: Evidence from the Swiss language border." *Journal of the European Economic Association* 15 (5): 1056–1100.

———. 2011. "The demand for social insurance: Does culture matter?" *The Economic Journal* 121 (556): F413–F448.

Eugster, B., and R. Parchet. 2019. "Culture and taxes." *Journal of Political Economy* 127 (1): 296–337.

Evans, B. J., A. Boatman, and A. Soliz. 2019. "Framing and labeling effects in preferences for borrowing for college: An experimental analysis." *Research in Higher Education* 60:438–457.

Financial Times. 2023. "Debt, guilt and Swabian housewives: Debate on German borrowing rule heats up," December. Accessed August 7, 2025. https://www.ft.com/content/90b0a2d0-a9b0-49a9-beac-f8c3bd1b2914.

Fuest, C., K. Gründler, M. Nübling, N. Potrafke, and M. Schlepper. 2024. "Die deutsche Schuldenbremse: Stabilitätsanker oder Investitionsblocker?" *ifo Schnelldienst* 77 (1): 44–48.

Gay, V., D. L. Hicks, E. Santacreu-Vasut, and A. Shoham. 2018. "Decomposing culture: An analysis of gender, language, and labor supply in the household." *Review of Economics of the Household* 16:879–909.

Graeber, D. 2012. *Debt: The first 5000 years.* Penguin UK.

Greenstone, Michael, Alexandre Mas, and Hoai-Luu Nguyen. 2014. "Do credit market shocks affect the real economy? Quasi-experimental evidence from the Great Recession and "normal" times." *Quarterly Journal of Economics* 129 (1): 249–305. https://doi.org/10.1093/qje/qjt032.

Grimm, J., and W. Grimm. 1854. *Deutsches Wörterbuch.* Vol. 16. S. Hirzel Leipzig.

Gross, D. B., and N. S. Souleles. 2002. "Do liquidity constraints and interest rates matter for consumer behavior? Evidence from credit card data." *The Quarterly Journal of Economics* 117 (1): 149–185.

Guin, B. 2016. "Culture and household saving." *Available at SSRN 2698872.*

Guiso, L., P. Sapienza, and L. Zingales. 2006. "Does culture affect economic outcomes?" *Journal of Economic Perspectives* 20 (2): 23–48.

———. 2013. "The determinants of attitudes toward strategic default on mortgages." *The Journal of Finance* 68 (4): 1473–1515.

Haaland, Ingar, Christopher Roth, and Johannes Wohlfart. 2023. "Designing Information Provision Experiments." *Journal of Economic Literature* 61, no. 1 (March): 3–40. https://doi.org/10.1257/jel.20221504.

Hamacher, W. 2002. "Guilt history: Benjamin's sketch "Capitalism as religion"." In *Walter Benjamin and history,* edited by A. Benjamin and P. Osborne, 95–110. Bloomsbury.

Henchoz, C., T. Coste, and B. Wernli. 2019. "Culture, money attitudes and economic outcomes." *Swiss Journal of Economics and Statistics* 155 (1): 1–13.

Hendren, N., T. J. Bakker, S. DeLuca, E. English, J. Fogel, and D. Herbst. 2025. *Credit access in the United States.* NBER Working Paper 34053.

Hennrich, J., S. Sauer, and K. Wohlrabe. 2023. *Who reports the mood in German boardrooms? Evidence from the ifo business survey.* CESifo Working Paper No. 10571.

Herz, H., M. Huber, T. Maillard-Bjedov, and S. Tyahlo. 2021. "Time preferences across language groups: Evidence on intertemporal choices from the Swiss language border." *The Economic Journal* 131 (639): 2920–2954.

Hicks, D. L., E. Santacreu-Vasut, and A. Shoham. 2015. "Does mother tongue make for women's work? Linguistics, household labor, and gender identity." *Journal of Economic Behavior & Organization* 110:19–44.

Hiersemenzel, M., S. Sauer, and K. Wohlrabe. 2022. *On the representativeness of the ifo business survey.* CESifo Working Paper No. 9863.

Hofstede, G., and M.H. Bond. 1988. "The Confucius Connection: From cultural roots to economic growth." *Organizational dynamics* 16 (4): 5–21.

Karlan, D., and J. Zinman. 2019. "Long-run price elasticities of demand for credit: Evidence from a countrywide field experiment in Mexico." *The Review of Economic Studies* 86 (4): 1704–1746.

Khwaja, Asim I., and Atif Mian. 2008. "Tracing the impact of bank liquidity shocks: Evidence from an emerging market." *American Economic Review* 98 (4): 1413–1442. https://doi.org/10.1257/aer.98.4.1413.

Kluge, F. 1891. *Etymological dictionary of the German language.*

Knechtl, V., and A. Stutzer. 2021. "Swiss municipal data merger tool: Open-source software for the compilation of longitudinal municipal-level data." *Swiss Political Science Review* 27 (4): 799–808.

Krugman, P. 2012. *End this depression now!* New York: W. W. Norton & Company. ISBN: 978-0-393-08877-9.

———. 2025. "Revenge of the black zero." Accessed: 2025-04-08, *Paul Krugman,* https://paulkrugman.substack.com/p/revenge-of-the-black-zero.

Lakoff, G. 1995. "Metaphor, morality, and politics, or, why conservatives have left liberals in the dust." *Social Research,* 177–213.

Le Maire, B. 2022. *Statement in "France-Allemagne, un couple en thérapie"*. Directed by Olivier Toscer, ARTE, Timestamp: 1:06:10. https://educ.arte.tv/program/france-allemagne-un-couple-en-therapie.

Leisibach, P., and C. A. Schaltegger. 2022. "Mind your language: The role of culture in future-oriented behavior."

Link, S. 2024. "The price and employment response of firms to the introduction of minimum wages." *Journal of Public Economics* 239 (105236).

Link, S., M. Menkhoff, A. Peichl, and P. Schüle. 2024. "Downward revision of investment decisions after corporate tax hikes." *American Economic Journal: Economic Policy* 16 (4): 194–222.

Link, S., A. Peichl, C. Roth, and J. Wohlfart. 2023. "Information frictions among firms and households." *Journal of Monetary Economics* 135:99–115.

Lukas, Daniel, Michaela Pagel, and Sascha Steffen. 2022. "Voluntary repayments and liquidity." *Journal of Financial Economics* 143 (2): 1100–1120. https://doi.org/10.1016/j.jfineco.2021.05.025.

Lukas, M., and M. Nöth. 2022. "Voluntary minimum repayments and borrower heterogeneity: Evidence from revolving consumer credit." *Journal of Banking & Finance* 135:106356.

Mann, F. K. 1959. *Finanztheorie und Finanzsoziologie.* Tübingen: Mohr (Siebeck).

Martínez-Marquina, A., and M. Shi. 2024. "The opportunity cost of debt aversion." *American Economic Review* 114, no. 4 (April): 1140–1172.

Mikolov, T., K. Chen, G. Corrado, and J. Dean. 2013. "Efficient estimation of word representations in vector space." *arXiv preprint arXiv:1301.3781.*

Mills, C.K., J. Battisto, S. Lieberman, M. Orozco, I. Perez, and N.S. Lee. 2018. "Latino-owned businesses: Shining a light on national trends." *The Federal Reserve Bank of New York, Interise, Standford Latino Entrepreneurship Initiative.*

Moll, Benjamin. 2014. "Productivity losses from financial frictions: Can self-financing undo capital misallocation?" *American Economic Review* 104 (10): 3186–3221. https://doi.org/10.1257/aer.104.10.3186.

Myers, S. C. 2001. "Capital structure." *Journal of Economic Perspectives* 15 (2): 81–102.

Nietzsche, F. 1994. *On the genealogy of morality.* Translated by C. Diethe. Originally published in 1887. Cambridge: Cambridge University Press.

Oxford University. 2023. *Oxford English Dictionary.* https://doi.org/10.1093/OED/1983985700. Online. Accessed 4 March 2024. Oxford.

Paine, F., A. Schoar, and D. Thesmar. 2025. "Attitudes to debt: The role of moral values." *Available at SSRN 5367017.*

Pérez, E. O., and M. Tavits. 2019. "Language influences public attitudes toward gender equality." *The Journal of Politics* 81 (1): 81–93.

Politico. 2015. "Germans are done with guilt," June. Accessed August 7, 2025. https://www.politico.eu/article/germany-greece-guilt-relationship-eurozone/.

Rajan, Raghuram G., and Luigi Zingales. 1998. "Financial dependence and growth." *American Economic Review* 88 (3): 559–586.

Rasinski, K. A. 1989. "The effect of question wording on public support for government spending." *Public Opinion Quarterly* 53 (3): 388–394.

Ricardo, D. 1817. *On the principles of political economy and taxation.* London: John Murray.

Richter, F., P. Koch, O. Franke, J. Kraus, L. Warode, and S. Heine. 2023. "Open discourse: Towards the first fully comprehensive and annotated corpus of the parliamentary protocols of the German Bundestag."

Roth, Christopher, Sonja Settele, and Johannes Wohlfart. 2022. "Beliefs about public debt and the demand for government spending." *Journal of Econometrics* 231 (1): 165–187.

Sapir, E. 1929. "The status of linguistics as a science." *Language* 5 (4): 207–214.

Smith, A. 1776. *An inquiry into the nature and causes of the wealth of nations.* First edition, in two volumes. London: W. Strahan / T. Cadell.

———. 1853. *The theory of moral sentiments and On the origins of languages.* Edited by D. Stewart. Online Library of Liberty. New edition with biographical and critical memoir by Dugald Stewart; originally *Theory of Moral Sentiments* (1759) and *Dissertation on the Origin of Languages* (1761). London: Henry G. Bohn.

Smith, T. W. 1987. "That which we call welfare by any other name would smell sweeter: An analysis of the impact of question wording on response patterns." *Public Opinion Quarterly,* 75–83.

Stantcheva, Stefanie. 2023. "How to Run Surveys: A Guide to Creating Your Own Identifying Variation and Revealing the Invisible." *Annual Review of Economics* 15, no. 1 (September): 205–234. https://doi.org/10.1146/annurev-economics-082222-103840.

Süddeutsche Zeitung. 2021. "Dem Geld eine Richtung geben," August. Accessed August 7, 2025. https://www.sueddeutsche.de/politik/finanzministerium-robert-habeck-klimapolitik-1.5369935?reduced=true.

The Economist. 2015. "As we forgive our debtors," July. Accessed August 7, 2025. https://www.economist.com/erasmus/2015/07/16/as-we-forgive-our-debtors.

———. 2023. "Germany's ruling coalition grapples with a wrecked budget," November. Accessed August 7, 2025. https://www.economist.com/europe/2023/11/30/germanys-ruling-coalition-grapples-with-a-wrecked-budget.

The Guardian. 2012. "Angela Merkel's austerity postergirl, the thrifty Swabian housewife," September. Accessed August 7, 2025. https://www.theguardian.com/world/2012/sep/17/angela-merkel-austerity-swabian-housewives.

Tufano, P. 2009. "Consumer finance." *Annual Review of Financial Economics* 1:227–247.

Varoufakis, Y. 2015. "Biblical economics leave everybody blind." Interviewed by Johanna Jaufer, *FM4,* https://fm4v3.orf.at/stories/1752877/index.html.

Waley, A. 2012. *The analects of Confucius.* Routledge.

Whorf, B. L. 1956. *Language, thought, and reality: Selected writings of Benjamin Lee Whorf.* Edited by J. B. Carroll. Technology Press of MIT.

Wittgenstein, L. 1922. *Tractatus logico-philosophicus.* Originally published in 1921 in *Annalen der Naturphilosophie.* London: Routledge & Kegan Paul.

Wong, F. 2023. "Taxing homeowners who won't borrow." *Available at SSRN 4584189.*

Zinman, Jonathan. 2015. "Household debt: Facts, puzzles, theories, and policies." *Annual review of Economics* 7 (1): 251–276.

7 Tables

Table 1: European Ancestry and Debt in the United States

	Share of people with any debt in collections							
	Germanic ancestry		British ancestry		French ancestry		Italian ancestry	
	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)
Share of people with	-0.59***	-0.32***	-0.47***	0.09	-0.45***	-0.07	-1.45***	0.02
	(0.07)	(0.04)	(0.11)	(0.07)	(0.12)	(0.06)	(0.47)	(0.17)
Log of income		-0.17***		-0.17***		-0.18***		-0.17***
		(0.01)		(0.01)		(0.01)		(0.01)
Share of White people in county		-0.16***		-0.20***		-0.19***		-0.19***
		(0.02)		(0.02)		(0.01)		(0.01)
Mean Dep. Var.	0.28							
State FE	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Observations	3051	3051	3051	3051	3051	3051	3051	3051
Adjusted R^2	0.68	0.82	0.63	0.81	0.62	0.81	0.63	0.81

Note: OLS regression of "share of people in county with a credit bureau record who have any debt in collections" on "share of people with Germanic, English, French or Italian ancestry in county" (= sum of ACS's estimates for people who report Germanic, British, French or Italian ancestry, respectively, divided by the population of the county). Germanic ancestry includes German, Swedish, Dutch, Austrian, Icelander, Swiss, Norwegian, Danish, Belgian, and Luxembourger ancestry; British includes English, Scottish, Scottish-Irish, Welsh, British, British West Indian, and Irish ancestry; French includes French and French-Canadian. The county-level ancestry data were obtained from the American Community Survey's (ACS) 5-Year estimates available on the United States Census Bureau. County-level data for debt were obtained from the Urban Institute. All the data collected pertains to 2022. All columns include state fixed effects. Standard errors (in parentheses) have been clustered at the state level. *** p<0.01, ** p<0.05, * p<0.1

Table 2: Effects of Guilt-Connoted Wording on Household Debt Attitudes and Borrowing

Panel A:	Survey 1: DE/NL/SW	Survey 2: Germany		
	Consumption	General	Consumption	Real Estate
	(1)	(2)	(3)	(4)
Treated	-0.07***	-0.12***	-0.06**	-0.02
	(0.01)	(0.02)	(0.02)	(0.02)
Constant	0.39***	0.61***	0.51***	0.76***
	(0.01)	(0.02)	(0.02)	(0.01)
% of CG mean	17.9%	19.7%	11.8%	–
Observations	4,630	1,668	1,668	1,668

Panel B:	Survey 3: Switzerland		
	Debt Dummy	Debt Game	Debt Game (Int)
	(5)	(6)	(7)
Treated	-0.09***	-10.29***	-7.20***
	(0.02)	(1.59)	(1.71)
Constant	0.56***	45.30***	80.85***
	(0.01)	(1.15)	(1.10)
% of CG mean	16.1%	22.7%	8.9%
Observations	3,388	3,388	1,754

Note: OLS regression of "attitude toward household debt" (Surveys 1 and 2) and "incentivized borrowing decision" (Survey 3) on treatment dummy (= 1 if wording is guilt-connoted) and country fixed effects (Survey 1), without controls. Survey 1 (Germany/Netherlands/Sweden): Willingness to incur debt for private consumption (mobile phone or car). Answer options: Yes/No. Wording: German: "verschulden" (treatment group) vs. "Geld leihen" (control group). Dutch: "schulden aangaan" (treatment group) vs. "geld lenen" (control group). Swedish: "skuldsatta sig" (treatment group) vs. "ta ett lån" (control group). Survey 2 (Germany): General willingness to incur debt (General), willingness to incur debt for private consumption (Consumption), and willingness to incur debt for real estate (Real Estate). Answer options: Yes/No. Wording: "Schulden aufnehmen" (treatment group) vs. "Kredite aufnehmen" (control group). Survey 3 (Switzerland): Column 5 (Debt Dummy): Dummy for whether debt was incurred in the debt game. Column 6 (Debt Game): Amount of debt incurred in the debt game. Column 7 (Debt Game (Intensive Margin)): Amount of debt incurred in the debt game, conditional on being greater than zero. Wording: "Schulden aufnehmen" (treatment group) vs. "Kredite aufnehmen" (control group). Robust standard errors in parentheses. *** p<0.01, ** p<0.05, * p<0.1

Table 3: Effects of Guilt-Connoted Wording on Public Debt Attitudes Across Countries

Panel A:	Survey 2 (Germany)		
	General	Social Transfers	Public Infrastructure
	(1)	(2)	(3)
Treated	-0.05***	0.00	0.01
	(0.02)	(0.02)	(0.02)
Constant	0.44***	0.53***	0.62***
	(0.02)	(0.02)	(0.02)
% of CG mean	11.4%	–	–
Observations	1,668	1,668	1,668
Panel B:	Survey 3 (Switzerland)		
	General	EU Referendum	National Referendum
	(4)	(5)	(6)
Treated	-0.15***	-0.16***	-0.31***
	(0.02)	(0.04)	(0.04)
Constant	0.38***	2.09***	2.57***
	(0.01)	(0.03)	(0.03)
% of CG mean	39.5%	7.7%	12.1%
Observations	3,388	3,388	3,388

Note: OLS regression of "attitude toward public debt" on treatment dummy (= 1 if wording is guilt-connoted), without controls. Survey 2 (Germany): New government debt in general (In favor/Against), new government debt to finance social transfers such as pensions or unemployment benefits (Yes/No), and new government debt to finance public infrastructure such as schools or roads (Yes/No). Wording: "Schulden aufnehmen" (treatment group) vs. "Kredite aufnehmen" (control group). Survey 3 (Switzerland): New government debt in general (In favor/Against), voting decision in a referendum on joining the European Union if EU member states were to take on joint debt (EU bonds) in the future to finance joint expenditure (1 - definitely against, 2 - probably against, 3 - would not participate, 4 - probably in favor, 5 - definitely in favor), voting decision in a referendum on the Fiscal Budget Act ("Finanzhaushaltsgesetz") that would allow the Swiss government to take on more government debt (1 - definitely against, 2 - probably against, 3 - would not participate, 4 - probably in favor, 5 - definitely in favor). Wording: "Schulden aufnehmen" (treatment group) vs. "Kredite aufnehmen" (control group). Robust standard errors in parentheses. *** p<0.01, ** p<0.05, * p<0.1

Table 4: Effects of Guilt-Connoted Wording on Firms' Debt Management Strategies

	Survey 4 (Germany)	
	Expand debt financing (2025 vs. 2024)	Unimportant to repay debt as quickly as possible
	(1)	(2)
Treated	-0.116***	-0.234***
	(0.023)	(0.032)
Constant	2.874***	2.543***
	(0.016)	(0.023)
% of CG mean	4.0%	9.2%
Observations	4,598	4,673

Note: OLS regression of "plans and strategies regarding debt financing" on treatment dummy (= 1 if wording is guilt-connoted), without controls. Survey 4 (Germany). Column 1: Expand or reduce debt financing in the current year (2025 compared to 2024). Answer scale: 1 - Strongly reduce, 2 - Reduce, 3 - Keep constant, 4 - Expand, 5 - Strongly Expand. Wording: "Schuldenfinanzierung" (treatment group) vs. "Kreditfinanzierung" (control group). Column 2: How important is it to repay debt as quickly as possible? Answer scale: 1 - Very important, 2 - Rather important, 3 - Neutral, 4 - Rather unimportant, 5 - Completely unimportant. Wording: "Schulden tilgen" (treatment group) vs. "Kredite tilgen" (control group). Robust standard errors in parentheses. *** p<0.01, ** p<0.05, * p<0.1

Table 5: Guilt-Connoted Language Usage Patterns in Parliamentary Speeches by Stance Toward Public Debt

			Guilt Slant: Intensity		Guilt Slant: Relative Frequency	
Party	# Speeches	Share in Favor	In Favor	Against	In Favor	Against
Overall	3427	17%	21.4	33.3	0.72	0.88
By party						
The Left	229	59%	12.5	40.6	0.74	0.92
The Greens	385	25%	18.6	32.7	0.62	0.88
SPD	815	16%	20.4	32.3	0.68	0.87
CDU/CSU	1386	12%	29.8	30.7	0.74	0.86
FDP	481	9%	26.8	34.8	0.86	0.92
AfD	89	8%	30.8	67.3	1.00	0.92

Note: This table presents metrics on guilt-connoted language usage in parliamentary speeches about public debt. *Intensity* measures how frequently guilt-connoted words appear in a speech, scaled per 10,000 words. *Relative frequency* measures the proportion of guilt-connoted words among all debt-related words in the speech. Speeches against public debt contain significantly more guilt-connoted language both relative to the speech length and relative to alternative neutral terms. Counts by party do not sum to the total number of speeches due to the exclusion of smaller parties and non-affiliated members of parliament.

Table 6: Regression Analysis of Guilt-Connoted Language in Parliamentary Speeches

	Guilt slant: Intensity					
	(1)	(2)	(3)	(4)	(5)	(6)
Constant	21.4***					
	(1.72)					
Against Public Debt	11.9***	6.91***	5.25**	10.6***	16.1***	4.55*
	(1.95)	(2.30)	(2.08)	(3.36)	(4.37)	(2.71)
Recession				3.60		
				(3.72)		
Against Public Debt × Recession				-6.51*		
				(3.90)		
Governing Coalition					2.05	
					(5.36)	
Against Public Debt × Governing Coalition					-14.7***	
					(4.75)	
Politician Experience						-0.043
						(0.048)
Against Public Debt × Politician Experience						0.069*
						(0.041)
Politician FE	No	Yes	Yes	Yes	Yes	Yes
Electoral term FE	No	No	Yes	No	No	No
Mean Dep. Var.	31.3	31.7	31.7	31.7	31.7	31.7
Number of politicians	739	159	159	159	159	159
Observations	3,427	1,961	1,961	1,961	1,961	1,961
Adjusted R^2	0.01	0.09	0.11	0.09	0.10	0.09

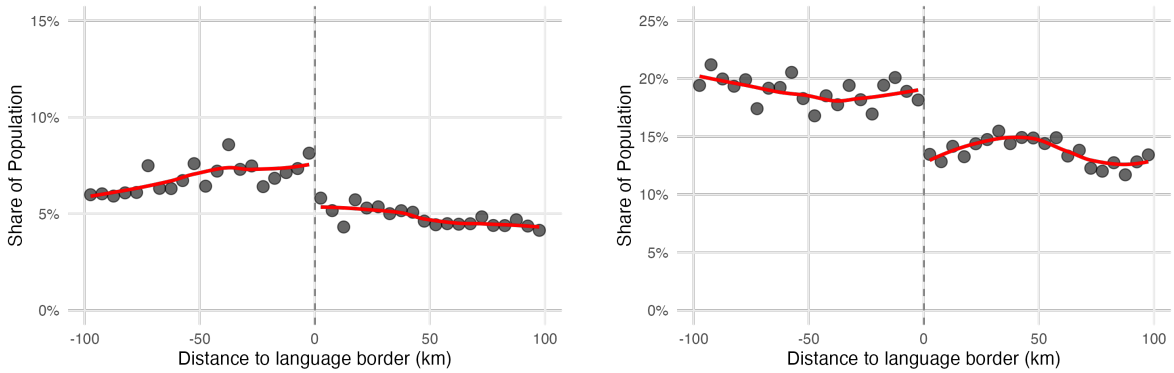
Note: This table presents OLS regression results examining the relationship between a politician's stance on public debt and their use of guilt-connoted language. The dependent variable is the intensity of guilt-connoted terminology used in parliamentary speeches. *Intensity* measures how frequently guilt-connoted words appear in a speech, scaled per 10,000 words. "Against Public Debt" is a dummy variable equal to 1 for speeches opposing public debt. "Recession" is a dummy variable equal to 1 for speeches delivered during electoral terms overlapping with a recession, based on recession dates identified by the German Council of Economic Experts. "Governing Coalition" is a dummy variable equal to 1 for speeches given when the speaker was in a governing coalition. "Politician Experience" is measured as the sequence number of the speech within a politician's full set of speeches concerning public debt. Standard errors in parentheses are robust. Significance levels: $^{***}p < 0.01$, $^{**}p < 0.05$, $^{*}p < 0.1$. Columns (2) through (6) restrict the sample to politicians who switched their stance across speeches (i.e., gave at least one speech in favor of public debt and at least one speech against it) and include politician fixed effects, which account for time-invariant characteristics of individual politicians. Column (3) includes term fixed effects.

8 Figures

Figure 1: Debt-related Outcomes by Distance to the Language Border

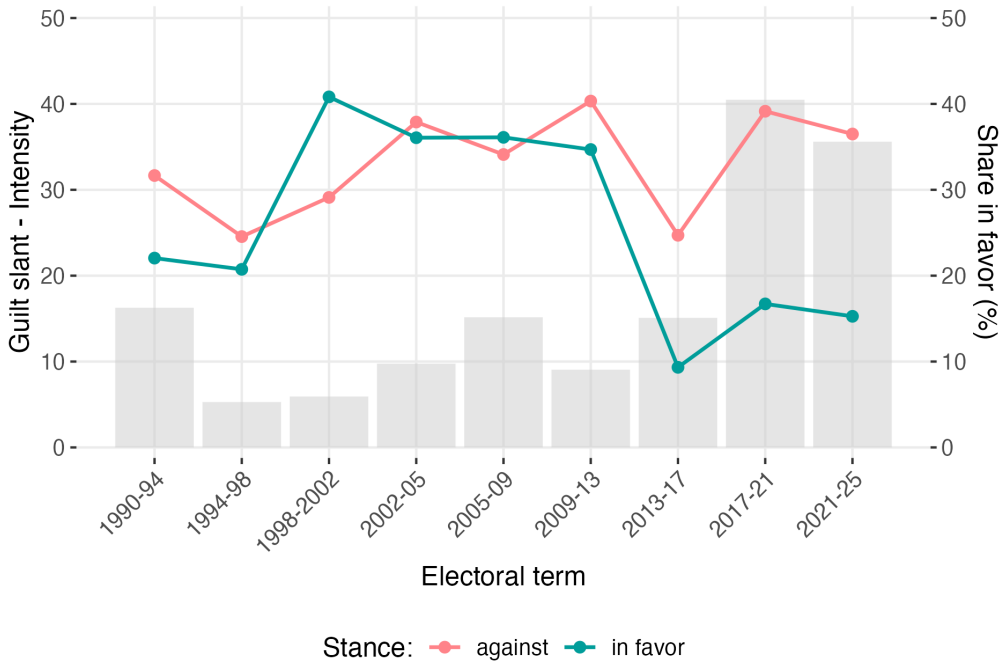
(a) Defaulting Debtor Rate

(b) Voting Against Debt Brake



Note: Dots show the share of defaulting debtors in panel (a) and share of "No" votes to the introduction of the debt brake in panel (b) for bins of municipalities. Municipalities are collected in bins by their distance to the language border, in 5 km intervals. Positive distances correspond to the majority German-speaking communities, negative distances correspond to the majority French, Italian, or Romansh-speaking communities. The vertical line indicates the language border, as detailed in the text. Also shown is a LOWESS fit to the bin-level shares, a locally weighted regression using 80% of the data to smooth each point. *Sources.* Own calculations based on data from CRIF AG and the Federal Statistical Office.

Figure 2: Evolution of Pro-Debt Parliamentary Speeches



Note: The green line (left y-axis) shows the intensity of using guilt-connoted terms in speeches supporting public debt, while the red line (left y-axis) shows the same measure for speeches opposing public debt. *Intensity* measures how frequently guilt-connoted words appear in a speech, scaled per 10,000 words. The gray bars (right y-axis) represent the percentage of speeches in favor of public debt among all debt-related speeches in each electoral term.

SPEAKING OF DEBT: FRAMING, GUILT, AND ECONOMIC CHOICES

Supplemental Appendices (for online publication only)

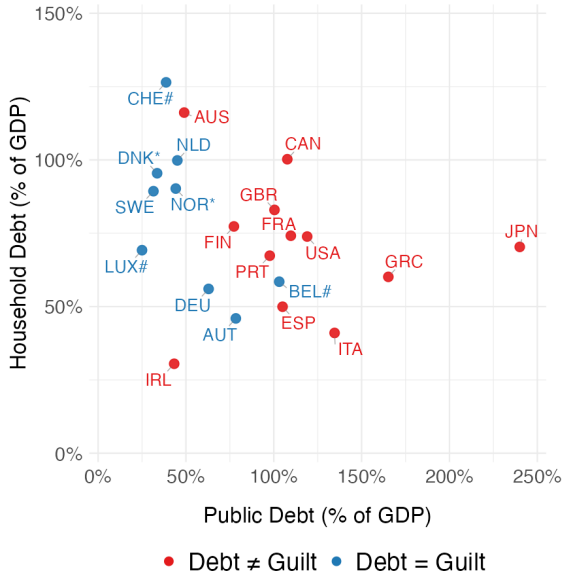
Cevat Giray Aksoy, Mathias Dolls, Justyna Klejdysz,
Andreas Peichl, Lisa Windsteiger

Appendix A. Descriptive evidence

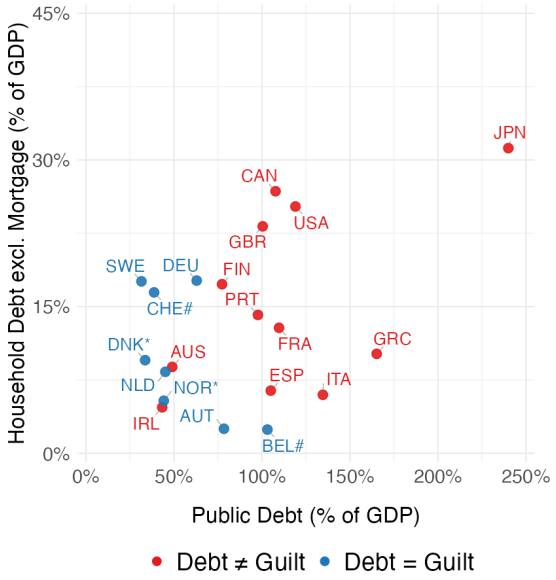
A.1 Macro evidence

Figure A.1: Debt-to-GDP Ratios in Selected OECD Countries (EU-15, G-7, Australia, Norway and Switzerland)

(a) Public Debt and Household Debt



(b) Public and Household Debt excl. Mortgage



Note: Public debt: General government gross debt as a share of GDP in 2023 (IMF). Household debt: All liabilities of households (including non-profit institutions serving households) that require payments of interest or principal by households to the creditors at fixed dates in the future, as a share of GDP in 2023 (OECD). Household debt excl. mortgage: Household debt excluding mortgage loans, as a share of GDP in 2023 (OECD). Blue dots (Debt=Guilt) denote countries with national languages in which the word for debt can also mean guilt, blame, or fault. # Belgium, Luxembourg, and Switzerland are multilingual; the guilt-connotation exists only in German and Flemish, but not in the other languages spoken in these countries (French (BEL/CHE/LUX), Italian, and Romansh (CHE)). *In Denmark and Norway, the guilt-connoted word for debt is rather uncommon. *Sources.* IMF Global Debt Database, 2024 and OECD Analytical Database. The most recent data on household and mortgage debt for Germany in the OECD database dates back to 2012. Data on mortgage debt for Luxembourg are unavailable in the OECD database.

A.2 Swiss language border

The Swiss language border sharply separates the regions with predominantly German-speaking and Romance language-speaking populations. Empirical evidence shows that there are important differences in attitudes, behaviors and norms at the border (Eugster et al. 2011, 2017; Eugster and Parchet 2019). Using this context, we examine attitudes toward debt and debt behavior, noting that Romance languages lack a guilt association with debt, unlike German.

A.2.1 Institutional setting

Switzerland has four official languages: Swiss German in the northeast, French in the west, Italian in the southeast, and Romansh in some eastern areas. According to the

2014 census, 63.4% of Swiss permanent resident population aged 15 and older speak German as their main language, 21.0% speak French, 5.9% speak Italian, 0.5% speak Romansh, and 9.1% speak other languages.[39]

Figure A.2 shows a map of Switzerland shaded by the percentage of the population speaking German. Black lines indicate the 26 cantonal borders. Notably, parts of the language divide do not align with geographical features or cantonal boundaries. The French-German language border runs north-south, while the Alps stretch east-west.

In multilingual cantons, people on different sides of the language border share the same regional policies and institutions but belong to different language groups. Of the 26 cantons, 17 are predominantly German-speaking, four are predominantly French-speaking, one is predominantly Italian-speaking, three are bilingual (Berne, Valais, Fribourg), and one – Graubünden – is trilingual (German, Romansh, and Italian).

A.2.2 Data and Variables

Our primary outcome variables relate to private and public debt. For private debt, we use the 2022 defaulting debtor rate at the municipal level. To the best of our knowledge, this is the only variable on private debt available on the municipal level. For public debt, we use voting results from the national referendum on the debt brake in 2001. We investigate discontinuities in these variables at the language border between the German-speaking and Romance language-speaking regions, where the share of the population with German as the main language shifts significantly.

Share of population with German as main language represents the proportion of permanent resident population aged 15 and older who declared German as their main language in 2014 - see Figure A.2. Data are provided by the Federal Statistical Office (BfS).

The defaulting debtor rate in 2022 is defined as the proportion of the total population registered with debts, specifically in the form of debt collections (following a continuation request), wage garnishments, collection certificates, or bankruptcies - see Figure A.4. This measure includes only individuals aged 18 and above and excludes mortgages from the calculation. Municipal-level data, available only for 2022, is provided by CRIF AG.[40]

National referendum on the debt brake in 2001. In the national referendum held on December 2, 2001, Switzerland voted on the introduction of a "debt brake" by amending Articles 126 and 159 of the Federal Constitution. This mechanism mandates balancing the federal budget over the economic cycle, allowing for deficits during economic downturns that must be offset by surpluses during periods of growth. 84.7% of voters approved the amendment. Figure A.5 shows the share of votes against the amendment in Swiss municipalities. Data on the results of popular initiatives are provided by the BfS.

Distance to the language border. We follow Eugster et al. (2011) to define the distance to the language border in four steps. First, we allocate every municipality to a language region based on the relative majority of its population speaking

[39] Data from the Federal Statistical Office (BfS), Historical Atlas of the Federal Population Census. Available at: https://www.atlas.bfs.admin.ch/maps/193/de/14776_14772_14771/23416.html. Accessed May 9, 2025.

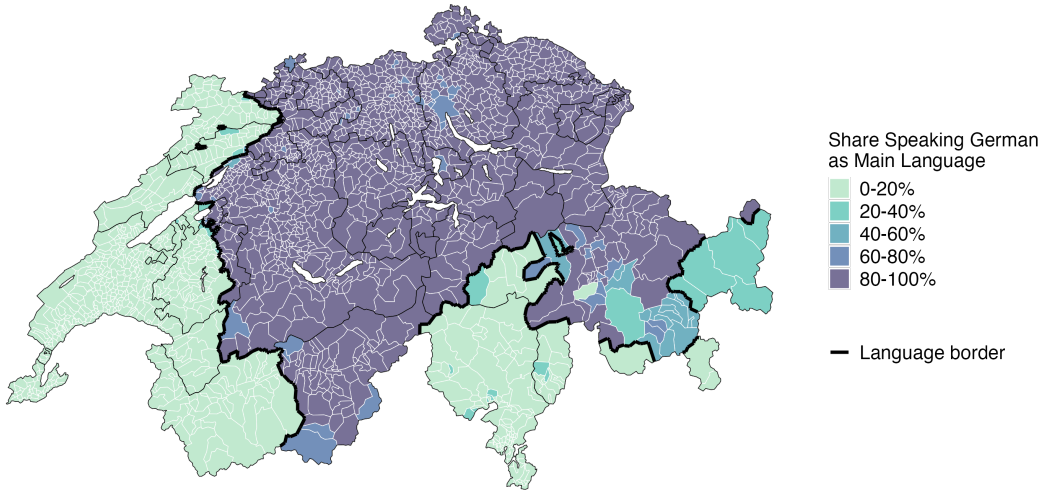
[40] For other years, data are available only at the canton level. The canton-level correlations between the 2022 defaulting debtor rate and those for 2019, 2020, 2021, 2023, and 2024 exceed 0.99, indicating that the values are persistent and not materially affected by the COVID-19 pandemic.

one of the national languages (German, French, Italian, or Romansh) as their main language as of 2020. Each municipality belongs either to the German-speaking or the Romance language-speaking region. Second, we determine the distance of a municipality to the language border as the shortest road distance between this municipality and the nearest municipality in the other language region, measured in kilometers (using the OpenStreetMap API). Third, we define border municipalities as those German-speaking municipalities that are the nearest neighbor to at least one Romance-speaking municipality. Fourth, the distance of the municipality to the language border is defined as the road distance to the closest language border municipality, in kilometers, setting the distance as negative for Romance language-speaking municipalities and positive for German-speaking municipalities.

We compute the distance matrix based on the municipal structure as of January 1, 2022, and all variables are standardized to that date. Switzerland's municipal landscape changes frequently, primarily due to the mergers of existing municipalities. For variables collected in earlier years (such as the share of the population with German as the main language and voting results), we use the historical municipality directory published by BfS and the Swiss Municipal Data Merger Tool to map municipal boundaries over time (Knechtl and Stutzer 2021). When municipalities are merged, values for these variables in earlier years are averaged.

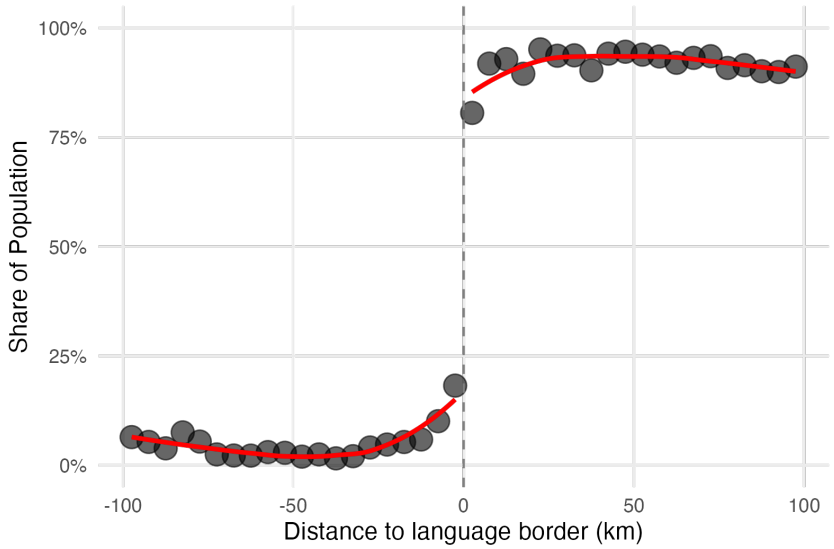
Figure A.3 shows the percentage of German speakers by distance to the language border, confirming a sharp shift in the share of German speakers at the border. Figure 1 (in the main part) presents debt-related outcomes by distance to the language border.

Figure A.2: Share of Population Speaking German as the Main Language



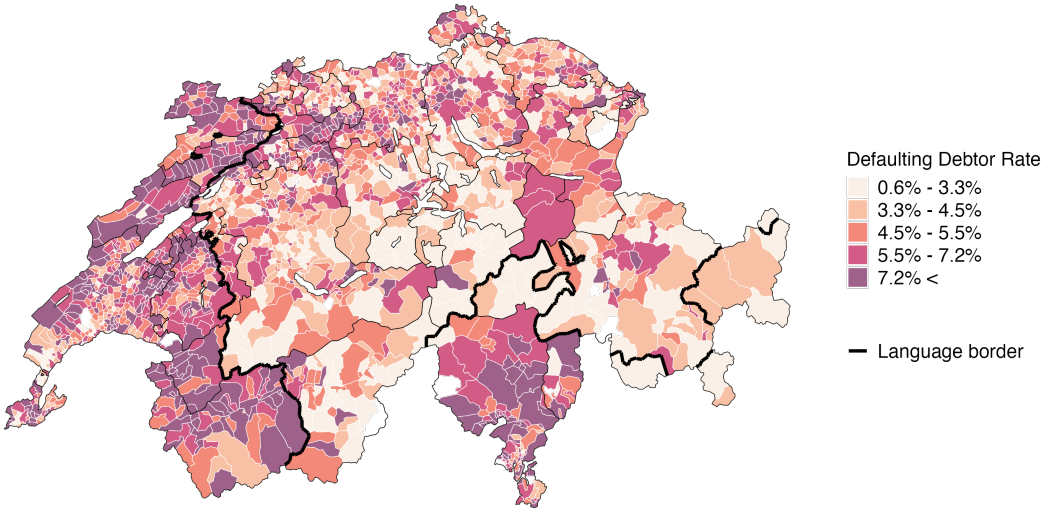
Note: The map shows the proportion of the permanent resident population aged 15 and older who reported German as their primary language in 2014, by municipality. The language border in Switzerland separates regions where the majority of the population speaks German from those where the majority speaks a Romance language (French, Italian or Romansh). *Sources.* Federal Statistical Office (BfS). Geographical data on municipalities and language regions from 2022.

Figure A.3: Share of Population Speaking German as the Main Language by Distance to the Language Border



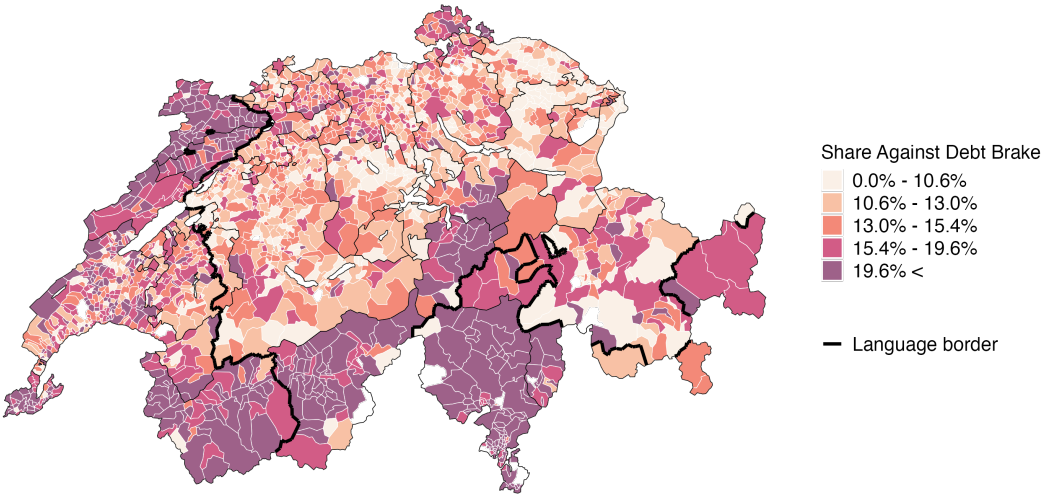
Note: Dots show the share of German speakers in the Swiss population at or above age 18 (eligible voters) speaking a Swiss official language (German, French, Italian or Romansh) for bins of municipalities. Municipalities are collected in bins by their distance to the language border, in 5 km intervals. Positive distances correspond to the majority German-speaking communities, negative distances correspond to the majority French, Italian, or Romansh-speaking communities. The vertical line indicates the language border, as detailed in the text. Also shown is a LOWESS fit to the bin-level shares, a locally weighted regression using 80% of the data to smooth each point. *Sources.* Own calculations based on data from the Federal Statistical Office.

Figure A.4: Defaulting Debtor Rate



Note: The map shows the share of the total population registered with debts, specifically in the form of debt collections (following a continuation request), wage garnishments, collection certificates, or bankruptcies, in 2022. This measure includes only individuals aged 18 and above and excludes mortgages from the calculation. The language border in Switzerland separates regions where the majority of the population speaks German from those where the majority speaks a Romance language (French, Italian, or Romansh). *Sources.* Own calculations based on data from CRIF AG and the Federal Statistical Office.

Figure A.5: Voting Against Debt Brake



Note: The map shows the share of the population voting against in the National referendum about the introduction of the debt brake held on December 2, 2001. The language border in Switzerland separates regions where the majority of the population speaks German from those where the majority speaks a Romance language (French, Italian, or Romansh). *Sources.* Own calculations based on data from the Federal Statistical Office.

A.2.3 Estimation and Results

We estimate the following regression:

$$Y_i = \alpha + \delta G_i + \beta_1 D_i + \beta_2 G_i D_i + \boldsymbol{\lambda}' \mathbf{X}_i + \varepsilon_i \tag{A.1}$$

where G is the German dummy variable (= 1 if the majority of the community population speaks German and 0 otherwise). The key parameter in this regression is δ, which estimates the border contrast in Y. The parameter β_1 measures the spatial trend in outcome variables in Swiss Romance language territory, while the parameter β_2 allows for a completely different spatial trend in Swiss German territory. The data vector $\mathbf{X}_i$ contains background information on the municipalities and a full set of canton dummies. Canton dummies ensure that the parameter δ is identified by contrasting German and Romance language border municipalities within the same canton. Background characteristics include age structure, the share of females, the population size of the municipality, the share of Catholics, the share of foreigners, the share of employees working in services, and average taxable income per taxpayer. All variables were standardized to the municipal structure as of January 1, 2022. Table A.1 reports the results showing that German-speaking municipalities near the border have a 1.4 percentage point (23.7%) lower default rate and a 5.1 percentage point (32%) lower opposition to the debt brake compared to Romance-speaking areas.

Table A.1: Language, Debt Behavior and Voting against Debt Brake

	Defaulting Debtor Rate			Share Voting Against Debt Brake		
	Full sample	±50km	±25km	Full sample	±50km	±25km
	(1)	(2)	(3)	(4)	(5)	(6)
Majority German	−2.08***	−1.41***	−1.89**	−3.95***	−5.06***	−5.72***
	(0.33)	(0.43)	(0.75)	(0.71)	(0.93)	(1.37)
Distance	0.02***	−0.004	0.03	0.01	0.04	0.05
	(0.01)	(0.01)	(0.04)	(0.01)	(0.02)	(0.07)
Distance × Majority German	−0.03***	0.003	−0.06	−0.03**	−0.02	−0.07
	(0.01)	(0.01)	(0.04)	(0.01)	(0.03)	(0.08)
Constant	13.51***	11.36*	0.41	22.14***	27.68***	17.65**
	(3.84)	(6.18)	(6.41)	(3.98)	(5.86)	(7.83)
Control variables	Yes	Yes	Yes	Yes	Yes	Yes
Mean Dep. Var.	5.48	5.93	5.96	15.39	15.93	15.80
Observations	2,112	939	431	2,104	935	430
Adjusted R^2	0.37	0.33	0.36	0.42	0.36	0.42

Note: Majority German (equal to 1 if the majority of the community population speaks German, 0 otherwise). Dependent variable in columns (1)-(3): Defaulting debtor rate (in pp.). Dependent variable in columns (4)-(6): Share of "No" votes to the introduction of debt brake (in pp.). Columns (1) and (4) use the full sample of municipalities. Columns (1) and (4) use the full sample of municipalities for which data is available. Columns (2) and (5) restrict the sample to municipalities located within 50 km of the language border, and columns (3) and (6) further limit the sample to municipalities within 25 km of the language border. Control variables on the municipality level are canton dummies, age structure, the share of females, population size of the municipality, the share of Catholics, the share of foreigners, and the share of employees working in services. Control variables in columns (1)-(3) additionally include average taxable income per taxpayer (which is not available before 2017). All variables were standardized to the municipal structure as of January 1, 2022. In columns (1)-(3), 36 municipalities drop out because of missing data on the defaulting debtor rate. In columns (4)-(6), 44 municipalities drop out due to missing data and harmonization. Robust standard errors in parentheses. *p<0.10, **p<0.05, ***p<0.01.
Sources. Own calculations based on data from CRIF AG and the Federal Statistical Office.

A.3 Germanic ancestry and debt in the United States

We collected information on people with Germanic ancestry in the US and related this in two ways to private debt.

County-level analysis. Similar to the defaulting debtor ratio of Swiss municipalities, we used data on the share of people in a county who have any debt in collections from the Urban Institute.[41] From the American Community Survey's (ACS), we compute the share of people with Germanic ancestry (German, Austrian, Dutch, Swedish, Icelandic, Swiss, Norwegian, Danish, Luxembourg or Belgian) by dividing the sum of ACS's estimates for

[41] These data are based on a 4 percent nationally representative panel of de-identified, consumer-level records from a major credit bureau. Source: https://datacatalog.urban.org/.

people who report a single ancestry from this group by the county's total population.[42] All the data collected is for the year 2022.

Figure A.6 shows the spatial distribution of the share of people with German(ic) ancestry across US counties. Figure A.7 shows the distribution of the share of people with any debt in collections across counties. We correlate both variables in Figure A.8, finding a strong negative correlation.

Data on Credit Access. Hendren et al. (2025) combine credit bureau records with Census and tax data in the US to study credit access. We use their data on the county-level on the a VantageScore 4.0 credit score, which uses credit file information to measure individuals' creditworthiness on a scale of 300 to 850, and the 90+ day delinquency rate. We replicate the analysis from Table 1 for these two outcomes in Tables A.2 and A.3. The results confirm our previous findings: Germanic ancestry is positively correlated with the credit score variable and negatively with the delinquency rates. We do not find such a systematic correlation for the other European ancestry as soon as we control for income and race.

Table A.2: Credit Score and European Ancestry in the US

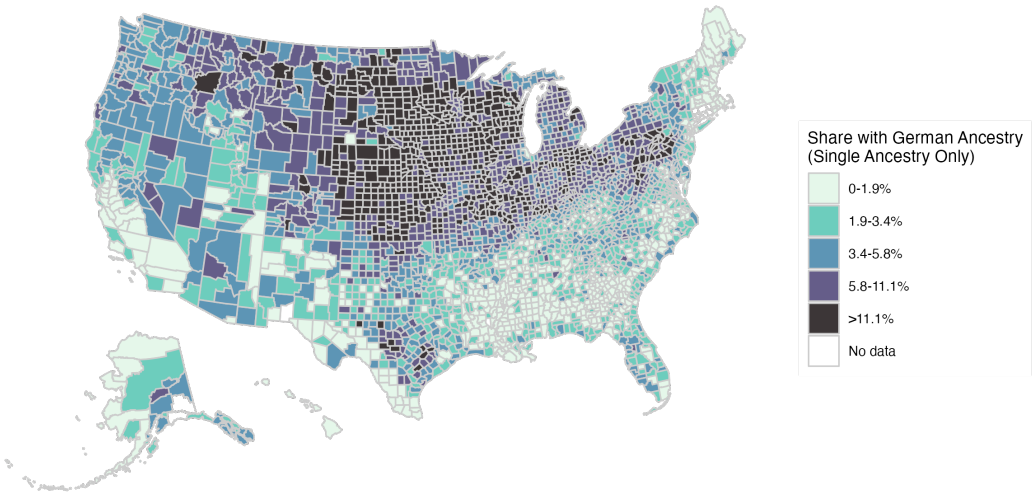
	Average Vantage 4.0 Credit Score							
	Germanic ancestry		British ancestry		French ancestry		Italian ancestry	
	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)
Share of people with	181.25***	124.17***	78.33***	-69.85**	136.13***	42.55	344.25***	12.47
	(15.38)	(10.12)	(25.77)	(26.58)	(26.96)	(35.05)	(80.97)	(49.17)
Log of income		37.82***		39.08***		39.35***		39.25***
		(1.96)		(2.16)		(2.16)		(2.06)
Share of white people in county		33.74***		55.87***		46.99***		47.33***
		(5.65)		(8.54)		(6.52)		(6.60)
Mean Dep. Var.	677.54							
State FE	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Observations	3125	3124	3125	3124	3125	3124	3125	3124
Adjusted R^2	0.77	0.86	0.70	0.84	0.70	0.83	0.71	0.83

Note: OLS regression of "Average Vantage 4.0 Score" from Hendren et al. (2025) on "share of people with Germanic, English, French or Italian ancestry in county" (= sum of ACS's estimates for people who report Germanic, British, French or Italian ancestry, respectively, divided by the population of the county). Germanic ancestry includes German, Swedish, Dutch, Austrian, Icelander, Swiss, Norwegian, Danish, Belgian, and Luxembourger ancestry; British includes English, Scottish, Scottish-Irish, Welsh, British, British West Indian, and Irish ancestry; French includes French and French-Canadian. The county-level ancestry data were obtained from the American Community Survey's (ACS) 5-Year estimates available on the United States Census Bureau. County-level data for debt was obtained from *Opportunity Insights*. Ancestry, income, and race data pertain to 2022, dependent variable to 2020. All columns include state fixed effects. Standard errors (in parentheses) have been clustered at the state level. *** p<0.01, ** p<0.05, * p<0.1

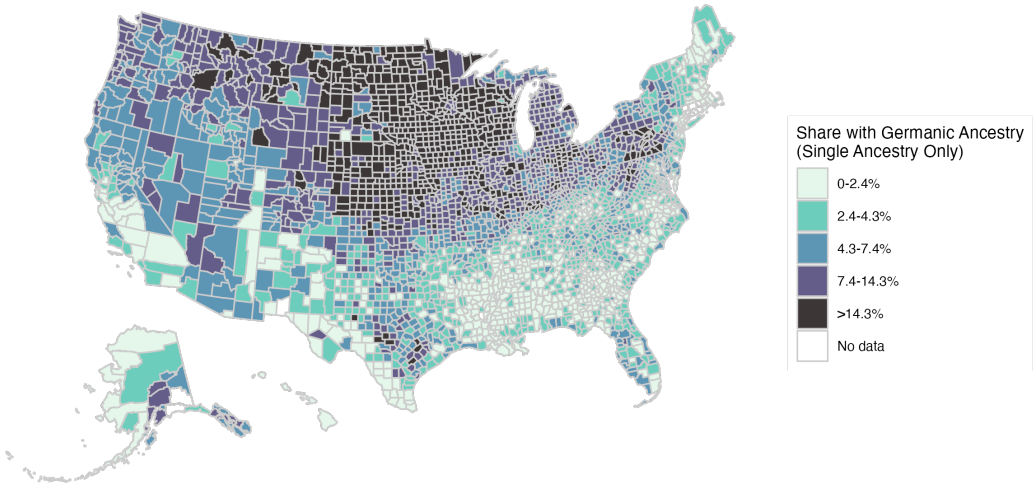
[42] The ACS question is "What is your ancestry or ethnic origin?". We focus on population reporting only one ancestry. According to the 2022 ACS 5-year estimates, 5% of the U.S. population reports Germanic, 6.7% reports British, 0.64% reports French, and 1.7% reports Italian as their sole ancestry.

Figure A.6: Share of Population with German(ic) Ancestry

(a) German Heritage

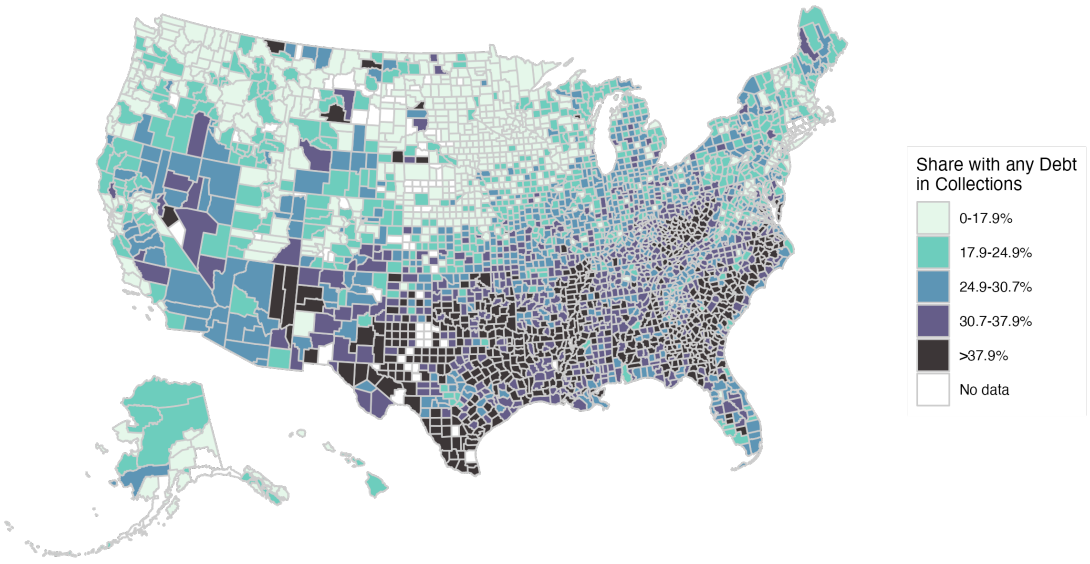


(b) Germanic Ancestry



Note: The share of people with German ancestry in each county was calculated by summing the ACS's estimates for people who report their ancestry as German, divided by the total population of the county. The share of people with broad Germanic ancestry in each county was calculated for people who report their ancestry as German, Austrian, Dutch, Swedish, Icelander, Swiss, Norwegian, Danish, Luxembourger, or Belgian. *Sources.* Own calculations based on data from the American Community Survey's (ACS) 5-Year estimates available on the United States Census Bureau.

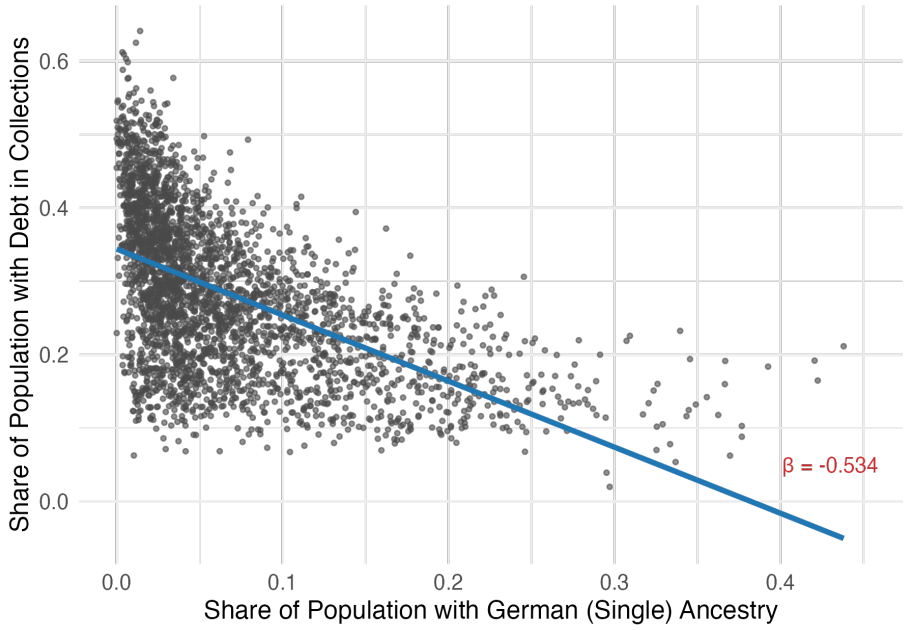
Figure A.7: Share of Population with any Debt in Collections



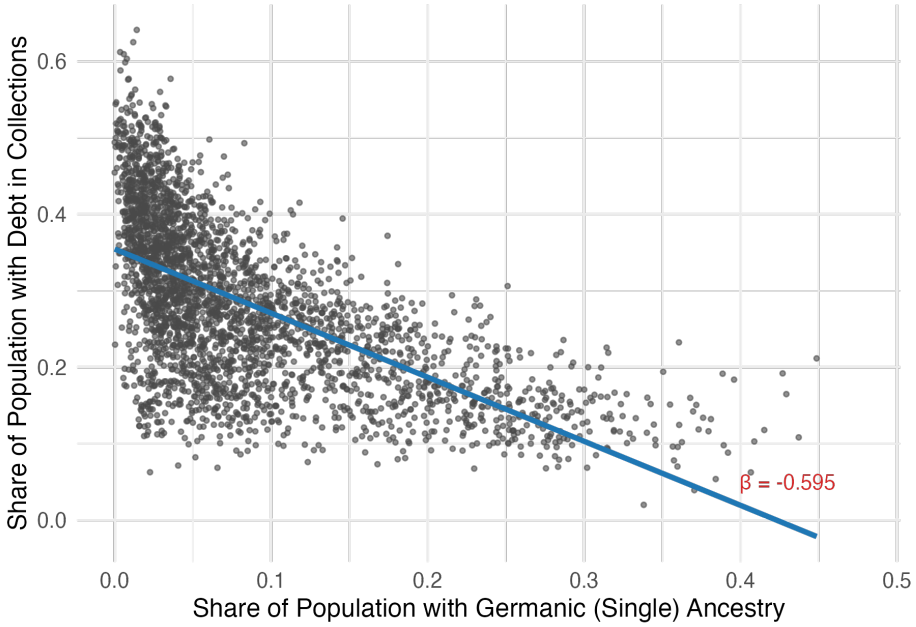
Note: Source: Own calculations based on data from the Urban Institute.

Figure A.8: Share of Population with any Debt in Collections vs. Share of People with German Ancestry in the U.S., 2022

(a) German Ancestry



(b) Germanic Ancestry



Note: The share of people with German ancestry in each county was calculated by summing the ACS's estimates for people who report their ancestry as German, divided by the total population of the county. The share of people with Germanic ancestry in each county was calculated for people who report their ancestry as German, Austrian, Dutch, Swedish, Icelander, Swiss, Norwegian, Danish, Luxembourger, or Belgian. The regression of the share of the population with debt in collections on the share of the population with German(ic) ancestry controls for state fixed effects. *Sources.* Own calculations based on data from the Urban Institute and the American Community Survey's (ACS) 5-Year estimates.

Table A.3: Debt Delinquency and European Ancestry in the US

	Fraction of individuals with a 90+ day delinquency between 2016 and 2020							
	Germanic ancestry		British ancestry		French ancestry		Italian ancestry	
	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)
Share of people with	-0.67***	-0.44***	-0.34***	0.25**	-0.55***	-0.18*	-1.04***	0.15
	(0.05)	(0.04)	(0.10)	(0.10)	(0.09)	(0.09)	(0.30)	(0.18)
Log of income		-0.13***		-0.13***		-0.13***		-0.13***
		(0.01)		(0.01)		(0.01)		(0.01)
Share of white people in county		-0.15***		-0.23***		-0.19***		-0.20***
		(0.02)		(0.03)		(0.02)		(0.02)
Mean Dep. Var.				0.45				
State FE	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Observations	3125	3124	3125	3124	3125	3124	3125	3124
R^2	0.79	0.86	0.73	0.84	0.73	0.84	0.73	0.84

Note: OLS regression of "Fraction of individuals with a 90+ day delinquency" from Hendren et al. (2025) on "share of people with Germanic, English, French or Italian ancestry in county" (= sum of ACS's estimates for people who report Germanic, British, French or Italian ancestry, respectively, divided by the population of the county). Germanic ancestry includes German, Swedish, Dutch, Austrian, Icelander, Swiss, Norwegian, Danish, Belgian, and Luxembourger ancestry; British includes English, Scottish, Scottish-Irish, Welsh, British, British West Indian, and Irish ancestry; French includes French and French-Canadian. The county-level ancestry data were obtained from the American Community Survey's (ACS) 5-Year estimates available on the United States Census Bureau. County-level data for debt was obtained from *Opportunity Insights*. Ancestry, income, and race data pertain to 2022, dependent variable to 2020. All columns include state fixed effects. Standard errors (in parentheses) have been clustered at the state level. *** p<0.01, ** p<0.05, * p<0.1

Appendix B. Survey experiments

Table B.1: Survey waves: Country coverage, questions, and wording

Panel A	Survey 1 (Jul/Aug 2021)	Survey 2 (Jan/Feb 2022)
Germany		
Language: German		
Guilt connotation: Yes		
Household debt:	consumption	general/consumption/real estate
Wording	verschulden/Geld leihen	Schulden/Kredite aufnehmen
Public debt:		general/social transfers/public infrastructure
Wording:		Schulden/Kredite aufnehmen
N	1,549	1,668
Netherlands		
Language: Dutch		
Guilt connotation: Yes		
Household debt	consumption	-
Wording	schulden aangaan/geld lenen	-
N	1,547	-
Sweden		
Language: Swedish		
Guilt connotation: Yes		
Household debt	consumption	-
Wording	skuldsatta sig/ta ett lan	-
N	1,534	-
Australia		
Language: English		
Guilt connotation: No		
Household debt	consumption	-
Wording	to incur debt/to borrow money	-
N	1,015	-
UK		
Language: English		
Guilt connotation: No		
Household debt	consumption	-
Wording	to incur debt/to borrow money	-
N	1,027	-
US		
Language: English		
Guilt connotation: No		
Household debt	consumption	-
Wording	to incur debt/to borrow money	-
N	1,066	-
Panel B	Survey 3 (May/June 2023)	Survey 4 (June 2025)
Germany		
Language: German		
Guilt connotation: Yes		
Business debt:		year-on-year change in debt, how important to repay debt quickly
Wording		Schuldenfinanzierung, Schulden tilgen/Kreditfinanzierung, Kredite tilgen
N		4,708
Switzerland		
Language: German		
Guilt connotation: Yes		
Household debt	incentivized borrowing decision	
Wording	Schulden/Kredite aufnehmen	
Public debt	general/EU/National	
Wording	Schulden/Kredite aufnehmen	
N	3,388	

Note: Our samples in the first and second survey include full-time employees between 20 and 59 years of age. The samples are broadly representative of the group of full-time employees with respect to age, gender, and education according to Gallup World Poll data. Our sample in the third survey includes individuals aged 18–70, irrespective of their labor market status. It is broadly representative with respect to age and gender. The fourth experiment has been conducted in the ifo Business Survey, a representative panel of German corporate and non-corporate firms. The wording used in the treatment group has a negative connotation in German, Dutch, and Swedish, because in those languages it can be understood both as "debt" and as "guilt". The alternative words in the control group are chosen to be neutral, i.e., not synonymous with guilt. In the three English-speaking countries, all expressions have a neutral connotation and are not synonymous with guilt.

B.1 Balance tables

Table B.2: Balance table for Survey 1 (all countries pooled)

Variable	Control (Mean/SD)	Treatment (= guilt wording) (Mean/SD)	p-value
Age (in yrs.)	41.00 (10.86)	40.75 (10.92)	0.322
Gender (1=Female)	0.51 (0.50)	0.52 (0.50)	0.315
Education (0=Primary, 1=Secondary, 2=Tertiary)	1.48 (0.65)	1.50 (0.64)	0.409
Household income (eq.)	3511.33 (2074.49)	3495.98 (2075.76)	0.745
Political orientation (0 (left-wing)–10 (right-wing))	5.35 (2.30)	5.30 (2.31)	0.343
Religion (1=Christian)	0.47 (0.50)	0.48 (0.50)	0.380
Not native speaker	0.11 (0.31)	0.11 (0.31)	0.991

Table B.3: Balance table for Survey 2 (DE)

Variable	Control (Mean/SD)	Treatment (= guilt wording) (Mean/SD)	p-value
Age (in yrs.)	41.73 (10.84)	41.65 (10.91)	0.885
Gender (1=Female)	0.50 (0.50)	0.51 (0.50)	0.770
Education (0=Primary, 1=Secondary, 2=Tertiary)	1.22 (0.42)	1.23 (0.44)	0.723
Household income (eq.)	2809.41 (1102.18)	2883.25 (1153.88)	0.184
Political orientation (0 (left-wing)–10 (right-wing))	4.92 (1.76)	4.84 (1.67)	0.339
Religion (0=Catholic, 1=Protestant, 2=Other)	1.38 (0.79)	1.39 (0.78)	0.829
Not native speaker	0.04 (0.20)	0.04 (0.19)	0.679

Table B.4: Balance table for Survey 3 (CH)

Variable	Control (Mean/SD)	Treatment (= guilt wording) (Mean/SD)	p-value
Age (in yrs.)	42.90 (14.64)	42.15 (14.06)	0.128
Gender (1=Female)	0.50 (0.50)	0.50 (0.50)	1.000
Education (0=Primary, 1=Secondary, 2=Tertiary)	1.36 (0.67)	1.38 (0.65)	0.336
Household income (eq.)	4071.69 (2027.44)	4075.57 (1982.06)	0.955
Political orientation (0 (left-wing)–10 (right-wing))	5.48 (2.07)	5.34 (2.00)	0.035
Religion (0=Catholic, 1=Protestant, 2=Other)	1.20 (0.85)	1.19 (0.85)	0.794
Not native speaker	0.18 (0.38)	0.16 (0.36)	0.128

Table B.5: Balance table for Survey 4 (DE)

Variable	Control (Mean/SD)	Treatment (= guilt wording) (Mean/SD)	p-value
Company size (nr. of employees)	521.69 (5370.84)	334.04 (4407.62)	0.173
Turnover (in M €)	209.71 (3439.68)	391.10 (10101.45)	0.426
Gender (1=Female)	0.16 (0.37)	0.16 (0.37)	0.741
Family firm (1=Yes)	0.74 (0.44)	0.74 (0.44)	0.806
Owner of family firm (1=Yes)	0.50 (0.50)	0.49 (0.50)	0.584
Sector: Manufacturing	0.33 (0.47)	0.33 (0.47)	0.708
Sector: Trade	0.22 (0.41)	0.20 (0.40)	0.134
Sector: Services	0.34 (0.47)	0.36 (0.48)	0.171
Sector: Construction	0.11 (0.31)	0.11 (0.31)	0.663
Q1 answered	0.90 (0.30)	0.90 (0.30)	0.541
Q2 answered	0.91 (0.29)	0.92 (0.27)	0.168

Note: Respondents in the ifo Business Survey can typically skip questions without answering them. The last two rows, *Q1 answered* and *Q2 answered*, show that non-response does not differ significantly between the treatment and the control group.

B.2 Additional results Survey 1

Table B.6: Treatment effects on attitude toward household debt by country (Survey 1)

	DE	NL	SE	US	UK	AU
Treated	-0.06**	-0.08***	-0.06**	0.01	-0.05	-0.00
	(0.02)	(0.02)	(0.03)	(0.03)	(0.03)	(0.03)
Constant	0.38***	0.26***	0.48***	0.55***	0.40***	0.41***
	(0.02)	(0.02)	(0.02)	(0.02)	(0.02)	(0.02)
Effect as % of CG mean	15.8%	30.8%	12.5%	–	–	–
Observations	1,549	1,547	1,534	1,066	1,027	1,015

Note: OLS regression of "household debt" on treatment dummy (= 1 if wording is guilt-connoted [and an alternative neutral word for US, UK and AU]), without controls. Survey 1. Dependent variable: Willingness to incur debt to finance private consumption expenditure (mobile phone or car). German: "verschulden" (treatment group) vs. "Geld leihen" (control group). Dutch: "schulden aangaan" (treatment group) vs. "geld lenen" (control group). Swedish: "skuldsatta sig" (treatment group) vs. "ta ett lan" (control group). English: "to incur debt" (treatment group) vs. "to borrow money" (control group). Robust standard errors in parentheses. *** p<0.01, ** p<0.05, * p<0.1

Table B.7: Differences in stated borrowing behavior between respondents in countries with guilt language (DE, NL, SE) and English-speaking countries (US, UK, AU)

	(1)	(2)
DE, NL or SE	-0.13***	-0.11**
	(0.03)	(0.03)
Teaching children responsibility is important		-0.03***
		(0.00)
Teaching children to save is important		-0.02*
		(0.01)
Trust people		-0.00
		(0.00)
Trust family		-0.03**
		(0.01)
Constant	0.16***	0.33***
	(0.00)	(0.03)
Observations	7,738	7,738

Note: OLS regression of variable indicating whether respondents state that their household "usually spend[s] savings and/or borrow[s] money to get by" on a dummy indicating whether respondents are from Germany, the Netherlands and Sweden [as opposed to from US, UK or Australia, where the dummy equals 0] (regression including controls in column (2), additional controls included but not shown in column (2): age, gender, income, education, single and nr. of children). Robust standard errors in parentheses. *** p<0.01, ** p<0.05, * p<0.1

B.3 Additional results Survey 3

Table B.8: Stated reasons for not borrowing or for borrowing less than 100 CHF in the incentivized experiment

Reasons for not borrowing or borrowing less than 100 CHF	
Reluctant to take on debt	76.0%
Unsure how taking on debt affects compensation	13.0%
Lower compensation when (more) debt is incurred	7.4%
Miscellaneous	3.5%
Observations	2,181

Note: The table shows how frequently the individual response options were chosen among respondents who did not borrow the profit-maximizing amount of 100 CHF. The table summarizes responses to the following two survey questions: *Why didn't you take on any debt?* (shown to respondents who did not borrow in the experiment). *Why did you take on less than 100 CHF in debt?* (shown to respondents who borrowed a positive amount in the experiment, but less than the maximum amount of 100 CHF).

Table B.9: Regression of debt aversion being stated as the main reason for not borrowing or borrowing less than 100 CHF in the incentivized experiment on treatment dummy

Dep. variable: dummy equal to one if debt aversion stated as reason for not borrowing or borrowing less than 100 CHF	
Treated	0.04**
	(0.02)
Constant	0.74***
	(0.01)
Observations	2,181

Note: The table reports regression results where the dependent variable is a dummy equal to one if the respondent selected "Reluctant to take on debt" as the reason for not borrowing or for borrowing less than the profit-maximizing amount of 100 CHF. Standard errors in parentheses. *** p<0.01, ** p<0.05, * p<0.1

Table B.10: Regression of amount borrowed in the incentivized experiment on post-experimental comprehension check dummy

Dep. variable: amount borrowed	
Post-experimental comprehension check passed	32.25***
	(1.50)
Constant	23.05***
	(1.09)
Observations	3,388

Note: The table reports regression results where the dependent variable is the amount borrowed in the incentivized experiment. Independent variable is a dummy equal to one if the respondent passed the following post-experimental comprehension check: *Earlier, you made a decision about whether you wanted to take on debt in order to invest in an investment opportunity. Do you think that taking on debt in the previous decision situation led to higher compensation?* The comprehension check is answered correctly if the answer option *Yes* was chosen. Standard errors in parentheses. *** p<0.01, ** p<0.05, * p<0.1

Table B.11: Regression of passing post-experimental comprehension check in the incentivized experiment on treatment dummy

Dep. variable: dummy equal to one if post-experimental comprehension check passed	
Treated	0.02
	(0.02)
Constant	0.52***
	(0.01)
Observations	3,388

Note: The table reports regression results where the dependent variable is a dummy equal to one if the respondent passed the following post-experimental comprehension check: *Earlier, you made a decision about whether you wanted to take on debt in order to invest in an investment opportunity. Do you think that taking on debt in the previous decision situation led to higher compensation?* The comprehension check is answered correctly if the answer option *Yes* was chosen. Standard errors in parentheses. *** p<0.01, ** p<0.05, * p<0.1

B.4 Regressions including controls

B.4.1 Household debt

Table B.12: Treatment effects on attitude toward household debt (Survey 1), pooled for DE, NL and SE, with controls

	DE/NL/SE
Treated	-0.07***
	(0.01)
Age Group 2	-0.02
	(0.02)
Age Group 3	-0.03
	(0.02)
Age Group 4	-0.07***
	(0.02)
Female	-0.02
	(0.01)
Secondary education	-0.04
	(0.03)
Tertiary education	-0.03
	(0.03)
Household income	-0.00
	(0.00)
Political orientation	0.01**
	(0.00)
Christian	0.01
	(0.01)
Not native speaker	0.15***
	(0.02)
Constant	0.41***
	(0.04)
Observations	4,630

Note: OLS regression of "household debt" on treatment dummy (= 1 if wording is guilt-connoted), with controls and country fixed effects (omitted from table). Survey 1. Dependent variable: Willingness to incur debt to finance private consumption expenditure (mobile phone or car). German: "verschulden" (treatment group) vs. "Geld leihen" (control group). Dutch: "schulden aangaan" (treatment group) vs. "geld lenen" (control group). Swedish: "skuldsatta sig" (treatment group) vs. "ta ett lan" (control group). Controls: Age Group 1 20-29 (Baseline), Group 2 30-39 Group 3 40-49, Group 4 50-59; Female dummy = 1 if gender = female, 0 else; Education: Primary (Baseline), secondary, tertiary; Household income: equivalized household income (ppp adjusted for cross country comparison); Political orientation: Self-positioning on 11 pt Likert Scale from 0 (very left wing) to 10 (very right wing); Christian: dummy = 1 if religion is Christian, 0 else; Not native speaker: dummy = 1 if respondent is not a native speaker of the country (and survey) language. Robust standard errors in parentheses. *** p<0.01, ** p<0.05, * p<0.1

Table B.13: Treatment effects on attitude toward household debt (Survey 2), DE, with controls

	General	Consumption	Real estate
Treated	-0.12***	-0.05**	-0.02
	(0.02)	(0.02)	(0.02)
Age Group 2	0.07*	0.04	-0.03
	(0.04)	(0.04)	(0.03)
Age Group 3	0.03	0.01	-0.07**
	(0.04)	(0.04)	(0.03)
Age Group 4	0.04	0.03	-0.14***
	(0.04)	(0.04)	(0.03)
Female	-0.06**	0.03	0.01
	(0.03)	(0.03)	(0.02)
Secondary education	0.07	-0.20	0.03
	(0.18)	(0.16)	(0.17)
Tertiary education	0.08	-0.34**	0.03
	(0.18)	(0.16)	(0.17)
Household income	0.00***	-0.00	0.00***
	(0.00)	(0.00)	(0.00)
Political orientation	-0.02**	-0.01	-0.01
	(0.01)	(0.01)	(0.01)
Religion: Protestant	0.06	0.03	0.01
	(0.04)	(0.04)	(0.03)
Religion: Other	0.02	0.07**	-0.04
	(0.03)	(0.03)	(0.03)
Not native speaker	-0.00	0.04	0.05
	(0.06)	(0.06)	(0.05)
Constant	0.49***	0.73***	0.68***
	(0.19)	(0.17)	(0.18)
Observations	1,652	1,652	1,652

Note: OLS regression of "attitude toward household debt" on treatment dummy (= 1 if wording is guilt-connoted), with controls. Survey 2 (DE): General willingness to incur debt (General), willingness to incur debt for private consumption (Consumption), and willingness to incur debt for real estate (Real estate). "Schulden aufnehmen" (treatment group) vs. "Kredite aufnehmen" (control group). Controls: Age Group 1 20-29 (Baseline), Group 2 30-39 Group 3 40-49, Group 4 50-59; Female dummy = 1 if gender = female, 0 else; Education: Primary (Baseline), secondary, tertiary; Household income: equivalized household income; Political orientation: Self-positioning on 11 pt Likert Scale from 0 (very left wing) to 10 (very right wing); Religion: 0 = Catholic (Baseline), 1 = Protestant, 2 = other; Not native speaker: dummy = 1 if respondent is not a German native speaker. Robust standard errors in parentheses. *** p<0.01, ** p<0.05, * p<0.1

Table B.14: Treatment effects on incentivized borrowing decision (Survey 3), CH, with controls

	Debt dummy	Debt game	Debt game (int)
Treated	-0.09***	-10.56***	-7.31***
	(0.02)	(1.56)	(1.62)
Age Group 2	-0.03	0.79	5.42**
	(0.03)	(2.31)	(2.63)
Age Group 3	-0.06**	3.31	14.26***
	(0.03)	(2.36)	(2.56)
Age Group 4	-0.10***	2.44	18.44***
	(0.03)	(2.39)	(2.47)
Age Group 5	-0.13***	0.81	20.48***
	(0.03)	(2.62)	(2.62)
Female	-0.14***	-13.71***	-4.61***
	(0.02)	(1.61)	(1.68)
Secondary education	0.02	6.86***	10.07***
	(0.03)	(2.59)	(3.32)
Tertiary education	0.06**	11.30***	12.02***
	(0.03)	(2.65)	(3.30)
Household income	0.00**	0.00***	0.00*
	(0.00)	(0.00)	(0.00)
Political orientation	0.01	-0.03	-0.40
	(0.00)	(0.40)	(0.39)
Religion: Protestant	-0.01	0.54	2.34
	(0.02)	(2.20)	(2.23)
Religion: Other	-0.02	0.35	2.51
	(0.02)	(1.85)	(1.95)
Not native speaker	0.09***	-3.91*	-18.19***
	(0.02)	(2.03)	(2.32)
Constant	0.57***	37.49***	63.33***
	(0.05)	(4.18)	(4.77)
Observations	3,388	3,388	1,754

Note: OLS regression of "incentivized borrowing decision" on treatment dummy (= 1 if wording is guilt-connoted), with controls. Survey 3 (CH): Column 1 (Debt dummy): Dummy for whether debt was incurred in the debt game. Column 2 (Debt game): Amount of debt incurred in the debt game. Column 3 (Debt game (intensive margin)): Amount of debt incurred in the debt game, conditional on being greater than zero. "Schulden aufnehmen" (treatment group) vs. "Kredite aufnehmen" (control group). Controls: Age Group 1 18-29 (Baseline), Group 2 30-39 Group 3 40-49, Group 4 50-59, Group 5 60-70; Female dummy = 1 if gender = female, 0 else; Education: Primary (Baseline), secondary, tertiary; Household income: equivalized household income; Political orientation: Self-positioning on 11 pt Likert Scale from 0 (very left wing) to 10 (very right wing); Religion: 0 = Catholic (Baseline), 1 = Protestant, 2 = other; Not native speaker: dummy = 1 if respondent is not a German native speaker. Robust standard errors in parentheses. *** p<0.01, ** p<0.05, * p<0.1

B.4.2 Public debt

Table B.15: Treatment effects on attitude toward public debt (Survey 2), DE, with controls

	General	Social transfers	Public infrastructure
Treated	-0.06***	0.01	0.01
	(0.02)	(0.02)	(0.02)
Age Group 2	0.05	-0.10***	0.05
	(0.04)	(0.04)	(0.04)
Age Group 3	0.09**	-0.06	0.02
	(0.04)	(0.04)	(0.04)
Age Group 4	0.08**	-0.02	0.03
	(0.04)	(0.04)	(0.04)
Female	-0.03	0.06**	0.00
	(0.02)	(0.03)	(0.02)
Secondary education	0.17	0.26	-0.11
	(0.13)	(0.18)	(0.16)
Tertiary education	0.22*	0.21	-0.09
	(0.13)	(0.18)	(0.16)
Household income	0.00***	-0.00	0.00
	(0.00)	(0.00)	(0.00)
Political orientation	-0.04***	-0.03***	-0.03***
	(0.01)	(0.01)	(0.01)
Religion: Protestant	0.00	0.02	0.03
	(0.04)	(0.04)	(0.04)
Religion: Other	0.01	-0.02	-0.03
	(0.03)	(0.03)	(0.03)
Not native speaker	-0.11*	-0.05	-0.04
	(0.06)	(0.07)	(0.06)
Constant	0.33**	0.46**	0.84***
	(0.14)	(0.19)	(0.17)
Observations	1,652	1,652	1,652

Note: OLS regression of "attitude toward public debt" on treatment dummy (= 1 if wording is guilt-connoted), with controls. Survey 2 (DE): New government debt in general, new government debt to finance social transfers such as pensions or unemployment benefits, and new government debt to finance public infrastructure such as schools or roads. "Schulden aufnehmen" (treatment group) vs. "Kredite aufnehmen" (control group). Controls: Age Group 1 20-29 (Baseline), Group 2 30-39 Group 3 40-49, Group 4 50-59; Female dummy = 1 if gender = female, 0 else; Education: Primary (Baseline), secondary, tertiary; Household income: equivalized household income; Political orientation: Self-positioning on 11 pt Likert Scale from 0 (very left wing) to 10 (very right wing); Religion: 0 = Catholic (Baseline), 1 = Protestant, 2 = other; Not native speaker: dummy = 1 if respondent is not a German native speaker. Robust standard errors in parentheses. *** p<0.01, ** p<0.05, * p<0.1

Table B.16: Treatment effects on attitudes towards public debt (Survey 3), CH, with controls

	General	EU referendum	National referendum
Treated	-0.15***	-0.17***	-0.33***
	(0.02)	(0.04)	(0.04)
Age Group 2	-0.04*	-0.12**	-0.14**
	(0.02)	(0.06)	(0.06)
Age Group 3	-0.08***	-0.20***	-0.18***
	(0.02)	(0.06)	(0.06)
Age Group 4	-0.08***	-0.26***	-0.34***
	(0.02)	(0.06)	(0.06)
Age Group 5	-0.10***	-0.23***	-0.39***
	(0.03)	(0.07)	(0.07)
Female	-0.13***	-0.12***	-0.25***
	(0.02)	(0.04)	(0.04)
Secondary education	-0.02	-0.12	-0.08
	(0.03)	(0.07)	(0.07)
Tertiary education	0.04	-0.00	0.03
	(0.03)	(0.07)	(0.07)
Household income	0.00*	-0.00*	0.00*
	(0.00)	(0.00)	(0.00)
Political orientation	-0.02***	-0.10***	-0.06***
	(0.00)	(0.01)	(0.01)
Religion: Protestant	-0.03	-0.10*	-0.11*
	(0.02)	(0.06)	(0.06)
Religion: Other	-0.05***	-0.08*	-0.20***
	(0.02)	(0.05)	(0.05)
Not native speaker	0.09***	0.44***	0.27***
	(0.02)	(0.06)	(0.06)
Constant	0.57***	2.97***	3.24***
	(0.04)	(0.12)	(0.11)
Observations	3,388	3,388	3,388

Note: OLS regression of "attitude toward public debt" on treatment dummy (= 1 if wording is guilt-connoted), without controls. Survey 3 (CH): New government debt in general, voting decision in a referendum on joining the European Union if EU member states were to take on joint debt (EU bonds) in the future to finance joint expenditure, voting decision in a referendum on the Fiscal Budget Act ("Finanzhaushaltsgesetz") that would allow the Swiss government to take on more government debt. "Schulden aufnehmen" (treatment group) vs. "Kredite aufnehmen" (control group). Controls: Age Group 1 18-29 (Baseline), Group 2 30-39 Group 3 40-49, Group 4 50-59, Group 5 60-70; Female dummy = 1 if gender = female, 0 else; Education: Primary (Baseline), secondary, tertiary; Household income: equivalized household income; Political orientation: Self-positioning on 11 pt Likert Scale from 0 (very left wing) to 10 (very right wing); Religion: 0 = Catholic (Baseline), 1 = Protestant, 2 = other; Not native speaker: dummy = 1 if respondent is not a German native speaker.
Robust standard errors in parentheses. *** p<0.01, ** p<0.05, * p<0.1

B.4.3 Business debt

Table B.17: Treatment Effects of Guilt-Connoted Wording on Firms' Plans and Strategies Regarding Debt Management

	Survey 4 (Germany)	
	Expand debt financing (2025 vs. 2024)	Unimportant to repay debt as quickly as possible
	(1)	(2)
Treated	-0.114***	-0.234***
	(0.023)	(0.032)
Company size	0.000***	0.000
	(0.000)	(0.000)
Sector: Manufacturing	0.100*	0.251***
	(0.039)	(0.053)
Sector: Trade	-0.028	0.127*
	(0.041)	(0.056)
Sector: Services	-0.005	0.286***
	(0.039)	(0.055)
Constant	2.845***	2.333***
	(0.035)	(0.049)
Observations	4,598	4,673

Note: OLS regression of "plans and strategies regarding debt financing" on treatment dummy (= 1 if wording is guilt-connoted) and controls. Survey 4 (Germany). Column 1: Expand or reduce debt financing in the current year (2025 compared to 2024). Answer scale: 1 - Strongly reduce, 2 - Reduce, 3 - Keep constant, 4 - Expand, 5 - Strongly Expand. Wording: "Schuldenfinanzierung" (treatment group) vs. "Kreditfinanzierung" (control group). Column 2: How important is it to repay debt as quickly as possible? Answer scale: 1 - Very important, 2 - Rather important, 3 - Neutral, 4 - Rather unimportant, 5 - Completely unimportant. Wording: "Schulden tilgen" (treatment group) vs. "Kredite tilgen" (control group). Controls: Company size (number of employees) ; Sector: Construction (Baseline), Manufacturing, Trade, Services; Other potential control variables shown in the corresponding balance table B.5 are not available for all observations, but results (available upon request) are qualitatively identical when including these additional variables on reduced sample sizes. Robust standard errors in parentheses. *** p<0.01, ** p<0.05, * p<0.1

Appendix C. Parliamentary debates

C.1 Pre-selecting the speeches mentioning public debt

The selection process is a two-fold procedure, involving: (1) the identification of speeches that are likely to make reference to public debt through the use of pre-determined keywords, (2) the selection of relevant Bundestag sessions where public debt is discussed, which is done by searching the session's table of contents to further refine the context of the speeches obtained in step (1). Table C.1 shows the number of speeches obtained after each step. The selection procedure is illustrated in Figure C.1.

In the first step, we use pattern search based on a pre-selected list of debt-related keywords to identify speeches mentioning public debt in Bundestag speeches. To compile this list of keywords, we select all words with the stem "schuld" (i.e. "Schulden", "Verschuldung", "Staatsverschuldung") or "kredit" (i.e. "Kredite", "Nettokreditaufnahme", "Kreditaufnahme") that appeared in the corpus of parliamentary speeches, and three of the authors (MD, AP, LW) selected the words that are relevant to the context of public debt.[43] We exclude words that appear only once within the corpus. Given that words containing the stem "kredit" may not sufficiently capture all the relevant neutral keywords that can be used to speak about public debt, we have augmented our dictionary by including additional terms such as "Staatsanleihen" (government bonds), "Bundeswertpapiere" (federal securities), and "schwarze Null" (black zero).[44] In total, the dictionary contains 1127 terms out of which 693 are guilt-connoted words. Guilt-connoted words are the words with the stem "schuld" from our dictionary.

In the second step, we refine our selection procedure by focusing on speeches that occur in the sessions where budget, financial plan, debt, loan, or funding is mentioned in the table of contents: "haushalt", "finanzplan", "schulden", "verschuldung", "kredit", "finanzierung".

Arguably, the most important debates about the budget follow the readings of the Budget Act (Haushaltsgesetz). During these debates, not only are the budgets of specific departments discussed, but also the main political direction of the government. The deliberations in the Bundestag comprise three readings of the Budget Act. In the first reading, the finance minister presents the budget. After several days of debate, the draft budget is sent to the Budget Committee, which makes changes and gives a new version to the Bundestag. This is followed by the second reading, in which the government and the opposition debate. In the third reading, the revised budget is put to a final vote. This procedure is repeated annually and usually lasts from September to December, preceding the budget year.[45] During the budget act discussions the five-year financial plan for the federal government (Finanzplan) is also discussed. The debate about the budget act, the supplementary budget act, and the financial plan is identified by the keywords "Haushaltsgesetz", "Nachtragshaushaltsgesetz" and "Finanzplan" occurring in the table of contents.

[43] The full list of debt-related keywords is available at: https://github.com/jklejdysz/bundestag_speeches/blob/main/parameters/words_kredit_schuld_filtered_et1_20.txt

[44] The term "schwarze Null" refers to a political commitment to avoid accruing further debt.

[45] However, there are years (the first year after elections) when the Budget Act is voted in the current year, i.e., the 2018 budget was discussed and put into a vote in 2018 and not one year before, as is usually the case.

Table C.1: Count of Sessions and Speeches Across Pre-processing Stages

Step	Sessions	Speeches
Full Corpus	2104	282694
Step 1: Filtering by Keywords	1879	17636
Step 2: Filtering by TOC	1383	14807
Budget Act Discussions	*348*	*5731*
Other Discussions	*1035*	*9076*

Note: This table outlines the sample selection process across speeches delivered in the German Parliament between December 20, 1990 and March 18, 2025. The column "Sessions" indicates the number of parliamentary sessions, while "Speeches" specifies the number of speeches after each selection step. Starting with the full corpus, excluding speeches by the Presidium of the Parliament, we first identify speeches containing debt-related keywords (Step 1). Next, we narrow the sample to sessions where debt, budget, or financial topics are listed in the table of contents (Step 2). Finally, we distinguish between speeches delivered during budget act discussions and those delivered in other sessions.

Figure C.1: Selection of Speeches Mentioning Public Debt in the German Parliament

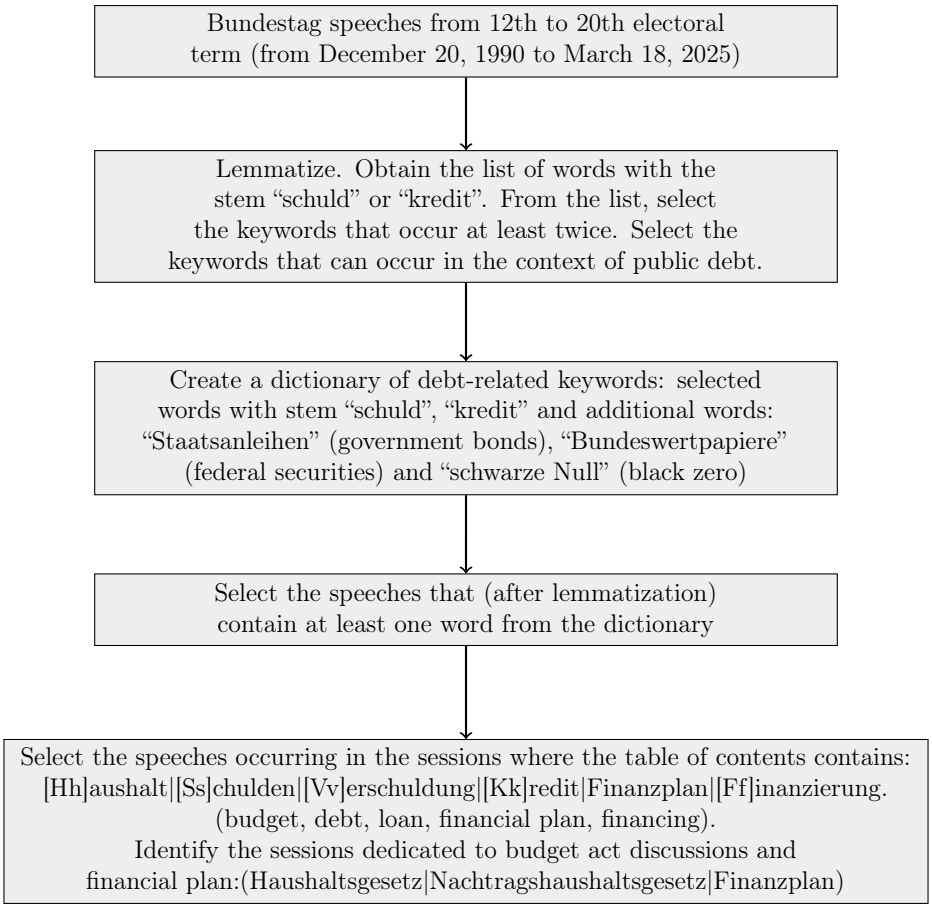
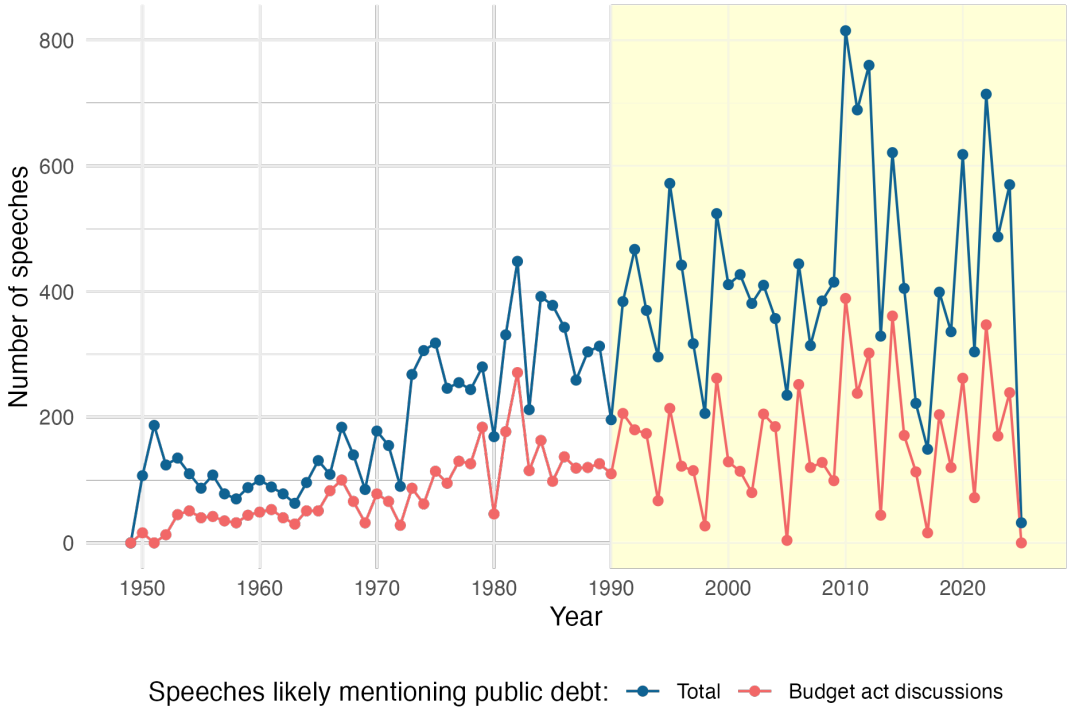


Figure C.2 shows the distribution of pre-selected speeches over time. Discussions during sessions dedicated to the budget act, supplementary budget, and financial plan consistently constitute a significant portion of all speeches that mention public debt, identified by our pattern search on speeches and a session's table of contents.

Figure C.2: Pre-selected Speeches Mentioning Public Debt in German Parliament



Note: The figure shows the number of speeches mentioning public debt after applying a pattern search on speeches and a session's table of contents. Budget act discussions denote a subset of speeches found in sessions dedicated to the budget act, supplementary budget act, and financial plan. Yellow area marks the analyzed time period (from December 20, 1990 to March 18, 2025).

Validating the dictionary of public debt-related keywords. To ensure our selection of keywords in the dictionary accurately captures the most important terms describing public debt, we verified the list of alternative keywords using word embeddings. The intuition behind word embeddings is that if two words appear in similar contexts, their vectors should also be similar.

We estimated word embeddings of Bundestag speeches from the 1st to the 20th electoral terms using the Word2Vec model (Mikolov et al. 2013), implemented in the Python package gensim. We employed the skip-gram model with 300 dimensions per word vector, a sliding window of size 10, and a minimum word frequency of 5. The sliding window size of 10 means the model considers 10 words before and after each target word to learn its context. Pre-processing steps included tokenization, sentence splitting, and lowercasing.[46] We focus on five key terms related to public debt: "schulden", "kredit", "neuverschuldung", "verschuldung", and "nettokreditaufnahme". For each of these words, we identify the top 5 most similar terms based on cosine similarity in the embedding space.

[46] We use Python library spaCy 3.4.1. for text processing. We applied a customized lemmatization rule to the word "Schulden" to deal with polysemy. "Schulden" is a plural form of "Schuld" and "schuld" is the lemma of both "Schuld" and "Schulden". However, while "Schuld" can refer to either guilt or, less commonly, a monetary obligation in the singular, the plural form "Schulden" is commonly used to denote financial debt. This distinction informed our decision to treat "Schulden" as a debt-related term while excluding instances of "Schuld" when used to express guilt.

Table C.2 shows the top 5 most similar terms based on cosine similarity in the embedding space to the key debt-related keywords. The model effectively captures semantically related terms for each keyword. For instance, "schulden" (debt) is associated with terms like "staatsschuld" (national debt), "verschuldung" (indebtedness), "schuldenberg" (mountain of debt), "zinslast" (interest burden), and "schuldenlast" (debt burden). "Kredit" (credit) is a more ambiguous term that can occur in both public and private or commercial debt contexts. "Nettokreditaufnahme" (net borrowing) is more closely related to the context of public debt. We conclude that terms with the stems "schuld" and "kredit" consistently emerge as the closest semantic neighbors, suggesting that they are the main words speakers use to refer to debt in Bundestag speeches. Thus, our dictionary should effectively capture relevant speeches.

Table C.2: Most Similar Terms to the Key Public Debt-Related Keywords

Word	Similar Words
schulden	staatsschuld, verschuldung, schuldenlast, schuldenberg, zinslast
kredit	bankkredit, darlehen, investitionskredite, fremdmittel, kreditmittel
neuverschuldung	nettokreditaufnahme, nettoneuverschuldung, verschuldung, kreditaufnahme, schuldenaufnahme
verschuldung	staatsverschuldung, neuverschuldung, schuldenstand, schulden, kreditaufnahme
nettokreditaufnahme	neuverschuldung, nettoneuverschuldung, kreditaufnahme, schuldenaufnahme, nettoverschuldung

Note: This table shows the five most similar words to key debt-related keywords based on word embeddings that were estimated using German Parliamentary speeches in the electoral terms 1-20. Similarity is measured by cosine similarity in the 300-dimensional Word2Vec embedding space, trained using a skip-gram model with a window size of 10.

Validating the selection of the speeches with a topic model. Estimating a topic model on the parliamentary speeches would be an alternative algorithmic way of extracting meaningful dimensions in text. A basic topic model, Latent Dirichlet Allocation (Blei et al. 2003), assumes that every document is a mixture of latent topics, where each topic is a distribution over fixed vocabulary. However, it is difficult to argue that a specific topic discovered by this model fully captures the concept of interest. We use LDA to compare the average share of the topic about the budget in the set of speeches selected with the pattern matching versus in the set of rejected speeches. We train LDA with 40 topics on data spanning the 1st to 20th electoral term, using the Python package gensim. In the set of estimated topics, we identify a topic about the budget, based on the top most probable words in that topic ("milliarde", "haushalt", "million", "geld", "investieren", "investition","bundeshaushalt", "verfügung", "zusätzlich","einzelplan", "finanzieren", "schulden", "ausgeben", "etat")[47]. Each filtering step increases the share of speeches discussing budgetary matters, with the highest concentration observed in Budget Act debates, as expected.

[47] English translations, in order: billion, budget, million, money, invest, investment, federal budget, disposal, additional, individual budget item, finance, debt, spend, budget

Table C.3: Average Topic Share per Speech for the "Budget"-Related Topic

Step	Budget Topic
Full Corpus	0.017
Step 1: Filtering by Keywords	0.054
Step 2: Filtering by TOC	0.058
Budget Act Discussions	*0.088*
Other Discussions	*0.039*

Note: The table shows the average share of the budget-related topic in speeches delivered in the German Parliament between December 20, 1990 and March 18, 2025, across different stages of the selection process. The "Full corpus" includes all speeches, excluding speeches by the Presidium of the Parliament. "Step 1" filters speeches containing debt-related keywords. "Step 2" further restricts the sample to sessions where debt, budget, or financial topics appear in the table of contents. The final rows distinguish between speeches delivered during budget act discussions and those in other discussions. The values reflect the relevance of the budget-related topic, with higher shares indicating greater alignment with budgetary content.

C.2 Measuring stance toward public debt

Rated sample of speeches. Our keyword search identified a subset of speeches likely mentioning public debt. However, this method alone does not determine the relevance of these speeches to the topic of German public debt. Many speeches containing debt-related keywords, especially with the stem "kredit" (loan), discuss topics not relevant to our analysis, for example, non-performing loans in the EU, development policy, consumer protection, or commercial loans.

Our manual rating process prioritized all speeches from Budget Act discussions and included a 16% random sample from other discussions. This stratification aimed to increase the proportion of speeches relevant to public debt. In total, 7012 speeches were manually rated out of 14807 containing debt-keywords.

Questions. Each annotator answered two questions. The first question asked about the *relevance* of the speech to the topic of public debt in Germany. The second question asked about the speaker's *stance* toward public debt expressed in the speech. Specifically, annotators evaluated each speech by answering the following questions:

1. Does the speaker mention public debt?
    - (i) Yes: German public debt only;
    - (ii) Yes: German public debt and public debt in other countries/the EU;
    - (iii) Yes: Public debt in other countries/the EU only;
    - (iv) No.
2. What is the speaker's stance toward German public debt?
    - (i) Against public debt;
    - (ii) Public debt is acceptable or justifiable under certain conditions;
    - (iii) Neutral, ambiguous, or mixed.

The second question was asked if the speech was relevant to the topic of public debt in Germany (answer (i) or (ii) in the first question was selected).

Procedure. All raters were Economics students and native German speakers. They participated in a joint training session explaining the annotation instructions. The rating process was conducted using Label Studio® (https://labelstud.io/).

The rating exercise proceeded as follows:

1. *First Training Round*: A sample of 63 speeches was rated by four research assistants and three authors of this paper, who received minimal instructions. After this round, the ratings were reviewed, disagreements were discussed, and a consensus label was assigned. The guidelines were then refined.

2. *Second Training Round*: With the refined guidelines, the next 80 speeches were rated by four research assistants. Again, disagreements were discussed, guidelines were further refined, and a consensus label was assigned.

3. *Main Round*: For the remaining speeches, each was rated by two research assistants.

Overall, 98% of speeches were rated by two raters, and 2% were rated by more than two raters.

Argument detection. To better understand the argumentation in the speeches, we ask the research assistants to highlight sentences indicative of speaker's stance toward public debt in a subset of speeches that were rated as in favor or against public debt. We selected 200 speeches that, in addition to stance rating, were annotated for arguments (100 speeches rated as in favor and 100 speeches rated as against by both raters). Four annotators were highlighting arguments in favor and against public debt using Label Studio® interface. The highlighted text was then aggregated by taking the union of all highlighted parts. The examples of arguments in favor and against are listed in Table C.4 and Table C.5, respectively.

Table C.4: Examples of Excerpts Indicative of the Stance "Against public debt"

Original text	English translation
Sparstrümpfe statt Spendierhosen, nur so sichern wir Wohlstand und Arbeit in diesem Land.	Saving stockings instead of spending pants is the only way to secure prosperity and jobs in this country.
Sparsamkeit ist eine der zentralen Quellen für Wirtschaftswachstum und Wohlstand in unserem Land.	Thrift is one of the key sources of economic growth and prosperity in our country.
Klar ist auch: Wir wollen die Investitionen konkret und solide gegenfinanzieren, ohne zusätzliche Schulden zu machen.	It is also clear that we want to finance the investments in a concrete and solid way without incurring additional debt.
Natürlich ist es auch ökonomisch sinnvoll, jetzt die Schuldenbremse einzuhalten. Neue Schulden heißt Anheizen der Inflation. Wir wollen doch, dass unsere Kinder und Enkel noch eigene Entscheidungen treffen können. Deshalb ist es falsch, die Schuldenbremse anzugehen.	Of course, it also makes economic sense to adhere to the debt brake now. New debt means fueling inflation. We want our children and grandchildren to be able to make their own decisions. That's why it's wrong to tackle the debt brake.
Ich habe schon angedeutet, dass bisher noch kein Haushalt mit einer solch hohen Nettokreditaufnahme vorgelegt worden ist. Man könnte glatt die Losung ausgeben: Große Koalition macht große Schulden.	I have already indicated that no budget with such a high level of net borrowing has ever been presented before. The slogan could easily be issued: Grand coalition takes on big debts.
Zusätzliche Investitionen ohne neue Schulden: Das sind insbesondere für die nachfolgenden Generationen gute Nachrichten - womit wir wieder bei der Verantwortung wären.	Additional investment without new debt: This is good news for future generations in particular - which brings us back to responsibility.
Das Erste ist etwas Grundsätzliches: Wir haben in diesem Haushalt als Koalition zum dritten Mal in Folge eine schwarze Null. Wir werden sogar im Gesamtbundeshaushalt 700 Millionen Euro an Altschulden tilgen. Ich halte das für eine große Leistung.	The first is something fundamental: as a coalition, we have a black zero in this budget for the third time in a row. We will even pay off 700 million euros in old debts in the overall federal budget. I consider that a great achievement.
Sie wissen auch, dass wir nur ausgeben können, was wir vorher eingenommen haben.	They also know that we can only spend what we have taken in beforehand.
Eigenlob zwei: Wir sparen. Mein Kollege Dietmar Bartsch hat Ihnen am Dienstag vorgerechnet, dass Sie in dieser Legislaturperiode mehr als 112 Milliarden Euro an neuen Schulden aufnehmen.	Self-praise two: We are saving. My colleague Dietmar Bartsch calculated on Tuesday that you will take on more than 112 billion euros in new debt during this legislative period.
Die wichtigste Aufgabe ist, den Marsch in den Schuldenstaat zu stoppen.	The most important task is to stop the march towards a debt state.
Keine Schulden, keine neuen Steuern, keine Steuererhöhungen - das war ein ganz klares Wahlversprechen der Union, und wir lösen es ein.	No debt, no new taxes, no tax increases - that was a very clear election promise made by the CDU/CSU, and we are keeping it.
Das Zeitalter der Staatsverschuldung führt zu Pumpkapitalismus an den Finanzmärkten. Wir haben dort Schneeballeffekte. Das müssen wir verändern, korrigieren;	The age of government debt leads to pumped capitalism on the financial markets. We have snowball effects there. We need to change and correct this;

Table C.5: Examples of Excerpts Indicative of the Stance “Public debt is acceptable or justifiable under certain conditions”

Original text	English translation
Der Finanzminister hat seine gesamte Strategie auf die schwarze Null verengt. Die schwarze Null ist eine gefährliche Obsession. Ja, natürlich müssen wir Schulden abbauen. Aber wir müssen auch in die Zukunft investieren.	The finance minister has narrowed his entire strategy down to the black zero. The black zero is a dangerous obsession. Yes, of course we have to reduce debt. But we also need to invest in the future.
Um welchen Preis wird die schwarze Null bzw. der Verzicht auf Neuverschuldung erzielt?”, “Eine Politik um der schwarzen Null willen, die die Schulden von heute in kaputte Städte und Gemeinden, marode Gesundheits-, Kulturund Bildungseinrichtungen unserer Enkel tauscht, ist der falsche Weg.	At what price will the black zero or the renunciation of new debt be achieved?", "A policy for the sake of the black zero, which swaps today’s debts for broken cities and municipalities, ailing health, cultural and educational facilities for our grandchildren, is the wrong path.
Sie machen keine Schulden gegenüber den Finanzmärkten, aber Sie machen Schulden gegenüber den Bundesbürgern, insbesondere gegenüber den jüngeren, meine Damen und Herren, weil Sie viel zu wenig in die Zukunft investieren.	You are not running up debts to the financial markets, but you are running up debts to the citizens of Germany, especially the younger ones, ladies and gentlemen, because you are investing far too little in the future.
Wir sind auch in der Lage und haben die Kraft, Kredite aufzunehmen, um durch eine Krise zu kommen. Klar, wenn das passiert, dann steigt auch die Schuldenquote unseres Landes. Das – dies will ich dazu sagen – ist etwas, was man immer im Blick haben muss.	We are also in a position and have the strength to borrow in order to get through a crisis. Of course, if that happens, then our country’s debt ratio will also rise. I would like to say that this is something we must always bear in mind.
Das bedeutet Schuldenaufnahme, ja! Und unser Finanzminister Olaf Scholz hat am Dienstag auch gesagt, warum das richtig ist: weil Nichthandeln in der Krise teurer ist als Jetzthandeln.	That means taking on debt, yes! And our Finance Minister Olaf Scholz also said on Tuesday why this is right: because not acting in the crisis is more expensive than acting now.
Wir geben viel Geld aus, und zwar mehr Geld, als ursprünglich von der Regierung geplant, weil dies auch ethisch geboten ist.	We spend a lot of money, and more money than originally planned by the government, because this is also ethically required.
Richten Sie im Spielraum der Schuldenbremse einen mehrjährigen Bundesinvestitionsfonds ein! Kommen Sie raus aus dieser finanzpolitischen intellektuellen Verbohrtheit – man könnte auch sagen: Faulheit!	Set up a multi-year federal investment fund within the scope of the debt brake! Get out of this fiscal-policy intellectual stubbornness - you could also say laziness!
Man kann jetzt die Niedrigzinsphase nutzen und neue Kredite aufnehmen, um in den nächsten vier Jahren 100 Milliarden Euro in den Klimaschutz zu investieren, für den Wald, für die Verkehrswende, für internationalen Klimaschutz und für Klimaforschung. All das muss man jetzt machen. Man muss jetzt klotzen und darf nicht kleckern; denn Zukunft gibt es nicht zum Nulltarif. Die Bundesregierung darf nicht weiter an der schwarzen Null klammern.	We can now take advantage of the low-interest phase and take out new loans to invest 100 billion euros in climate protection over the next four years, for forests, for the transport transition, for international climate protection and for climate research. All of this must be done now. We need to get down to business now and not just spill the beans, because the future does not come for free. The Federal Government must not continue to cling to the black zero.
Herr Döring, in einer solchen Situation ideologische Gesänge des Sparens und ideologische Gesänge für ein Verbot zur Aufnahme von Krediten anzustimmen, so wie Sie das hier gemacht haben, finde ich zutiefst unangemessen.	Mr. Döring, to sing ideological chants of saving and ideological chants for a ban on borrowing in such a situation, as you have done here, I find deeply inappropriate.
In Zeiten der Not handelt man; man spart sich in keine Krisen hinein.	In times of need, one takes action; one does not save oneself into a crisis.
Wir wollen die Schulden nicht um der Schulden willen, sondern wir wollen Schulden und Kredite, weil wir Chancen für dieses Land schaffen, neue Jobs sichern, Innovationen vorantreiben wollen.	We don’t want debt for debt’s sake, we want debt and loans because we want to create opportunities for this country, secure new jobs and drive innovation.

Table C.6: Examples of Excerpts Indicative of the Stance "Neutral, ambiguous, or mixed"

Original text	English translation
Wir sagen deshalb: Markenzeichen linker Haushaltspolitik sind nicht neue Schulden, sondern ist eine gerechte Steuerpolitik.	We therefore say that the hallmark of left-wing budgetary policy is not new debt, but a fair tax policy.
Das gilt zum einen für die Pflicht zur Verankerung von Schuldenbremsen im nationalen Recht und zum anderen für die Einführung eines diesbezüglichen Klagerechts vor dem Europäischen Gerichtshof, wie es in Art. 8 der derzeitigen Entwurfsfassung des VerParl. Staatssekretär Steffen Kampeter trags beschrieben ist.	This applies firstly to the obligation to anchor debt brakes in national law and secondly to the introduction of a right of action before the European Court of Justice in this regard, as described in Art. 8 of the current draft version of the Treaty.
Mit der Kollegin Flach von den Freien Demokraten habe ich mich abgestimmt und gesagt, dass ich mich neutral verhalten werde. Wir sollten uns darauf einigen, dass wir alle beim Schuldenmachen dabei waren.	I agreed with my colleague Mrs. Flach from the Free Democrats and said that I would remain neutral. We should agree that we were all involved in creating the debt.
Wir halten mit 6,5 Milliarden Euro die gleiche Nettokreditaufnahme als Zielsetzung aufrecht. Argumentieren Sie inhaltlich dagegen, aber sprechen Sie uns nicht die finanzielle Solidität ab.	We are maintaining the same net borrowing target of 6.5 billion euros. Argue against this in terms of content, but do not deny our financial solidity.
Stattdessen blenden Sie die Öffentlichkeit mit riesigen Summen Schuldengeld, verfehlen aber die notwendigen Investitionen in den Aufbau der Bundeswehr.	Instead, you dazzle the public with huge sums of debt money, but fail to make the necessary investments in the development of the Bundeswehr.
Klar war, dass die Haushaltsverhandlungen vor dem Hintergrund der Schuldenbremse alles andere als leicht würden.	It was clear that the budget negotiations would be anything but easy against the backdrop of the debt brake.
Die nächste Kritik, die ich hörte: Die Schuldenbremse muss weg; je eher, desto besser. – Ich behaupte: Zum Glück steht diese Schuldenbremse in der Verfassung und nicht in irgendeinem Gesetz. enn man genauer hinschaut, auch gerade für solche Konstruktionen gedacht. Sie hat nämlich eine Konjunkturkomponente. Das heißt, sie kann atmen. Und sie hat ja auch einen Sinn: Wir wollen nachfolgende Generationen nicht überfordern. Genau deswegen ist die Aufnahme der Schuldenbremse ins Grundgesetz gut und richtig gewesen.	The next criticism I heard was that the debt brake must go; the sooner the better. - I say: Fortunately, this debt brake is in the constitution and not in any law. If you look more closely, it is also intended precisely for such constructions. It has a cyclical component. That means it can breathe. And it also has a purpose: we don't want to overburden future generations. This is precisely why the inclusion of the debt brake in the Basic Law was good and right.

C.2.1 Annotation quality

Table C.7 presents the inter-annotator agreement for relevance and stance, using Krippendorff's alpha. Krippendorff's alpha ranges from -1 to 1, with $\alpha = 0$ indicating agreement at the level of chance and $\alpha = 1$ indicating perfect agreement. The results demonstrate high agreement for relevance, while agreement on stance is lower, suggesting it is a more complex task. The agreement rates are similar to those found in other studies that conducted stance annotation on political speeches Card et al. (2022). The agreement rates remain relatively consistent across different time periods. This consistency indicates that annotators did not face significantly greater challenges when evaluating the speeches from earlier periods, despite potential unfamiliarity with the language and contemporary issues of those times.

Table C.8 shows inter-rater agreement for four subsets of the data, each corresponding to speeches evaluated by a specific rater and their co-rater. The agreement rates demonstrate consistency across raters, suggesting a uniform understanding of the annotation task. The most prevalent type of disagreement occurs when one rater assigns an opinionated label (either in favor of or against public debt), while the other classifies the speech as neutral or not relevant to public debt. Instances of ratings assigning opposed stances (in favor versus against) are rare, constituting only about 2% of the sample. For a subset of speeches, we also assessed raters' confidence in their annotations using a scale from 1 (very unsure) to 10 (very confident). All raters had the least confidence in assigning the "Neutral, ambiguous or mixed" label.

Table C.7: Inter-Annotator Agreement and Count of Annotated Speeches

	Krippendorf's Alpha			Number of Annotated Speeches	
Period	Relevance	Stance	Overall	Relevance	Stance
Overall	**0.78**	**0.58**	**0.64**	**6869**	**5311**
1990-2000	0.73	0.55	0.62	1880	1425
2001-2010	0.79	0.54	0.65	803	625
2011-2020	0.80	0.60	0.65	3365	2585
2021-2024	0.79	0.57	0.58	821	676

Note: This table presents the inter-annotator agreement rates and the number of annotated speeches for each task (relevance and stance) across different time periods. "Overall" refers to agreement rate calculated on a four-category variable that jointly encodes relevance and stance. Agreement is measured using Krippendorff's alpha, where 1 indicates perfect agreement and 0 represents agreement at the level of chance. Only speeches annotated by two independent raters are included in this analysis.

Table C.8: Annotation Quality by Annotator

	Rater 1	Rater 2	Rater 3	Rater 4
Number of speeches	3454	3702	3736	2846
Krippendorf's Alpha				
Overall	0.63	0.65	0.61	0.65
Relevance	0.79	0.78	0.80	0.73
Stance	0.57	0.59	0.54	0.62
Share with Disagreements				
Overall	0.22	0.22	0.24	0.20
Neutral vs opinionated	0.20	0.20	0.21	0.19
Bad extremes	0.02	0.02	0.03	0.01
Confidence				
Overall	8.30	8.32	7.43	8.32
Against	8.62	8.64	7.71	8.77
In favor	8.34	8.18	6.55	8.28
Neutral	7.10	7.89	6.20	7.27

Note: This table presents key metrics from the speech annotation process across four subsets, each corresponding to speeches rated by a specific annotator. The metrics include: (1) the number of speeches annotated; (2) inter-annotator agreement, measured using Krippendorff's alpha, where 1 indicates perfect agreement and 0 represents agreement at the level of chance; (3) the proportion of speeches with disagreements, defined as instances where one rater assigns an opinionated label (in favor/against) and the other a neutral or non-relevant label, or when raters provide opposing labels; and (4) raters' stated confidence in their annotations, assessed on a scale from 1 (very unsure) to 10 (very confident) for a subset of speeches. Only speeches evaluated by two independent raters are included in this analysis.

C.2.2 Aggregating annotations

To aggregate multiple annotations per speech, we use the Dawid-Skene aggregation method that is based on the Expectation Maximization (EM) algorithm (Dawid and Skene 1979). It iteratively estimates the true labels of items and the error rates of annotators, where error rates represent the probability of an annotator providing an incorrect label given the true label of an item. The algorithm alternates between computing these error rates and class probabilities (M-step) and updating the estimated true labels (E-step) until convergence. The obtained labels are used in our baseline sample. Figure C.3 illustrates the yearly distribution of labels using the Dawid-Skene method, while Figure C.3b demonstrates that the proportion of neutral labels remains relatively constant over time. In addition, for robustness, we consider two alternative aggregation methods:

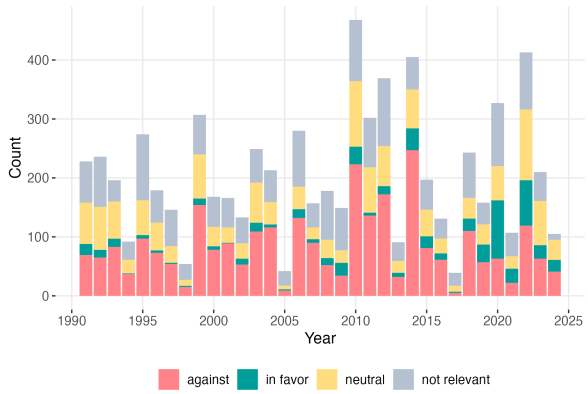
1. "Mean score" aggregation: We assign numerical values to labels (1: in favor, -1: against, 0: neutral/not relevant) and calculate the average of two ratings. The final rating is determined by the sign of this average (positive: in favor, negative: against, zero: neutral or not relevant).

2. "Agreement-only" aggregation: We assign the label on which both raters agree. In cases of disagreement, we assign a neutral label.

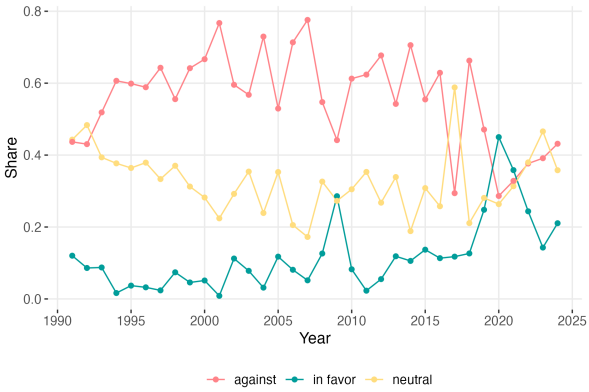
Table C.9 presents the label distribution under each aggregation method.

Figure C.3: Annotated Speeches By Year and Stance

(a) Annual Count of Annotated Speeches



(b) Annual Distribution of Stance Categories



Note: Panel (a) shows the distribution of speeches by stance categories over time. Panel (b) shows the shares of stance categories, conditional on speeches that discuss German public debt."Against" denotes speeches classified as opposing public debt, "In favor" denotes speeches where public debt is viewed as acceptable or justifiable under certain conditions, and "Neutral" denotes speeches expressing ambiguous or mixed opinions toward public debt. The stance was evaluated only for speeches mentioning German public debt (either exclusively or alongside foreign debt). 'Not relevant' includes speeches that either do not mention public debt or discuss only public debt in other countries/the EU. Each speech was rated by two annotators. Final classifications were determined using the Dawid-Skene aggregation method, which employs an Expectation-Maximization algorithm to estimate true labels while accounting for annotator-specific error rates.

Table C.9: Label Distributions Across Aggregation Methods

Final stance	Mean score	Agreement-only	Dawid-Skene
Against	3269	2217	2841
In favor	685	364	586
Neutral	1028	2401	1554
Not relevant	2030	2030	2031

Note: This table compares the distribution of stance labels across different aggregation methods. The "Mean score" method assigns numeric values to stances (Against=−1, Neutral=0, In favor=1, Not relevant = 0) and averages them, with the final label determined by the sign of this average (positive: in favor, negative: against, zero: neutral or not relevant). The "Agreement-only" method assigns "Neutral" whenever raters disagree between "In favor" or "Against". If either "Neutral" or "Not relevant" labels are provided, the final label under both methods defaults to "Not relevant". The Dawid-Skene method employs an Expectation-Maximization algorithm to estimate true labels while accounting for annotator-specific error rates.

C.2.3 Testing for wording-induced biases in rating

To determine whether specific wording in the speeches influenced annotators, we conducted a comparative analysis using two groups of research assistants (RAs). The control group consisted of two RAs who rated the original speeches, while the treatment group, comprising two different RAs, evaluated the same speeches with changed wording. We created three subsets of speeches: one where guilt-connoted words were replaced

with neutral terms, another where neutral words were substituted with guilt-connoted language, and a placebo sample where no changes were made. We measured negativity by calculating a score based on the number of "Against" ratings minus the number of "In favor" ratings, with possible values ranging from -2 to 2. This experimental design allowed us to isolate the effect of wording changes on annotator perceptions. Our analysis shows that annotators were not significantly affected by the changes in wording, suggesting that their evaluations were based on the substantive content of the speeches rather than the wording.

Table C.10: Effect of Wording on Annotation Outcomes

Change in wording	#Speeches	Negativity: T	Negativity: C	T-C	SE
schuld to kredit	195	-0.97	-1.03	0.06	0.12
kredit to schuld	84	-0.13	-0.13	0.00	0.25
placebo	75	-1.17	-1.20	0.03	0.19

Note: T: Treatment group (modified wording), C: Control group (original wording). Negativity score is the number of "Against" ratings minus the number of "In favor" ratings and ranges from -2 to 2; T-C: Difference in negativity scores between treatment and control groups; SE: Standard error of the difference; 'schuld to kredit': Guilt-connoted words replaced with neutral terms, 'kredit to schuld': Neutral words replaced with guilt-connoted terms, 'placebo': No changes in wording.

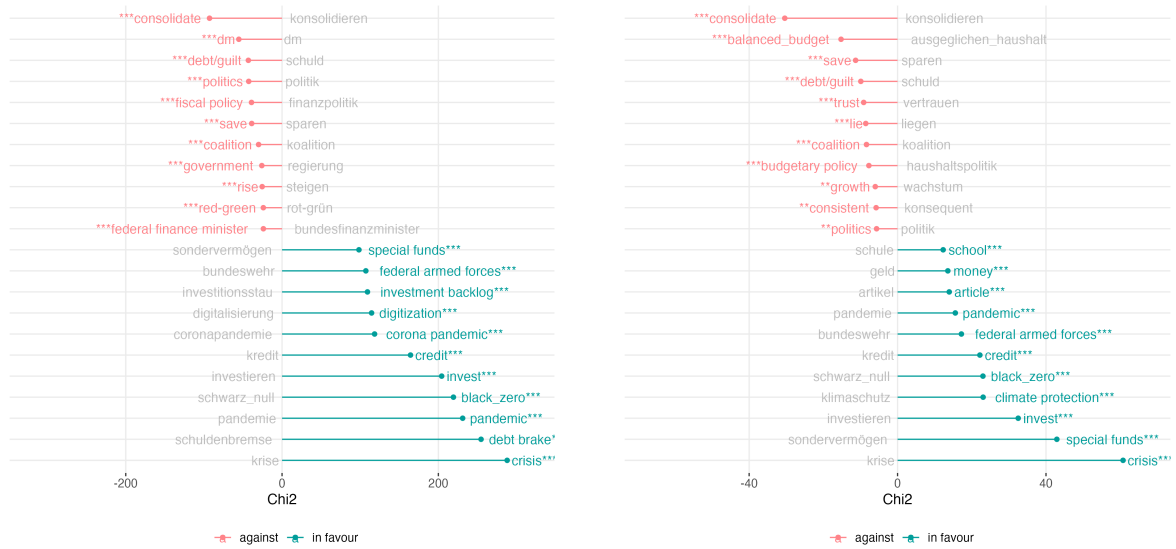
C.3 Argument detection

Figure C.4 compares the terms most strongly associated with arguments for and against public debt, using two approaches: panel C.4a relies on a 5-sentence context window around debt-related terms, while panel C.4b is based on manual annotation of 200 speeches (100 per stance) by four annotators who identified relevant argumentative passages.

Figure C.4: Keywords Uniquely Associated with Speeches and Arguments For and Against Public Debt in German Parliament

(a) Speeches (Context Window)

(b) Arguments



Note: This figure displays the keywords most distinctively associated with arguments for and against public debt. Panel (a) presents the results for speeches annotated as being either in favor of or against public debt, using a 5-sentence context window around sentences containing debt-related terms. Panel (b) shows the results using manually identified arguments from a subset of 200 speeches. While manual annotation is more accurate in isolating argumentative content, the similarity between the two panels suggests that the context-window approach captures the main features of these arguments. The score for each term represents the χ^2 test statistic, which measures how strongly a word is associated with one position versus the other. Significance levels: $p < 0.1$; $p < 0.05$; $p < 0.01$.

C.4 Details of training and applying classifiers for stance

Dataset preparation. First, we restricted the labelled sample of speeches to speeches from the main political parties (CDU/CSU, SPD, FDP, Greens, and PDS/The Left). Next, the data was split into training (75%), validation (15%), and test (10%) sets, with stratification by stance to ensure balanced representation across splits.

For the fine-tuning dataset for GPT-4, we focused on speeches from the training set where annotators showed perfect agreement in their stance classification to reduce ambiguity in the training data. To ensure representation of all parties, we first selected a minimum of five observations per party-stance combination where available. The dataset was then expanded to 300 total observations per stance using random sampling. The fine-tuning dataset includes 300 observations per stance category and 300 observations for the category indicating that the speech is not relevant for the topic of German public debt, for a total of 1200 speeches.

Each speech was processed to extract relevant text segments by extracting and merging text passages around debt-related keywords. To obtain these text segments, we started by splitting each speech into sentences using spaCy's sentencizer. The algorithm then located sentences containing debt-related keywords. For sentences containing debt-related keywords, the algorithm created windows of 5 sentences before and after each match. When multiple such windows overlapped, they were merged. The resulting

merged contexts were joined together, and if the total length exceeded 20,000 words, the context was truncated. This method ensured that all debt-related discussions in a speech were captured while maintaining manageable context lengths for training and classification.

Fine-tuned GPT-4. We fine-tuned the GPT-4-mini model (gpt-4o-mini-2024-07-18) to classify the stance toward public debt using OpenAI's fine-tuning API. The training dataset comprised 1,200 labeled examples, formatted as conversational inputs. For each speech, a training instance was created where the user's message contained the speech text along with a prompt asking for classification into one of four categories: 'Against public debt', 'Public debt is acceptable or justifiable under certain conditions', 'Neutral, ambiguous, or mixed opinion toward public debt', or 'Not about public debt in Germany'. The assistant's response provided only the corresponding stance label.

The fine-tuned model was subsequently applied to classify a test set of speeches using the same input format. The specific prompt used for constructing both the training and test set examples is as follows:

> **System prompt:**
> "You are a helpful research assistant analyzing German parliamentary speeches. Your task is to classify speeches based on their stance toward German public debt."
>
> **User prompt:**
> "What is the stance toward public debt in the following speech?
>
> Select one of these stance categories:
>
> - **Against public debt:** The speaker predominantly opposes public debt, emphasizes fiscal responsibility, warns about negative consequences, or advocates for balanced budgets
> - **Public debt is acceptable or justifiable under certain conditions:** The speaker primarily views debt as a necessary tool in specific situations (e.g., during crises, for investments) or argues against strict budget constraints
> - **Neutral, ambiguous, or mixed opinion toward public debt:** An unclear or contradictory position on public debt
> - **Not about public debt in Germany:** The speech doesn't mention German public debt
>
> Guidelines:
>
> - Focus only on German public debt, not private debt or foreign debt
> - Look for explicit statements about the speaker's position
> - Consider the overall message, not just isolated statements
>
> Speech: [speech text]
>
> Please respond with one of the four stance categories listed above."

Table C.11: Test-Set Performance: Accuracy and F1 Score by Label

	GPT
Number of examples	1003
Predictions	
Against	0.32
Neutral	0.56
In Favor	0.12
Error Types	
Too Opinionated	0.07
Too Balanced	0.12
Bad Extreme	0.03
Prediction Performance	
Accuracy	0.78
F1: Against	0.78
F1: Neutral	0.83
F1: In Favor	0.56

Note: This table shows the distribution of label predictions, error types, accuracy, and F1 scores in the test set. Speeches were classified into three categories using a fine-tuned GPT-4 model: (i) against public debt ("Against"), (ii) neutral or not addressing public debt ("Neutral"), and (iii) in favor of public debt ("In Favor"). "Too Opinionated" refers to cases where neutral speech was classified as expressing an opinion (either against or in favor). "Too Balanced" indicates cases where speeches expressing an opinion (either against or in favor) were classified as neutral. "Bad Extreme" represents cases where speeches against public debt were classified as in favor, or vice versa. "Accuracy" is the proportion of correct predictions among all predictions made. The F1 scores are reported separately for three categories.

C.5 Robustness

This section presents robustness checks examining the sensitivity of our results to several methodological choices. We test how our findings change with: (1) alternative methods of aggregating annotator ratings, (2) different approaches to measuring guilt rhetoric, and (3) an expanded sample using classifications from fine-tuned GPT. Below, we describe our baseline sample and each of these modifications.

Baseline. Our baseline sample consists of manually annotated speeches, with 98% of speeches rated by two annotators. We aggregate these annotations using the Dawid-Skene method. To measure guilt slant, we count occurrences of guilt-connoted words, defined as debt-related keywords containing the stem 'schuld'.

Different aggregation. Instead of aggregating stance using Dawid-Skene aggregation, we use the "Mean score aggregation" which assigns numeric values to stances (Against=-1, Neutral=0, In favor=1, Not relevant = 0) and averages them. The final stance is determined by the sign of the mean score: positive values are classified as "In favor", negative values as "Against", and exactly zero as "Neutral" or "Not relevant".

Debt keywords. In this robustness check, we modify only the definition of debt-related keywords while maintaining other aspects of the baseline specification. Instead of using the full range of words with stems "schuld" and "kredit", we restrict the analysis to the most common terms. For guilt-connoted words, we include only "Schulden", "Neuverschuldung", and "Verschuldung". For neutral terms, we use "Kredit", "Nettokreditaufnahme", and "Kreditaufnahme".

GPT - baseline sample. Instead of manual annotations, we use classifications from the fine-tuned GPT-4 model on the baseline dataset. See Section C.4 for details on the fine-tuning procedure.

GPT - extended sample. We extend the analysis beyond manually annotated speeches to include all speeches containing debt-related keywords. For this expanded sample, we use stance classifications from the fine-tuned GPT-4 model.

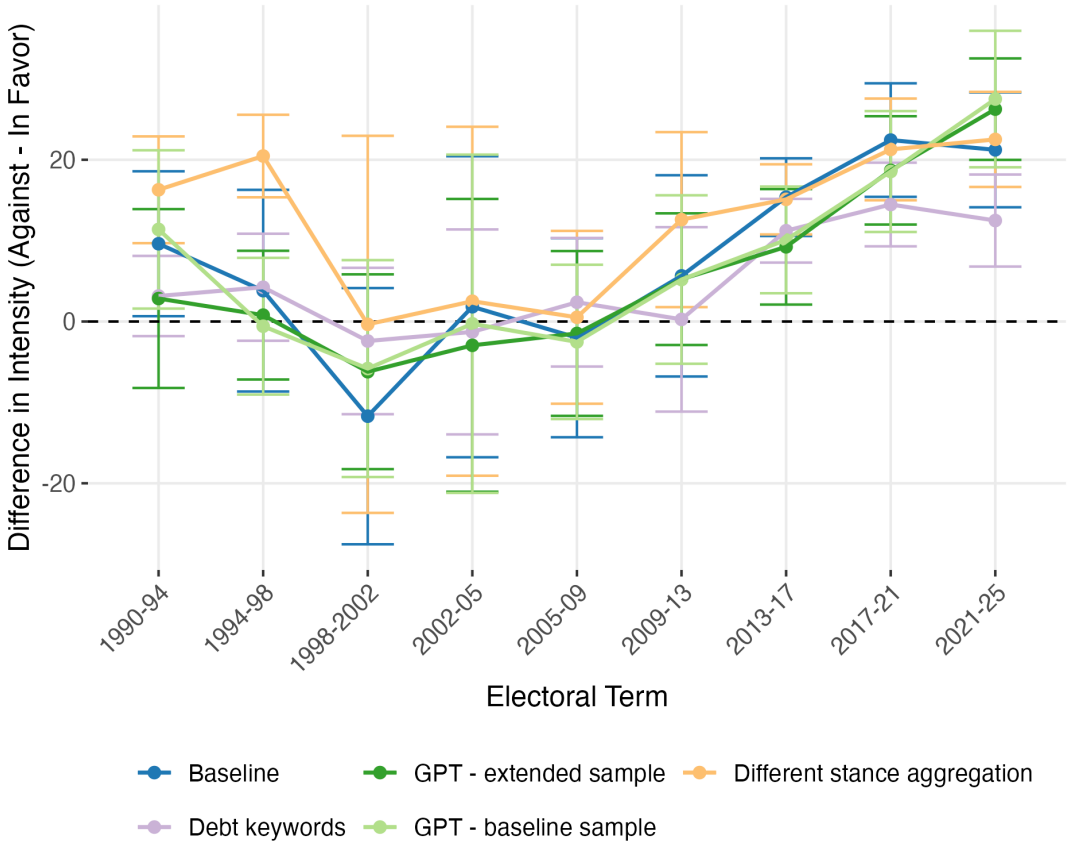
In addition, we use the fine-tuned GPT model to perform the classification of all speeches with debt-related keywords starting in 1949. Figure C.7 shows the results. It is important to note that the model was fine-tuned using speeches from 1990-2024 only, as these were the speeches available in our manually annotated training set. Therefore, while we apply the model to classify the entire corpus of debt-related speeches since 1949, the training data may not be fully representative of the earlier period's language patterns and rhetorical styles.

Table C.12: Robustness Check: Average Word Usage by Stance Category

			Guilt Slant: Intensity		Guilt Slant: Relative Frequency	
	Count	Share in Favor	In Favor	Against	In Favor	Against
Baseline	3427	17%	21.4	33.3	0.72	0.88
Different stance aggregation	3954	17%	17.7	32.9	0.69	0.87
Debt keywords	3427	17%	13.4	20.6	0.67	0.85
GPT - extended sample	4831	26%	24.1	34.8	0.76	0.88
GPT - baseline sample	3169	25%	23.2	33.5	0.73	0.88

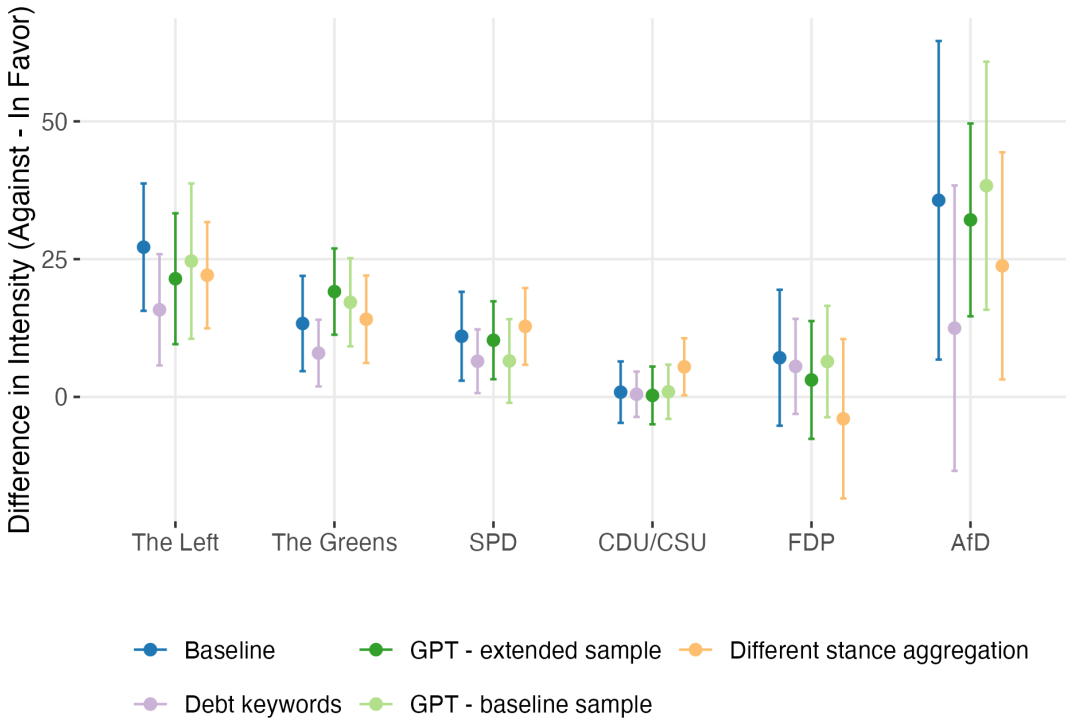
Note: The table shows the guilt slant in the speeches across different specifications. Count is the number of speeches classified as being against or in favor of public debt. Intensity is the number of guilt-connoted words. Relative frequency is the number of guilt-connoted words relative to the number of neutral words and guilt-connoted words. Guilt-connoted words are the words from the dictionary of debt-related keywords with the stem "schuld". Neutral words are the words with the stem "kredit" and the additional terms. Specifications: Baseline sample; Different aggregation: baseline with alternative aggregation of manual annotations using "mean score aggregation"; Debt keywords: baseline using only the most frequent debt-related terms to determine guilt wording and neutral wording; GPT - baseline sample: stance classifications from fine-tuned GPT-4 model on baseline sample. GPT - extended sample: stance classifications from fine-tuned GPT-4 model on all speeches containing debt-related keywords.

Figure C.5: Robustness Check: Differences in Average Intensity of Guilt-Connoted Language Between Speeches Against and In Favor of Public Debt



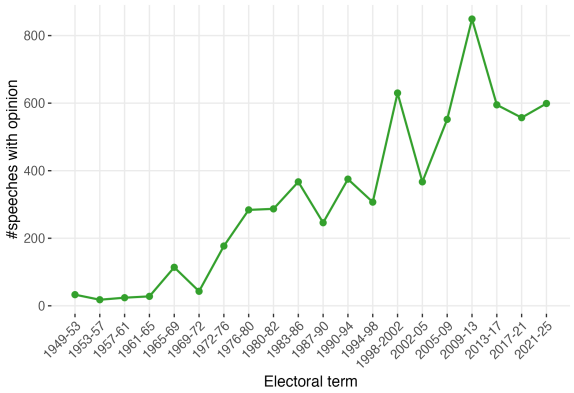
Note: The coefficients represent the average difference in the intensity of guilt-connoted words between the speeches against public debt and the speeches in favor of public debt within the electoral term. Confidence intervals based on robust standard errors. The coefficients (β_s) are estimated using the following regression: $Intensity_i = \delta_d + \sum_{s=12}^{20} \beta_s \mathbb{1}[d = s] \times against_i + \varepsilon_i$ where d is the electoral term and δ_d denotes fixed effects for each electoral term. Specifications: Baseline sample; Different aggregation: baseline with alternative aggregation of manual annotations using "mean score aggregation"; Debt keywords: baseline using only the most frequent debt-related terms to determine guilt wording and neutral wording; GPT - baseline sample: stance classifications from fine-tuned GPT-4 model on baseline sample. GPT - extended sample: stance classifications from fine-tuned GPT-4 model on all speeches containing debt-related keywords.

Figure C.6: Robustness Check: Differences in Average Intensity of Guilt-Connoted Language Between Speeches Against and In Favor of Public Debt by Party

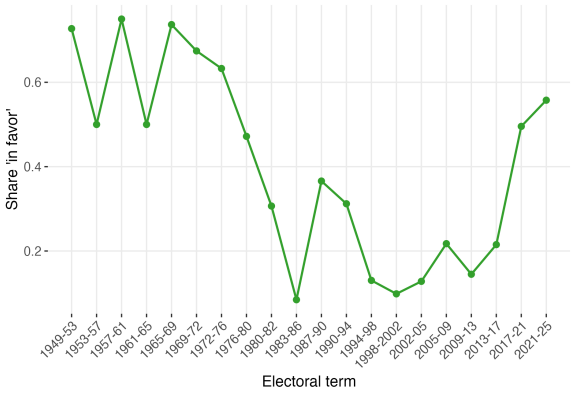


Note: The coefficients represent the average difference in the intensity of guilt-connoted words between the speeches against public debt and the speeches in favor of public debt within political parties. 95% confidence intervals based on robust standard errors. Specifications: Baseline sample; Different aggregation: baseline with alternative aggregation of manual annotations using "mean score aggregation"; Debt keywords: baseline using only the most frequent debt-related terms to determine guilt wording and neutral wording; GPT - baseline sample: stance classifications from fine-tuned GPT-4 model on baseline sample. GPT - extended sample: stance classifications from fine-tuned GPT-4 model on all speeches containing debt-related keywords.

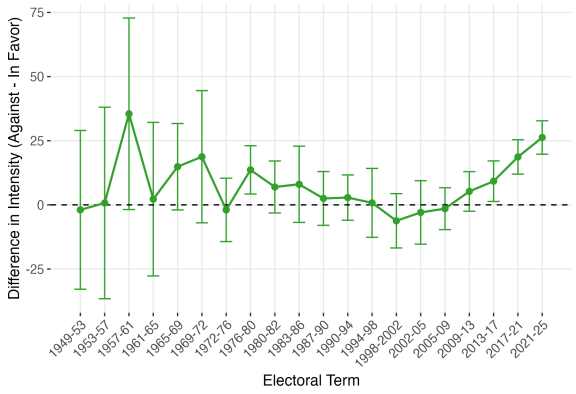
Figure C.7: Stance Toward Public Debt and Guilt Slant in Parliamentary Speeches, Electoral Terms 1–20



(a) Number of Speeches Against or in Favor of Public Debt



(b) Share of Speeches in Favor of Public Debt



(c) Difference in Average Intensity of Guilt-Connoted Language Between Speeches Against and in Favor of Public Debt

Note: This figure shows the evolution of stance toward public debt and guilt slant in German parliamentary speeches across electoral terms 1-20 (1949-2025). Panel (a) shows the number of speeches classified as being in favor or against public debt. Panel (b) shows the share of speeches classified as being in favor of public debt, among the speeches classified as being against or in favor of public debt. Panel (c) shows the coefficients that represent the average difference in the intensity of guilt-connoted words between the speeches against public debt and the speeches in favor of public debt within electoral terms and 95% confidence intervals. Confidence intervals are based on robust standard errors. Stance classification in all panels is based on a GPT-4 classifier fine-tuned on manually labeled speeches from 1990–2024 and applied to the full 1949–2025 corpus. See Section C.4 for details on the fine-tuning procedure.

Appendix D. Strategic wording in the context of private debt

Table D.1: Financial Product Advertisements Containing Guilt-Connoted Language

				Share with debt/guilt terms (%)	
Country	Total ads	Total reach	Total ads debt/guilt	Ads	Reach
Languages with debt-guilt connotation:					
DE	1,811	51,035,418	264	14.6	9.8
NL	838	11,869,628	81	9.7	5.5
SE	4,009	117,329,671	230	5.7	4.0
English-speaking (without debt-guilt connotation):					
GB	1,928	1,275,883	108	5.6	2.6
US	1,593	7,696,225	174	10.9	2.2

Note: This table shows Meta advertisements related to financial products and services across five countries (Germany, the Netherlands, Sweden, the UK, and the US), using data from Meta's Ad Library API retrieved on July 27, 2025. We searched for advertisements using country-specific keywords related to debt and credit: "debt", "loan" and "credit" for the US and the UK; "schulden", "kredit", "darlehen" for Germany; "schulden" "lening" and "krediet" for the Netherlands; and "skuld", "lån", "kredit" for Sweden. For each country, we report the total number of unique advertisements collected ("Total ads") and their cumulative reach ("Total reach"), measured as the number of times these ads were shown to users. Among these keywords, we specifically classified terms with guilt connotations ("schulden" in German, "schulden" in Dutch, and "skuld" in Swedish). We report both their absolute number ("Total ads with debt/guilt terms") and their relative frequency in terms of both the number of unique ads ("% of total ads") and their reach ("% of total reach"). Meta's Ad Library retains advertisements from the financial products and services category for up to one year after their last impression in the European Union. For non-EU countries only, currently active advertisements were available at the time of data collection, which accounts for the smaller sample size in those countries.

Figure D.1: Frequencies of Guilt-Connoted and Neutral Debt-Related Terms in German Financial Product Advertisements



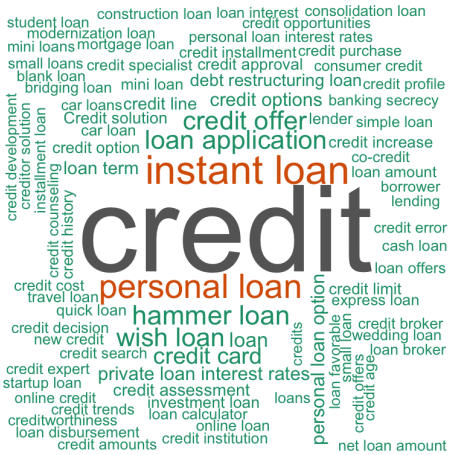
(a) Word Frequencies for Terms Containing 'schuld'



(b) Word Frequencies for Terms Containing 'kredit'



(c) Word Frequencies for Terms Containing 'schuld' (English translation)



(d) Word frequencies for terms containing 'kredit' (English translation)

Note: The word clouds show the relative frequencies of terms containing the stem 'schuld' (panel (a), English translation in panel (c)) and 'kredit' (credit/loan, panel (b), English translation in panel (d)) in German Facebook advertisements for financial products and services. The terms have been lemmatized. Font size indicates the term's frequency weighted by advertisement reach (the minimum threshold: 1,000 views in the EU). Data collected from Meta's Ad Library.

Table D.2: Noun+Verb Collocations in the Advertisements of Financial Products in Germany

With guilt-connotated words	With neutral words
Schuld + abbauen (debt + reduce)	Sofortkredit + erhalten (instant loan + receive)
Umschuldungskredit + finden (debt restructuring loan + find)	Kredit + finden (loan + find)
Schuldenkonsolidierung + finden (debt consolidation + find)	Sofortkredit + sichern (instant loan + secure)
Schuld + reduzieren (debt + reduce)	Kredit + beantragen (loan + apply)
Schuld + abzubezahlen (debt + pay off)	Kredit + suchen (loan + search)
Schuldenfrei + geben (debt-free + provide)	Kredit + anfragen (loan + request)
Schuldner + einigen (debtor + reach agreement)	Wunschkredit + helfen (desired loan + help)
Schuldenfrei + helfen (debt-free + help)	Kreditantrag + füllen (loan application + fill)
Entschuldungsverfahren + versprechen (debt relief process + promise)	Kredit + vergleichen (loan + compare)

Note: The table shows the most frequent verb-noun combinations (collocations) in German advertisements for financial services across Meta platforms. Collocations were identified using spaCy's dependency parser. The left column shows collocations with "Schuld"-based terms (carrying guilt connotation in German), while the right column shows collocations with neutral terms "Kredit" and "Darlehen". The frequency of collocations is weighted by the advertisements' reach (number of impressions). Collocations are presented in their original German form and English translation.