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Managers' cultural origin and corporate response to an economic shock

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ABSTRACT

We exploit the exogenous Covid-19 shock in a bicultural area of Italy to identify cultural differences in the way companies respond to economic shocks. Firms with managers of diverse cultural backgrounds resort to different forms of government aid, diverge in their investment decisions, and have different growth rates. These findings are consistent with cultural differences in time preferences and debt aversion. Specifically, we find that the response of managers belonging to a more long-term oriented culture is characterized by a lower recourse to debt, more investments and higher growth rates. Overall, our results show that the cultural origin of managers significantly affects firms' reaction to economic shocks and real economic outcomes.

1. Introduction

The Covid-19 pandemic had unprecedented effects on businesses across the world. Faced with severe contractions in corporate revenues and disruptions in the production process and the supply chain, many companies risked running into a liquidity shortage to cover their fixed costs and debt payments. The reaction to such challenges has been heterogeneous across firms in different countries, reflecting differences in (i) the geographical spreading of the virus, (ii) the restrictions to the free movement of people and business activities, (iii) the support packages arranged by governments to contrast the effects of the pandemic, and (iv) the composition of the business sector (e.g., relative proportion of small and medium enterprises (SMEs) that are more vulnerable to economic shocks, relative importance of sectors that are more exposed to the pandemic such as tourism).¹

In this paper we use the unexpected Covid-19 shock to economic activity to analyze whether the cultural origin of the firms' managers can help explain how companies respond to an exogenous shock. We define culture as the set of "beliefs and values that

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¹ The IMF Covid-19 policy tracker, available at <https://www.imf.org/en/Topics/imf-and-covid19/Policy-Responses-to-COVID-19>, contains a short background and a summary of key responses to the pandemic across countries. A comparison of GDP growth rates across countries is available from the World Economic Outlook database at: <https://www.imf.org/external/datamapper/datasets/WEO>.

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ethnic, religious, and social groups transmit fairly unchanged from generation to generation” (Guiso et al., 2006). Our research questions build upon a significant stream of literature that shows that individuals belonging to different cultures display important differences in their financial decisions and economic outcomes (see Guiso et al., 2006; Alesina and Giuliano, 2015, for comprehensive reviews on the topic). To the extent that firm managers are individuals whose financial decisions are affected by their cultural background, and that individual characteristics of managers are significant determinants of firm policies (see Bertrand and Schoar (2003) for an early contribution to the managerial style literature), then managers’ preferences—as shaped by their cultural origin—are likely to be reflected into firm policies.

Identifying the effect of management cultural origin on a company’s response to the Covid-19 pandemic is problematic, because firms with managers of different cultural groups are usually headquartered in different countries that, as highlighted above, vary in terms of policies and regulatory measures adopted to face the pandemic. Our identification strategy consists of two main elements. First, we exploit cultural differences in a sample of firms within a geographical area that shares a common economic and institutional setting: The autonomous province of South Tyrol in Northern Italy. Following the annexation to Italy in 1919, the former Austro-Hungarian area of South Tyrol hosts two main cultural groups: Italian and Germanic.² The two groups live next to each other but remain self-segregated in terms of most social interactions. Importantly for our study, as we shall explain in detail in Section 3, several papers have documented salient differences between the two cultural groups that could influence how firms respond to the Covid-19 shock. From a linguistic perspective, weak (strong) future-time reference languages such as German (Italian) have been associated with a stronger long-term (short-term) oriented behavior. Additionally, the German word for debt, *Schuld*, has a negative moral connotation (it can be translated into English as fault or guilt), while the Italian word for debt, *debito*, simply means to owe something. These differences between the two cultural groups enable us to formulate a range of hypotheses on their relative behavior in response to the pandemic. Compared to firms of the Germanic cultural group, firms from the Italian cultural group will likely resort more to debt, take up more government guaranteed bank loans, build up their current assets more, resort less to recapitalization, make fewer capital investments, and experience a lower asset growth. Due to its uniqueness, the South Tyrol setting has been used in previous studies to investigate the influence of culture on other economic and financial outcomes (Angerer et al., 2016; Sutter et al., 2018; Bedendo et al., 2020; Accetturo et al., 2023).

Focusing on South Tyrol ensures that all firms run by managers of either Germanic or Italian culture share the same institutional settings, not only in general, but also during the Covid-19 pandemic, being subject to a common set of restrictive measures and entitled to a common pool of governmental and provincial economic aid. While in the initial phase of the pandemic in Italy (March–April 2020), essentially all decisions were centralized at the government level and applied equally nationwide, in later stages restrictions to free movement of people or business activities could differ across regions or provinces based on local infection and hospitalization rates. Thus, while the response of Italian companies to Covid-19 might have been heterogeneous across regions because of local differences in the spreading of the virus and in the resulting institutional reactions, our sample firms were subject to a homogeneous set of measures within South Tyrol. In addition, South Tyrol is an excellent natural laboratory to study firm-level outcomes, as all firms in the province are privately held and most of them are owner managed, therefore: (i) the cultural origin of the firm can be assimilated to the cultural origin of its managers³; (ii) the cultural traits of managers are more likely to manifest themselves through firm policies; (iii) owner-managed firms are not prone to principal–agent problems. Finally, most firms in the province are micro and SMEs.⁴ These firms have limited access to capital markets and are more likely to be financially constrained and thus, more vulnerable to the liquidity shock caused by the pandemic than large firms. These features make our sample firms especially suitable for studying the response of businesses to an economic shock.

The second element in our identification strategy consists of the unexpected arrival of the Covid-19 pandemic, which represents an exogenous shock that allows us to identify the different responses of companies run by entrepreneurs of either cultural group using a difference-in-differences approach. In addition, the ample availability of financing made available by the government for virtually all firms during the pandemic mitigates the concern that firms’ responses were constrained by credit supply. Our sample includes all non-financial limited liability companies headquartered in South Tyrol with financial accounts available for the years 2018–2020. We enhance our specifications with firm and industry-year fixed effects. The former subsume all time invariant differences across firms, while the latter take into account any time-varying changes in responses to the pandemic, such as changes in the composition of individuals’ consumption across sectors, different lockdown regimes for essential and non-essential sectors, and heterogeneous government policy responses across sectors. Finally, our rich dataset allows us to control for time-varying firm characteristics, and to analyze a wealth of outcome variables. Overall, this empirical setup allows us to cleanly identify the effects of cultural origin on firm responses and firm resilience, while keeping constant the institutional setup, economic conditions, regulations, infrastructures, markets, and several firm and industry characteristics.

Our findings uncover significant cultural differences in firm responses to the Covid-19 shock. First, consistently with a dislike of individuals of Germanic origin towards debt financing, we find that firms of Italian origin are more likely to resort to government-guaranteed loans during the pandemic, while firms of Germanic origin recur more often to recapitalization. Second, in line with different time preferences across the two cultural groups, we find that firms with managers of Italian origin strengthen their position in current assets but invest less in fixed assets and have lower capital expenditures compared to the Germanic group. This can also be

² With “Germanic culture” (“Italian culture”) we refer to people who speak German (Italian) as mother tongue.

³ Throughout the paper, we will use managers’ cultural origin or firm cultural origin interchangeably.

⁴ Micro and SMEs, defined according to the European Union standards, as those with at most 250 employees and revenues up to €50 million or total assets up to €43 million, represent 97% of our sample firms.

explained by the Italian managers' preference for debt financing, which might deter investment through a debt overhang channel (Myers, 1997; Hennessy et al., 2007) and render short-term orientation optimal for shareholders (Hackbarth et al., 2022). Third, consistently with the lower investment in fixed assets and capital expenditures by firms of Italian origin, we find that asset growth rates for these firms are lower relative to firms of Germanic origin. Overall, our results support the hypothesis that Germanic culture is more long-term oriented than Italian culture and that such cultural traits can affect real economic outcomes.

Our paper contributes first and foremost to the literature analyzing the impact of culture on firm policies. Existing contributions associate culture with corporate risk taking (Li et al., 2015; Pan et al., 2017; Pan et al., 2020), corporate governance (Griffin et al., 2017), firm performance (Frijns et al., 2016; Delis et al., 2017), cash holdings (Chen et al., 2017) and firm financing (Chui et al., 2002; Li et al., 2011; El Ghouli and Zheng, 2016). Within this literature, our paper is mostly related to Bedendo et al. (2020), who use a similar empirical laboratory to analyze the role of culture in firm financing choices. This paper differs in several important ways. First, we use the exogenous and unexpected Covid-19 shock to neatly identify demand-driven effects, free from supply-side factors, given the virtually unrestricted access to credit provided by governments which was unique to this crisis episode. Second, we focus on several outcome variables which enable us to analyze differences in responses to an economic shock across cultural groups. Third, our findings show that cultural differences across firms can have real effects on the economy, by impacting long-term investments in fixed assets and capital expenditures, as well as firm growth.

Our study focuses on the effect of culture on the corporate response to a crisis. There are a few other papers that investigate the role of culture during times of crises. Nguyen et al. (2018) find that the cultural heritage of senior managers in a sample of U.S. banks affect firm policies and performance under competitive pressure, measured with the deregulation of interstate branching. Using an international sample of firms, Levine et al. (2018) conclude that firms are more resilient to systemic banking crises in economies with higher levels of social trust. Hasan et al. (2021) use the 2005 U.S. hurricane season to investigate the role played by religious beliefs (as a measure of culture) in mitigating a crisis and find that higher religious adherence spurs a stronger post-disaster productivity recovery. In the context of Covid-19, Francis et al. (2020) examine the impact of the pandemic on corporate borrowing across 31 countries and find some national cultural traits (trust, altruism, negative reciprocity, xenophobia) to be significant in explaining a company's recourse to debt during the pandemic. Paaso et al. (2021) conduct a survey of owner-managed SMEs in Finland and link, in a cross-sectional setting, the reluctance of entrepreneurs to undertake government-guaranteed debt during the Covid-19 pandemic with their debt aversion. We add to this strand of the literature by using a difference-in-differences empirical setting that allows us to neatly disentangle the effect of culture from other common confounders through both a strong exogenous shock to firms' operations and a single administrative region as a natural laboratory. While our results are specific to the bicultural context under study, they shed light on the role of culture in explaining cross-country differences in responses to economic shocks.

Finally, our paper also contributes to the burgeoning literature on the impact of Covid-19 on firms. Early contributions on the topic are based on surveys conducted in the initial stages of the pandemic (see, among others, Bartik et al., 2020 or Bartlett III and Morse, 2020 on U.S. firms; Balduzzi et al., 2020 on Italian firms). Other early papers propose models to draw predictions on the consequences of the pandemic on firm performance and survival (see Schivardi et al., 2020; Carletti et al., 2020 on Italian firms). A third stream of studies focus on publicly listed firms to investigate the link between the stock price response to Covid-19 and various corporate characteristics (see, among others, Fahlenbrach et al., 2021; Ding et al., 2021). Differently from these contributions, we study the actual impact of the pandemic on firm policies and outcomes for a sample of SMEs, exploiting the availability of annual financial accounts for limited liability firms of any size in Italy. Also, as emphasized above, our work is one of few studies that attempt to link the cultural heritage of the firm with its response to the Covid-19 shock. In the context of Covid-19, the role of culture has been mostly examined in relation to compliance of individuals with public health recommendations during the pandemic (e.g., Bargain and Aminjonov, 2021; Durante et al., 2021).

2. Institutional background

South Tyrol is a province in Northern Italy located at the border with Austria and Switzerland. As discussed in more detail in Appendix 1, this area was originally part of the Austro-Hungarian Empire and was annexed to Italy at the end of the First World War. Because of its historical background, 70% of the population in South Tyrol is of Germanic origin and speaks German as their mother tongue (Istituto Provinciale di Statistica, 2015), while the rest of the population consists mainly of Italians who immigrated to the province after the annexation. Residents in the province have the formal right to use their mother tongue on all occasions, allowing the two linguistic groups to preserve their culture, as everyday life activities (such as childcare, eldercare, and schooling) are de facto separated for each language group. In 1972, the province was granted an autonomous status, which entails considerable legislative and executive independence from the national Italian government in most economic and social matters. Hence, all firms headquartered in South Tyrol are subject to autonomous regulations that are set at the province level with the provincial chamber of commerce in charge of their enforcement. Importantly for our study, all sample firms share the same legal, economic, and regulatory framework.

South Tyrol entered the first lockdown on 10 March 2020, at the same time as the rest of Italy. Italy was the first Western economy to experience a widespread epidemic of Covid-19: Two weeks after the first local case was recorded in Lombardy on 21 February 2020, the government introduced a national lockdown, restricting the movement of the population and mandating the closure of all non-essential business activities. These measures hit companies in a sudden, unpredictable, and unprecedented manner, making Covid-19 a truly exogenous shock. Business activities were allowed to gradually reopen only from May 4. In these two months, 44.4% of firms in South Tyrol (compared to 45% in Italy) halted their economic activity (ASTAT, 2020). Following a new Covid-19 wave, in October–November 2020 the Italian government reinstated some general restrictions and at the same time allowed regional flexibility in the adoption of more restrictive measures by introducing three zones (yellow, orange, and red) based on local infection and

hospitalization rates. South Tyrol was classified as red zone for most of the second wave. Whilst having the highest regional GDP per capita in Italy in 2019,⁵ the province was badly hit by the pandemic. Between February and December 2020, it recorded the second highest infection rate per 100,000 people and the fourth highest excess mortality rate (compared to the average death rate over 2015–19) of the 21 regions and autonomous provinces in Italy (ISTAT-ISS, 2021). The spread of Covid-19 took a heavy toll on the economy of South Tyrol, leading to a 9% contraction in GDP in 2020, compared to a national average of 8.9% (ISTAT, 2021).⁶

In the weeks following the first lockdown, the Italian government adopted a wide range of measures aimed at mitigating the negative impact of a temporary curtailment in economic activity on businesses. In the following paragraphs we summarize the main measures introduced to ensure that companies would have sufficient liquidity to weather the Covid-19 storm.⁷

First, the government introduced a moratorium on loan payments (notional and interests) and rental payments for micro firms and SMEs. Second, in a similar spirit, the payment of corporate taxes was suspended, and partially cancelled by a later decree for certain taxes. Third, the government strengthened and extended the public guaranteed scheme for bank business loans. Under the new rules, approved in April 2020, bank loans to micro and SMEs up to €25,000 (increased to €30,000 in June 2020) are 100% guaranteed by the Guarantee Fund (*Fondo di Garanzia*). No fee is charged to the borrower to obtain the guarantee and the interest rate applied by the bank on the loan shall only cover the appraisal costs and the expenses to manage the transaction. The Fund also guarantees 90% of loans over €30,000 (up to a maximum of €5 million) for companies below 500 employees. The guarantee is also free of charge, but, unlike fully guaranteed loans, these loans carry an interest rate freely determined by the bank.⁸ Large firms with more than 500 employees that were not eligible to the Guarantee Fund scheme for SMEs could apply for public guarantees between 70% and 90%.

Fourth, the government launched a novel set of measures aimed at supporting companies that decided to recapitalize. For companies with a turnover between €5 and €50 million that recapitalized before 31 December 2020, the government introduced tax incentives in the form of tax credits for recapitalization, and an SME capital fund for subscribing newly issued subordinated debt securities (i.e., hybrid capital).⁹ Fifth, non-refundable grants were introduced for companies with a turnover of up to €5 million in 2019 and a loss of at least one third in revenues between April 2019 and April 2020. Additional non-refundable grants were available for sectors severely affected by the pandemic (e.g., catering or tourism).

A common feature to all measures of public aid is that eligible companies must have experienced a sizeable decrease in revenues (for recapitalization aid and non-refundable grants) or a temporary liquidity shortage (for government-guaranteed loans) because of Covid-19 but were not in distress before the onset of the pandemic. Companies that had bank exposures classified as non-performing or impaired loans before the pandemic are excluded from the bank moratorium and the government guaranteed loan scheme. To grant quick access to funding for micro and SMEs, the application process for the moratorium on loans and for fully guaranteed loans is also greatly simplified. The applicant submits a self-declaration to its bank certifying how the business has been affected by Covid-19, and the bank accepts the moratorium request or disburses the loan after verifying that the company meets the formal requirements without any further assessment of the firm creditworthiness. No appraisal is carried out on the applicant by the Guarantee Fund and the guarantee is automatically granted.

The exceptional availability of different types of governmental aid and the ease of access to these programs (especially for micro and SMEs) ensure that our analysis is not confounded by supply-side effects of firm financing, and that the choice of whether to exploit these opportunities was entirely demand-driven. Consistently with this statement, several studies document how a significant part of state aid offered by European countries during the pandemic was unused. Core and De Marco (2021) observe a low take-up of government-guaranteed loans in Italy. Similar findings apply to the UK and Spain (The Economist, 2020) as well as Finland (Paaso et al., 2021). Amberg and Jacobson (2021) show that credit supply remained stable in Sweden and that changes in bank business loans were demand driven.

3. Research design

3.1. Hypotheses

Previous research provides good reasons to believe that managers' cultural differences will play a significant role in explaining their response to an exogenous economic shock. It has been shown that individuals of Germanic culture have a longer-term orientation than individuals of Italian cultural origin. For example, Chen (2013) finds that individuals who speak a language in which future actions are typically expressed in the present tense (i.e., weak future-time reference languages, such as German) display stronger future-oriented behavior than individuals who speak a language with a strong future-time reference (such as Italian). Sutter et al. (2018) validate these predictions in South Tyrol by means of an experiment on intertemporal choices in a sample of German-speaking and Italian-speaking primary school children. The long- vs short-term orientation of the two cultures and other cultural differences among the groups could

⁵ Retrieved from www.ec.europa.eu/Eurostat.

⁶ For comparison, in 2019 the GDP increase in the province was 1.4% against a national average of 0.4%.

⁷ In addition to these measures, all companies headquartered in Italy were banned from laying off employees from February 2020 to June 2021.

⁸ The Italian public loan guarantee program was not a novelty, as it was first introduced in 2000 and had played an important role in supporting SMEs during the financial and sovereign crisis (de Blasio et al., 2018). It was however, greatly extended in size and scope to help companies overcome the Covid-19 liquidity crunch.

⁹ Further measures in support of recapitalization were designed for large companies with a turnover above €50 million but were only implemented from July 2021.

affect firm managers' response to the pandemic in terms of financing and investment decisions.

In terms of financing, government support during the pandemic was provided in the form of both government-guaranteed loans and recapitalization aid and—differently to previous crises such as the 2008–2009 financial crisis, and the subsequent sovereign debt crisis—it was readily available to all financially sound firms (see Section 2). This implies that firms led by managers of Italian and German cultural origin will find it equally easy to access either type of government aid. However, firms of Germanic origin may prefer to keep their leverage low for a number of reasons. First, the future-oriented behavior of German-speaking individuals has been associated in Chen (2013) to a higher household's net worth (defined as real plus financial assets minus debt). Even though the negative association between long-term oriented behavior and debt has been established for individuals, it seems reasonable to extend it to our setting of manager-owned micro- and SMEs. Second, the German word for debt, *Schuld*, has a negative moral connotation (it can be translated into English as fault or guilt), while the Italian word for debt, *debito*, simply means to owe something. From a purely linguistic viewpoint, we can therefore predict different preferences for equity and debt across the two groups. Bedendo et al. (2020) find that South Tyrolean firms run by managers from the Italian cultural group resort more to external debt financing than firms run by individuals from the Germanic group. Following these ideas, we expect firms of Italian (Germanic) cultural origin to resort relatively more to debt (equity) to weather the Covid-19 shock. We formulate our first hypotheses as follows:

H1a. Firms from the Italian cultural group will resort more to debt during the pandemic compared to firms of the Germanic cultural group.

H1b. Firms from the Germanic cultural group will resort more to recapitalization during the pandemic compared to firms from the Italian cultural group.

Data availability on the take-up of government-guaranteed loans also enables us to add one hypothesis related to H1a¹⁰:

H1c. Firms from the Italian cultural group will resort more to government guaranteed bank loans during the pandemic compared to firms of the Germanic cultural group.

In terms of investment, if firms of Germanic origin are more long-term oriented in their intertemporal choices, they will be more likely to favor long-term capital investments (such as investment in fixed assets and capital expenditures) compared to firms of Italian origin. For the same reason, firms of Italian origin will be more focused on strengthening their position in short-term assets, such as current assets, compared to the firms of Germanic origin. In addition, the relative preference for debt of Italian managers could lead these firms to increase their indebtedness to a higher extent than firms of Germanic origin. Higher debt could lead to debt overhang issues (Myers, 1997; Hennessy et al., 2007), which could in turn lower the relative incentives of firms of Italian origin for capital expenditures, reinforcing the effect of time preferences on capital investments. Following these arguments, we formulate two hypotheses as follows:

H2a. Firms from the Germanic cultural group will make more capital investments during the pandemic compared to firms of the Italian cultural group.

H2b. Firms from the Italian cultural group will build up their current assets during the pandemic more compared to firms of the Germanic cultural group.

Hackbarth et al. (2022) argue that short-termism can represent an optimal response of shareholders to debt financing, to mitigate potential wealth transfers in favor of debtholders in case of a bankruptcy. Debt can increase short-termism especially in times of distress and/or for shareholders with a shorter time horizon. In their setting, an increase in short-term effort makes long-term effort more costly, thereby undermining long-term investment and growth. In sum, the higher reliance on debt as a form of financing of firms of Italian origin can therefore lead these firms to become more short-term oriented during the pandemic, ultimately affecting these firms' future growth. From this relation we derive our final hypothesis, which is formulated as:

H3. Firms from the Italian cultural group will experience a lower asset growth compared to firms of the Germanic cultural group.

3.2. Data and cultural origin classification

Our data consist of all non-financial limited liability firms headquartered in the South Tyrol province with balance sheet data available for all the years 2018, 2019 and 2020 (the latest available year at the time of writing) from AIDA Bureau van Dijk. To ensure a good match between the reported financial data and the start of the pandemic, we only keep firms with fiscal year ending on 31 December.

We retrieve the latest available data on the management and the board composition of our sample firms. We proceed by classifying firm managers into their cultural groups following the methodology used in Bedendo et al. (2020) and Accetturo et al. (2023). As in Grinblatt and Keloharju (2001), this approach is based on the given names and surnames of the firm managers. More precisely, we utilize search algorithms that identify the most common Germanic surnames, Germanic male given names, Germanic female given names, Italian surnames, Italian male given names, and Italian female given names to establish whether the managers are

¹⁰ Unfortunately, detailed data on the corporate take-up of other forms of government support (e.g., recapitalization aid and non-refundable grants) are not available.

predominately of Germanic or Italian cultural origin.¹¹ A manager is classified as having a Germanic (Italian) cultural origin if all his/her given names and surname can be found in the Germanic (Italian) listings. All classifications have been manually double checked to validate the output of the search algorithms. Crucially, our approach helps us identify individuals from bicultural families, considering that such instances are most likely to manifest themselves through mixed names (i.e., a Germanic first name and an Italian surname, or vice-versa). Examples of our classification are provided in [Appendix 2](#). Of the 8365 managers processed, 457 (5.5%) are classified as neither Germanic nor Italian, 432 (5.2%) as bicultural, 4888 (58.4%) as Germanic and 2599 (31.1%) as Italian. The final step is the classification of the firm's management as a whole. A firm where more than 50% of the highest executives and board members are classified as of Germanic (Italian) origin is subsequently classified as Germanic (Italian).¹² We discard firms that do not belong to these two groups. With the help of historical AIDA files, we reconstruct the board composition of our sample firms in 2018, and only retain firms whose cultural origin remains unchanged over the entire sample period. This ensures that the policies adopted by a given firm can be uniquely associated with one cultural group both before and during the pandemic. Our cultural classification at firm level yields 29% of firms of Italian origin, and 71% of firms of Germanic origin, much in line with the population distribution of the two linguistic groups in the province. The final sample is a balanced panel dataset consisting of 4561 firms observed over the 2018–2020 period.

[Fig. 1](#) gives an overview of our empirical laboratory. The upper map illustrates the linguistic composition of South Tyrol by municipality, measured by the distribution (quartiles) of German-speaking residents. Data are collected from the website of the institute of statistics of South Tyrol (ASTAT) and are based on the 2011 Census, where individuals were asked to self-report their linguistic group. Dark red (blue) areas indicate the lowest (highest) percentages of German speakers. Most municipalities are predominantly German-speaking, although there is a substantial variation in the percentage of Italian-speaking residents. The lower map illustrates the quartile distribution of firms by municipality based on the proportion of firms from either cultural group. Dark red (blue) areas indicate the lowest (highest) percentages of German speaking managers. Comparing the two maps, we note that the cities with the largest proportions of firms of Italian origin are mostly, but not always, those cities where the population is predominantly Italian speaking.

3.3. Regression specifications

To analyze whether the managers' cultural background affects the firm's response to an economic shock, we estimate regressions of the following general form over the period 2019–2020:

$$y_{i,t} = \alpha + \beta(\text{Covid} \times \text{Italian origin}_i) + \gamma' X_{i,t-1} + \delta_i + \theta_{s(i)} \times t + \varepsilon_{i,t} \quad (1)$$

The dependent variable $y_{i,t}$ represents various outcome variables measuring firm i 's responses to the shock (i.e., leverage, use of government-guaranteed loans, recapitalization, investments, etc.) and firm growth. *Covid* is a dummy variable which equals one for the year 2020, and zero for 2019.¹³ *Italian origin_i* is a dummy variable that takes a value of one if firm i belongs to the Italian cultural group, and zero if it is of Germanic cultural origin. Our focus is on the coefficient of the interaction term, β . The null hypothesis is that the pandemic should not differentially affect firms in the two cultural groups. Rejection of the null hypothesis would mean that the two cultures are differently affected by the Covid-19 shock. Our specification thus enables us to assess to what extent cultural traits contribute to the firm's effort in mitigating the pandemic once controlling for pre-existing differences across firms.

As mentioned in the introduction, our identification strategy is based on the exogenous and unexpected nature of the Covid-19 shock, and on the homogeneous economic and institutional framework in South Tyrol, both before and during the pandemic. In addition, our specifications include $X_{i,t-1}$, a vector containing *firm age* and one-year lags of variables *size* and *Z-score*. These control variables are standard indicators of financial constraints and account for the differential access to government support granted on the base of size and creditworthiness (as discussed in [Section 2](#)).¹⁴ Our specifications also include firm fixed effects, δ_i , which control for all time invariant factors at the firm level that might affect the outcome variables, including the general effect of belonging to one of the two cultural groups and the firm's location. Finally, we add interacted industry-year fixed effects, $\theta_{s(i)} \times t$, which control for any time-varying changes in response to the pandemic which are common within sectors. We classify our sample firms into 18 main industrial sectors based on the Statistical Classification of Economic Activities in the European Community (NACE) codes. These fixed effects absorb factors such as shifts in the composition of consumption, changes in demand, generalized production or supply chain issues within a given sector, different lockdown regimes and government support schemes across sectors before and during the pandemic. We

¹¹ Italian first- and surnames are retrieved from [Nomi Italiani Maschili e Femminili](#) and [Cognomi Italiani](#), respectively. Germanic first names are retrieved from [Deutsche Vornamen mit Bedeutung und Herkunft](#). Germanic surnames are retrieved from [Verzeichnis:Deutsch/Namen/die häufigsten Nachnamen Deutschlands](#), [Nachnamen-Verbreitungskarten für Österreich](#), and [Familiennamendatenbank](#).

¹² We look at the cultural classification of the highest executives and directors instead of only the CEOs since previous studies emphasize the role of all top managers and directors in shaping corporate culture (see [Pan et al., 2017](#)). The results discussed in the paper are nevertheless robust to focusing on the cultural origin of the CEO only. To single out the cultural impact of the CEO from that of the directors, one should look at instances where the CEO's cultural origin differs from that of the board. This is, however, unfeasible in our sample of small and privately held firms, since in 99.6% (98.1%) of cases, a firm with a board of Italian (Germanic) origin is led by a CEO from the same cultural group.

¹³ We use observations for year 2018 to compute lags. Our estimations and summary statistics are calculated over 2019–2020 throughout.

¹⁴ A more precise measure of eligibility of our sample firms to the different support measures cannot be computed, given the unavailability of the data that would be needed to identify eligible firms (such as changes in revenues between April 2019 and April 2020, classification of bank loans in performing, non-performing or impaired, etc.).

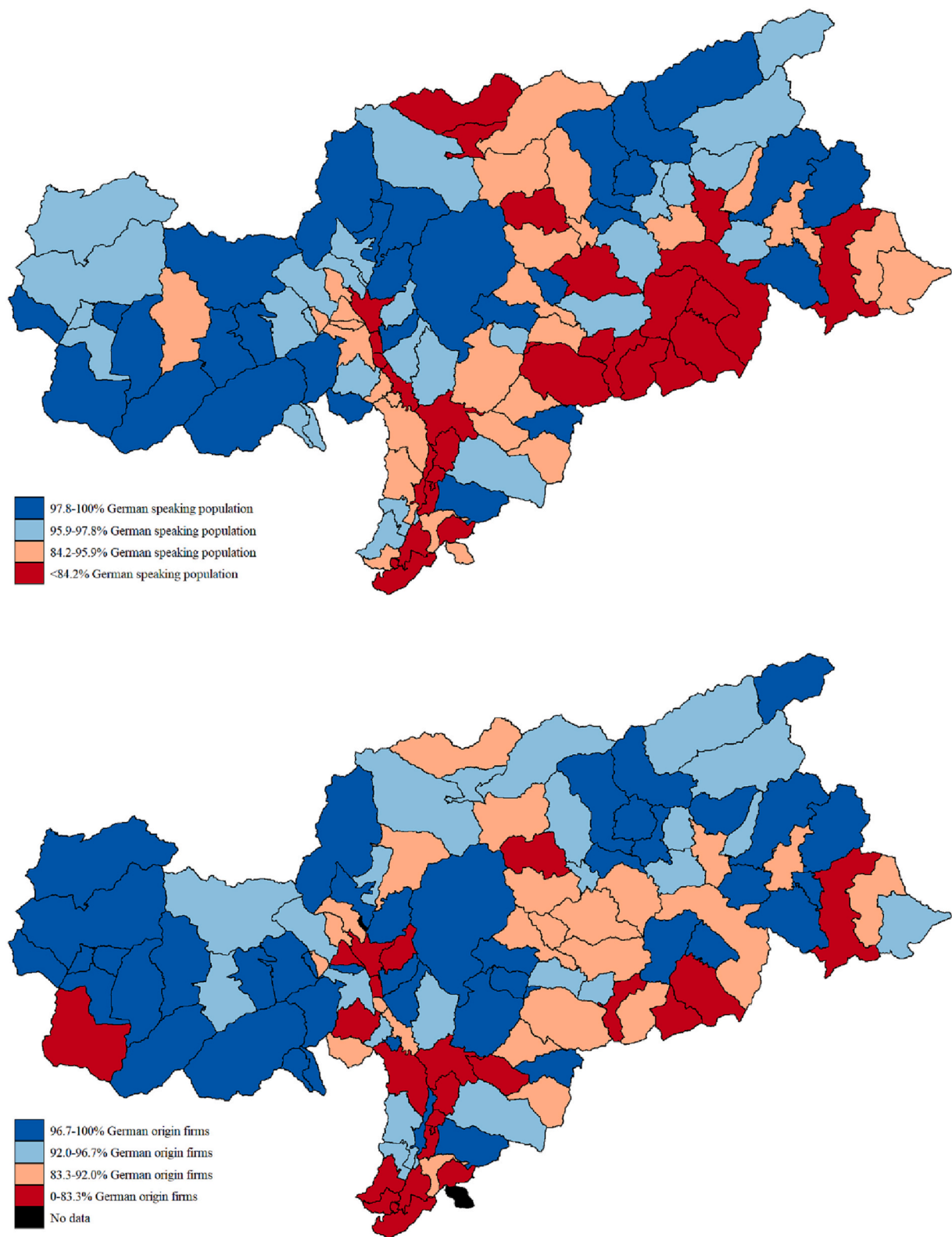


Fig. 1. Language mix in South Tyrol. This figure shows the quartile distributions of municipalities in South Tyrol based on language mix (upper map) and percentage of firms run by managers of Germanic cultural origin (lower map).

Table 1
Summary statistics.

	N	Mean	St. dev.	Median
	(I)	(II)	(III)	(IV)
Italian origin	9122	0.29	0.46	0.00
Gender indicator	9122	1.8	0.30	2
Managers' age (years)	9118	53	10	53
Firm age (years)	9122	15	13	11
Revenues ('000 €)	9122	4340	39438	572
Employees	8920	17	175	2
Size ('000 €)	9122	7012	46913	1171
Total liabilities/Total assets	9122	0.57	0.32	0.58
(Equity + reserves)/Total assets	9122	0.34	0.32	0.25
Government guaranteed loans indicator	9122	0.11	0.31	0.00
Government guaranteed loans/Total assets	9122	0.01	0.05	0.00
Operating grant indicator	9098	0.48	0.50	0.00
Operating grants/Total assets	9098	0.02	0.06	0.00
Italian origin (limited sample)	3766	0.32	0.47	0.00
Gender indicator (limited sample)	3766	1.8	0.28	2
Managers' age (years, limited sample)	3764	53	9.2	53
Total debt/Total assets	3766	0.23	0.25	0.15
Bank debt/Total assets	3766	0.18	0.22	0.09
Total debt/Total liabilities	3762	0.37	0.35	0.32
Bank debt/Total liabilities	3762	0.29	0.32	0.18
Accounts payable/Total assets	3766	0.15	0.17	0.09
Accounts receivable/Total assets	4014	0.19	0.21	0.12
Capex/Total assets	9122	0.07	0.14	0.01
Current assets/Total assets	9122	0.58	0.34	0.64
Fixed assets/Total assets	9122	0.34	0.33	0.22
ΔSize	9122	0.10	0.38	0.02
EBITDA margin	8178	0.37	1.14	0.12
ROA	9122	0.03	0.15	0.02
Wage per capita	5540	3.26	0.98	3.50
Wage/Revenues	8178	0.17	0.19	0.13
Productivity per capita	7966	4.99	1.24	4.96
Cost for material and services/Revenues	8178	0.81	1.27	0.64
Z-score	9122	5.73	19.05	2.18

This table reports summary statistics for the panel dataset consisting of all non-financial firms headquartered in South Tyrol during years 2019 and 2020. All variables are described in detail in [Appendix 3](#).

cluster standard errors at the firm level.

4. Cultural differences in the response to the Covid-19 shock

4.1. Summary statistics

[Table 1](#) reports basic summary statistics on the panel of our sample firms over the period 2019–2020. A detailed description of how all variables are constructed is presented in [Appendix 3](#). Our key variable is the dummy *Italian origin*, which captures the cultural origin of the firm. As mentioned before, 29% of the firms belong to the Italian origin category, which is well in line with the overall percentage of the Italian-speaking population in South Tyrol.

The managers are predominately male (80%) with an average for *Managers' Age* of 53 years. Though the mean (median) *Firm age* is as high as 15 years (11 years), none of the sample firms is publicly traded (untabulated), and the firms are generally small: Mean (median) *Revenues* amount to €4.3 million (€0.6 million), the mean (median) average yearly number of *Employees* is 17 (2), and *Size*, measured as total assets, have mean (median) values of €7.0 million (€1.2 million).

For tests of H1, we require measures of the firm's recapitalization and liability structure. We choose the proportion of shareholder funds not explained by current profits or retained earnings over total assets, $(Equity + reserves)/Total\ assets$, as a measure of equity capitalization, which amounts to 0.34 (0.25) in mean (median) for our sample firms on a yearly basis over the whole period. The mean (median) leverage computed as *Total liabilities over total assets* is 0.57 (0.58). This measure is admittedly a rough proxy of firm debt, as it includes some non-debt liabilities such as unpaid taxes. For a limited sample consisting of the largest sample firms only, we have more

Table 2
Differences in mean values of firm characteristics.

	Overall			Pre-pandemic			Pandemic		
	Mean G.	Mean It.	t-test	Mean G.	Mean It.	t-test	Mean G.	Mean It.	t-test
	(I)	(II)	(III)	(IV)	(V)	(VI)	(VII)	(VIII)	(IX)
Gender indicator	1.85	1.83	2.32**						
Managers' age (years)	52	54	-6.34***						
Firm age (years)	16	15	2.69***						
Size	7.11	6.84	6.08***	7.04	6.79	4.07***	7.17	6.89	4.53***
Total liabilities/Total assets	0.56	0.60	-5.16***	0.58	0.61	-2.86***	0.53	0.58	-4.42***
(Equity + reserves)/Total assets	0.35	0.33	2.68***	0.32	0.31	0.85	0.38	0.35	2.94***
Government guaranteed loans indicator	0.09	0.14	-6.51***	0.02	0.04	-3.54***	0.16	0.24	-5.85***
Government guaranteed loans/Total assets	0.01	0.02	-6.51***	0.00	0.01	-3.11***	0.02	0.03	-5.91***
Operating grant indicator	0.49	0.45	3.53***	0.26	0.23	1.93*	0.72	0.67	3.59***
Operating grants/Total assets	0.02	0.03	-5.21***	0.01	0.02	-2.62***	0.03	0.04	-4.61***
Capex/Total assets	0.07	0.06	4.45***	0.04	0.05	-0.92	0.10	0.07	6.25***
Current assets/Total assets	0.57	0.61	-5.32***	0.58	0.61	-3.15***	0.56	0.61	-4.37***
Fixed assets/Total assets	0.35	0.31	5.04***	0.34	0.31	2.89***	0.36	0.32	4.22***
ΔSize	0.10	0.10	0.34	0.06	0.09	-1.94*	0.13	0.10	2.43**
EBITDA margin	0.34	0.44	-3.49***	0.32	0.41	-2.42**	0.36	0.47	-2.54**
ROA	0.04	0.03	2.05**	0.04	0.03	1.83*	0.03	0.03	1.05
Wage per capita	3.34	3.06	8.33***	3.37	3.13	5.35***	3.30	2.99	6.43***
Wage/Revenues	0.17	0.17	1.07	0.17	0.16	0.70	0.17	0.17	0.81
Productivity per capita	5.02	4.90	3.93***	5.08	4.98	2.38**	4.96	4.82	3.17***
Cost for material and services/Revenues	0.81	0.81	-0.09	0.79	0.77	0.39	0.83	0.86	-0.46
Z-score	6.11	4.83	3.19***	6.03	4.61	2.56**	6.18	5.05	1.96*

This table reports *t*-tests for differences in means of firm characteristics across non-financial firms headquartered in South Tyrol with managers of Italian (*It.*) and Germanic (*G.*) cultural origin for years 2019–2020 (*Overall*), as well as 2019 (*Pre-pandemic*) and 2020 (*Pandemic*), separately. All variables are described in detail in [Appendix 3](#).

detailed information on the structure of assets and liabilities.¹⁵ In this limited sample, we observe that the mean (median) proportion of *Total debt over total assets* is 0.23 (0.15), *Bank debt over total assets* is 0.18 (0.09), *Accounts payable over total assets* is 0.15 (0.09) and *Accounts receivable over total assets* is 0.19 (0.12). The last two variables measure these larger firms' recourse to trade credit and their provision of credit to their clients, respectively. We include them for completeness in our analysis of sources of external financing.

In terms of use of government aid, loan level data on the universe of guaranteed loans are publicly available from the *Fondo di Garanzia*. The data include basic information on the borrower that obtained the guarantee, the amount of the loan and the guarantee, and the date when the guaranteed loan was granted. We match this information to our sample firms based on the tax code and find that 11% of the firms took *Government guaranteed loans*, which is consistent with the overall low take up of 16% documented by [Core and De Marco \(2021\)](#) for Italian firms. Non-refundable grants from all sources (provincial, national, European, etc.) are booked as *Operating grants*, which are used by 48% of our firms.

To test H2, we measure corporate investments as *Capex over total assets*, *Current assets over total assets*, and *Fixed assets over total assets*. The mean (median) values for these measures amount to 0.07 (0.01), 0.58 (0.64), and 0.34 (0.22), respectively. We gauge the impact of the pandemic on firm growth through the yearly log change in total assets, whose mean (median) value over the whole period is 0.10 (0.02).

Other variables of interest—which are not the focus of our study given the lack of predictions on how they could be directly impacted by culture—include profitability measures such as the *EBITDA margin* and *Return on Assets (ROA)*. Their respective means (medians) are 0.37 and 0.03 (0.12 and 0.02). Looking at the composition of operating costs, we note that *Wages* and *Costs for material and services* on average constitute 17% and 81%, respectively, of revenues. The *Z-score* reveals that the sample firms are on average financially healthy with a mean (median) score of 5.73 (2.18).

In [Table 2](#), we compare the characteristics of the full sample firms led by managers of Italian and Germanic origin by means of *t*-tests for differences in means for the 2019–2020 period as a whole (columns I to III), as well as for the pre-pandemic (columns IV to VI) and pandemic (columns VII to IX) years respectively. Firms of Italian origin are slightly younger than firms of Germanic origin and are led by managers who are slightly older and more likely to be female. Importantly for our analysis, firms from the former group are smaller, more indebted (in terms of total leverage and government guaranteed funding), have more (less) current (fixed) assets, higher operating margins, lower wage and productivity per capita, and lower *Z-score* than firms from the latter group before Covid-19. We account for these and other pre-pandemic differences by using firm fixed effects throughout our analyses. Additionally, in [Section 5](#) we replicate our difference-in-differences analyses on a sample of firms of Italian and Germanic origin matched according to those variables that differed the most in the pre-pandemic period.

¹⁵ The size of a firm has implications with respect to the availability of data. Small firms only need to report a simplified balance sheet to the Chamber of Commerce. Subsequently, for 59% of the sample, we lack detailed information on the debt and asset structure. The characteristics of the managers of the limited sample closely resemble those of the full sample with respect to their cultural origin, age, and gender distribution (see [Table 1](#)).

Table 3
Capital structure.

	Total liabilities/Total assets	(Equity + reserves)/Total assets	Government-guaranteed loans indicator	Government-guaranteed loans/Total assets
	(I)	(II)	(III)	(IV)
Italian origin × Covid	0.013** (0.006)	−0.018*** (0.006)	0.070*** (0.013)	0.011*** (0.002)
Size _{t-1}	−0.018** (0.008)	0.040*** (0.012)	0.014 (0.012)	−0.001 (0.003)
Firm age _t	0.120*** (0.035)	−0.161*** (0.041)	−0.171*** (0.058)	0.012 (0.011)
Z-score _{t-1}	0.000 (0.000)	0.001 (0.000)	−0.000 (0.000)	−0.000 (0.000)
Firm FE	Yes	Yes	Yes	Yes
Industry-Year FE	Yes	Yes	Yes	Yes
Observations	9122	9122	9122	9122
R-squared	0.933	0.918	0.611	0.580

This table reports estimates from [regression \(1\)](#) over a panel dataset consisting of all non-financial firms headquartered in South Tyrol during years 2019 and 2020. *Italian origin* is an indicator variable equal to one (zero) for firms of Italian (Germanic) cultural origin. *Covid* is a dummy taking the value one for year 2020, zero otherwise. These and all other variables are described in detail in [Appendix 3](#). Standard errors in parentheses are clustered at the firm level. *, **, and *** indicate statistical significance at the 10%, 5%, and 1% levels, respectively.

Table 4
Debt structure.

	Total debt/Total assets	Bank debt/Total assets	Total debt/Total liabilities	Bank debt/Total liabilities	Accounts payable/Total assets	Accounts receivable/Total assets
	(I)	(II)	(III)	(IV)	(V)	(VI)
Italian origin × Covid	0.012* (0.007)	0.014** (0.006)	0.018** (0.009)	0.019** (0.008)	−0.001 (0.004)	0.001 (0.005)
Size _{t-1}	0.019** (0.009)	0.015* (0.009)	0.034** (0.015)	0.023** (0.012)	0.001 (0.008)	−0.007 (0.008)
Firm age _t	0.102** (0.047)	0.121*** (0.034)	−0.014 (0.057)	0.035 (0.043)	−0.011 (0.032)	0.047 (0.034)
Z-score _{t-1}	−0.000 (0.000)	−0.000 (0.000)	−0.000 (0.001)	−0.000 (0.001)	−0.000 (0.000)	−0.000 (0.000)
Firm FE	Yes	Yes	Yes	Yes	Yes	Yes
Industry-Year FE	Yes	Yes	Yes	Yes	Yes	Yes
Observations	3766	3766	3762	3762	3766	4014
R-squared	0.939	0.935	0.944	0.944	0.935	0.943

This table reports estimates from [regression \(1\)](#) over a panel dataset consisting of all non-financial firms headquartered in South Tyrol during years 2019 and 2020 that file detailed financial accounts with available data on the debt structure. *Italian origin* is an indicator variable equal to one (zero) for firms of Italian (Germanic) cultural origin. *Covid* is a dummy taking the value one for year 2020, zero otherwise. These and all other variables are described in detail in [Appendix 3](#). Standard errors in parentheses are clustered at the firm level. *, **, and *** indicate statistical significance at the 10%, 5%, and 1% levels, respectively.

4.2. Response to the economic shock

In [Table 3](#) we begin our investigation on whether firms' responses to the pandemic shock are partly determined by the cultural origin of the managers. The table reports estimates from Eq. 1 aimed at testing hypotheses H1a-H1c. The dependent variables represent various forms of firm financing. We note from column I that firms from the Italian group increased their leverage in the pandemic year relatively more than firms in the Germanic group. The coefficient of 0.013 is statistically significant at the 5% level. The coefficient is also economically significant, representing 4% of the total variation (standard deviation) in leverage ($0.04 = 0.013 / 0.32$, see [Table 1](#)). From columns II to IV, we see that this increased leverage is at least partly driven both by a lower recapitalization vis-à-vis the Germanic group, and a higher utilization of government guaranteed bank loans. Column II shows that the firms from the Italian group recapitalize less than firms from the Germanic group (coefficient of −0.018, representing 6% of the total variation in recapitalization). From column III we see that firms in the Italian group were 7 percentage points more likely to resort to a government guaranteed loan, and from column IV we see that this take-up also leads to a significantly larger relative amount of these loans compared to the Germanic group. These differences are economically significant, representing in both cases 22% of the total variation in these variables. These findings of a relatively higher recourse to external debt observed in the firms of the Italian group is consistent with the preference

Table 5
Investment and growth.

	Capex/Total assets	Current assets/Total assets	Fixed assets/Total assets	ΔSize
	(I)	(II)	(III)	(IV)
Italian origin × Covid	−0.027*** (0.005)	0.012*** (0.004)	−0.012*** (0.004)	−0.043** (0.017)
Size _{t-1}	−0.045*** (0.008)	−0.018*** (0.006)	0.017*** (0.006)	
Firm age _t	−0.324*** (0.030)	0.187*** (0.025)	−0.194*** (0.023)	−0.937*** (0.112)
Z-score _{t-1}	0.000 (0.000)	0.000 (0.000)	−0.000 (0.000)	0.001 (0.001)
Firm FE	Yes	Yes	Yes	Yes
Industry-Year FE	Yes	Yes	Yes	Yes
Observations	9122	9122	9122	9122
R-squared	0.620	0.964	0.966	0.532

This table reports estimates from [regression \(1\)](#) over a panel dataset consisting of all non-financial firms headquartered in South Tyrol during years 2019 and 2020. *Italian origin* is an indicator variable equal to one (zero) for firms of Italian (Germanic) cultural origin. *Covid* is a dummy taking the value one for year 2020, zero otherwise. These and all other variables are described in detail in [Appendix 3](#). Standard errors in parentheses are clustered at the firm level. *, **, and *** indicate statistical significance at the 10%, 5%, and 1% levels, respectively.

of the firms in the Germanic groups for avoiding debt that can be associated with the morally charged reference to debt (*Schuld*) in the German language. We conclude that the results are consistent with hypotheses H1a and H1c (that firms from the Italian cultural group will both resort relatively more to debt and will make relatively more use of government guaranteed bank loans during the pandemic), and with hypothesis H1b (a higher recourse of managers of Germanic origin to recapitalization).

In [Table 4](#) we take a closer look at the debt structure to understand which debt sources are tapped during the pandemic. It should again be mentioned that we can only perform this analysis for a subsample of firms, since smaller firms are exempt from the requirements to provide details of their debt structure in their balance sheet. From columns I and III we see that the firms from the Italian group increased their total debt relative to the firms of the Germanic group. The estimates in columns II and IV indicate that this relative increase is strongly linked to an increase in the recourse to bank debt. These results are, once again, consistent with hypotheses H1a and H1c. We do not find evidence from column V of significant differences in the use of trade credit (proxied by the ratio of accounts payable to assets) across the two groups during the pandemic. Though previous evidence suggests that culture can impact the recourse to trade credit ([El Ghouli and Zheng, 2016](#); [Bedendo et al., 2020](#)), there are two explanations for why this is unlikely to happen during the pandemic. The first reason is that the pandemic caused major disruptions of supply chains, making it difficult for firms to increase their reliance on this informal credit source. This explanation is further supported by the results in column VI where we observe no significant differences between the two cultural groups in the provision of trade credit to their clients (as measured by the ratio of accounts receivable to total assets). The second reason is that, differently from the financial crisis, in which trade credit was used by firms to substitute for the lower supply of bank loans ([Garcia-Appendini and Montoriol-Garriga, 2013](#)), during the Covid-19 shock ample liquidity has been channeled through the financial sector to the corporate sector, undermining the need to resort to a larger use of trade credit.

In [Table 5](#) we examine how funds have been invested during the pandemic and the resulting impact on firm growth, and consequently on the real economy. Consistently with H2a, column I shows that firms from the Italian origin group made considerably lower capital investments compared to the firms of the Germanic group during the pandemic. The difference is sizeable from an economic viewpoint (accounting for 20% of the total variation in capital investments) and is strongly statistically significant. The lower capital investments are also reflected in a relatively lower ratio of fixed assets to total assets as can be seen in column III. By contrast, in accordance with hypothesis H2b we see from column II that the firms in the Italian cultural group build up their current assets during the pandemic year relatively more than the firms in the Germanic cultural group. To better understand what drives the increase in current assets, we investigate in [Appendix 4](#) the effects of the Covid-19 shock on the key components of current assets: cash, inventory and accounts receivable. We note that the effect is explained by a relatively higher increase in cash in firms from the Italian origin group, which is consistent with a liquidity hoarding behavior aligned with a stronger short-term orientation in this cultural group.¹⁶

Returning to [Table 5](#), we note that the negative coefficient in column IV indicates that firms from the Italian cultural group experienced lower asset growth during the pandemic relative to firms from the Germanic group.¹⁷ This is consistent with the higher capital expenditures and investments in fixed assets undertaken by the latter (as shown in columns I and III), and the result also confirms hypothesis H3. We conclude that culturally based differences in time preferences and financing preferences affect firm

¹⁶ We cannot entirely rule out that the relatively larger increase in cash may be the mechanical result of a higher recourse to borrowed funds that have not been invested yet. However, this seems unlikely as the same delay in investing new funding could apply to funds raised through recapitalization. As a matter of fact, the measures introduced to facilitate borrowing were introduced in April 2020, three months before the adoption of recapitalization benefits. Therefore, firms resorting to borrowed funds had more time to invest the cash.

¹⁷ Lagged size is excluded as control variable from this regression.

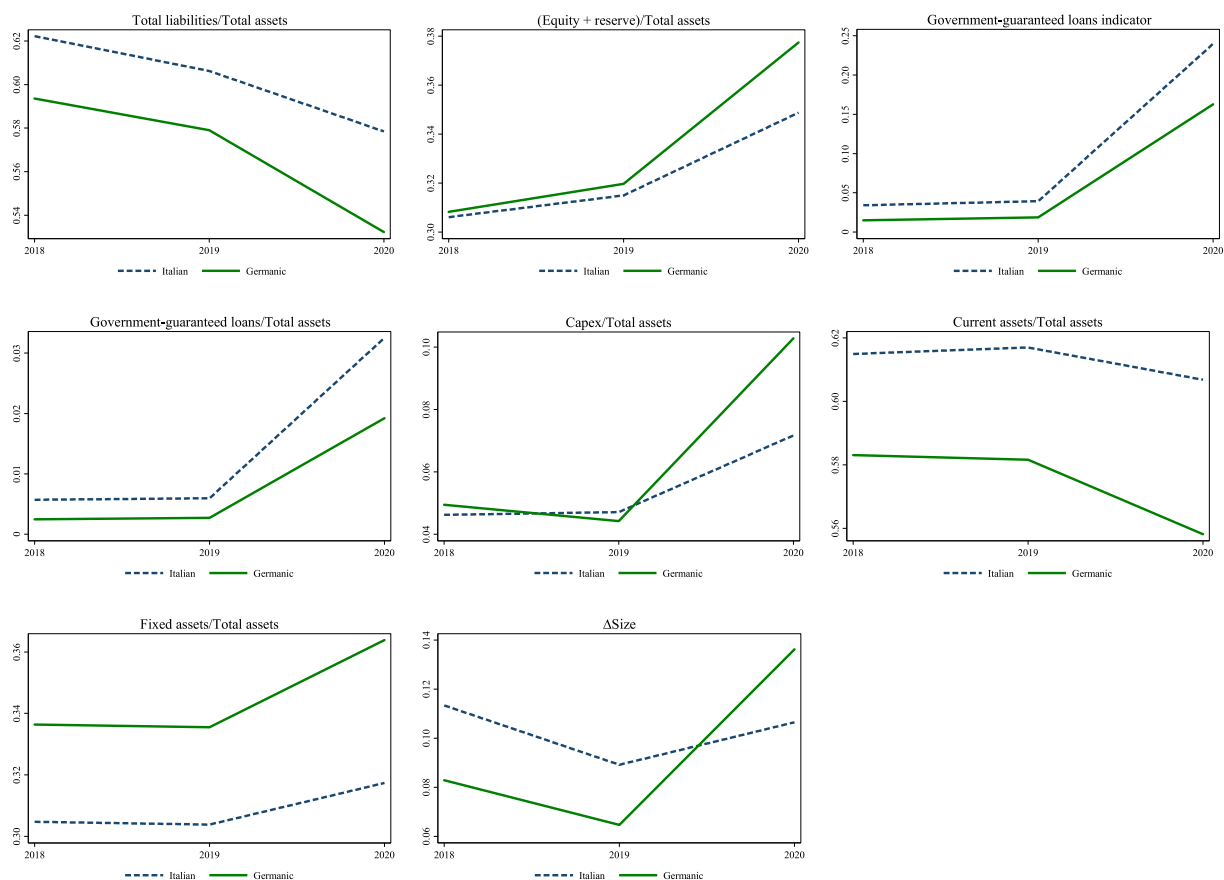


Fig. 2. Pre-pandemic trends.

This figure plots several outcome variables for both cultural groups for the pre-pandemic years 2018 and 2019 and the pandemic year 2020.

Table 6

Robustness – pre-pandemic trends.

	Total liabilities/ Total assets	(Equity + reserves)/ Total assets	Government- guaranteed loans indicator	Government- guaranteed loans/ Total assets	Capex/ Total assets	Current assets/Total assets	Fixed assets/ Total assets	ΔSize
	(I)	(II)	(III)	(IV)	(V)	(VI)	(VII)	(VIII)
Italian origin × 2018	0.001 (0.005)	0.002 (0.006)	0.000 (0.007)	0.000 (0.001)	-0.003 (0.004)	-0.003 (0.004)	-0.001 (0.004)	0.018 (0.017)
Italian origin × 2020	0.015*** (0.006)	-0.019*** (0.006)	0.068*** (0.013)	0.011*** (0.002)	-0.031*** (0.006)	0.012*** (0.004)	-0.013*** (0.004)	-0.050*** (0.017)
Firm FE	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Year FE	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Observations	13,746	13,746	13,746	13,746	13,329	13,746	13,746	13,279
R-squared	0.891	0.876	0.494	0.446	0.479	0.941	0.949	0.402

This table reports estimates for the pre-pandemic year 2018 and the pandemic year 2020 relative to the pre-pandemic base year 2019. *Italian origin* is an indicator variable equal to one (zero) for firms of Italian (Germanic) cultural origin. Standard errors in parentheses are clustered at the firm level. *, **, and *** indicate statistical significance at the 10%, 5%, and 1% levels, respectively.

investment behavior in the aftermath of an economic shock, which in turn has an impact on real economic outcomes.

5. Robustness analysis

In this section we perform a battery of robustness tests for the results presented in Section 4 that were derived using the full sample.

Table 7
Robustness – capital structure.

	Total liabilities/Total assets	(Equity + reserves)/Total assets	Government-guaranteed loans indicator	Government-guaranteed loans/Total assets
	(I)	(II)	(III)	(IV)
<i>Panel A: Matching</i>				
Italian origin × Covid	0.015* (0.009)	−0.031*** (0.010)	0.116*** (0.024)	0.017*** (0.004)
Control variables	Yes	Yes	Yes	Yes
Firm FE	Yes	Yes	Yes	Yes
Year FE	Yes	Yes	Yes	Yes
Observations	3160	3160	3160	3160
R-squared	0.932	0.911	0.638	0.604
<i>Panel B: EU size group-Industry-Year FE</i>				
Italian origin × Covid	0.011** (0.006)	−0.016** (0.006)	0.072*** (0.013)	0.011*** (0.002)
Control variables	Yes	Yes	Yes	Yes
Firm FE	Yes	Yes	Yes	Yes
Triple interaction FE	Yes	Yes	Yes	Yes
Observations	9102	9102	9102	9102
R-squared	0.935	0.920	0.622	0.589
<i>Panel C: Cluster by industry</i>				
Italian origin × Covid	0.013** (0.005)	−0.018** (0.007)	0.070*** (0.013)	0.011*** (0.003)
Control variables	Yes	Yes	Yes	Yes
Firm FE	Yes	Yes	Yes	Yes
Industry-Year FE	Yes	Yes	Yes	Yes
Observations	9122	9122	9122	9122
R-squared	0.933	0.918	0.611	0.580
<i>Panel D: Province born</i>				
Italian origin × Covid	0.021*** (0.007)	−0.024*** (0.008)	0.056*** (0.018)	0.009*** (0.003)
Control variables	Yes	Yes	Yes	Yes
Firm FE	Yes	Yes	Yes	Yes
Industry-Year FE	Yes	Yes	Yes	Yes
Observations	6954	6954	6954	6954
R-squared	0.933	0.918	0.610	0.581
<i>Panel E: Continuous measure</i>				
Italian origin share × Covid	0.014** (0.006)	−0.018*** (0.006)	0.014** (0.006)	0.018*** (0.006)
Control variables	Yes	Yes	Yes	Yes
Firm FE	Yes	Yes	Yes	Yes
Industry-Year FE	Yes	Yes	Yes	Yes
Observations	9748	9748	9748	9748
R-squared	0.933	0.916	0.612	0.582

This table reports estimates from several robustness tests. Panel A reports difference-in-differences estimates on a matched sample of firms from the two cultural groups. In Panel B industry-year fixed effects are replaced with EU size group-industry-year fixed effects. In Panel C, standard errors are clustered on the industry level and not the firm level. In Panel D, all firms where the majority of managers are born outside the province have been excluded. In Panel E, the indicator variable for cultural origin of firm managers is replaced with a continuous variable, *Italian origin share*, for the proportion of managers of Italian cultural origin in the firm, that takes a value from zero to one. *Italian origin* is an indicator variable equal to one (zero) for firms of Italian (Germanic) cultural origin. *Covid* is a dummy taking the value one for year 2020, zero otherwise. Control variables (described in [Appendix 3](#)) include $Size_{t-1}$, $Firm\ age_t$, $Z\text{-score}_{t-1}$. Standard errors in parentheses are clustered at the firm (industry) level in Panels A, B, D, and E (Panel C). *, **, and *** indicate statistical significance at the 10%, 5%, and 1% levels, respectively.

The identifying assumption underlying our difference-in-differences approach is that the firms of both cultural groups would have experienced the same development in outcome variables in the absence of the pandemic. We assess this assumption in two ways. First, in [Fig. 2](#) we plot the outcome variables for both groups for the pre-pandemic years 2018 and 2019 and the pandemic year 2020. As we can see from the plots, our identifying assumption is supported, since the outcomes in the two groups prior to the outburst of the pandemic moved in parallel (differences in levels are irrelevant and captured by firm fixed effects). Second, in [Table 6](#) we regress our outcome variables on the Italian origin dummy interacted with the pre-pandemic year 2018 and the pandemic year 2020, using the pre-pandemic year 2019 as base year. The coefficients for the interacted pre-pandemic indicator variable are insignificant for all outcome variables, which is evidence against the existence of different pre-pandemic trends between the two cultural groups. We

Table 8
Robustness – investment and growth.

	Capex/Total assets	Current assets/Total assets	Fixed assets/Total assets	ΔSize
	(I)	(II)	(III)	(IV)
<i>Panel A: Matching</i>				
Italian origin × Covid	−0.041*** (0.009)	0.020*** (0.006)	−0.019*** (0.006)	−0.064*** (0.020)
Control variables	Yes	Yes	Yes	Yes
Firm FE	Yes	Yes	Yes	Yes
Year FE	Yes	Yes	Yes	Yes
Observations	3160	3160	3160	3160
R-squared	0.630	0.955	0.956	0.734
<i>Panel B: EU size group-Industry-Year FE</i>				
Italian origin × Covid	−0.027*** (0.006)	0.012*** (0.004)	−0.012*** (0.004)	−0.029*** (0.013)
Control variables	Yes	Yes	Yes	Yes
Firm FE	Yes	Yes	Yes	Yes
Triple interaction FE	Yes	Yes	Yes	Yes
Observations	9102	9102	9102	9102
R-squared	0.626	0.965	0.967	0.723
<i>Panel C: Cluster by industry</i>				
Italian origin × Covid	−0.027*** (0.007)	0.012** (0.005)	−0.012*** (0.004)	−0.033** (0.012)
Control variables	Yes	Yes	Yes	Yes
Firm FE	Yes	Yes	Yes	Yes
Industry-Year FE	Yes	Yes	Yes	Yes
Observations	9122	9122	9122	9122
R-squared	0.620	0.964	0.966	0.718
<i>Panel D: Province born</i>				
Italian origin × Covid	−0.035*** (0.007)	0.016*** (0.006)	−0.015*** (0.005)	−0.062*** (0.017)
Control variables	Yes	Yes	Yes	Yes
Firm FE	Yes	Yes	Yes	Yes
Industry-Year FE	Yes	Yes	Yes	Yes
Observations	6954	6954	6954	6954
R-squared	0.616	0.961	0.965	0.707
<i>Panel E: Continuous measure</i>				
Italian origin share × Covid	−0.030*** (0.006)	0.013*** (0.004)	−0.013*** (0.004)	−0.035*** (0.014)
Control variables	Yes	Yes	Yes	Yes
Firm FE	Yes	Yes	Yes	Yes
Industry-Year FE	Yes	Yes	Yes	Yes
Observations	9748	9748	9748	9748
R-squared	0.620	0.964	0.966	0.717

This table reports estimates from several robustness tests. Panel A reports difference-in-differences estimates on a matched sample of firms from the two cultural groups. In Panel B industry-year fixed effects are replaced with EU size group-industry-year fixed effects. In Panel C, standard errors are clustered on the industry level and not the firm level. In Panel D, all firms where the majority of managers are born outside the province have been excluded. In Panel E, the indicator variable for cultural origin of firm managers is replaced with a continuous variable, *Italian origin share*, for the proportion of managers of Italian cultural origin in the firm, that takes a value from zero to one. *Italian origin* is an indicator variable equal to one (zero) for firms of Italian (Germanic) cultural origin. *Covid* is a dummy taking the value one for year 2020, zero otherwise. Control variables (described in [Appendix 3](#)) include $Size_{t-1}$, $Firm\ age_t$, $Z\text{-score}_{t-1}$. Standard errors in parentheses are clustered at the firm (industry) level in Panels A, B, D, and E (Panel C). *, **, and *** indicate statistical significance at the 10%, 5%, and 1% levels, respectively.

conclude from [Fig. 2](#) and [Table 6](#) that differences in pre-pandemic trends in the outcome variables do not drive our main findings.

Estimates from additional robustness tests are reported in [Tables 7 and 8](#), which replicate the results of [Tables 3 and 5](#), respectively. First, in Panel A of both tables we report estimates from difference-in-differences on a matched sample of firms from the two cultural groups. To relieve concerns that our main findings may be driven by pre-existing differences in the characteristics of firms of Italian and Germanic origin which are not adequately controlled for by firm fixed effects, we perform a matching exercise. Specifically, for each firm of Italian origin in the sample, we find the closest match (in Mahalanobis distance) of Germanic origin in terms of a number

of variables that were significantly different between firms of the two cultural groups in the pre-pandemic year 2019. From Table 2, we choose to match according to: Size, Total liabilities/Total assets, Government guaranteed loans/Total assets, Operating grants/Total assets, Current assets/Total assets, Fixed assets/Total assets, EBITDA margin, Wage per capita, Productivity per capita, Z-score. Firms from the two cultural groups are also exactly matched by industry.¹⁸

Second, in Panel B of both tables we substitute the industry-year fixed effects with EU size group-industry-year fixed effects, where EU size groups are defined according to the standards described in Footnote 4. Although we have a very homogeneous sample consisting primarily of SMEs and we always control for firm size, this robustness provides a stronger control for the fact that public aid differed according to firm size categories. Third, in Panel C of both tables we change the clustering of the standard errors to the industry (rather than the firm) level for all our panel estimations to control for within-industry residual correlation. Fourth, in Panel D of both tables we account for the possibility that managers of Italian and Germanic cultural origin that run firms in South Tyrol but are born outside the province could harbor different cultural traits than those born in the province. We do so by excluding all firms where the majority of managers are born outside the province. Data on managers' birthplace are provided by AIDA Bureau van Dijk: 17% (49%) of managers of Germanic (Italian) cultural origin are born outside South Tyrol. Fifth, in Panel E of both tables we replace the indicator variable for cultural origin of firm managers with a continuous variable for the proportion of managers of Italian cultural origin in the firm (*Italian origin share*), that takes a value from zero to one. This approach enables us to assess how a relative increase in the share of managers from the Italian group affects the various outcome variables. In both tables and throughout all the panels, our specifications include controls for size, firm age, and the Z-score as in the baseline regressions.

Overall, the evidence reported in Tables 7 and 8 is consistent with our main findings and supports our research hypotheses. The estimates from the difference-in-differences specifications on the matched sample, which arguably represent the strictest check to our results, confirm that, relative to firms led by managers of Germanic origin, firms from the Italian cultural group borrowed more (also in terms of government guaranteed loans), recapitalized less, invested less, strengthened (weakened) their current (fixed) assets ratio, and grew their assets less during the pandemic.

6. Conclusions

Using the bicultural province of South Tyrol as a natural laboratory, we exploit the exogenous and unexpected arrival of the Covid-19 pandemic to identify the effect of the managers' cultural origin on firms' responses to the shock. Our results suggest that culture is an important factor in this respect. More precisely, our analysis uncovers two main findings. First, we find significant cultural differences in the reaction of firms to the Covid-19 shock in terms of changes to their capital structure and investment allocations. These differences are broadly consistent with an overall dislike of individuals of Germanic cultural origin to take on debt and with differences in time preferences across the two groups. Second, we find that the cultural differences in how firms respond to shocks can lead to differences in real economic outcomes such as investment and asset growth.

Our findings advance our knowledge of the importance of cultural heritage along several dimensions. Understanding firms' responses and vulnerability to shocks is critical and topical not only because of the Covid-19 pandemic but also in light of the severe economic shocks that have occurred in recent years (e.g., the global financial crisis, the European sovereign debt crisis and the energy crisis following the war in Ukraine), and their heterogeneous effects observed across firms in different countries. This cross-country variation is usually ascribed to differences in institutions and regulations, contract enforcement, and business practices. Our findings shed light on the role that the cultural heritage of firm managers plays in explaining how companies react to a crisis, while holding everything else equal. In this respect, besides contributing to the academic literature on culture and finance, our research can help policymakers understand why different cultural groups respond differently to shocks. Similarly, our findings may help inform policymakers on what measures could be appropriate to mitigate the effects of cultural differences in times of crisis. As such, we expect our research to be useful for the design of policies that address firm vulnerabilities to shocks, both from an ex-ante point of view (prevention of shocks) and an ex-post point of view (response to shocks), in particular for institutions that operate in multi-cultural environments.

Data availability

The authors do not have permission to share data.

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Appendix 1. Historic context

In 1882, the Triple Alliance was formed between Germany, Austria-Hungary, and Italy by which each member promised mutual

¹⁸ To assess the goodness of the matching procedure, we report in Appendix 5 the estimates of *t*-tests for differences in means across treated and control samples, which confirm that, overall, the two groups are well matched with respect to the key variables of interest in our analysis.

support in the event of an attack by any other “great power”. With the outbreak of war in August 1914, Italy first pledged to support the central powers—Germany, Austria-Hungary, and the Ottoman Empire. However, because Italy considered Austria-Hungary and Germany as the aggressors, Italy did not enter the war on their side. Instead, in 1915, Italy signed the secret Treaty of London with the Triple Entente powers—the United Kingdom, France, and Russia. The agreement stipulated that Italy should abandon the Triple Alliance and join the war on the side of the Triple Entente in return for territorial gains following the defeat of the Central Powers. Subsequently, through the 1919 Treaty of Saint-Germain-en-Laye, the successor state to Austria-Hungary, the Republic of German-Austria, ceded South Tyrol to Italy which put an end to 550 years of Habsburg rule.

At the time of its annexation, only 3% of the population spoke Italian. By contrast, the vast majority, 89%, spoke German and the remainder of the population either Ladin or other languages of the former Austro-Hungarian empire (Istituto Provinciale di Statistica, 2015). This situation however dramatically changed starting from 1923 when the new fascist government initiated the “Italianization” of South Tyrol. This process encompassed a range of economic, legal, and social measures that all had the aim to spur relocation of Italian subjects from other parts of Italy to South Tyrol. For example, Italian was declared the only official language of the province and German-language education was prohibited. Shortly after the end of the Second World War, the incentives in favor of Italians were formally removed, German language education was reintroduced and German and Italian were both recognized as official languages. In 1972, the province of South Tyrol was granted an autonomous status, which guarantees equal rights and opportunities to South Tyroleans of both language groups and grants considerable legislative and executive independence from the national Italian government in most economic and social matters.

As of the last census conducted in 2011, 70% (26%) [4%] of South Tyroleans reported German (Italian) [Ladin] as their mother tongue (Istituto Provinciale di Statistica, 2015). Because of the Italianization process, the largest concentration of Italian speakers is located in the valleys close to the cities of Bolzano and Merano. The majority of individual municipalities is predominantly German speaking, although there is variation across towns. For example, 73% of the population in the capital city of Bolzano is Italian speaking, compared to 50% in Merano and 0 % in Martello.

Appendix 2. Examples of cultural origin classifications

Name and surname	Criteria	Classification
Giorgia Cazzolli	Italian given name and surname	Italian
Dieter Kompatscher	Germanic given name and surname	Germanic
Anna Mayr	Italian or Germanic given name, Germanic surname	Germanic
Anna Grandi	Italian or Germanic given name, Italian surname	Italian
Paolo Zöschg	Italian given name, Germanic surname	Excluded
Philipp Longo	Germanic given name, Italian surname	Excluded
Daejin Jeon	Neither Italian nor Germanic given- or surname	Excluded

This table gives some examples of the classification of managers. We classify an individual as being of Italian (Germanic) origin if all his/her given names and surname are Italian (Germanic). If the given name is common to both the Italian and Germanic languages, we classify the origin based on the surname. Foreign managers and those with discordant given names and surname are excluded.

Appendix 3. Variable definitions

Variable [†]	Construction [‡]
Accounts payable/Total assets	(Due to suppliers + Due to suppliers beyond 12 months)/Total assets
Accounts receivable/Total assets	(Trade accounts + Trade accounts beyond 12 months)/Total assets
Bank debt/Total assets	(Due to banks + Due to banks beyond 12 months)/Total assets
Bank debt/Total liabilities	(Due to banks + Due to banks beyond 12 months)/Total payables
Capex/Total assets	(Fixed assets _t – Fixed assets _{t-1} + Total depreciation, amortization and writedowns)/Total assets _t
Cash/Total assets	Total liquid funds/Total assets
Cost for material and services/Revenues	Costs for raw, consumption material and goods for resale/Revenues
Covid	Dummy variable = 1 for year 2020
Current assets/Total assets	(Inventories + Total receivables + Total financial assets + Total liquid funds)/Total assets
EBITDA margin	EBITDA/Revenues
Employees	Number of employees
(Equity + reserves)/Total assets	(Shareholderfunds – Retained earnings – Net profit)/Total assets
Firm age	Table 1: Firm age in years Other tables: ln(1 + Firm age in years)
Fixed assets/Total assets	(Tangible fixed assets + Intangible fixed assets)/Total assets
Gender indicator	Dummy variable = 1 (2) for female (male) manager
Government guaranteed loan indicator	Dummy variable = 1 if the company has taken Government guaranteed loans Source: https://www.fondidigaranzia.it/amministrazione-trasparente/

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(continued)

Variable [†]	Construction [‡]
Government guaranteed loans/ Total assets	Government guaranteed loans/Total assets Source: https://www.fondidigaranzia.it/amministrazione-trasparente/
Inventories/Total assets	Inventories/Total assets
Italian origin	Dummy variable = 1 following the classification in Appendix 2
Italian origin share	A continuous variable from zero to one that indicates the proportion of managers of Italian cultural origin in a firm following the classification in Appendix 2 .
Managers' age	Managers' average age in years
Operating grant indicator	Dummy variable = 1 if the company has received Operating grants
Operating grants/Total assets	Operating grants/Total assets
Productivity per capita	$\ln(\text{Revenues}/(1 + \text{Number of employees}))$
Revenues	Revenues in thousands of €
ROA	Net profit/Total assets
Size	Table 1 : Total assets in thousands of € Other tables and all figures: $\ln(\text{Total assets})$
ΔSize	$\ln(\text{Total assets})_t - \ln(\text{Total assets})_{t-1}$
Total debt/Total assets	(Bonds due + Bonds due beyond 12 months + Due to banks + Due to banks beyond 12 months + Loans due to shareholders + Loans due to shareholders beyond 12 months)/Total assets
Total debt/Total liabilities	(Bonds due + Bonds due beyond 12 months + Due to banks + Due to banks beyond 12 months + Loans due to shareholders + Loans due to shareholders beyond 12 months)/Total payables
Total liabilities/Total assets	Total payables/Total assets
Wage/Revenues	Total personnel costs/Revenues
Wage per capita	$\ln(\text{Total personnel costs}/(1 + \text{Number of employees}))$
Z-score	$6.56 \times (\text{Net working capital}/\text{Total assets}) + 3.26 \times (\text{Retained earnings}/\text{Total assets}) + 6.72 \times (\text{EBIT}/\text{Total assets}) + 1.05 \times \text{Shareholderfunds}/(\text{Total assets} - \text{Shareholderfunds})$

[†] All continuous variables are winsorized at the 1% level at both tails to reduce the impact of outliers.

[‡] Unless otherwise stated, the source is AIDA Bureau van Dijk.

Appendix 4. Current asset components

	Inventories /Total assets (I)	Cash /Total assets (II)	Accounts receivable /Total assets (III)
Italian origin × Covid	-0.004 (0.003)	0.009** (0.004)	0.003 (0.004)
Size _{t-1}	-0.009** (0.004)	-0.011** (0.005)	0.003 (0.006)
Firm age _t	0.034* (0.020)	0.076*** (0.026)	0.071** (0.028)
Z-score _{t-1}	-0.000 (0.000)	-0.000 (0.000)	0.000 (0.000)
Firm FE	Yes	Yes	Yes
Industry-Year FE	Yes	Yes	Yes
Observations	9122	9122	9122
R-squared	0.960	0.893	0.935

This table reports estimates from [regression \(1\)](#) over a panel dataset consisting of all non-financial firms headquartered in South Tyrol during years 2019 and 2020. *Italian origin* is an indicator variable equal to one (zero) for firms of Italian (Germanic) cultural origin. *Covid* is a dummy taking the value one for year 2020, zero otherwise. These and all other variables are described in detail in [Appendix 3](#). Standard errors in parentheses are clustered at the firm level. *, **, and *** indicate statistical significance at the 10%, 5%, and 1% levels, respectively.

Appendix 5. T-tests on treated and control samples

	Treated		Control		t-test
	Mean	St. dev.	Mean	St. dev.	
Size	7.02	1.42	7.01	1.80	0.26
Total liabilities/Total assets	0.60	0.27	0.60	0.28	-0.07
Government guaranteed loans/Total assets	0.01	0.03	0.01	0.03	-0.94
Current assets/Total assets	0.67	0.27	0.67	0.29	-0.41
Fixed assets/Total assets	0.27	0.26	0.26	0.27	2.12**
Z-score	2.87	4.30	2.82	4.29	0.48
Observations	790		790		

This table reports summary statistics and *t*-tests for difference in means for firms of Italian origin and firms of Germanic origin from a matched sample. The matching is based on characteristics for year 2019; see [Section 5](#) for details. All variables are described in [Appendix 3](#). *, **, and *** denotes significance at the 10%, 5%, and 1% level, respectively.

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