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ALLIANZ RESEARCH

# MONEY IS POWER:

# CAN A COUNTRY'S CULTURE INCREASE THE RISK OF PAYMENT DEFAULTS?

30 June 2020



# EXECUTIVE SUMMARY



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- The Covid-19 crisis is morphing into a payment crisis as companies tend to protect their working capital by paying their suppliers late. Defaults and insolvencies loom ahead. Companies need to understand structural payment patterns to help them triage bad payers from the good ones in finding their way back to growth. The Euler Hermes' [Country Risk](#) database serves this purpose.
- In this paper, we used Euler Hermes' unique dataset of international trade flows and payment defaults to explore the relationship between national culture and payment defaults between companies. We found that importers located in countries where society accepts and expects that power is distributed unequally tend to have a higher default ratio. The role of national culture is robust to the use of alternative indicators, such as the World Bank's Resolving Insolvency indicator, and to the inclusion of the geographic and cultural distances between the importer and the exporter. Those findings are consistent with previous results based on mortgage default and tax evasion, and confirm the role of national culture in cross-country differences in behavior concerning non-payments.
- In other words, the strength of societal and social hierarchy matters for insured trade credit defaults. Using power as a proxy for B2B non-payments, the 10 countries on your accounts receivables watch list should be: Malaysia, Slovakia, Guatemala, Panama, the Philippines, Russia, Romania, Serbia, Mexico and China. Conversely, the following 10 countries exhibit equally distributed power (and reduced default risk): Austria, Israel, Denmark, New Zealand, Ireland, Norway, Sweden, Finland, Switzerland, and Germany. Understanding the power structure in your clients' country can become a useful compass during the Covid-19 crisis.

**The strength  
of social hierarchy matters for insured  
trade credit defaults.**



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Trade credit insurance protects suppliers against the risk of non-payment by their customers. In 2017, private trade credit insurance covered more than EUR2.3trn of domestic and international trade<sup>1</sup>, representing approximately 10% of global trade. The increasing importance of trade credit insurance since the early 1990s has led to a burgeoning literature on the relationship between trade credit insurance, trade volume and export performance (Felbermayr & Yalcin 2013, Auboin & Engemann 2014, Van der Veer 2015). While there is a consensus on the positive impact of trade credit insurance on trade developments, little is known on the determinants of international and domestic insured trade credit defaults. Indeed, an increase in claims might lead credit insurers to reduce their exposure and/or to increase the premium of export credit insurance (Van der Veer 2019), and thus, in turn, might impact trade volume.

In this paper, we explore the determinants of trade credit defaults by using an extensive dataset of more than 7 million records from Euler Hermes. Following the recent findings from Tajaddini & Gholipour (2017) on the relation between national culture and default on mortgages, we use the Hofstede (1984) cultural dimensions for 40 countries to test the hypothesis that payment defaults are more frequent in countries with a high power distance index, high individualism, high uncertainty avoidance and high masculinity. After controlling for sectoral composition differences, we confirm that im-

porters located in countries where the society accepts and expects that power is distributed unequally (high power distance) have a higher default ratio. In contrast, individualism, uncertainty avoidance and masculinity have no impact on payment defaults. Those findings are robust to the inclusion of additional control variables, such as geographic distance (in kilometers), cultural distance measured by differences in languages, the World Bank's "Resolving Insolvency" indicator and the inclusion of macroeconomic variables. The positive impact of national culture is consistent with previous findings showing that a higher power distance is associated with an increase in mortgage default (Tajaddini & Gholipour 2017), a larger level of tax evasion (Tsakumis et al. 2007, Gabor 2012) and a higher acquirers' post-merger default risk (Koerniadi et al. 2015). Our results confirm the role of national culture in cross-country differences in behavior concerning non-payments.

We use the "Trade Flows Payment Defaults" data from Euler Hermes, the world's largest credit insurance company (36.1% of market share in 2017). Since February 2019, Euler Hermes has provided open access to some of its data on international trade on its website. The "Trade Flows Payment Defaults" data are available for the years 2016, 2017 and 2018 and provide a snapshot of trade flows and payment defaults between importing and exporting countries. The dataset includes: (1) the given month, (2) the importer/

buying country, (3) the exporter/selling country, (4) the importer company trade sector NACE code rev.1.1, (5) the total of trade flows (in euros) declared to Euler Hermes in the given month, (6) the total of payment defaults (in euros) declared to Euler Hermes in the given month and (7) the risk indicator of the given buyer population. The dataset includes 2,835,119 observations (month-importer-exporter-sector) for the year 2016, 2,901,867 for the year 2017, and 2,504,716 for the year 2018. The country with the highest number of observations and the highest trade flows is France, followed by Germany and the U.S..

We compute the loss ratio as the sum of payment defaults from customers in country  $i$  to suppliers in country  $j$  divided by the total trade flows between customers in country  $i$  and suppliers in country  $j$ . We compute for each  $i, j$  pair the percentage of trade flows that belong to a list of 16 sectors by using the Statistical Classification of Economic Activities in the European Community (NACE code) and a correspondence table between NACE codes and trade sectors provided by Euler Hermes on its open data website<sup>2</sup>. We consider the following sectors: retail, agrifood, household equipment, machinery equipment, commodities, transport, automotive manufacturers, services, construction, computers telecom, textiles, chemicals, metals, electronics, paper, automotive suppliers, software IT services, pharmaceuticals, transport equipment and energy.

<sup>1</sup> Source: *International Credit Insurance & Surety Association (ICISA, 2017)*

<sup>2</sup> <https://opendata.eulerhermes.com/explore/dataset/nace-codeslabels-vs-trade-sectors/information/>

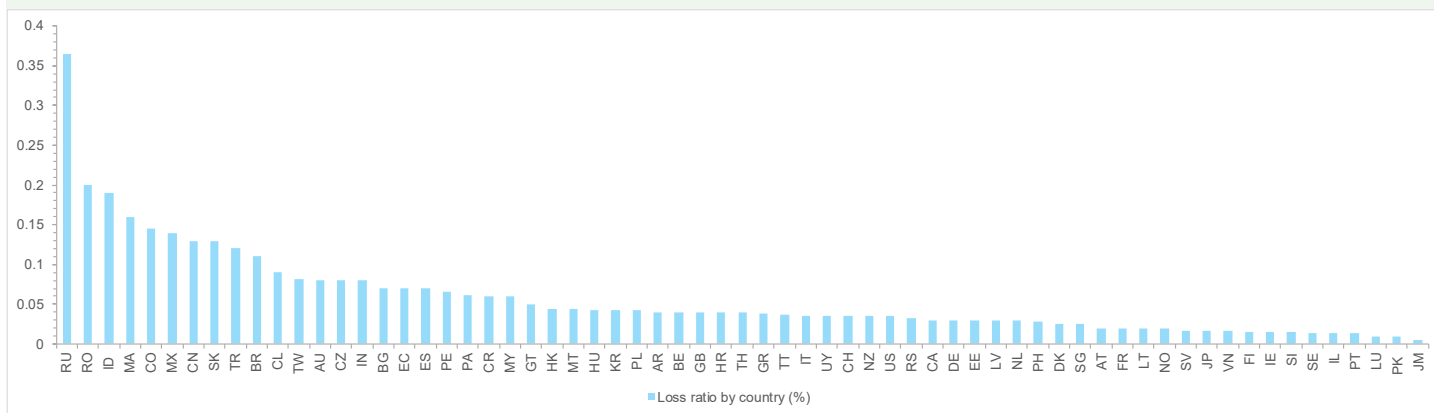
A simple univariate analysis suggests large differences across countries and sectors. Figure 1 presents the loss ratio by country, and Figure 2 the loss ratio by sector. The loss ratio is the highest in Russia (0.37%), followed by Romania (0.21%), the United Arab Emirates (0.17%), Morocco (0.15%), Turkey (0.14%), Colombia (0.14%), Mexico (0.13%) and China (0.13%). It is the lowest in Luxembourg (0.01%), Portugal (0.01%), Norway (0.02%), Israel (0.02%), and Sweden (0.02%). With regard to sectors, the loss ratio is the highest in the following sectors: computers telecom (0.07%), electronics (0.06%) and

textiles (0.06%). It is the lowest in automotive suppliers (0.02%), transport equipment (0.02%) and pharmaceuticals (0.02%).

We download data on cultural dimensions of Hofstede (1984) from Professor Hofstede website<sup>3</sup>. The four dimensions of culture proposed by Hofstede (power distance, uncertainty avoidance, individualism, and masculinity) have been used in the literature to analyze the impact of national culture on mortgage default (Tajaddini & Gholipour 2017), on tax evasion (Tsakumis et al. 2007, Gabor 2012) and

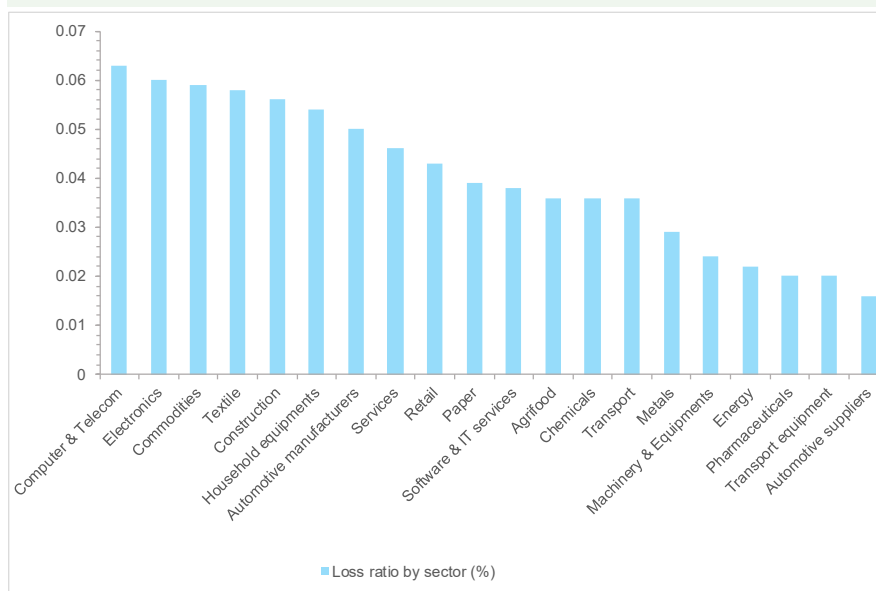
on acquirers' post-merger default risk (Koerniadi et al. 2015). Power distance expresses the degree to which the less powerful members of a society accept and expect that power is distributed unequally. Uncertainty avoidance expresses the degree to which the members of a society feel uncomfortable with uncertainty and ambiguity. In Hofstede's framework, the 'masculinity' dimension is used to categorize societies with a preference for "achievement, heroism, assertiveness and material rewards for success", in contrast to 'feminine' societies with a "preference for cooperation, modesty, caring for the

**Figure 1: Loss ratio (%) by importer country (2016-2018)**



Note: This figure presents the loss ratio (payment default / trade flows) for the 40 countries in our sample. Country codes are based on ISO 3166-1 Alpha-2 code. Sources: Euler Hermes, Allianz Research

**Figure 1: Loss ratio (%) by sector (2016-2018)**



Note: This figure presents the loss ratio (payment defaults/trade flows) for the 16 sectors in our sample. Sources: Euler Hermes, Allianz Research

<sup>3</sup> <https://geerthofstede.com/research-and-vsm/dimension-data-matrix/>

**Table 1:** Correlation matrix - National culture and loss ratio

	<b>Loss Ratio</b>	<b>Power Distance</b>	<b>Masculinity</b>	<b>Individualism</b>	<b>Uncertainty Avoidance</b>
<b>Loss Ratio</b>	1	0.514	0.114	-0.257	0.141
<b>Power Distance</b>	0.514	1	0.138	-0.615	0.216
<b>Masculinity</b>	0.114	0.138	1	0.085	-0.056
<b>Individualism</b>	-0.257	-0.615	0.085	1	-0.226
<b>Uncertainty Avoidance</b>	0.141	0.216	-0.056	-0.226	1

*This table presents the correlation between the four dimensions of national culture (power distance, masculinity, individualism, and uncertainty avoidance) and the loss ratio (payment defaults divided by trade flows) for the 40 countries in our sample.*

*Sources: Euler Hermes, Allianz Research*

weak and quality of life<sup>4</sup>. While a distinction can indeed be drawn between two kinds of national cultures, those that are more focused on individual competition and success, and those that prioritize a cooperative effort towards a better quality of life, we acknowledge that the term ‘masculinity’ in this context can reinforce gender stereotypes. Our use of the term in this study is only to adhere to the official wording of the framework. The last dimension, individualism, is explicit.

Table 1 presents the correlation between the four indicators and the loss ratio (at the country level). The variable with the highest correlation (0.514) with the loss ratio is the power distance index (PDI). Table 2 shows the 10 countries in our sample with the highest (lowest) PDI score.

Based on previous findings from the literature, we make the hypothesis that the loss ratio should be higher (lower) when importers are located in a country with a high (low) power distance index. We also test this hypothesis for the masculinity, individualism and uncertainty indicators.

We control for sectoral composition differences by dividing, for each sector  $s$ , the trade flows between  $i$  and  $j$  on sector  $s$  by the total trade flows between  $i$  and  $j$ . Then, we consider the following model:

$$LR_{i,j} = \alpha + \beta_1 PDI_i + \beta_2 UNC_i + \beta_3 MAS_i + \beta_4 IND_i + X_{i,j} + Z_i + \varrho_{i,j}$$

Where  $LR_{i,j}$  is the loss ratio between importers in country  $i$  and exporters in country  $j$  (as in the previous section),  $PDI_i$  is the power distance index score

of country  $i$ ,  $UNC_i$  is the uncertainty avoidance score of country  $i$ ,  $MAS_i$  is the masculinity score of country  $i$ ,  $IND_i$  is the individualism score of country  $i$ .  $X_{i,j}$  is a vector of control variable including the sectoral breakdown of trade flows between importer  $i$  and exporter  $j$ , the distance in kilometers between  $i$  and  $j$ , and a dummy variable equal to 1 if the two countries share the same language (from the CEPII GeoDIST database).  $Z_i$  is a vector of control including GDP per capita from the IMF World Economic Outlook database, and the ‘Resolving Insolvency’ index from the World Bank Doing Business database. We restrict our sample to all  $i,j$  pairs with a trade flow greater than USD1 bn over our sample period<sup>5</sup>. We end up with a total of 986 observations. Table 3 presents the results.

<sup>4</sup> <https://hi.hofstede-insights.com/national-culture>

<sup>5</sup> The results are qualitatively similar if we include all the observations

**Table 2: Countries with the highest (lowest) power distance score**

Country	PDI	Country	PDI
Malaysia	104	Austria	11
Slovakia	104	Israel	13
Guatemala	95	Denmark	18
Panama	95	New Zealand	22
Philippines	94	Ireland	28
Russia	93	Norway	31
Romania	90	Sweden	31
Serbia	86	Finland	33
Mexico	81	Switzerland	34
China	80	Germany	35

Sources: Euler Hermes, Allianz Research

We find that the power distance index variable is positive and significant in all the regressions. In contrast, the three other cultural dimensions of Hofstede (masculinity, uncertainty avoidance and individualism) are not significant. Consistent with previous findings on tax evasion and mortgage default, the loss ratio is also lower in rich (high GDP per capita) countries. Last, and surprisingly, we find that the two indicators of distance (geographical distance and language distance) are both negative and significant<sup>6</sup>. Trade flows in distant countries are, all other things being equal, less likely to result in a default than trade flows in nearby countries. Although a more detailed analysis would be required to better understand this result, a possible explanation is that when an exporter in a country A sells goods in a distant country B, he may be more cautious and seek more infor-

mation on the importer's ability to honor his debt. This result may also be due to a difference in the size of the firms (composition effect), which unfortunately we cannot control precisely in our sample.

An increase of the power index of 70 – i.e., the difference between the power distance of Austria (11) and the power distance in Mexico (81) – is associated, all other things being equal, with an increase in the loss ratio of 4.52 basis points ( $0.0646 * 70 = 0.0452pp$ ). This effect is economically significant and approximately equal to the average loss ratio in our sample when we consider all trade flows and all payment defaults on the 7 million observations. Table 4 presents the results of robustness tests (1) when we restrict our sample to all  $ij$  pairs with a trade flow greater than USD100mn over our sam-

**Table 3: Regression results - Baseline model**

	[1]	[2]	[3]	[4]
<b>alpha</b>	-1.5548		5.4912***	
<b>PDI<sub>i</sub></b>	0.0731***	0.0528***	0.0648***	0.0646***
<b>MAS<sub>i</sub></b>	0.0122	0.0075	0.0153	0.0098
<b>UNC<sub>i</sub></b>	0.0103	0.0043	0.002	0.0074
<b>IND<sub>i</sub></b>	0.0051	-0.007	0.0092	0.0122
<b>DistanceKm<sub>i,j</sub></b>			-0.2306***	-0.2007***
<b>DistanceLang<sub>i,j</sub></b>			-4.5425***	-4.4081***
<b>GDPCapita<sub>i</sub></b>			-0.0425***	-0.0264***
<b>Sectoral Composition</b>	NO	YES	NO	YES
<b>n</b>	986	986	986	986
<b>Adj R<sup>2</sup> (%)</b>	4.3	27.7	11.9	32.4

Note: This table presents the results of the regression presented in equation (1). Standard errors are computed using heteroskedasticity robust standard errors. Superscripts \*\*\*, \*\*, and \* indicate statistical significance at the 1%, 5%, and 10% level, respectively. The regressions include all  $ij$  pair with a trade flow greater than 1 billion USD over our sample period (986 observations).

Sources: Euler Hermes, Allianz Research

ple period, (2) when we restrict our sample to all  $ij$  pairs with a trade flow greater than USD10bn over our sample period and (3) when we add the World Bank "Resolving Insolvency" indicator.

Again, the power distance variable is significant, at the 1% level, in all the models. In the literature, high power distance countries are associated with a certain level of leniency towards rules of civil morality (Tsakumis et al. 2007), lower corporate social responsibility (Lensen et al. 2007) and weaker perceptions of responsibility to aid others (Winterich & Zhang 2014). Our results are also consistent with these behavioral hypotheses and tend to confirm the role of national culture in cross-country payment defaults.

Table 4: Regression results - Robustness checks

	[1]	[2]	[3]
<b>PDI<sub>i</sub></b>	0.0378***	0.1129***	0.0620***
<b>DistanceKm<sub>i,j</sub></b>	-0.0596	-0.1592	-0.1973***
<b>DistanceLang<sub>i,j</sub></b>	-3.8411**	-4.6745 ***	-4.2269***
<b>GDPCapita<sub>i</sub></b>	-0.0302**	-0.0254	-0.0194
<b>WBInsolvency<sub>i</sub></b>		-0.0052	
<b>Sectoral Composition</b>	YES	YES	YES
<b>n</b>	2053	248	986
<b>Adj R<sup>2</sup> (%)</b>	4.3	53.8	32.4

*Note: This table presents the results of the regression presented in equation (1). Standard errors are computed using heteroskedasticity robust standard errors. Superscripts \*\*\*, \*\* and \* indicate statistical significance at the 1%, 5%, and 10% level, respectively. The regressions include respectively (1) all *ij* pair with a trade flow greater than 100 million USD over our sample period (2,053 observations), (2) all *ij* pair with a trade flow greater than 10 billion USD over our sample period (248 observations), (3) all *ij* pair with a trade flow greater than 1 billion USD over our sample period (986 observations) and the World Bank Insolvency indicator.*

*Sources: Euler Hermes, Allianz Research*



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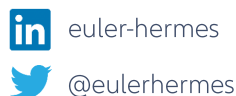
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