THE SPEED OF ADJUSTMENT IN NET OPERATING WORKING CAPITAL: AN INTERNATIONAL STUDY

Sonia Baños-Caballero[a], Pedro J. García-Teruel[b,*], Pedro Martínez-Solano[c]

[a] *University of Murcia, Faculty of Economics and Business, Dpt. Management and Finance, Campus Universitario de Espinardo, 30100-Murcia (SPAIN), tel: +34 868 883798, email: sbanos@um.es*

[b] *University of Murcia, Faculty of Economics and Business, Dpt. Management and Finance, Campus Universitario de Espinardo, 30100-Murcia (SPAIN), tel: +34 868 887828, email: pjteruel@um.es*

[c] *University of Murcia, Faculty of Economics and Business, Dpt. Management and Finance, Campus Universitario de Espinardo, 30100-Murcia (SPAIN), tel: +34 868 883747, email: pmsolano@um.es*

*Corresponding author.

Abstract

This paper analyses whether there are differences in the speed of adjustment in net operating working capital (NWC) across countries. Unlike prior research, which reported that the adjustment speed of any current item is always rapid, we find that the speed of adjustment to NWC targets depends on a country's investor protection and financial development. Specifically, using a sample of firms from 30 countries, we show that NWC adjustment speeds vary across countries, and they are faster for companies that operate in countries with stronger investor protection and greater financial development.

Keywords: Net operating working capital; adjustment speed; legal system, financial development.

JEL classification: G15; G18; G31; G32.

Acknowledgements: This research is part of project ECO2016-76481-P (AEI/FEDER, UE) financed by the Research Agency of the Spanish Government and the European Regional Development Fund. The authors also acknowledge financial support from Fundación CajaMurcia

Post-print version

Baños-Caballero, S., García-Teruel, P. J. and Martínez-Solano, P., The speed of adjustment in net operating working capital: an international study, ***Spanish Journal of Finance and Accounting****, 50(4), pp. 423-440.* (https://doi.org/10.1080/02102412.2020.1864176)

1. Introduction

As corporate financial executives indicate, working capital management is an important determinant of firm value (Kieschnick, Laplante, & Moussawi, 2013). Accordingly, Baños-Caballero, García-Teruel, & Martínez-Solano (2014) for UK firms, Aktas, Croci, & Petmezas (2015) for US companies, and Ben-Nasr (2016) for a sample of firms around the world, show that companies have an optimal level of investment in net operating working capital (NWC) and that firms reaching that optimal level show better stock performance. Indeed, NWC, defined as the sum of accounts receivable and inventories after accounts payable, represents a considerable portion of a firm's total assets (Aktas et al. 2015). In our sample, this ranges from an average of 12.6 % in Canada to 29.5 % in the Netherlands.

Earlier research reports that firms have NWC target levels (Baños-Caballero, García-Teruel, & Martínez-Solano, 2013), for each individual NWC component (e.g., García-Teruel & Martínez-Solano, 2010a; García-Teruel & Martínez-Solano, 2010b; Guariglia & Mateut, 2010), and for the financial ratios that involve these current items (Lee & Wu, 1988 and Peles & Schneller, 1989). In addition, these works show the importance of these short-term decisions for management (Lee & Wu, 1988 and Peles & Schneller, 1989) as companies gradually adjust to their target and do so rapidly. This also seems to indicate that the adjustment costs of any current item are lower than those of long-term items.

In a more in-depth study with a sample of Spanish firms, Baños-Caballero et al. (2013) demonstrated that the rate of adjustment to NWC targets is heterogeneous and is faster in companies with better access to capital markets and greater bargaining power because they can modify their NWC at lower adjustment costs. In another, more recent work, Baños-Caballero, García-Teruel & Martínez-Solano (2020) find that NWC is not valued

in the same way in all countries and how shareholders value this investment depends on investor protection and financial and economic development. Since these variables also influence access to capital markets, we think that the speed of adjustment to NWC targets could also depend on a country's legal system and financial development. Strong investor protection and law enforcement help firms to raise external financing (La Porta, Lopez-de-Silanes, Shleifer, & Vishny, 1997) and reduce the probability of becoming credit-constrained (Moro, Maresch, & Ferrando, 2018). But there is another reason why the legal system can influence how quickly firms meet their NWC targets. As Myers, & Rajan (1998) indicate, it is easier for controlling shareholders to convert current assets (e.g. NWC) into private benefits than fixed assets, and effective investor protection can prevent this opportunistic behaviour.

Despite the importance of legal systems for short-term financial decisions (La Porta, Lopez-de-Silanes, Shleifer, & Vishny, 1998; Demirgüc-Kunt & Maksimovic, 2002; Fisman & Love, 2003; among others), we know of no empirical study at the international level on the differences in the speed of adjustment in any current balance item. Therefore, the aim of this paper is to cover this lack of previous work by analysing whether the speed of adjustment to NWC targets depends on a country's investor protection and financial development. To do this, we use a sample of 30 countries. Through this work, we contribute to the financial literature in a variety of ways. Firstly, we study the speed of adjustment to NWC targets using a large sample of countries, providing empirical evidence about the differing adjustment speeds across countries. Secondly, we analyse whether adjustment speed is determined by country characteristics, such as investor protection and financial development. While Baños-Caballero et al. (2020) study how shareholders value NWC in each country, in this paper we examine a target adjustment model in an international context and analyse

whether the costs and benefits of adjusting to targets also vary according to a country's legal system and financial development. This study complements previous research on NWC and legal environments and adds evidence that supports the importance of institutional setting in firms' financial policies.

Our findings indicate that firms from countries with extensive and well-enforced investor rights adjust faster. The rate of adjustment is also faster in countries that are more financially developed. In addition, unlike previous findings, in this paper we demonstrate that the speed of adjustment for short-term items is not always rapid and varies extensively across countries.

The remainder of this paper is organised as follows. Section 2 provides a brief literature overview. In Section 3, we describe the model. Section 4 gives a description of the data and offers comparisons of adjustment speeds across countries. Section 5 looks into the effects of investor protection and a country's financial development on adjustment speed. Section 6 concludes.

2. Theoretical framework

Sartoris & Hill (1983) and Hill, Kelly, & Highfield (2010) point out the desirability of managing current assets and liabilities jointly rather than individually, with special attention paid to NWC. By definition, investment in NWC depends on the management of a firm's accounts receivable, inventories and accounts payable. Many corporate financial executives are aware that this investment affects both the value and risk of a firm (Kieschnick, et al., 2013). Other works also support the importance of NWC, showing that firms follow an adjustment process to reach their NWC target and to balance the costs and benefits of this investment (Baños-Caballero et al., 2013, 2014). Positive NWC implies a net investment in current assets, which are easier to convert

into cash (Fazzari & Petersen, 1993) or private benefits for insiders than other assets are.

The speed of adjustment depends on both the costs of deviating from an NWC target and the costs of adjusting back to the target, so financial managers have to consider the trade-off between these costs. Since changes in NWC are associated with changes in the need for capital, we expect companies with better access to external capital markets to adjust to their NWC targets faster, as these firms can obtain more external financing and at better terms, and it is therefore easier for them to modify their investment in accounts receivable and inventories, as well as their financing from accounts payable. Indeed, using firms from a specific country, Baños-Caballero et al. (2013) show that those firms that can access external capital more easily adjust to their investment target quicker. Thus, the first hypothesis is:

H_1: *Firms in countries with greater and broader equity and debt markets adjust to their NWC targets faster.*

Peles & Schneller (1989) indicate that the current items of a company can be manipulated easily, even in the short term, as they are, to a large extent, under the firm's control. In this line, Myers & Rajan (1998) indicate that it is easier for insiders to convert current assets into private benefits than it is to convert fixed assets. As NWC is a net current asset, insiders could convert part of the NWC into private benefits that increase their own welfare when the interests of outside investors are not well protected.

Levels of protection for outside investors depend on laws and the systems that enforce them (La Porta, Lopez-de-Silanes, Shleifer, & Vishny, 2000). In many countries, the expropriation of outsiders (minority shareholders and creditors) by insiders (managers and controlling shareholders) is extensive, whereas in other countries, outside investors enjoy greater legal protection. The ease of insiders to extract private benefits by taking

advantage of their positions depends, to a fair extent, on the level of protection given to outside investors' interests (Pinkowitz, Stulz, & Williamson 2006). As Mechelli & Cimini (2019) indicate, even the quality of firm-level corporate governance is affected by the legal system in which the firm operates.

As the previous literature reports, investor protection influences a firm's access to financing. In countries where investors' rights are extensive and regulators and courts enforce them, both shareholders and creditors are willing to offer financing under more favourable terms (La Porta, Lopez-de-Silanes, Shleifer, & Vishny, 2000), and creditors are willing to take more risks (Djankov, McLiesh, & Shleifer, 2007 and Benmelech & Bergman, 2011).

Since better investor protection reduces the ease of insiders to extract private benefits through use of their positions and also allows firms to obtain more external financing and at better terms, the second hypothesis is:

H_2: *Firms in countries with better investor protection (better laws and better law enforcement) adjust to their NWC targets faster.*

As investor protection depends on both legal rights and the enforcement of and respect for these rights, in Section 5 we analyse separately how laws protecting investors (creditors and shareholders) and their enforcement affect adjustment speed.

3. Model

To analyse whether the speed of adjustment to NWC targets varies across countries, we estimate the following general partial adjustment model of NWC for 30 countries:

$$NWC_{i,t} - NWC_{i,t-1} = \gamma (NWC^{*}_{i,t} - NWC_{i,t-1}) \qquad (1)$$

where $NWC_{i,t}$ is firm *i*'s net operating working capital at the end of year *t*; $NWC^*_{i,t}$ is firm *i*'s desired NWC in year *t*; and γ measures the speed of adjustment to the target.

As in previous studies, we model the NWC target as a linear combination of the following set of variables that appear regularly as explanatory factors of a firm's net operating working capital[1]. Specifically, we estimate a firm's NWC target by

$$NWC^*_{i,t} = \beta_0 + \beta_k X_{i,t} + \varepsilon_{i,t} \qquad (2)$$

where β_k represents the parameters, $X_{i,t}$ is a vector of firm characteristics that determine NWC, and $\varepsilon_{i,t}$ is a random disturbance. By incorporating Equation (2) into Equation (1) and including unobservable heterogeneity and industry, time and country dummy variables, the current NWC is

$$NWC_{i,t} = \alpha + \rho NWC_{i,t-1} + \phi_k X_{i,t} + \upsilon_{i,t} + \eta_i + \lambda_n + \delta_t + \vartheta_c \qquad (3)$$

Where $\alpha = \gamma\beta_0$, $\rho = (1-\gamma)$, $\phi_k = \gamma\beta_k$, $\upsilon_{i,t} = \gamma\varepsilon_{i,t}$, η_i is the unobservable heterogeneity, λ_n is an industry dummy variable, δ_t is a time dummy variable, and ϑc is a country dummy variable. However, Equation (3) is a basic model that does not capture differences in the speed of adjustment. Therefore, to analyse the impact of investor protection and the financial system on adjustment speed, we create a dummy variable to separate the sample countries into two groups based on these characteristics. We then

[1] See Section 4 or Panel A of the Appendix for a detailed description of the firm specific variables.

interact each dummy variable with the lagged variable[2]. We use Blundell & Bond's (1998) two-step system generalised method of moments (GMM) to estimate all the equations.

4. Data

Firm-specific data

We use the *COMPUSTAT* database to obtain the firm-specific variables of a sample of 30 countries for the period 1995-2013. As in other studies on NWC, we exclude financial firms and utilities from the sample and eliminate firm-year observations with lost values and cases with errors in the accounting data. Next, to decrease the effect of outliers, we trim our sample by 1% by dropping 0.5% from the tails of each variable. The resulting sample consists of 160,589 observations representing 14,467 firms from around the world.

The variables used as the determinants of NWC are: cash flow (earnings before interest and taxes plus depreciation over total assets), leverage (total debt over total assets), growth opportunities (market value of equity plus total debt over total assets), size (the natural logarithm of assets), fixed assets (property plan and equipment over total assets) and profitability (earnings before interest and taxes/total sales). Table 1 presents the descriptive statistics, and Table 2 shows the correlations among these variables. Figure 1 presents the mean value of the ratio NWC/total assets by country. This ratio ranges from an average of 12.6% for Canada to 29.5% for the Netherlands, confirming the importance of this investment in a firm's total assets and how investment in NWC

[2] The model is specified in Section 5.

varies across countries. This result is consistent with the idea that firms in different countries have distinct investment patterns (Shao et al., 2013).

INSERT TABLE 1

INSERT TABLE 2

INSERT FIGURE 1

International adjustment speeds

Table 3 presents the estimated coefficient for NWC_{t-1} from Equation (3) and the mean values of specific firm variables by country. Specifically, we regress the partial adjustment model (Equation (3)) for the 30 countries comprising the sample. The estimated coefficients indicate that the adjustment speed to NWC targets varies extensively across countries. Moreover, unlike previous studies, this paper shows that the adjustment speed of short-term items is not always rapid. Previous works (e.g., Peles & Schneller, 1989; Ozkan & Ozkan, 2004, among others) present relatively rapid adjustment speeds for all the items related to short-term financial management. However, our results indicate that there are international differences in firms' adjustment behaviours. This confirms that, due to adjustment costs, firms do not immediately offset deviations from targets, and that these costs of adjusting to NWC targets vary across countries.

INSERT TABLE 3

Country-specific variables

To analyse the heterogeneity of the speed of adjustment to NWC targets, we classify countries according to financial development and investor protection, measured by investors' rights and law enforcement effectiveness. These data related to country-specific variables were obtained from various sources.

We collected data related to each country's financial development from the World Bank's *Financial Development and Structure Database*. Three variables have been used as proxies for financial development: the financial system's organisation (*Financial system*), which classifies countries as market- or bank-oriented; stock market capitalisation to GDP (*Stock market cap*); and private bond market capitalisation to GDP (*Bond market cap*). We use the average value of these last two ratios for the period 1995-2013 in order to measure the financial development of each country. We assume that countries with higher scores for both ratios have more developed capital markets. Moreover, since La Porta et al. (1997, 1998) demonstrated that all of the previous variables are strongly correlated with indicators of the legal system (*Legal system*), we also use this classification to ascertain whether there are differences in the speed of adjustment. Qian & Strahan (2007) indicate that it is also interesting to use this last classification to consider possible omitted variables, such as culture and religion, which do not figure in this study but can influence investor protection.

We quantify shareholders' legal protection using the revised anti-director rights index and the anti-self-dealing index from Djankov, La Porta, Lopez-de-Silanes, & Shleifer (2008). The first, *Anti-director rights*, is the result of aggregating the following country-level variables: possibility of voting by mail, requirement to deposit shares before a general meeting, cumulative voting, oppressed minority, pre-emptive rights, and the minimum percentage of share capital required to call a shareholders' meeting. The second is the anti-self-dealing index (*Antiself*), which measures the protection minority shareholders have against possible expropriation by insiders. This index captures the regulation of a firm's self-dealing transactions through three dimensions: disclosure, approval procedures for transactions and the facilitation of private litigation when there

are indications of self-dealing. A higher score in this index implies that minority shareholders are better protected.

Like Cho, El Ghoul, Guedhami, & Suh (2014) and Shah, Shah, Smith, & Labianca (2017), we proxy creditor protection using the 2002 values of the creditor rights index from Djankov et al. (2007)[3]. This index (*Creditor rights*) has four components, each of which captures a specific aspect of creditors' legal protection: No Automatic Stay, Secured Creditor Paid First, Restrictions on Reorganisation and No Management Stay. The creditor rights index is the result of adding these four variables, where each one takes the value of 1 if the country's law stipulates protection to lenders and zero otherwise. Thus, this index ranges from 0 (weak creditor rights) to 4 (strong creditor rights).

As La Porta et al. (1998) indicate, strong legal enforcement can compensate for weak rules, so we also control for the effectiveness of law enforcement. Specifically, we use the variable *Rule of law* from the International Country Risk Guide (ICRG) and the protection of property rights index published by the Heritage Foundation. We use the mean value of these variables in the period studied. The *Rule of law* variable is drawn up by The PRS Group and ranges from 0 to 6, where higher scores indicate greater legal system efficiency. The *Property rights* variable is an annual index that measures how well a country's laws protect private property rights, and to what extent the government enforces those laws. Moreover, this index considers the likelihood of private property expropriation and analyses how independent the judiciary is, whether there is corruption within the judiciary and the capacity of individuals and businesses to enforce contracts.

[3] Although the values of this index are not available for the last years of our sample, Djankov et al. (2007) indicate that this index presents a high degree of persistence. In this line, Cho et al. (2014) show that most countries did not undergo any change in their creditor rights index values for the period 1991-2004.

This index ranges from 0 to 100, with a higher score indicating greater legal protection of property rights.

Finally, we use the annual growth of GDP per capita (*GDP growth*) as a control variable to measure the economic development of a country. This information comes from the *World Development Indicators* of the World Bank[4].

Table 4 presents the values of these country-specific variables for all 30 countries. Each country's average GDP per capita growth for the period 1995-2013 is also included in this table.

INSERT TABLE 4

5. Empirical evidence

5.1 Main evidence

With the aim of analysing how a country's investor protection and financial development affect the speed of adjustment to NWC targets, we separate the sample of countries into two groups according to the median value of each country-specific variable. In Table 5 we specify the group to which each country belongs for each of these proposed country-specific variables. With regard to financial development, countries with greater stock market capitalisation to GDP and greater private bond market capitalisation to GDP take a value of 1; the remaining countries take a value of 0. When we use investor protection variables (*Anti-director rights, Antiself, Creditor Rights*, *Rule of law* and *Property Rights*), countries with stronger rights and countries with higher-quality law enforcement take a value of 1 and the remaining countries take a value of 0.

[4] The Appendix provides a summary of all country-specific variables and data sources.

INSERT TABLE 5

To test whether the adjustment speed to NWC targets depends on a country's financial development and investor protection, we create dummy variables (DUM), taking into account the classifications in Table 5. Specifically, the variables DUM take the value 1 for countries with greater financial development and greater investor protection and 0 otherwise. We then interact each dummy variable with the lagged variable from Equation (3), so that we estimate the following model:

$$NWC_{i,t} = \alpha + \rho NWC_{i,t-1} + \varpi DUM\, NWC_{i,t-1} + \phi_k X_{i,t} + \upsilon_{i,t} + \eta_i + \lambda_n + \delta_t + \vartheta_c \qquad (4)$$

In this way, the coefficient of the lagged variable will be ρ when the dummy variable takes the value 0, and it will be $(\rho + \omega)$ when the dummy variable takes the value 1. Since the smaller the coefficient on the lagged NWC, the faster the speed of adjustment, we expect the coefficient of the interaction between each dummy variable (DUM) and the lagged NWC to be negative (ϖ), as this outcome indicates a faster adjustment speed in more financially developed countries and those with stronger investor protection (i.e., when the dummy variable (DUM) takes a value of 1).

Table 6 compares the adjustment speed of NWC across financial and legal traditions. *Dummy financial system* is a dummy variable that equals 1 for countries with a market-based system and 0 otherwise. Results indicate that companies established in market-based systems adjust to NWC targets significantly faster than firms operating in bank-based financial systems, as the coefficient NWC_{t-1}x*dummy financial system* is also negative and significant (column 1 in Table 6). That is, converging to NWC targets has

lower costs and/or higher benefits for firms operating in a market-based system. With regard to the legal system, the *Dummy legal system* equals 1 for common-law countries and 0 otherwise. Since institutions and legal protection are stronger for shareholders and creditors in common-law countries than in civil-law countries (La Porta et al; 1997, 1998), adjustment costs ought to be lower and/or adjustment benefits higher in the former. Consistent with this idea, results indicate that the adjustment speed to NWC targets is greater in common-law countries, as the coefficient NWC_{t-1}x*dummy legal system* is negative and significant (see column 2 in Table 6)[5].

INSERT TABLE 6

Since the previous proxies may not be the best way to distinguish financial systems (La Porta et al., 2000) or to measure investor protection, we use other, more specific measures, such as financial market development, investor rights and law enforcement. Thus, in columns (1) and (2) of Table 7, we analyse whether there are differences in the speed of adjustment according to financial market development. In line with the idea that firms adjust their current NWC to their target faster when they have easier access to financing and this financing has better conditions, we find that the adjustment speed is quicker in countries with greater stock and credit market development, as the coefficient of the interaction between the dummy variable and the lagged NWC is negative and significant. In columns (3) and (4), we find that firms operating in countries with strong shareholder rights adjust faster. Similarly, firms established in countries with strong creditor rights also adjust more quickly (column (5)). This finding confirms that the

[5] We find the same result when we carry out a more in-depth analysis by dividing the civil tradition into the three families normally identified within this tradition (French, German and Scandinavian): the speed of adjustment is faster in common-law countries than in any of these families with civil-law tradition.

costs of adjustment are lower in countries that provide more legal protection for investors. Columns (6) and (7) compare the adjustment speed of NWC according to legal enforcement. The results show that the speed of adjustment is faster in countries with more efficient legal systems (i.e., a higher score for the *Rule of law* variable) and greater legal protection of property rights (i.e., a higher *Property rights* index). That is, firms operating in countries in which investor rights are extensive and well enforced adjust faster, as it is more difficult for insiders to convert part of the NWC into private benefits[6].

INSERT TABLE 7

5.2 Robustness check

In this subsection, our first objective is to demonstrate that the results found are not due to the unequal distribution of observations across countries. To do this, we first re-estimate all the models without considering firms from the US and Japan because they represent a large proportion of the observations in our sample (34,706 and 51,762 observations, respectively). Second, we exclude firms from Argentina, Ireland and Portugal, which are the countries with the lowest number of observations (588, 455 and 482 observations, respectively). In Table 8 (Panel A), we present the estimated coefficients for the variable NWC_{t-1} and the interaction between the dummy variable and NWC_{t-1} for each country-specific variable. The estimated coeficients for firm-specific variables are available upon request. We do not include them in the table for space reasons. As described previously, the results show that firms operating in more financially developed countries and in countries with greater investor protection adjust

[6] We also find that the speed of adjustment is faster in OECD member countries and with a higher Index of Economic Freedom.

faster. Thus, we find that our results do not correspond to an uneven distribution of observations across countries.

INSERT TABLE 8

6. Conclusions

This paper studies the adjustment speed to NWC targets for a sample of 30 countries during the period 1995-2013. While the previous literature is scarce and focuses on single countries, we provide the first analysis in an international setting. Unlike prior research, which reported that the adjustment speed of any short-term item is rapid, our findings show that this speed differs markedly around the world and that the costs and benefits of adjusting to targets depend on a firm's legal setting and how the country is financially developed. In particular, the results indicate that firms operating in countries where investor protection is higher and financial development is greater adjust more quickly because their costs of adjustment are lower.

This study contributes to our understanding of the importance of investor protection and a country's financial development for the financial management of firms. One noteworthy conclusion from this study is that in countries with weak investor protection, firms adjust their current NWC to their target level more slowly, which negatively affects the value and risk of these firms. Likewise, firms operating in countries with low levels of financial development also adjust more slowly. Hence, the chief financial officers of these firms should pay more attention to short-term financial management. In addition, understanding this fact is valuable to goverments, as firms could reduce their risk and increase their value with better legal protection.

Appendix. Description of variables and sources

Panel A: Firm-specific variables

Name	Description
NWC	Net Operating Working Capital. The sum of accounts receivable and inventories net of accounts payable divided by total assets.
Cash flow	(Earnings before interest and taxes + depreciation) / total assets.
Leverage	Total debt / total assets
Growth opportunities	(Market value of equity + total debt) / total assets
Size	The natural logarithm of assets
Fixed assets	Property plan and equipment/ total assets
Profitability	Earnings before interest and taxes/total sales

Panel B: Country-specific variables

Name	Description
Legal system	This variable equals 1 for common-law countries and zero for civil-law countries.
Financial system	This variable equals 1 for market-based financial systems and 0 for bank-based systems, as defined in Demirguc-Kunt and Levine (1999).
Stock market cap	The stock market capitalisation to GDP ratio. This variable is a measure of stock market development.
Bond market cap	The private bond market capitalisation to GDP ratio. This value is a measure of bond market development.
Anti-director rights	The anti-director rights index measures shareholders' legal protection. It is the result of aggregating the following country-level variables: possibility of voting by mail, requirement to deposit shares before a general meeting, cumulative voting, oppressed minority rights, pre-emptive rights and the minimum percentage of share capital required to call a shareholders' meeting. A higher score in this index implies better shareholder protection.
Antiself	The anti-self-dealing index measures minority shareholders' legal protection against expropriation by insiders. This index captures the regulation of a firm's self-dealing transactions through three dimensions: disclosure, approval procedures for transactions, and the facilitation of private litigation when self-dealing is suspected. A higher score implies better protection for minority shareholders.
Creditor rights	The creditor rights index is the result of adding four binary variables that capture different aspects of the strength of creditors' legal protection: No Automatic Stay, Secured Creditor Paid First, Restrictions on Reorganisation, and No Management Stay. The index takes values from 0 (weak creditor rights) to 4 (strong creditor rights).
Rule of law	Integrity of the legal system. This variable comes from the PRS Group's International Country Risk Guide (ICRG) and measures the tradition of law and order in the country. This variable takes values from 0 to 6, with higher scores indicating a more efficient legal system.
Property rights	This index measures the protection of property rights and ranges between 0 and 100, with higher scores indicating greater legal protection of property rights.
GDP growth	The annual growth of the nominal Gross Domestic Product (GDP).

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Table 1. Descriptive statistics

	Observations	Mean	Std. Dev.	Median	Perc. 10	Perc. 90
NWC	160,589	0.2113	0.1503	0.1976	0.0272	0.4146
NWC_{t-1}	160,589	0.2129	0.1986	0.1996	0.0267	0.4196
Cash flow	160,589	0.1565	0.2596	0.1036	0.0092	0.3025
Leverage	160,589	0.4909	0.2064	0.4999	0.2037	0.7615
Growth opport.	160,589	1.4767	1.2543	1.1123	0.7200	2.5072
Size	160,589	5.5718	1.7674	5.4698	3.3670	7.9797
Fixed assets	160,589	0.2884	0.2105	0.2514	0.0421	0.5940
Profitability	160,589	0.0930	0.4328	0.0667	-0.0284	0.3149

NWC is the sum of accounts receivable and inventories after accounts payable divided by total assets; *Cash flow* is the earnings before interest and taxes plus depreciation over total assets; *Leverage* is the total debt to total assets ratio; *Growth opportunities* is the market value of equity plus the book value of debt to total assets; *Size* is the natural logarithm of total assets; *Fixed assets* is the property plan and equipment to total assets; *Profitability* is the earnings before interest and taxes to total sales.

Table 2. Correlation matrix

	NWC	NWCt-1	Cash flow	Leverage	Growth opport.	Size	Fixed assets	Profitability
NWC	1							
NWCt-1	0.7036***	1						
Cash flow	0.1189***	0.0851***	1					
Leverage	0.0227***	0.0192***	0.0598***	1				
Growth opport.	-0.0466***	-0.0305***	0.0829***	-0.1532***	1			
Size	-0.165***	-0.1162***	0.0403***	0.2755***	-0.0667***	1		
Fixed assets	-0.3426***	-0.2598***	0.0446***	0.1299***	-0.1575***	0.159***	1	
Profitability	0.1006***	0.0721***	0.5928***	0.0955***	-0.0155***	0.1395***	0.0598***	1

NWC is the sum of accounts receivable and inventories after accounts payable divided by total assets; *Cash flow* is the earnings before interest and taxes plus depreciation over total assets; *Leverage* is the total debt to total assets ratio; *Growth opportunities* is the market value of equity plus the book value of debt to total assets; *Size* is the natural logarithm of total assets; *Fixed assets* is the property plan and equipment to total assets; *Profitability* is the earnings before interest and taxes to total sales. *** indicates significance at the 1% level.

Figure 1. The mean value of NWC across countries

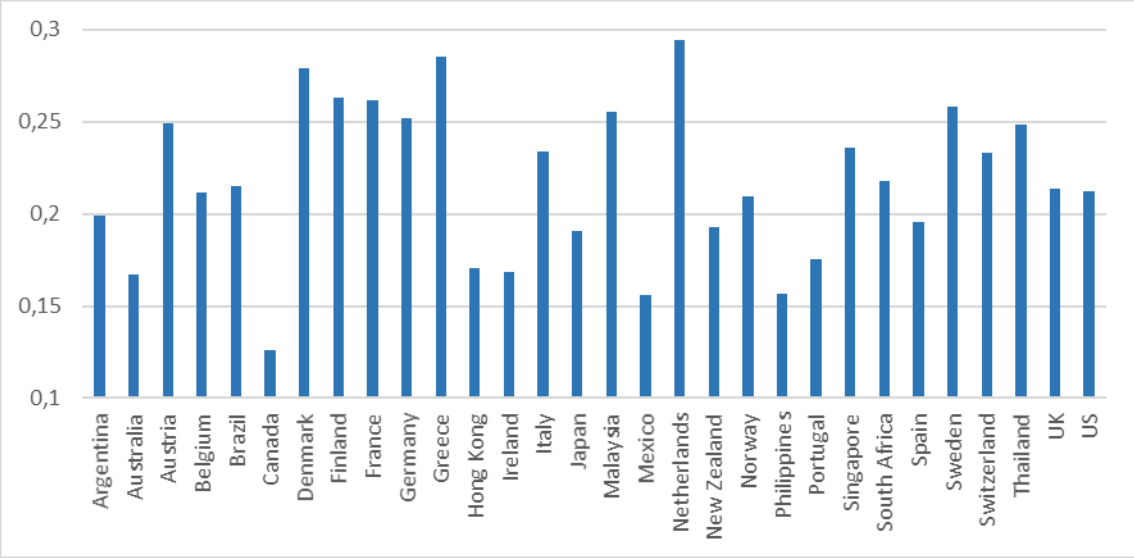

Table 3. Firm-specific variables by country

Countries	N	Number of firms	Coefficient of NWC_{t-1}	NWC	Cash flow	Leverage	Growth opport.	Size	Fixed assets	Profitability
Argentina	588	52	0.28	0.1988	0.1612	0.4975	1.3276	5.4647	0.4751	0.1289
Australia	5,773	695	0.01**	0.1674	0.1401	0.4088	1.6795	4.2449	0.2771	-0.1532
Austria	764	71	0.70***	0.2495	0.4812	0.5722	1.2288	5.9858	0.3294	0.4581
Belgium	946	90	0.77***	0.2118	0.4313	0.5648	1.5365	5.9260	0.2990	0.3368
Brazil	1,426	174	0.66***	0.2153	0.1281	0.5607	1.2845	6.7728	0.3231	0.1206
Canada	3,510	366	0.69***	0.1260	0.0972	0.4357	1.7022	6.0928	0.4542	-0.0140
Denmark	953	93	0.71***	0.2794	0.2951	0.5060	1.6201	5.1462	0.3312	0.2069
Finland	1,322	112	0.69***	0.2630	0.5661	0.5320	1.4892	5.4700	0.2716	0.4325
France	5,507	553	0.64***	0.2616	0.4504	0.5719	1.4426	5.4291	0.1911	0.3643
Germany	6,169	601	0.55***	0.2519	0.4404	0.5427	1.5354	5.3343	0.2376	0.3184
Greece	1,882	198	0.72***	0.2855	0.0798	0.5543	1.2521	5.4121	0.3760	0.0561
Hong Kong	1,632	194	0.65***	0.1704	0.0830	0.3930	1.2422	5.9036	0.2599	0.0361
Ireland	455	41	0.20	0.1683	0.1408	0.5003	1.5682	6.6340	0.3035	0.1122
Italy	2,376	233	0.74***	0.2340	0.3529	0.5981	1.3180	6.2791	0.2505	0.4063
Japan	51,762	3,874	0.73***	0.1910	0.0773	0.5211	1.1512	5.7407	0.3002	0.0440
Malaysia	7,512	787	0.40***	0.2551	0.1291	0.3992	1.0765	4.3743	0.3595	0.1243
Mexico	663	60	0.69***	0.1558	0.1564	0.4799	1.1789	6.8892	0.4393	0.1527
Netherlands	1,228	116	0.77***	0.2946	0.4207	0.5465	1.6418	5.9145	0.2548	0.2883
New Zealand	627	75	0.79***	0.1926	0.2451	0.4480	1.5527	4.7758	0.3685	0.1996
Norway	1,146	139	0.68***	0.2096	0.4379	0.5440	1.6024	5.5315	0.2844	0.3386
Philippines	711	75	0.72***	0.1564	0.1299	0.4253	1.4162	5.2003	0.3702	0.1498
Portugal	482	43	1.21*	0.1754	0.3650	0.6731	1.2503	6.7384	0.3415	0.4013
Singapore	4,555	497	0.62***	0.2358	0.1380	0.4359	1.1867	4.6447	0.2810	0.1120
South Africa	1,989	208	0.56***	0.2178	0.2131	0.4949	1.4521	5.1113	0.2887	0.1414
Spain	1,303	119	0.82***	0.1954	0.4674	0.5746	1.5647	6.6550	0.3481	0.5536
Sweden	2,460	263	0.65***	0.2582	0.1856	0.4974	1.8812	4.7108	0.1830	0.0607
Switzerland	2,004	177	0.83***	0.2330	0.3402	0.4855	1.5777	6.2627	0.3189	0.3136
Thailand	4,282	373	0.64***	0.2482	0.1140	0.4358	1.2647	4.3969	0.3970	0.0631
UK	11,856	1,208	0.59***	0.2140	0.1611	0.4960	1.6637	4.9179	0.2666	0.0792
US	34,706	2,980	0.60***	0.2120	0.1096	0.4527	1.9925	6.1586	0.2508	0.0301
Total	160,589	14,467		0.2113	0.1565	0.4909	1.4767	5.5718	0.2884	0.0930

This table presents, for each country, the number of firm-years, number of firms, the estimated coefficient of the lagged variable, and the country means of the specific firm variables. NWC is the sum of accounts receivable and inventories after accounts payable divided by total assets; *Cash flow* is the earnings before interest and taxes plus depreciation over total assets; *Leverage* is the total debt to total assets ratio; *Growth opportunities* is the market value of equity plus the book value of debt to total assets; *Size* is the natural logarithm of total assets; *Fixed assets* is the property plan and equipment to total assets; *Profitability* is the earnings before interest and taxes to total sales. * indicates significance at the 10% level, ** indicates significance at the 5% level and *** indicates significance at the 1% level.

Table 4. Country-specific variables

Countries	Legal system	Financial system	Stock market cap	Bond market cap	Anti-director rights	Antiself	Creditor rights	Rule of law	Property rights	GDP growth
Argentina	0	0	32.06	5.54	2	0.34	1	3.71	39.28	0.0658
Australia	1	1	115.60	54.23	4	0.76	3	5.91	90	0.0779
Austria	0	0	24.02	40.73	2.5	0.21	3	6	90	0.0404
Belgium	0	0	65.15	39.68	3	0.54	2	5.07	85.5	0.0391
Brazil	0	1	55.35	16.95	5	0.27	1	2.17	50	0.0797
Canada	1	1	107.36	28.83	4	0.64	1	6	90	0.0547
Denmark	0	0	60.63	142.93	4	0.46	3	6	90.25	0.0405
Finland	0	0	108.16	23.72	3.5	0.46	1	6	90.24	0.0525
France	0	0	78.21	43.33	3.5	0.38	0	5.01	72.86	0.0351
Germany	0	0	46.53	41.80	3.5	0.28	3	5.39	90	0.0325
Greece	0	0	51.09	10.19	2	0.22	1	3.93	55.71	0.0424
Hong Kong	1	1	434.10	15.83	5	0.96	4	4.93	90	0.0291
Ireland	1	0	51.90	60.17	5	0.79	1	5.99	89.76	0.0672
Italy	0	0	38.74	31.47	2	0.42	2	4.91	60.95	0.0363
Japan	0	0	75.64	42.75	4.5	0.5	2	5.34	79.52	0.0038
Malaysia	1	1	131.64	51.34	5	0.95	3	3.83	56.67	0.0646
Mexico	0	1	27.98	13.07	3	0.17	0	2.53	50.95	0.0417
Netherlands	0	1	102.42	59.05	2.5	0.2	3	6	90	0.0434
New Zealand	1	0	38.64	.	4	0.95	4	5.87	91.75	0.0623
Norway	0	0	52.43	25.74	3.5	0.42	2	6	90	0.0724
Philippines	0	1	48.77	0.81	4	0.22	1	2.86	43.33	0.0624
Portugal	0	0	39.29	33.27	2.5	0.44	1	5.1	70	0.0454
Singapore	1	1	175.53	16.37	5	0.81	3	5.1	90	0.0549
South Africa	1	0	194.03	16.52	5	1	3	1.85	50	0.0441
Spain	0	0	76.88	31.52	5	0.37	2	4.65	70	0.047
Sweden	0	1	105.28	47.00	3.5	0.33	1	5.04	84.52	0.0509
Switzerland	0	0	225.69	34.81	3	0.27	1	5.81	89	0.0415
Thailand	1	1	57.43	11.54	4	0.81	2	4.8	59.76	0.0532
UK	1	1	134.86	16.15	5	0.95	4	5.36	89.52	0.044
US	1	1	128.83	100.45	3	0.65	1	5.73	88.1	0.0348

Legal system classifies countries as having a common (1) or civil law system (0), *Financial system* classifies countries as market- (1) or bank-oriented (0), *Stock market cap* is the stock market capitalisation to GDP, *Bond market cap* is the private bond market capitalisation to GDP, the *Anti-director rights* index measures the legal protection of shareholders, *Antiself* measures the legal protection of minority shareholders against expropriation by insiders, *Creditor rights* is a proxy for creditor protection, *Rule of law* assesses the law and order tradition in the country, *Property rights* is an index of the published protection of private property rights, and *GDP growth* is GDP per capita average growth. A more detailed definition of the variables is presented in the Appendix.

Table 5. Country groups by institutional characteristics

Countries	Legal system	Financial system	Stock market cap	Bond market cap	Anti-director rights	Antiself	Creditor rights	Rule of law	Property rights
Argentina	0	0	0	0	0	0	0	0	0
Australia	1	1	1	1	1	1	1	1	1
Austria	0	0	0	1	0	0	1	1	1
Belgium	0	0	0	1	0	1	0	0	0
Brazil	0	1	0	0	1	0	0	0	0
Canada	1	1	1	0	1	1	0	1	1
Denmark	0	0	0	1	1	1	1	1	1
Finland	0	0	1	0	0	1	0	1	1
France	0	0	1	1	0	0	0	0	0
Germany	0	0	0	1	0	0	1	1	1
Greece	0	0	0	0	0	0	0	0	0
Hong Kong	1	1	1	0	1	1	1	0	1
Ireland	1	0	0	1	1	1	0	1	1
Italy	0	0	0	0	0	0	0	0	0
Japan	0	0	1	1	1	1	0	1	0
Malaysia	1	1	1	1	1	1	1	0	0
Mexico	0	1	0	0	0	0	0	0	0
Netherlands	0	1	1	1	0	0	1	1	1
New Zealand	1	0	0	.	1	1	1	1	1
Norway	0	0	0	0	0	0	0	1	1
Philippines	0	1	0	0	1	0	0	0	0
Portugal	0	0	0	1	0	0	0	0	0
Singapore	1	1	1	0	1	1	1	0	1
South Africa	1	0	1	0	1	1	1	0	0
Spain	0	0	1	0	1	0	0	0	0
Sweden	0	1	1	1	0	0	0	0	0
Switzerland	0	0	1	1	0	0	0	1	1
Thailand	1	1	0	0	1	1	0	0	0
UK	1	1	1	0	1	1	1	1	1
US	1	1	1	1	0	1	0	1	1

This table specifies the group to which each country belongs for each of the country-specific variables proposed. *Legal system* classifies countries as having a common (1) or civil law system (0) and *Financial system* classifies countries as market- (1) or bank-oriented (0). Countries with greater financial development (*Legal system*, *Financial system*, *Stock market cap*, and *Bond market cap*) are given a value equal to 1 and countries receive a value of 0 otherwise. Countries with higher investor protection variables *(Creditor rights, Antiself, Property rights* and *Rule of law)* are given a value equal to 1, and countries receive a value of 0 otherwise.

Table 6. Speed of adjustment and financial and legal systems

	Financial system (1)	**Legal system (2)**
NWC_{t-1}	0.5069***	0.5044***
	(27.0)	(27.96)
NWC_{t-1} × dummy financial system	-0.4705***	
	(-11.86)	
Dummy financial system	0.0345	
	(0.44)	
NWC_{t-1} × dummy legal system		-0.4702***
		(-12.50)
Dummy legal system		0.2197*
		(1.82)
Cash flow	0.0116***	0.0106***
	(3.04)	(3.03)
Leverage	0.0581***	0.0543***
	(6.41)	(6.17)
Growth opportunities	-0.0026***	-0.0029***
	(-4.76)	(-5.63)
Size	-0.0104***	-0.0107***
	(-4.57)	(-5.06)
Fixed assets	-0.0778***	-0.0884***
	(-6.06)	(-7.45)
ROA	0.0139***	0.0129***
	(6.05)	(6.37)
GDP growth	0.0084*	0.0113**
	(1.92)	(2.56)
Constant	0.2369***	0.2518***
	(2.87)	(3.06)

Dummy financial system equals 1 for countries with a market-based system and 0 otherwise. *Dummy legal system* equals 1 for common-law countries and 0 otherwise. All variables are defined in the Appendix.
Time, industry and country dummies are included in the estimations but not reported. *T-statistic* in brackets. * indicates significance at the 10% level, ** indicates significance at the 5% level, and *** indicates significance at the 1% level.

Table 7. Speed of adjustment and financial development and investor protection.

	Stock market cap (1)	Bond market cap (2)	Anti-director rights (3)	Antiself (4)	Creditor rights (5)	Rule of law (6)	Property rights (7)
NWCt-1	0.4663***	0.5279***	0.5429***	0.4613***	0.5763***	0.4803***	0.5137***
	(14.18)	(25.92)	(25.50)	(16.99)	(37.78)	(16.04)	(24.77)
NWC $_{t-1}$ × dummy stock market cap	-0.4035***						
	(-5.42)						
Dummy stock market cap	0.1456						
	(1.40)						
NWC $_{t-1}$ × dummy bond market cap		-0.4855***					
		(-9.99)					
Dummy bond market cap		0.1646**					
		(2.37)					
NWC $_{t-1}$ × dummy anti-director rights			-0.5104***				
			(-12.81)				
Dummy anti-director rights			0.2966***				
			(3.59)				
NWC $_{t-1}$ × dummy antiself				-0.4056***			
				(-6.17)			
Dummy antiself				0.1537			
				(1.32)			
NWC $_{t-1}$ × dummy creditor rights					-0.5575***		
					(-24.57)		
Dummy creditor rights					0.3042***		
					(3.84)		
NWC $_{t-1}$ × dummy rule of law						-0.4375***	
						(-8.28)	
Dummy rule of law						0.2047***	
						(2.82)	
NWC $_{t-1}$ × dummy property rights							-0.4803***
							(-12.90)
Dummy property rights							0.1043
							(1.54)
Cash flow	0.0143***	0.0159***	0.0118***	0.0095**	0.0154***	0.0117***	0.0125***
	(2.87)	(3.57)	(3.54)	(2.17)	(4.88)	(2.78)	(3.18)
Leverage	0.0687***	0.0559***	0.0585***	0.0535***	0.0504***	0.0599***	0.0534***
	(5.36)	(4.90)	(6.43)	(4.75)	(6.99)	(5.25)	(5.96)
Growth opportunities	-0.0019***	-0.0022***	-0.0020***	-0.0023***	-0.0020***	-0.0019***	-0.0025***
	(-3.20)	(-4.11)	(-3.86)	(-4.31)	(-4.11)	(-3.44)	(-5.03)
Size	-0.0070**	-0.0105***	-0.0087***	-0.0095***	-0.0056***	-0.0092***	-0.0089***
	(-2.42)	(-4.26)	(-4.24)	(-3.80)	(-2.96)	(-3.84)	(-4.31)
Fixed assets	-0.0797***	-0.0539***	-0.0795***	-0.0843***	-0.0843***	-0.0725***	-0.0807***
	(-4.92)	(-3.72)	(-6.66)	(-5.99)	(-8.40)	(-5.22)	(-7.05)
ROA	0.0154***	0.0128***	0.0099***	0.0139***	0.0086***	0.0140***	0.0143***

	(5.61)	(5.60)	(5.26)	(5.63)	(5.66)	(6.22)	(7.09)
GDP growth	0.0197***	0.0219***	-0.0014	0.0193***	0.0045	0.0199***	0.0099**
	(2.93)	(4.41)	(-0.31)	(3.43)	(0.97)	(3.73)	(2.28)
Constant	0.2619***	0.0877	0.1620***	0.2638***	0.1382***	0.0541	0.1613**
	(6.66)	(1.23)	(9.49)	(3.63)	(9.03)	(0.71)	(2.24)

Dummy stock market cap equals 1 for countries with greater stock market capitalisation and 0 otherwise. *Dummy bond market cap* equals 1 for countries with a greater development of private bond markets and 0 otherwise. *Dummy anti-director rights* and *Dummy antiself* equal 1 for countries with strong shareholder rights and 0 otherwise. *Dummy creditor rights* equals 1 for countries with strong creditor rights and 0 otherwise. *Dummy rule of law* equals 1 for countries with greater legal system efficiency. *Dummy property rights* equals 1 for countries with greater legal protection of property rights. All variables are defined in the Appendix.

Time, industry and country dummies are included in the estimations but not reported. *T-statistic* in brackets. ** indicates significance at the 5% level, and *** indicates significance at the 1%level.

Table 8. Robustness check

	Results obtained by excluding both the United States and Japan		Results obtained by excluding Argentina, Ireland and Portugal	
	NWC_{t-1}	**NWC_{t-1} × dummy variable**	**NWC_{t-1}**	**NWC_{t-1} × dummy variable**
Legal system	0.5092***	-0.4916***	0.5051***	-0.4709***
	(21.07)	(-17.50)	(28.17)	(-12.62)
Financial system	0.4891***	-0.4699***	0.5031***	-0.4670***
	(18.97)	(-15.64)	(26.72)	(-12.01)
Stock market cap	0.4923***	-0.4712***	0.4508***	-0.3883***
	(17.75)	(-14.35)	(13.72)	(-5.33)
Bond market cap	0.5715***	-0.5570***	0.5254***	-0.4828***
	(30.73)	(-26.16)	(25.83)	(-9.96)
Anti-director rights	0.4858***	-0.4661***	0.5430***	-0.5110***
	(18.40)	(-14.94)	(25.49)	(-13.16)
Antiself	0.4993***	-0.4808***	0.4604***	-0.4046***
	(19.61)	(-16.16)	(16.84)	(-6.21)
Creditor rights	0.5256***	-0.5065***	0.5756***	-0.5573***
	(21.61)	(-17.08)	(37.77)	(-25.26)
Rule of law	0.5144***	-0.4993***	0.4766***	-0.4339***
	(17.47)	(-15.78)	(15.63)	(-8.12)
Property rights	0.4900***	-0.4731***	0.5128***	-0.4798***
	(14.12)	(-12.70)	(24.90)	(-13.05)

This table presents the results obtained by replicating Equation (4) after excluding firms from countries with large or small fractions of observations in our sample firm-years. First, this shows the results obtained after excluding firms from both the US and Japan. Second, it reports the results obtained after excluding firms from Argentina, Ireland and Portugal.
All dummy variables and firm-specific variables are included in the estimations but not reported for brevity. *T-statistic* in brackets.
*** indicates significance at the 1% level.