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Determinants of corporate cash holdings in South Africa

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and Tlhologelo Thoka³

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Abstract: Globally, corporate cash holdings have risen since the 1980s. In South Africa, some commentators have accused corporations of engaging in an ‘investment strike’, while others see corporate liquidity as a precaution against systemic uncertainty. We use the unique South African Revenue Service/National Treasury firm-level dataset to scrutinize corporate liquidity, using panel analysis. Relative to GDP, corporate cash and liquidity holdings have not increased between 2010 and 2017. However, corporate cash is high in international comparison and has grown at the firm level. We do not find evidence for the hypothesis that companies are engaging in an investment strike. Cash and liquidity are shaped by idiosyncratic and sectoral risk factors. In the short run, heightened uncertainty might reduce corporate cash and liquidity as firms struggle to adjust to an unexpected economic situation. In the medium run, we find a strong association between political uncertainty and corporate cash and liquidity holdings.

Key words: South Africa, corporate liquidity, cash holdings, panel analysis

JEL classification: C23, D22, G3

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1 Introduction

Corporate cash holdings have been on the rise since the 1980s (Bates et al. 2009). The determinants of such holdings have been first and most often analysed for US-based listed non-financial companies (NFCs¹; see Ferreira da Cruz et al. (2019) and Kim et al. (1998) for a geographical breakdown). However, similar trends of rising corporate cash holdings have been identified for other OECD countries, including Australia, Canada, France, Germany, Japan, and the UK (Iskandar-Datta and Jia 2012; Ozkan and Ozkan 2004).

Scholarly and media attention around corporate cash has particularly increased since the global financial crisis (Ferreira da Cruz et al. 2019) as a perception developed that especially large corporations have been amassing ‘idle’ cash while investment remained subdued (Waters 2014). For instance, S&P estimated that global investment fell by US\$900 billion in 2012/13 due to corporate liquidity (Sakoui 2014). The global COVID-19 pandemic has revived these concerns as corporations hold record levels of cash (ICAEW Insights 2020; Moody’s 2020). While most attention is given to US-based companies, cash holdings among corporations based in emerging economies have also been the focus of growing interest more recently (Al-Najjar 2013; BIS 2015; Hall et al. 2014; Jebran et al. 2019).

The reasons for large cash holdings among corporations can vary, depending on firm characteristics (such as size and leverage), sector-specific circumstances (for instance, profitability and industry risks), as well as macroeconomic determinants (among others, aggregate demand and institutional factors). Assessments of OECD-based firms’ cash holdings tend to adopt a narrow analytical lens, heavily focusing on listed NFCs and firm-level characteristics. However, the debate on South African corporate cash points towards important macroeconomic implications and potential reasons for corporate cash and liquidity. In South Africa, corporations reportedly hold increasing liquid assets (Daya and Heyneke 2016), though there is disagreement on the matter. While some commentators dismiss such reports as a ‘myth’ (Thambo and Theobald 2017), others have accused South African corporations of engaging in an ‘investment strike’ (Maake 2017; Mbindwane 2015), sparking a debate focused on systemic issues including growth, job creation, and socio-economic justice (COSATU 2017). In contrast, corporate precaution regarding systemic uncertainty, be it economic or political, has been flagged as a potential driver of mounting cash.

So far it has been difficult to judge whether cash holdings among South African corporations are large or increasing, and if so, for what reason. The evidence used to put forward claims about large and rising cash volumes among corporations is aggregate data on corporate bank deposits, giving us few clues about the actual extent of cash holdings or firms’ motivations to hold liquid assets. Economists have cautioned against a simplistic interpretation of aggregate data (Keeton 2017). To address these shortcomings and to scrutinize the characteristics and potential drivers of corporate cash and liquidity holdings, we draw on the unique CIT-IRP5 firm-level panel (Ebrahim et al. 2021; National Treasury and UNU-WIDER 2021).² These data are based on companies’ (confidential) tax returns, as well as tax return data filed by employees and at customs, providing as close to a complete database of small-, medium-, and large-firm activity in South Africa as

¹ Since it is acknowledged that financial companies operate differently from industrial ones, often holding or investing in liquid assets on behalf of other sectors.

² The dataset is also known as the SARS/NT panel (Pieterse et al. 2018).

possible,³ allowing for an empirical investigation of corporate cash holdings, their actual volume, and potential reasons for the holdings. Thus, in the context of emerging economies (EMEs), the comparator group for our results, the database enables us to analyse an unprecedentedly large number of companies for a given country, covering around 750,000 private firms for the period 2010–17 and yielding close to 6.8 million firm–year observations.

Overall, we find that relative to GDP, cash and liquidity holdings among South African NFCs have not increased over the studied period. At the firm level, however, corporate cash is high in international comparison, in particular when comparing to other EMEs, and has grown between 2010 and 2017. The single largest sector contributing to corporate cash in aggregate is manufacturing. When analysing potential determinants of corporate cash holdings, we do not find evidence for the hypothesis that South African companies at large are engaging in an investment strike. On the firm and industry levels, cash and liquidity are shaped by idiosyncratic and sectoral risk factors, such as firms’ indebtedness, the reliability of their cash flow, and fluctuations in industry earnings. These characteristics are typically perceived as risky by companies and are therefore likely to induce higher levels of precautionary cash and liquid asset holdings, which is confirmed by our results for the South African economy as a whole and across different industries. These findings are in line with the existing literature.

To our knowledge, our study is the first one to comprehensively assess the impact of international and domestic uncertainty—measured by exchange rate volatility, international and domestic business confidence, labour market performance, and the quality of domestic institutions—on firm-level cash. We identify two types of influences that uncertainty is likely to have on firm operations. In the short run, heightened uncertainty might in fact reduce corporate cash and liquidity as firms struggle to adjust to a new and unexpected economic situation. This result is stronger for domestic measures and particularly pronounced for our labour market performance measures, which are a proxy for domestic demand. In the medium run, we find a strong association between political uncertainty—emanating from poor regulatory quality—and corporate cash and liquidity holdings. To unpack these results further, more direct engagement with domestic industries and firm representatives is required.

The paper is organized as follows. The next section provides a concise overview of the macroeconomic and firm-level landscape of corporate cash and liquidity among NFCs operating in South Africa in international comparison, and especially compared to other emerging economies. Section 3 introduces the data and methodology employed, while Section 4 presents our findings. In Section 5 we provide a discussion and conclusion.

2 Corporate cash and liquidity among South African corporations

Corporate cash and liquidity have been at the centre of controversial debate in South Africa. Cash holdings among NFCs based in South Africa were observed to have risen in the aftermath of the GFC. For instance, Nedbank CIB flagged that South African NFCs ‘hoarded substantial amounts of cash’ between 2009 and 2016, growing from ZAR481 billion to ZAR725 billion (Daya and Heyneke 2016: 10). By early 2017 corporate cash holdings stood at 17 per cent of GDP (Karwowski 2018). The Nedbank analysis puts this mainly down to subdued growth prospects

³ We have excluded micro-enterprises from our analysis due to the distinct nature of such companies. Since these firms tend to be informal and by definition do not exceed a turnover of ZAR100,000 per year, they are unlikely to drive aggregate corporate liquidity.

both at home and abroad, as well as political uncertainty. When considering the 50 largest companies listed on the Johannesburg Stock Exchange (JSE), among which 15 were financial companies, Bosiu et al. (2017) find that company reserves rose from around ZAR500 billion to ZAR1.4 trillion over the same period due to significant profitability and lacklustre investment spending among large corporations operating in South Africa. Focusing on a much smaller sample of 17 JSE-listed retail companies, Chireka and Fakoya (2017) find average cash-to-total asset ratios, a standard measure of firm-level cash, of 16 per cent for the period 2000–15. Nyamgero (2015) reports average cash ratios fluctuating between 6.5 and 10.5 per cent for all JSE-listed NFCs for the years 1990 to 2014. Both figures are notably higher than cash ratios documented for listed NFCs in the other BRICS economies (Brazil, Russia, India, and China), which Al-Najjar (2013) estimates at 2–5 per cent of total assets for the period 2002–08. Analysing the years 2001–10, Hall et al. (2014) find average cash holdings between 2 and 10 per cent for a sample of private and listed NFCs in 18 Central and Eastern European (CEE) countries.

However, international comparisons are not straightforward since, due to data limitations, most studies only examine listed NFCs, which are large companies in the overall firm population. Even studies that attempt to go beyond listed corporations grapple with limited data availability, especially for small and medium-sized firms.⁴ Therefore, as documented in the case of the USA (Iskandar-Datta and Jia 2012), this focus tends to provide lower estimates of cash ratios on firms' balance sheets than a broad approach that accounts for a larger number of non-listed firms, often of medium and small size. For example, using a large firm-level dataset of 400,000 Japanese firms for the years 1996–2016, Honoso et al. (2019) find an average cash ratio of 25 per cent. However, Japanese NFCs are generally among the most cash-rich in international comparison. Sher (2014) reports that Japanese NFCs in aggregate held cash and equivalents worth around 50 per cent of GDP in 2013. For comparison, the Institute of Chartered Accountants in England and Wales states that in mid-2020, and as a reaction to the global COVID-19 pandemic, cash holdings among UK-based private NFCs hit an all-time high of 40 per cent of GDP (ICAEW Insights 2020). In addition, in the context of emerging economy analyses, there tend to be relatively few listed NFCs, making a direct comparison potentially difficult without accounting for firm-specific and sectoral differences.⁵

Some economists dismiss the idea of corporate cash hoarding among South African companies as 'myth' (Thambo and Theobald 2017). In a study of the top 85 JSE-listed NFCs for the period 2007–16, Thambo and Theobald (2017) find corporate cash among these large corporations grew by 11 per cent in real terms per year, thus by far outstripping GDP growth during the period. However, they argue that much of the rise was in line with companies' growth (with cash ratios moving between 6 and 10 per cent of total assets). Additionally, a significant proportion of these large firms are multinationals with limited operations in South Africa, shedding doubt on the impact of their cash holdings on the South African economy, according to the authors. Equally, the argument has been made that cash holdings among South African companies are not high in historical perspective (Nyamgero 2015) when comparing cash ratios among JSE-listed companies in the 2010s to the 1990s. However, given the fundamental, and often tumultuous, transformation of South African society to democracy in the early 1990s, high levels of corporate cash, for instance

⁴ Using the commercial ORBIS database, Hall et al. (2014) only manage to source data for fewer than 17,000 unique companies in a study of 18 CEE countries. Our dataset includes over 700,000 unique firms for the period 2010–17.

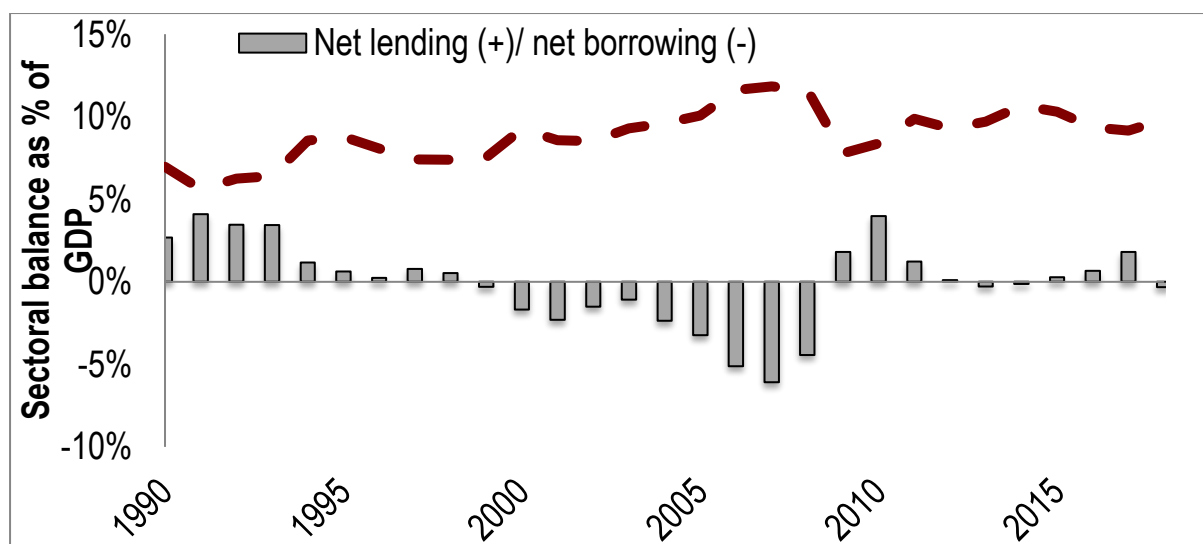
⁵ For instance, Maheshwari and Rao (2017) only consider 395 Indian NFCs for the years 2007–12. Shah (2011) investigates the cash holdings among 380 Pakistani NFCs between 1996 and 2008. Jebran et al. (2019) look at an even smaller set of 280 Pakistani listed NFCs for 2005–14. Uyar and Kuzey (2014) consider 389 Turkish NFCs for the years 1997–2011.

to guard against economic and political uncertainty, are more plausible for the 1990s than a decade later.

The concept of ‘idle cash’ has been criticized more generally for disregarding the intermediary role of banks and the financial sector (Keeton 2017). This criticism is aimed at the macroeconomic role of corporate savings and liquidity. The argument alludes to the endogenous nature of money (Keeton 2017: 7); that is, to the fact that commercial banks create money *ex nihilo* when they extend credit (see Jakab and Kumhof 2019). Thus, the argument runs, corporate cash holdings have increased as NFCs borrow to invest (Keeton 2017). This is in line with the claim that NFCs accumulate liquid funds for future investment. Companies with high growth potential but risky initial investment strategies are known for holding large volumes of cash (Begenau and Palazzo 2017).

This final claim is difficult to uphold for South Africa, given subdued investment rates. Most bank lending goes, in fact, to households (around 40–50 per cent of total bank credit between 2000 and 2016) and the finance, insurance, and real estate (FIRE) sector (another 20–25 per cent of this lending) rather than to NFCs (Karwowski 2018). It is true that cash and cash equivalents on corporate balance sheets do not lie idle in the sense that they are not withdrawn from the economy. However, these funds are not necessarily generated to fund productive investment. NFCs in rich countries as well as EMEs have been observed to increasingly invest into financial assets while holding substantial cash volumes, doing so potentially at the expense of productive investment (Krippner 2005; Rossi 2011; Stockhammer 2004; Tori and Onaran 2017, 2020). In fact, South African NFCs in aggregate repeatedly invested less in fixed capital than their available funding sources on an annual basis since 1990, meaning they amassed savings through cash and financial investment. They turned into net lenders to the rest of the South African economy (see Figure 1).

Figure 1: Aggregate financial balance of South African NFCs, 1990–2018



Source: authors' calculations based on SARS National Financial Accounts and StatsSA GDP data.

This phenomenon is part of corporate financialization, which refers to the change in business practices and strategies under way since the 1980s as the influence of financial markets, and particularly financial investors, on corporations rose (see Davis (2018) for a survey). Financialization can affect NFCs in different ways as it plays out in variegated manners across countries and industries (see, e.g., Karwowski et al. 2020; Soener 2015). The phenomenon is mainly understood to entangle NFCs more strongly with financial markets through an increase in financial payments and receipts. This increased involvement with finance is a result of behavioural changes

within firms and, especially among listed companies, a shift in power benefiting financial shareholders (Davis 2018; Lazonick and O’Sullivan 2000). Empirically, financialization has been linked to rising cash holdings and liquidity on corporate balance sheets (see Karwowski (2018) for South Africa; Davis (2018) for the USA; Jibril et al. (2018) for Brazil; and Rabinovich and Artica (2020) for Latin America).

A major concern of this strand of literature is that corporate cash and liquidity holdings undermine corporations’ productive activity, especially in terms of capital expenditure and job creation, either because investment is forgone completely or financial investment replaces investment into production (Davis 2018).

When considering open economy settings, the financialization literature has strong overlaps with studies of global financial cycles (Miranda-Agrippino and Rey 2020). In the context of EMEs, the type and degree of integration into the global economy is an important determinant of NFCs’ cash and liquidity. Since the 1980s, rich countries and emerging economies have deregulated their financial sectors and accounts (Oatley and Petrova 2020). As a consequence, financial fragility has increased across poor and rich countries, illustrated by waves of asset price inflation followed by bursts in financial and real estate markets, exacerbated and sometimes led by foreign capital inflows (see, for instance, Arestis and Glickman (2002) on the East Asian crisis). An important observation is that monetary policy decisions in rich countries increasingly have direct consequences for EMEs and developing countries. Global financial cycles have become the new normal as surges in cross-border capital flows contribute to domestic credit booms in EMEs, shaping the business cycle (Rey 2015). Consequently, economic uncertainty and volatility of financial markets have increased globally, impacting corporate decisions, including the precautionary holding of liquidity. Precaution among NFCs is an often-found motive for accumulating cash and short-term investment to guard against idiosyncratic and industry risks that a company faces—for instance, due to the volatility of its cash flow (Iskandar-Datta and Jia 2012; Kim et al. 1998; Opler et al. 1999). For listed NFCs in the USA, Bates et al. (2009) estimate that 2 percentage points of the growth in accumulated cash between 1980 and 2006 was down to rising industry uncertainty as measured through cash flow volatility. However, the insight that systemic uncertainty, at the macroeconomic level, might fuel NFCs’ cash accumulation is more recent and rarely considered in studies of corporate cash. Considering the impact of financial liberalization on investment in EMEs, Demir (2009) finds that NFCs’ financial investment (into short-term and therefore liquid instruments) in Argentina, Mexico, and Turkey has been driven by increasing uncertainty emanating from the global financial system.⁶ Seo et al. (2016) argue that increased levels of uncertainty introduced by financial market liberalization raised cash holdings and liquidity among South Korean NFCs between 1990 and 2010. Thus, this paper brings together two strands of economic literature that seldom interact: insights from corporate finance studies that focus on firm-level determinants of cash and the financialization literature concerned with the impact of macroeconomic conditions on companies’ operations. The following section lays out how these insights are operationalized in this empirical study.

3 Data and methodology

The objective of this paper is to test hypotheses about potential reasons for corporate liquidity among South African NFCs, drawing on insights from the literature on corporate finance and corporate financialization. Given the controversial nature of corporate cash in South Africa, the

⁶ Akkemik and Ozen (2014) confirm these results for Turkey.

paper also analyses corporate liquidity more broadly, ensuring the phenomenon is thoroughly investigated. Therefore, the paper assesses (1) the cash ratio and (2) the liquidity ratio:

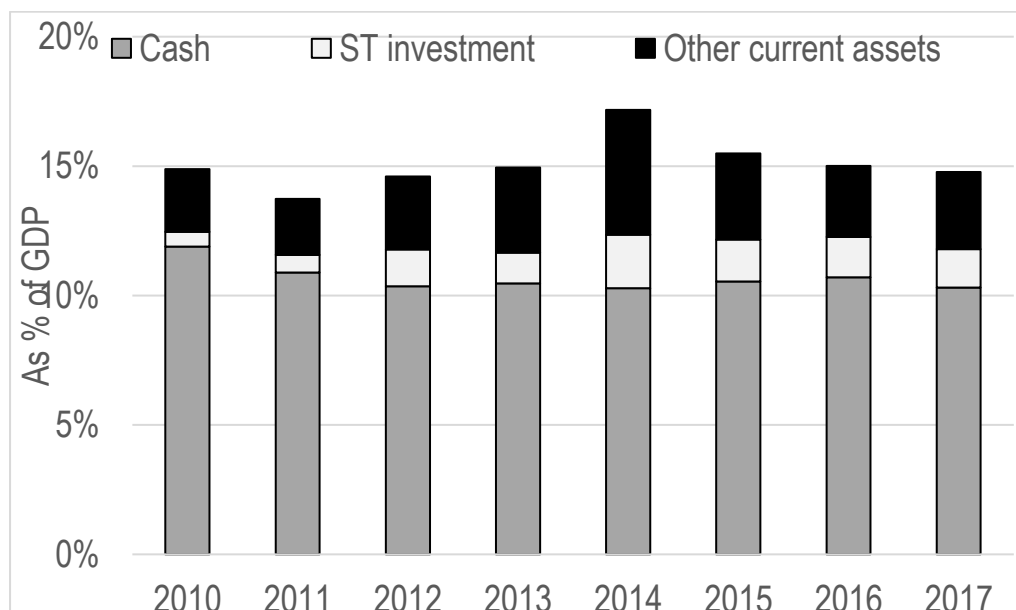
1. cash/total assets;
2. liquidity/total assets; here, liquidity includes financial assets beyond cash holdings: cash, short-term investments, and other current assets.

The former narrowly focuses on cash and cash equivalents divided by total assets. The latter equals the sum of cash and cash equivalents, short-term investment, and other current assets on corporate balance sheets over total assets. These three balance sheet items tend to be highly liquid. Cash and equivalents refer to cash and financial instruments with a maturity period of up to three months, while short-term investments and other current assets mature within a year. Short-term investment captures financial instruments such as government bonds, whereas other current assets is a miscellaneous category absorbing any other short-term assets which cannot easily be classified. For that reason, the label often picks up financially innovative instruments.

Current trade and other receivables, which also have a one-year maturity, have been excluded from the analysis since they mainly capture clients' payment commitments and are therefore closely linked to firms' productive operations. Thus, the dependent variables in the analysis correspond to two measures of liquidity: a narrow and a wide measure which are inspired by the two economic literatures on which this study draws. Corporate finance studies of cash equivalents are effectively interested in cash and its highly liquid equivalents, while financialization research focuses on NFCs' short-term and innovative financial investment.

To minimize the impact of outliers, both measures of the dependent variable are winsorized at the bottom 1 per cent and the top 1 per cent of their respective distribution. We focus on NFCs since financial companies operate differently, often holding or investing into liquid assets on behalf of other sectors. Furthermore, we also exclude electricity companies from our analysis, a standard approach in international corporate cash analysis, and firms that are part of the South African community sector as they can be assumed to follow different organizational behaviour than standard private-sector firms. This is done to allow, where possible, for better international comparison between our results and existing studies. Figure 2 provides an overview of the development in the three chosen liquidity items (cash, short-term investment, and other current assets) among NFCs in South Africa as the share of GDP. Total liquidity among corporations grew somewhat from 15 per cent of GDP in 2010 to exceed 17 per cent by 2014, after which point it declined again, falling just below 15 per cent by 2017. The bulk of liquidity is held in cash and equivalents, with short-term investment making up a small share of total liquid assets (never exceeding 2 per cent of GDP). Other current assets fluctuated strongly over the period, ranging from 1 per cent of GDP in 2010 to 5 per cent at the peak in 2014. Measured relative to GDP, we do not see an increase in corporate cash holdings over the studied years. However, our analysis is limited by data availability to a relatively short period.

Figure 2: South African NFCs' liquidity, 2010–17



Note: financial companies, electricity companies, and community companies have been excluded.

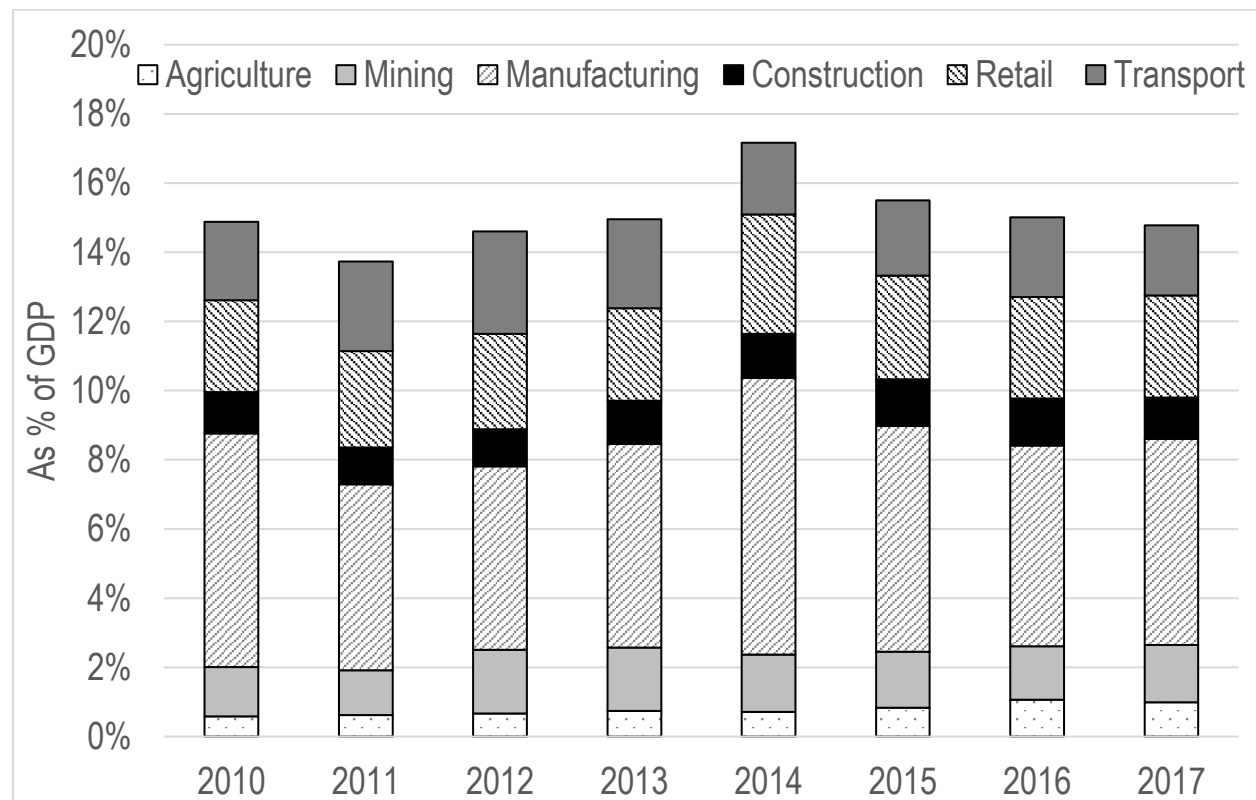
Source: authors' calculations based on StatsSA GDP data and the CIT-IRP5 firm-level panel (Ebrahim et al. 2021; National Treasury and UNU-WIDER 2021).

Not all sectors are equally involved in accumulating liquidity, as depicted in Figure 3. The largest contributor by far is the manufacturing sector, followed by retail and the transport sector. The manufacturing sector accounts for almost 30 per cent of relevant NFCs, while retail firms make up more than 40 per cent of all firms analysed. Transport companies in contrast have above-average cash ratios. This is documented in Table 1, which provides mean and median cash-to-asset ratios across industries for 2010–17. Construction and transport consistently show above-average cash ratios. The same is true for firm-level liquidity ratios, which are provided in Appendix Table A1.

The mean values of firm-level liquidity are comparable to those of US companies (see, for instance, Iskandar-Datta and Jia 2012) and well above NFCs in other EMEs. Studies for EMEs in CEE (Hall et al. 2014) and Southern Europe (Uyar and Kuzey 2014), on the South Asia subcontinent (Jebran et al. 2019; Maheshwari and Rao 2017; Shah 2011), and in the BRIC economies (Al-Najjar 2013) have generally found much lower cash ratios among NFCs, between 2 and 14 per cent of total assets.⁷ Firm-level cash ratios have increased over the time period studied on average (from 18.9 per cent to 20.1 per cent). This growth in firm-level cash holdings is most pronounced in mining (3.7 percentage points), transport (2.6 percentage points), construction (2 percentage points), and manufacturing (1.5 percentage points).

⁷ As mentioned before, comparability is difficult due to sample selection. However, the cash ratios we are presenting are on the lower end since we exclude short-term financial investment from the estimation, which is often included in the cash ratio by corporate finance studies.

Figure 3: South African NFCs' liquidity by sector, 2010–17



Source: authors' calculations based on StatsSA GDP data and the CIT-IRP5 firm-level panel (Ebrahim et al. 2021; National Treasury and UNU-WIDER 2021).

Table 1: Cash-to-total asset ratios by industry and year, 2010–17

Year	Sector													
	All NFCs		Agriculture		Mining		Manufacturing		Construction		Retail		Transport	
	Mean	Median	Mean	Median	Mean	Median	Mean	Median	Mean	Median	Mean	Median	Mean	Median
2010	0.189	0.070	0.121	0.020	0.174	0.053	0.183	0.077	0.224	0.082	0.190	0.074	0.207	0.078
2011	0.179	0.059	0.106	0.011	0.178	0.055	0.175	0.067	0.211	0.065	0.181	0.064	0.201	0.069
2012	0.183	0.059	0.111	0.011	0.177	0.053	0.180	0.069	0.216	0.066	0.183	0.063	0.210	0.074
2013	0.186	0.058	0.110	0.010	0.198	0.064	0.185	0.068	0.229	0.071	0.178	0.059	0.221	0.080
2014	0.190	0.060	0.121	0.012	0.195	0.058	0.187	0.069	0.238	0.076	0.181	0.061	0.221	0.076
2015	0.194	0.062	0.122	0.012	0.208	0.064	0.192	0.072	0.240	0.075	0.186	0.065	0.229	0.081
2016	0.198	0.063	0.126	0.013	0.205	0.057	0.195	0.071	0.243	0.074	0.192	0.069	0.230	0.080
2017	0.201	0.064	0.126	0.013	0.211	0.060	0.198	0.073	0.244	0.073	0.195	0.069	0.233	0.079

Source: authors' calculations based on the CIT-IRP5 firm-level panel (Ebrahim et al. 2021; National Treasury and UNU-WIDER 2021).

Sections 3.1–3.5 set out the five main hypotheses capturing the most important potential reasons for cash and liquidity holdings among South African NFCs, emerging from international academic debates and the South African policy discourse.

3.1 Hypothesis 1

The hypothesis that proponents of the ‘investment strike’ allegation effectively put forward is that cash holdings are positively linked to firms’ profitability while negatively correlated with their investment expenditure.⁸ Similarly, some financialization researchers have argued that NFCs engage in financial investment instead of production due to the dominance of financial shareholders or because of increasing financial liberalization (Demir 2009; Lazonick and O’Sullivan 2000). According to the World Economic Forum, South Africa had some of the best corporate governance standards (especially with respect to shareholder protection) in the world for the analysed period, illustrating the influence of shareholders on South African companies.⁹ Furthermore, the country has substantially liberalized its financial accounts since the end of the apartheid regime, opening up to international capital flows.¹⁰ Therefore, South African companies have been observed to behave in a financialized manner (Bowman 2018; Isaacs and Kaltenbrunner 2018). If ‘investment-strike’-type financialization pressures are driving corporate cash accumulation, NFCs’ liquidity will be negatively correlated with their future investment expenditure (INV_{t+1} , expected sign: $-$) while positively linked to firms’ past profitability measured by the return on assets (ROA_{t-1} , $+$). Since financialization does not necessarily affect all firms to the same extent and in the same manner, we introduce a financial dummy (FIN, $+$) identifying NFCs more closely intertwined with financial markets. The FIN dummy equals 1 for all NFCs which either pay dividends and/or receive financial payments, including interest and dividend payments, in a given year.

H1 Companies are holding cash and financial assets instead of investing.

3.2 Hypothesis 2

Sceptics of the ‘investment strike’ view point out that firms need to borrow to invest (Keeton 2017), effectively referring to Keynes’ finance motive for holding cash (Keynes 1937). For rich countries, this claim does not seem to be confirmed empirically. For instance, Bates et al. (2009) find that listed firms with high cash ratios generally invest less than those with lower ones. Iskander-Datta and Jia (2012) find that future capital expenditure (that is, in $t + 1$) is negatively correlated with corporate cash holdings for a sample of five OECD countries (Australia, France, Germany, the UK, and the USA). Bigelli and Sanchez-Vidal (2012) confirm this general finding for a sample of over 19,000 private and listed Italian companies between 1995 and 2006; however, they also find that medium-term future investment (in $t + 2$ and in $t + 1$ to $t + 4$ on average) is

⁸ While not using the controversial term, Bosiu et al. (2017) observe this type of behaviour for the top 50 JSE-listed firms.

⁹ According to the Global Competitiveness Reports published between 2010 and 2017, South Africa ranked on average 5th on the strength of auditing and reporting standards, 6th on the efficacy of corporate boards and the protection of minority shareholders, and 12th on investor protection, worldwide.

¹⁰ According to the IMF’s financial reforms index (Abiad et al. 2008), South Africa has opened up to international financial flows since 1995 and achieved a financial reform index of 0.87 since 2000. The index is expressed on a 0–1 scale, with 1 denoting complete openness, exemplified in the US financial system since 1999.

significantly higher among cash-rich firms. Given the limited number of years available for our analysis, we include investment in the coming year (INV_{t+1}) to test hypothesis 2 (H2).¹¹

H2 Future investment drives corporate liquidity.

3.3 Hypothesis 3

The corporate finance literature mostly focuses on idiosyncratic and firm-internal variables to explain rising cash holdings among rich-country, and especially US, NFCs (Bates et al. 2009; Baum et al. 2004; Opler et al. 1999; Ozkan and Ozkan 2004). Companies' debts and their structures are among the most studied variables when it comes to determinants of cash holdings.¹² While there is a general agreement that leverage, that is the ratio of debt to company assets, influences cash holdings, the direction of the effect is less clear. Some authors suggest that firm leverage signals companies' ability to access external credit, reducing the need to hold cash (LEV, $-$) (Ozkan and Ozkan 2004). However, higher levels of debt introduce potential financial fragility into a firm's balance sheet which companies might want to hedge against by holding cash (LEV, $+$). Similarly, cash flow fluctuations introduce idiosyncratic uncertainty and are likely to increase corporate cash holdings (CFF, $+$). For US firms, there is also the suspicion that increases in cash holdings are mainly driven by multinational firms as they choose not to repatriate profits because of tax considerations (Dhaliwal et al. 2011; Pinkowitz et al. 2012). For South African companies, the concern is rather that foreign firms might only experience increases in their cash on paper as their foreign-denominated assets appreciate when the rand weakens. To capture this potential effect, we have included a dummy variable (FOREIGN, $+$) for companies that hold foreign-denominated assets.

H3 Idiosyncratic uncertainty drives corporate liquidity.

3.4 Hypothesis 4

Uncertainty at the level of the industry may contribute to liquidity accumulation. For listed US companies, cash holdings increase significantly if industry cash flow is more volatile (Bates et al. 2009; Opler et al. 1999). Following existing studies, we include a measure of industry cash flow volatility (ICF, $+$)—that is, the industry sigma—in our analysis. ICF is calculated as the standard deviation of the sectoral mean of the ratio of operating cash flow to total assets over a three-year period (t , $t - 1$, $t - 2$). In comparison to US studies,¹³ we have a much shorter time period available to calculate the industry sigma. Given the large single contribution of manufacturing to overall corporate cash, we carry out a subgroup analysis for the sector to establish whether there are any industry-specific reasons for holdings cash.

H4 Industry-level uncertainty drives corporate liquidity.

¹¹ Introducing INV_{t+2} would mean that we cannot use the final two years of observations for our estimations since required data for including the last two years (2018 and 2019) are not available yet. Including medium-term future investment in $t + 4$, for instance, would shrink our dataset even further. Therefore, the analysis focuses only on $t + 1$.

¹² The other much-discussed variable is corporate governance, typically when analysing listed companies. Unfortunately, our dataset does not allow us to identify listed corporations for all relevant years.

¹³ Typically, a 20-year period is used for publicly listed US companies.

3.5 Hypothesis 5

Studies of corporate cash tend to focus on firm-level and industry uncertainty. However, in the context of an EME, macroeconomic uncertainty might impact firm behaviour. This finding is highlighted by financialization research (Isaacs and Kaltenbrunner 2018; Kaltenbrunner and Paineira 2015), although it is rarely linked to corporate cash and liquidity (see Demir (2009) for an exception). In the context of South Africa, the domestic policy debate suggests that either difficult demand conditions at home and/or abroad (Daya and Heyneke 2016), or a poor political environment, could fuel corporate liquidity as businesses are unwilling to invest.

There are extremely few studies analysing the impact of macro-uncertainty on corporate cash accumulation (see Smietanka et al. (2018) for England). Interacting the financialization and the corporate finance literatures, a major contribution of the paper is to test the impact of a range of economic and political indicators of systemic uncertainty on corporate cash and liquidity. Therefore, we introduce two types of systemic variables which capture uncertainty. On the one hand, international uncertainty will affect South African firms through the exchange rate and the volatility of international (financial) markets. Potential exchange rate effects are accounted for by including the volatility of the real effective exchange rate (REER, +) and volatility of the nominal USD/ZAR exchange rate (US/ZAR, +). We expect higher exchange rate volatility to lead to higher uncertainty for exporters. International financial and goods market conditions, on the other hand, are picked up by the VIX (VIX,¹⁴ +) and the World Uncertainty Index (WUI, +). Generally, as international economic conditions deteriorate cash holdings are expected to rise as a precaution. For domestic indicators of uncertainty, we include the BER confidence index (BER, -) alongside the South African Uncertainty Index (SAUI, +). These two indicators capture perceived uncertainty by business leaders (in the case of the BER confidence index) and international analysts of the South African economy (since the SAUI is based on the Economist Intelligence Unit (EIU) country reports). To capture the influence of weak domestic demand, the expanded unemployment rate (EXU_{t-1} , +) and the labour market absorption rate (ABR_{t-1} , -) are introduced. Because firms are more likely to react to domestic demand conditions already observed in the past, the labour market variables are lagged by one period. While the labour market measures are pure economic indicators, in the sense that they are meant to proxy the strength of aggregate domestic demand, the BER confidence index and the SAUI are likely to represent a mixture of economic *and* political considerations by business leaders and analysts. In that way, the latter two measures are also implicitly measures of political uncertainty at home. Finally, we include an explicit measure of the long-term domestic political environment, employing the Regulatory Quality Index (RQ, -), measured by its five-year moving average. RQ is defined as the perceived ability of the government to formulate and implement sound policies and regulations that permit and promote private-sector development. Institutional change is slow, and therefore corporate reactions to changes in regulatory quality are likely to only take place in the medium run. We expect that political uncertainty impacts cash holdings negatively.

To differentiate more effectively between domestic and international influences, we implement our analysis for different subgroups. We distinguish between exporting and non-exporting firms using companies' customs declarations. Furthermore, we create a subgroup of firms that, given their sector of activity (that is, construction, retail, and transport), are likely to focus on the domestic market.

¹⁴ The VIX is interpreted as low, meaning there are low levels of volatility in international financial markets, for values below 12, medium for scores between 12 and 20, and high above 20 (Edwards and Preston 2017).

3.6 Sample selection and variables

Internationally, the aftermath of the financial crisis was the period in which a general increase in corporate liquidity has been observed in a range of rich and emerging economies. Therefore, our analysis fittingly focuses on the period 2010–17. We use the CIT-IRP5 firm-level panel (Ebrahim et al. 2021; National Treasury and UNU-WIDER 2021), which gathers information from firms' annual tax returns. The database covers the years 2008–18. However, due to the nature of corporate tax filings, data gathering for 2018 has not been completed yet. Similarly, for the early years (2008 and 2009) the number of firm observations is low, suggesting some missing data.

The sample used in our analysis excludes firms with certain characteristics in order to provide more reliable insights into the determinants of cash holdings among South African NFCs. To ensure that only viable companies are analysed, firms with zero or negative sales are excluded from the sample. Moreover, we exclude micro-enterprises, defined by a turnover threshold set by StatsSA,¹⁵ as assets held by these firms tend to represent household saving. As discussed above, we also exclude firms in the following sectors: finance, electricity, and community services.

Table 2 outlines the descriptive statistics of the variables included in our model specification. Table 3 presents the correlation matrix of the analysed variables. Unsurprisingly, many of the variables measuring international and domestic uncertainty, be it economic or political, are strongly correlated. For instance, the WUI and SAUI are calculated based on the EIU country reports. The authors counted the number of times the words 'uncertainty', 'uncertain', and 'uncertainties' are mentioned (Ahir et al. 2018). The RQ uses a wide range of indicators as a basis, one of them being the EIU country reports. This explains the strong negative correlation between indicators 12 and 16 (−0.63) in Table 3. Therefore, variables capturing hypothesis 5 are included one at a time in the regression analysis.¹⁶

¹⁵ ZAR2,000,000 since 2015.

¹⁶ The macroeconomic indicators included in hypothesis 5 vary only across time, not across firms. Consequently, the estimated parameters for these variables may to some extent reflect the time trend, which could potentially obscure the independent effects of macroeconomic indicators on cash holdings. However, this is not likely to be of concern in the present model as owing to sample selection and the definitions of the macroeconomic indicators employed, there tends to be little variation over time in the values of the analysed macroeconomic variables, which suggests that only a minor part of these estimates could likely be attributed to the time trend. The inclusion of macroeconomic variables in one specification alongside firm-level regressors is a common practice in the literature on cash holdings (see, e.g., Bates et al. 2009). To assess the relative performance of the specification, including the macroeconomic variables against a model including firm-level variables only, we employ the likelihood ratio test. This test is performed on two specifications (one of which is nested in the other by imposing restrictions on selected parameter values) and evaluates which specification fits the data better by analysing the statistical significance of the difference in the estimated log-likelihood of each model. As reported in Tables 4 and 5, for the vast majority of macroeconomic uncertainty indicators the null hypothesis is rejected, which suggests that inclusion of the macroeconomic variables yields statistically significant improvements in the fit of the model in our sample. Furthermore, when excluding all macroeconomic variables the FE model yields extremely similar results for the firm-level variables with the sole exception of ICF (results available on request), once again confirming our results.

Table 2: Descriptive statistics, 2010–17

Variable	Mean	Median	Standard deviation	Minimum	Maximum
Cash ratio	0.190	0.062	0.276	0.000	1.000
Liquidity ratio	0.209	0.075	0.287	0.000	1.000
Return on assets	0.504	0.457	0.316	−0.180	1.000
Financialized firms	0.481	0.000	0.500	0.000	1.000
Future investment	0.743	0.507	0.834	−1.375	6.461
Leverage ratio	0.452	0.208	0.900	0.000	8.108
Cash flow fluctuation	0.823	0.307	1.403	0.000	12.838
Exporting firms	0.089	0.000	0.285	0.000	1.000
Industry profit fluctuations	3.026	3.033	0.580	2.016	4.613
Foreign holdings	0.001	0.000	0.037	0.000	1.000
SABR REER volatility	6.271	5.657	3.343	0.849	15.274
USD/ZAR volatility	0.648	0.520	0.363	0.350	1.600
VIX	17.333	16.670	4.327	11.090	24.200
WUI	21,838.88	20,001.84	4,259.44	16,795.84	30,038.82
BER Confidence Index	40.752	40.500	4.027	32.300	44.800
SAUI	0.710	0.550	0.358	0.262	1.343
Expanded unemployment rate	35.584	35.600	0.486	32.400	36.500
Absorption rate	42.642	42.700	0.634	41.900	43.900
Regulatory quality	0.335	0.335	0.063	0.130	0.500

Source: authors' calculations based on the CIT-IRP5 firm-level panel (Ebrahim et al. 2021; National Treasury and UNU-WIDER 2021) and other sources (see the Appendix).

Table 3: Correlation matrix, 2010–17

Variables	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	(10)	(11)	(12)	(13)	(14)	(15)	(16)
(1) Cash ratio	1.000															
(2) Liquidity ratio	0.934	1.000														
(3) Return on assets	-0.007	-0.005	1.000													
(4) Future investment	0.059	0.059	-0.015	1.000												
(5) Leverage ratio	0.087	0.090	-0.006	0.039	1.000											
(6) Cash flow volatility	0.183	0.175	0.008	0.039	0.180	1.000										
(7) Industry cash flow volatility	0.071	0.086	0.033	-0.042	0.027	0.155	1.000									
(8) SARB REER volatility	-0.014	-0.017	0.003	-0.033	-0.001	-0.054	-0.390	1.000								
(9) USD/ZAR volatility	0.004	0.009	-0.002	-0.038	0.003	0.020	0.169	0.255	1.000							
(10) VIX	-0.018	-0.037	0.004	0.063	-0.007	-0.064	-0.710	0.595	0.051	1.000						
(11) WUI	0.006	0.014	0.000	-0.023	0.002	0.017	0.255	-0.509	-0.039	-0.374	1.000					
(12) SAUI	0.020	0.034	-0.003	-0.050	0.003	0.049	0.622	-0.683	0.020	-0.700	0.551	1.000				
(13) BER Confidence Index	-0.021	-0.022	0.003	-0.040	0.000	-0.047	-0.364	0.624	-0.079	0.349	-0.134	-0.749	1.000			
(14) Exp. unemployment rate	0.012	0.016	-0.001	0.028	-0.001	0.014	0.275	-0.579	-0.524	-0.353	0.242	0.745	-0.715	1.000		
(15) Absorption rate	0.020	0.037	-0.005	-0.063	0.007	0.073	0.696	-0.417	0.543	-0.794	0.300	0.662	-0.474	0.074	1.000	
(16) Regulatory quality	-0.062	-0.066	0.002	0.066	0.025	-0.036	-0.567	0.418	-0.210	0.658	-0.226	-0.630	0.420	-0.295	-0.687	1.000

Source: authors' calculations based on the CIT-IRP5 firm-level panel (Ebrahim et al. 2021; National Treasury and UNU-WIDER 2021) and other sources (see the Appendix).

3.7 Estimation method

Quantitative studies investigating the determinants of corporate cash holdings apply standard cross-sectional and panel-data estimation methods (Bigelli and Sanchez-Vidal 2012; Shah 2011). Cross-sectional non-panel-data estimation methods such as pooled ordinary least squares (POLS) assume that unobserved heterogeneity is constant across observations and uncorrelated with the regressors. Unobserved heterogeneity associated with panel data can introduce bias into cross-sectional regression estimates, which do not control for the relationship between consecutive observations (Wooldridge 2012).

Based on the standard diagnostic tests, the fixed effects (FE) model is selected as the preferred specification over the alternative panel-data estimation method using random effects (RE), which assumes that the time-invariant effects are uncorrelated with the regressors.¹⁷ The FE regression is also preferred due to the highly unbalanced nature of the panel in our analysis. Equation 1 presents our specification, where cash holdings for firm i at time t $z_{i,t}$ are regressed on a set of firm-level explanatory variables described in Sections 3.1–3.4 (estimates β_1 to β_9) and indicators of systemic uncertainty and macroeconomic environment ($UNCERT_t$), outlined in Section 3.5 (included one at a time), as well as a composite error term accounting for unobserved firm-specific heterogeneity μ_i and a random component $\varepsilon_{i,t}$. The base year is 2010.

$$z_{i,t} = \alpha + \beta_1 * ROA_{i,t-1} + \beta_2 * INV_{i,t+1} + \beta_3 * FIN_{i,t} + \beta_4 * LEV_{i,t} + \beta_5 * CFF_{i,t} + \beta_6 * ICF_{i,t} + \beta_7 * FOREIGN_{i,t} + \beta_8 * UNCERT_t + \mu_i + \varepsilon_{i,t} \quad (1)$$

To mitigate the impact of outlier observations on our estimates, we winsorize selected variables at either the 1 per cent or 5 per cent level. Details of this procedure, as well as definitions of the variables, can be found in Table A2.

While the FE estimation technique allows for unobserved heterogeneity to be correlated with the explanatory variables, it assumes that unobserved heterogeneity is time-invariant, which implies that firms immediately adjust their cash holdings in response to changes in the dependent variables. This ignores the existence of adjustment costs, which hinder firms from instantaneously changing their cash holdings to the desired level. Dynamic panel-data techniques can overcome this limitation by considering the lagged effects in the adjustment of the dependent variable (Equation 2):

$$z_{i,t} = \beta_0 * z_{i,t-1} + \beta_1 * ROA_{i,t-1} + \beta_2 * INV_{i,t+1} + \beta_3 * FIN_{i,t} + \beta_4 * LEV_{i,t} + \beta_5 * CFF_{i,t} + \beta_6 * ICF_{i,t} + \beta_7 * FOREIGN_{i,t} + \beta_8 * UNCERT_t + \mu_i + \varepsilon_{i,t} \quad (2)$$

Inclusion of the lagged cash ratio among the regressors in Equation 2 introduces endogeneity problems, as the lagged dependent variable is correlated with the error term (Roodman 2009). To address this problem, Equation 2 is estimated using the system generalized methods of moments (GMM) estimation developed by Arellano and Bover (1995) and Blundell and Bond (1998), in line with the existing literature (Dottori and Micucci 2018; Drobetz and Grueninger 2006). System

¹⁷ For the baseline specification (see Equation 1), the null hypothesis of zero variance of the unobserved firm-specific heterogeneity μ_i was rejected based on the Breusch Pagan Lagrangian Multiplier test, indicating that a panel data estimation technique should be employed. The fixed effects estimation method was selected based on rejection of the null hypothesis of no correlation between regressors and the unobserved firm-specific heterogeneity μ_i in the Hausman test.

GMM is preferred here to the alternative difference GMM as our data series are highly persistent over time, which renders the difference GMM estimates unreliable (Blundell and Bond 1998).

3.8 Robustness analysis

In addition to considering two different estimation methods (FE and system GMM), the robustness of our results is further examined by considering different definitions of cash holdings (narrow and wide, see Section 3), and different variables capturing systemic uncertainty as outlined in Sections 3.2 and 3.5.

Furthermore, to consider the differential impact of the explanatory variables on the measures of corporate liquidity, Equation 1 is estimated separately across selected subgroups of firms. First, for South Africa we consider the following industries specifically: manufacturing and the construction, retail, and transport sectors as a group. Studying these sectors separately gives us the opportunity to disaggregate the underlying dynamics driving corporate liquidity by sector.¹⁸ The manufacturing sector is the single largest contributor to corporate cash and liquidity holdings in the South African economy. To gain some insight about firms that tend to focus on the domestic market, we consider the construction, retail, and transport sectors as a group.¹⁹ Moreover, to gauge the determinants of corporate liquidity among more export-oriented firms, we estimate a subgroup regression for exporting firms.

4 Results

Our FE regressions for both the cash and liquidity ratio yield consistent answers to hypotheses 1–4 (see Tables 4 and 5). Results for hypothesis 5 capturing economic and political uncertainty in South Africa and abroad are more complex in their interpretation. Here, immediate and more medium-term developments in the political and economic landscape potentially feed effects that pull in different directions: while higher regulatory quality, which only unfolds its full effect in the medium term, is associated with generally lower levels of cash holdings, a stronger economic environment as measured in the short term by confidence indices and labour market performance might enable NFCs to amass cash and liquidity. In the following, we will consider our baseline specification (for the cash ratio) followed by our stated robustness checks, each time discussing results for H1 through H5.

4.1 Baseline specification

There is no clear evidence that profitable companies are holding cash and financial assets instead of investing (H1). While the coefficient on our profitability measure is mostly positive, it is not statistically significant. Future investment can be linked to higher cash and liquidity holdings today, offering support for H2. Idiosyncratic, meaning firm-specific, indicators can be shown to influence corporate cash and liquidity (H3). Leverage and cash flow fluctuations influence corporate cash positively, meaning that firms facing higher firm-level uncertainty hold higher cash ratios. Industry-level characteristics, especially cash flow volatility, are also consistently associated with higher corporate cash (H4). Foreign-denominated asset holdings (captured by the FOREIGN dummy)

¹⁸ The subgroup regression analysis of these four sectors excludes ICF from the regression specification as the value of industry cash flow fluctuations is the same for all firms in a given sector.

¹⁹ Firms in the construction, retail, and transport sectors are analysed together in a single subgroup regression due to the low number of observations in these sectors individually, which renders the coefficients estimated separately for these sectors less reliable.

among NFCs are linked to lower cash and liquidity ratios, while stronger entanglement with financial markets (as measured by our FIN dummy) points to higher cash holdings.

There seems to be a weak link between corporate cash and measures of international economic uncertainty for our baseline. While stronger volatility in the nominal dollar–rand exchange rate is positively linked to corporate cash, there is no such link when considering the real effective exchange rate. Similarly, indicators that can be used to gauge economic confidence in the global economy (such as the VIX and the WUI) do not seem to be strongly linked to NFCs’ cash holdings. Overall, domestic uncertainty measures are much more closely associated with corporate cash holdings. Thus, higher perceived domestic uncertainty (SAUI) and rising unemployment (EXU) all have a statistically significant and negative association with cash holdings, while improvements in the labour market as measured by the absorption rate (ABR) are linked to higher cash holdings. Thus, in the short term higher uncertainty seems to force NFCs to run down liquidity rather than increasing it. More longer-term uncertainty, for instance associated with regulatory quality, might induce corporations to hold higher levels of cash. Firms that hold foreign-denominated assets have generally lower cash holdings, while NFCs that are more closely intertwined with financial markets tend to hold higher cash ratios.

The above results are largely corroborated by the GMM estimation (see Table A3). Where the estimates differ across the two methods, FE is the preferred approach. First, diagnostic tests of the FE regression indicate that the model is jointly valid and exhibits low correlation between unobserved firm-specific heterogeneity and the estimates. Second, diagnostic tests of the GMM estimation suggest endogeneity of instruments in the Hansen test and the presence of serial second-order autocorrelation in the Arellano–Bond test. The former problem is not uncommon in system GMM due to the large number of instruments generated by this estimation method (Roodman 2009). While in small samples the GMM estimates may thus be biased, in this instance the estimates remain consistent as the sample estimated here corresponds to the population of firms. The issue of second-order serial correlation is mitigated by inclusion of two additional lags of the dependent variable, which suggests that among the analysed firms the decision regarding the level of cash holdings is highly influenced by past information.²⁰ However, estimation of additional lags only partially addresses the endogeneity of instruments (depending on the measure of uncertainty included), while substantially restricting the sample size. In light of the above, the results of the FE estimation can be deemed robust.

²⁰ Due to the restricted time series available, we are only able to consider two additional lags of the dependent variable in Equation 2 (results available upon request).

Table 4: Determinants of the cash ratio: FE model

	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)
ROA _{t-1}	0.001 (0.001)	0.001 (0.001)	0.001 (0.001)	0.001 (0.001)	0.001 (0.001)	0.001 (0.001)	0.001 (0.001)	0.001 (0.001)	0.001 (0.001)
INV _{t-1}	0.008*** (0)	0.008*** (0)	0.009*** (0)	0.008*** (0)	0.008*** (0)	0.009*** (0)	0.009*** (0)	0.009*** (0)	0.009*** (0)
LEV	0.011*** (0.001)	0.011*** (0.001)	0.011*** (0.001)	0.011*** (0.001)	0.011*** (0.001)	0.011*** (0.001)	0.011*** (0.001)	0.011*** (0.001)	0.011*** (0.001)
CFF	0.004*** (0)	0.004*** (0)	0.004*** (0)	0.004*** (0)	0.004*** (0)	0.004*** (0)	0.004*** (0)	0.004*** (0)	0.004*** (0)
ICF	0.006*** (0.001)	0.007*** (0.001)	0.002 (0.001)	0.006*** (0.001)	0.009*** (0.001)	0.01*** (0.001)	0.008*** (0.001)	0.002* (0.001)	-0.003*** (0.001)
FOREIGN	-0.015*** (0.005)	-0.015*** (0.005)	-0.015*** (0.005)	-0.015*** (0.005)	-0.015*** (0.005)	-0.015*** (0.005)	-0.015*** (0.005)	-0.015*** (0.005)	-0.015*** (0.005)
FIN	0.002** (0.001)	0.002*** (0.001)	0.002*** (0.001)	0.002*** (0.001)	0.002*** (0.001)	0.002*** (0.001)	0.002*** (0.001)	0.002** (0.001)	0.002** (0.001)
USD/ZAR	0.002*** (0)								
REER		0 (0)							
VIX			0*** (0)						
WUI				0** (0)					
SAUI					-0.005*** (0.001)				
BER						0*** (0)			
EXU _{t-1}							-0.003*** (0)		
ABR _{t-1}								0.003***	

	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)
								(0)	
RQ									−0.202*** (0.02)
_cons	0.112*** (0.002)	0.111*** (0.003)	0.134*** (0.005)	0.115*** (0.003)	0.107*** (0.003)	0.08*** (0.004)	0.226*** (0.012)	−0.012 (0.019)	0.206*** (0.01)
Observations	753,212	753,212	753,212	753,212	753,212	753,212	753,212	753,212	753,212
Within R ²	0.005	0.005	0.005	0.005	0.005	0.005	0.005	0.005	0.005
Between R ²	0.031	0.032	0.030	0.031	0.032	0.032	0.032	0.030	0.026
Overall R ²	0.020	0.020	0.018	0.020	0.020	0.021	0.020	0.018	0.017
Prob > F	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000
Corr(μ_i , Xb)	0.090	0.091	0.087	0.091	0.092	0.092	0.091	0.087	0.074
Prob > χ^2	0.000	0.364	0.000	0.168	0.000	0.000	0.000	0.003	0.000

Robust standard errors are in parentheses. *** $p < 0.01$, ** $p < 0.05$, * $p < 0.1$. χ^2 refers to the likelihood ratio test.

Source: authors' calculations based on the CIT-IRP5 firm-level panel (Ebrahim et al. 2021; National Treasury and UNU-WIDER 2021).

4.2 Robustness checks

The analysis of the determinants of corporate liquidity confirms our core findings discussed above.²¹ Once again, there is little support for H1, while H2 and H3 are confirmed as future investment, leverage, and firm-level cash flow volatility are all positively correlated with liquid assets on company balance sheets (see Table 5). Industry-level uncertainty is also of importance, as higher sectoral cash flow fluctuations are linked to higher liquidity ratios. While the influence of economic uncertainty from the international sphere appears limited, domestic economic and political conditions have a strong bearing on liquidity holdings. Thus, once again the results for nominal and real effective exchange rate volatility are contradictory, while the WUI does not have a meaningful association with the liquidity ratio. However, the VIX, our measure of international financial market uncertainty, shows a negative correlation with corporate liquidity. In that way, it echoes the findings for domestic indicators of economic uncertainty. Here, higher levels of uncertainty are linked to lower NFC liquidity. The strongest influence, in terms of effect size, however, is captured by our RQ measure, indicating that a better institutional setting might contribute to lower corporate cash holdings. Firms with foreign-denominated assets tend to have less liquidity, while firm-level liquidity ratios for financialized NFCs will generally be higher.

Our findings on H5 are confirmed across the different subgroups that we study (see Table 6). In addition to analysing the full sample, we also isolate the manufacturing sector, the domestically oriented construction, retail, and transport sectors, as well as exporting and non-exporting firms. The association of exchange rate volatility with corporate cash and liquidity remains inconclusive. In contrast, most other economic uncertainty indicators, that is the VIX and the two labour market indicators, point towards a link between higher uncertainty and lower levels of firm-level cash and liquidity. Thus, when economic activity becomes more uncertain NFCs are likely to come under pressure to run down their cash or liquid asset holdings to meet unforeseen expenses. In contrast, in the medium run political uncertainty as measured by RQ can result in higher cash and liquid asset holdings by NFCs, presumably out of precaution.

²¹ In fact, our GMM estimation also corroborates our results.

Table 5: Determinants of the liquidity ratio: FE model

	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)
ROA _{t-1}	0.001 (0.001)	0.001 (0.001)	0.001* (0.001)	0.001 (0.001)	0.001 (0.001)	0.001 (0.001)	0.001 (0.001)	0.001* (0.001)	0.001* (0.001)
INV _{t+1}	0.01*** (0)	0.01*** (0)	0.01*** (0)	0.01*** (0)	0.01*** (0)	0.01*** (0)	0.01*** (0)	0.01*** (0)	0.01*** (0)
LEV	0.011*** (0.001)	0.011*** (0.001)	0.011*** (0.001)	0.011*** (0.001)	0.011*** (0.001)	0.011*** (0.001)	0.011*** (0.001)	0.011*** (0.001)	0.011*** (0.001)
CFF	0.004*** (0)	0.004*** (0)	0.004*** (0)	0.004*** (0)	0.004*** (0)	0.004*** (0)	0.004*** (0)	0.004*** (0)	0.004*** (0)
ICF	0.013*** (0.001)	0.014*** (0.001)	0.006*** (0.001)	0.013*** (0.001)	0.018*** (0.001)	0.018*** (0.001)	0.016*** (0.001)	0.007*** (0.001)	0.002 (0.001)
FOREIGN	-0.011** (0.006)	-0.011** (0.006)	-0.012** (0.006)	-0.011** (0.006)	-0.012** (0.006)	-0.012** (0.006)	-0.012** (0.006)	-0.012** (0.006)	-0.012** (0.006)
FIN	0.004*** (0.001)	0.004*** (0.001)	0.004*** (0.001)	0.004*** (0.001)	0.004*** (0.001)	0.004*** (0.001)	0.004*** (0.001)	0.004*** (0.001)	0.004*** (0.001)
USD/ZAR	0.002*** (0)								
REER		0** (0)							
VIX			-0.001*** (0)						
WUI				0*** (0)					
SAUI					-0.008*** (0.001)				

	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)
BER						0.001***			
						(0)			
EXU _{t-1}							-0.004***		
							(0)		
ABR _{t-1}								0.005***	
								(0.001)	
RQ									-0.249***
									(0.022)
_cons	0.111***	0.106***	0.147***	0.113***	0.102***	0.066***	0.261***	-0.067***	0.226***
	(0.003)	(0.003)	(0.006)	(0.003)	(0.003)	(0.005)	(0.013)	(0.021)	(0.011)
Observations	758,298	758,298	758,298	758,298	758,298	758,298	758,298	758,298	758,298
Within R ²	0.005	0.005	0.005	0.005	0.005	0.005	0.005	0.005	0.005
Between R ²	0.043	0.043	0.043	0.043	0.042	0.042	0.042	0.042	0.032
Overall R ²	0.027	0.027	0.026	0.027	0.027	0.027	0.027	0.026	0.022
Prob > F	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000
corr(μ_i , Xb)	0.115	0.115	0.114	0.115	0.112	0.112	0.114	0.114	0.093
Prob > χ^2	0.000	0.089	0.000	0.013	0.000	0.000	0.000	0.004	0.000

Robust standard errors are in parentheses. *** $p < 0.01$, ** $p < 0.05$, * $p < 0.1$. χ^2 refers to the likelihood ratio test.

Source: authors' calculations based on the CIT-IRP5 firm-level panel (Ebrahim et al. 2021; National Treasury and UNU-WIDER 2021).

Table 6: Results for hypothesis 5 for cash ratio and liquidity ratio across subgroups

Sub-sector	All NFCs		Manufacturing		Exporting NFCs		Construction, retail, and transport		Non-exporting NFCs		Financialized NFCs		Non-financialized NFCs	
Model specification	Cash ratio	Liquidity ratio	Cash ratio	Liquidity ratio	Cash ratio	Liquidity ratio	Cash ratio	Liquidity ratio	Cash ratio	Liquidity ratio	Cash ratio	Liquidity ratio	Cash ratio	Liquidity ratio
Variable														
USD/ZAR	0.002*** (0)	0.001*** (0)	0.001** (0.001)	0.001 (0.001)	0 (0.001)	0 (0)	0.002*** (0.001)	0.001 (0.001)	0.002*** (0)	0.002*** (0.001)	0.001** (0)	0 (0.001)	0.003*** (0.001)	0 (0)
REER	0 (0)	0 (0)	0* (0)	0 (0)	0** (0)	0 (0)	0*** (0)	0* (0)	0*** (0)	0 (0)	0 (0)	0 (0)	0** (0)	0* (0)
VIX	0*** (0)	0* (0)	-0.001*** (0)	-0.001*** (0)	0** (0)	0 (0)	-0.001*** (0)	0*** (0)	-0.001*** (0)	0* (0)	0** (0)	0 (0)	-0.001*** (0)	0*** (0)
WUI	0** (0)	0 (0)	0 (0)	0 (0)	0 (0)	0 (0)	0 (0)	0 (0)	0* (0)	0** (0)	0 (0)	0 (0)	0* (0)	0 (0)
SAUI	-0.005*** (0.001)	-0.003*** (0.001)	-0.001 (0.001)	-0.003** (0.001)	0.002 (0.002)	-0.002 (0.002)	0 (0.001)	-0.001 (0.001)	-0.001 (0.001)	-0.004*** (0.001)	-0.003*** (0.001)	-0.005*** (0.001)	-0.008*** (0.001)	-0.008*** (0.001)
BER	0*** (0)	0*** (0)	0 (0)	0** (0)	0 (0)	0* (0)	0 (0)	0*** (0)	0** (0)	0.001*** (0)	0*** (0)	0.001*** (0)	0.001*** (0)	0.001*** (0)
EXU _{L-1}	-0.003*** (0)	-0.002*** (0)	-0.002*** (0.001)	-0.002*** (0.001)	0.001 (0.001)	-0.001 (0.001)	-0.002*** (0)	-0.001*** (0.001)	-0.002*** (0)	-0.002*** (0.001)	-0.002*** (0)	-0.002*** (0.001)	-0.005*** (0.001)	-0.003*** (0.001)
ABR _{L-1}	0.003*** (0)	0.001 (0.001)	0.003*** (0.001)	0.002*** (0.001)	0.002** (0.001)	0 (0.002)	0.004*** (0.001)	0.003*** (0.001)	0.004*** (0)	0.002** (0.001)	0.002*** (0.001)	-0.001 (0.001)	0.005*** (0.001)	0 (0.001)
RQ	-0.202*** (0.02)	0.028 (0.019)	-0.129*** (0.022)	-0.071*** (0.023)	-0.088*** (0.029)	0.009 (0.072)	-0.167*** (0.018)	-0.072*** (0.018)	-0.174*** (0.014)	0.024 (0.02)	-0.195*** (0.028)	0.068** (0.028)	-0.201*** (0.032)	0.116*** (0.028)

Robust standard errors are in parentheses. *** $p < 0.01$, ** $p < 0.05$, * $p < 0.1$.

Source: authors' calculations based on the CIT-IRP5 firm-level panel (Ebrahim et al. 2021; National Treasury and UNU-WIDER 2021).

5 Discussion and conclusion

This paper provides an overview of the liquidity landscape for corporations operating in South Africa. It finds that corporate liquidity of NFCs, including agricultural, mining, manufacturing, retail, construction, and transport firms, ranged from 14 to 17 per cent of GDP between 2010 and 2017, peaking in 2014. The main contributor to corporate liquidity was cash holdings, ranging from 10 to 12 per cent of GDP over the time period. Manufacturing companies (followed by retail and the transport sector) are the main sectors contributing to overall corporate liquidity in the economy, mostly because of their large number, whereas construction and transport companies have the highest cash-to-asset ratios on average. When considering firm-level data, South African companies hold high levels of cash in international comparison, especially vis-à-vis other emerging markets, albeit comparisons can be difficult in this peer group.

Regarding the determinants of cash and liquidity holdings among NFCs, we find no clear evidence that across the South African corporate landscape profitable companies are holding cash and financial assets instead of investing. In contrast, future investment can be linked to higher cash and liquidity holdings today. Idiosyncratic, meaning firm-specific, as well as sector-specific uncertainty are closely linked to corporate cash and liquidity, especially leverage and cash flow fluctuations.

When considering systemic uncertainty, higher levels of labour market uncertainty are associated with lower cash holdings. This is robust across all our specifications with the reasonable exception of exporting firms. Thus, we find that domestic demand has a major influence on cash holdings, especially for firms that cannot access foreign markets when domestic spending is subdued. However, contrary to the current policy debate, our findings suggest that heightened economic uncertainty puts downward pressures on corporate cash and liquidity. This makes sense when considering the business cycle. Economic uncertainty and pessimism prevail during downswings and crises. This is when firms face unexpected expenditures, reduced cash flow, or losses. As a consequence, they might be forced to tap into their cash and liquid reserves. In contrast, political uncertainty, especially with respect to RQ, plays out in the medium run and is linked to higher corporate cash holding and liquidity.

Some important caveats to our results need to be mentioned. We consider the largest possible number of small through to large South African companies, excluding firms only to allow for international comparability of our results. Our findings can, of course, be compatible with pockets of profitable firms, holdings on to liquid and financial assets while refraining from investment, as has been documented for top JSE-listed companies. The database used here does not allow us to identify JSE-listed companies specifically, which is an important omission from the study. We are also constrained by the data with respect to the period studied. Ideally, we would have liked to analyse two decades' worth of data as is the case in many US-focused studies. Finally, we can only speculate about the underlying processes and corporate decisions that result in cash and liquid assets being held on corporate balance sheets. To reveal some of the underlying dynamics, further analysis—and in particular a close engagement with corporations and their management—is necessary to understand the determinants of corporate cash holdings from within the firm.

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Appendix A: Extra tables

Table A1: Liquidity ratios by industry and year, 2010–17

Year	Sector													
	All NFCs		Agriculture		Mining		Manufacturing		Construction		Retail		Transport	
	Mean	Median	Mean	Median	Mean	Median	Mean	Median	Mean	Median	Mean	Median	Mean	Median
2009	0.209	0.086	0.149	0.030	0.204	0.071	0.201	0.093	0.248	0.110	0.209	0.085	0.224	0.096
2010	0.209	0.085	0.144	0.029	0.199	0.068	0.203	0.092	0.248	0.103	0.209	0.087	0.225	0.093
2011	0.201	0.074	0.130	0.017	0.203	0.068	0.196	0.082	0.238	0.088	0.202	0.078	0.223	0.085
2012	0.205	0.075	0.137	0.019	0.204	0.071	0.202	0.085	0.243	0.089	0.203	0.077	0.232	0.089
2013	0.209	0.076	0.136	0.018	0.225	0.083	0.209	0.089	0.255	0.095	0.199	0.075	0.245	0.101
2014	0.213	0.078	0.144	0.021	0.225	0.078	0.210	0.089	0.263	0.100	0.202	0.077	0.246	0.099
2015	0.217	0.081	0.146	0.021	0.236	0.088	0.215	0.091	0.265	0.098	0.206	0.081	0.252	0.103
2016	0.221	0.082	0.150	0.022	0.236	0.079	0.217	0.089	0.269	0.097	0.212	0.086	0.252	0.098
2017	0.224	0.082	0.152	0.022	0.241	0.081	0.221	0.092	0.270	0.098	0.216	0.086	0.256	0.099
2018	0.230	0.085	0.156	0.023	0.255	0.099	0.228	0.096	0.278	0.102	0.220	0.087	0.257	0.099

Source: authors' calculations based on the CIT-IRP5 firm-level panel (Ebrahim et al. 2021; National Treasury and UNU-WIDER 2021).

Table A2: Variable definitions

Variable	Definition	Units	Source
Cash ratio	Cash and cash equivalents over total assets; winsorized at 1%	Ratio	CIT-IRP5 firm-level panel (Ebrahim et al. 2021; National Treasury and UNU-WIDER 2021)
Liquidity ratio	Cash and cash equivalents, short-term investment, and other current assets over total assets; winsorized at 1%	Ratio	
Return on assets	Ratio of gross profits to total assets in the preceding tax year ($t - 1$); winsorized at 1%	Ratio	
Financial dummy	Dummy variable equals 1 if a firm paid out dividends and received financial income in a given tax year	Dummy variable	
Future investment	The ratio of investment in the following tax year ($t + 1$) to property, plant, and equipment; winsorized at 5%	Ratio	
Leverage ratio	Total liabilities over total assets (excludes negative values of liabilities); winsorized at 1%	Ratio	
Cash flow fluctuation	Standard deviation of the ratio of operating cash flow to total assets over a three-year period ($t, t - 1, t - 2$); winsorized at 5%	Ratio	
Exporting firms	Dummy variable equals 1 if a firm reports a positive total value of exported goods as per customs declarations in a given tax year	Dummy variable	
Industry cash flow volatility	Standard deviation of the sectoral mean of the ratio of operating cash flow to total assets over a three-year period ($t, t - 1, t - 2$); winsorized at 5%	Ratio	
Foreign holdings	Dummy variable equal to 1 if a firm has foreign holdings in a given tax year	Dummy variable	
REER volatility	Standard deviation of the South African Reserve Bank real effective exchange rate	Index	South African Reserve Bank
USD/ZAR volatility	Standard deviation of the nominal US dollar/rand exchange rate	Ratio	South African Reserve Bank
VIX	Exchange volatility index	Index	Bloomberg
World Uncertainty Index	An index of global uncertainty based on the measures of newspaper coverage of policy-related economic uncertainty, the number of tax code provisions set to expire in future years, and disagreement of economic forecasts	Index	Ahir et al. (2018), 'World Uncertainty Index', Stanford, mimeo
BER Confidence Index	A proxy of business confidence measured by the proportion of respondents who rate prevailing conditions as satisfactory	Index	Bureau for Economic Research
South African Uncertainty Index	An index of South African uncertainty based on the measures of newspaper coverage of policy-related economic uncertainty, the number of tax code provisions set to expire in future years, and disagreement of economic forecasts	Index	Ahir et al. (2018), 'World Uncertainty Index', Stanford, mimeo

Expanded unemployment rate	People who do not work but want to work and are available to start work, as a proportion of the economically active population, in the preceding tax year ($t - 1$)	Percentage	Statistics South Africa
Absorption rate	The proportion of the working-age population which is employed in the preceding tax year ($t - 1$)	Percentage	Statistics South Africa
Regulatory quality	Perceptions of the government's ability to design and implement sound policies that promote the development of the private sector, measured as a five-year moving average	Index	Worldwide Governance Indicators

Source: authors' compilation.

Table A3: Determinants of the cash ratio: GMM model

	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)
CASH_R _{t-1}	0.420*** (0.034)	0.434*** (0.034)	0.423*** (0.035)	0.439*** (0.034)	0.418*** (0.034)	0.420*** (0.034)	0.412*** (0.034)	0.428*** (0.034)	0.440*** (0.035)
ROA _{t-1}	-0.020 (0.013)	-0.015 (0.013)	-0.023 (0.014)	-0.020 (0.013)	-0.009 (0.013)	-0.006 (0.013)	-0.016 (0.013)	-0.016 (0.013)	-0.010 (0.014)
INV _{t+1}	0.005*** (0.001)	0.005*** (0.001)	0.005*** (0.001)	0.005*** (0.001)	0.005*** (0.001)	0.006*** (0.001)	0.005*** (0.001)	0.005*** (0.001)	0.005*** (0.001)
LEV	0.004* (0.002)	0.004** (0.002)	0.004* (0.002)	0.004* (0.002)	0.005** (0.002)	0.006*** (0.002)	0.004** (0.002)	0.004** (0.002)	0.004** (0.002)
CFF	0.005*** (0.001)	0.005*** (0.001)	0.005*** (0.001)	0.005*** (0.001)	0.005*** (0.001)	0.006*** (0.001)	0.005*** (0.001)	0.005*** (0.001)	0.005*** (0.001)
ICF	0.007*** (0.001)	0.006*** (0.001)	0.009*** (0.002)	0.007*** (0.001)	0.008*** (0.001)	0.010*** (0.001)	0.008*** (0.001)	0.006*** (0.001)	0.008*** (0.002)
FOREIGN	0.280 (0.299)	0.423 (0.299)	0.442 (0.295)	0.369 (0.295)	0.120 (0.308)	-0.407 (0.338)	-0.067 (0.316)	0.313 (0.300)	0.357 (0.296)
FIN	-0.080*** (0.009)	-0.072*** (0.009)	-0.079*** (0.010)	-0.075*** (0.009)	-0.053*** (0.011)	-0.026** (0.012)	-0.063*** (0.009)	-0.076*** (0.009)	-0.068*** (0.009)
USD/ZAR	0.001*** (0.000)								
REER		-0.000 (0.000)							
VIX			0.000* (0.000)						
WUI				0.000 (0.000)					

	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)
SAUI					-0.003*** (0.001)				
BERCI						0.000*** (0.000)			
EXU _{t-1}							-0.002*** (0.000)		
ABS R _{t-1}								0.001* (0.001)	
RQ									0.028 (0.019)
_cons	0.104*** (0.011)	0.099*** (0.011)	0.096*** (0.011)	0.099*** (0.011)	0.084*** (0.011)	0.041*** (0.015)	0.153*** (0.016)	0.064*** (0.023)	0.077*** (0.018)
AR(1)	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000
AR(2)	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000
Hansen test excl. group	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000
Difference-in-Hansen	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000
Observations	739,422	739,422	739,422	739,422	739,422	739,422	739,422	739,422	739,422

Note: robust standard errors are in parentheses. *** $p < 0.01$, ** $p < 0.05$, * $p < 0.1$. AR(1) and AR(2) denote the p -value of the Arellano–Bond test of first- and second-order serial correlation. Hansen test excl. group and difference-in-Hansen denotes the p -value of the difference-in-Hansen tests of exogeneity of instrument subsets.

Source: authors' calculations based on the CIT-IRP5 firm-level panel (Ebrahim et al. 2021; National Treasury and UNU-WIDER 2021).

Table A4: Results for hypothesis 5 for cash ratio across subgroups, FE and GMM specifications compared

Sub-sector	All NFCs		Manufacturing		Exporting NFCs		Construction, retail, and transport		Non-exporting NFCs		Financialized NFCs		Non-financialized NFCs	
Model specification	FE	GMM	FE	GMM	FE	GMM	FE	GMM	FE	GMM	FE	GMM	FE	GMM
Variable														
USD/ZAR	0.002*** (0)	0.001*** (0)	0.001** (0.001)	0.001 (0.001)	0 (0.001)	0 (0)	0.002*** (0.001)	0.001 (0.001)	0.002*** (0)	0.002*** (0.001)	0.001** (0)	0 (0.001)	0.003*** (0.001)	0 (0)
REER	0 (0)	0 (0)	0* (0)	0 (0)	0** (0)	0 (0)	0*** (0)	0* (0)	0*** (0)	0 (0)	0 (0)	0 (0)	0** (0)	0* (0)
VIX	0*** (0)	0* (0)	-0.001*** (0)	-0.001*** (0)	0** (0)	0 (0)	-0.001*** (0)	0*** (0)	-0.001*** (0)	0* (0)	0** (0)	0 (0)	-0.001*** (0)	0*** (0)
WUI	0** (0)	0 (0)	0 (0)	0 (0)	0 (0)	0 (0)	0 (0)	0 (0)	0* (0)	0** (0)	0 (0)	0 (0)	0* (0)	0 (0)
SAUI	-0.005*** (0.001)	-0.003*** (0.001)	-0.001 (0.001)	-0.003** (0.001)	0.002 (0.002)	-0.002 (0.002)	0 (0.001)	-0.001 (0.001)	-0.001 (0.001)	-0.004*** (0.001)	-0.003*** (0.001)	-0.005*** (0.001)	-0.008*** (0.001)	-0.008*** (0.001)
BER	0*** (0)	0*** (0)	0 (0)	0** (0)	0 (0)	0* (0)	0 (0)	0*** (0)	0** (0)	0.001*** (0)	0*** (0)	0.001*** (0)	0.001*** (0)	0.001*** (0)
EXU _{t+1}	-0.003*** (0)	-0.002*** (0)	-0.002*** (0.001)	-0.002*** (0.001)	0.001 (0.001)	-0.001 (0.001)	-0.002*** (0)	-0.001*** (0.001)	-0.002*** (0)	-0.002*** (0.001)	-0.002*** (0)	-0.002*** (0.001)	-0.005*** (0.001)	-0.003*** (0.001)
ABR _{t+1}	0.003*** (0)	0.001 (0.001)	0.003*** (0.001)	0.002*** (0.001)	0.002** (0.001)	0 (0.002)	0.004*** (0.001)	0.003*** (0.001)	0.004*** (0)	0.002** (0.001)	0.002*** (0.001)	-0.001 (0.001)	0.005*** (0.001)	0 (0.001)
RQ	-0.202*** (0.02)	0.028 (0.019)	-0.129*** (0.022)	-0.071*** (0.023)	-0.088*** (0.029)	0.009 (0.072)	-0.167*** (0.018)	-0.072*** (0.018)	-0.174*** (0.014)	0.024 (0.02)	-0.195*** (0.028)	0.068** (0.028)	-0.201*** (0.032)	0.116*** (0.028)

Note: robust standard errors are in parentheses. *** $p < 0.01$, ** $p < 0.05$, * $p < 0.1$.

Source: authors' calculations based on the CIT-IRP5 firm-level panel (Ebrahim et al. 2021; National Treasury and UNU-WIDER 2021).

Appendix B: Data

Data access

The data was accessed at the National Treasury Secure Data Facility (NT-SDF).

The data used: CIT-IPR5 panel (citirp5_v4.0).

The data accessed: first accessed on 9 April 2021 and last accessed on 28 February 2022.

Software

The study was conducted using Stata 15.

Variables

Variables used from the raw CIT-IPR5 data include: `taxyear` `FID` `g_sales` `k_cash` `cust_export` `cust_import` `IT14_y_loc_div` `IT14_y_for_div` `y_int` `k_otherca` `k_stinvest` `comp_prof_sic5_1d` `k_ppe` `k_faother` `k_goodwill` `k_investsub` `k_ltloan` `k_ltloan_ifree` `k_ltloan_ibear` `k_ltloan` `k_deftax` `k_othernca` `k_inventory` `k_trade` `k_prepayment` `k_gccurracc` `k_sars` `x_deprec` `c_stcddiv` `c_divtax` `c_divexem` `c_divdtr` `c_divinspeciedec` `taxyear` `l_deftax` `l_trade` `l_prov` `l_contract` `g_grossprofit` `g_grossloss` `y_nl` `y_np` `l_otherncl` `l_dep` `l_gccurracc` `l_cur_ibear` `l_cur_ifree` `l_overdraft` `l_sars` `l_shdiv` `l_othercl` `ITR14_c_fgnassinv` `e_shcapital` `e_shprem` `e_nondisres` `e_disres` `e_retprofit` `e_otherrescr` `e_accloss` `e_otherresdt`.

Cleaning and sample notes

Firms that had missing or zero sales/turnover observations were dropped for each year that these were not available. Missing values were excluded from the calculation of variables and all variables from the database were winsorized at either 1 or 5 per cent depending on the distribution of the variable (see Table A2 for the full list of winsorized variables). A firm with the FID of 17176 was dropped across the entire sample or years due to an extreme outlier value of cash & cash equivalents in 2010. Microenterprises were excluded from the analysis using turnover thresholds based on firm size definitions from StatsSA.

Disclosure statement

Access to the data was provided under a non-disclosure agreement and our output was checked so that no firm or individual would be compromised. Our results do not represent any official statistics of National Treasury or SARS, and similarly the views expressed in this research are not necessarily the views of the National Treasury or SARS.