**Gordon Institute
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Are South African firms holding more cash than before?

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Abstract

This research investigates the levels of cash holdings of South African firms and the progression over the past 25 years. It also reviews factors that may have a relationship to the levels of cash. Such factors have been shown to include the size of the firm, levels of debt, industry of operation, level of share prices and impact of dividends and research. The research is quantitative and relies on financial metrics of the companies listed on the JSE All share index, with the data coming from the MacFas database, and from Bloomberg. The research aims to find if any of these key factors are present in the South African context, and to open up the debate on whether the factors affect the levels of cash.

The research found that the levels of cash in 2013 are higher than they were in 1990 but lower than all the years since 1997. Larger companies and dividend payers hold less cash, and certain industries like mining and media have higher cash to assets. There was no evidence of any link with research and development. There is no single reason found for the levels of cash, which is driven by industry and company specifics.

Key words

Cash flow – Earnings before interest tax depreciation and amortisation

Industry risk – The average of the standard deviations of cashflow divided by assets over five years in the same industry. The industry is defined as per the JSE industry sectors.

Dividend dummy – a value of one means that a firm paid dividends in that year, and zero if the firm paid no dividend.

Cash ratio – the cash and marketable securities for a firm in a particular year, divided by the total assets of that firm.

Constrained firms – companies that are unable to invest in all their positive NPV projects because they do not have enough finances.

Declaration

I declare that this research project is my own work. It is submitted in partial fulfilment of the requirements for the degree of Master of Business Administration at the Gordon Institute of Business Science, University of Pretoria. It has not been submitted before for any degree or examination in any other University. I further declare that I have obtained the necessary authorisation and consent to carry out this research.

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1 Problem definition

1.1 Introduction

The budget speech Minister Pravin Gordhan on 27th February 2013 was perceived as a rallying call to the Unions and ANC faithfuls and and a reprimand to business. In his speech, minister Gordhan asked business to "seize the opportunities around us. For years unions, media and some businesses have been talking about the excess piles of cash that South African corporates are sitting on, on some misdirected revolt against government policy or lack of. There has been significant debate on the amounts of cash that South African firms are said to be holding on their balance sheets. A Grant Thornton report also showed that corporates were waiting for things to stabilize before they could invest. Jeanette Clark (2013) and Stephen Gunnion (2012) both of Moneyweb, separately raise this issue and posit that it is caused by uncertainty in SAs policy stance. Pressure is mounting on the corporates to invest more to support the government and its plans as described in the NDP. There are claims by Cosatu, SACP and their partners that SA corporates are hoarding this cash due to their unpatriotic and ultra conservative view of the SA economy and government policy. Analysts and economists have different views for what the true amount of cash that SA firms are holding (Mittner, 2013). What if we are wrong, and there are no hoards of cash stashed away waiting for change? No one knows for sure.

This is not a debate that is unique to South Africa. President Obama in 2011 had a meeting with the U.S. Chamber of commerce in which he asked them to put their cash to use creating jobs (Kuhnhenn. J, 2011) . In his speech in February that year, he asked business to free up some of the $2 trillion that was sitting on their balance sheets. Years before, in 2004, President George Bush had also signed an act to encourage American multinationals to repatriate cash back home, with an 85% discount as incentive. The Economist (2005) ran an article on "the corporate savings glut", followed by the telegraph (2006) with "Behind those stockpiles of cash". This switched in the 2008 meltdown and the crises that followed and previously lean and fit companies were in 2008 considered anorexic said the Economist (2008) in their editorial, "All you need is cash".
More recently, as the global media have also raised the issue of the $7 trillion cash that companies are sitting on (Marlow and Armstrong (2014)).

The natural question that arises is "what do the academics think". Opler, Pinkowitz, Stulz and Williamson (1999) asked the question of how much cash is enough. Other academics have not been left out of the debate, as the paper by Bates, Kahle and Stulz (2006) talks about the US

firms holding more cash than they used to, and Foley, Hartzell, Titman and Twite (2007), explore the tax effects of foreign held cash for US firms. Later on, Fresard shows that cash increases competiveness of firms that have above average levels of cash.

Since 2006, there have been several reports about the level of cash holdings by SA firms, and this number has grown from 300bn ZAR in 2006 to 570bn in 2013. Commentators, journalists and analysts speculate on the causes of this accumulation of cash. Is it a rebellion against government inefficiencies, or is it lack of projects, or are companies just being cautious in an environment that is likely to become harder to raise funds. Rian le Roux (2013) weighs in on this and shows that the actual amount of corporate deposits was 578bn ZAR and not 1.3 trillion as initially reported, making it only 18% of GDP as opposed to 43% of GDP as previously assumed. According to le Roux (2013), the cash does not say anything about willingness to invest or not, and more research on the topic would be warranted.

Two differences arise between the SA situation and the US or global research is the mode of measuring cash. While SA uses an absolute measure – cash with banks, the US media and researchers have used a relative measure cash to assets ratio and its other variants. In addition, the US media relied on academic research like Bates, Kahle and Stulz (2006) working paper which was later expanded and published. In South Africa, there has been a shortage of research on this and issues related to capital structure, the macroeconomic environment and the competitiveness of SA firms, and it is the hope that this paper will contribute to research in this area of cash holdings.

1.2 Research Motivation

This research seeks to explore the evolution of the levels of cash held by South African firms since independence, and what they really mean. . The research will investigate the level and speed of change in leverage and cash on SA firms' balance sheets. Most of the measures of cash reserves in South Africa have focused on the level of deposits that corporates have as measured from bank balance sheets. In other markets, similar research has focused on the cash to total assets ratio, which is a relative measure based on the total size of the balance sheet.

The discussion of cash reserves naturally raises the issue of capital structure and competitiveness of firms. While it is widely agreed that debt is cheaper than equities, the question of how much debt is right for a business is less clear, and most experts will answer to –

it depends (Campello, 2006). What it depends on varies significantly from whether it is boom or depression time (Campello, 2006), or level of the leverage (Campello, 2006), whether one is negotiating with suppliers (Chu, 2012), or if you are negotiating the cost of debt with your bank (Valta, 2012). It even extends to if the firm is in a competitive or a concentrated market (Fresard, 2010), or dealing with local vs foreign competitors. It is expected that the growth that SA firms would need has to come from outside the borders, requiring more competitiveness. Would cash and capital structure have any impact in this quest for growth and value that SA firms seek in Africa and other parts of the world?

The SA economy's growth is expected to grow at 2% which is below its target levels of 5% for the next couple of years, a level it cannot afford based on the NDP and the social tensions that are building up. However, since the global financial crisis, the chances of returning to this level of growth are growing dimmer by the day. The South African Reserve bank recently revised its growth forecast for 2016 downwards to 2.2% (SARB, 2015). Coupled with this, is the recent focus on the fact that SA companies are hoarding cash on their balance sheets in excess of 570 billion rands (Clarke. J, (2013)). Many of the top SA companies make more of their revenue from outside SA than they make from SA. This means that they and their shareholders are partly shielded from the current problems that face the SA economy and the residents of South Africa. To what extent does the economy affect the level of debt that SA corporates choose to keep? As the SA corporates look for growth outside of South Africa, are they targeting a higher level of debt to benefit from tax shields, or are they targeting a low level of debt to allow themselves a competitive edge in future markets?

2 Literature Review

2.1 Introduction

The debate on companies' capital structure and its effect of this debt on company performance started with Modigliani and Miller. That debate continues until today. Modigliani and Miller (1958) stated that because debt is cheaper, companies would be better served by using debt rather than equity to finance their operations. More recently, academics and practitioners are split between those who less debt or cash (Fresard, 2010), and those who believe it is all context based (Campello, 2006). In South Africa, there have been lots of debates and reports about how South African firms are holding too much cash. This paper seeks to investigate how prevalent the high cash holdings are, and where possible to identify the causes of these high balances of cash. The assumption by business and government in South Africa has been that business is waiting for better direction and movement around policy and actions to spur investment.

Recent research on the levels of cash has helped in a better understanding of leverage that is held by companies. In the past, lots of finance literature reviewed leverage as simply debt to equity or debt to assets (Bates, Kahle and Stulz, 2010). In their research, Bates, Kahle and Stulz, found little change in leverage levels based on the traditional leverage measures, but when the impact of cash is included and they measure net debt ratios, their figures exhibit marked reduction in leverage in US firms from 1980 to 2006. This use of net debt was deemed to be more consistent with how practitioners measure leverage. Earlier research by Foley, Hartzell, Titman, and Twite (2007) had shown cash build-ups were the result of not repatriating foreign profits, but Bates, Kahle and Stulz, find this was not a key factor in their case.

2.2 Reasons for holding cash

Firms can hold cash for the transaction motive, tax motives , precautionary reasons , and agency motive. In addition, there are additional motives being investment, also known as R&D (Pinkowitz, Stulz and Williamson, 2013) and competitive advantage (Fresard, 2009)

1. The transaction motive
   In a perfect world, there would be no need to hold liquid assets because firms could simply go to the market as and when needed to get cash. However, in reality there are costs to liquidity which a firm has to bear. If a firm keeps too much cash, it loses out on interest or investment returns. Similarly, if it keeps too little cash, it risks being unable to meet its day to day obligations, and this could lead to bankruptcy (Opler, Pinkowitz, Stulz

and Williamson, 1999). The transaction motive is therefore the cost of converting non cash assets to cash, and the subsequent payments that result from this. The transaction motive would mean that firms that are large will have less cash than smaller ones because they benefit from economies of scale which smaller firms do not have.

Figure1: Marginal cost of liquidity
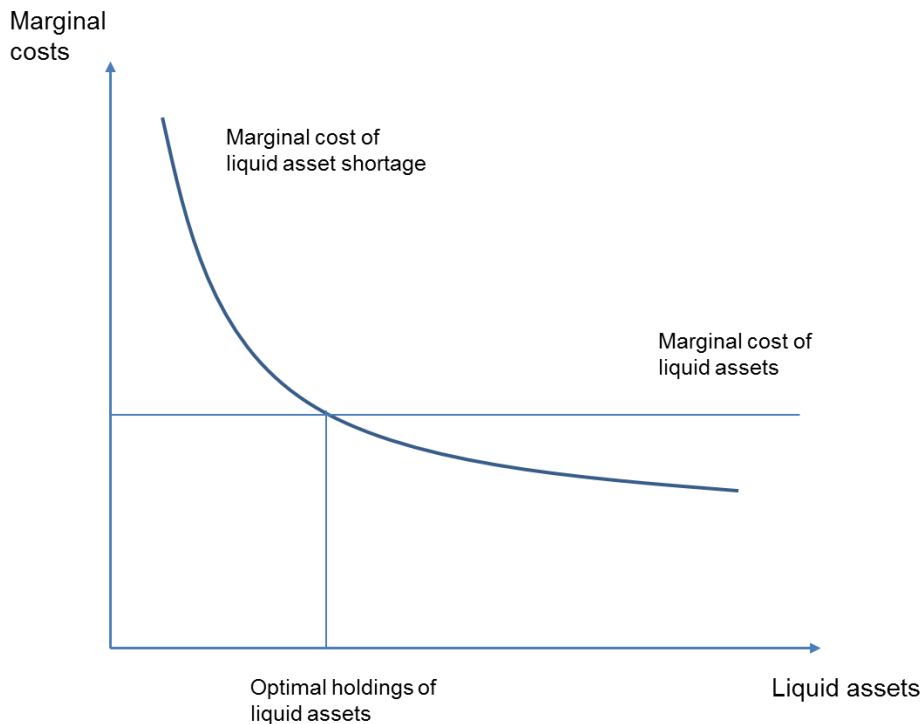
Optimal holdings of liquid assets. The optimal amount of liquid assets is given by the intersection of the marginal cost of liquid assets curve and the marginal cost of liquid asset shortage curve. The marginal cost of liquid assets curve is non-decreasing while the marginal cost of liquid asset shortage curve is decreasing.

In figure 1 above, Opler, Pinkowitz, Stulz and Williamson, (1999) describe the transaction motive for holding cash. There is a fixed element to raising funds through internal asset sales or capital markets, which serves as a deterrent for managers who need the cash. The liquid assets cost is the opportunity cost of holding them, instead of investing the cash in other assets. This could simply be the difference between the cash rate and the return from other investments, meaning that this cost of liquid assets stays the same. On the other hand, the marginal cost of shortage of liquid asset swill increase as the shortage increases because a larger portion of assets would have to be liquidated to meet a larger shortage. The less liquid assets you have, the higher the marginal cost of liquid asset shortages.

They show that high holdings of cash and liquid assets would have a relation to the following:

a) Capital raising costs

Firms with prior history of going to markets or with a good debt rating will have lower capital raising costs, as will firms that are larger. Investment banks like to charge a minimum fee for the work they do, which will limit tiny firms' ability to go to the markets. Any bond that is publicly issued also needs the approval of the regulatory authorities, usually the Johannesburg stock exchange. Additional approvals would be needed should it be a complex or derivative structure, or when there are foreign investors involved. To meet all these obligations, firms need lawyers, accountants, corporate finance structuring teams, bankers and traders. The process also takes many months to finalize, during which a company will not have access to the funds.

Larger firms go to market more frequently and will have large teams dedicated to doing this kind of thing. They are more able to divide the costs across the different fund raising programs they have to reduce to overall cost of raising funds. It is common to have treasury teams as well as corporate finance teams working together at different companies, based on their size.

b) Internal costs of fund raising (asset sales, dividend cuts)

If a firm is very specialised it is harder to find find buyers for its assets because others will have little use for these assets. Diversified firms will find it much easier to transfer their assets, and therefore their costs of raising funds are much lower. A firm with high dividends can raise funds easily by reducing dividends. These two types of firms (high dividend, and highly diversified) should be able to get away with lower cash.

Asset sales are not as commonly used as reduction of dividends would be used. When asset sales are used, it is more often large stand alone assets like planes that might move. Many saleable assets may sometimes have to be packaged into a separate legal entity together with the debt used to finance them. In such cases, the sale is likely to trigger a reduction in value, like when mining companies try to sell some of their old mines. The assumption is usually that a company will not sell a core asset or an asset that is earning it lots of income. This will trigger the potential buyers to underbid on the asset.

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c) Investment opportunities

d) Costs of financial instruments used for hedging

Companies will use derivative instruments to manage their potential future cash flows. An exporter could enter into a foreign exchange forward contract to convert US dollar receipts into South African rands. In doing this, there are no upfront costs, but there is a risk that the rate will move against the exporter resulting in losses. This is also become harder with the advancement of International Accounting standards that require more reporting for hedging instruments. Many firms end up facing mark to market losses as a result of positions that they were running in derivatives.

Firms can avoid this market risk by buying insurance in the form of options. In South Africa, options have not been popular with corporates partly due to the upfront fees that are charged whether or not the option is later exercised.

e) The Cash conversion cycle

A short cash cycle would mean less requirement for liquid assets.

f) Cash flow uncertainity

If a firm has volatile cashflows in its business, chances are it will hold more cash to avoid the potential cash shortage.

g) Lack of economies of scale

2. The precautionary motive

Firms hold cash in anticipation of difficult times both in the business and in the capital markets in which they source financing. Firms with less reliable cashflows are therefore more prone to holding larger cash balances as shown by Opler, Pinkowitz, Stulz and Williamson (1999). Whether a firm decides to hold precautionary cash or not is driven by its level of constraints and it is expected that companies that have constrained finances are likely to keep precautionary cash (Han and Qui, 2007) while unconstrained firms will have enough capacity to make investments unhindered. As volatility of future cashflows increases, the precautionary holdings of cash for the constrained firm will also go up to allow more cash for future investment. As the firm needs to manage this cash flow risk, there results a inverse relationship between current investments and the volatility of future cash flows, but a positive one between future cash flow volatility and cash holding.

Research shows that the relationship is true only for firms that are constrained financially, and not for unconstrained firms (Han and Jui, 2007). This research therefore means that as firms that are financially constrained expect future cash flows to be more volatile, they start to reduce their investments and instead hold cash. A case in point would be the global financial crisis, where liquidity dried up and there was limited access to credit both for banks as well as for corporates. One would expect to see cash levels going up after the crisis as firms were no longer sure that they would have sustainable liquidity. The cash flows would become more volatile due to the global recession which would hurt their profitability (EBITDA), as well as reduce fund raising capability in the market or from their banks. A firm that is able to invest in its choice of positive NPV projects would be considered unconstrained. It is therefore not restricted in which projects to take, it can take all its positive NPV projects. A constrained firm is one that has to cut back its investment or select less than its first choice because of potential future downside on liquidity (Han and Jui, 2007).

The concept of firms that are constrained or unconstrained is difficult to measure quantitatively. In general, firms do not share their internal project assessments publicly. Outsiders can only guess as to whether the companies undertook all the projects that were of positive NPV. Research in this area is reliant on proxies for what a constrained firm would look like based on outcomes that are publicly available. These would include the levels of debt, dividend or growth of the firm. Other research that has been eye opening, had qualitative elements containing interviews with CEOs and CFOs of firms. It is likely that such research would be more helpful in South Africa.

Pinkowitz, Stulz and Williamson (2013), find that there was little difference between the cash holdings in multinationals with no R&D and domestic US firms with no R&D. This highlights the difference as being the existence of R&D rather than one being multinational and another domestic. It is not surprising that the companies that held high cash balances were also deemed innovative globally. Even today, Apple cash holdings are said to be over $200 billion (Whitten, 2015). These funds are utilised in financing their new products, patents and acquisitions – the most recent of which is Beats music from Dr Dre and Jimmy Iovine.

3. The Tax motive

In certain countries like the US, the tax laws are different for branches and for subsidiaries of multinationals. Tax on the branches is paid as income is earned, which tax on subsdiaries is paid when dividends are repatriated. There would therefore be an incentive for those multinationals that have subsidiaries with income, to keep the cash in the subsidiary in a foreign country, instead of repatriating it and paying a tax for it. President George Bush has been frequently quoted as the pioneer or at least the champion of the largest tax cuts in the past two decades in the United States of America. In 2004 he signed into law a bill giving an 85% one time tax deduction to companies that repatriated their earnings back to the US (Blouin, & Krull, 2009).

4. The agency motive – cost of management

When a firm has few investable opportunities, managers hoard cash instead of paying dividends. Such managers will have an opposing view or interest to that of the shareholders. Dittmar, Mahrt-Smith, and Servaes (2003) show higher average cash balances in countries that evidence agency issues compared to those that do not. The agency issue here is described as a situation where there is a clash between ownership and management priorities. Managers with takeover defences would have more cash to help them defend themselves – usually at shareholders cost. In other cases, cash empowers managers who therefore do not need to go to the market to raise project funding as it is available internally.

South Africa firms have not been immune to hostile take over activities in the past. However, the reactions that have been publicly available have shown managers using other tools apart from cash to protect themselves.

Opler, Pinkowitz, Stulz and Williamson, (1999) found that the agency motive may not always be significant because in many cases the interest of management and shareholders are aligned. Cases where there is misalignment would be where outside shareholders are highly diverse, and possibly small. Large concentrated shareholders usually have similar, though not always, identical priorities.

The agency motive is not one that has been explored much in South Africa, and there is little research around the topic. This makes it difficult to measure. There are many elements of agency starting with length of management tenure, presence of poison pills

and other defence mechanisms, concentration of shareholders and interaction between various shareholders.

5. The competitive advantage
   This issue is raised in research by Fresard (2010), and shows that companies with higher cash balances are better placed to gain market share than their competition. The power of average higher cash balances is more pronounced in a competitive market than in a concentrated market.

According to Foley, Hartzell, Titman, and Twite (2007), global companies based in the US are more likely to accumulate cash as repatriation will have dire tax implications for all cash brought back. This situation came about because of US tax regulations that have different rules for subsidiaries and to branches. A foreign subsidiary of a US multinational pays US tax when it repatriates its earnings, but a branch pays tax on any income as soon as it is earned. This rule was seen as driving US multinationals from paying dividends as they would then pay the tax due, whereas leaving the cash in their foreign subsidiaries, gave them a saving. It was because of this cash that the Bush administration signed tax exemption was targeting to draw funds back to the US from the foreign subsidiaries. The subsidiaries affected would be those where the tax rate was lower than the US tax rate.

The rule was also seen as targeting the technology industry mainly, which sat of billions of cash, with the top companies holding cash in 2010 to the tune of $51bn for Apple, $46bn for Microsoft, $40bn for Cisco, $35bn for Google and $29bn for Oracle. (Pinkowitz, Stulz and Williamson, 2013).

Foley, Hartzell, Titman and Twite (2007), found that the tax burden of repatriation led to large cash balances held by foreign subsidiaries of multinational US firms. These large cash balances were not offset by lower tax balances of the US parents, resulting in an overall higher cash balance for the US multinationals. In an ideal world, as the cash balances were repatriated, the balances held at parent level should have reduced to revert to a normalized level, and the funds spent on investment. However, this did not always happen as was expected by the government and the drafters of the regulation.

Research by Blouin and Krull (2009) shows that over $290 bn was repatriated to the US as a result of this. They found that companies which took advantage of the Act were those with few investment opportunities both abroad and in the US resulting in most of the funds being used

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not for investment as expected by Congress, but for share repurchases, and to a smaller extent for dividend payouts to shareholders in the US. The initial assumption is that firms with high cash could invest more if only the tax barriers were removed.

The research is not conclusive on the effects of tax. There is a divide between those who think it matters and those who do not. What appears to be the case is that companies with high research and development usually also have high cash in certain countries and industries, mainly because external financiers would not fund research and development. High research and development expenditures are closely aligned with high tech companies like software development, computer and technology design and manufacturers and biotech firms. South Africa has very few of these kinds of firms in large scale, and most of its innovative sectors are still fledgling and not listed. While it is reasonable to assume that these firms would have high research and development, their scale is very small and will have no impact on the overall numbers.

Another element of the tax is the fact that South Africa has similar though not identical tax regulations to the United States of America. This means tax will be paid by South African firms for earnings in their branches as they are earned, but only paid for the subsidiaries when they are remitted. Barring a few exceptions like MTN, South African firms' businesses outside of the country are relatively small, making it less likely that they have lots of cash sitting outside of the country. It is worth noting that MTN is one of the firms with very high cash balances throughout the sample period.

Bates, Kahle and Stulz (2010), conclude that the cash ratio increase is mainly in firms that pay no dividends, those that have had an IPO recently, and those in industries that have high cashflow volatility. Significantly though, they exclude the transactional, tax and agency motive, and settle on the precautionary motive as the main reason for increase in cash holdings. They further posit that some of the risks firms face cannot be fully hedged despite the increased sophistication and liquidity of derivatives. It is interesting that in the US, even before the regulatory changes that made hedging expensive and prohibitive, corporates were shying away from derivatives for hedging purposes. In South Africa, corporates are not known to hedge much either, except for the very large ones. The derivative hedging market has not grown much beyond banks trading with key state owned entities, and hedging with each other. The increase in cash coincided with a reduction in debt, and as a result leverage was measured as a net figure being leverage less cash. Thus leverage was deemed to be the opposite of cash, a concept that contradicts Achrya, Almeida and Campello's work below.

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In other research by Acharya, Almeida and Campello (2007), they identify situations when debt is not the opposite of cash, meaning negative debt is not same as cash. Previous models had assumed that capital raising is frictionless, but recent empirical evidence had shown that capital raising could be costly, thereby making cash and debt different. They study firms that have future investment opportunities, but with limitations to capital to fund such opportunities. In such situations, a firm may choose to raise funds internally through savings or through issuing additional debt now, for use in the future when it is assumed it will be harder to source funds. This makes both cash and debt fungible across time. Where there is uncertainty about future cashflows however, this fungibility no longer exists. Their model shows that firms are indifferent between cash and negative debt as long as there are no other non-financial costs to contend with. They find that firms do not segregate between cash and negative debt when there are no financial constraints. Acharya, Almeida & Campello, find that firms that are constrained can use cash instead of derivatives in their hedging and would have high cash holdings, while constrained firms with low hedging needs end up paying down their debt.

In summary, they found unconstrained firms paying down their debt instead of saving cash despite the level of correlation between their cash flows and investment opportunities. Constrained firms on the other hand will only pay down debt when they have low hedging needs, choosing instead to keep the cash and not reducing their debt if they have future hedging needs. Importantly, they show that correlation between cashflows and investment opportunities are an important element of whether cash will keep cash or pay down their deb (Achrya, Almeida and Campello (2007)). My research will seek to draw from this and the relevance of South African firms growing cash balances, if they are as stated in recent papers and in the media.

2.3 Capital structure and company competitiveness

Fresard's research (2010) shows us that beyond the reasons for holding cash stated above and highlighted by Foley, Hartzell, Titman and Twite (2007), and Bates, Kahle and Stulz (2009), and Acharya, Almeida & Campello (2007) cash can be a competitive advantage if the cash holdings are higher than its competitors or the industry average. When viewed in light of the global financial crisis, those firms that were cash rich were better able to invest in R&D, capital expenditure and employment, and therefore gain a leading market position that could be exploited when things turned. Fresard's (2010) sets this as his basis for analysing cash reserves as a competitive advantage, as opposed to just looking at overall leverage and or negative debt.

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Fresard states that cash is different from debt especially in cases where external finance is expensive. In a changing landscape where there is increasing uncertainty, future fund raising efforts will be harder than past efforts, and therefore paying down debt is not a good idea. Firms run the risk of paying more for their future debt raising than they would if they just held on to the historical one.

Fresard (2010) goes on to show that cash affects competitiveness twice as much in competitive markets as it does concentrated markets. This raises an important point for SA firms that are expanding out of the country. Would it be that these companies choose to use cash as a key competitive advantage in the regional and international expansions as those markets are seen to be more competitive than South Africa? One cannot ignore the fact that most South African industries are highly concentrated compared to international and regional markets.

Concentrations in industries as measured using the Four-firm concentration or the Herfindhal-Hirshman Index show many of the industries are highly concentrated. These would include insurance, banking, telecoms, manufacturing, mining and retail. Most industries have less than 5 key companies that dominate it, leading to high concentration as measured with the HHI.

By extension, product market competitiveness will be more sensitive to levels of cash reserves in cases where there is a lot of foreign competition. Cash affects competitiveness by either pre-emptive action or via threat of retaliation. Firms could take pre-emptive actions against potential entrants.

This alone would not have been satisfactory as shareholders and managers acting as their agents are looking for returns and increases in market value of the firm, and not just market share growth for its own sake. Fresard (2010) resolves this problem by reviewing the influence of relative cash reserves on performance and value. He finds that cash enhances firm value when compared with firms who have a relatively lower cash reserve. Cash therefore does not just play the role of being a risk manager, but actually is a value enhancer for firms.

Gamba and Triantis (2008) show that uncertainty about future cash flows differentiates cash from negative debt. Faulkender and Petersen (2006) also show firms will borrow more if they have more access to the public bond markets. This contradicts the widely held assumption that low debt will be a good indicator of financial strength. It means that companies who have access to borrowing, will borrow, and those that do not have access to funds, end up with a lower level of debt, more because of lack of access as opposed to prudence or lack of need.

On the other hand, according to Fan, Titman and Twite (2012) countries that have weaker controls and corruption spawn companies that borrow more. The research shows that the country of residence has a higher impact on capital structure than does the industry of operation. This is mainly due to tax advantages, strength of legal systems and level of regulation of financial institutions.

Fan, Titman and Twite (2012), also highlight the crowding out effect of government bond markets on corporate debt and the negative effect on tenor, on maturity of debt. South Africa has both a large banking sector and a large government bond market, meaning that it would be expected to have lower debt levels and lower maturities, if Fan, Titman and Twite (2012), holds.

So would the South African companies in the scramble for African market share adopt a high cash strategy as per Fresard (2010) or a high debt strategy as per Fan, Titman and Twite (2012)? In what cases would there be a difference in the strategy for South African firms.

2.4 Capital structure and the Macroeconomic environment

Korajczyk and Levy (2003) find that managers prefer debt financing when coming from a period of low returns in the equity markets or low corporate profits. However, constrained firms have much lower likelihood of varying their capital structure with changes in macroeconomic conditions, while unconstrained firms have no similar restrictions. They state that firms facing greater financial constraints find it difficult to borrow to smooth cashflows following negative shocks to the economy. In their research, they define constrained firms as those that do not have sufficient cash to undertake investment opportunities. The definition also includes firms with agency costs higher than the market average.

Their use of the trade-off theory is picked up on later by Fan, Titman and Twite (2012), who talk about the tax advantages of debt as highlighted in the section above. Campello's work (2003), on the other hand, concludes that debt negatively affects sales growth in cases where firms competitors are less levered, during recessions. While Campello's conclusions are directionally different from Korajczyk and Levi, he still does show that debt has more impact during recessions when compared with during booms.

Hackbarth, Miao and Morellec (2006) show the counter cyclicality of leverage, and state that macroeconomic conditions affect the speed of adjustment to firms target leverage. They also conclude that firms should adjust their capital structure in smaller incremental portions instead of large moves. A higher frequency of capital restructuring is also more advisable. booms than in recessions. Firms should amend their leverage to the economy's cycles, if operating cashflows depend on current economic conditions. The debt capacity of a firm will be dependent on the economic environment the firm is facing. Therefore, macro economic conditions affect not only the level of leverage, but also the speed of change of leverage that a firm adopts.

This view is confirmed by Cook and Tang (2010) who found firms adjusting their capital structure faster in a good economic times than in a bad macroeconomic environment. Their research shows that the movement of firms towards their target ratios is impeded by poor economic conditions.

2.5 Capital structure and stakeholder management

Companies do not operate in a vacuum, and need to manage their various stakeholders proactively. Maak and Pless (2006) describe the leader's role as being the cultivation and facilitation of relationships with stakeholders. Their definition of stakeholders includes the standard customers and clients, shareholders, employees, business partners and the social and natural environment. The interaction with various stakeholders needs to be balanced between suppliers and customers and government as they will often have different needs and priorities. For example, customers are likely to be forced to endure poorer quality products from a company that is trying to survive, and therefore not reinvesting in good products (Maksimovic and Titman, 1991). Banerjee, Dasgupta and Kim (2008) expand on the various works of Titman (including the above), and show that suppliers in durable goods industries would maintain lower leverage when they have few customers dominating their sales (2008).

2.6 Impact of the global financial crisis

Pinkowitz, Stulz and Williamson (2013), explore the impact of the financial crisis on abnormal cash holdings. Abnormal holdings are defined as holdings above what the normal level should be for a firm. The normal level can be determined by setting a baseline period, considered normal, and from which an extrapolation can be made. There is no universally accepted model, and most researchers have relied on empirical analysis to do this, most recent ones relying on

Opler, Pinkowitz, Stulz and Williamson (1999) as a base. They find that there was no increase in cash when comparing the before and after crisis scenarios.

Looking at the markets during and after the financial crisis, many companies were unable to raise cash. In fact, the crisis was largely driven by a credit problem that became a liquidity problem. In South Africa, access to the financial markets was also limited as uncertainty increased.

While South African firms are expected to be affected, there would be an impact due to the exchange controls. While most countries limit foreigners investing in their countries, South African exchange controls limit how much locals can invest outside the country. Asset managers, who are the key institutional investment category for South Africa can only invest 25% of their funds outside the country. Banks are limited to investing 40 percent of their deposits with non-South African entities. These two mean that there will always be trapped liquidity within the South African borders.

Stock prices influence on cash.

Research suggests that there is interaction between stock prices and corporate actions (Campello and Graham, 2013). Stock overvaluations are usually accused for the increased IPO activities, as managers seek to take advantage of the high valuations to sell to outsiders. One would expect then that as the JSE has gone up over the past twenty years, cash would be cheaper and companies would be piling up through secondary offers, and IPOs. Recent increases in the market as well, especially since the market collapse after the crisis, has seen the index come from 30,000 to over 50,000 points. We should therefore expect cash levels and IPO activity to be the same.

3 Research Problem

3.1 Overview

This paper intends is to explore the level of cash held by SA firms, and its interaction with capital structure, with macroeconomic conditions, and market effects. The research seeks to review the reason for the levels of cash that SA firms are holding, ranging from tax, precaution, transaction, agency and competitiveness.

- Smaller firms will hold cash as transaction costs are high and they would like to avoid these
- Some firms will hold cash in tax situations, especially where tax rules distinguish between income earned by subsidiaries as opposed to branches.
- Firms with agency problems will likely hold more cash
- Cash levels will be inversely related to the net working capital of the firms.
- Firms may hold cash to cover for future cashflow and hedging needs

3.2 Hypotheses

Hypotheses:

Hypothesis 1: Cash balances of SA firms are high by historical standards, and have been increasing of the past several years.

Null Hypothesis: Cash balances of SA firms are not high by historical standards, and they are not rising

Hypothesis 2: Larger companies hold less cash balances than small companies

Null **Hypothesis**: Large companies do not hold less cash balances than small companies

Hypothesis 3: Companies hold high balances to aid in Research and development

Null Hypothesis: Companies spending more on R&D do not hold more cash

Hypothesis 4: Some industries will hold higher cash balances than others.

Null Hypothesis: Cash balances are not affected by the industry of its operations.

Hypothesis 5: Companies with high dividends have low cash levels

Null Hypothesis: Companies with high dividends do not have low cash levels

4 Research methodology

4.1 Design

This research is a quantitative research that will review relationship between various variables in the balance sheets. It will therefore have both elements of correlation and seek causality in other cases.

I will start with descriptive statistics covering the current and historical levels of cash holdings of South African firms, from 1995. In addition I will review the total assets, sales and total debt. Total debt for the is defined as total long term debt plus the short term portion of the debt (the part sitting in current liabilities). Research in South Africa on the cash holdings has focused on the absolute values of cash as reported to the SA Reserve bank. However this is not consistent with previous research done by Fresard (2010) and Bates, Kahle and Stulz (2009), who use cash to total assets ratios as the basis for amount of cash. The reason Fresard's and Bates, Kahle and Stulz's (2009), methodologies make sense is that cash can and should be expected to grow as the balance sheet grows. For example, according to the World Bank group (2015), the SA economy was $136bn in 2000 and had grown to $366bn in 2013. Thus any comparison of cash or debt on the balance sheets of South African corporates cannot be complete without normalizing this data based on a ratio based view as opposed to an absolute view. The descriptive analysis review the cash levels, total assets, revenue and leverage of SA firms from 1994 to 2014 as described above. This will follow the methodology used by Bates, Kahle and Stulz (2009).

Secondly, the research will review the overall capital structure over the same period as per Campello, in comparison with the economic environment / business cycles. The capital structure will focus on the debt levels at both a gross and net debt level. Lastly, it will review SA firms' competitiveness when compared with capital structure. The time frame will be 1990 to 2014 which should cover a long enough period to highlight any differences between pre and post crises, as well as both the new post-independence, and the more established economy in the teens.

Academic research is split on whether book value (Fama and French, 2002), or market value (Welch 2004) is the better measure. For the purpose of this research we will use book value which is more reliably measured as it is available through the financial statements and because

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the market for corporate debt has not always been as developed or as deep as would be expected, compared to the government debt of equity markets. I choose therefore to use book value of debt as calculated by Cook and Tang (2010).

What drives cash and leverage?

Leverage is affected by macroeconomic as well as firm level issues. The trade-off theory states that firms need to balance between the tax benefit of debt and the risk of bankruptcy (Cook and Tang, 2010), both of which are macroeconomic variables.

One problem that arises is the assumption that any increase in market share is due to cash holdings, a problem similar to the one encountered by Fresard. A high correlation may be present but the direction of causation may not be clear, between cash causing market share or market share causing cash balances. Secondly, there might not be any causation implied between these two variables. This can be partly addressed by adding to the model control variables that capture other sources of product market performance that are correlated with cash positions of the firm. However, more work needs to be done to be able to resolve the causation conundrum emanating from the above phenomenon.

Unit of analysis:

The unit of analysis will be a firm-year. Each firm year represents a dataset for a firm in a single year, including but not limited to cash, total assets, short term debt, long term debt, market value.

4.2 Population and sample

The research will incorporate all South African firms

Sample:

The sample will be of publicly quoted companies which will act as a proxy for all SA firms which will be further screened using judgemental analysis. The Market value of publicly quoted firms in SA is equivalent to 100% of the GDP of South Africa. This makes them a good size and

representation of the make-up of the collective size of the SA market. In addition, due to JSE regulations, listed companies are required to report their financial statements and that these statements should be audited by and independent auditor. The JSE is currently ranked number 1 in terms of regulation of exchanges by the World Economic Forum (2014). In addition, SA has also won awards in financial reporting standards, meaning the audited financial statements can be relied on to be reliable and as per generally accepted accounting principles.

The listed companies are companies whose financials are published and easily retrievable in an electronic format. The data will be both cross sectional (across industries) and time series, across time. The industries will be selected based on the JSE categories with a focus on industries that have at least 5 companies in them. I will exclude financial services firms because they have a different capital regime, and may use cash to meet these regulatory and business concerns. This is consistent with Bates, Kahle and Stulz (2009), who exclude financial firms and utilities. I also exclude firms that have negative equity as well as growth of more than 200% per annum as these will skew the data (Campello, 2003). In summary, the following will be excluded:

- Negative equity firms
- Financial services firms

4.3 Data collection and analysis

The data used will be annual financial data sourced from McFas database for the 25 year period between 1990 and 2014. It contains data for South Africa All share companies listed by year.

The data will exclude financial services firms like banks and insurance companies because these companies may keep cash for regulatory reasons which are not part of this study. The key data that will be collected from the financials include:

In this section I investigate if the changes in cash holdings of firms can be explained by characteristics unique to each firm, and whether the relationship between those characteristics and the cash ratios of the firms change over time. Firstly, I performed regressions between the firms cash ratios to their individual characteristics and test to see if these regressions can

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explain the changes in cash holdings over time. The purpose of this was to test if there was a change in the approach towards firms methods for determining their cash holdings.

There are different ways of measuring the cash ratio according to literature, defined as (1) cash divide by assets, (2) cash divide by sales, (3) log of cash divided by net assets, and (4) cash to net assets (book assets less cash). Opler, Pinkowitz, Stulz, and Williamson (1999) use the cash to net assets ratio which distorts the results because of some significant outliers. Bates, Kahle and Stulz (2009) as well as Foley, Hartzell, Titman and Twite. (2007), elaborate on this problem and have different solutions. Foley, Hartzell, Titman and Twite. (2007), use the log of the cash to net assets which resolves most of the problems with the outliers, but Bates, Kahle and Stulz, encounter problems with using the log of the cash to net assets. In addition, Bates, Kahle and Stulz., find that the cash to total assets has a much higher R2 than the log to net cash does (with the R@ being about 2 times that of the log methodology). Lastly, Bates, Kahle and Stulz also find that the cash to sales do not have meaningful results on their samples.

In my research I used cash to assets as the measure for the level of cash holdings. For my model, I rely on Opler, Pinkowitz, Stulz, and Williamson (1999) and the paper by Bates, Kahle and Stulz (2009).

The variables I used are below, and I add sharebuy backs as a measure. I leave out acquisitions to assets and R&D to sales for which my data does not have as reliable data as would be required to reach a conclusion:

1. Firm Size
   Larger firms are able to raise cash in the capital markets at a smaller percentage cost that small firms due to the fixed cost element of advisory fees. My descriptive stats also show higher levels of cash in small firms when compared with larger firms, and my attempt was to tease out this data. I convert the assets to 1990 size using the annual historical inflation for each year. The size of companies from 1990 to 2014 based on total assets ranges from a few million rands (ISA holdings and Adcorp) to hundreds of billions (like Glencore and Sasol). To calculate the firm size, I use the logarithm of total assets for each company.

2. Cashflow to assets
   High cash flow firms would be able to accumulate higher cash balances, assuming all else is equal. I measured cash flow as EBITDA (Earnings after interest, dividends and

taxes, but before depreciation and amortisation). The cash flow to assets was calculated as cash flow divide by the total book assets. The EBITDA will show the cash generated by the operations of the firm before accounting for any interest, and depreciation charges, and also ignoring taxes.

3. Net working capital to assets

Net working capital (NWC) are those assets that can substitute for cash, which I measured as total NWC less cash. Therefore as the cash holdings increased, NWC should decrease, and vice versa.

4. Capital expenditure to assets

I measured capital to assets as total Capital expenditure in the year to total book assets. Research has shown that capex can be funded from debt, but research and development is almost always funded from accumulated cash. Capex would therefore have a lower impact or correlation to the levels of cash.

5. Leverage

I measured leverage as long term borrowing plus debt in current liabilities divided by total book assets. To the extent that debt is a constraint, firms will pay it down using cash, thus leading to a negative correlation between cash holdings and leverage.

6. Industry cashflow risk

Some industries are more risky than others, and these industries would be expected to hold higher cash to forestall any unforeseeable problems. To calculate the

7. Dividend payout dummy/ share buybacks

I split the dividend paying and non-dividend paying firms into different groups, and the dividend paying ones have a dummy variable of 1 in the year they pay. If a firm pays no dividend, it will have a dummy variable of zero in that year.

8. Research and development

I calculated research and development as a percentage of the total assets of the firm in any given year. I then average this out over the years. Research and development has been shown to have a positive correlation with cash holdings. Firms with R&D at higher than average levels

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will build up cash as they cannot afford to be without access to cash for R&D and they rely on their own savings. In addition, contrary to capex, it is much harder to raise external financing to cover R&D expenses, meaning companies have to keep extra cash if they are in an industry or growth phase that requires R&D.

I exclude any variables to test for the agency effect. Pinkowitz, Stulz and Williamson (2013) find evidence contrary to the agency theory suggesting that entrenched management do not hoard more cash than non-entrenched management. This is consistent with Bates, Kahle, and Stulz (2009). In addition, they rely on GIM index published for US firms, for which there isn't adequate South African data.

Chapter 5: Results

Table 1: Absolute balance sheet metrics

In Billions of rands

Year	Number of firms	Aggregate Total Assets	Aggregate EBITDA	Aggregate Cash Balance	NCA	Average Total Assets	Median Total Assets
1990	65	109	20	7	16	2	.4
1991	69	127	21	8	16	2	.3
1992	71	145	23	11	21	2	.4
1993	72	158	23	12	23	2	.4
1994	74	162	23	14	22	2	.4
1995	79	195	32	17	30	2	.5
1996	85	224	38	20	33	3	.5
1997	91	268	41	21	37	3	1
1998	98	383	70	30	47	4	1
1999	108	355	75	26	32	3	1
2000	112	376	105	29	28	3	1
2001	114	453	103	42	32	4	1
2002	117	532	116	43	34	5	1
2003	118	558	106	43	26	5	1
2004	120	613	133	54	37	5	2
2005	123	717	195	67	47	6	2
2006	126	890	252	88	37	7	3
2007	137	1097	289	111	34	8	3
2008	151	1413	380	141	77	9	3
2009	153	1445	360	148	95	10	3
2010	156	1575	420	165	133	10	4
2011	158	1841	429	154	118	12	4
2012	162	2140	435	164	135	13	4
2013	163	2457	457	208	195	15	5
2014	147	2417	462	236	193	16	5

NCA*   Net Current Assets

5.1 Are cash balances higher than historical averages?

The sample contains all JSE All share companies from 1990 to 2013 for the balance sheet and income statement values. Financial services firms have been excluded from the sample because they may hold cash for regulatory reasons. The definitions of the variables in the table below are explained in the Appendix

Table 2 – Cash and leverage ratios

Year	Count	Aggregate cash ratio	Average cash ratio	Median cash ratio	Average leverage ratio	Median leverage ratio	Average net leverage	Median net leverage
1990	65	0.0674	0.0738	0.0284	0.1657	0.1116	0.0919	0.0793
1991	69	0.0646	0.0773	0.0392	0.1793	0.1219	0.1020	0.0728
1992	69	0.0774	0.0806	0.0433	0.1740	0.1199	0.0933	0.0780
1993	72	0.0786	0.0749	0.0430	0.1906	0.1329	0.1157	0.0727
1994	72	0.0849	0.0840	0.0588	0.1721	0.1119	0.0880	0.0331
1995	79	0.0872	0.0966	0.0528	0.1627	0.1152	0.0660	0.0514
1996	85	0.0909	0.0936	0.0611	0.2112	0.0865	0.1176	0.0204
1997	88	0.0784	0.0920	0.0605	0.1456	0.0822	0.0536	0.0093
1998	96	0.0795	0.1127	0.0718	0.1462	0.0906	0.0334	0.0189
1999	107	0.0720	0.1243	0.0664	0.1661	0.1122	0.0417	0.0476
2000	109	0.0783	0.1149	0.0672	0.1722	0.1041	0.0573	0.0294
2001	113	0.0923	0.1070	0.0773	0.1819	0.1396	0.0749	0.0754
2002	115	0.0807	0.1149	0.0763	0.2190	0.1529	0.1041	0.0816
2003	116	0.0773	0.1304	0.0891	0.2102	0.1206	0.0798	0.0356
2004	119	0.0882	0.1387	0.1021	0.2064	0.1118	0.0678	0.0168
2005	122	0.0935	0.1246	0.1048	0.1969	0.1268	0.0723	0.0231
2006	123	0.0987	0.1319	0.1028	0.2136	0.1516	0.0816	0.0369
2007	134	0.1016	0.1256	0.0838	0.1934	0.1374	0.0678	0.0650
2008	149	0.0999	0.1102	0.0730	0.2116	0.1518	0.1014	0.0912
2009	151	0.1023	0.1195	0.0873	0.2312	0.1868	0.1117	0.0893
2010	156	0.1047	0.1132	0.0794	0.2027	0.1586	0.0894	0.0633
2011	158	0.0839	0.1034	0.0729	0.1885	0.1321	0.0851	0.0546
2012	162	0.0766	0.0947	0.0622	0.2007	0.1393	0.1061	0.0664
2013	163	0.0848	0.0929	0.0603	0.2126	0.1636	0.1197	0.1028
2014	142	0.0978						

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| 0.0952 | 0.0665 | 0.2036 | 0.1648 | 0.1084 | 0.0846 |

The column two of Table I shows the number of firms in the sample for the relevant year.

Column three contains the aggregate cash ratio, which is derived as the aggregate sum of cash and bank in the sample divided by the aggregate sum of total assets for the sample

Column four has the average cash ratio, which is a simple average of the cash ratio for the sample. This is calculated by first calculating the cash and bank for each firm by its total assets. Then all the cash ratios are averaged. This measure by design will be affected by outliers.

Column five is the median cash ratio also measured using the same parameters at a firm level, with the median being done for all the firms.

The average leverage ratio is calculated for each firm, and then an average of all the observations for each year is calculated. The leverage ratio at firm level is the sum of current portion of long term debt plus long term debt, divided by total book assets.

The median leverage ratio uses the same data but calculates the median for each year compared with column 6 which is the average.

The net leverage is the total leverage less the cash position of the firm. The methodology for the average and median is the same as the other columns above.

The graph below shows the changes between 1990 and 2013, which shows an initial increase followed by a reduction in the cash levels starting in 2004 for the average and 2005 for the median. The aggregate cash levels for the sample peaks in 2010 before coming down.

Figure 1: Graph of cash ratios
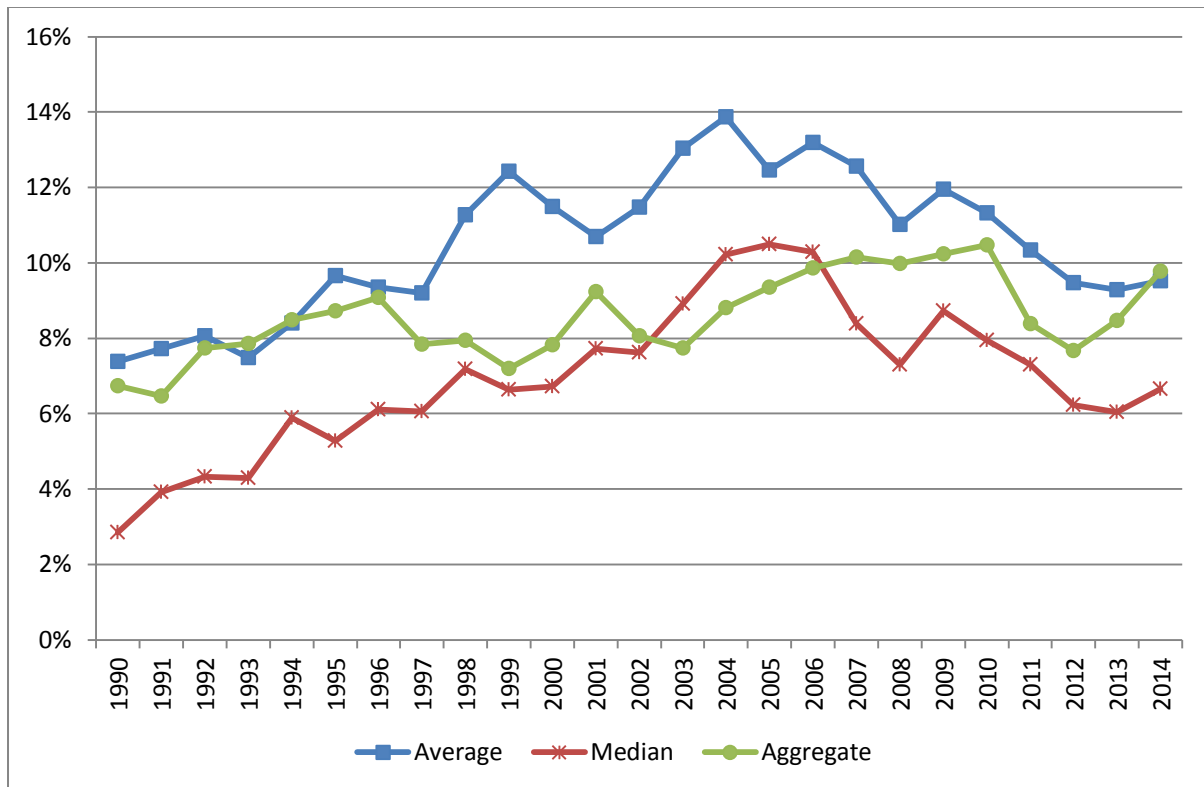
I tested significance of the change in the cash ratio using three different periods: 1990 to 2013, 1995 to 2013 and 2007 to 2013. The coefficient on the time trend for the cash increases by 0.13% each year from 1990 to 2013, and has an R squared of 23%. The trend in the cash ratio from 2007 to 2013 was the highest, showing a coefficient on time of -0.46%, and an R squared of 83%. This evidence is consistent with a negative time trend in cash holdings between 2007 and 2013. The year 2007 in this case was chosen because it was the final year before the global financial crisis. The representative graphs are shown below. The data suggests that one cannot use the past result to extrapolate for the future as the regression has changed a number of times over the period, and it might not be a true reflection of what will happen in future.

In addition, I ran a T-test for each of the three periods above, and each period shows a statistically significant difference in the average cash ratios. The tables are presented below.

Table 3: t test of cash balances 1990 vs 2013

t-Test: Two-Sample Assuming Unequal
Variances – 1990 vs 2013

	Variable 1 (1990)	Variable 2 (2013)
Mean	0.073806085	0.092866419
Variance	0.009892888	0.008576852
Observations	65	163
Hypothesized Mean Difference	0	
df	111	
t Stat	-1.331826031	
P(T<=t) one-tail	0.092822841	
t Critical one-tail	1.658697265	
P(T<=t) two-tail	0.185645682	
t Critical two-tail	1.981566757	

Table 4: t test of cash balances 1995 vs 2013

t-Test: Two-Sample Assuming Unequal
Variances – 1995 to 2013

	Variable 1 (1995)	Variable 2 (2013)
Mean	0.096602327	0.092866419
Variance	0.018881767	0.008576852
Observations	79	163
Hypothesized Mean Difference	0	
df	113	
t Stat	0.218766735	
P(T<=t) one-tail	0.413613196	
t Critical one-tail	1.658450216	
P(T<=t) two-tail	0.827226391	
t Critical two-tail	1.981180359	

Table 4: t test of cash balances 1995 vs 2013

t-Test: Two-Sample Assuming Unequal
Variances – 2007 to 2013

	Variable 1 (2007)	Variable 2 (2013)
Mean	0.12559916	0.092866419
Variance	0.01929571	0.008576852
Observations	134	163
Hypothesized Mean Difference	0	
df	223	
t Stat	2.334384177	
P(T<=t) one-tail	0.010232427	
t Critical one-tail	1.65171532	
P(T<=t) two-tail	0.020464854	
t Critical two-tail	1.970658961	

5.2 Impact of Size on Cash balance:

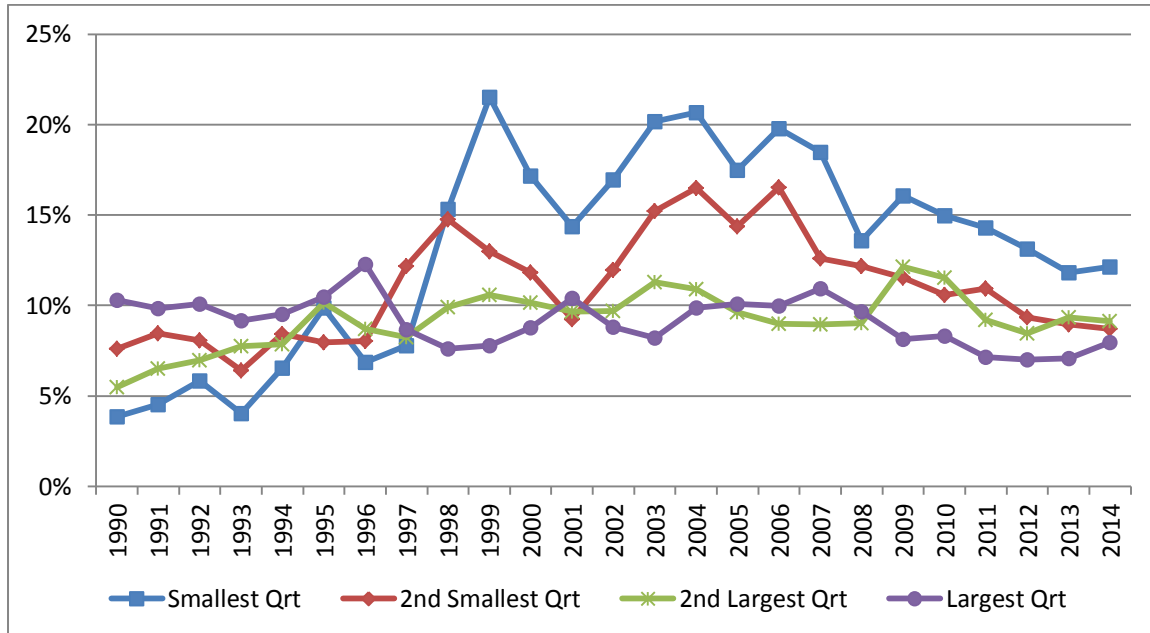Figure 2: Cash ratio by size quartile

Figure four shows the average cash ratio based on firm size over the period from 1990 to 2013. The trend is the same with the overall trends shown for the complete unsegregated sample, which is an increase from 1990 followed by a reduction around 2004 onwards, except for the largest quartile. The largest quartile has a cash ratio of 10% in 1990 and this comes down to 8% in 2013. The two smaller quartiles have more volatile cash ratios with the smallest starting at 4% in 1990 and rising above 20% in 1999 and in 2004. Based on the above data we conclude that the largest changes in cash ratios are affected more by the smallest firms, and that the large firms are more stable.

The implications of the change in cash ratio on the amount of leverage ran by the sample firms was measured, as well as leverage as total long term debt plus debt in current liabilities divided by total assets (book value basis). The average leverage ratio in 1990 was 16.5% and increases slightly each year and then collapses in 1997 and 1998 before slowly rising after that.

SUMMARY
OUTPUT

Regression Statistics	
Multiple R	0.46954
R Square	0.22046
Adjusted R Square	0.18657
Standard Error	0.01713
Observations	25

ANOVA

	df	SS	MS	F	Significance F
Regression	1	0.00191	0.00191	6.50474	0.01788
Residual	23	0.00675	0.00029		
Total	24	0.00865			

	Coefficients	Standard Error	t Stat	P-value	Lower 95%
Intercept	0.07754	0.01133	6.84532	0.00000	0.05411
X Variable 1	0.00431	0.00169	2.55044	0.01788	0.00081

Table 5: Cross sectional regression on size

SUMMARY
OUTPUT

Regression Statistics	
Multiple R	0.011325579
R Square	0.000128269
Adjusted R Square	-0.006082115
Standard Error	0.083009264
Observations	163

ANOVA

	df	SS	MS	F	Significance F
Regression	1	0.000142	0.000142	0.020654	0.885905
Residual	161	1.109377	0.006891		
Total	162	1.109519			

	Coefficients	Standard Error	t Stat	P-value	Lower 95%
Intercept	0.103504311	0.015914	6.503953	9.4E-10	0.072077
X Variable 1	0.000326364	0.002271	0.143715	0.885905	-0.00416

5.3 Is Leverage the opposite of Cash:

The average leverage ratio starts at 16.5% in 1990 and ends at 20% in 2013. There is not overall trend, except that the ratio is very volatile and it gradually increases over time.

Figure 3: Average leverage and median leverage for the sample
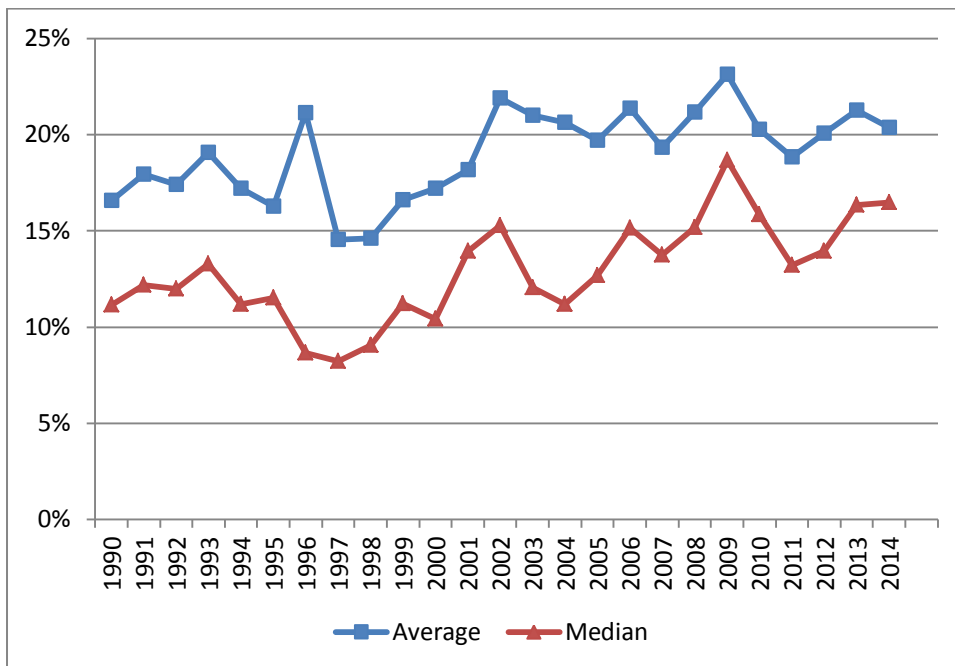
Figure 4: Average leverage ratio and cash ratio for the sample
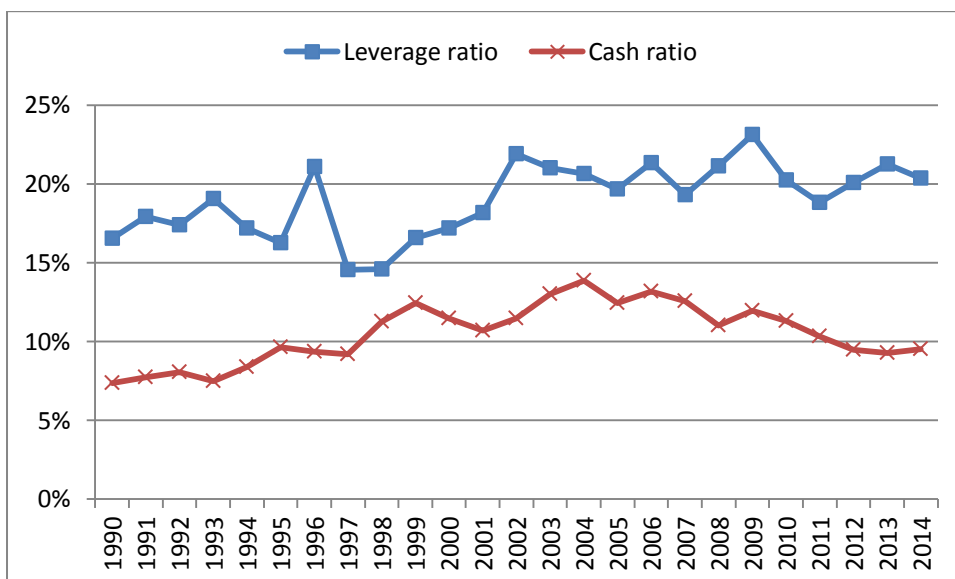
The correlation between the leverage ratio and the cash ratio is 36%. I measure this on a time series basis.

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The Net leverage ratio

The net leverage is calculated as leverage less cash holdings for each firm in each year.

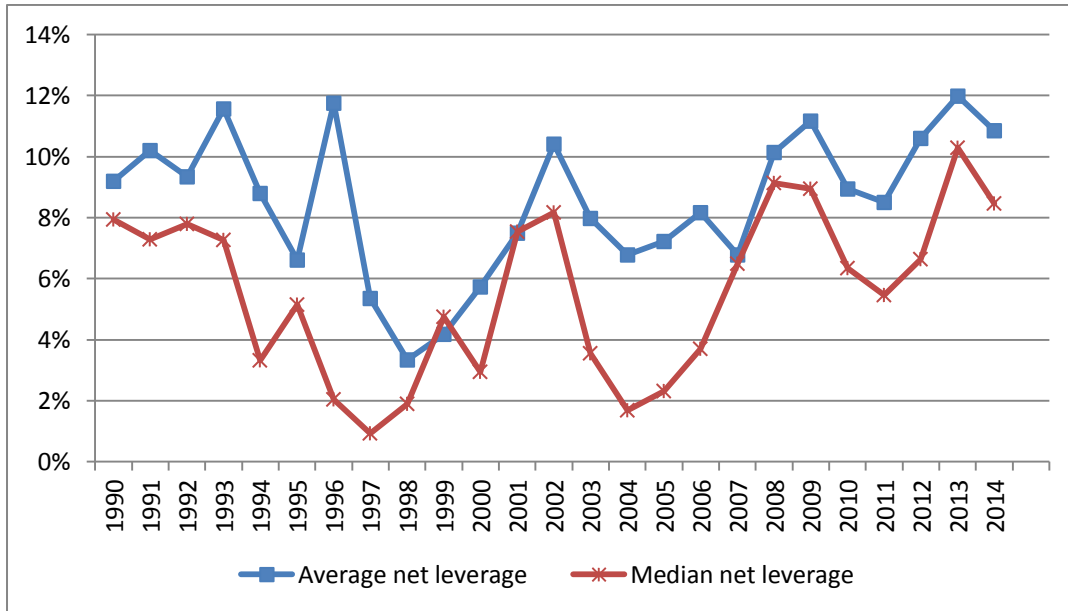Figure 5: Average and median net leverage

Figure 6: Average net leverage and cash ratio
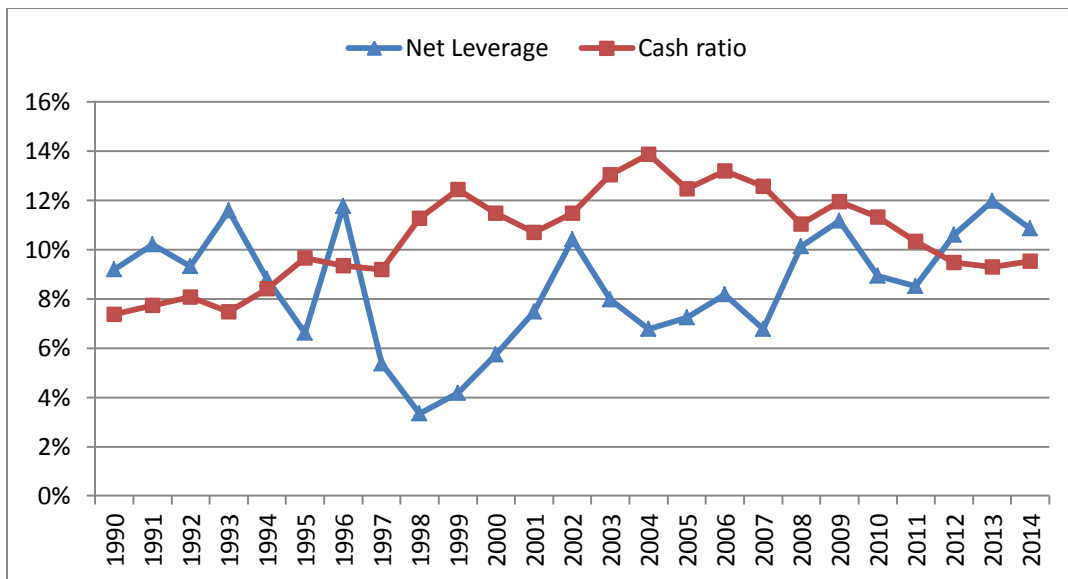
The correlation of the net leverage ratio to the cash ratio is -44.29%

Table 6: Time series analysis of regression of gross leverage and cash ratio

SUMMARY
OUTPUT

Regression Statistics	
Multiple R	0.369858386
R Square	0.136795226
Adjusted R Square	0.099264584
Standard Error	0.018022369
Observations	25

ANOVA

	df	SS	MS	F	Significance F
Regression	1	0.00118	0.00118	3.64489	0.06879
Residual	23	0.00747	0.00032		
Total	24	0.00865			

	Coefficients	Standard Error	t Stat	P-value	Lower 95%
Intercept	0.0467	0.0308	1.5187	0.1425	-0.0169
X Variable 1	0.3066	0.1606	1.9092	0.0688	-0.0256

Leverage ratio to the cash ratio had a P value of 0.068 and an R squared of 13.7%.

A cross sectional regression was done for the full period of the review. The cross sectional analysis has an R squared of 40%, and a p-value of 0.

Table 7: Cross sectional analysis of regression of gross leverage and cash ratio

SUMMARY
OUTPUT

Regression Statistics	
Multiple R	0.636129234
R Square	0.404660402
Adjusted R Square	0.400962641
Standard Error	0.064052606
Observations	163

ANOVA

	df	SS	MS	F	Significance F
Regression	1	0.448978376	0.448978376	109.4338845	7.22828E-20
Residual	161	0.660540553	0.004102736		
Total	162	1.109518929			

	Coefficients	Standard Error	t Stat	P-value	Lower 95%
Intercept	0.130403984	0.005549403	23.49873921	6.59268E-54	0.119444978
X Variable 1	-0.270327806	0.025841327	-10.46106517	7.22828E-20	-0.321359468

5.4 Does the Industry affect cash holdings?

To assess the impact of the industry on the cash ratio, the paper starts with the descriptive stats. The cash ratio for each of the firms is calculated as described in section 5.1 above. Then the firms are grouped by industry sub-groups, and the average cash ratio calculated for each industry for each of the years from 1990 to 2014. Finally, the cash ratio for each industry across the 25 years is averaged.

Table 8: Industry analysis of cash ratios, and volatility of cash ratios

Industry	Average	Ranking	Standard Deviation	Volatility of Cash levels	Difference
Industrial Telecoms	35%	1	23%	1	-
Construction and Materials	21%	2	10%	8	6
Industrial Media	20%	3	14%	3	-
Coal	19%	4	21%	2	2
Industrial Personal Goods	**17%**	**5**	**5%**	**17**	**12**
Gold & Platinum Mining	15%	6	9%	9	3
Industrial Electronic and Electrical	**14%**	**7**	**7%**	**13**	**6**
Industrial Travel and Leisure	**14%**	**8**	**6%**	**16**	**8**
Financials NonLife	14%	9	11%	4	5
Industrial Services	14%	10	8%	11	1
General Mining	13%	11	8%	12	1
Industrial Metals	**12%**	**12**	**10%**	**6**	**6**
Industrial Healthcare	**12%**	**13**	**11%**	**5**	**8**
Industrial Transportation	**11%**	**14**	**4%**	**20**	**6**
Industrial Retailers Furniture and Motor	**10%**	**15**	**10%**	**7**	**8**
Financials Life	**10%**	**16**	**8%**	**10**	**6**
Industrial Retailers Soft	10%	17	5%	18	1
Industrial Food and Drug Retailers	**10%**	**18**	**3%**	**24**	**6**
Financial Asset Managers	9%	19	6%	15	4
General Industrial	9%	20	4%	21	1
Financials Banks	7%	21	3%	22	1
Real Estate Investment Trusts	**6%**	**22**	**6%**	**14**	**8**
Forestry and Paper	6%	23	4%	19	4
Industrial Packaging	5%	24	2%	25	1
Chemicals	5%	25	3%	23	2
Industrial Beverages & Tobacco	4%	26	2%	26	-

The industries with the highest average cash holdings are Telecoms, Constructrions and materials, Media and Mining (both coal, and Gold and platinum). On the other end of the spectrum, the industries with the lowest cash ratios are Beverages and tobacco, chemicals and packaging.

The volatility of the level of cash as the standard deviation of each industry's average cash was calculated taking each year's number and aggregating over 25 years. In this case the most volatile cash ratios are Telecoms, Coal Mining and Media, and the least volatile are Beverages and tobacco, Packaging and Food and drug retailers.

It appears that many of the industries that had high cash ratios also have high cash ratio volatility, but this is by no means a universal issue. We have some outliers like Personal goods where the ranking between these two measures is 12.

Industry risk

The volatility of cash flows of each industry was calculated. To calculate the industry risk I first generated the cashflow for each company, by taking the EBITDA for the year. I calculated the cashflow to assets which is the EBITDA to TOTAL ASSETS for each year. Then I generate the volatility by calculating the standard deviation for the past five years, with the first year being 1995. For example, Adcorp shows 8.22 % cashflow risk in 1995 which is the standard deviation of the Cashflow to assets for the five years prior to that, 1990 to 1994. The cashflow to total assets for Adcorp was, respectively for each of the years 28%, 30%, 25%, 8% and 15%, coming to a standard deviation of 8.22% in 1995.

Next, the companies were grouped by the industry sectors, and calculated an average of this standard deviation. I do this for each of the years, and then calculate the average of the standard deviation across the years from 1995 to 2013. The highest average number represents the most volatile industrial sector. The results are shown in the table below, which shows the most volatile (risk) industries by cashflow are coal, Industrial personal goods, Mining, and Telecoms. The least volatile are real estate, Beverages and tobacco, chemicals and Forestry and Paper.

Figure 7: Cash ratio based on volatility of industry, listed in quartiles
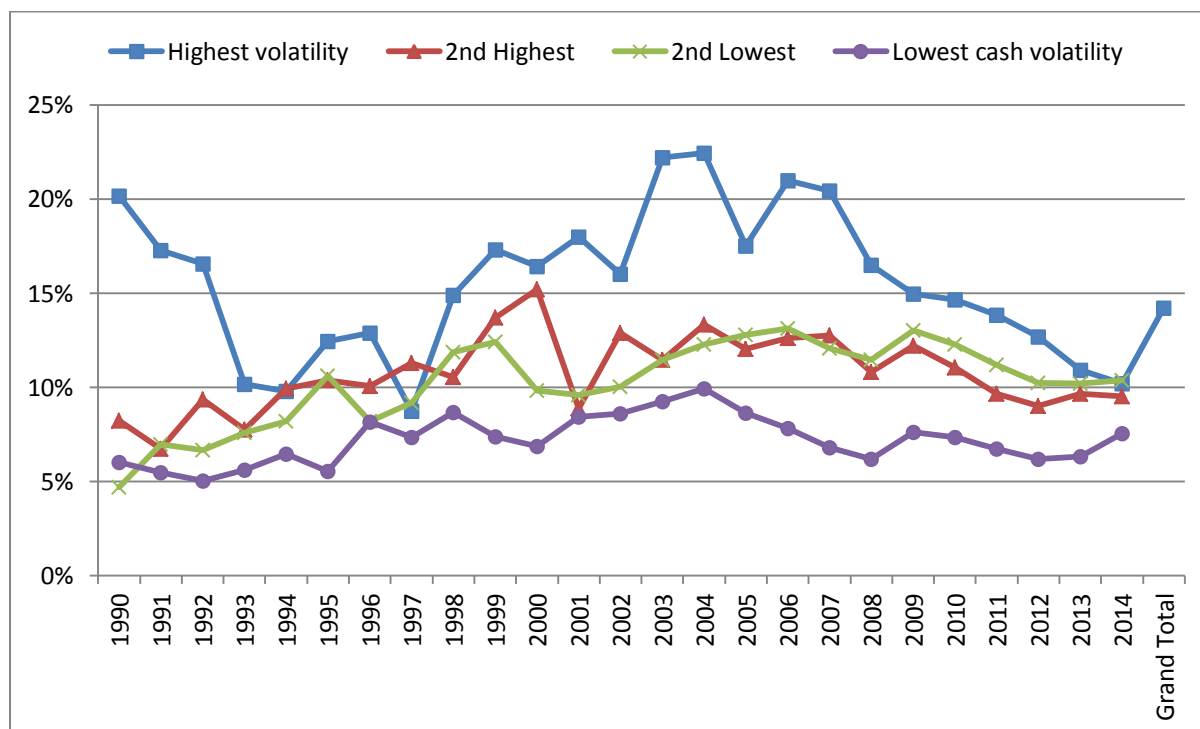
Table 9: Volatility of cash flows by industry

Subsector	Average	Subsector	Average
Coal	49%	Industrial Media	16%
Industrial Personal Goods	44%	Industrial Metals	15%
Gold & Platinum Mining	23%	Industrial Services	13%
Industrial Telecoms	23%	General Mining	12%
Industrial Travel and Leisure	16%	Industrial Food and Drug Retailers	8%
		Industrial Healthcare	8%
Industrial Electronic and Electrical	7%	Industrial Retailers	5%
Industrial Packaging	6%	Forestry and Paper	5%
General Industrial	6%	Chemicals	5%
Industrial Transportation	6%	Industrial Beverages & Tobacco	3%
Industrial Food	5%	Real Estate Holdings and Development	3%
Construction and Materials	5%	Real Estate Investment Trusts	2%

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Individual cash flow risk:

To calculate the significance of the cash flow risk for each firm, I calculate the cash flow risk across all firms same as above. I take the cashflow calculated as EBITDA, and do a standard deviation of the last five years. I then average the standard deviation for each year. Subsequently, I run a regression of the cash flow risk for each year, with the cash level for that year.

This gives an R squared of 51% and a p value of 0.0004. Therefore there is a significant relationship between the cash flow volatility and the level of cash ratio of a firm.

Table 10: Cash flow risk compared with the cash ratio

SUMMARY OUTPUT

Regression Statistics	
Multiple R	0.71515984
R Square	0.511453597
Adjusted R Square	0.48431213
Standard Error	0.010474993
Observations	20

ANOVA

	df	SS	MS	F	Significance F
Regression	1	0.002067666	0.002067666	18.84399	0.000393685
Residual	18	0.001975059	0.000109725		
Total	19	0.004042725			

	Coefficients	Standard Error	t Stat	P-value	Lower 95%
Intercept	0.0940	0.0047	19.9021	0.0000	0.0841
X Variable 1	0.1442	0.0332	4.3410	0.0004	0.0744

A review of the idiosyncratic risk for each industry turns up the same results, though it is not presented here. The similarity is expected because the idiosyncratic risk is a factor of the cash flow calculation presented above.

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Figure 8: Cash ratio grouped by industry
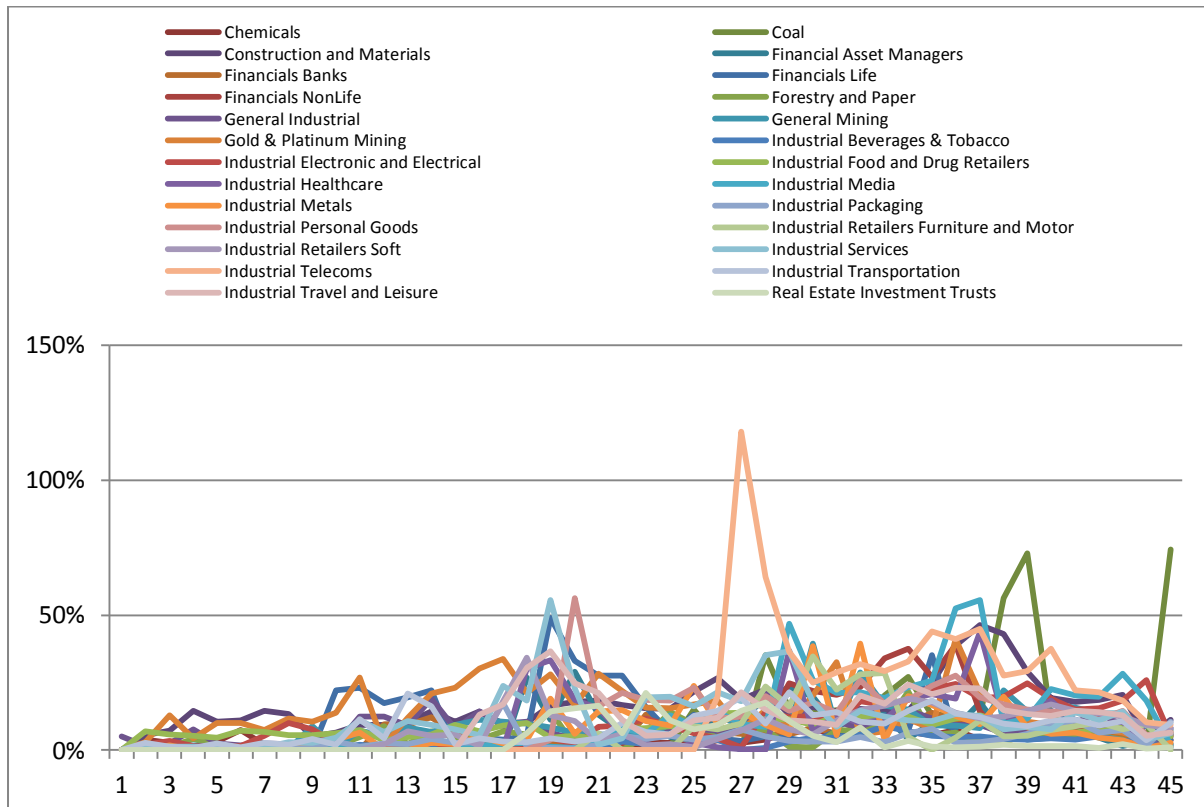
Table 11: Cash flow to assets compared to Cash ratio

SUMMARY OUTPUT

Regression Statistics	
Multiple R	0.619205145
R Square	0.383415011
Adjusted R Square	0.356606968
Standard Error	0.015231807
Observations	25

ANOVA

	df	SS	MS	F	Significance F
Regression	1	0.003318233	0.003318233	14.302238	0.000965561
Residual	23	0.005336183	0.000232008		
Total	24	0.008654415			

	Coefficients	Standard Error	t Stat	P-value	Lower 95%
Intercept	0.066422681	0.010665098	6.228042536	2.35558E-06	0.044360246
X Variable 1	0.17656388	0.046687419	3.781829981	0.000965561	0.079983596

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Figure 9: Cash flow to assets compared to Cash ratio

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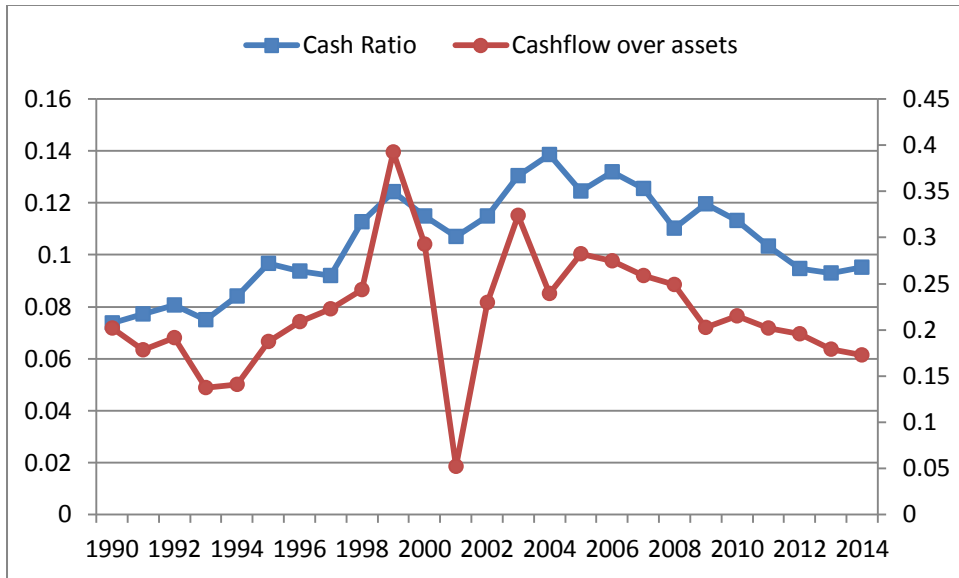
5.5 Is there any effect on Research and development

Figure 11: Cash ratio and level of research and development
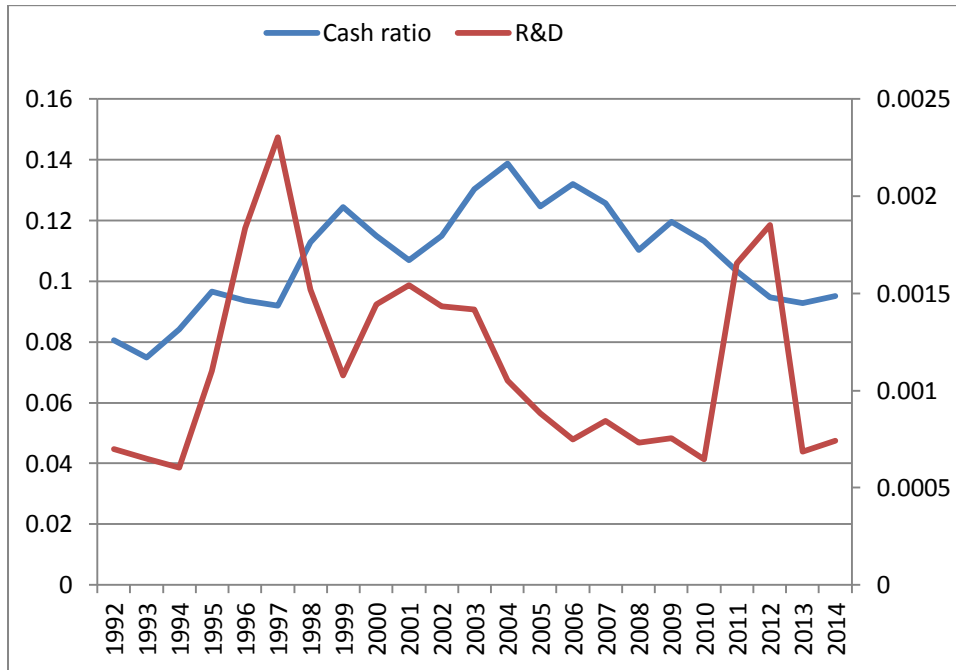
Table 12: Research and development by year

Year	Count	Count	Average	Percentage of R&D firms
1990	65	0	0.000%	0%
1991	69	0	0.000%	0%
1992	69	9	0.070%	13%
1993	72	8	0.065%	11%
1994	72	10	0.060%	14%
1995	79	16	0.110%	20%
1996	85	17	0.184%	20%
1997	88	22	0.230%	25%
1998	96	23	0.152%	24%
1999	107	24	0.108%	22%
2000	109	26	0.144%	24%
2001	113	30	0.154%	27%
2002	115	33	0.143%	29%
2003	116	33	0.142%	28%
2004	119	35	0.105%	29%
2005	122	33	0.088%	27%

2006	123	33	0.075%	27%
2007	134	34	0.084%	25%
2008	149	40	0.073%	27%
2009	151	41	0.076%	27%
2010	156	43	0.064%	28%
2011	158	42	0.165%	27%
2012	162	39	0.185%	24%
2013	163	36	0.069%	22%
2014	142	31	0.074%	22%

Table 13: Research and development compared to cash ratio

SUMMARY OUTPUT

Regression Statistics	
Multiple R	0.026180712
R Square	0.00068543
Adjusted R Square	-0.005521493
Standard Error	0.082986133
Observations	163

ANOVA

	df	SS	MS	F
Regression	1	0.000760497	0.000760497	0.110429871
Residual	161	1.108758432	0.006886698	
Total	162	1.109518929		

	Coefficients	Standard Error	t Stat	P-value
Intercept	0.106168709	0.006727814	15.78056472	1.66946E-34
X Variable 1	-0.499552618	1.503273347	-0.332309902	0.740087517

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5.6 Companies with high dividends have low cash levels

Table 14: Dividend paying firms

Year	ALL COMPANIES	DIVIDEND PAYERS	Non Dividend payer	Percent of payers
1990	65	64	1	98%
1991	69	68	1	99%
1992	69	69	0	100%
1993	72	70	2	97%
1994	72	72	0	100%
1995	79	76	3	96%
1996	85	79	6	93%
1997	88	84	4	95%
1998	96	91	5	95%
1999	107	94	13	88%
2000	109	98	11	90%
2001	113	100	13	88%
2002	115	103	12	90%
2003	116	107	9	92%
2004	119	112	7	94%
2005	122	117	5	96%
2006	123	119	4	97%
2007	134	124	10	93%
2008	149	132	17	89%
2009	151	133	18	88%
2010	156	137	19	88%
2011	158	142	16	90%
2012	162	146	16	90%
2013	163	150	13	92%
2014	142	103	39	73%

Table 15: Summary of non-paying firms (dividends)

	No dividend	Average cash ratio
Volatility	2.9%	1.9%
Range	10.7%	6.5%
Min	4.50%	7.38%
Max	15.16%	13.87%

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Figure 11: Comparison of cash ratios: industry, and non-paying firms
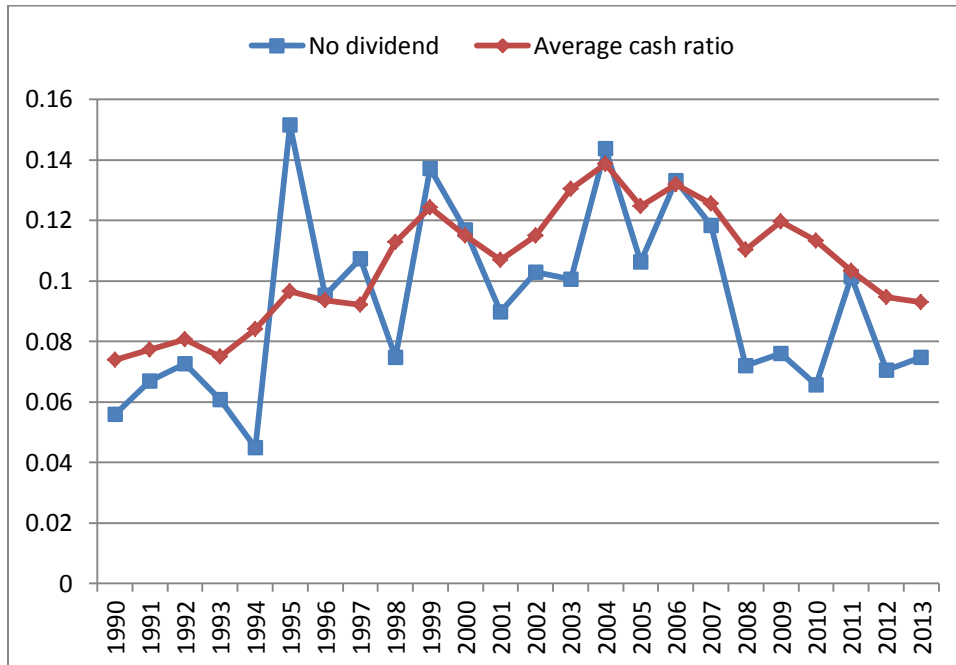
Table 16: Comparison of non-payers vs full sample

t-Test: Two-Sample Assuming Unequal Variances

	Variable 1	Variable 2
Mean	0.093285911	0.105488522
Variance	0.000863941	0.000371837
Observations	24	24
Hypothesized Mean Difference	0	
df	40	
t Stat	-1.700545533	
P(T<=t) one-tail	0.048395997	
t Critical one-tail	1.683851013	
P(T<=t) two-tail	0.096791995	
t Critical two-tail	2.02107539	

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5.7 Has Net working capital investment affected cash?

Correlation
The correlation between Net working capital ratio to total assets and the cash ratio to total assets was -75% for the period from 1990 to 2013.

Figure 12: Cash ratio vs net working capital

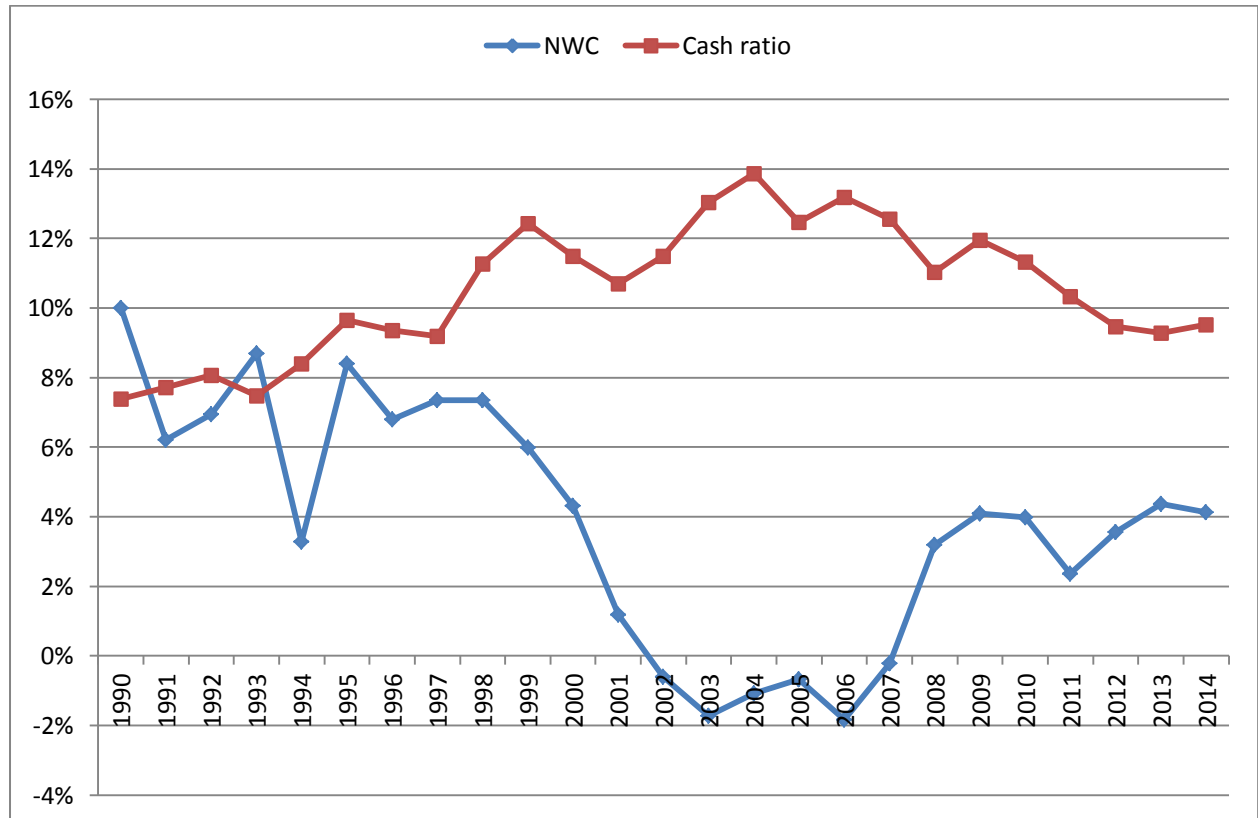Table 17: Cash ratio vs net working capital

SUMMARY
OUTPUT

Regression Statistics	
Multiple R	0.300386091
R Square	0.090231803
Adjusted R Square	0.084581069
Standard Error	0.079180784
Observations	163

ANOVA

	df	SS	MS	F	Significance F
Regression	1	0.100113894	0.100113894	15.96815586	9.78263E-05
Residual	161	1.009405035	0.006269596		
Total	162	1.109518929			

	Coefficients	Standard Error	t Stat	P-value	Lower 95%
Intercept	0.111152602	0.006356122	17.48748702	4.69722E-39	0.098600481
X Variable 1	-0.150837644	0.037746993	-3.9960175	9.78263E-05	-0.225380711

Figure 13: Cash ratios of personal goods and F&D retailers
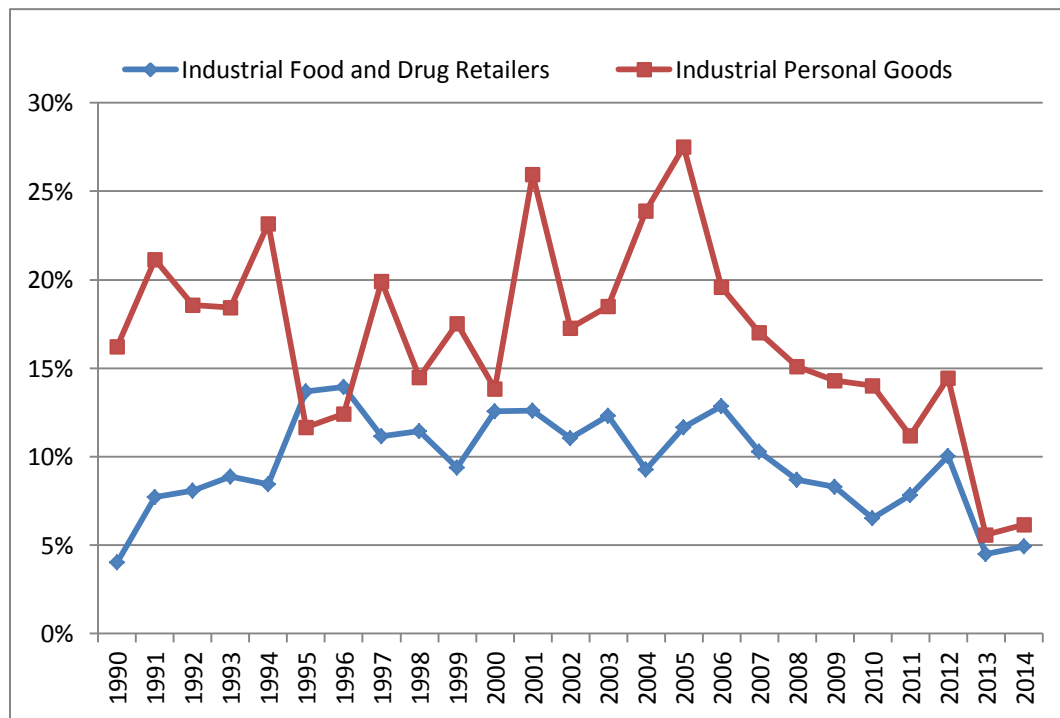
6. Data analysis

6.1 Hypothesis 1: Cash balances of SA firms are high by historical standards, and have been increasing of the past several years.

The average cash balances were 10% in the 1990s, starting at a low of 7% and increasing over the decade to end at 12%. In the 2000s, the cash ratio also increases but peaks in 2004 at 14%, which is also the highest in the period under review. It then comes down steadily from then until 2013.

When measured using the median, the cash ratio is 5% for the 1990s, 9% for the 2000s, and 7% for the 2010s. In this case, the peak is in 2005, and it moves down to 2013 which is 6%. These show that the cash levels are clearly higher than in the 1990s but lower than the 2000s. In fact the cash level in 2013 is the lowest it has been since 1996, almost 20 years ago.

In comparison to international standards, the cash holdings for South African firms are also much lower. In 2010, the cash holdings for countries were 21% (US),,, 14.36 (Advanced countries), 12.77% (UK), 19.36% (Japan), 12.31% (Developing nations).

The main reason driving the debate around cash levels may appear to be the methodology that has been used so far in South Africa to measure the levels of cash. Managers may be looking at the absolute amounts of cash they are holding and these have certainly gone up. When doing balance sheet analysis, it is commonly understood that comparisons should be done on a common standard, also called a same size balance sheet. When using internationally recognized methods similar to Opler, Pinkowitz, Stulz and Williamson (1999), South African cash holdings are lower than its historical average. They used cash over total assets. South African firms also hold less cash than the world average as well as the averages of equivalent developing nations.

Big business vs small business
The sample used in this research is of the JSE All share which contains large listed companies. There is a possibility, even a high one, that the picture shown here is different when small and medium companies are reviewed. For the purposes of this study, business would typically mean big business as it is broadly defined in the media to mean large listed companies, for which the All share index is a good representative. When the press, the unions or the government talk of business holding cash, they almost always mean large corporations, and not spaza shops and family run middle enterprises.

South Africa got independence in 1994, and began the journey of development, growth and transformation. While there was growth, it was also affected by increased interest rates and higher inflation that was usually in the double digits. The environment in the early to late 90s would have lent itself to higher risks and uncertainty for the whole country. Over the years, the South African market has matured and even has a large presence of foreign investors.

Interest rates are at an all-time low, and markets are more comfortable with South African risks. This stability would give comfort to corporate leaders who would need less cash than historically deemed necessary.

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6.2 Hypothesis 2: Larger companies hold less cash balances than small companies

The transaction motive and precautionary motives for holding cash both imply that smaller companies would have higher balances than large companies. By estimating scale elasticity, Mullingan (1997), found that there are economies of scale in holding money. Larger firms are likely to hold less cash because they make savings on transaction costs due to their size. Smaller firms would hold higher levels of cash as they would like to avoid the costs of constantly raising cash, as the fixed cost portion is high. In line with Opler, Pinkowitz, Stulz and Williamson (1999), it would be expected that the fixed element of fund raising is a deterrent to small firms having low cash balances, while larger firms can absorb these transaction costs easier. The most obvious and common costs are those of tapping the capital markets. Investment banks charge minimum fees for capital raising because there are processes that must be done regardless of the size of the company. These costs would include legal fees, fees for listing on an exchange, auditors fees and due diligence costs, which might vary slightly with size, but will be incurred regardless of the entity. Other transaction costs they list include internal costs of raising funds like asset sales, the costs of hedging charged by banks, and the cash conversion cycle.

Bates, Kahle and Stulz (2009), investigate cash balances for 13,599 firms over 26 years. They split the sample into quintiles according to book values of the firms and find that the lower quintiles representing the smaller firms have higher cash balances than the larger firms. This is consistent with the transaction motive of holding cash.

Size also differentiates between firms that have a precautionary motive and those that do not, with the main distinction being constrained firms are more likely to need money for precautionary reasons. Hans and Jui (2007), defined a constrained firm as one that would be forced to cut back or forgo an investment with positive NPV due to lack of adequate finances. In some cases, a less than optimal investment would be made in order to preserve cash for the future. Such an investment is categorised as second to best.

The data confirms this to be the case, when reviewed on a time series basis. In 2013, the smallest quartile of companies has an average cash ratio of 12%, while the largest quartile has only 7% cash holdings. This trend is consistent with the rest of the research period, showing that smaller companies in South Africa have consistently higher cash holdings than larger companies.

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This is consistent with the literature on the topic. Smaller firms are more likely to try and avoid transactional costs that are usually fixed in nature (Opler, Pinkowitz, Stulz and Williamson, 1999). The costs of transactions are charged by investment bankers for taking a company to market. Each time a company needs to raise debt it needs analysts, corporate and investment banks, lawyers, and regulators. The regulatory processes alone are significantly challenging and companies that do not issue bonds frequently, are faced with the task of paying external legal counsel. Large corporates are known to have their own treasury departments, and corporate finance teams who manage funding programs. For a small organisation, keeping such large teams of professionals is a high cost they would rather avoid. As a result, they would more likely keep higher cash levels than large corporates who have the resources and who take advantage of the economies of scale in debt issuance.

The precautionary motive is also highlighted here, similar to the literature which shows this as a key reason for cash holdings (Bates, Kahle and Stulz, 2009). By their very nature, smaller companies are more likely to have volatility in their cash flows than larger companies. Smaller companies face more competition than larger ones, and have less power in their markets. Increased competition and business cycles can have a large impact on them, and their cash flows. Large companies are more likely to have market power by being dominant in an industry or product, or they are likely to be more diversified. This limits the chances of their cash flows bobbing up and down frequently, and reduces their cash flow risk. In addition, they are usually already used to accessing the markets and will have a debt rating, and reputation. They will therefore be more confident of being able to raise funds in the market.

Large South African firms are usually multi banked, enabling them to play their banks' pricing off each other, compared with the smaller firms that are captive clients of a particular bank. The negotiating power of large banks enables them to have multiple credit lines that can be drawn upon in case of future needs. Their confidence and size allows them to have more lines than they are likely to use Campello, Graham and Harvey (2010), therefore negating the need for large cash balances.

6.3 Hypothesis 3: Companies hold high balances to aid in Research and development

The research and development data is collated from the Mcfas database, under the heading Research and development with the code 01090303. Where the number is blank, I assume there were no research and development costs. The average level of R&D across the sample was 0.11% for the years 1992 to 2014, and there was no data for years 1990 and 1991. There is a spike in the years 1996 to 1998 and then again in 2011 and 2012. It is not clear from the data if there is a reporting issue or if South African firms spend just this portion of their earnings on research and development.

Spending is R&D is viewed as an indicator of growth opportunities for firms. Pinkowitz, Stulz and Williamson (2013), found that firms with high Research and development budgets also hold more cash than other firms. Part of the reasoning behind this is that it is difficult to borrow cash for R&D when compared to normal capex. Firms would therefore hold more precautionary cash if they believe they will have high R&D in future, to avoid a situation where they are unable to invest.

I ran a regression on the data for both a cross sectional view and a time series view. The cross sectional data shows an R squared of 0.7% and a p value of 0.74. I therefore do not reject the null hypothesis that there is no relationship between research and development spending and levels of cash holdings for companies in South Africa. When compared with the US, South African firms' spend on R&D is very low. In this sample, the average spend was 0.11% as shown above, and in most years less than 30% of the firms reported a number for R&D. It is possible that the South Africa numbers are reported in a different line, but this is not clear from the data. I believe that if the R&D was significant, companies would try to report it separately as this alone would be a key indicator to investors that they were preparing better for the future.

According to the World bank, the US spends 2.76% of its GDP on R&D while South Africa spends 0.76%. This is a much higher figure for R&D than is available in the Mcfas data that I used for the sample. It is possible that it is a reporting issue with the companies or that a large part of the R&D is spent by government and is therefore not easily available.

Research and development is not a highly discussed issue in South African literature or business, and it is not a highly visible expense for South African firms. This is in contrast to capital expenditure which is relatively high for South African firms. South Africa is dominated by

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manufacturing, mining, and financial services firms, the latter two of which are not traditionally known for very high research and development. While some manufacturers do have research and development budgets, this does not seem to be the case for South African firms for various reasons. South African manufacturers are concentrated on the lower end of the value add chain, producing clothing, food and other consumables, as well as manufacturing for multinationals as is the case in the vehicle manufacturing industry.

One would therefore expect that a more granular view of the cash levels if focused on companies with high research and development, could be higher than the average for the sample and specifically higher than the mining and manufacturing which are more likely to spend on capital expenditure. Capital expenditure is easier to finance through debt than research and development is. Banks and other investors in the debt markets use traditional lending methods that rely on asset based securities to cover their risks.

6.4 Hypothesis 4: Cash balances driven by the industry in which the firm operates

Every industry has different characteristics from the next. Financial services firms are highly regulated, and therefore are expected to have higher cash flow than other firms. Specifically, banks need to hold cash to meet their Liquidity Coverage Ratio, according to Basel III. Currently, the liquidity ratio is 60% according to Basel regulations, and it is expected to go up by 10% every year. Other industries will hold cash based on the structure and needs of that industry.

The level of risk in each industry and the pattern of cash flows also varies significantly. Some businesses are cyclical and their fortunes will fluctuate with the business cycle. These firms will do well in good times and badly in recessions and would include vehicle manufacturers. Those referred to as defensive on the other hand, will weather economic recessions, but also ignore booms. Food and oil retailers would be considered defensive companies.

The data shows very high cash holdings for certain industries, most notably Industrial telecoms, Construction and materials, Industrial Media and Coal, with ratios of 35%, 21%, 20% and 19% respectively. Telecoms companies include Vodacom and MTN which have high margins of return, and high levels of intellectual capital, with low fixed assets. Other than the base stations, mobile phone companies are not known to hold land, buildings or machinery. Due to the nature of bank lending, which is very fixed asset dependent, it is possible that mobile phone companies would prefer to fund their growth from internally generated funds. This would result in high average cash holdings. Media companies are also the same as mobile phone companies, with few fixed assets and more intellectual capital, resulting in a similar outcome.

Construction and mining companies rely on long term debt to fund their projects but mix it up with cash for short term needs. This is especially so because their revenues can drop suddenly and significantly, hampering ability to raise funds and forcing reliance on banks and capital markets. Construction company earnings would drop with the business cycles, just as commodity prices have cycles that affect them.

At the other end of the spectrum, we have Tobacco, Packaging and Forestry and Paper industries, with very low cash ratios, and correspondingly very low standard deviations of those cash flows. Tobacco, Packaging and Forestry have average cash of 4%, 5%, and 6% respectively, and standard deviations of 2%, 2% and 4% in the same order. The standard deviation here is volatility of the level of cash, which means these companies have a low level of

cash and the level of cash changes very little from year to year. The media and telecoms companies have high cash and the levels of cash change significantly from year to year.

Next I calculated the cash flow volatility, which I defined as the standard deviation of the EBITDA of each firm. The data here is from 1995 because the cash flow volatility is calculated with a five year history, so starting in 1991 to 1994 to get the 1995 volatility. The firms were then grouped into quartiles starting with the least volatile being quartile one and the most volatile being quartile four. The results are similar to the test of the cash level volatility, with the most volatile cash flows being for Mining (coal, platinum and gold), industrial telecoms, Industrial personal goods and Travel and Leisure. The least volatile cash flows were in Tobacco, Forestry and Paper, and Chemicals.

Regression:
I perform a regression of the data, which shows an R squared of 51%, and a p value of 0.0004. This means that there is a significant relationship between the cash flow volatility (EBITDA volatility) and the level of cash ratio of a firm.

Key to the difference between industries is the type of risks that each industry would face.

6.5 Hypothesis 5: Companies with high dividends have low cash levels

Cash holdings are a consequence of the actions taken by firms, and a simplistic explanation is that cash holdings are simply the remnant of the receipts and payments. As a result, one could suggest that companies that spend more have less cash. Dividends are a key part of the corporate policy of organisations, and they have a significant effect on cash levels of all organisations, except in cases where firms give bonus shares or share splits.

The non-dividend payers had a minimum (maximum) cash ratio of 4.5% (6.5%) compared with the full sample minimum (maximum) of 7.38% (13.87%) in the period. The range in the dividend paying companies is 10.7% while the full sample was 6.5%, and the non-payers cash ratio had a volatility through the period of 2.9% compared with 1.9% volatility for the full sample. The

The one tail t test result was 1.683 while the t stat was -1.7, meaning the null hypothesis can be rejected. The cash ratio of the dividend paying firms is lower than the whole sample. This would mean that the dividend paying firms are more stable and can afford to pay dividends while the non-payers, are financially constrained and have a more inconsistent dividend. The cash ratios of the non-paying firms are more volatile with a standard deviation of 2.9% compared with the whole sample standard deviation of 1.9%. As can be seen in the graph, the cash ratios are higher for the dividend paying firms and also more stable than for the non-payers.

This could be attributable to the fact that they are constrained financially, and do not have a steady flow of cash. Companies do not stay in confined to one universe or the other. There is a lot of free movement between the universes depending on times, economic cycles, industry specifics and even management. The list of non-payers therefore will be different each year, depending on their financial specifics.

The data shows companies actively managing their cash positions in light of their future outlook. When they have an expectation of future cash being low, they withhold their dividends, and when they expect a bountiful, they pay dividends. The spread of companies is across the board, and covers all sizes as well.

6.6 Hypothesis 6: Changes in Net working capital have affected cash levels

The net working capital was calculated as total current assets, total current liabilities less cash on the balance sheet. Net working capital is the closest thing to cash, and increases in working capital result in a decrease in cash. When stocks and accounts receivable go up, this will result in a reduction in cash, and when they go down, there is an increase in cash. Likewise, when accounts payable increase, this is an increase in cash, and a reduction in accounts payable, has a negative effect on cash.

The net working capital ratio to the cash ratio shows an R squared of 9% and p value of 0.000098. Therefore the null hypothesis is rejected that net working capital have not had any impact on the levels of cash. The net working capital ratio has a negative 75% correlation to the cash ratio, which is very high. For every increase in net working capital of 1%, the net working capital reduced by 0.75% between 1990 and 2013.

Since 2005, the levels of net working capital have been increasing. It is not surprising that over the same period, the level of indebtedness in South African households has gone up when compared with their earnings. Similarly, one would expect a buildup of inventories over the same period for identical reasons – consumers are struggling to buy and those who buy are struggling to pay.

As the net working capital is the opposite of cash it is expected to increase as cash reduces (Bates, Kahle and Stulz, 2009). Since cash is the consequence as opposed to the driving factor, cash levels react to the companies' policies and processes around accounts receivable, inventories and accounts payables.

7. Conclusion

Principal findings

This paper finds that South African firms do not hold significantly more cash than they have in the past. Cash as a percentage of total assets are higher than they were 20 years ago, but lower than they have been in the recent past, over a ten year time frame. Average cash levels in 2013 are lower than cash levels in any of the years since 1997. Similar conclusions can be reached if the median cash is used instead of the average cash levels. The increase can be explained by the changes in net working capital, size of companies, industry specific risk, the level of cash flows and whether or not companies pay dividends.

Industry effect

The cash levels vary significantly between various industries. Companies hold cash for different reasons, one of which is precautionary. Highly leveraged industries like mining hold high levels of cash as well as high levels of debt. The debt is typically long term debt used to fund long term projects, which the cash would accommodate needs in the short term range. Typically this would mean keeping cash to accommodate any needs of cash up to 18 months in the future.

Cash flows

Cash flows have a significant impact on the level of cash balances an organisation holds. The firms that generate high cash from operations also end up with average cash balances. Profitable companies are more likely to have average high balances.

Dividends

On average, over 90% of the companies in the sample paid dividends each year. The proportion of South African firms that does not pay dividends is relatively low. The dividends had an impact but not in the way it was expected. The average level of cash for non-dividend-paying firms was lower than for the whole sample. The non-paying firms would be expected to have higher balances as they are retaining the cash for the future. However, a deeper review would reveal that these firms are paying no dividends because they are financially constrained. Should they not have paid dividends, their financial health would be way worse than it really was.

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Implications for management

South African businesses have talked a lot about the high levels of cash. This research challenges the commonly held view that there is excess cash sitting in the balance sheets of big business. Management in South Africa should re-evaluate their views on the levels of cash and on their leverage structures. As a start, companies could sponsor further research on their leverage structures, and on corporate choices affecting the structures of their balance sheets.

The gross leverage ratio was different to the net leverage ratio. This means that when we exclude cash from leverage, it acts different from when it is included. Therefore for the South African companies, it would mean there is little benefit in early payment of debt, because there would be higher than usual costs in raising of capital. Companies would be better served keeping the higher debt levels while also holding higher cash.

Limitations of the research

This research was a quantitative research that reviewed companies based on the externally available data. The assumption is made that the data is accurate and complete, and it is possible that in some cases, the data may not be 100 percent complete. This may result from the accounting policies of the firms, or from their reporting process, and finally could occur from the process of collating the Macfas database. This research does not highlight any issues or errors with the McFas database, and therefore assumes its accuracy. Reviews of the data to other external sources have shown there are no obvious or material errors in any of the data that was reviewed.

Impact of Agency
Prior research in the US and in Europe has explored the impact of agency conflicts on the levels of cash. However, this is a relatively new and unexplored area, and as such there is little research on agency conflicts and costs. This research did not look into the effects of agency costs due to lack of adequate data.

Survivorship bias was not adjusted for in this study. This means that companies that have dropped off from the JSE All share index would not have been removed at the beginning. Should these companies have had higher cash balance at the beginning of the review in 1990, it will affect the supposed reduction in cash balances. If on the other hand, these companies had lower than expected cash ratios, it means the study underestimates the results.

Suggestions for future research

Campello, Graham and Harvey (2010) did a survey of 1050 CFOs in America, Europe and Asia to ascertain if their firms were constrained during the crisis. Their study showed constrained firms cutting back on spending more than unconstrained firms, and using credit lines more than at other times. A survey of CFOs in South Africa could shed more light into the levels of cash holdings over time. As an extension of this paper, it would allow a more focused investigation into the issues causing the decreased levels of cash as a percentage of earnings. It might also clear the dilemma facing the industry as to why executives talk about excess cash while the data shows otherwise. We believe that executives are mainly referring to absolute numbers but this can only be proven by talking directly and in specifics to the executives who make these decisions.

This study has focused on large companies, with the average total assets for each company being 16 billion rands and a median of 4 billion rands in 2013. The smallest company by assets in 2013 had 46 million rands in total. South Africa has thousands of small businesses with assets of less than 50 million rands, and there are also hundreds of companies with above 50 million in assets that are not listed. The total cash balance for the sample as at 2013 was just over 200 milion rands, which is much less than the 670 billion that is attributable to corporate clients. A study of unlisted companies would yield a lot of information that may have been missed in this study, and enlighten the academic community.

A review of the causes for change in Inventory and accounts receivable

The research on the tax implications for multinationals is not conclusive. Sometimes there is an impact and sometimes not. Multinational companies with high levels of research and development seem to have their cash balances affected by tax rules, while purely local companies are not. In addition, multinationals that have low levels of research and development are not as highly affected as those that have high research and development. South African firms continue to expand into other countries in Europe, the United States of America and other emerging markets. As this happens, the firms will choose different legal vehicles to do this, mainly split between subsidiaries and branches. This choice will have an impact on how their balance sheets are structured, and will provide more needed data for further research.

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8. References

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9. Appendices:

Appendix 1 -: Definitions

Aggregate cash ratio	Total cash balances for each of the companies the sample divided by the total assets for each of the companies the sample
Average cash ratio	Simple average of the company level cash ratio. The cash ratio at company level is the cash divide by total assets
Median cash ratio	Median of the company level cash ratio. The cash ratio at company level is the cash divide by total assets
Average leverage ratio	An average of the leverage ratios of all the companies in the sample for a given year
Median leverage ratio	A median of the leverage ratios of all the companies in the sample for a given year
Average net leverage	An average of the net leverage ratios of all the companies in the sample for a given year. The net leverage ratio is calculated as the leverage less cash, divided by total assets
Median net leverage	A median of the net leverage ratios of all the companies in the sample for a given year. The net leverage ratio is calculated as the leverage less cash, divided by total assets

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Appendix 2 – List of firms

Name	Industry
AECI LTD	Chemicals
AFRICAN OXYGEN LTD	Chemicals
OMNIA HOLDINGS LTD	Chemicals
ROLFES HOLDINGS LTD	Chemicals
BUILDMAX	Coal
COAL OF AFRICA	Coal
EXXARO	Coal
KEATON ENERGY	Coal
PETMIN LTD	Coal
SENTULA MINING LTD	Coal
WESCOAL	Coal
AFRIMAT	Construction and Materials
AVENG LTD	Construction and Materials
BASIL READ HOLDINGS LTD	Construction and Materials
CALGRO M3 HOLDINGS LTD	Construction and Materials
DISTRIBUTION & WAREHOUSING NETWORK LTD	Construction and Materials
ELB GROUP LTD	Construction and Materials
ESOR LTD	Construction and Materials
GROUP FIVE LTD	Construction and Materials
MASTER DRILLING GROUP LTD	Construction and Materials
MAZOR GROUP LTD	Construction and Materials
MURRAY AND ROBERTS HOLDINGS LTD	Construction and Materials
PRETORIA PORTLAND CEMENT COMPANY LTD	Construction and Materials
RAUBEX	Construction and Materials
SEPHAKU HOLDINGS LTD	Construction and Materials
STEFANUTTI STOCKS HOLDINGS LTD	Construction and Materials
WILSON BAYLY HOLMES-OVCON LTD	Construction and Materials
MONDI LTD/PLC	Forestry and Paper
SAPPI	Forestry and Paper
YORK TIMBER HOLDINGS LTD	Forestry and Paper
BARLOWORLD LTD	General Industrial
BELL EQUIPMENT LTD	General Industrial
EQSTRA HOLDINGS	General Industrial
HOWDEN AFRICA HOLDINGS LTD	General Industrial
HUDACO INDUSTRIES LTD	General Industrial
INVICTA HOLDINGS LTD	General Industrial
KAP INTERNATIONAL HOLDINGS LIMITED	General Industrial
METAIR INVESTMENTS LTD	General Industrial
REMGRO LTD	General Industrial
AFRICAN RAINBOW MINERALS LTD	General Mining
ANGLO AMERICAN PLC	General Mining
ASSORE LTD	General Mining
BHP BILLITON PLC	General Mining

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GLENCORE PLC	General Mining
KUMBA IRON ORE	General Mining
SASOL LTD	General Mining
TRANS HEX GROUP LTD	General Mining
ANGLO PLATINUM LTD	Gold & Platinum Mining
AQUARIUS PLATINUM LIMITED	Gold & Platinum Mining
IMPALA PLATINUM HOLDINGS LTD	Gold & Platinum Mining
LONMIN PLC	Gold & Platinum Mining
NORTHAM PLATINUM LTD	Gold & Platinum Mining
ROYAL BAFOKENG PLATINUM LTD	Gold & Platinum Mining
BRITISH AMERICAN TOBACCO	Industrial Beverages & Tobacco
CAPEVIN (KWV)	Industrial Beverages & Tobacco
DISTELL GROUP LTD	Industrial Beverages & Tobacco
SABMILLER PLC	Industrial Beverages & Tobacco
ARB HOLDINGS	Industrial Electronic and Electrical
CONSOLIDATED INFRASTRUCTURE GROUP LTD	Industrial Electronic and Electrical
DIGICORE HOLDINGS LTD	Industrial Electronic and Electrical
ELLIES HOLDINGS LTD	Industrial Electronic and Electrical
JASCO ELECTRONICS HOLDINGS LTD	Industrial Electronic and Electrical
MIX TELEMATICS	Industrial Electronic and Electrical
REUNERT LTD	Industrial Electronic and Electrical
SOUTH OCEAN HOLDINGS	Industrial Electronic and Electrical
ASTRAL FOODS LTD	Industrial Food
AVI LTD	Industrial Food
CLOVER INDUSTRIES	Industrial Food
CROOKES BROTHERS LTD	Industrial Food
ILLOVO SUGAR LTD	Industrial Food
OCEANA GROUP LTD	Industrial Food
PIONEER FOODS	Industrial Food
RCL FOODS	Industrial Food
SOVEREIGN FOOD INVESTMENTS LTD	Industrial Food
TIGER BRANDS LTD	Industrial Food
TONGAAT GROUP LTD	Industrial Food
ZEDER INVESTMENTS	Industrial Food
CLICKS GROUP LTD	Industrial Food and Drug Retailers
PICK N PAY HOLDINGS LTD	Industrial Food and Drug Retailers
PICK N PAY STORES LTD	Industrial Food and Drug Retailers
SHOPRITE HOLDINGS LTD	Industrial Food and Drug Retailers
THE SPAR GROUP LIMITED	Industrial Food and Drug Retailers
ADCOCK INGRAM	Industrial Healthcare
ASPEN PHARMACARE HOLDINGS LTD	Industrial Healthcare
LIFE HEALTHCARE	Industrial Healthcare
MEDI-CLINIC CORPORATION LTD	Industrial Healthcare
NETCARE LTD	Industrial Healthcare
AFRICAN MEDIA ENTERTAINMENT LTD	Industrial Media
CAXTON CTP PUBLISHERS AND PRINTERS	Industrial Media

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NASPERS LTD N	Industrial Media
ARCELOR MITTAL	Industrial Metals
ARGENT INDUSTRIAL LTD	Industrial Metals
BSI STEEL	Industrial Metals
EVRAZ HIGHVELD STEEL	Industrial Metals
HULAMIN	Industrial Metals
MERAFE RESOURCES LIMITED	Industrial Metals
METMAR RESOURCES	Industrial Metals
ASTRAPAK LTD	Industrial Packaging
BOWLER METCALF LTD	Industrial Packaging
MPACT LTD	Industrial Packaging
NAMPAK LTD	Industrial Packaging
TRANSPACO	Industrial Packaging
WINHOLD LTD	Industrial Packaging
MUSTEK LTD	Industrial Personal Goods
NU-WORLD HOLDINGS LTD	Industrial Personal Goods
RICHEMONT SECURITIES AG	Industrial Personal Goods
STEINHOFF INTERNATIONAL HOLDINGS LTD	Industrial Personal Goods
VERIMARK HOLDINGS LTD	Industrial Personal Goods
COMBINED MOTOR HOLDINGS	Industrial Retailers Furniture and Motor
LEWIS GROUP LIMITED	Industrial Retailers Furniture and Motor
CASHBUILD LTD	Industrial Retailers Hard
ILIAD AFRICA LTD	Industrial Retailers Hard
ITALTILE LTD	Industrial Retailers Hard
MASSMART HOLDINGS LTD	Industrial Retailers Hard
HOLDSPORT LTD	Industrial Retailers Soft
MR PRICE GROUP LTD	Industrial Retailers Soft
THE FOSCHINI GROUP	Industrial Retailers Soft
TRUWORTHS INTERNATIONAL LTD	Industrial Retailers Soft
WOOLWORTHS HOLDINGS LTD	Industrial Retailers Soft
ADCORP HOLDINGS LTD	Industrial Services
ADVTECH LTD	Industrial Services
BIDVEST GROUP LTD (THE)	Industrial Services
CURRO HOLDINGS LTD	Industrial Services
INTERWASTE HOLDINGS LTD	Industrial Services
METROFILE HOLDINGS LTD	Industrial Services
ADAPT IT HOLDINGS LTD	Industrial Telecoms
DATACENTRIX HOLDINGS LTD	Industrial Telecoms
DATATEC LTD	Industrial Telecoms
EOH HOLDINGS LTD	Industrial Telecoms
ISA HOLDINGS LIMITED	Industrial Telecoms
MTN GROUP LTD	Industrial Telecoms
PINNACLE TECHNOLOGY HOLDINGS LTD	Industrial Telecoms
TELKOM SA SOC LIMITED	Industrial Telecoms
VODACOM	Industrial Telecoms
COMAIR LTD	Industrial Transportation

GRINDROD LTD	Industrial Transportation
IMPERIAL HOLDINGS LTD	Industrial Transportation
ONELOGIX	Industrial Transportation
SANTOVA	Industrial Transportation
SUPER GROUP LTD	Industrial Transportation
TRENCOR LTD	Industrial Transportation
VALUE GROUP LTD	Industrial Transportation
CITY LODGE HOTELS LTD	Industrial Travel and Leisure
FAMOUS BRANDS LTD	Industrial Travel and Leisure
GRAND PARADE INVESTMENTS	Industrial Travel and Leisure
HOSKEN CONSOLIDATED INVESTMENTS LTD	Industrial Travel and Leisure
PHUMELELA GAMING AND LEISURE LTD	Industrial Travel and Leisure
SPUR CORPORATION LTD	Industrial Travel and Leisure
SUN INTERNATIONAL LTD	Industrial Travel and Leisure
TASTE HOLDINGS	Industrial Travel and Leisure
TSOGO SUN HOLDINGS LIMITED	Industrial Travel and Leisure
CAPITAL AND COUNTIES	Real Estate Holdings and Development
GROWTHPOINT PROPERTIES LTD	Real Estate Holdings and Development
HOSPITALITY A	Real Estate Holdings and Development
HYPROP INVESTMENTS LTD	Real Estate Holdings and Development
OCTODEC INVESTMENTS LTD	Real Estate Holdings and Development
REDEFINE PROPERTIES LTD	Real Estate Holdings and Development
RESILIENT PROPERTY INCOME FUND LTD (PLS)	Real Estate Holdings and Development
VUKILE PROPERTY FUND	Real Estate Holdings and Development
EMIRA PROPERTY FUND	Real Estate Investment Trusts
INTU PROPERTIES PLC	Real Estate Investment Trusts
SA CORPORATE	Real Estate Investment Trusts
SYCOM PROPERTY FUND	Real Estate Investment Trusts

Appendix 3: Growth in JSE, year on year

Date	Last Price
Dec-95	5 595
Dec-96	5 992
Dec-97	5 499
Dec-98	5 026
Dec-99	8 385
Dec-00	8 164
Dec-01	10 442
Dec-02	9 277
Dec-03	10 387
Dec-04	12 657
Dec-05	18 097
Dec-06	24 915
Dec-07	28 958
Dec-08	21 509
Dec-09	27 666
Dec-10	32 119
Dec-11	31 986
Dec-12	39 250
Dec-13	46 256
Dec-14	49 771

JSE Allshare