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The rise in cash holdings of Danish companies

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Abstract

The distribution of cash holdings across Danish companies has changed dramatically since the onset of the Global Financial Crisis, with the median company more than doubling its cash reserves in the last ten years.
Cash holdings are highly heterogeneous across companies. Large companies, less profitable companies, companies with less risky cash flows and companies in the manufacturing sector tend to hold smaller cash reserves.

While structural changes in the Danish economy cannot explain the development of cash holdings, we find that increased cash holdings covary strongly with a simultaneous decrease in loan financing. Changes in the distribution of loan debt can explain most of the increase in cash holdings.

The increase in cash holdings and loan financing is driven by entry and exit patterns: after 2007, companies with low cash holdings are more likely to exit, while entering companies have higher cash reserves. Overall, our results are consistent with companies reacting to more difficult access to credit by increasing their precautionary cash buffers.

Introduction

Companies regularly pay wages and fixed input costs, while their incoming cash flows are often irregular and uncertain. External sources of funding, such as loans or equity financing, are not always readily available at short notice. As a result, most companies hold cash in liquid deposit accounts as insurance against cash flow risks. These cash buffers have been put to the test by widespread business disruptions during the COVID-19 pandemic, and ensuring that viable companies remain able to pay for fixed costs and wages has been an essential cornerstone of the Danish policy response to the pandemic. Nevertheless, very little is known about the liquidity buffers of Danish companies at the onset of the pandemic, how they differ across different companies, and how they have evolved in the recent past.

To address this gap, we analyse the distribution of cash holdings of all economically active Danish companies and their evolution between 2003 and 2018. Our analysis yields several novel results. First, a large share of Danish companies has very low cash reserves over the whole sample period. This is especially the case for large companies, less profitable companies, companies with less risky cash flows and companies in the manufacturing sector. Second, the size of cash buffers held by the typical Danish company has increased dramatically since the 2007-2008 Global Financial Crisis, despite the persistently low or even negative interest rates on cash deposits. The median Danish company holds cash reserves amounting to between 2 and 2.5 per cent of annual sales between 2003 and 2007, and median cash reserves relative to sales more than double to 5 per cent between 2008

and 2018. We investigate several possible sources of this development. We find that the increase in cash reserves cannot be attributed to structural changes in the Danish company population toward companies that typically hold more cash. It can also not be explained by changes in company profitability or cash flow risks.

Instead, we show that increasing cash holdings are closely related to developments in credit markets. We show that while the cash holdings of the typical Danish company increase after the Global Financial Crisis, the use of loan financing decreases. Moreover, companies with no or little loans from financial institutions hold substantially more cash reserves than companies with more loans. This relationship is stable over time, and changes in the distribution of loan debt can explain most of the increase in cash holdings. This suggests the underlying reason behind the increase in cash holdings lies either in worse access to credit or an unobserved third factor that drives both the increase in cash holdings and the decline in debt.

Finally, we show that even though structural changes in the composition of Danish company cannot account for the increase in companies' cash holdings, companies' dynamic selection through entry and exit is an essential driver of the increase in companies' cash holdings. Before 2007, the median cash holdings of entering and exiting companies are similar to incumbents and continuing companies. In the subsequent years, the median cash holdings of exiting companies are substantially below the median cash holdings of continuing companies, and the median cash holdings of entering companies are substantially above the cash holdings of incumbent companies. This dynamic selection process can explain the total increase in companies' cash holdings over the period. Moreover, this pattern is consistent with an important role of credit supply: following the Global Financial Crisis, companies start to build up higher cash buffers or ultimately exit the market if they cannot do so.

Measuring cash holdings of all economically active companies Box 1

Our analysis is based on companies in the Danish Business Register and covers all economically active companies in Denmark except companies in the financial sector. Our definition of 'active' is annual sales of at least kr. 500,000 (2018 kroner) (approx. EUR 70,000 (2018 euros)). We combine the Business Register with data on cash held in deposit accounts from Danish banks' annual reports of all accounts to the Danish tax authorities. The advantage of this source over alternatives based on balance sheet data is that it contains information on the entire population of Danish companies. A drawback is that it imposes a narrow definition of cash that excludes liquid financial investments often included in analyses of cash holdings based on balance sheets. There are 50,200 economically active companies in Denmark in 2003, and this number grows to 69,000 by 2018. Most companies are small, with median employment of 5-7 employees and median annual sales of kr. 5-6 million (current kroner) (corresponds to about EUR 650,000-800,000) over the 2003 to 2018 period. The median company age lies between 8 and 11 years. About 85 per cent of companies operate in service sectors and 15 per cent of companies in manufacturing, with a small number falling into the agriculture and mining sectors. Our primary measure of cash holdings is cash in companies' deposit accounts at the end of the year relative to their annual sales. We prefer to scale cash holdings by sales rather than the book value of assets since sales are measured precisely and better describe the size of small service sector companies that comprise most of our dataset. However, all of the patterns we document also hold when we look at cash to assets instead.

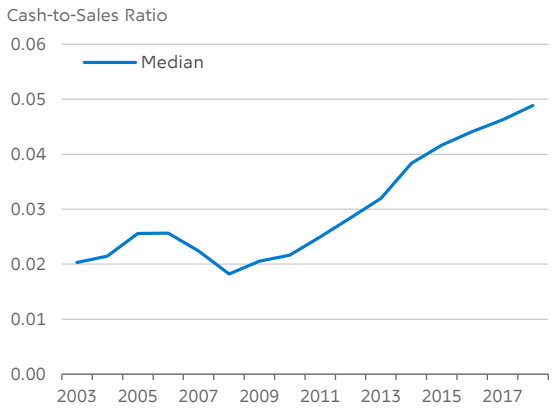
1.

The typical company's cash holding increase strongly after 2007

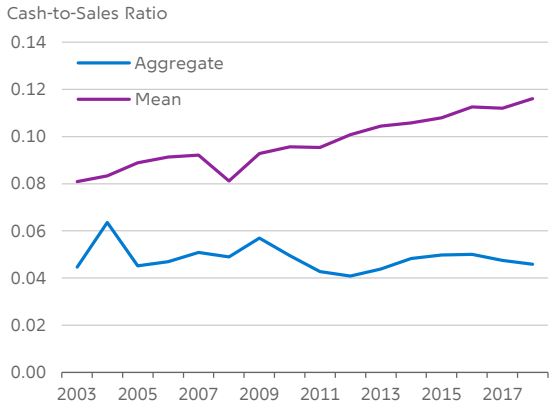
The median Danish company's cash-to-sales ratio is relatively stable at 2 to 2.5 per cent between 2003 and 2007 but more than doubles to 5 per cent between 2008 and 2018 (Figure 1, panel a). This development takes place against the backdrop of a very stable aggregate cash-to-sales ratio of about 5 per cent and a slight

increase in mean cash-to-sales ratios from about 11 to 14 per cent (Figure 1, panel b).

Development of cash holdings in Denmark Figure 1



(a) - Median

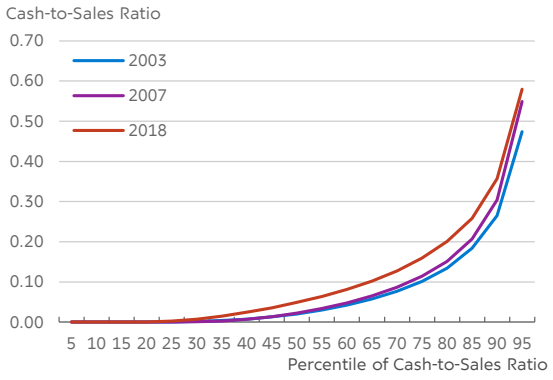


(b) – Mean and aggregate

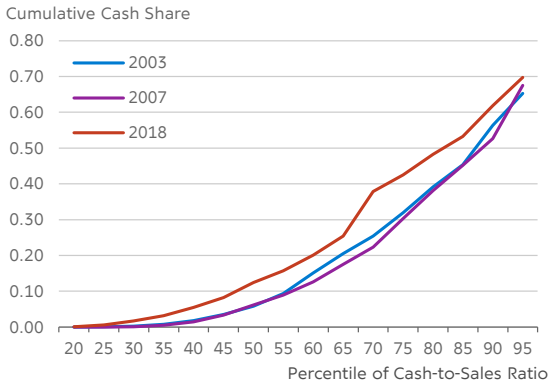
Note: Extreme values of the Cash Ratio distribution has been replaced with the 1st and 99th percentile to account for abnormal outliers (winsorizing).
Source: Own calculation based on DST microdata.

Aggregate and mean cash-to-sales ratios need to be interpreted with care: First, the cash-to-sales distribution is highly skewed (Figure 2, panel a). A substantial fraction of about one-fourth to one-third of companies hold very little cash relative to their sales, and their cash-to-sales ratio is close to zero. On the other end of the distribution, there is a long right tail of companies with very high cash-to-sales ratios. As a result, the mean of the distribution substantially exceeds the median and is a poor measure of the cash holdings of the typical' Danish company at the center of the distribution. Second, company size (employment) and cash holdings are concentrated on opposite ends of the cash-to-sales ratio distribution (Figure 2, panels b and c).

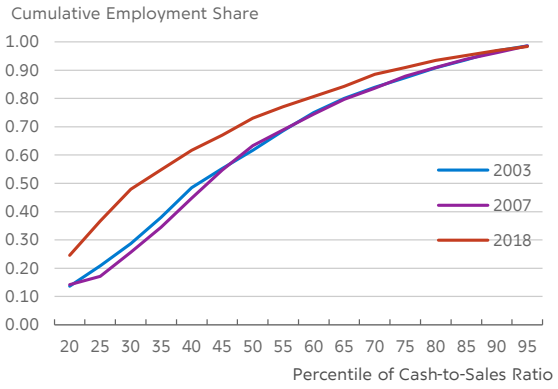
Cash-to-sales distribution Figur 2



(a) – Cash-to-sales ratio



(b) – Cumulative cash share



(c) – Cumulative employment share

Note: Panel b shows the cumulative share of total cash held at each percentile of the cash-to-sales distribution in different years. Panel c shows the cumulative share of employment.
Source: Own calculation based on DST microdata.

Companies in the top decile of the cash-to-sales distribution hold between 40 and 50 per cent of all cash in companies' deposit accounts, but they are typically small and account for less than 5 per cent of cumulative employment. Companies below the 30th percentile of the cash-to-sales distribution hold essentially no cash but are usually large and account for 30 to 50 per cent of employment. As a result, the aggregate cash-to-sales ratio is strongly influenced by parts of the company distribution with cash-to-sales ratios that are very different from the aggregate measure, making it a poor indicator of the cash holdings of the typical Danish company. The median serves this scope much better, and we will focus on this statistic for the rest of the analysis.

Small companies, profitable companies and riskier companies hold more cash

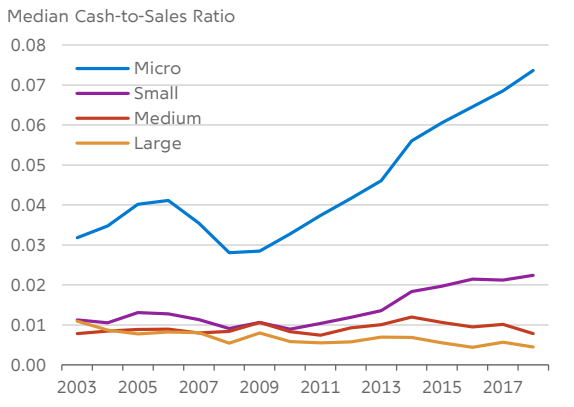
There is considerable heterogeneity in the cash-to-sales ratio of Danish companies – in 2018, the bottom 25 per cent of the cash-to-sales distribution hold essentially no cash, while the top 25 per cent exhibit cash-to-sales ratios above 0.15 (Figure 2, panel a). Moreover, differences in cash-to-sales align with several important company characteristics identified by the empirical literature as main determinants of a company's cash holdings. In the following section, we cover a sample including company size, its profitability, the volatility of its cash flow, its age and level of working capital. Our results confirm the empirical findings in Opler et al. (1999) and Bigelli and Sánchez-Vidal (2012) that study cash holdings in the US from 1971 to 1994 and Italy from 1995 to 2005.

We first note that consistent with the existence of a substantial fixed cost of obtaining external financing, small companies hold considerably more cash relative to their sales than large companies (Figure 4, panel a). In 2003, for example, the median cash-to-sales ratio is 0.08 for the first decile of the sales distribution and

only 0.01 for the last decile. However, from 2007 to 2018, the cash holdings of all but the largest 10 per cent of companies increase substantially. The median cash-to-sales ratio in each of the lower nine deciles increases by a factor of two or more, while for the 10 per cent largest companies, it declines very slightly. It is crucial to keep in mind that the company size distribution is highly skewed – the 90th percentile of the company size distribution in 2018 lies at 33 employees or kr. 55 million (about EUR 7.5 million) in sales and all companies except the top decile are 'small' by standard definitions.

The contribution of these small companies in explaining the upward trend in cash holdings is evident from the evolution of cash-to-sales ratios over time (Figure 3).

Median of cash-to-sales by company size over time Figure 3



Note: Micro – less than 10 employees; Small – between 10 and 49; Medium – between 50 and 249; Large – over 250 employees
Source: Own calculation based on DST microdata.

While the cash-to-sales ratio of medium and large enterprises is relatively stable in the 2003-2018 period, small companies appear to systematically increase their cash buffers following the Global Financial crisis, more than doubling cash reserve between 2008 and 2018.

We also observe that young companies hold less cash than old companies in 2003 and 2007 (Figure 4, panel b). The variation along this dimension is smaller than in the size dimension: companies below age five exhibit median cash-to-sales ratios around 0.015 to 0.02, while the median ratio lies around 0.025 to 0.03 for old companies. Between 2007 and 2018, median cash-to-sales ratios increase especially strongly for companies below age ten, while they increase less for old companies relative to the initial ratio. This is enough to flip the sign of the relationship between age and cash holdings changes over this period, and in 2018, old companies tend to hold less cash than young companies.

Most companies in Denmark are registered as private limited companies (ApS) or corporations (A/S). Since limited companies and corporations differ in their liability and access to loans and equity, they may have different incentives to accumulate cash buffers. The median corporation holds slightly less cash than the median private limited company in 2003 and 2007 (Figure 4, panel c). Between 2007 and 2018, cash holdings increase moderately for corporations and substantially for private limited companies. The median for private limited companies increases from about 0.025 to 0.06. This development goes along with an increased share of private limited companies in the company distribution, from 60 per cent of companies in 2003 to 80 per cent in 2018.

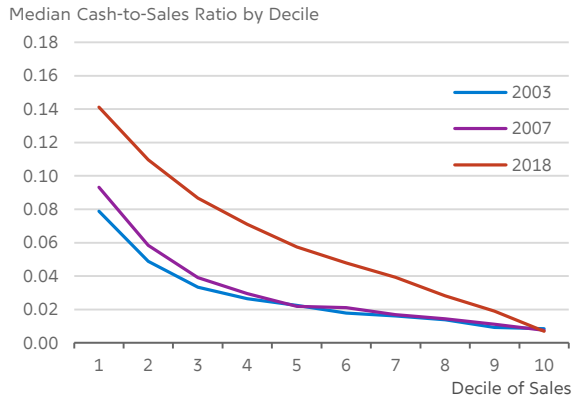
The primary theoretical motivation for companies to hold cash is as a buffer against cash flow shocks when credit is not always available. Such a buffer is most important when a large share of production expenditures are pre-financed (i.e. higher working capital requirements). A precautionary buffer would be built up when profits are high in good times and used up in bad times when profits are low or negative. The target buffer should be more

significant for companies with higher cash flow volatility and higher working capital needs.

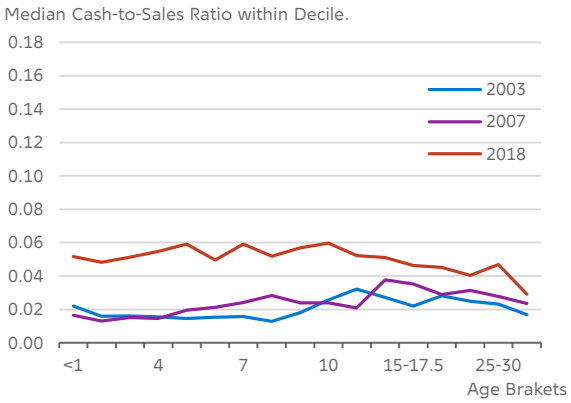
Indeed, we find that companies with high current profit-to-sales ratios hold substantially more cash in their bank accounts (Figure 4, panel d). In 2003 and 2007, the median cash-to-sales ratio increases from 0.01 for the least profitable companies to 0.075 to 0.1 for the most profitable companies. The relationship between profitability and cash holdings seems to be relatively stable, as cash-to-sales ratios roughly double between 2007 and 2018 across all deciles of the profitability distribution. Consistent with a motive of precautionary cash holdings, we also find that companies with a higher cash flow risk (measured as the standard deviation of half-yearly sales minus purchases, divided by mean sales) hold more cash (Figure 4, panel f). Again, this relationship is relatively stable over time, and median cash-to-sales ratios roughly double for each decile.

We find a negative relationship between cash holdings and working capital requirements (measured as current assets minus cash holdings relative to sales), and only for companies with the highest working capital ratios, cash ratios increase. On the one hand, the result is consistent with the trade-off-theory of holding cash and confirms findings in Opler et al. (1999), where net working capital is interpreted as a cash substitute. On the other hand, Horioka/Terada-Hagiwara (2013) found positive relationships between cash and net working capital in emerging Asian markets. These opposite findings align with the pecking-order theory predictions that internal financing is the preferred option to finance investment. Cash should rise as net working capital increases due to managerial discretion and high external financing cost caused by information asymmetries.

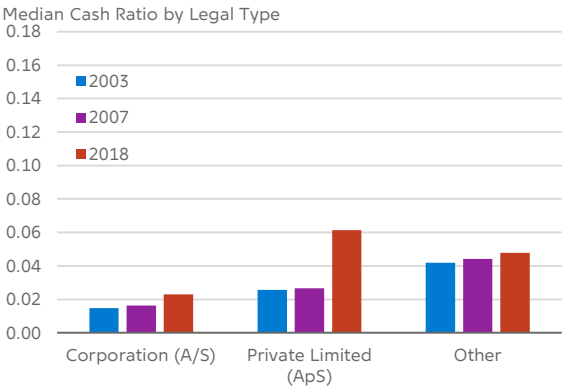
The distribution of cash holdings by selected company characteristics 2003, 2007 and 2018 Figure 4



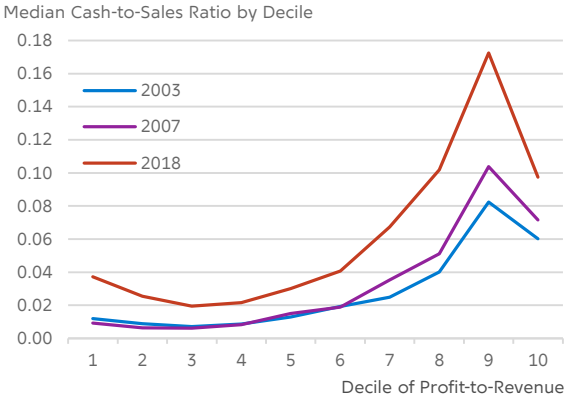
(a) – Sales



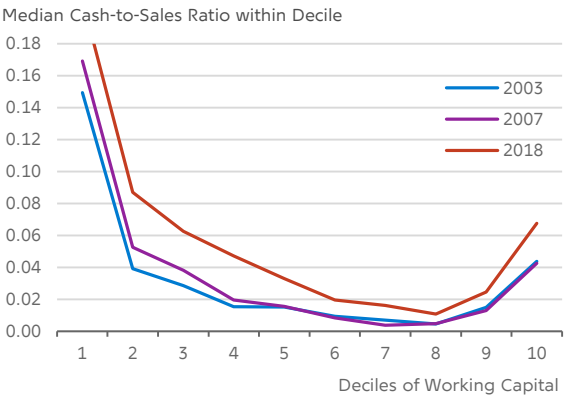
(b) – Company age



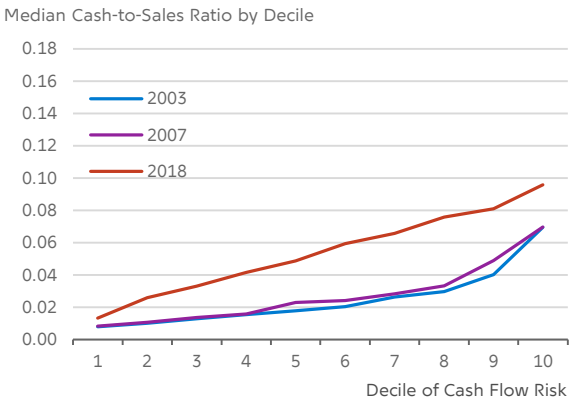
(c) – Legal type



(d) – Profit



(e) – Working capital

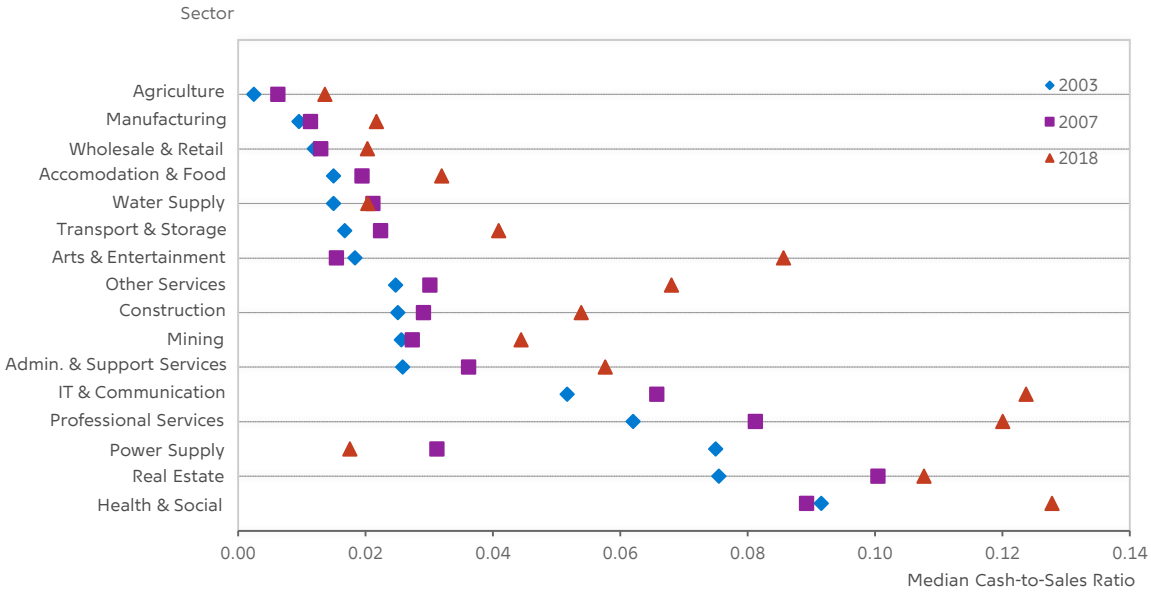


(f) – Cash flow risk

Note: Each graph depicts the median cash-to-sales ratio across decile (or categories) of important company characteristics. Panel (a) shows deciles of revenue on the x axis, panel (b) company age, panel (c) the different legal company type, panel (d) the decile of profit-to-revenue, panel (e) deciles of working capital and panel (f) the decile of cash flow risk, measured as the standard deviation of half-yearly sales minus purchases, divided by mean sales.
Source: Own calculation based on DST microdata.

Cash holdings by sector 2003, 2007 and 2018

Figure 5



Note: The figure shows the level of cash-to-sales ratio across sectors in 2003 (blue), 2007 (purple) and 2018 (red).
Source: Own calculation based on DST microdata.

In Figure 5, we illustrate differences in median cash-to-sales ratios across different sectors to explore cash distribution across industries. Overall, we observe that cash-to-sales ratios are higher in service sectors than in manufacturing, agriculture and mining. Sectors with especially high cash ratios include health and social services, administration and support services and real estate. In all sectors, median cash holdings increase between 2007 and 2018, except for the (very small) power supply sector.

Many of the company characteristics discussed in Figure 4 are correlated, and we present a multivariate analysis in Table 1. The purpose of this multivariate analysis is to confirm that the variables we discuss above matter on their own terms, not just because of correlation with another driving variable. Our analysis is based on unconditional median regressions developed in Firpo et. al. (2009) and relate the unconditional median of a distribution to small changes in the mean of explanatory variables – in contrast to OLS regressions that relate changes in conditional means to explanatory variables. We employ this methodology due to the high skewness of the cash-to-sales distribution, which makes the mean a poor characterisation of the cash holdings of a typical Danish company. Like in the univariate analysis above, the median regressions yield a negative relationship between company size and cash holdings, and this relationship becomes substantially stronger between 2007 and 2018.

In contrast to the univariate analysis in Figure 4, we find that old companies have consistently higher cash holdings than young companies once we condition on size. This relationship also becomes slightly stronger over time. The relationships between cash holdings and profitability (positive), cash flow risks (positive), and working capital (negative) are similar to the univariate analysis and stable over time. Finally,

once we control for other variables, the legal type of a company has no strong relationship with cash holdings: private limited companies have slightly lower cash holdings than corporations in 2003 and 2007 and slightly larger cash holdings in 2018.

Structural change cannot explain the increase in cash holdings

Between 2003 and 2018, the Danish economy went through some significant structural changes. For example, the share of service sector companies increased from 0.83 to 0.88, and the median company size decreased from 7 to 5 employees. Given the heterogeneity in cash holdings between companies in different sectors and of different sizes, one could imagine that such structural change in the composition of companies may play an important role in the development of median cash holdings.

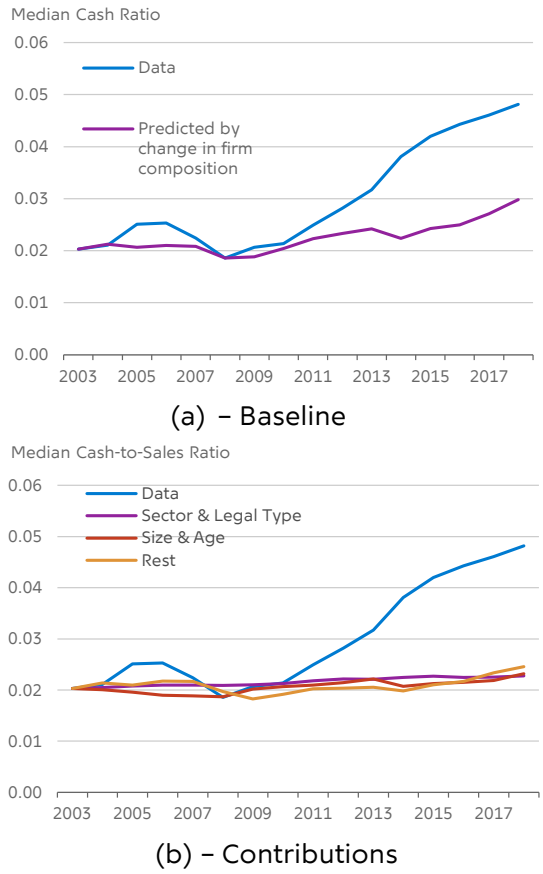
We investigate this possibility using a variant of the Oaxaca-Blinder decomposition adapted to analysing differences in medians, developed in Firpo et al. (2018). This method decomposes developments of the median into a component that can be explained by changes in the composition of companies (keeping fixed the relationships between cash holdings and company characteristics), a component explained by changes in the relationships between cash holdings and company characteristics (keeping fixed the composition of companies), and a remainder. We consider the company characteristics discussed in the previous section as variables reflecting structural changes – i.e. sectoral dummies, legal type dummies, linear and quadratic terms of log revenue, log age, profitability, as well as revenue risk and working capital intensity. We then calculate the change in the median cash-to-sales ratio that can be explained by changes in company composition along these dimensions while keeping the relationships between company characteristics and cash holding fixed to their 2003 level.

Median regression Table 1

	2003	2007	2018
Log Age	0.0042	0.0076	0.0094
	(0.0003)	(0.0003)	(0.0006)
Log Sales	-0.006	-0.0091	-0.023
	(0.0003)	(0.0003)	(0.0004)
Profits to sales	0.0743	0.0742	0.0768
	(0.0026)	(0.0023)	(0.0028)
Cash flow risk	0.0093	0.0085	0.0187
	(0.0009)	(0.0009)	(0.0016)
Working capital	-0.0084	-0.0039	-0.0043
	(0.0004)	(0.0003)	(0.0004)
Private ltd.	-0.0026	-0.0048	0.0054
	(0.0007)	(0.0007)	(0.0012)
Constant	0.0938	0.131	0.353
	(0.0042)	(0.004)	(0.0065)
R2	0.076	0.0888	0.136
N	46,189	56,829	63,018

Note: The table presents results of an unconditional median regression where companies' cash-to-sales ratio are regressed on companies characteristics which are important determinants of the level of cash reserves, such as companies age, sales level, cash flow risk, working capital, and a legal structure dummy in 2003, 2007 and 2018. The regression includes industry fixed effects. Standard errors in parenthesis.
Source: Own calculation based on DST microdata.

Oaxaca-Blinder decomposition Figur 6



Note: Panel (a) reports the changes in cash-to-sales over time explained by a changing composition of companies. Panel (b) splits the total explained part into the grouped contributions of Sector and Legal Type, Size and Age and the rest (Profitability, Cash Flow Risk and Working Capital ratios).
Source: Own calculation based on DST microdata.

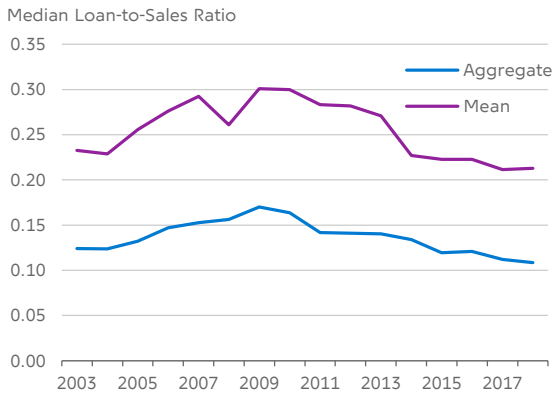
The econometric analysis shows that changes in none of these variables can explain much of the observed changes in the cash-to-sales distribution. Figure 6, panel (a) plots the development of cash holdings letting the distribution of company characteristics vary over time, but keeping the relationship between company characteristics and cash holdings at their 2003 level. Changes in all considered company characteristics taken together explain about one-third of the increase in companies' median cash holdings, while the rest remains unexplained. We then further decompose the explained component into the contributions of three different characteristics groups (Figure 6, panel b). Of the three, changes in profitability, cash flow risk, and working capital combined can explain a more significant (but still minor) increase, while changes in the sector, legal type, size, and age combined can account for only a minor increase. Overall, we conclude that structural change in the composition of companies is not behind the bulk of the increase in observed cash holding.

Cash holdings are closely related to loan financing

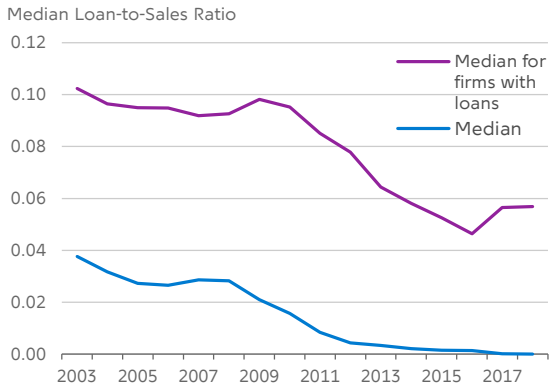
Since both loans and cash can be used for liquidity management, in a world with imperfect capital markets where companies' access to external finance is limited, changes in the cost/availability of credit are likely to be mirrored by changes in the cost (and hence optimal level) of companies cash. We look at the simultaneous development of companies cash holdings and loan balances, focusing on the years following the 2007-08 financial crisis that saw a decline in the availability of loans.

We find that the increasing trend in companies' cash holdings after 2007 is accompanied by a substantial decline in companies outstanding loan balances (Figure 7, panel a and b). The aggregate loan-to-sales ratio decreases from 0.17 to 0.1 after 2009, while the mean ratio decreases from 0.3 to 0.2. Similarly to cash holdings, the decrease is particularly strong at the median: the unconditional median loan to sales ratio decreases from 0.03 in 2007 to close to 0 in 2018—conditioning on a positive loan amount, the median declines by almost half from 0.1 to about 0.05.

Development of loan-to-sales ratio in Denmark Figur 7



(a) – Mean vs aggregate



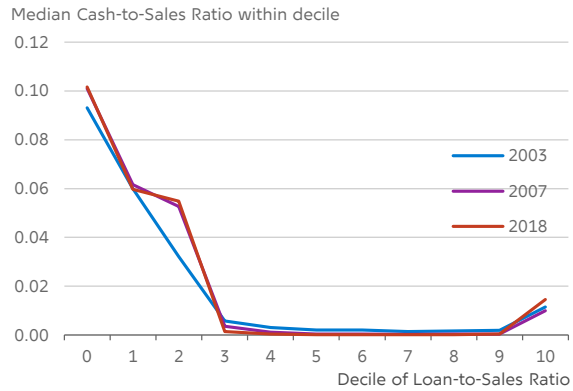
(b) - Median

Note: Extreme values of the loan ratio distribution has been replaced with the 1st and 99th percentile to account for abnormal outliers (winsorizing).
Source: Own calculation based on DST microdata.

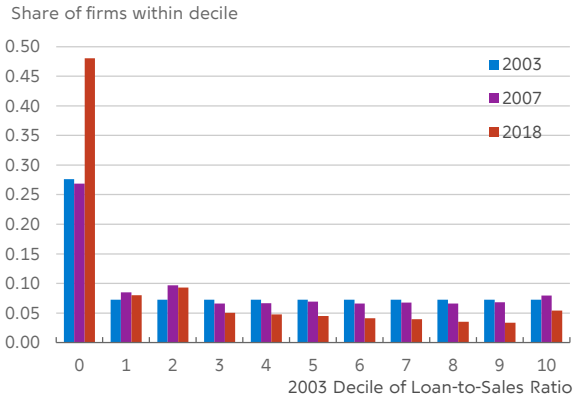
This decrease in loan financing is closely related to the simultaneous increase in cash holdings. To shed light on this relationship, we calculate the median cash-to-sales ratios in eleven different loan-to-sales bins: bin zero contains all companies with no loans, while bins one to ten are defined based on the deciles of the distribution of positive 2003 loan-to-sales ratios (Figure 8, panel a). Median cash-to-sales ratios are high for companies with no loans (decile 0) and decrease to close to zero in the fourth decile.

These medians by loan bins are very stable over the years. However, the number of companies in the different loan bins varies considerably between 2003 and 2018 ratios (Figure 8, panel b). In 2003 and 2007, slightly less than 30 per cent of companies have no loans. The share in the remaining bins is fixed to 10 per cent of companies with loans in 2003, and does not change much until 2007. In the years following the Global Financial Crisis, the share of companies in high loan bins falls, while the share of companies in low loan bins increases. The share of companies with no loans reaches almost 50 per cent.

Cash holdings and loan financing Figure 8



(a) - Cash by loan decile



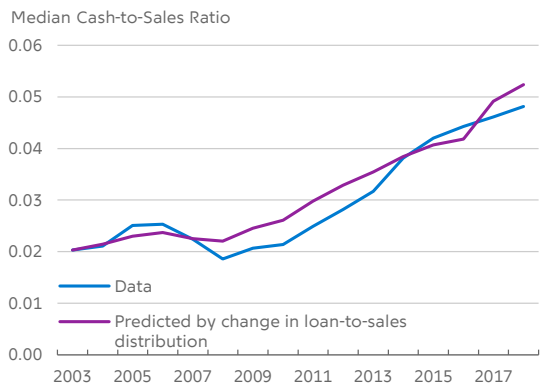
(b) - Share of companies in bins

Note: Panel (a) shows the median cash-to-sales ratio across different deciles of the loan-to-sales distribution; Panel (b) the share of companies within each loan-to-sales deciles in 2003, 2007 and 2018.
Source: Own calculation based on DST microdata.

To summarise, the relationship between the loan-to-sales and the cash-to-sales ratio is

negative and stable over the whole sample period. However, there is a clear shift toward less loan financing after 2007, and companies with fewer loans typically hold more cash. In order to understand to which degree the decrease in loan financing can explain the observed increase in cash holdings, we re-run the Oaxaca-Blinder decomposition of the median cash-to-sales ratio using the eleven loan-to-sales bins as the only company characteristic. We find that changes in the loan-to-sales distribution can fully explain the increase in the median cash-to-sales ratio (Figure 9).

Oaxaca-Blinder decomposition using only loan-to-revenue bins Figure 9



Note: The figure plots the cash-to-sales value predicted by changes in the loan-to-sales distribution
Source: Own calculation based on DST microdata.

Our results are consistent with an important role of banks' loan supply for the observed increase in cash holdings. When smoothing fluctuations in cash flows using bank loans becomes more difficult, building up higher precautionary cash buffers would be a natural response. However, we cannot rule out alternative mechanisms due to a lack of a clearly identified loan supply shock. An alternative explanation for the decline in loan financing is a decrease in loan demand due to a scarcity of promising investment projects, as proposed for example by Robert Gordon (see Gordon, 2016). However, there is no clear link between such a scarcity and companies' decision to build up cash buffers rather than pay dividends to their owners.

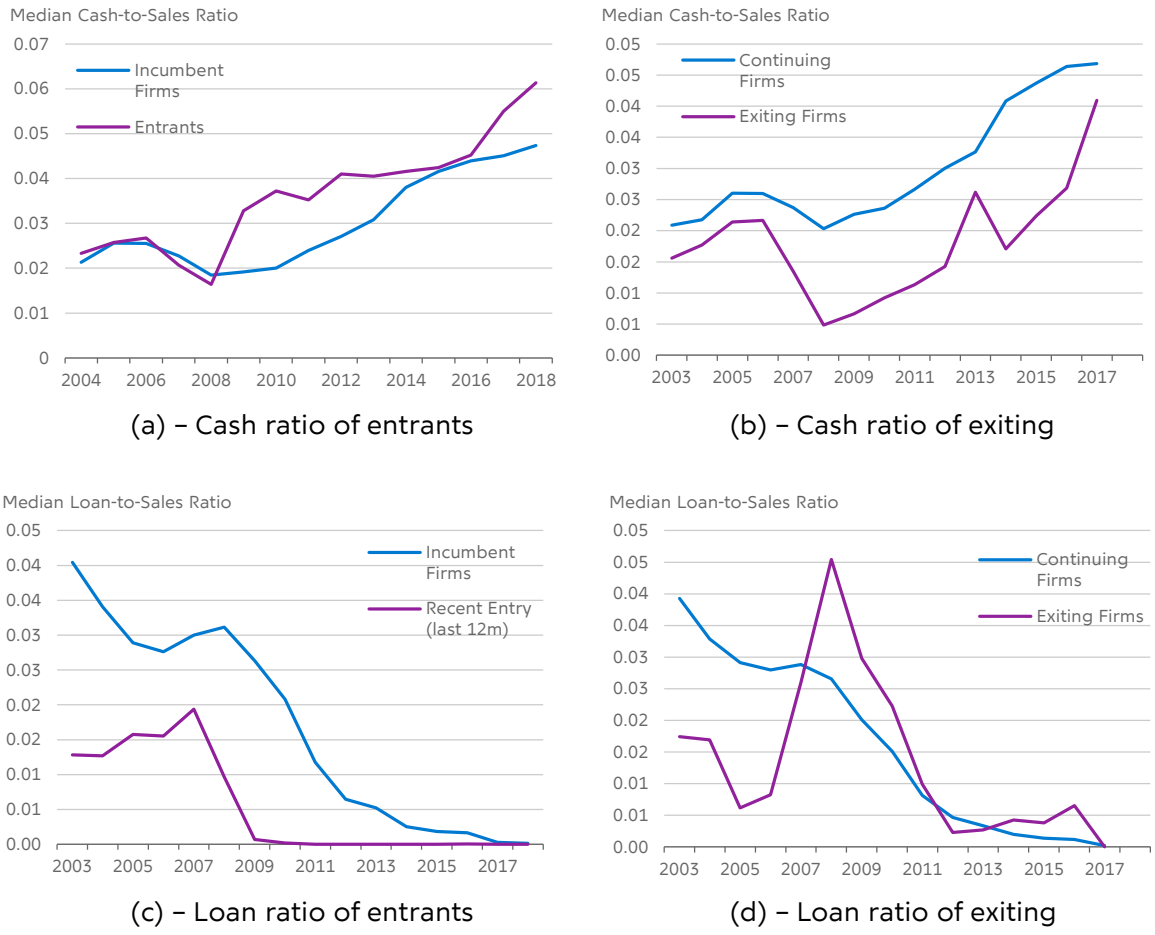
Selective entry and exit of companies mediate the trend

One potential factor driving the evolution of cash holdings could be the change in the level of cash companies hold when entering and exiting the economy. We refer to this as selective entry and exit and document in the following section that it is a crucial channel through which cash holdings have increased. Figure 10 shows the cash-to-sales and loan-to-sales ratio of entering and exiting companies over time. Before 2007, companies that exit the market (companies active in the current but not the following year) exhibit slightly lower median cash-to-sales ratios than continuing companies. However, from 2007, exiting companies have substantially lower median cash-to-sales ratios than continuing companies. This is consistent with liquidity playing a more important role for companies exit. Cash-to-sales ratios of both exiting and continuing companies rise, but a large gap between the two remains until 2018. That means selective company exit drives up the median cash-to-sales ratio of remaining companies in each year 2008-2018 (Figure 10, panel a).

We can observe the opposite pattern for entrants (Figure 10, panel b). Before 2009, entrants (companies active in the current year but not the year before) exhibit the same median cash-to-sales ratio as incumbent companies. From 2009 until 2014, and again in 2017 and 2018, the median entering company has cash-to-sales ratios exceeding the median within existing companies. As a result, in those years, entry drives up the median cash-to-sales ratio.

We observe the opposite pattern for loan-to-sales ratios. Before 2007, exiting companies have substantially lower median loan-to-sales ratios than continuing companies. Subsequently, the

Median cash-to-sales and loan-to-sales ratios of incumbents, entrants and exiting companies Figur 10



Note : Panel (a) and (c) show the cash- and loan-to-sales ratio of incumber and newly entering companies in each year. Panel (b) and (d) show the cash-to-sales and loan-to-sales ratio of continuing vs exiting company in each year.
Source: Own calculation based on DST microdata.

median ratio of exiting companies spikes and lies above the ratio of continuing companies between 2007 and 2011. During these years, companies with high loan-to-sales ratios are much more likely to exit than other companies. The median loan-to-sales ratio of entrants lies below the median ratio of incumbents every year from 2003 to 2018, but the gap between entrants and incumbents also becomes particularly large during the crisis years.

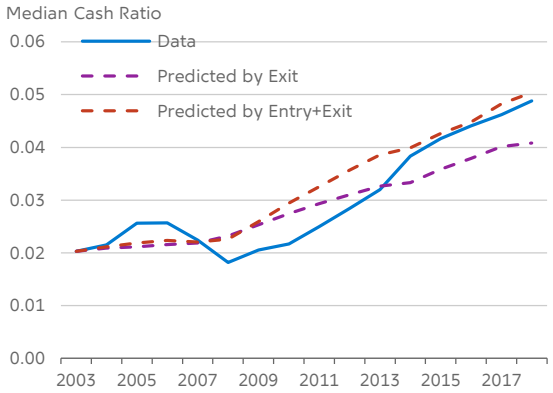
These entry and exit patterns can account for the overall increase in the median cash-to-sales ratios. To show this, we calculate the year-to-year change in the median that can be explained only from changes in company composition. We calculate the difference between the actual median in year t and a counterfactual median for year t+1 that is based on the year t cash-to-sales ratio of all companies that are active in both years – i.e. excluding companies that exit – and the year t+1 cash-to-sales ratios of companies that enter in year t+1. If companies exit from and enter into a random position in the cash-to-sales distribution, the expected difference between the two medians is zero.

Indeed, this is (roughly) the case for the 2003-2007 period, when entrants and exiting companies are similar to incumbents and continuing companies in terms of their cash holdings (Figure 11, panel a). After 2007, exit and entry begin to drive up the median cash to revenue ratio. Accumulating the predicted year-to-year changes, we arrive at a median development that almost exactly mirrors what we observe in the data. Selective exit patterns alone account for about two-thirds of the median cash to revenue ratio increase, while entry patterns explain the remaining third. This mechanism does not require or imply constant cash holdings for incumbent and continuing companies (which would be inconsistent with the data). For example, if a negative credit supply shock leads to increased cash holdings across the company distribution, then selective entry and exit would mean that companies that cannot increase their cash holdings would exit, and entrepreneurs who cannot raise enough cash are not able to start a company.

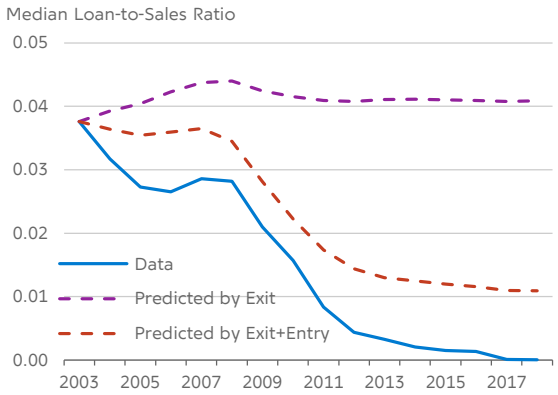
Selective entry and exit can explain a large part of the decline in the loan-to-sales ratio. Exit dynamics do not seem to play a prominent role in the developments of median loan-to-sales ratios, while entry dynamics can explain a large part of the drop (Figure 11, panel b).

The observed entry and exit patterns are also consistent with a decline in loan supply as an explanation for increased cash holdings. Companies with high initial debt and low cash holdings could face liquidity issues and exit. Entering companies would have to rely on a faster issuance of equity or a more efficient generation of internal cash rather than loan financing. In contrast, there is no clear link between a scarcity of investment opportunities and selective exit of companies with low cash holdings or a shift toward more cash holdings for those companies that do enter.

Entry and exit contribution Figur 11



(a) – Cash ratio



(b) – Loan ratio

Note: Year-to-year change in the median that can be explained only from changes in company composition
Source: Own calculation based on DST microdata.

Conclusion

This analysis documents the evolution of cash holdings for the population of active companies in Denmark from 2003 to 2018. The distribution of cash-to-sales ratio is highly skewed, and a large share of Danish companies has very little cash reserves. Among these are large companies, less profitable companies, companies with less risky cash flows and companies in the manufacturing sector. On the other hand, cash holdings are highest in health

and social services, administration and support services and real estate.

Second, the cash-to-sales ratio of the median company in Denmark has increased dramatically since the onset of the Global Financial Crisis, more than doubling from 2007 to 2018. This happened despite the low or even negative interest rate on cash deposits.

We investigate several possible reasons behind this development of cash holdings. We find that changes in Danish companies' composition cannot explain the increase in the cash-to-sales ratio.

However, there is a clear negative correlation between the increase in cash holdings and the simultaneous decrease in the usage of loan financing. This pattern hints at an important role for loan supply, suggesting a worsening of companies access to credit or highlighting the existence of an unobserved third factor that drives both the increase in cash holdings and the decline in debt.

The development of cash-to sales and loan-to-sales ratios is largely driven by entry of new companies with high cash holdings and exit of companies with low cash holdings. After 2007, the cash holdings of exiting companies begin to decrease, while that of entering companies increase substantially. Both patterns drive up the median cash-to-sales ratio of the remaining companies in the 2008-2018 period and can explain most of the overall increase in the median cash-to-sales ratio we observe.

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