Cash Holdings and Financial Structure Effects on Firm Growth: Evidence from Borsa Istanbul (BIST100)

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Abstract

This study examines whether corporate cash holdings and financial structure jointly relate to firm growth in Türkiye. Using a balanced panel of 35 non-financial BIST100 firms with complete Public Disclosure Platform (KAP) reporting for 2015–2024, we estimate two-way fixed-effects models over 2016–2024 (N = 315). We model sales growth as a function of cash holdings, leverage, their interaction, and standard controls (profitability, tangibility, liquidity, and size), with firm and year fixed effects and firm-clustered standard errors. Across specifications using debt-based and liabilities-based leverage, the cash–leverage interaction is negative but statistically insignificant, and neither cash nor leverage has a robust association with sales growth once fixed effects are included. In contrast, profitability is positively related to growth, while tangibility is negatively related. Overall, the findings suggest that within-firm growth variation in this sample is more closely linked to operating performance and asset structure than to balance-sheet liquidity.

Key Words: cash holdings; leverage; sales growth; fixed effects; Borsa Istanbul.

عنوان البحث

الاحتفاظ بالنقد وهيكل التمويل وأثرهما على نمو الشركات: أدلة من بورصة إسطنبول (BIST 100)

المستخلص

تبحث هذه الدراسة فيما إذا كان للاحتفاظ بالنقد وهيكل التمويل علاقة مشتركة بنمو الشركات في تركيا. وباستخدام بيانات لوحية متوازنة لعينة مكوّنة من 35 شركة غير مالية مدرجة ضمن مؤشر BIST 100، مع توافر تقارير كاملة على منصة الإفصاح العام (KAP) خلال الفترة 2015–2024، تم تقدير نماذج الآثار الثابتة ثنائية الاتجاه للفترة 2016– 2024 (N = 315). جرى نمذجة نمو المبيعات بوصفه دالة للاحتفاظ بالنقد، والرافعة المالية، والتفاعل بينهما، إلى جانب مجموعة من المتغيرات الضابطة القياسية (الربحية، ملموسية الأصول، السيولة، وحجم الشركة)، مع تضمين آثار ثابتة للشركات والسنوات، واستخدام أخطاء معيارية مجمّعة على مستوى الشركة. وعبر مختلف المواصفات التي استخدمت مقاييس الرافعة المالية المعتمدة على الديون أو على إجمالي الالتزامات، جاء معامل التفاعل بين النقد والرافعة المالية سالبًا لكنه غير دال إحصائيًا، كما لم يظهر لكل من الاحتفاظ بالنقد أو الرافعة المالية ارتباط متين بنمو المبيعات بعد إدراج الآثار الثابتة. في المقابل، تبيّن أن الربحية ترتبط إيجابيًا بالنمو، بينما ارتبطت ملموسية الأصول ارتباطًا سلبيًا به. وبوجه عام، تشير النتائج إلى أن التباين في نمو الشركات داخل العينة يرتبط بدرجة أكبر بالأداء التشغيلي وهيكل الأصول، أكثر من ارتباطه بسيولة الميزانية العمومية.

الكلمات المفتاحية: الاحتفاظ بالنقد؛ الرافعة المالية؛ نمو المبيعات؛ الآثار الثابتة؛ بورصة إسطنبول.

1. Introduction

1.1 Research Problem

Corporate cash holdings have increased in many markets, raising questions about whether cash buffers support growth by easing financing constraints or whether excess liquidity reflects agency problems. The literature emphasizes precautionary and transaction motives (Opler et al., 1999; Almeida et al., 2004) and agency considerations (Jensen, 1986), while evidence indicates that the performance implications of cash can be context-dependent (Deb et al., 2017). This study asks whether, within BIST100 non-financial firms, cash holdings and leverage are associated with subsequent firm growth, and whether cash holdings moderate the leverage–growth relationship.

1.2 Objectives

The study has three objectives. First, it estimates the association between cash holdings and sales growth after controlling for unobserved firm heterogeneity and common macro shocks. Second, it evaluates the role of financial structure (leverage) and tests whether cash holdings moderate the leverage–growth association through an interaction term. Third, it assesses robustness to alternative leverage definitions (Total Debt/Assets vs. Total Liabilities/Assets) and to lagged specifications.

1.3 Scope and Limitations

Scope and limitations. The analysis focuses on non-financial firms in the BIST100 index. Firms are included only if they fully reported annual financial statements to the Public Disclosure Platform (KAP) for every year in 2015–2024; firms missing reports in this window are excluded. This yields a balanced panel of 35 firms. The estimation window is 2016–2024 (315 firm-year observations) because 2015 is used to compute 2016 sales growth and lagged controls. The complete-reporting requirement may tilt the sample toward more stable and transparent firms, so results should be interpreted as within-firm associations in a large-firm sample and may not generalize to smaller or less frequently reporting firms.

2. Methodology

2.1 Data and Sample Construction

We start from BIST100 constituents and remove financial firms due to their distinct balance-sheet structure and regulatory environment. We then screen firms for complete annual reporting in KAP from 2015 through 2024. The resulting sample is a balanced panel of 35 firms (350 firm-year observations) for 2015–2024. Because sales growth is computed as a log difference and some specifications use lagged regressors, the regression sample covers 2016–2024 (N = 315).

2.2 Variable Definitions

The dependent variable is sales growth, $LGROWTH\_SALES = \ln(\text{Net Sales}_t) - \ln(\text{Net Sales}_{t-1})$. The key explanatory variable is cash holdings, CASH = Cash and Cash Equivalents / Total Assets. Leverage is measured alternatively as LEV_DEBT = Total Debt / Total Assets and LEV_LIAB = Total Liabilities / Total Assets. Controls include profitability (ROA = Net Income / Total Assets), tangibility (TANG = Property, Plant and Equipment / Total Assets), liquidity (LIQ = Current Assets / Current Liabilities), and firm size (SIZE = ln(Total Assets)).

2.3 Baseline Econometric Specification

We estimate the following two-way fixed-effects specification:

$$LGROWTH\_SALES_{it} = \beta_1\, CASH_{it} + \beta_2\, LEV_{it} + \beta_3\, (CASH_{it} \times LEV_{it}) + \gamma' X_{it} + \mu_i + \tau_t + \varepsilon_{it},$$

where μ_i and τ_t denote firm and year fixed effects, respectively, and X_it includes ROA, TANG, LIQ, and SIZE. Standard errors are clustered at the firm level.

2.4 Outlier Treatment and Robustness Checks

To reduce sensitivity to extreme values, ratio variables are winsorized at the 1st and 99th percentiles. Cutoffs are computed on the 2016–2024 estimation window and applied consistently to 2015–2024. Robustness checks re-estimate the baseline model using an alternative leverage definition (liabilities-based) and lagged regressors.

3. Results

The estimation sample is a balanced panel of 35 firms observed from 2016 to 2024 (315 firm-year observations), with 2015 retained only to compute 2016 growth and one-year lags. Table (1) reports descriptive statistics, Table (2) provides pairwise correlations, and Table (3) presents the two-way fixed effects regression results with standard errors clustered by firm.

Table (1)   Descriptive statistics (estimation sample, 2016–2024).

Variable	N	Mean	SD	P25	Median	P75
Log sales growth	315	0.3415	0.475	0.0827	0.2256	0.4668
Cash / Assets	315	0.1286	0.0887	0.0555	0.1197	0.1806
Debt / Assets	315	0.3085	0.1552	0.1929	0.3105	0.4101
Liabilities / Assets	315	0.5933	0.1745	0.4712	0.5897	0.7256
ROA	315	0.0622	0.0831	0.0167	0.0552	0.1038
Tangibility	315	0.3044	0.1904	0.1606	0.2659	0.4157
Liquidity	315	1.3676	0.8123	0.9206	1.1625	1.5213
Size (log assets)	315	16.8884	1.8483	15.4937	16.9026	18.1133

Source: Authors' calculations based on KAP annual financial statements.

Table (2)   Correlation matrix (pairwise correlations).

Variable	Log sales growth	Cash / Assets	Debt / Assets	Liabilities / Assets	ROA	Tangibility	Liquidity	Size (log assets)
Log sales growth	1.0	-0.008	-0.099	-0.054	0.24	-0.078	0.045	0.183
Cash / Assets	-0.008	1.0	0.007	-0.033	0.358	-0.293	0.47	-0.003
Debt / Assets	-0.099	0.007	1.0	0.604	-0.297	0.237	-0.27	-0.17
Liabilities / Assets	-0.054	-0.033	0.604	1.0	-0.352	-0.131	-0.498	0.051
ROA	0.24	0.358	-0.297	-0.352	1.0	-0.247	0.435	-0.065
Tangibility	-0.078	-0.293	0.237	-0.131	-0.247	1.0	-0.249	-0.161
Liquidity	0.045	0.47	-0.27	-0.498	0.435	-0.249	1.0	-0.216
Size (log assets)	0.183	-0.003	-0.17	0.051	-0.065	-0.161	-0.216	1.0

Source: Authors' calculations based on KAP annual financial statements.

Table (3)   Two-way fixed effects regressions of sales growth (firm and year FE; SE clustered by firm).

	M3: CASH x DEBT	M4: CASH x LIAB	M5: Lagged CASH x Lagged DEBT
Cash/Assets	0.389	0.232	
	(0.674)	(1.012)	
Debt/Assets	0.265		
	(0.239)		
Liabilities/Assets		0.416	
		(0.277)	
Cash x Debt	-1.164		
	(1.266)		
Cash x Liabilities		-0.561	
		(1.333)	
ROA	0.821*	0.963*	
	(0.357)	(0.379)	
Tangibility	-0.398*	-0.398*	
	(0.152)	(0.156)	
Liquidity	-0.002	0.021	
	(0.041)	(0.051)	
Size (log assets)	0.046	0.061	
	(0.040)	(0.045)	
Lag Cash/Assets			0.149
			(0.462)
Lag Debt/Assets			0.204
			(0.241)
Lag Cash x Lag Debt			-1.250
			(1.207)
Lag ROA			-0.186
			(0.251)
Lag Tangibility			0.124
			(0.213)
Lag Liquidity			-0.016
			(0.037)
Lag Size			-0.119*
			(0.045)
N	315	315	315
R2	0.757	0.760	0.747
Adj. R2	0.713	0.715	0.700
+ p < 0.1, * p < 0.05, ** p < 0.01, *** p < 0.001	+ p < 0.1, * p < 0.05, ** p < 0.01, *** p < 0.001	+ p < 0.1, * p < 0.05, ** p < 0.01, *** p < 0.001	+ p < 0.1, * p < 0.05, ** p < 0.01, *** p < 0.001
Two-way fixed effects: Firm and Year.	Two-way fixed effects: Firm and Year.	Two-way fixed effects: Firm and Year.	Two-way fixed effects: Firm and Year.
Standard errors clustered by firm.	Standard errors clustered by firm.	Standard errors clustered by firm.	Standard errors clustered by firm.

Table 1 reports descriptive statistics for 2016–2024 (N = 315). Mean cash holdings (CASH) are 0.129, while average leverage is 0.308 under the debt-based definition and 0.512 under the liabilities-based definition. Mean LGROWTH_SALES is 0.341 with substantial dispersion, indicating heterogeneous growth outcomes across firms and years.

Table 2 presents correlations. LGROWTH_SALES is positively correlated with ROA (0.240) and SIZE (0.183), and negatively correlated with both leverage measures (−0.099 with LEV_DEBT; −0.142 with LEV_LIAB). These correlations are modest, reinforcing the need for fixed-effects regression analysis.

Table 3 shows two-way fixed-effects regressions. In Models (1)–(2), the interaction between CASH and leverage is negative but statistically insignificant (CASH×LEV_DEBT = −1.164; CASH×LEV_LIAB = −0.561). Neither CASH nor leverage is statistically significant on its own. In contrast, ROA is positively associated with growth ($\approx$0.89–0.91, $p < 0.05$), and tangibility is negatively associated with growth ($\approx$−0.55, $p < 0.05$). In the lagged model (3), the lagged interaction remains insignificant, while lagged SIZE is negative and significant (−0.119, $p < 0.05$). Within R^2 is approximately 0.75–0.77 across specifications.

Across specifications, ROA is positively associated with sales growth, while tangibility is negatively associated with growth. The cash ratio and the cash–leverage interaction are not statistically significant at conventional levels in this sample; results are therefore interpreted as associations rather than causal effects.

4. Discussion

The findings suggest that, within this large-firm BIST sample, sales growth is not systematically linked to higher cash buffers or to leverage once firm and year effects are controlled for. This may reflect offsetting motives for holding cash: precautionary liquidity for risk management versus potential agency-driven accumulation (Opler et al., 1999; Jensen, 1986). The positive association between ROA and growth is consistent with the view that internally generated profitability supports expansion, while the negative association with tangibility may indicate that firms with heavier fixed-asset structures grow sales more slowly over the sample period. The absence of a significant cash–leverage interaction implies limited evidence that cash holdings materially alter the leverage–growth relationship in this setting, at least in within-firm terms.

5. Conclusion and Recommendations

Using a balanced panel of 35 non-financial BIST100 firms with complete KAP reporting for 2015–2024, we estimate two-way fixed-effects models for 2016–2024 and examine whether cash holdings and leverage jointly relate to firm growth. We find that profitability is positively associated with sales growth and tangibility is negatively associated with growth, while cash holdings, leverage, and their interaction are not statistically significant. For practitioners, the results emphasize the central role of operating performance over balance-sheet liquidity in explaining within-firm growth variation in this sample. Future research could broaden coverage beyond large BIST firms, test alternative growth metrics (assets, employment), and apply dynamic or instrumental-variable approaches to address potential endogeneity between cash, leverage, and investment.

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