# Precautionary Savings with Risky Assets: When Cash Is Not Cash

Ran Duchin, Thomas Gilbert, Jarrad Harford, and Chris Hrdlicka
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Alex von Hafften

UW-Madison

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# Motivation

- Traditional assumption in corporate finance models:

  *Financial portfolios of industrial firms are only cash (or near-cash).*

- But recent media coverage indicates that firms invest in a broader set of financial assets.

# What do Duchin et al do?

- Measure the financial portfolios of large U.S. industrial firms.
- Show how risky financial asset holdings change with firm characteristics.

# Key Findings

- U.S. industrial firms invest heavily in risky financial assets
  - 40% of aggregate financial asset portfolio
  - 6% of aggregate book value
- Investments in risky financial assets are higher for less financially constrained firms.

# Outline

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# Standard Approach to Measure Financial Portfolios

From consolidated balance sheet,

- "Cash and cash equivalents" (*CH* in Compustat)
  - Financial assets with maturity of up to 90 days at issuance.
- "Short-term investments" (*IVST*)
  - Financial assets that the firm intends to liquidate within a year.
- The standard measure of financial assets is $CHE = CH + IVST$
- **Problem: Underestimate because *CHE* omits financial assets in "long-term investments" and "other assets".**

⏩ Apple 2007 10-K

# Duchin et al (2017) Approach

- In 2009, the SEC began requiring firms to disclose more information about their financial assets. ⏩ Apple 2011 10-K
- Duchin et al. (2017) hand collect data from the footnotes to the balance sheet of all industrial firms in the S&P 500.
- They divide financial assets by riskiness and liquidity. ⏩ More

# Aggregates by Riskiness

| | Amount ($B) | % of Book Assets | % of *CHE* | % of Fin. Assets |
|---|---|---|---|---|
| Safe | 983 | 9 | 77 | 62 |
| Risky | 611 | 6 | 48 | 38 |
| Total | 1,594 | 15 | 125 | 100 |

- Firms invest heavily in risky financial assets:
  - 40% of aggregate financial asset portfolio
  - 6% of aggregate book value
- *CHE* underestimates financial assets by 25%.

# Aggregates by Liquidity

| | % Liquid | % Illiquid |
|---|---|---|
| Safe | 86 | 14 |
| Risky | 21 | 79 |
| Total | 63 | 37 |

- A substantial fraction of financial assets are illiquid contradicting traditional assumption in corporate finance models.
- Negative, but imperfect, correlation of riskiness and liquidity.

# Outline

# Main Question

- How does a firm's degree of financial constraint change the composition of its financial portfolio?
- Use the overall size of the financial portfolio as a proxy for the degree of financial constraint.
- Theoretical prediction:

  *Firms that are less financially constrained invest relatively more in risky and illiquid financial assets.*

# OLS Results

$$\textit{Risky financial assets}_{i,t} = \alpha_0 + \alpha_1 \textit{Financial assets}_{i,t} + \beta' X_{i,t} + \sum_s \textit{year}_s + \sum_j \textit{industry}_j + \varepsilon_{i,t}$$

| Model | OLS |
|---|---|
| Dependent Variable | Risky Financial Assets/Financial Assets |
| Column | (1) |
| Financial assets | 0.681*** [0.10 |
| Market to book | 0.00 [0.01 |
| Size | 0.044*** [0.009] |
| Cash flow | 0.303* [0.165] |
| Net working capital | 0.103 [0.088] |
| Capital expenditure | 0.560** [0.226] |
| Leverage | 0.039 [0.065] |
| Cash flow volatility | −0.377* [0.211] |
| Dividend dummy | −0.017 [0.020] |
| R&D expenditures | 0.730*** [0.160] |
| Acquisition expenditures | 0.089 [0.113] |
| Year fixed effects? | Yes |
| Industry fixed effects? | Yes |
| Adjusted $R^2$ | 0.330 |
| $N$_obs | 1,727 |

# Endogeneity

- **Problem:** Firms likely jointly determine the size and composition of their financial portfolio.

  $\Longrightarrow$ A violation of the conditional mean independence assumption.

- **Solution:** Use two-stage least squares to exploit the variation in the portfolio size due to unexpected cash flow shocks.

# Unexpected Cash Flows Shocks as Instrument

- Unexpected cash flow shocks ($e_{i,t}$) are estimated with the pooled cross-sectional time-series model below:

$$\Delta CF_{i,t} = \alpha + \beta_1 \Delta CF_{i,t-1} + \beta_2 \Delta CF_{i,t-2} + \beta_3 \Delta CF_{i,t-3} + e_{i,t}$$

  where $\Delta CF_{i,t} \equiv CF_{i,t} - CF_{i,t-1}$ and $CF_{i,t}$ is the cash flow for firm $i$ in year $t$.

- *Inclusion restriction:* Unexpected cash flow shocks affect the size of the firm's financial portfolio.

- *Exclusion restriction:* Unexpected cash flow shocks do not affect the composition of the firm's financial portfolio.

# 2SLS Results

$$\textit{Financial assets}_{i,t} = \alpha_0 + \alpha_1 \textit{Unexpected cash flow}_{i,t} + \beta' X_{i,t} + \sum_s \textit{year}_s + \sum_j \textit{industry}_j + \varepsilon^T_{i,t}$$

$$\textit{Risky financial assets}_{i,t} = \alpha_0 + \alpha_1 \textit{Financial assets}^*_{i,t} + \beta' X_{i,t} + \sum_s \textit{year}_s + \sum_j \textit{industry}_j + \varepsilon^R_{i,t}$$

| | | 2SLS | |
|---|---|---|---|
| Model | OLS | First Stage | Second Stage |
| Dependent Variable | Risky Financial Assets/Financial Assets | Financial Assets/Book Assets | Risky Financial Assets/Financial Assets |
| Column | (1) | (2) | (3) |
| Financial assets | 0.681*** | | |
| | [0.102] | | |
| Unexpected cash flow | | 0.178*** | |
| | | [0.065] | |
| Financial assets* | | | 0.296*** |
| | | | [0.062] |
| Market to book | 0.001 | 0.035*** | 0.022 |
| | [0.010] | [0.008] | [0.021] |
| Size | 0.044*** | −0.016*** | 0.035*** |
| | [0.009] | [0.006] | [0.013] |
| Cash flow | 0.303* | 0.159 | 0.416** |
| | [0.165] | [0.126] | [0.193] |
| Net working capital | 0.103 | −0.286*** | −0.045 |
| | [0.088] | [0.058] | [0.162] |
| Capital expenditure | 0.560** | −0.590*** | 0.230 |
| | [0.226] | [0.116] | [0.338] |
| Leverage | 0.039 | −0.162*** | −0.036 |
| | [0.065] | [0.036] | [0.106] |
| Cash flow volatility | −0.377* | 0.433** | −0.120** |
| | [0.211] | [0.213] | [0.055] |
| Dividend dummy | −0.017 | −0.024* | −0.031 |
| | [0.020] | [0.013] | [0.025] |
| R&D expenditures | 0.730*** | 0.821*** | 1.184** |
| | [0.160] | [0.151] | [0.460] |
| Acquisition expenditures | 0.089 | −0.374*** | −0.119 |
| | [0.113] | [0.068] | [0.218] |
| Year fixed effects? | Yes | Yes | Yes |
| Industry fixed effects? | Yes | Yes | Yes |
| Adjusted $R^2$ | 0.330 | 0.525 | 0.268 |
| $N$_obs | 1,727 | 1,727 | 1,727 |

# Main findings

- Coefficient is smaller in 2SLS than in OLS $\implies$ firms do jointly determine stuff.
- Still statistically and economically significant.
- One percentage point increase in financial asset portfolio leads to a 30 basis point increase in risky financial asset holdings.

# Other Findings

- Firms invest more in risky financial assets if they have
  - Worse corporate governance
  - An overconfident CEO
- Industrial firms cannot generate a positive alpha through their risky financial asset holdings.
- Develop a theory of industrial firms investing in risky and illiquid financial assets.
  - Predictions that are consistent with their empirical analysis.

# Outline

# Weaknesses

- Instrument validity

# New Questions

- Broad literature on corporate cash holdings with the traditional assumption. How does including risky financial assets change those model?
- The authors say that the industrial firm's risky financial asset holdings constitute a $1.5 trillion unregulated asset management industry. Should it be regulated and how?

# Outline

# Apple 10-K (2007) Consolidated Balance Sheet

| | September 29, 2007 |
|---|---|
| **ASSETS:** | |
| Current assets: | |
| Cash and cash equivalents | $ 9,352 |
| Short-term investments | 6,034 |
| Accounts receivable, less allowances of $47 and $52, respectively | 1,637 |
| Inventories | 346 |
| Deferred tax assets | 782 |
| Other current assets | 3,805 |
| Total current assets | 21,956 |
| Property, plant, and equipment, net | 1,832 |
| Goodwill | 38 |
| Acquired intangible assets, net | 299 |
| Other assets | 1,222 |
| Total assets | $ 25,347 |

# Apple 10-K (2007) Note 2 Financial Instruments

Cash, Cash Equivalents and Short-Term Investments.

| | September 29, 2007 |
|---|---|
| Cash | $ 256 |
| U.S. Treasury and Agency securities | 670 |
| U.S. Corporate securities | 5,597 |
| Foreign securities | 2,829 |
| Total cash equivalents | 9,096 |
| U.S. Treasury and Agency securities | 358 |
| U.S. Corporate securities | 4,718 |
| Foreign securities | 958 |
| Total short-term investments | 6,034 |
| Total cash, cash equivalents, and short-term investments | $ 15,386 |

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# Apple 10-K (2011) Consolidated Balance Sheet

| | September 24, 2011 |
|---|---|
| **ASSETS:** | |
| Current assets: | |
| Cash and cash equivalents | $ 9,815 |
| Short-term marketable securities | 16,137 |
| Accounts receivable, less allowances of $53 and $55, respectively | 5,369 |
| Inventories | 776 |
| Deferred tax assets | 2,014 |
| Vendor non-trade receivables | 6,348 |
| Other current assets | 4,529 |
| Total current assets | 44,988 |
| Long-term marketable securities | 55,618 |
| Property, plant and equipment, net | 7,777 |
| Goodwill | 896 |
| Acquired intangible assets, net | 3,536 |
| Other assets | 3,556 |
| Total assets | $ 116,371 |

# Apple 10-K (2011) Note 2 Financial Instruments

Cash, Cash Equivalents and Marketable Securities.

| | Adjusted Cost | Unrealized Gains | Unrealized Losses | Fair Value | Cash and Cash Equivalents | Short-Term Marketable Securities | Long-Term Marketable Securities |
|---|---|---|---|---|---|---|---|
| Cash | $ 2,903 | $ 0 | $ 0 | $ 2,903 | $ 2,903 | $ 0 | $ 0 |
| Level 1: | | | | | | | |
| Money market funds | 1,911 | 0 | 0 | 1,911 | 1,911 | 0 | 0 |
| Mutual funds | 1,227 | 0 | (34) | 1,193 | 0 | 1,193 | 0 |
| Subtotal | 3,138 | 0 | (34) | 3,104 | 1,911 | 1,193 | 0 |
| Level 2: | | | | | | | |
| U.S. Treasury securities | 10,717 | 39 | (3) | 10,753 | 1,250 | 2,149 | 7,354 |
| U.S. agency securities | 13,467 | 24 | (3) | 13,488 | 225 | 1,818 | 11,445 |
| Non-U.S. government securities | 5,559 | 11 | (2) | 5,568 | 551 | 1,548 | 3,469 |
| Certificates of deposit and time deposits | 4,175 | 2 | (2) | 4,175 | 728 | 977 | 2,470 |
| Commercial paper | 2,853 | 0 | 0 | 2,853 | 2,237 | 616 | 0 |
| Corporate securities | 35,241 | 132 | (114) | 35,259 | 10 | 7,241 | 28,008 |
| Municipal securities | 3,411 | 56 | 0 | 3,467 | 0 | 595 | 2,872 |
| Subtotal | 75,423 | 264 | (124) | 75,563 | 5,001 | 14,944 | 55,618 |
| Total | $81,464 | $ 264 | $ (158) | $81,570 | $ 9,815 | $ 16,137 | $ 55,618 |

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# Classifying by Riskiness and Liquidity

- Riskiness is based on the Fed's money supply definitions:
  - *Safe* is money-like (M4 and L).
  - *Risky* is nonmoney-like (the rest).
- Liquidity is based on fair value levels:
  - *Liquid* is level 1 (market price available).
  - *Illiquid* is level 2 and 3 (no market price available).

- Example, equities are classified as risky and liquid.

# More on Riskiness

Safe financial assets

- Cash
- Deposits
- Commercial paper
- Money market funds
- U.S. Treasuries

Risky financial assets

- Other government debt
  - Munis
  - Agency
  - Foreign
- Corporate
- ABS and MBS
- Equity
- Other

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