Understanding the Rise in Corporate Cash: Precautionary Savings or Foreign Taxes

Supplementary Tables and Appendix

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Supplementary Table 1

Location of Cash by Industry

	Industry Names (SIC codes)	Foreign Cash	Total Cash	Foreign Income	Foreign Tax Rate
Top 5	Chemical & Allied Products (28) Petroleum & Coal Products (29) Industrial Machinery & Equipment (35) Transportation Equipment (37), and Business Services (73)	69.8%	47.7%	33.1%	26.2%
Top 9	Above five industries plus Not Classified (e.g. conglomerates 99) Food & Kindred Products (20) Electrical Equip & Components (36) Controlling Instruments (38)	85.9%	71.0%	31.5%	26.1%
	All Other Industries	14.1%	29.0%	13.3%	29.0%

The table contains the location of cash and earnings by industry (two-digit SIC). The first row contains the numbers for the five industries with the most foreign cash. The second row contains the numbers for the nine industries with the most foreign cash. The industry names at the 2-digit level are broad. However, subsectors of each of the top industries contain firms where intangible assets are important. The top industries include: Chemical and Allied products (Pharma), Petroleum & Coal Products (oil exploration), Industrial Machinery and Equipment (computer hardware), Business services (computer software), and Food & Kindred products (beverages). The remaining industries are reported in the final row. These remaining 53 industries each hold less than 2% of the total foreign cash on average during our sample period (1998–2008). To maintain the confidentiality of the individual respondents and abide by BEA disclosure rules, finer cuts of the data are not feasible. The foreign cash (total cash) column reports the percent of foreign (total) cash that is held by firms in the listed industries. Foreign income is the average fraction of income that is earned in foreign subsidiaries by firms in the listed industries. The foreign tax rate is the average of the marginal statutory corporate tax paid by foreign subsidiaries of firms in the listed industries.

Supplementary Table 2

Capital Constraints and Additional Risk

	I	II	III	IV
	Domestic Cash	Foreign Cash	Domestic Cash	Foreign Cash
Effective Tax Rate	0.103**	-0.753*	0.117**	-0.780*
	(0.047)	(0.077)	(0.048)	(0.079)
Years Constrained (%)	0.129*	0.025**		
	(0.013)	(0.011)		
Product Market Fluidity			0.011*	-0.004*
			(0.001)	(0.001)
Ln(Firm Sales)	-0.008*	0.009*	-0.016*	0.010*
	(0.002)	(0.002)	(0.002)	(0.002)
Has Bond Rating	-0.007	0.009	-0.005	0.007
	(0.007)	(0.007)	(0.007)	(0.007)
PPE to Book Assets	-0.205*	-0.087*	-0.156*	-0.068*
	(0.015)	(0.016)	(0.015)	(0.017)
Return on Assets	0.151*	-0.071	-0.039	-0.117*
	(0.026)	(0.043)	(0.028)	(0.035)
Firm Pays Dividends	-0.029*	0.011***	-0.020*	0.002
	(0.005)	(0.006)	(0.006)	(0.006)
R&D to Sales	0.265*	0.007	0.176*	0.012
	(0.031)	(0.017)	(0.028)	(0.015)
Market to Book	0.011*	0.001	0.024*	0.008*
	(0.002)	(0.001)	(0.003)	(0.002)
Book Leverage	-0.101*	-0.003	-0.103*	0.005
	(0.009)	(0.006)	(0.010)	(0.008)
Capital Exp/Sales	-0.028	0.010	0.029	0.038
	(0.047)	(0.045)	(0.044)	(0.042)
Observations	11,853	11,853	11,287	11,287
R^2	0.358	0.115	0.400	0.123

The table contains regressions of the ratio of the firm's cash to book assets on a set of firm characteristics. Only MNCs are included in the regressions. Cash is defined as domestic cash in columns I and III and foreign cash in columns II and IV. In the first two columns, we include a measure of capital constraints: the percent of years the firm is financially constrained (Faulkender and Petersen 2012). This variable is the fraction of the prior three years during which the firm's internal cash flow was insufficient to finance their investment (EBITDA – taxes – capital expenditure was negative). In the next two columns, we include product market fluidity as measured by Hoberg, Phillips, and Prabhala (2014). Each regression contains year dummies. Standard errors are clustered by firm. Statistical significance at the 1%, 5%, or 10% levels is reported as *, **, and ***, respectively.

Supplementary Table 3

Baseline Cash Regressions [Benchmark years only]

	I	II	III	IV	V
	Total Cash		Domestic Cash		Foreign Cash
	All Firms	MNC	All Firms	MNC	MNC
Effective Tax Rate	-0.693*	-0.564*	0.044	0.098	-0.663*
	(0.098)	(0.095)	(0.074)	(0.077)	(0.092)
Ln(Firm Sales)	-0.019*	-0.001	-0.020*	-0.013*	0.012***
	(0.001)	(0.003)	(0.001)	(0.003)	(0.002)
Has Bond Rating	0.025*	0.012	0.020*	0.006	0.006
	(0.005)	(0.010)	(0.004)	(0.009)	(0.007)
PPE to Book Assets	-0.325*	-0.253*	-0.317*	-0.187*	-0.066*
	(0.007)	(0.024)	(0.007)	(0.020)	(0.017)
Return on Assets	0.033*	-0.115**	0.038*	-0.035	-0.079***
	(0.009)	(0.050)	(0.009)	(0.043)	(0.045)
Firm Pays Dividends	-0.001	-0.016*	-0.003	-0.025*	0.010***
	(0.004)	(0.008)	(0.004)	(0.007)	(0.005)
R&D to Sales	0.126*	0.338*	0.126*	0.319*	0.019
	(0.004)	(0.101)	(0.004)	(0.093)	(0.018)
Market to Book	0.009*	0.016*	0.009*	0.016*	-0.001
	(0.001)	(0.002)	(0.001)	(0.002)	(0.001)
Book Leverage	-0.113*	-0.134*	-0.112*	-0.127*	-0.007
	(0.004)	(0.015)	(0.004)	(0.015)	(0.007)
Capital Exp/Sales	0.065*	0.195*	0.058*	0.181**	0.014
	(0.018)	(0.085)	(0.018)	(0.075)	(0.060)
Domestic Firm	-0.019*		0.052*		
(1 if yes)	(0.004)		(0.004)		
Observations	15,190	2,470	15,190	2,470	2,470
R^2	0.411	0.346	0.429	0.357	0.115

The table contains regressions of the ratio of the firm's cash to book assets on a set of firm characteristics from table 3 but with a restricted sample. This sample includes only observations from the benchmark survey years (1999 and 2004). Cash is defined as total cash (columns I and II), domestic cash (columns III and IV), and foreign cash (column V) divided by net assets. All firms are included in the regression in columns I and III. Only multinational firms (MNC) are included in the sample in columns II, IV, and V. Each regression contains year dummies. Standard errors are clustered by firm. Statistical significance at the 1%, 5% or 10% levels is reported as superscripts *, **, and *** respectively.

Supplementary Table 4

Related Sales Cash Regressions [Benchmark Years]

	I	II	III	IV	V	VI	VII	VIII
	Domestic Cash	Foreign Cash	Foreign Cash	Foreign Cash	Domestic Cash	Foreign Cash	Foreign Cash	Foreign Cash
	MNC	MNC	MNC R&D=0	MNC R&D>0	MNC	MNC	MNC R&D=0	MNC R&D>0
Related Sales	-0.087	0.602*	0.448	0.641*	-0.007	0.048*	0.031**	0.056**
	(0.078)	(0.156)	(0.340)	(0.174)	(0.023)	(0.014)	(0.014)	(0.022)
Effective Tax Rate	-0.014	-0.183*	-0.250*	-0.138***				
	(0.090)	(0.056)	(0.089)	(0.072)				
Related Sales x Tax Rate	0.031	-0.991**	0.640	-1.132**				
	(0.246)	(0.471)	(0.994)	(0.529)				
Tax Haven (1 if yes)					-0.006	0.039*	0.050*	0.027*
					(0.008)	(0.005)	(0.007)	(0.007)
Related Sales x Tax Haven					-0.022	0.193*	0.092	0.205*
					(0.036)	(0.042)	(0.067)	(0.052)
Ln(Firm Sales)	-0.011*	0.005*	0.001	0.008*	-0.012*	0.003	-0.002	0.007**
	(0.003)	(0.002)	(0.002)	(0.003)	(0.003)	(0.002)	(0.002)	(0.003)
Has Bond Rating	0.005	0.002	0.002	0.003	0.005	0.005	0.003	0.006
	(0.009)	(0.006)	(0.007)	(0.009)	(0.009)	(0.007)	(0.007)	(0.011)
PPE to Book Assets	-0.204*	-0.060*	-0.044*	-0.069**	-0.201*	-0.060*	-0.038**	-0.084**
	(0.019)	(0.016)	(0.016)	(0.032)	(0.019)	(0.017)	(0.016)	(0.036)
Return on Assets	-0.023	-0.081**	-0.003	-0.116**	-0.019	-0.073	0.010	-0.113**
	(0.034)	(0.039)	(0.030)	(0.049)	(0.034)	(0.039)	(0.028)	(0.048)
Firm Pays Dividends	-0.031*	0.012**	-0.002	0.020*	-0.031*	0.007	-0.003	0.016**
	(0.007)	(0.005)	(0.006)	(0.007)	(0.007)	(0.005)	(0.006)	(0.008)
R&D to Sales	0.194*	-0.011		-0.019	0.205*	-0.017		-0.026
	(0.031)	(0.013)		(0.016)	(0.031)	(0.012)		(0.015)
Market to Book	0.015*	0.001	0.003	0.000	0.015*	0.000	0.002	-0.001
	(0.002)	(0.001)	(0.002)	(0.001)	(0.002)	(0.001)	(0.002)	(0.001)
Book Leverage	-0.122*	-0.008	-0.014***	-0.006	-0.123*	-0.007	-0.008	-0.006
	(0.013)	(0.006)	(0.008)	(0.008)	(0.013)	(0.006)	(0.008)	(0.008)
Capital Exp/Sales	0.182**	0.097	0.024	0.187	0.176**	0.099	0.001	0.223
	(0.081)	(0.109)	(0.053)	(0.257)	(0.082)	(0.110)	(0.054)	(0.258)
Observations	2,577	2,577	969	1,608	2,565	2,565	965	1,600
R^2	0.362	0.300	0.195	0.326	0.361	0.179	0.128	0.196

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The table contains regressions of the ratio of the firm's cash to book assets on a set of firm characteristics from table 4 but with a restricted sample. This sample includes only observations from the benchmark survey years (1999 and 2004). Cash is defined as domestic cash (columns I and V), foreign cash (columns II-IV and VI-VIII). Related sales is defined as the percent of the firm's total sales that are sales made by its subsidiaries to other subsidiaries or to the parent. The sample includes only multinational firms (MNC). Columns III and VII contain only firm-years with zero reported R&D while columns IV and VIII contain only firm-years with strictly positive reported R&D. The regressions contain year dummies. Standard errors are clustered by firm. Statistical significance at the 1%, 5%, or 10% levels is reported as *, **, and ***, respectively.

Supplementary Table 5

Related Sales on Foreign Tax Rates

	I	II	III
Foreign Tax Rate	-0.030*	-0.021*	-0.025*
	(0.004)	(0.004)	(0.004)
Subsidiary Sale	0.009*	0.012*	0.002
Total Sales	(0.001)	(0.002)	(0.004)
PPE	0.190*	0.172*	0.229*
of subsidiary	(0.019)	(0.018)	(0.025)
Ln(Sub Sales)	0.002*	0.003*	0.003*
	(0.000)	(0.000)	(0.000)
R&D	0.009*	0.009*	0.009*
of subsidiary	(0.001)	(0.001)	(0.001)
Ln(GDP)	0.000	-0.002*	-0.002*
of country	(0.000)	(0.000)	(0.000)
Firm Dummies	No	Yes	No
Firm-Year Dummies	No	No	Yes
Observations	105,776	105,776	105,776
R^2	0.108	0.283	0.393

The table contains the regression of a subsidiary's related sales on the foreign tax rate and other subsidiary controls. Related sales is defined as the percent of the subsidiaries sales that are made to the parent or other subsidiaries. The foreign tax rate is the average marginal foreign tax rate across companies operating in the country in the given year. Standard errors are clustered at the firm level. Statistical significance at the 1%, 5%, or 10% levels is reported as *, **, and ***, respectively.
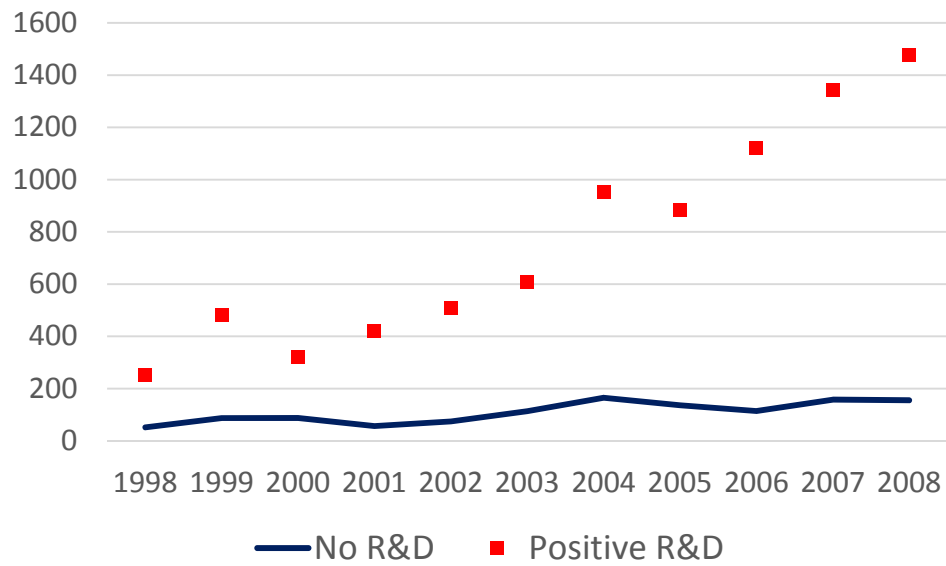
Supplementary Table 6

Subsidiary Level Cash Regressions for Firms with Positive R&D and Tax Havens

	I	II	III	IV	V	VI	VII	VIII
Related Sales	0.188*	0.208*	0.218*	0.174*	0.184*	0.207*	0.218*	0.166*
	(0.041)	(0.043)	(0.049)	(0.040)	(0.041)	(0.043)	(0.049)	(0.040)
Tax Haven	0.012*	0.011*	0.010*		0.011*	0.010*	0.010*	
(1 if yes)	(0.002)	(0.002)	(0.002)		(0.002)	(0.002)	(0.002)	
Related Sales	0.163**	0.128***	0.128***	0.167**	0.036	0.037	-0.009	0.055
x Tax Haven	(0.068)	(0.068)	(0.077)	(0.067)	(0.091)	(0.091)	(0.115)	(0.089)
Subsidiary Sales					0.005*	0.007*	0.011*	0.008*
					(0.001)	(0.002)	(0.001)	(0.001)
Subsidiary Sales					0.118***	0.087	0.132***	0.106***
x Tax Haven					(0.065)	(0.061)	(0.074)	(0.061)
PPE	0.276*	0.217*	0.222*	0.269*	0.275*	0.216*	0.221*	0.267*
of subsidiary	(0.027)	(0.023)	(0.027)	(0.027)	(0.027)	(0.023)	(0.027)	(0.027)
R&D	0.004*	0.007*	0.007*	0.003*	0.004*	0.007*	0.007*	0.002**
of subsidiary	(0.001)	(0.001)	(0.001)	(0.001)	(0.001)	(0.001)	(0.001)	(0.001)
Ln(GDP)	0.002*	0.001*	0.001*	0.008*	0.002*	0.001*	0.001*	0.007*
of country	(0.000)	(0.000)	(0.000)	(0.001)	(0.000)	(0.000)	(0.000)	(0.001)
Firm Dummies	No	Yes	No	No	No	Yes	No	No
Firm-Year Dummies	No	No	Yes	No	No	No	Yes	No
Country Dummies	No	No	No	Yes	No	No	No	Yes
Observations	78,165	78,165	78,165	78,164	78,165	78,165	78,165	78,164
R^2	0.175	0.321	0.408	0.204	0.179	0.322	0.409	0.208

The table contains regressions of the subsidiary's cash to book assets on a set of subsidiary characteristics. Each observation represents a MNC's subsidiary in a given year. Thus, a firm that has ten subsidiaries will have ten observations per year. The regressions include only observations for MNCs that report strictly positive R&D. The foreign tax rate in table 8 has been replaced by a dummy variable that is equal to one if the subsidiary is in a tax haven as defined by the Global Policy Forum (see Dyreng and Lindsey 2009). Since this variable does not vary across time for a given country, it is dropped from columns IV and VIII. Related sales (the percent of the subsidiaries sales which are made to the parent or other subsidiaries of the parent), and the cross product of related sales and the tax haven dummy are included in each regression. In columns V-VIII, we include the subsidiary sales (as a percent of total firm sales) as well as the cross produce of subsidiary sales and the foreign tax rate. The subsidiary's property, plant, and equipment (PPE) to book value of assets, the subsidiary R&D/Sales ratio, and the natural log of GDP at the country level are included as additional explanatory variables. Standard errors are clustered by firm. Statistical significance at the 1%, 5%, or 10% levels is reported as *, **, and ***, respectively.
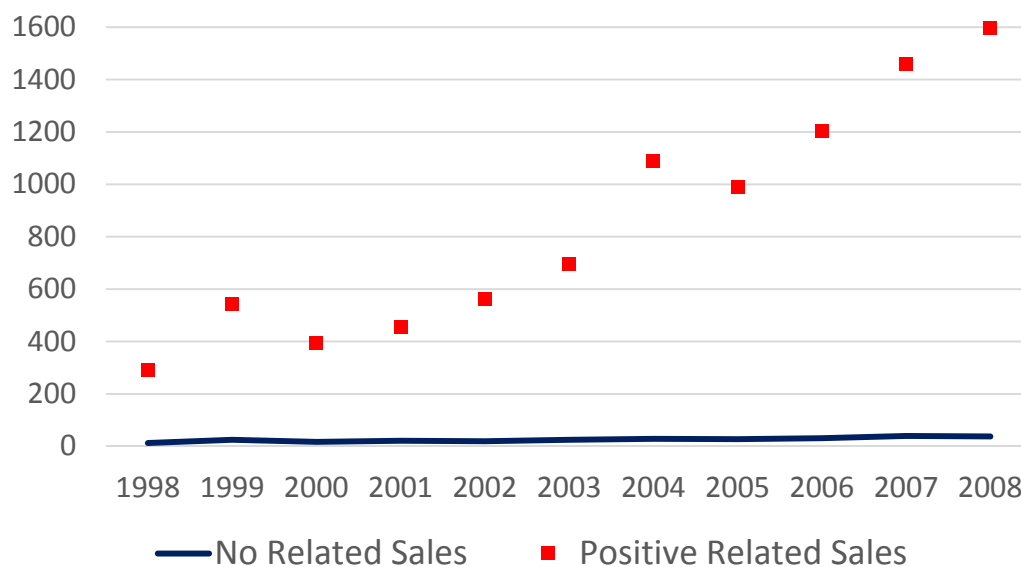
Supplementary Figure 1

Foreign Cash of MNC by R&D

The figure graphs total foreign cash for two samples: MNCs that report zero (or missing) R&D and MNCs that report positive R&D. Sixty-one percent of firm-year observations report positive R&D. Cash is reported in $B.

Supplementary Figure 2

Foreign Cash of MNC by Related Sales

The figure graphs total foreign cash for two samples: MNCs that report no related sales and firms that report positive related sales. Related sales are subsidiary's revenue arising from sales to the other subsidiaries of the firm or to its parent. Sixty-five percent of firm-year observations report positive related sales. Cash is reported in $B.

Appendix I: Comparison of the Tax Variables used in Foley et al. (2007)

The tax variable used to explain variation in foreign taxes in our paper and in Foley et al. (2007) are related but not the same. They are both scaled versions of the difference between the foreign and the domestic tax rate, but the scaling is different. The main tax variable used in Foley et al. (2007) is called the Effective Repatriation Tax Rate (ERTR). The ERTR is defined as the US tax rate minus the foreign tax rate (if the difference is positive) times fraction of activity (PPE or employment) that is foreign:

$$ERTR = Max\left[0, \tau_{US} - \tau_{Foreign}\right] \frac{Foreign\, PPE}{Total\, PPE} \tag{1}$$

This is the difference between the US tax rate (statutory or the Graham tax rate) and the foreign tax rate multiplied by the fraction of the firm's PPE which is foreign. This variable has a mean of 0.0054 and a standard deviation of 0.0149 (see Foley et al. table 1).

Our effective tax rate variable (ETR) can be viewed as weighted average of domestic and foreign tax rate where α is the percent of income earned by the foreign subsidiaries.

$$ETR = \alpha\, \tau_{Foreign} + \left(1-\alpha\right)\tau_{US}$$
$$= \tau_{US} - \alpha\left(\tau_{US} - \tau_{Foriegn}\right) \tag{2}$$

This is also the difference between the US tax rate and the foreign tax rate but is multiplied by the fraction of the firm's income that is foreign.

In Table 5, Foley et al. estimate the effect of the Effective Repatriation Tax Rate on the log of foreign cash to assets. Based on their coefficient estimate of 8.0815 (see their table 5, column 1), a one standard deviation increase in ERTR (a reduction in the foreign tax rate), leads to as 12% increase in the foreign cash to asset ratio (Foley et al. 2007, 595). Although the coefficient is statistically significant, the economic magnitude is small. It is even smaller when we consider the change in the foreign cash to asset ratio. Since the mean of the dependent variable (e.g., ln[Foreign Cash/Net Asset]) is -4.9414, this implies an increase in the foreign cash to asset ratio of 10 basis points (from 0.71% [exp(-4.914)] to 0.81% [exp(-4.914+0.12)]).