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Risk as determinant of income and cross-border pricing of multi-national enterprises [*]

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International taxation rules for multi-national enterprises (MNEs) prescribe that international prices for goods and services between different subsidiaries – and therefore incomes of these subsidiaries - must be comparable to those set between independent international firms for the purpose of taxation. These rules also prescribe that risk should be accounted for in pricing and income. Since current practice of price comparisons does not yet fully allow accounting for risk, prices and in turn earnings and taxation may be distorted. We analyze a panel of about 160,000 European manufacturing, wholesale and retail trade firms for the years 1992 to 2007 in order to establish to what extent earnings do take risk into account. Risk measured by earnings volatility emerges as one major determinant of income. When earnings are set in relation to invested capital, risk emerges as the only stable determinant of income. Results indicate that both MNEs and independent firms regularly account for risk as a major determinant of income when pricing international goods and services.

JEL classification: F2, K2, L0, M4

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1. Introduction

International restructurings by globally acting enterprises have become a common occurrence in the wake of accelerating globalization and lead to increasing global relocations of economic activities. Besides resource cost and infrastructure, the taxation regime, through its effects on institutional hurdles for business development on one hand and on international pricing on the other hand, is an important determinant of the geographical development of globalization. While OECD taxation rules prescribe that risk should be accounted for when determining international prices for goods and services between – and therefore incomes of – different subsidiaries of multi-national enterprises (MNEs), current empirical practice of price and income comparisons does not yet fully allow for risk as a major determinant.

So far, empirical price comparisons of income and transfer prices within MNEs are conducted by analyzing descriptive statistics of sets of comparable firms and transactions derived from so-called benchmark studies. These studies do not take individual account of differences in the amount of risk assumed by different individual comparables within a set. Nevertheless, theoretical considerations as well as previous research suggest that there is a systematic relationship between international pricing and earnings and risks assumed when measured as volatility in net earnings. This research analyses the relationship between expected net earnings and volatility of net earnings of firms as well as the influence of other factors with respect to function performed, product, industry, geography, age of the firm, independence and others.

Data analyzed comes from the Amadeus firm-level data base and spans a panel of European manufacturing, wholesale and retail trade firms for the years 1992 to 2007. Results are used to draw conclusions with regard to intermediate product pricing within European multi-nationals. Risk measured by earnings volatility emerges as one major determinant of pricing. Risk emerges as the only stable determinant of pricing when earnings are set in relation to capital employed.

The remainder of the paper is structured as follows. Section 2 introduces the economic and institutional background, the resulting research questions posed here, as well as the hypotheses to be investigated. Section 3 describes the data used. Section 4 presents the general modeling and summarizes the results. Section 5 concludes. Statistical and econometric results are presented in the appendix.

2. Background and research questions

Profitability of a particular enterprise can generally be assessed from an investor's perspective by observing profits as a return on some measure of capital invested. Following contemporary capital market theory, risk-adverse investors take the level of risk involved in the investment into account when determining what amount of return they expect on a risky investment. In applied modern corporate finance theory the remuneration for the risks associated to an investment is measured by the so called Equity Risk Premium (ERP). One of the standard conclusions of this theory is that an adequate remuneration for the risks taken is a function of the volatility of the returns on the equity invested. Based on historical financial markets data, the relation between the volatility of the returns on the capital invested on the one hand and the ERP with which capital markets remunerate the assumption of risk on the other hand can be identified. Empirical analyses show that the ERP paid by the capital market for the assumption of risk corresponds to a multiple of the standard deviation of the Returns on Equity (RoE).[1]

While these empirical results are derived from data on investments in financial markets, the principles should also apply when an investor finances an enterprise directly, i.e. the investor would expect that the profits to be derived from the equity invested in a particular enterprise

[1]See, e.g., Damodaran (2008).

are an adequate remuneration for the invested equity – given the particular level of risk involved. As a consequence, the pricing of an enterprises goods or services must be set such that the resulting profits can be expected to adequately remunerate the firm's investors for the risks they have taken in financing the enterprise.

While this should hold for any enterprise, it should also be true for individual subsidiaries of MNEs. Consequently, transfer prices, i.e. prices for goods and services between different subsidiaries within MNEs, should also be set such that the subsidiaries' investors are adequately remunerated for the risks they have taken in financing the subsidiaries.

International taxation rules do principally assert the comparability of economic conditions, pricing and profits of independent enterprises with subsidiaries of MNEs and the resulting principle applied to the evaluation of international transfer prices by national tax authorities is known as the arm's length standard.[2] OECD taxation rules in also prescribe that risk should be accounted for when determining international prices for goods and services between different subsidiaries of MNEs.[3]

The OECD principles also directly imply that risk should be accounted for when evaluation resulting profits of such subsidiaries of MNEs, since the adequacy of transfer prices is most commonly measured by comparisons of profit-level indicators, such as profit after taxes, between independent firms and comparable subsidiaries of MNEs.

So far, empirical price comparisons of transfer prices within MNEs are conducted by analyzing descriptive statistics of sets of comparable firms and transactions derived from so-called benchmark studies using individual firm data from a publicly available database.

[2] The arm's length standard for the assessment of transfer prices remains consensus among the OECD member states. See para 1.6 and 1.12 of the OECD guidelines (OECD (1995/2001)).

[3] Compare para 1.27 of the OECD guidelines (OECD (1995/2001)). See also OECD (2008) for new OECD considerations regarding business restructurings changing corporate risk profiles, as well as Baumhoff/Puls (2009) and Werra (2009) for recent discussions.

While these studies use a variety of selection criteria in order to ensure comparability of the final set of independent firms to the tested subsidiary of a MNE[4], they do not specifically account for differences in the amount of risk assumed by different individual comparable firms within a set beyond controlling in a general way for risk in the selection process itself.[5]

Applicability and limitations of benchmark studies have been discussed widely in the literature.[6] Some of the traditional limitations of the benchmark approach have their source in prior data limitations. Given the vastly increased volume and quality of data available, the influence of risk on individual firms' profitability – as well as that of every other selection criterion commonly used in benchmark analyses – can now also be identified and quantified with the use of econometric panel-data methods.[7]

The research presented here aims to empirically test the following hypotheses about the role of risk on individual firms' profitability.

(1) Risk measured as volatility of profits is a major determinant of firms' profits.

(2) Risk measured as volatility of returns on capital invested or employed is the only remaining determinant of firms' return on capital in the long run.

[4] In practice, the search for a comparable set of independent firms is done by identifying independent companies which predominantly carry out the function to be tested (such as manufacturing or wholesale trade), taking other aspects like geographic origin, particular business or industry, company's maturity and size into consideration. Comparables searches by use of databases are internationally widely accepted and also acknowledged by the German Federal Fiscal Court and the German fiscal authorities. See, e.g., BFH Judgment as of October 10, 2001 – I R 1043/00 published in the German Federal Tax Gazette 2004 II p. 171. See also German Federal Ministry of Finance Circular Letter as of April 4, 2005 – IV B 4 – S 1341 – 1/05 published in the German Federal Tax Gazette 2005 I p. 570.

[5] For a typical example of the steps and results of a benchmark search, see Table 1 in the appendix.

[6] See, .e.g., Endres/Oestreicher (2005), Oestreicher/Vormoor (2004), Oestreicher/Duensing (2005). At the same time, other literature more and more addresses innovative ways of incorporating risk considerations into transfer pricing, e.g., Kaut et al. (2007), Faß/Lutz (2009), Kornetzki (2007), Vögele/Lutz (2007).

[7] Compare, Peter (2008) for a comprehensive survey of available data commonly used for European benchmark studies.

3. The Data

The empirical analysis is based on data from the AMADEUS[8] "Very large, large and medium sized companies" database Update No. 180 – September 2009 (DVD-ROM) as well as all previous database versions since 1995.

The latest database update used for the analysis contains information on 2,031,019 companies. From these, all about 160,000 firms contained in the industry codes for manufacturing, retail and wholesale trade where selected (NACE 2 codes 10-32, 45, 46, 47) and corresponding data for the years 1995 to 2009 (as far as available) was compiled.

Data collected comprises the following variables[9]: BvD ID number[10], Company name, Country, Trade description (English), Trade description (original language), Immediate shareholder – type, name and percentage of direct ownership, Independence indicator, Industry code and description (NACE Rev.2), Subsidiary – percentage of ownership, Date of incorporation, Active/Inactive, Consolidation code, Operating revenue, Cost of goods sold, Other operating expenses, Operating profit/loss, EBIT, Profit/loss before tax, Profit/loss after tax, Current assets, Working capital, Shareholders funds.

[8] The Amadeus database published by Bureau van Dijk Electronic Publishing is a comprehensive, pan-European database containing financial information on public and private companies in 41 European countries. Emphasis is placed on annual financial statements.

These data have been standardized in Amadeus in order to enable comparisons between companies, both nationally and internationally.

A standard company report includes 23 balance sheet items, 25 profit and loss account items and 26 ratios, descriptive information including trade description and activity codes (NACE 1.1, NACE 2, NAICS or UK SIC, US SIC can be used across the database) as well as ownership information.

The Amadeus database is generally used by transfer pricing specialists all over Europe to verify the arm's length character of transfer prices by traditional benchmarking studies. The use of the Amadeus database for such benchmarking studies is generally accepted by European fiscal authorities.

[9] A full list of variables used is given in Table 2 in the appendix. Summary statistics are provided in Table 3.1.

[10] Bureau van Dijk's unique ID number per enterprise.

In addition, trade descriptions as well as industry descriptions were screened in order to generate additional dummy variables for the functions manufacturing[11], wholesale[12], retail[13], service[14], and R&D[15] activities.

Furthermore, immediate shareholder and independence variables were screened to create an Independence dummy variable according to the standard benchmark selection criteria.[16]

For each country, a separate dummy variable was constructed. Countries (country variables) in the data set are: Denmark, Estonia, Finland, France, Germany, Greece, Iceland, Ireland, Latvia, Liechtenstein, Lithuania, Malta, Moldova, Netherlands, Poland, Portugal, Russian_Fed, Sweden, CH, Ukraine, UK.

Lastly, data on general macroeconomic developments and climate were taken from the Ifo Institute's collection of European economic indices as well as from Eurostat via the European Central Bank. These comprise indices for European economic climate[17], European capacity utilization[18], and European production.[19]

[11] Dummy variable set to "1" if industry code between 1000 and 3299 or if company description contains at least one of the terms manufact*, manufact*, producti*, Producti*.

[12] Dummy variable set to "1" if if industry code between 1000 and 3299 or if company description contains at least one of the terms Wholesal*, wholesal*, whole sal*, Whole sal*.

[13] Dummy variable set to "1" if industry code between 1000 and 3299 or if company description contains at least one of the terms Retail*, retail*, end custom*, end consum*.

[14] Dummy variable set to "1" if company description contains at least one of the terms repair*, service*, traini*, consul*.

[15] Dummy variable set to "1" if company description contains at least one of the terms research*, develo*, design*, engineer*.

[16] An enterprise is categorized as independent, when either the Independence Indicator variable is A+, A, or A- or the immediate shareholder is an individual or the enterprise is employer or manager owned.

[17] Index data on European economic climate were taken from http://www.cesifo-group.de (http://www.cesifo-group.de/link/wes-zeitreihen-euro-2009q4.xls, Wirtschaftsklimaindikator Euroraum, Index R1).

[18] Capacity utilization data were taken from the Bundesbank, series YJW244, capacity utilization in manufacturing, Euro zone (16), in percent, http://www.bundesbank.de/statistik/statistik_zeitreihen.php?lang=de&open=&func=row&tr=YJW244.

4. Modeling and results

Given the panel data available and the economic hypotheses presented, a regression model takes the following generalized form:

(1) $$y_{i,t} = \alpha + \mathrm{B}F_i + \Gamma G_{i,t} + \Delta M_t + \varepsilon_{i,t} + \eta_i$$

where the dependent variable $y_{i,t}$ is a profit level indicator (e.g. profits after taxes or return on shareholder funds) of company *i* in period *t*;

F_i is a vector of determinants specific to firm i but invariant over time (such as country, industry, date incorporated);

$G_{i,t}$ is a vector of determinants that may vary between firms and also over time (e.g., R&D expenditure, functions performed, income volatility, and industry);

M_t is a vector of period-specific determinants that affect all firms in the same manner (e.g. global economic factors);

$\varepsilon_{i,t}$ is an idiosyncratic error term that may vary between firms and also over time;

and η_i represents unobserved heterogeneity across firms (i.e., company specific random effects).

This general specification allows for either random-effects or fixed-effects modeling, where the random or fixed effects are firm-specific components. The more general approach is to allow for random firm-specific effects; the case where these effects are fixed, that is determinate constants instead of random variables, is a special sub-case. In particular, the random-effects

[19] Industrial production index data were taken from http://sdw.ecb.europa.eu/ (Eurostat, Industrial Production Index, series STS.M.I5.W.PROD.2C0000.4.000, STS.M.I5.W.PROD.NS0040.4.000, and STS.M.I5.W.PROD.NS0050.4.000, short-term statistics, monthly, fixed composition, working-day adjusted).

estimation procedure is still consistent, even if fixed effects are present, whereas a fixed-effects procedure is biased if the true model contains only random effects.[20]

The data available contains several firm-specific, time-invariant variables that can be assumed to capture a significant part of present fixed effects (e.g. country, NACE2, functional dummies, etc.). Hence a random-effects specification seems to be a priori more appropriate. Therefore, the majority of results presented are based on random-effects estimations.

In order to test the two hypotheses introduced in the previous section, two sets of regressions are run.

The first set of regressions in Models (1) to (4) analyses profits after taxes (PaT) while the second set of regressions in Models (5) to (7) analyzes after-tax returns on shareholder funds (RoEbaT). Since the various profit variables are highly correlated with each other and the various capital variables are also highly correlated with each other[21], the results presented within these seven models are generally robust to some degree regardless of the profit variable or the capital variable chosen. Thus the random-effects specification of Model (2) is given by:

(2) $$PaT_{it} = \alpha + \gamma_1 PaT\_\_s3_{it} + \eta_i + \varepsilon_{it}$$

The fixed-effects specification of Model (7) is then given by:

(3) $$RoEbaT\_a3_{it} = \alpha + \beta_i + \gamma_1 RoEbaT\_s3_{it} + \varepsilon_{it}$$

The instrumental-variables random-effects specification of Model (10) is then given by:

(4.a) $$RoEbaT\_a3_{it} = \alpha + \gamma_1 \widehat{RoEbaT\_s3_{it}} + \eta_i + \varepsilon_{it}$$ [22]

[20] See, e.g., Greene (2002), Hausman (1978). Fixed-effects regression may be chosen over a random-effects specification, if the Hausman test on random effects is rejected.

[21] See Table 3.2 for correlation coefficients of various profit and capital variables.

[22] The variable RoEbaT_s3 in equation (4.a) is instrumented using two lags of RoEbaT in equation (4.b).

(4.b) $$RoEbaT\_s3_{it} = \alpha + \gamma_1 RoEbaT_{it-1} + \gamma_2 RoEbaT_{it-2} = + \varepsilon_{it}$$

The other seven models are set up accordingly. The results of all model regressions are summarized in Tables reported 4.1, 4.2 and 4.3 in the appendix; the details to each regression are reported in Tables 5.1 to 5.10.

The suffix _a3 denotes a 3-year moving average whereas _s3 denotes a 3-year moving standard deviation. Both variables are designed to capture the "longer-term" relationship between risk and profit or return, respectively.

The results on profit after tax are reported in Table 4.1 in the appendix. They basically confirm that risk measured as 3-year moving standard deviation[23] has a strong significant effect on profit after tax. Given the high correlation between operating profit, profit before tax, and profit after tax, these results are also true for these other profit variables.

In Model (1), which takes contemporary profit after tax as dependent variable, variables on capital are significant as are three of the functions indicators. However, neither the year nor the dummies for independence and for active firms, or the date of incorporation appear to have a significant effect on profit levels.[24] A comparison of Models (1) and (2) indicates that about 40 percent of the total variation in the data explained by model (1) can be explained by the risk variable alone.

Models (3) and (4) take the 3-year average of profit after tax as dependent variable in order to capture the longer-term relationship between risk and profit. As expected, both models have a significantly higher explanatory power. In addition, besides risk, other explanatory variables, such as the year, the retail function indicator, the date of incorporation, and one of the

[23] Alternative estimations using 5-year averages and standard deviations basically confirm all the results presented here.

[24] Alternative estimations indicate that most country dummies are not significant in a wide variety of model specifications.

macroeconomic indicators become significant. A comparison of Models (3) and (4) indicates that about 50 percent of the total variation in the data explained by model (3) can be explained by the risk variable alone.

The results on return on capital invested (shareholder funds) are reported in Tables 4.2 and 4.3 in the appendix. They basically confirm that risk measured as 3-year moving standard deviation[25] has a strong significant effect on return on capital (see models (6) and (7)) while virtually no other variable remains significant.[26] Given the high correlation between shareholder funds, current assets, and working capital, these results are also true for return on capital measures using these other capital variables. In fact the risk variable alone accounts for over 90 percent of the variation in return to capital, whereas all other variables combined cannot even explain one percent of the variation (since their parameter estimated are all not significantly different from zero). The results remain when endogeneity of the risk measure is taken into account (see models (8) to (10)).

Parameter estimates indicate that the return on capital should increase by about three quarters of a percent for every percentage point increase in risk measured as standard deviation, so the resulting ERP is 0.75 percent for any percent increase in risk.[27]

[25] Alternative estimations using 5-year averages and standard deviations basically confirm all the results presented here.

[26] The only exception here is the NACE Rev.2 industry code which appears to be a determinant on the 10 percent significance level. Several alternative estimations, e.g. including yearly dummies, basically confirm the results presented here, i.e. most possible variables with exception of the risk variable appear insignificant.

[27] Damodaran (2008) reports yearly historical US stock returns and treasury bill rates for 1928 to 2007. Calculating the resulting equity risk premia and estimating their relationship on return volatility results in somewhat lower parameter estimates of about 0.33 to 0.55. However, since stock market data reports include market value of capital invested and the Amadeus firm-level data analyzed here include book values, the results are not directly comparable.

5. Conclusions

The research presented here aimed to empirically test hypotheses about the role of risk on individual firms' profitability. The results presented provide strong evidence that risk measured by profit volatility in fact is a major determinant of profits and therefore of international pricing for independent firms and multi-national enterprises alike.

Furthermore, when earnings are set in relation to invested capital, risk emerges as the only stable determinant of return on capital. It follows that risk together with the amount of capital invested appear to be the only significant determinants of pricing.

Results thus indicate that both independent firms and MNEs regularly account for risk as well as the amount of capital invested as the major determinants of pricing international goods and services.

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Appendix

Table 1. Example of a typical sampling process for benchmarking

Step	Search Criterion	Description of Search Criterion	Search Result
1	No. of companies in the database	AMADEUS Update No. 180 – September 2009 (DVD-ROM)	2,031,019
2	Geographical Screen	EU 27	1,639,762
3	Standard industrial classification code search (Nace Rev. 2)	NACE Rev. 2 4646 – Wholesale of pharmaceutical goods	7,273
4	Keyword Search	Keyword search to exclude irrelevant companies	6,541
5	Year of incorporation	Incorporation date before and including 2002	5,504
6	Active/Inactive Screen	Exclusion of inactive companies	5,192
7	Independence Screen	Excluding a company if a corporate shareholder owns 25% or more of the shares Excluding a company if it owns 25% or more of any company	1,138
8	Availability of Financial data	Financial data available for at least two years in the years 2005 to 2008	773
9	SG&A to Turnover	Excluding a company if SG&A-to-turnover ratio is smaller than 15% or higher than 25%	167
10	Functional Screening	Companies are excluded from the set if they perform different functions using business descriptions in English or native language	81
11	Product Screening	Companies are excluded from the set if products are significantly different using business descriptions in English or native language	29
12	Internet Screen I	Companies are excluded from the set if they perform different functions according to their websites; companies without web presence remain in the set	19
13	Internet Screen II	Companies are excluded from the set if they perform different functions according to their websites; companies without web presence are excluded	6
	Set of potentially comparable Companies		**6**

Source: AMADEUS Database

Table 2. List of variables

Variable	Definition
BvD	Firm ID number (numeric)
Year	Year
BvDEP_ID_number	BvD ID number (alphanumeric)
Company_name	Company name
Country	Country
Trade_Eng	Trade description (English)
Trade_Local	Trade description (original language)
ImSharHold_Type	Immediate shareholder – type
ImSharHold_Name	Immediate shareholder – name
ImSharHold_Pct_Own	Immediate shareholder –percentage of direct ownership
Indep_Ind	Independence indicator
NACE2	Industry code (NACE Rev.2)
NACE2_Descr	Industry description (NACE Rev.2)
Subs_Pct_Own	Subsidiary – percentage of ownership
Date_Incorp	Date of incorporation
Active	Active/inactive
Cons__Code	Consolidation code
OpRev	Operating revenue, EUR thousand
COGS	Cost of goods sold, EUR thousand
OpExp	Other operating expenses, EUR thousand
OpProfit	Operating profit/loss, EUR thousand
EBIT	EBIT, EUR thousand
PbT	Profit/loss before tax, EUR thousand
PaT	Profit/loss after tax, EUR thousand
CurrAsset	Current assets, EUR thousand
WorkCap	Working capital, EUR thousand
SharHoFund	Shareholders funds, EUR thousand
DateInc	Date of incorporation
IFO_eur	IFO index, economic climate, Euro zone
Cap_Util_EWU	Capacity utilization, in percent, Euro zone (16)
Prod_EWU_total	Industrial production index (total manufacturing) , Euro zone (16)
Prod_EWU_IM	Industrial production index (intermediate goods) , Euro zone (16)
Prod_EWU_Inv	Industrial production index (investment goods), Euro zone (16)

(to be continued)

Table 2. List of variables (continued)

Variable	Definition
ISPO	Immediate shareholder percentage of ownership (numeric)
Independence	Dummy variable, by ImSharHold_Type and Indep_Ind
Manufacturing	Dummy variable, by NACE2 and Trade_Eng
Wholesale	-"-
Retail	-"-
Service	-"-
ResDev	-"-
Tr45	Dummy variable, by NACE2
Tr46	Dummy variable, by NACE2
Tr47	Dummy variable, by NACE2
Mfg30	Dummy variable, by NACE2
Mfg20	Dummy variable, by NACE2
Active_Ind	Dummy variable, Active/inactive
<Country>	Dummy variable, by <Country>
IYear<year>	Dummy variable, by <year>
PaT_a3	3-period moving average of PaT, (PaT+l.PaT+l2.PaT)/3
PaT_s3	3-period moving standard deviation of PaT, (abs(PaT-PaT_a3)+abs(l.PaT-PaT_a3)+abs(l2.PaT-PaT_a3))/3
RoEbaT	Return on equity (after tax, book value), PaT / SharHoFund
RoEbaT_a3	3-period moving average of RoEbaT, (RoEbaT+l.RoEbaT+l2.RoEbaT)/3
RoEbaT_s3	3-period moving standard deviation of RoEbaT, (abs(RoEbaT-RoEbaT_a3)+abs(l.RoEbaT-RoEbaT_a3)+abs(l2.RoEbaT-RoEbaT_a3))/3
RR3	3-period relative moving standard deviation of RoEbaT, RoEbaT_s3/ RoEbaT_a3
RoEbaT_a5	5-period moving average of RoEbaT
RoEbaT_s5	5-period moving standard deviation of RoEbaT

Table 3.1. Summary statistics

Variable	Obs	Mean	Std. Dev.	Min	Max
BvD	2405640	80188.5	46296.57	1	160376
Year	2405644	2002	4.320509	1991	2009
NACE2	2311155	3690.095	1313.908	1000	4799
OpRev	1011274	34968.65	844222.8	0	1.63e+08
COGS	1020057	26253.59	685004.3	-2803821	1.53e+08
OpExp	1026773	6305.448	177073.8	-525220	2.73e+07
EBIT	1032254	1619.38	165562.5	-1.53e+08	1.16e+07
PbT	1028616	1713.042	170652	-1.53e+08	1.58e+07
PaT	1013210	1187.276	164691.8	-1.53e+08	1.60e+07
CurrAsset	1059193	3869.328	138118.5	-65718	9.47e+07
WorkCap	1052973	5049.442	210450.9	-1.40e+07	8.95e+07
SharHoFund	1067458	10169.02	407292.8	-1186564	2.22e+08
Denmark	2405640	.0166733	.1280442	0	1
Estonia	2405640	.0217115	.1457398	0	1
Finland	2405640	.0009291	.0304664	0	1
France	2405640	.0007358	.0271151	0	1
Germany	2405640	.0027124	.0520098	0	1
Greece	2405640	.0649723	.2464771	0	1
Iceland	2405640	.0007295	.0270001	0	1
Ireland	2405640	.0023507	.0484273	0	1
Latvia	2405640	.0118097	.1080291	0	1
Liechtenst~n	2405640	6.24e-06	.0024971	0	1
Lithuania	2405640	.0129009	.1128473	0	1
Malta	2405640	.0003118	.0176542	0	1
Moldova	2405640	.001509	.0388159	0	1
Netherlands	2405640	.0053749	.0731162	0	1
Poland	2405640	.0173841	.1306979	0	1
Portugal	2405640	.1358059	.3425824	0	1
Russian_Fed	2405640	.4464571	.497125	0	1
Sweden	2405640	.0190053	.1365436	0	1
CH	2405640	.0003429	.0185156	0	1
Ukraine	2405640	.1460443	.3531507	0	1
UK	2405640	.0922333	.289355	0	1
Independence	2405640	.5093967	.4999118	0	1

(to be continued)

Table 3.1. Summary statistics (continued)

Variable	Obs	Mean	Std. Dev.	Min	Max
Mfg10	2405640	.1447349	.3518334	0	1
Tr45	2405640	.0629708	.2429104	0	1
Mfg30	2405640	.0287948	.1672295	0	1
Manufactur~g	2405640	.3767022	.4845593	0	1
Retail	2405640	.16808	.3739374	0	1
Wholesale	2405640	.410529	.4919299	0	1
ResDev	2405640	.0112797	.1056055	0	1
Service	2405640	.0327044	.1778618	0	1
Active_Ind	2405640	.9679815	.1760492	0	1
IFO_eur	2405644	90.4237	14.28439	57.83898	116.5254
Cap_Util_EWU	2405644	81.42	2.935121	71.3	84.2
Prod_EWU_t~l	2405644	95.69111	7.489539	77.37417	108.9467
Prod_EWU_IM	2405644	95.26112	7.830695	75.84333	108.6858
Prod_EWU_Inv	2405644	94.61495	10.35161	70.60667	113.115
RoEbaT	980671	-.2026746	852.2335	-824357.6	176755.9
RoEbaT_a3	584945	.4730202	80.00559	-2086.45	58920.04
RoEbaT_s3	584945	.9098211	106.3689	0	78557.27
RR3	581989	767.4959	585805	-1.34e+08	1.97e+08
PaT_a3	615041	1489.154	47648.75	-1703807	7485862
PaT_s3	615041	789.3758	24976.43	0	7042040
RoEbaT_a5	337035	.4003556	62.63181	-1251.609	35352.16
RoEbaT_s5	337035	.9386527	99.90493	0	56561.51

Table 3.2. Correlations profit and capital variables

	OpProfit	**EBIT**	**PbT**	**PaT**
OpProfit	1.0000			
EBIT	1.0000	1.0000		
PbT	0.9904	0.9904	1.0000	
PaT	0.9847	0.9847	0.9932	1.0000

	CurrAsset	**WorkCap**	**SharHoFund**
CurrAsset	1.0000		
WorkCap	0.7996	1.0000	
SharHoFund	0.6603	0.5658	1.0000

Table 4.1. Results summary: profits after taxes

Model	(1)	(2)	(3)	(4)
Dep. Variable	**PaT**	**PaT**	**PaT_a3**	**PaT_a3**
PaT_s3	.3150263***	.6423641***	.4857649***	.5818913***
SharHoFund	.1691198***		.1222436***	
CurrAsset	-.1571605***		-.057165***	
WorkCap	.0069391***		.0182809***	
NACE2	-.2492013*		-.3479346**	
Year	790.6337		342.9812***	
Independence	-373.6141		-246.903	
Retail	643.9122		1032.424**	
Wholesale	942.1419**		1195.509***	
ResDev	3339.187***		3005.011***	
Service	-1092.534*		-1466.138**	
Active_Ind	-520.549		-387.2612	
DateInc	-8.670241		19.1599***	
IFO_eur	50.50429*		36.23006***	
Cap_Util_EWU	352.8594		114.7451	
Prod_EWU_total	-1164.381		180.5074	
Prod_EWU_IM	144.1346		-532.1258	
Prod_EWU_Inv	456.2698		128.461	
Observations	342186	615041	342186	615041
Groups (Firms)	68816	135340	68816	135340
R-sq. within	0.1041	0.0261	0.4031	0.2084
R-sq. between	0.6720	0.3864	0.6481	0.3965
R-sq. overall	0.4922	0.1999	0.6093	0.3077
Prob > chi2	0.0000	0.0000	0.0000	0.0000

Note. (i) All models estimated with random effects. (ii) All equations include a constant. (iii) *** denotes significant at the 1%, ** at the 5%, * at the 10% level.

Table 4.2. Results summary: return on shareholder funds – RE/FE models

Model	(5)	(6)	(7) fixed effects
Dep. Variable	**RoEbaT_a3**	**RoEbaT_a3**	**RoEbaT_a3**
RoEbaT_s3		.739143***	.7404886***
Year	.0496019		
NACE2	-.0005447*		
OpRev	5.34e-07		
COGS	-4.86e-07		
OpExp	-7.54e-07		
CurrAsset	-3.80e-07		
WorkCap	-1.09e-07		
France	-.1103064		
Germany	5.907157		
Greece	-.2940051		
Ireland	.0324365		
Netherlands	.9539049		
Poland	-.062561		
Portugal	-.3295639		
Russian_Fed	.8487541		
Sweden	-.018641		
CH	.2320946		
Ukraine	-.0166807		
UK	.2610084		
Independence	.2685334		
Manufactur~g	-1.040702		
Retail	.1369163		
Wholesale	.1522806		
ResDev	-.1524406		
Service	.1868506		
Active_Ind	.313417		
DateInc	.0100055		
IFO_eur	-.0644427		
Cap_Util_EWU	.9497316		
Prod_EWU_t~l	1.163247		
Prod_EWU_IM	-.6437047		
Prod_EWU_Inv	-.4892717		
Observations	333561	584945	584945
Groups (Firms)	68503	130841	130841
R-sq. within	0.0000	0.9730	0.9730
R-sq. between	0.0004	0.8790	0.8790
R-sq. overall	0.0001	0.9618	0.9618
Prob > chi2 (>F)	0.9534	0.0000	0.0000

Note. (i) Models (5) and (6) estimated with random effects; Model (7) estimated with fixed effects. (ii) All equations include a constant. (iii) *** denotes significant at the 1%, ** at the 5%, * at the 10% level.

Table 4.3. Results summary: return on shareholder funds – IV models

Model	(8)	(9)	(10)
Dep. Variable	**RoEbaT_a3**	**RoEbaT_a3**	**RoEbaT_a3**
RoEbaT_s3	.7531308***	.7613355***	.7618823***
OpRev		6.17e-07	
COGS		-5.69e-07	
OpExp		-7.17e-07	
CurrAsset		-2.40e-07	
WorkCap		1.28e-08	
SharHoFund		-2.82e-08	
Germany	4.385667***		
Russian_Fed	-.421388***		
UK	.0320813		
Independence	.1308139		
Retail	.0913744		
Service	.009429		
DateInc	-.0002586		
IFO_eur			
Lag 1	.0021687		
Observations	344956	576622	584945
Groups (Firms)	69792	130222	130841
R-sq. within	0.9797	0.9745	0.9730
R-sq. between	0.8698	0.8849	0.8790
R-sq. overall	0.9689	0.9644	0.9618
Prob > chi2 (>F)	0.0000	0.0000	0.0000

Note. (i) All models G2SLS RE IV regressions with RoEbaT_s3 instrumented by lagged values of RoEbaT and other variables. (ii) All equations include a constant. (iii) *** denotes significant at the 1%, ** at the 5%, * at the 10% level.

Table 5.1. Model (1) estimation and results

. xtreg PaT SharHoFund CurrAsset WorkCap NACE2 Year Independence Retail Wholesale ResDev Service Active_Ind DateInc IFO_eur Cap_Util_EWU Prod_EWU_total Prod_EWU_IM Prod_EWU_Inv PaT_s3,re

Random-effects GLS regression Number of obs = 342186
Group variable: BvD Number of groups = 68816

R-sq: within = 0.1041 Obs per group: min = 1
between = 0.6720 avg = 5.0
overall = 0.4922 max = 8

Random effects u_i ~ Gaussian Wald chi2(19) = 228587.32
corr(u_i, X) = 0 (assumed) Prob > chi2 = 0.0000

PaT	Coef.	Std. Err.	z	P>z	[95% Conf.	Interval]
SharHoFund	.1691198	.0006235	271.23	0.000	.1678977	.1703418
CurrAsset	-.1571605	.0018594	-84.52	0.000	-.1608048	-.1535161
WorkCap	.0069391	.0004566	15.20	0.000	.0060442	.007834
NACE2	-.2492013	.1467925	-1.70	0.090	-.5369094	.0385068
Year	790.6337	277.4237	2.85	0.004	246.8933	1334.374
Independence	-373.6141	228.4506	-1.64	0.102	-821.3691	74.14086
Retail	643.9122	443.7828	1.45	0.147	-225.8861	1513.71
Wholesale	942.1419	391.5091	2.41	0.016	174.7981	1709.486
ResDev	3339.187	726.1058	4.60	0.000	1916.046	4762.328
Service	-1092.534	640.002	-1.71	0.088	-2346.915	161.8472
Active_Ind	-520.549	466.6954	-1.12	0.265	-1435.255	394.1572
DateInc	-8.670241	5.932272	-1.46	0.144	-20.29728	2.956798
IFO_eur	50.50429	28.62581	1.76	0.078	-5.601266	106.6098
Cap_Util_EWU	352.8594	392.7304	0.90	0.369	-416.8781	1122.597
Prod_EWU_t~l	-1164.381	1313.048	-0.89	0.375	-3737.908	1409.146
Prod_EWU_IM	144.1346	704.5188	0.20	0.838	-1236.697	1524.966
Prod_EWU_Inv	456.2698	524.1343	0.87	0.384	-571.0146	1483.554
PaT_s3	.3150249	.0031922	98.69	0.000	.3087683	.3212815
_cons	-1543091	560683.5	-2.75	0.006	-2642011	-444171.8

sigma_u | 17268.108
sigma_e | 44822.111
rho | .12924167 (fraction of variance due to u_i)

Table 5.2. Model (2) estimation and results

. xtreg PaT PaT_s3,re

Random-effects GLS regression Number of obs = 615041
Group variable: BvD Number of groups = 135340

R-sq: within = 0.0261 Obs per group: min = 1
between = 0.3864 avg = 4.5
overall = 0.1999 max = 8

Random effects u_i ~ Gaussian Wald chi2(1) = 62054.63
corr(u_i, X) = 0 (assumed) Prob > chi2 = 0.0000

PaT	Coef.	Std. Err.	z	P>z	[95% Conf.	Interval]
PaT_s3	.6423641	.0025787	249.11	0.000	.63731	.6474182
_cons	932.8439	85.58743	10.90	0.000	765.0956	1100.592

sigma_u | 22244.375
sigma_e | 35546.18
rho | .28140822 (fraction of variance due to u_i)

Table 5.3. Model (3) estimation and results

. xtreg PaT_a3 SharHoFund CurrAsset WorkCap NACE2 Year Independence Retail Wholesale ResDev Service Active_Ind DateInc IFO_eur Cap_Util_EWU Prod_EWU_total Prod_EWU_IM Prod_EWU_Inv PaT_s3,re

Random-effects GLS regression Number of obs = 342186
Group variable: BvD Number of groups = 68816

R-sq: within = 0.4031 Obs per group: min = 1
between = 0.6481 avg = 5.0
overall = 0.6093 max = 8

Random effects u_i ~ Gaussian Wald chi2(18) = 313456.34
corr(u_i, X) = 0 (assumed) Prob > chi2 = 0.0000

PaT_a3	Coef.	Std. Err.	z	P>z	[95% Conf.	Interval]
SharHoFund	.1222436	.0004285	285.29	0.000	.1214038	.1230835
CurrAsset	-.057165	.0012828	-44.56	0.000	-.0596793	-.0546506
WorkCap	.0182809	.0002172	84.16	0.000	.0178552	.0187067
NACE2	-.3479346	.1537317	-2.26	0.024	-.6492431	-.0466261
Year	342.9812	127.4334	2.69	0.007	93.21638	592.746
Independence	-246.903	232.1537	-1.06	0.288	-701.916	208.11
Retail	1032.424	459.9427	2.24	0.025	130.9532	1933.896
Wholesale	1195.509	411.1747	2.91	0.004	389.6217	2001.397
ResDev	3005.011	769.1606	3.91	0.000	1497.484	4512.538
Service	-1466.138	675.9434	-2.17	0.030	-2790.963	-141.3135
Active_Ind	-387.2612	492.68	-0.79	0.432	-1352.896	578.3739
DateInc	19.1599	6.21326	3.08	0.002	6.982136	31.33767
IFO_eur	36.23006	12.99447	2.79	0.005	10.76136	61.69875
Cap_Util_EWU	114.7451	176.2098	0.65	0.515	-230.6197	460.1099
Prod_EWU_t~l	180.5074	595.9537	0.30	0.762	-987.5404	1348.555
Prod_EWU_IM	-532.1258	324.191	-1.64	0.101	-1167.529	103.2769
Prod_EWU_Inv	128.461	236.8455	0.54	0.588	-335.7477	592.6697
PaT_s3	.4857649	.0016033	302.99	0.000	.4826226	.4889072
_cons	-714980.2	257605.9	-2.78	0.006	-1219879	-210081.9

sigma_u | 26605.824
sigma_e | 20497.976
rho | .62752368 (fraction of variance due to u_i)

Table 5.4. Model (4) estimation and results

. xtreg PaT_a3 PaT_s3,re

Random-effects GLS regression Number of obs = 615041
Group variable: BvD Number of groups = 135340

R-sq: within = 0.2084 Obs per group: min = 1
between = 0.3965 avg = 4.5
overall = 0.3077 max = 8

Random effects u_i ~ Gaussian Wald chi2(1) = 169090.12
corr(u_i, X) = 0 (assumed) Prob > chi2 = 0.0000

PaT_a3	Coef.	Std. Err.	z	P>z	[95% Conf.	Interval]
PaT_s3	.5818913	.0014151	411.21	0.000	.5791178	.5846648
_cons	735.6148	79.05327	9.31	0.000	580.6733	890.5564

sigma_u | 25901.808
sigma_e | 18257.522
rho | .66807053 (fraction of variance due to u_i)

Table 5.5. Model (5) estimation and results

. xtreg RoEbaT_a3 Year NACE2 OpRev COGS OpExp CurrAsset WorkCap France Germany Greece Ireland Netherlands Poland Portugal Russian_Fed Sweden CH Ukraine UK Independence Manufacturing Retail Wholesale ResDev Service Active_Ind DateInc IFO_eur Cap_Util_EWU Prod_EWU_total Prod_EWU_IM Prod_EWU_Inv,re

Random-effects GLS regression Number of obs = 333561
Group variable: BvD Number of groups = 68503

R-sq: within = 0.0000 Obs per group: min = 1
between = 0.0004 avg = 4.9
overall = 0.0001 max = 8

Random effects u_i ~ Gaussian Wald chi2(32) = 19.88
corr(u_i, X) = 0 (assumed) Prob > chi2 = 0.9534

RoEbaT_a3	Coef.	Std. Err.	z	P>z	[95% Conf.	Interval]
Year	.0496019	.5931254	0.08	0.933	-1.112903	1.212106
NACE2	-.0005447	.0003036	-1.79	0.073	-.0011397	.0000504
OpRev	5.34e-07	2.90e-06	0.18	0.854	-5.16e-06	6.22e-06
COGS	-4.86e-07	2.95e-06	-0.16	0.869	-6.27e-06	5.30e-06
OpExp	-7.54e-07	4.11e-06	-0.18	0.854	-8.81e-06	7.30e-06
CurrAsset	-3.80e-07	4.21e-06	-0.09	0.928	-8.62e-06	7.86e-06
WorkCap	-1.09e-07	9.43e-07	-0.12	0.908	-1.96e-06	1.74e-06
France	-.1103064	3.710988	-0.03	0.976	-7.383709	7.163096
Germany	5.907157	3.245669	1.82	0.069	-.4542385	12.26855
Greece	-.2940051	.8374065	-0.35	0.726	-1.935292	1.347281
Ireland	.0324365	3.096087	0.01	0.992	-6.035783	6.100656
Netherlands	.9539049	1.964913	0.49	0.627	-2.897253	4.805063
Poland	-.062561	1.347777	-0.05	0.963	-2.704156	2.579034
Portugal	-.3295639	.8153737	-0.40	0.686	-1.927667	1.268539
Russian_Fed	.8487541	.8468052	1.00	0.316	-.8109536	2.508462
Sweden	-.018641	1.057636	-0.02	0.986	-2.091569	2.054287
CH	.2320946	5.794207	0.04	0.968	-11.12434	11.58853
Ukraine	-.0166807	.9590869	-0.02	0.986	-1.896456	1.863095
UK	.2610084	.8430097	0.31	0.757	-1.39126	1.913277
Independence	.2685334	.3863236	0.70	0.487	-.4886469	1.025714
Manufactur~g	-1.040702	.9081344	-1.15	0.252	-2.820613	.7392083
Retail	.1369163	.7713802	0.18	0.859	-1.374961	1.648794
Wholesale	.1522806	.6872482	0.22	0.825	-1.194701	1.499262
ResDev	-.1524406	1.151754	-0.13	0.895	-2.409836	2.104955
Service	.1868506	1.007281	0.19	0.853	-1.787383	2.161084
Active_Ind	.313417	.949335	0.33	0.741	-1.547245	2.174079
DateInc	.0100055	.0098322	1.02	0.309	-.0092653	.0292764
IFO_eur	-.0644427	.06186	-1.04	0.298	-.1856861	.0568007
Cap_Util_EWU	.9497316	.8570719	1.11	0.268	-.7300985	2.629562
Prod_EWU_t~l	1.163247	2.817218	0.41	0.680	-4.358399	6.684892
Prod_EWU_IM	-.6437047	1.499249	-0.43	0.668	-3.582179	2.294769
Prod_EWU_Inv	-.4892717	1.12757	-0.43	0.664	-2.699269	1.720726
_cons	-191.9444	1199.686	-0.16	0.873	-2543.285	2159.396

sigma_u | 0
sigma_e | 106.33263
rho | 0 (fraction of variance due to u_i)

Table 5.6. Model (6) estimation and results

. xtreg RoEbaT_a3 RoEbaT_s3,re

Random-effects GLS regression Number of obs = 584945
Group variable: BvD Number of groups = 130841

R-sq: within = 0.9730 Obs per group: min = 1
between = 0.8790 avg = 4.5
overall = 0.9618 max = 8

Random effects u_i ~ Gaussian Wald chi2(1) = 1.72e+07
corr(u_i, X) = 0 (assumed) Prob > chi2 = 0.0000

RoEbaT_a3	Coef.	Std. Err.	z	P>z	[95% Conf.	Interval]
RoEbaT_s3	.739143	.0001783	4146.03	0.000	.7387936	.7394924
_cons	-.2062312	.0276325	-7.46	0.000	-.2603899	-.1520725

sigma_u | 6.9255879
sigma_e | 13.481103
rho | .20880693 (fraction of variance due to u_i)

Table 5.7. Model (7) estimation and results

. xtreg RoEbaT_a3 RoEbaT_s3,fe

Fixed-effects (within) regression Number of obs = 584945
Group variable: BvD Number of groups = 130841

R-sq: within = 0.9730 Obs per group: min = 1
between = 0.8790 avg = 4.5
overall = 0.9618 max = 8

F(1,454103) = 1.64e+07
corr(u_i, Xb) = -0.0296 Prob > F = 0.0000

RoEbaT_a3	Coef.	Std. Err.	t	P>t	[95% Conf.	Interval]
RoEbaT_s3	.7404886	.0001831	4044.73	0.000	.7401298	.7408474
_cons	-.200692	.0176274	-11.39	0.000	-.2352411	-.1661429

sigma_u | 10.718748
sigma_e | 13.481103
rho | .38732056 (fraction of variance due to u_i)

F test that all u_i=0: F(130840, 454103) = 2.54 Prob > F = 0.0000

Table 5.8. Model (8) estimation and results

. xtivreg RoEbaT_a3 Germany Russian_Fed UK Independence Retail Service DateInc
l.IFO_eur (RoEbaT_s3 = RoEbaT l.RoEbaT l2.RoEbaT), re first

First-stage G2SLS regression

Number of obs = 344956
Wald chi(11) = 2.3e+07
Prob > chi2 = 0.0000

RoEbaT_s3	Coef.	Std. Err.	z	P>z	[95% Conf.	Interval]
Germany	1.187542	.736581	1.61	0.107	-.2561302	2.631214
Russian_Fed	.645984	.1388069	4.65	0.000	.3739275	.9180405
UK	.2061017	.1392995	1.48	0.139	-.0669203	.4791238
Independence	-.2308548	.1034365	-2.23	0.026	-.4335866	-.0281231
Retail	-.0727917	.1309406	-0.56	0.578	-.3294305	.1838471
Service	.2290313	.2892477	0.79	0.428	-.3378838	.7959465
DateInc	.0058316	.0026575	2.19	0.028	.000623	.0110402
IFO_eur						
L1.	-.0010325	.0024964	-0.41	0.679	-.0059254	.0038603
RoEbaT						
--.	.0633732	.0014707	43.09	0.000	.0604908	.0662557
L1.	-.1238788	.0015089	-82.10	0.000	-.1268362	-.1209213
L2.	.4420455	.0000926	4775.38	0.000	.4418641	.4422269
_cons	-10.94784	5.289392	-2.07	0.038	-21.31486	-.5808254

G2SLS random-effects IV regression Number of obs = 344956
Group variable: Number of groups = 69792
R-sq: within = 0.9797 Obs per group: min = 1
between = 0.8698 avg = 4.9
overall = 0.9689 max = 8
Wald chi2(9) = 1.40e+07
corr(u_i, X) = 0 (assumed) Prob > chi2 = 0.0000

RoEbaT_a3	Coef.	Std. Err.	z	P>z	[95% Conf.	Interval]
RoEbaT_s3	.7531308	.0002013	3740.77	0.000	.7527362	.7535254
Germany	4.385667	.7081678	6.19	0.000	2.997684	5.773651
Russian_Fed	-.421388	.1334807	-3.16	0.002	-.6830053	-.1597707
UK	.0320813	.1339533	0.24	0.811	-.2304623	.2946248
Independence	.1308139	.0994673	1.32	0.188	-.0641384	.3257662
Retail	.0913744	.125916	0.73	0.468	-.1554164	.3381653
Service	.009429	.2781481	0.03	0.973	-.5357312	.5545892
DateInc	-.0002586	.0025555	-0.10	0.919	-.0052674	.0047501
IFO_eur						
L1.	.0021687	.0024006	0.90	0.366	-.0025364	.0068738
_cons	.0561135	5.086377	0.01	0.991	-9.913002	10.02523

sigma_u | 9.9607548
sigma_e | 14.92439
rho | .30817018 (fraction of variance due to u_i)

Instrumented: RoEbaT_s3
Instruments: Germany Russian_Fed UK Independence Retail Service DateInc L.IFO_eur
RoEbaT L.RoEbaT L2.RoEbaT

Table 5.9. Model (9) estimation and results

```
. xtivreg RoEbaT_a3  OpRev COGS OpExp CurrAsset WorkCap SharHoFund (RoEbaT_s3 = RoEbaT
        l.RoEbaT l2.RoEbaT), re first

First-stage G2SLS regression
                                  Number of obs    =     576622
                                  Wald chi(9)      =    2.0e+07
                                  Prob > chi2      =     0.0000
```

RoEbaT_s3	Coef.	Std. Err.	z	P>z	[95% Conf.	Interval]
OpRev	-4.33e-07	6.87e-07	-0.63	0.529	-1.78e-06	9.15e-07
COGS	4.18e-07	6.90e-07	0.61	0.544	-9.34e-07	1.77e-06
OpExp	6.21e-07	8.84e-07	0.70	0.482	-1.11e-06	2.35e-06
CurrAsset	6.65e-08	1.08e-06	0.06	0.951	-2.04e-06	2.17e-06
WorkCap	-7.81e-09	1.72e-07	-0.05	0.964	-3.45e-07	3.29e-07
SharHoFund	-8.74e-08	2.93e-07	-0.30	0.766	-6.62e-07	4.87e-07
RoEbaT						
--.	.3612711	.0006823	529.51	0.000	.3599339	.3626083
L1.	.3177225	.0006773	469.09	0.000	.316395	.31905
L2.	.4399816	.0000991	4441.82	0.000	.4397874	.4401757
_cons	.3799265	.0380757	9.98	0.000	.3052995	.4545535

```
G2SLS random-effects IV regression      Number of obs      =    576622
Group variable: BvD                     Number of groups   =    130222
R-sq:  within  = 0.9745                 Obs per group: min =         1
       between = 0.8849                                avg =       4.4
       overall = 0.9644                                max =         8
                                        Wald chi2(7)       =  1.87e+07
corr(u_i, X) = 0 (assumed)              Prob > chi2        =    0.0000
```

RoEbaT_a3	Coef.	Std. Err.	z	P>z	[95% Conf.	Interval]
RoEbaT_s3	.7613355	.0001761	4323.58	0.000	.7609903	.7616806
OpRev	6.17e-07	5.41e-07	1.14	0.254	-4.44e-07	1.68e-06
COGS	-5.69e-07	5.43e-07	-1.05	0.295	-1.63e-06	4.96e-07
OpExp	-7.17e-07	6.96e-07	-1.03	0.303	-2.08e-06	6.47e-07
CurrAsset	-2.40e-07	8.47e-07	-0.28	0.777	-1.90e-06	1.42e-06
WorkCap	1.28e-08	1.35e-07	0.09	0.925	-2.53e-07	2.78e-07
SharHoFund	-2.82e-08	2.31e-07	-0.12	0.903	-4.81e-07	4.24e-07
_cons	-.224224	.0299777	-7.48	0.000	-.2829792	-.1654688

```
  sigma_u |  8.2983538
  sigma_e |  13.345309
      rho |  .27884148   (fraction of variance due to u_i)
------------------------------------------------------------------------------
Instrumented:  RoEbaT_s3
Instruments:   OpRev COGS OpExp CurrAsset WorkCap SharHoFund RoEbaT L.RoEbaT
               L2.RoEbaT
------------------------------------------------------------------------------
```

Table 5.10. Model (10) estimation and results

. xtivreg RoEbaT_a3 (RoEbaT_s3 = RoEbaT l.RoEbaT l2.RoEbaT), re first

First-stage G2SLS regression

Number of obs = 584945
Wald chi(3) = 1.9e+07
Prob > chi2 = 0.0000

RoEbaT_s3	Coef.	Std. Err.	z	P>z	[95% Conf.	Interval]
RoEbaT						
--.	.3446768	.0006767	509.37	0.000	.3433505	.346003
L1.	.3155672	.000687	459.35	0.000	.3142207	.3169136
L2.	.4398766	.0001008	4362.47	0.000	.439679	.4400743
_cons	.3965918	.0392706	10.10	0.000	.3196228	.4735608

G2SLS random-effects IV regression Number of obs = 584945
Group variable: BvD Number of groups = 130841

R-sq: within = 0.9730 Obs per group: min = 1
between = 0.8790 avg = 4.5
overall = 0.9618 max = 8

Wald chi2(1) = 1.79e+07
corr(u_i, X) = 0 (assumed) Prob > chi2 = 0.0000

RoEbaT_a3	Coef.	Std. Err.	z	P>z	[95% Conf.	Interval]
RoEbaT_s3	.7618823	.0001802	4228.85	0.000	.7615292	.7622354
_cons	-.2292628	.0310601	-7.38	0.000	-.2901394	-.1683862

sigma_u | 8.7433885
sigma_e | 13.641844
rho | .2911742 (fraction of variance due to u_i)

Instrumented: RoEbaT_s3
Instruments: RoEbaT L.RoEbaT L2.RoEbaT
