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Financial frictions and the K/L ratio in UK manufacturing industries

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**Financial frictions and the K/L ratio in UK
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Marina-Eliza Spaliara

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Dept Economics
Loughborough University
Loughborough
LE11 3TU United Kingdom
Tel: + 44 (0) 1509 222701
Fax: + 44 (0) 1509 223910
<http://www.lboro.ac.uk/departments/ec>



Financial frictions and the K/L ratio in UK manufacturing industries*

Marina-Eliza Spaliara

Loughborough University and Kiel Institute for the World Economy

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Abstract

Using comprehensive financial data on UK unquoted firms, we investigate whether technological differences of UK manufacturing industries influence the response of firms' capital-labour ratio (K/L) to changes in financial indicators under capital market imperfections. The results reveal that cash flow has a positive impact on the K/L ratio for constrained firms in high tech industries and a negative impact for firms with similar characteristics in low tech industries. Specifically, the sensitivity of the K/L ratio to cash flow not only depends on firms' net worth and financial frictions, but most importantly on firms' industry affiliation.

JEL classification: E22, D92, E44

Key words: Financial frictions, Capital-labour ratio, Manufacturing industries

*Correspondence to Marina-Eliza Spaliara; Department of Economics, Loughborough University, Loughborough, Leics, LE11 3TU, UK. E-mail: M.Spaliara@lboro.ac.uk. The author would like to thank Spiros Bougheas, Simor Price, and seminar participants at the Annual Money Macro and Finance conference.

1 Introduction

Empirical and theoretical studies of firm investment and employment suggest that changes in net worth and consequently in firms' real decisions (investment, employment) arise from information problems in financial markets (see Bond and van Reenen (2006), for a survey). Evidence from the UK, presented by Guariglia (2008) and Nickell and Nicolitsas (1999), reveal the significant impact of financial constraints on firms' fixed investment and employment choices. Recently, Spaliara (2009), considered the effects of financial indicators on both investment and hiring decisions to examine how financial constraints affect the allocation of funds between capital and labour when decisions on both inputs have to be taken simultaneously rather than independently. Results show that firms' capital-labour ratio is affected directly by financial variables and when firms are classified to more and less financially constrained it is found that the former group faces a greater sensitivity of the K/L ratio.

In this paper, we examine whether technological differences influence the response of the K/L ratio to changes in financial indicators in the presence of market imperfections. To motivate our analysis, suppose that firms operating in different industrial groups, experience a permanent increase in the demand for their products. Firms that are less likely to be financially constrained should be able to expand both inputs (K, L) using external and internal funds, irrespective of their industry affiliation. On the other hand, firms that are likely to be more financially constrained in high tech (capital intensive) industries have to use their internal funds to invest mainly on physical capital to satisfy partially the increase in demand. Thus, it should be expected an increase in the K/L ratio. Yet, the same group of firms in low tech (labour intensive) industries might satisfy partially the demand by hiring more labour using their own sources. For these firms we should anticipate a decrease in the K/L ratio. Motivated by this consideration we argue that the sensitivity of the K/L ratio might not only depend on firms' net worth and financial frictions, but most importantly on firms' industry affiliation.

This paper is an intra-industry and inter-industry evaluation of the impact of financial indicators on the K/L ratio for firms that operate in technologically different manufacturing industries. An important feature of our analysis is that we have access to a large panel of financial data on UK firms, extracted from the FAME database, most of which are unquoted on the stock market. This is an appealing characteristic of the data as it allows our measures of capital market imperfections to display a wide degree of variation across observations in our sample. Hence, we will be able to identify firms that are likely to be financially constrained and study their nexus with the K/L ratio across industries.

The paper is structured as follows. The next section presents the data. Section 3 describes the econometric results. The final section concludes.

2 Data analysis

The data come from two sources. The first is FAME, which is a UK financial database created and distributed by Bureau Van Dijk complemented by STAN, the source for data on industry level maintained by the Economic Analysis and Statistics Division of OECD's Directorate for Science. We draw our data on firm-specific and financial indicators for all UK manufacturing firms from FAME between 1994-2004 and we extract information on investment and output at the industry level from STAN.

A distinguishing characteristic of FAME database is that it includes a majority of unquoted firms which are not traded on the stock market allowing for a high degree of heterogeneity amongst firms. This is an important advantage since earlier US and UK studies on financing constraints and firms' real activities employed data on listed firms which are unlikely to display a wide range of financial constraints. We are able therefore to consider a sample of non-publicly traded firms which are in general the smallest, youngest and most bank-dependent firms and therefore are more likely to be financially constrained.

Applying normal selection criteria, we exclude companies that did not have complete records for all explanatory variables, we also exclude observations in the 0.5 percent from upper and lower tails of the distribution of the variables, and we make the restriction that firms have at least three consecutive time-series observations. We start our empirical analysis with 14,700 firms. Following Blundell et al. (1992) firms are allocated to one of the following nine industrial groups: food, drink and tobacco; textiles, clothing, leather and footwear; chemicals and man made fibres; other minerals and mineral products; metal and metal goods; electrical and instrument engineering; motor vehicles and parts, other transport equipment; mechanical engineering; and others.

To account for financial frictions arising from asymmetric information we distinguish our sample between firms that are more or less likely to be financially constrained using size as a sorting device. The importance of size in firms' real decisions was emphasized in the empirical financing constraints literature. Mizen and Vermeulen (2005), Bougheas et al. (2006) and Guariglia (2008), use this variable as a proxy for capital market access for firms in the manufacturing sector. Small firms are associated with a higher degree of information asymmetry, they are more vulnerable to capital market imperfections and therefore are more likely to be financially constrained. We construct the dummy $SMALL_{it}$, which is equal to

one if the firm’s real total assets are below the upper quartile of the size distribution and zero otherwise. It should be expected the response of the K/L ratio to changes in financial variables to be higher for small firms compared to their large counterparts within and across all nine manufacturing industries.

3 Econometric results

Our task is to estimate the intra-industry and inter-industry sensitivity of the K/L ratio to financial indicators under market imperfections. To this end we specify the following equation:

$$y_{it} = X_{it}\beta + F_{it}D_{it}\gamma + F_{it}(1 - D_{it})\delta + e_{it} \quad (1)$$

where y_{it} is the log of capital-labour ratio (K/L), K is the replacement value of capital stock and L is the number of employees. X_{it} consists of *PRICE*, the log of the industry variable user cost of capital to average firm wages and *SALES*, the log of real sales. F_{it} is the vector of financial variables which is composed of *COLLATERAL*, the ratio of tangible assets to total assets, *LEVERAGE*, the ratio of total liabilities to total assets, and *CASH FLOW*, the sum of after tax profit and depreciation normalised by total assets. Vector F_{it} is interacted with the dummy vector D_{it} , which reflects the binary variable size, defined as the firm’s real total assets, and this is our measure of financing constraints at the firm level. e_{it} , is the error term made up of a firm-specific component, a time-specific component accounting for business cycle effects, an industry-specific component accounting for industry dynamics, an industry specific component which varies across time and accounts for industry-specific shifts across the time period and lastly an idiosyncratic component.

To estimate our specification we employ the First-Differenced GMM approach (see Arellano and Bond (1991)) which considers both the endogeneity bias and the unobserved heterogeneity problems. To remove unobserved firm-specific and time invariant industry-specific effects, the model is specified in first differences, whereas to control for endogeneity concerns the right hand side variables in the first-differenced equation are instrumented by using the levels of the series involved, lagged by two or more periods. To test the validity of the additional instruments we use the GMM test of overidentifying restrictions, or Sargan/Hansen test and to evaluate whether the model is correctly specified we use the $m2$ test statistic.

Our results of estimating Eq.(1) are presented in Table 1. An intra-industry inspection of the interacted coefficients shows significant differences between constrained and unconstrained firms for all nine manufacturing industries. The K/L ratio tends to be more sensitive to cash flow and leverage for small firms compared to their large counterparts, with the only

exception being collateral. The significant impact of cash flow on the K/L ratio for constrained firms shows that small firms retain cash flow as a buffer stock to reach a target K/L ratio.¹ High levels of debt, proxied by leverage, deteriorate small firms' financial health affecting negatively the K/L ratio. The insignificant coefficients for large firms may be explained by the fact that they are less informationally opaque and have access to external funding sources. As for the collateral variable, the p-values for the test of equality for the two groups of firms indicate that they are not significantly different from each other pointing out the importance of collateralized assets on firms' K/L ratio.² The control variables, price (the ratio of factor prices) and sales, have the expected negative and significant effect on the K/L ratio. One should note that the Sargan (J) and $m2$ tests statistics provide support for the choice of the instruments and the specification of the model. Thus, grouping firms into different industries gives further support to the important role of financial frictions in firms' K/L ratio.

Focusing now on the inter-industry differences of the coefficients on the financial indicators, our attention is captured by the sign reversal of cash flow for the constrained group of firms. By estimating Eq.(1) for nine technologically different industries we show that the coefficients on cash flow for industries 6,7 and 8 attain a positive sign, whilst the coefficients on cash flow for the remaining industries (1,2,3,5 and 9) attract a negative sign, indicating the significant impact of the internal funds variable on the K/L ratio. Industry 4 exerts insignificant coefficients on cash flow.

The positive linkage between cash flow and the K/L ratio for more constrained firms, as shown in columns 6,7 and 8 in Table 1, implies that firms facing financial problems and having inadequate access to external debt use their cash flow to finance their K/L ratio. Although financially constrained firms cannot invest optimally in capital due to some technological impediment to adjusting capital quickly, the capital intensive nature of high tech and medium-high tech industries, in which firms operate, drives them to channel their internal funds on the investment of capital.³ The negative relation between cash flow and the K/L ratio for the constrained group of firms is presented in columns 1,2,3,5 and 9. When firms face difficulties in obtaining external finance, its employment should be more

¹ We elaborate on the sign of cash flow in the next paragraphs.

² To ensure robustness, we also use bank dependency and collateral as alternative measures of financing constraints (see Kashyap et al. (1993) and Almeida et al. (2004)). We split firms between more and less bank-dependent and high and low collateralised and estimate Eq.(1) to capture any intra-industry and inter-industry variations between constrained and unconstrained firms. Results are very similar both quantitatively and qualitatively. See Tables A-1 and A-2 in the Appendix.

³According to OECD's sectoral classification (Hatzichronoglou (1997)) industries 6,7 and 8 are classified as medium-high tech and high tech industries, while industries 1,2,3,5 and 9 as low tech and medium-low tech industries.

sensitive to the availability of its internal funds. This is of particular importance especially for firms that operate in low tech and medium-low tech industries, which on average are labour intensive. Constrained firms will satisfy demand using labour more intensively. As for the leverage and collateral variables, they retain their negative and positive effect on the K/L ratio respectively, across all industries.

To confirm the robustness of our results in Table 1, we estimate Eq.(1) employing a dynamic approach given the speed and the time of capital and labour adjustment. Our findings presented in Table 2 show that financial indicators interacted with the small dummy retain their significance within and across industries.⁴ Once again, it is confirmed the existence of a positive (negative) nexus between the K/L ratio and cash flow for constrained firms operating in more capital (labour) intensive industries.⁵

4 Conclusion

In this paper we find evidence that financial frictions and firms' net worth play a significant role in firms' K/L ratio across UK manufacturing industries. More importantly, cash flow has a positive impact on the K/L ratio for constrained firms operating in high tech industries and a negative impact for firms with similar characteristics in low tech industries. We conclude that firms' industry affiliation is the most important factor in shaping the response of the K/L ratio to changes in internal funds.

⁴ Tables A-3 and A-4 in the Appendix show that estimated results in a dynamic setting remain largely unchanged when bank dependency and collateral are used as alternative measures of constraints.

⁵ To test the consistency of our findings based on the industrial grouping, instead of splitting firms into nine industries, we allocate them into high tech and low tech industries based on Görg and Strobl (2003) (i.e. high tech sectors are Aerospace, Computers & Office Machinery, Electronics & Communications, Pharmaceuticals, Scientific Instruments, Electrical Machinery, Motor Vehicles, Chemicals, Non-electrical Machinery). The results, which are not reported for brevity, remain unchanged.

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Table 1: Intra-industry and inter-industry comparison of the K/L ratio under financial frictions

	Industry 1	Industry 2	Industry 3	Industry 4	Industry 5	Industry 6	Industry 7	Industry 8	Industry 9
	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)
$Price_{it}$	-0.494*** (-6.16)	-0.829*** (-9.50)	-0.455*** (-5.42)	-0.394*** (-3.11)	-0.621*** (-9.12)	-0.523*** (-7.61)	-0.807*** (-5.62)	-0.649*** (-10.33)	-0.530*** (-12.38)
$Sales_{it}$	-0.715*** (-9.60)	-0.664*** (-8.02)	-0.613*** (-6.29)	-0.691*** (-4.29)	-0.675*** (-12.49)	-0.586*** (-11.41)	-0.869*** (-9.24)	-0.703*** (-16.09)	-0.683*** (-18.15)
$CashFlow_{it} * Small_{it}$	-0.386*** (-2.94)	-0.359** (-2.56)	-0.344** (-2.11)	-0.081 (-0.29)	-0.165* (-1.88)	0.170** (2.09)	0.379** (1.99)	0.244** (2.02)	-0.549** (-2.08)
$CashFlow_{it} * (1 - Small_{it})$	-0.203 (-1.02)	-0.178 (-0.86)	-0.194 (-0.44)	-0.056 (-0.19)	0.033 (0.19)	-0.181 (-0.48)	0.204 (0.59)	0.187 (0.98)	-0.048 (-0.60)
$Collateral_{it} * Small_{it}$	0.265*** (9.85)	0.329*** (5.71)	0.290*** (4.89)	0.405*** (9.73)	0.272*** (3.15)	0.324*** (14.66)	0.377*** (5.01)	0.278*** (3.39)	0.326*** (19.69)
$Collateral_{it} * (1 - Small_{it})$	0.304*** (10.88)	0.383*** (6.83)	0.306*** (6.07)	0.391*** (9.25)	0.283*** (4.28)	0.388*** (14.64)	0.435*** (6.36)	0.391*** (3.67)	0.342*** (17.95)
$Leverage_{it} * Small_{it}$	-0.160** (-2.29)	-0.165** (-2.04)	-0.097* (-1.82)	-0.146*** (-2.88)	-0.044** (-2.38)	-0.081** (-2.28)	-0.130** (-2.00)	-0.097** (-2.04)	-0.094*** (-3.13)
$Leverage_{it} * (1 - Small_{it})$	-0.065 (-1.60)	-0.073 (-1.27)	0.026 (0.55)	0.034 (0.70)	0.023 (0.80)	-0.003 (-0.10)	0.026 (0.45)	-0.010 (-0.17)	-0.032 (-1.37)
$JStatistic$	0.415	0.187	0.109	0.970	0.128	0.104	0.419	0.501	0.602
$m2$	0.204	0.741	0.528	0.033	0.788	0.302	0.715	0.375	0.039
$Observations$	1665	1239	2635	588	3501	2732	764	1535	5236
$Instruments$	t-2; t-3; t-4	t-2; t-3; t-4	t-2; t-3; t-4	t-2; t-3; t-4	t-2; t-3; t-4	t-2; t-3; t-4	t-2; t-3; t-4	t-2; t-3; t-4	t-2; t-3; t-4

Notes: Dependent variable is $\log(\text{capital}/\text{labour})$. All specifications were estimated using the GMM first-differenced specification. The figures reported in parentheses are t-statistics. * significant at 10%; ** significant at 5%; *** significant at 1%. $SMALL_{it}$ is equal to 1 for firms in the bottom 75% of their real assets distribution in year t , and 0, otherwise. Time dummies and time dummies interacted with industry dummies were included in all specifications. $m2$ is a test for second-order serial correlation in the first-differenced residuals, and the J statistic is a test of the overidentifying restrictions.

Table 2: Dynamic estimation

	Industry 1	Industry 2	Industry 3	Industry 4	Industry 5	Industry 6	Industry 7	Industry 8	Industry 9
	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)
$(K/L)_{i(t-1)}$	0.096 (1.63)	0.008 (0.10)	0.182*** (4.07)	0.125** (2.51)	0.099*** (3.10)	0.182*** (5.87)	0.066 (1.09)	0.110** (2.29)	0.136*** (3.80)
$Price_{it}$	-0.552*** (-5.52)	-0.851*** (-7.83)	-0.426*** (-3.99)	-0.524*** (-3.83)	-0.647*** (-8.89)	-0.649*** (-8.26)	-0.791*** (-4.54)	-0.646*** (-8.02)	-0.548*** (-10.40)
$Sales_{it}$	-0.816*** (-11.95)	-0.730*** (-11.58)	-0.577*** (-6.21)	-0.890*** (-8.25)	-0.708*** (-17.99)	-0.735*** (-16.53)	-0.830*** (-11.26)	-0.737*** (-12.55)	-0.732*** (-14.55)
$CashFlow_{it} * Small_{it}$	-0.346* (-1.70)	-0.235* (-1.72)	-0.375* (-1.89)	-0.143 (-0.57)	-0.214* (-1.69)	0.260** (2.19)	0.506** (2.08)	0.343** (2.55)	-0.536* (-1.87)
$CashFlow_{it} * (1 - Small_{it})$	-0.418 (-1.61)	-0.170 (-0.71)	-0.181 (-0.64)	0.214 (0.56)	0.011 (0.06)	0.189 (1.09)	0.095 (0.26)	0.281 (1.48)	-0.042 (-0.46)
$Collateral_{it} * Small_{it}$	0.233*** (5.23)	0.303*** (4.24)	0.290*** (9.18)	0.300*** (6.80)	0.280*** (9.28)	0.317*** (11.97)	0.322*** (6.49)	0.371*** (8.07)	0.312*** (15.10)
$Collateral_{it} * (1 - Small_{it})$	0.265*** (4.54)	0.416*** (6.41)	0.298*** (10.60)	0.286*** (6.51)	0.301*** (12.96)	0.375*** (12.12)	0.408*** (5.89)	0.424*** (6.83)	0.338*** (13.05)
$Leverage_{it} * Small_{it}$	-0.148*** (-3.83)	-0.108 (-1.26)	-0.064** (-2.41)	-0.117** (-2.46)	-0.061 (-1.55)	-0.094** (-2.11)	0.022 (0.40)	-0.164* (-1.82)	-0.077* (-1.73)
$Leverage_{it} * (1 - Small_{it})$	-0.062 (-1.29)	-0.079 (-1.18)	0.035 (1.24)	0.085 (1.61)	0.006 (0.21)	-0.004 (-0.10)	0.166*** (2.80)	-0.065 (-0.91)	-0.018 (-0.51)
$JStatistic$	0.752	0.374	0.084	0.993	0.127	0.347	0.253	0.209	0.560
$m2$	0.200	0.521	0.469	0.302	0.181	0.740	0.896	0.552	0.109
$Observations$	1196	871	1882	443	2481	1931	540	1057	3689
$Instruments$	t-2; t-3; t-4	t-2; t-3; t-4	t-2; t-3; t-4	t-2; t-3; t-4	t-2; t-3; t-4	t-2; t-3; t-4	t-2; t-3; t-4	t-2; t-3; t-4	t-2; t-3; t-4

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Notes: Dependent variable is $\log(\text{capital}/\text{labour})$. All specifications were estimated using the GMM first-differenced specification. The figures reported in parentheses are t-statistics. * significant at 10%; ** significant at 5%; *** significant at 1%. Time dummies and time dummies interacted with industry dummies were included in all specifications. $m2$ is a test for second-order serial correlation in the first-differenced residuals, and the J statistic is a test of the overidentifying restrictions. See notes to Table 1.

Table A-1: Alternative measures of constraints: Collateral

	Industry 1	Industry 2	Industry 3	Industry 4	Industry 5	Industry 6	Industry 7	Industry 8	Industry 9
	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)
$Price_{it}$	-0.479*** (-5.87)	-0.824*** (-9.11)	-0.417*** (-4.72)	-0.376*** (-2.63)	-0.637*** (-9.44)	-0.550*** (-8.48)	-0.831*** (-5.45)	-0.649*** (-10.50)	-0.520*** (-11.99)
$Sales_{it}$	-0.715*** (-10.81)	-0.686*** (-14.50)	-0.544*** (-4.67)	-0.735*** (-4.05)	-0.702*** (-16.21)	-0.633*** (-17.72)	-0.977*** (-8.02)	-0.707*** (-16.50)	-0.675*** (-14.41)
$CashFlow_{it} * Low Coll_{it}$	-0.277* (-1.87)	-0.436*** (-2.94)	-0.445*** (-2.68)	-0.162 (-0.59)	-0.522* (-1.94)	0.212*** (2.59)	0.447** (2.21)	0.214** (2.16)	-0.500* (-1.88)
$CashFlow_{it} * (1 - Low Coll_{it})$	-0.331 (-0.98)	-0.806 (-1.27)	-0.216 (-1.55)	0.004 (0.02)	-0.300 (-1.49)	0.099 (1.33)	0.422 (1.32)	0.087 (0.41)	-0.117 (-1.20)
$Collateral_{it} * Low Coll_{it}$	0.302*** (9.80)	0.486*** (9.83)	0.361*** (10.62)	0.384*** (9.52)	0.379*** (16.50)	0.512*** (13.87)	0.345*** (3.52)	0.598*** (10.25)	0.399*** (19.67)
$Collateral_{it} * (1 - Low Coll_{it})$	0.231*** (6.07)	0.267*** (4.71)	0.330*** (9.36)	0.340*** (8.66)	0.286*** (12.07)	0.284*** (9.25)	0.296*** (2.92)	0.279*** (5.92)	0.292*** (15.06)
$Leverage_{it} * Low Coll_{it}$	-0.169*** (-3.89)	-0.195*** (-2.60)	-0.077* (-1.83)	-0.100** (-1.98)	-0.089*** (-2.67)	-0.108*** (-2.79)	0.035 (0.40)	-0.182** (-2.51)	-0.118*** (-3.75)
$Leverage_{it} * (1 - Low Coll_{it})$	-0.051 (-0.59)	0.055 (1.23)	-0.105 (-1.38)	-0.045 (-0.78)	0.035 (1.32)	0.062 (0.87)	0.033 (0.36)	0.111 (1.04)	-0.006 (-0.34)
$JStatistic$	0.204	0.394	0.249	0.994	0.569	0.512	0.767	0.352	0.789
$m2$	0.190	0.610	0.695	0.056	0.713	0.586	0.788	0.399	0.111
$Observations$	1665	1239	2635	588	3501	2732	764	1535	5236
$Instruments$	t-2; t-3; t-4	t-2; t-3; t-4	t-2; t-3; t-4	t-2; t-3; t-4	t-2; t-3; t-4	t-2; t-3; t-4	t-2; t-3; t-4	t-2; t-3; t-4	t-2; t-3; t-4

9

Notes: Dependent variable is $\log(\text{capital}/\text{labour})$. All specifications were estimated using the GMM first-differenced specification. The figures reported in parentheses are t-statistics. * significant at 10%; ** significant at 5%; *** significant at 1%. $Low Coll_{it}$ is equal to 1 for firms in the bottom 75% of their collateral ratio distribution in year t , and 0, otherwise. Time dummies and time dummies interacted with industry dummies were included in all specifications. $m2$ is a test for second-order serial correlation in the first-differenced residuals, and the J statistic is a test of the overidentifying restrictions.

Table A-2: Alternative measures of constraints: Bank Dependency

	Industry 1	Industry 2	Industry 3	Industry 4	Industry 5	Industry 6	Industry 7	Industry 8	Industry 9
	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)
<i>Price_{it}</i>	-0.489*** (-5.96)	-0.825*** (-9.47)	-0.470*** (-5.17)	-0.445*** (-3.02)	-0.610*** (-9.04)	-0.551*** (-8.44)	-0.716*** (-4.99)	-0.653*** (-10.69)	-0.535*** (-12.42)
<i>Sales_{it}</i>	-0.695*** (-10.67)	-0.673*** (-14.36)	-0.658*** (-6.13)	-0.756*** (-5.52)	-0.648*** (-17.35)	-0.630*** (-17.71)	-0.733*** (-11.43)	-0.696*** (-15.90)	-0.737*** (-23.43)
<i>CashFlow_{it}*MoreBank_{it}</i>	-0.381** (-2.51)	-0.433** (-2.47)	-0.424*** (-3.04)	0.126 (0.51)	-0.170 (-1.65)	0.215*** (2.98)	0.375* (1.74)	0.250** (2.04)	-0.089* (-1.71)
<i>CashFlow_{it}*(1-MoreBank_{it})</i>	-0.348 (-1.30)	0.288 (0.68)	-0.301 (-1.47)	-0.887 (-1.28)	-0.166 (-0.98)	0.050 (0.40)	0.045 (0.19)	0.053 (0.28)	-0.237 (-0.95)
<i>Collateral_{it}*MoreBank_{it}</i>	0.271*** (9.64)	0.337*** (6.33)	0.352*** (6.24)	0.365*** (10.47)	0.221*** (6.05)	0.340*** (13.63)	0.286*** (4.17)	0.372*** (9.75)	0.328*** (20.22)
<i>Collateral_{it}*(1-MoreBank_{it})</i>	0.265*** (8.93)	0.301*** (4.03)	0.325*** (6.24)	0.357*** (9.16)	0.158*** (2.69)	0.344*** (10.12)	0.302*** (4.21)	0.398*** (8.27)	0.326*** (19.08)
<i>Leverage_{it}*MoreBank_{it}</i>	-0.112* (-1.80)	-0.123* (-1.85)	-0.119** (-2.24)	-0.190* (-1.66)	-0.046** (-2.14)	-0.070 (-1.60)	-0.015 (-0.32)	-0.076* (-1.76)	-0.037*** (-2.99)
<i>Leverage_{it}*(1-MoreBank_{it})</i>	-0.085 (-1.58)	-0.098 (-1.50)	-0.083 (-1.58)	-0.121 (-1.07)	0.039 (0.95)	-0.071 (-1.03)	0.000 (0.01)	-0.073 (-1.53)	-0.016 (-0.82)
<i>JStatistic</i>	0.187	0.217	0.052	0.639	0.547	0.125	0.292	0.146	0.379
<i>m2</i>	0.194	0.668	0.586	0.178	0.609	0.386	0.822	0.734	0.094
<i>Observations</i>	1665	1239	2635	588	3501	2732	764	1535	5236
<i>Instruments</i>	t-2; t-3; t-4	t-2; t-3; t-4	t-2; t-3; t-4	t-2; t-3; t-4	t-2; t-3; t-4	t-2; t-3; t-4	t-2; t-3; t-4	t-2; t-3; t-4	t-2; t-3; t-4

Notes: Dependent variable is $\log(\text{capital}/\text{labour})$. All specifications were estimated using the GMM first-differenced specification. The figures reported in parentheses are t-statistics. * significant at 10%; ** significant at 5%; *** significant at 1%. *More Bank_{it}* is equal to 1 for firms in the top 75% of their mix distribution in year t , and 0, otherwise. Time dummies and time dummies interacted with industry dummies were included in all specifications. *m2* is a test for second-order serial correlation in the first-differenced residuals, and the *J* statistic is a test of the overidentifying restrictions.

Table A-3: Alternative measures of constraints: Dynamic estimation

	Industry 1	Industry 2	Industry 3	Industry 4	Industry 5	Industry 6	Industry 7	Industry 8	Industry 9
	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)
$(K/L)_{i(t-1)}$	0.216*** (4.96)	0.072 (1.28)	-0.116*** (-3.50)	0.126* (1.71)	0.066** (2.00)	0.151*** (4.42)	-0.117** (-2.07)	0.099** (1.98)	0.153*** (4.40)
$Price_{it}$	-0.570*** (-5.35)	-0.844*** (-7.41)	-0.349*** (-3.50)	-0.545*** (-3.23)	-0.638*** (-9.29)	-0.648*** (-8.47)	-0.760*** (-4.79)	-0.639*** (-8.24)	-0.541*** (-10.21)
$Sales_{it}$	-0.839*** (-12.77)	-0.744*** (-11.63)	-0.501*** (-6.17)	-0.952*** (-5.61)	-0.697*** (-18.33)	-0.727*** (-16.42)	-0.818*** (-12.45)	-0.744*** (-13.40)	-0.715*** (-12.59)
$CashFlow_{it} * Low Coll_{it}$	-0.550* (-1.94)	-0.424*** (-2.90)	-0.292** (-2.38)	0.089 (0.32)	-0.028 (-0.20)	0.257** (2.36)	0.290* (1.81)	0.248** (2.12)	-0.671** (-2.24)
$CashFlow_{it} * (1 - Low Coll_{it})$	-0.329* (-1.66)	-0.249 (-1.06)	-0.236 (-1.55)	0.104 (0.41)	-0.443** (-1.97)	0.106 (1.24)	0.237 (0.57)	0.301 (1.24)	-0.089 (-0.73)
$Collateral_{it} * Low Coll_{it}$	0.295*** (4.56)	0.518*** (8.41)	0.380*** (9.98)	0.290*** (5.42)	0.259*** (4.43)	0.531*** (12.78)	0.467*** (7.69)	0.572*** (7.33)	0.378*** (14.03)
$Collateral_{it} * (1 - Low Coll_{it})$	0.220*** (3.92)	0.207** (2.58)	0.270*** (6.47)	0.292*** (5.95)	0.216*** (4.95)	0.259*** (8.43)	0.343*** (5.70)	0.278*** (4.69)	0.293*** (13.38)
$Collateral_{it} * Low Coll_{it}$	-0.129*** (-2.73)	-0.297*** (-2.73)	-0.195** (-2.32)	-0.011 (-0.13)	-0.037 (-0.86)	-0.213*** (-2.73)	0.035 (0.57)	-0.190** (-2.41)	-0.052*** (-2.82)
$Collateral_{it} * (1 - Low Coll_{it})$	-0.038 (-0.43)	0.094 (1.22)	-0.067 (-1.38)	-0.031 (-0.37)	0.028 (0.64)	-0.001 (-0.02)	0.117* (1.67)	0.078 (0.53)	0.025 (1.21)
$JStatistic$	0.457	0.388	0.055	0.675	0.086	0.489	0.300	0.231	0.926
$m2$	0.311	0.794	0.0943	0.408	0.110	0.937	0.948	0.720	0.209
$Observations$	1196	871	1882	443	2481	1931	540	1057	3689
$Instruments$	t-2; t-3; t-4	t-2; t-3; t-4	t-2; t-3; t-4	t-2; t-3; t-4	t-2; t-3; t-4	t-2; t-3; t-4	t-2; t-3; t-4	t-2; t-3; t-4	t-2; t-3; t-4

Notes: Dependent variable is log(capital/labour). All specifications were estimated using the GMM first-differenced specification. The figures reported in parentheses are t-statistics. * significant at 10%; ** significant at 5%; *** significant at 1%. Time dummies and time dummies interacted with industry dummies were included in all specifications. $m2$ is a test for second-order serial correlation in the first-differenced residuals, and the J statistic is a test of the overidentifying restrictions. See notes to Table A-1.

Table A-4: Alternative measures of constraints: Dynamic estimation

	Industry 1	Industry 2	Industry 3	Industry 4	Industry 5	Industry 6	Industry 7	Industry 8	Industry 9
	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)
$(K/L)_{i(t-1)}$	0.184*** (4.33)	0.061 (1.13)	0.105** (2.42)	0.136** (2.25)	0.085*** (2.80)	0.167*** (4.80)	-0.096* (-1.87)	0.133** (2.54)	0.164*** (4.39)
$Price_{it}$	-0.578*** (-5.87)	-0.877*** (-8.35)	-0.411*** (-3.93)	-0.508*** (-2.92)	-0.639*** (-9.26)	-0.651*** (-8.31)	-0.812*** (-5.12)	-0.658*** (-8.25)	-0.542*** (-9.75)
$Sales_{it}$	-0.865*** (-14.56)	-0.707*** (-12.22)	-0.561*** (-6.10)	-0.836*** (-7.00)	-0.700*** (-18.56)	-0.734*** (-16.10)	-0.884*** (-9.37)	-0.747*** (-12.94)	-0.684*** (-10.37)
$CashFlow_{it} * MoreBank_{it}$	-0.366 (-1.64)	-0.465*** (-3.10)	-0.240* (-1.80)	0.009 (0.04)	-0.098 (-0.67)	0.264** (2.17)	0.376** (2.07)	0.312** (2.42)	-0.867** (-2.48)
$CashFlow_{it} * (1 - MoreBank_{it})$	-0.321 (-1.18)	0.330 (1.01)	-0.176 (-0.40)	-0.395 (-0.82)	-0.296* (-1.72)	0.149 (0.69)	0.044 (0.18)	0.027 (0.16)	-0.381** (-2.48)
$Collateral_{it} * MoreBank_{it}$	0.256*** (7.28)	0.351*** (5.30)	0.293*** (9.52)	0.303*** (6.35)	0.279*** (10.49)	0.337*** (11.60)	0.342*** (6.50)	0.381*** (8.44)	0.326*** (13.20)
$Collateral_{it} * (1 - MoreBank_{it})$	0.273*** (7.11)	0.323*** (3.38)	0.289*** (7.71)	0.293*** (5.20)	0.291*** (10.86)	0.290*** (5.25)	0.364*** (6.94)	0.425*** (7.88)	0.311*** (12.45)
$Leverage_{it} * MoreBank_{it}$	-0.093** (-2.55)	-0.043 (-0.62)	-0.022 (-0.34)	-0.101 (-1.14)	0.005 (0.30)	-0.179* (-1.84)	0.071 (1.25)	-0.029 (-1.15)	-0.066 (-1.59)
$Leverage_{it} * (1 - MoreBank_{it})$	-0.136 (-1.46)	-0.037 (-0.52)	-0.018 (-0.30)	-0.057 (-0.56)	0.007 (0.30)	-0.093 (-0.99)	0.075 (1.11)	-0.076** (-2.13)	-0.065* (-1.65)
$JStatistic$	0.155	0.120	0.083	0.948	0.075	0.168	0.373	0.067	0.907
$m2$	0.204	0.811	0.386	0.437	0.0832	0.769	0.993	0.919	0.185
$Observations$	1196	871	1882	443	2481	1931	540	1057	3689
$Number Instruments$	t-2; t-3; t-4	t-2; t-3; t-4	t-2; t-3; t-4	t-2; t-3; t-4	t-2; t-3; t-4	t-2; t-3; t-4	t-2; t-3; t-4	t-2; t-3; t-4	t-2; t-3; t-4

Notes: Dependent variable is $\log(\text{capital}/\text{labour})$. All specifications were estimated using the GMM first-differenced specification. The figures reported in parentheses are t-statistics. * significant at 10%; ** significant at 5%; *** significant at 1%. Time dummies and time dummies interacted with industry dummies were included in all specifications. $m2$ is a test for second-order serial correlation in the first-differenced residuals, and the J statistic is a test of the overidentifying restrictions. See notes to Table A-2.