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# Trade Credit Supply, Market Power and the Matching of Trade Credit Terms

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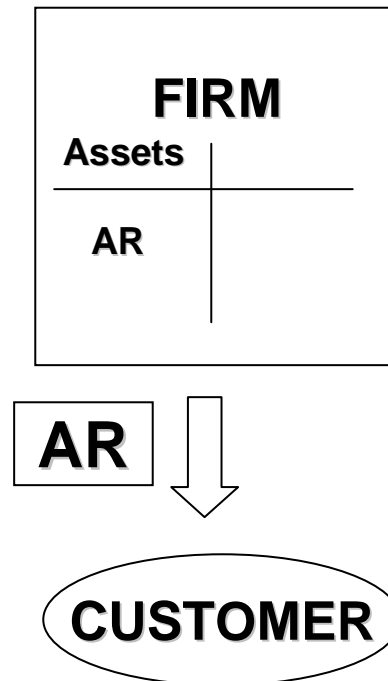
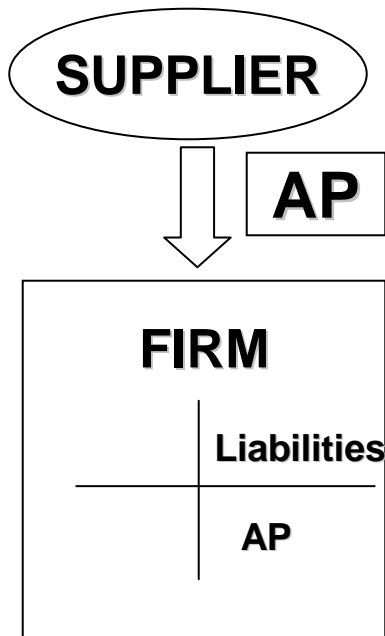
*Conference on Small Business Finance: What Works, What Doesn't?*

*World Bank, Washington, May 2008*

# Motivation

- Trade credit is an important source of financing for both small and large firms around the world  
(Petersen & Rajan 1997, Demirguc-Kunt and Maksimovic 2001, McMillan and Woodruff 1999, Fisman and Raturi 2004, van Horen, 2005, etc.)
- There is some empirical evidence on the decision to use and extend trade credit, but - due mainly to data limitations -
  - less is known on the determinants of trade credit (contract) terms
  - focus on only one-side of trade credit relationship in isolation

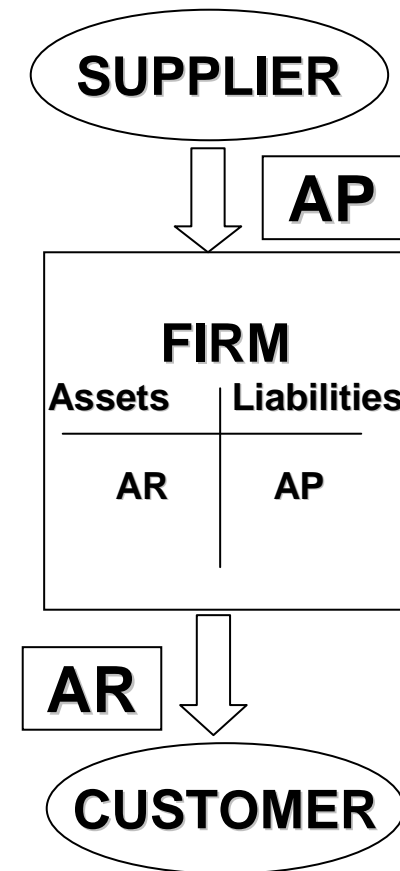
# Motivation



# Motivation

This paper takes a novel perspective and looks at the symbiotic relationship between *a firm, its customers, and its suppliers*.

- we link the **supply** of TC to customers to the **demand** of TC from suppliers (amount and TC terms)
- we match information on Firms with information on Customers and Suppliers



# Background

- The literature suggests various explanations for trade credit:
  - a *non-financial* role (Ferris 1981, Brennan et al. 1988, etc.),
  - a *liquidation advantage* (Mian & Smith 1992, Frank & Maksimovic 2005, Fabbri & Menichini 2007, etc)
  - an *information/monitoring advantage* (Bias & Gollier 1997, Jain 2001, Burkart & Ellingsen 2004, Cunat 2006) →  
role for *moral hazard* (Burkart et al. 2006), *credit constraints* (Petersen & Rajan 1995), *legal protection* (Fisman & Love 2004), *financial shocks* (Calomiris et al. 1995, Boissay & Gropp 2007, Love et al. 2006)
- Puzzlingly... empirical literature finds:
  - also large & credit unconstrained firms use massively TC (Demirguc-Kunt & Maksimovic 2001, Marotta 2001, etc.)
  - small and credit constrained firms extend trade credit (McMillan & Woodruff 1999 - ICA sample: 54% of firms receive bank financing, while 87% extend trade credit to their customers)

# Contribution

- Our results highlight the importance of market structure and competition in the decision to extend trade credit
  - Suppliers with relatively weaker market power are more likely to extend TC and extend a larger amount of TC
- We find a strong matching story between the use and contract terms of receivables and payables
  - Firms typically rely on accounts payable – and not bank financing – to finance accounts receivable
  - Supply chain financing decisions seem to be decided as part of a more general risk management policy
- Strong evidence that the payment to suppliers matches the receipt of payments remitted from customers

# Data

- *World Bank Enterprise Survey* for China, 2003
- 2,500 Chinese firms
- Questions on trade credit:
  - Use and terms of payables and receivables
  - Payment histories (e.g. days offered, days paid, etc.)
- Questions on market environment:
  - Number and importance of supplier and customer relationships
- Questions on access to bank financing
- Questions on the role of legal enforcement

# Summary statistics

- The use and terms of trade credit:

Variable Name	Obs.	Mean	AR_d=0	AR_d=1
<i>Account Receivables</i>				
AR_d	2,157	39%		
AR_per	2,184	14%(35%)		
AR_days	818	50%		
AR_discount	823	20%		
AR_gap	809	0.08		
=+1	35%			
= 0	37%			
=-1	27%			
<i>Account Payables</i>				
AP_d	2,100	45%	34%	62%
AP_per	2,069	10%(20%)	4%	18%
AP_days	656	25%	16%	36%
AP_discount	829	7%	34%	62%
AP_gap	656	0.09	0.07	0.12
=+1	29%			
= 0	51%			
=-1	20%			

# Summary statistics

- Explanatory variables:

Variable Name	Mean	Std. Dev.	AR_d=0	AR_d=1
<i>General Characteristics</i>				
L_Age	2.57	0.74	2.60	2.51
L_Emp	4.94	1.48	4.84	5.11
D_Foreign	0.07	0.26	0.06	0.10
D_State	0.23	0.42	0.24	0.19
D_Export	0.09	0.28	0.09	0.11
<i>Financial Characteristics</i>				
LC_unused	0.07	0.21	0.06	0.09
Profitable	0.61	0.49	0.58	0.66
<i>Indicators of Market Power of the Firm relative to his Customer and his Supplier</i>				
Saleslargest_5	0.57	0.49	0.54	0.64
Compmktshare_1	0.28	0.45	0.23	0.36
New_product	0.42	0.49	0.36	0.51
Lowered_prices	0.48	0.50	0.41	0.60
<b>Bi_mktpower</b>	0.29	0.45	0.26	0.33

# Summary statistics

The matching practice is more likely used when firms face strong competition in the **product market** (relative to their customers), and enjoy strong market power in the **input market** (relative to their suppliers)

		Firm is the most important customer to its main supplier; market power in <b>input market</b> (relative to suppliers)	
		<i>Weak</i>	<i>Strong</i>
Sales to largest customer is greater than 5%; market power in <b>product market</b> (relative to customers)	<i>Market power:</i> <i>Weak</i>	Weak/Weak (37%)	<b>Weak/Strong</b> <b>(29%)</b>
	<i>Strong</i>	Strong/Weak (20%)	Strong/Strong (14%)

**Bi\_Mktpower:** Dummy equal to one if:

- the percentage of total sales that normally goes to the firm's largest customer is greater than 5% (i.e.  $Sales_{largest\_5} = 1$ )
- the firm is the largest supplier's most important customer.

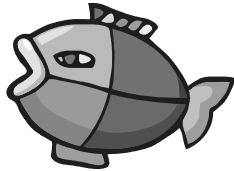
# Summary statistics

- **Explanatory variables:** indicators of Collateral Value, Customer Creditworthiness and Legal Confidence

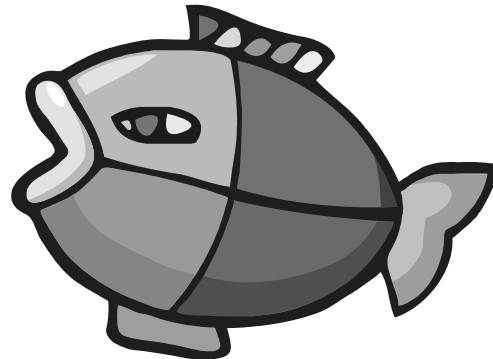
Variable Name	Mean	Std. Dev.	AR_d=0	AR_d=1
Property_rights	64.42	38.52	63.20	66.76
Uniqueness	37.53	42.05	37.45	37.60
Certified	46.58	45.80	41.42	55.00
Contract	0.88	0.33	0.85	0.93
Cust_deception	0.60	0.49	0.57	0.65

# Contribution

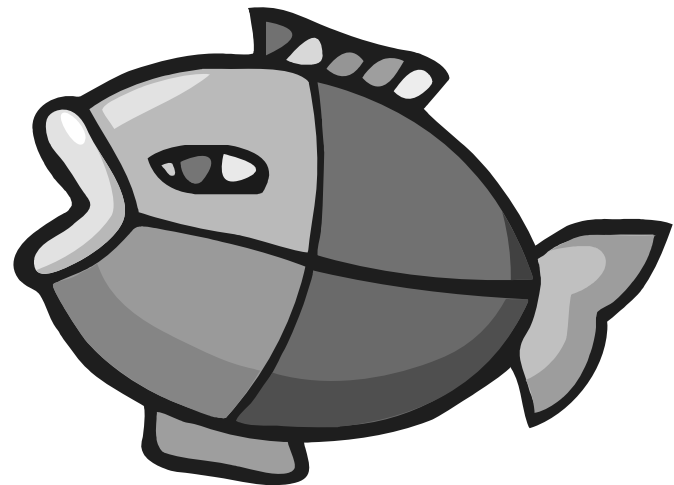
The “Big Fish”  
sets the credit terms....



Supplier



Firm



Customer

# Hypotheses and Results

- The Market Power Hypothesis:***

AR indicators = f {Firm characteristics, **Weak** Market Power indicators}

	<i>AR_d</i>	<i>AR_d</i>	<i>AR_per</i>	<i>AR_per</i>
L_Age	-0.19 [0.02]**	-0.14 [0.00]***	-0.14 [0.00]***	-0.14 [0.00]***
L_emp	0.10 [0.01]**	0.10 [0.00]***	0.09 [0.00]***	0.10 [0.00]***
D_Foreign	0.34 [0.10]*	0.14 [0.24]	0.08 [0.50]	0.14 [0.24]
D_State	-0.10 [0.49]	-0.02 [0.78]	0.03 [0.76]	0.02 [0.78]
D_Export	0.35 [0.07]*	0.39 [0.04]**	-0.06 [0.64]	-0.06 [0.61]
<b>Compmktshare_1</b>	<b>0.21</b> <b>[0.07]*</b>		<b>0.16</b> <b>[0.04]**</b>	
<b>Lower_price</b>		<b>0.56</b> <b>[0.00]***</b>		<b>0.33</b> <b>[0.00]***</b>
Observations	2,099	2,011	2,000	2,038
R-squared	0.09	0.09	0.10	0.11

# Hypotheses and Results

- ***The Financial Constraint and the Matching Hypotheses:***

1. *The Relationship between TC Demand and TC Supply*

AR indicators = f {Firm characteristics, Financial characteristics, Accounts Payable (AP) indicators}

	<i>AR_d</i>	<i>AR_per</i>	<i>AR_days</i>	<i>AR_discount</i>	<i>AR_d</i>	<i>AR_per</i>	<i>AR_days</i>	<i>AR_discount</i>
LC_unused	0.16 [0.51]	0.07 [0.70]	0.24 [0.54]	-0.11 [0.79]				
Profitable					0.07 [0.54]	0.08 [0.29]	0.05 [0.77]	-0.29 [0.19]
AP_d	1.41 [0.00]***				1.44 [0.00]***			
AP_per		0.02 [0.00]***				0.02 [0.00]***		
AP_days			0.38 [0.11]				0.35 [0.14]	
AP_discount				1.25 [0.00]***				1.25 [0.00]***
Observations	1,881	1,869	740	725	1,943	1,925	765	771
R-squared	0.13	0.14	0.09	0.12	0.13	0.14	0.09	0.13

# Hypotheses and Results

## 2. Is TC Demand More Important for Credit Constrained Firms?

*AR indicators = f {Firm characteristics, Financial characteristics, AP indicators, Interaction of Financial and AP indicators}*

	<i>AR_d</i>	<i>AR_per</i>	<i>AR_d</i>	<i>AR_per</i>
AP_d	1.40 [0.00]***		1.48 [0.00]***	
AP_per		0.02 [0.00]***		0.02 [0.00]***
LC_unused	0.11 [0.78]	0.23 [0.20]		
LC_unused*AP_d	10.32 [0.84]			
LC_unused*AP_per		-0.77 [0.11]		
Profit_d			0.10 [0.49]	0.08 [0.30]
Profit_d*AP_d			-0.07 [0.73]	
Profit_d*AP_per				-0.00 [0.92]
Observations	1,881	1,869	1,943	1,925
R-squared	0.13	0.14	0.13	0.14

# Hypotheses and Results

## 3. Is Trade Credit Demand More Important in Competitive Markets?

*AR indicators = f {Firm characteristics, Market Indicators, AP indicators, Interaction of Market and AP indicators}*

	<i>AR_d</i>	<i>AR_per</i>	<i>AR_d</i>	<i>AR_per</i>
AP_d	1.22 [0.00]***		1.34 [0.00]***	
AP_per		0.01 [0.00]***		0.01 [0.00]***
Saleslargest_5	0.03 [0.85]	0.03 [0.69]		
Sales*AP_d	0.47 [0.05]*			
Sales*AP_per		0.00 [0.55]		
Bi_mktpower			-0.43 [0.07]*	-0.13 [0.22]
Bi*AP_d			0.75 [0.02]**	
Bi*AP_per				0.01 [0.00]***
Observations	1,547	1,529	1,080	1,072
R-squared	0.16	0.18	0.15	0.13

# Hypotheses and Results

## 4. Do firms match TC terms ex-post?

***AP indicators*** = *f* {*Firm characteristics, AR indicators, Financial indicators, Interaction of AR indicators and Financial indicators* }

	<i>AP_gap=-1</i>	<i>AP_gap=+1</i>	<i>AP_gap=-1</i>	<i>AP_gap=+1</i>
AR_gap	0.29 [0.22]	0.56 [0.01]***	0.37 [0.12]	0.53 [0.01]***
LC_unused	0.50 [0.37]	-0.45 [0.40]		
Profit_d			0.29 [0.30]	0.03 [0.91]
Observations	593	602	593	602
Pseudo R-squared	0.23	0.22	0.23	0.22

# Robustness tests

## 1. *Simultaneous Equation Approach:*

*AR indicators = f {Firm characteristics, **AP indicators**, Market Power}*  
**Not significant**

*AP indicators = f {Firm characteristics, **AR indicators**, Financial indicators}*  
**Very significant**

2. *If we use the **survey for Brazil**, our results for market structure and matching story hold.*

# Robustness tests

- Dummy indicating “unique” specifications is not related to the decision to extend TC
  - If goods are certified, a larger amount of TC is offered
- A Dummy indicating written contracts is positive and significant
- Variables measuring likelihood that the legal system uphold contracts and predictability of laws and regulations are insignificant
  - consistent with evidence that firms in our sample have few disputes with trading partners (<30%) and only seldom rely on court action.
- Financial variables (for a limited subsample) indicating changes in firm investment policies are insignificant.

# Conclusions

- Payables and receivables are set as part of a *more general risk management* corporate policy. —————> The unilateral perspective used so far to analyze TC is unsatisfactory.
- Firms offer TC to compete in the product market and use account payables to finance account receivables (*matching story*).
- This matching story seems to be:
  - (1) independent of *credit rationing*;
  - (2) more likely to hold when firms face stronger competition in the *product* market and have stronger market power in the *input* market
- Firms tend to *match* also *trade credit terms* (ex-ante and ex-post): number of days before penalties are imposed and pre-payment discounts; speed to repay and share of overdue payments.
- Our story might explain why even *large unconstrained* firms use TC; why/how *small credit-constrained* firms are able to offer TC