



# **Ninth ARTNeT Capacity Building Workshop for Trade Research "Trade Flows and Trade Policy Analysis"**

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# Research using World Bank Enterprise Surveys data

# Content

- a) Introduction
- b) World Bank Enterprise Surveys Dataset
- c) Empirical Examples
- d) Conclusion

## a) Introduction

- Most of the published firm-level work has used national datasets
- Most commonly, these data come from government statistical agencies
- They are usually of very high quality, since firms can be subject to penalties for non-compliance or mis-statements
- Two main disadvantages:
  - They are generally not comparable across countries
  - Statistical coverage is essentially limited to accounting data

## a) Introduction (ct'd)

- There is a small, but growing, part of the firm-level literature that uses data from a number of countries simultaneously
- One approach is to use commercially available firm-level data, such as Amadeus (EU), Orbis (Global), or Datastream
  - Extremely expensive
  - Again, only accounting data
  - Usually less reliable than national survey data
  - Problems of comparability across countries

## b) World Bank Enterprise Surveys (WB ES)

- An alternative is provided by the World Bank's Enterprise Surveys project: [www.enterprisesurveys.org](http://www.enterprisesurveys.org)
- Freely available at the aggregate level. For firm-level data, just fill out the form, and accept the confidentiality restrictions
- Very wide coverage: 130,000 firms in 135 countries
- Some countries/firms are surveyed over multiple years
- Combination of accounting data and data based on opinions/perceptions
- Firm level data: standardized cross-country dataset and country-specific datasets (panel data for some countries)

## b) WB ES: Structure of the core questionnaire

- A. Control information
- B. General information (*legal status, ownership, birth year*)
- C. Infrastructure and services (*connection applications for electricity, water and telephone, waiting time, informal payments*)
- D. Sales and supplies (*sales, exports, customs, shipment problems*)
- E. Degree of competition (*price changes due to competition, informal sector*)
- F. Capacity (*utilization of facilities*)
- G. Land (*ownership versus lease, construction permit*)
- I. Crime (*cost for security, losses due to theft*)
- J. Business-government relations (*courts, government contracts, informal payments, licenses*)
- K. Finance (*timing of payments, sources for financing, loans, collaterals*)
- L. Labor (*number of employees, worker types, training, skills, labor regulation*)
- M. Investment climate constraints (*three biggest obstacles*)
- N. Performance (*cost structure, value of assets, sales three years ago*)

## b) WB ES: Coverage of originating countries of participants

Country	Year	Methodology	Firms	Exporters	Non-exporters	Panel Data
Bangladesh	2007	Global	1,504	377	1,127	
Cambodia*	2007	Not Global	502	102	399	
India*	2006	Not Global	4,234	362	3,691	
Indonesia	2009	Global	1,444	174	1,270	
Lao PDR	2009	Global	360	44	316	
Lao PDR	2012	Global	269	43	226	2009-2012
Malaysia*	2007	Not Global	1,115	547	555	
Nepal	2009	Global	368	23	345	
Pakistan	2007	Global	935	104	743	2002-2007
Philippines	2009	Global	1,326	246	1,080	
Sri Lanka	2011	Global	610	45	565	
Thailand*	2006	Not Global	1,043	432	261	
Vietnam	2009	Global	1,053	256	796	

\*Not included in cross-country dataset

- Fieldwork is currently conducted for China, Bangladesh, India, Nepal and Pakistan



## b) WB ES: Issues to be aware of

- Stratified random sampling, but in reality large enterprises and exporters tend to be over-represented
- Caution is required when using Enterprise Surveys data
- General and research-specific quality checks should be applied
  - Interviewer's opinion regarding the truthfulness of perceptions (a16) and data accuracy (a17)
  - Consistency of figures, e.g. employment categories add up to total employment
  - Outliers
- There are good reasons to be wary of the accuracy of some of the most interesting data: e.g., firms have a strong incentive to under-report corruption in many countries
- How comparable are the perceptions data across countries?

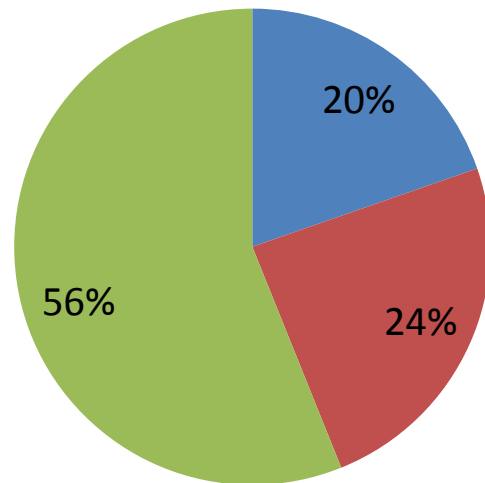
## b) WB ES: Use in Workshop

- Full questionnaire available upon registration with the website
- Note that the Enterprise Surveys data are made available to researchers on the condition that individual firm responses be kept confidential
- The empirical work of this workshop will use a dataset based on part of the Enterprise Surveys data, but randomly altered so as to hide the responses of individual firms
- It is not possible to re-create the original data, or do proper analysis, using the example data from this course – you need to contact the Enterprise Surveys team directly to get the real data

## Descriptive results: Indonesia (2009) and Vietnam (2009)

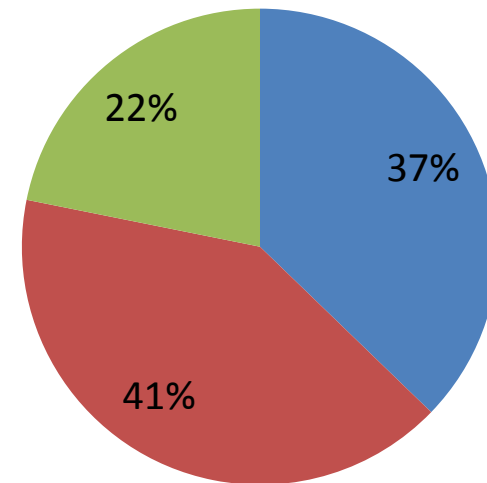
- Indonesia: 1,444 firms surveyed (manufacturing and services)
- Vietnam: 1,053 firms surveyed (manufacturing and services)

### Indonesia



■ Large (100+) ■ Medium (20-99) ■ Small (5-19)

### Vietnam

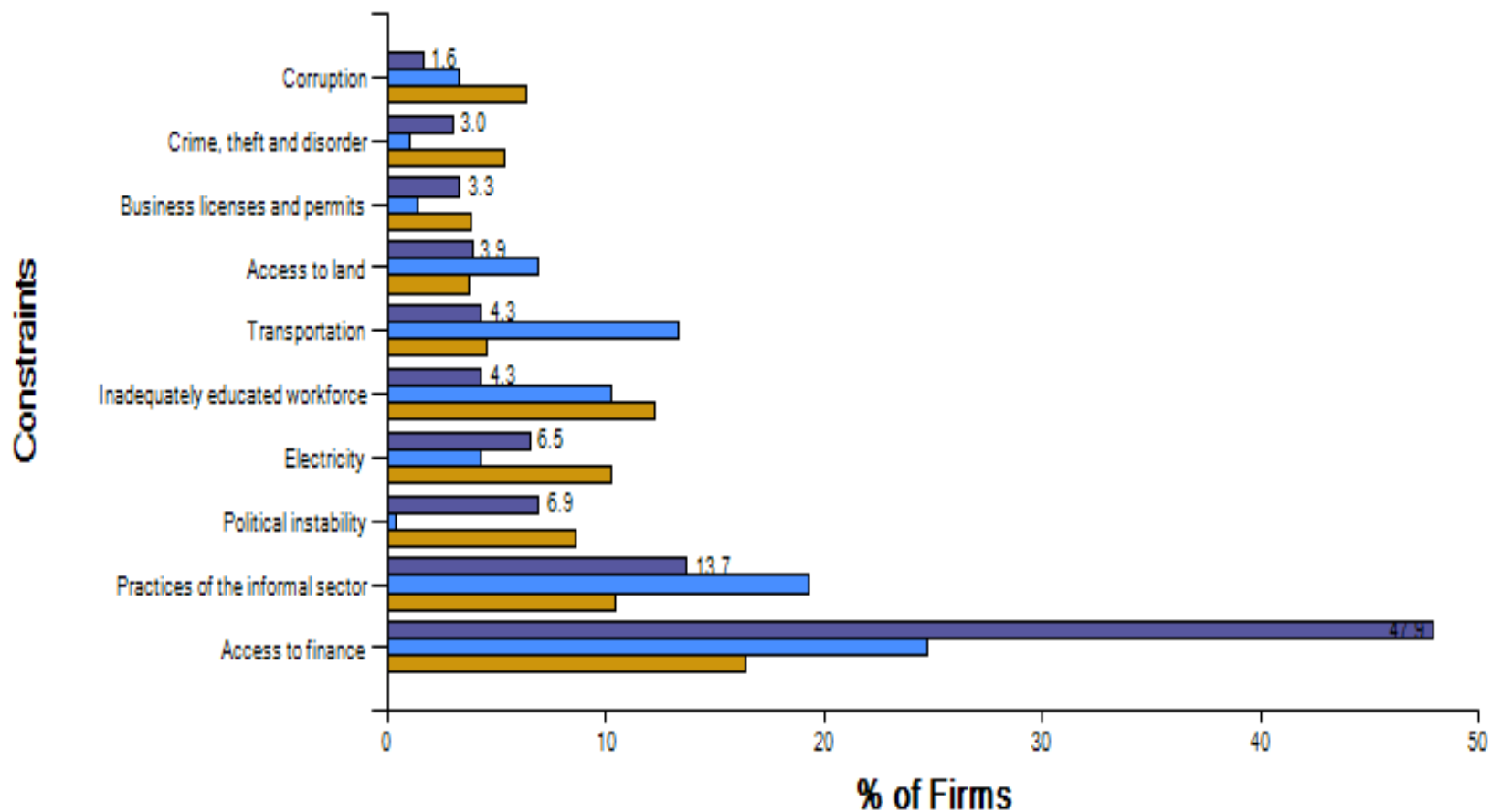


■ Large (100+) ■ Medium (20-99) ■ Small (5-19)

# Top 10 business environment constraints

## Top 10 Business Environment Constraints for Firms

Indonesia (2009) Vietnam (2009) East Asia & Pacific



Source: Enterprise Surveys ([www.enterprisesurveys.org](http://www.enterprisesurveys.org))

## Regulations and taxes

	Indonesia	Vietnam	Region	All countries
Senior management time spent dealing with the requirements of government regulation (%)	1.6	4.6	6.5	9.0
Days to obtain an operating license	21.1	15.9	16.6	29.7
Days to obtain an import license	10.5	22.6	16.2	19.5
% of firms identifying tax rates as a major constraint	4.4	6.3	22.1	34.9
% of firms identifying tax administration as major constraint	4.8	5.3	14.7	23.0
% of firms identifying business licensing and permits as a major constraint	5.6	1.6	8.5	15.7

## Corruption

	Indonesia	Vietnam	Region	All countries
% of firms expected to pay informal payment to public officials (to get things done)	14.9	52.5	24.7	25.5
% of firms expected to give gifts to get an operating license	25.9	15.2	18.6	15.0
% of firms expected to give gifts to get an import license	19.5	18.2	19.9	14.1
Bribery depth (% of public transactions where a gift or informal payment was requested)	23.0	27.3	19.8	15.0
% of firms identifying corruption as a major constraint	14.1	5.1	29.1	36.0

## Trade

	Indonesia	Vietnam	Region	All countries
Days to clear direct exports through customs	2.3	4.2	7.5	7.1
Days to clear imports from customs	3.4	10.9	9.4	11.3
% of firms exporting directly or indirectly (at least 1% of sales)	4.1	20.5	19.6	17.2
Proportion of total sales that are domestic sales (%)	97.8	88.2	90.4	92.5
% of firms using material inputs and/or supplies of foreign origin	4.9	63.2	63.8	62.1
% of firms identifying customs and trade regulations as a major constraint	4.8	8.5	13.9	17.7

## Firm heterogeneity: exporters (direct exports are 10% or more of sales) vs. non-exporters

	Indonesia		Vietnam	
	Exporters	Non-exporters	Exporters	Non-exporters
% of firms with an internationally-recognized quality certification	40.3	2.0	39.2	13.5
% of firms using technology licensed from foreign companies	23.6	3.5	15	11.5
% of firms offering formal training	31.9	4.0	60.5	37.5
Number of permanent full-time workers	196.6	13.7	259.7	50.2
Proportion of unskilled workers (out of all production workers) (%)	29.9	20.1	26.2	18.4



## c) Empirical Examples

- [Seker \(2012\)](#) (working paper [Seker \(2011\)](#))
- [Ricci and Trionfetti \(2011\)](#)
- [Dollar et al. \(2006\)](#)
- [Li and Wilson \(2009\)](#)
- [Shepherd \(2010\)](#)

## Seker (2011)

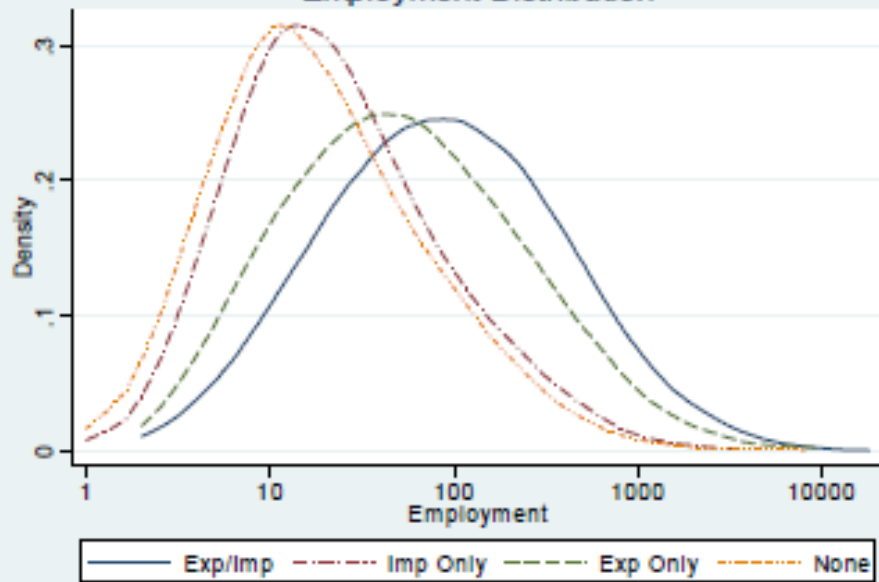
- 43 developing countries
- Focus on firm premia, but including importing as well as exporting
- Two-way traders tend to be larger, more productive, and faster growing than all other firms
  - Followed by exporters (not importers)
  - Followed by importers (not exporters)
  - Followed by non-traders

Seker (2011) (ct'd)

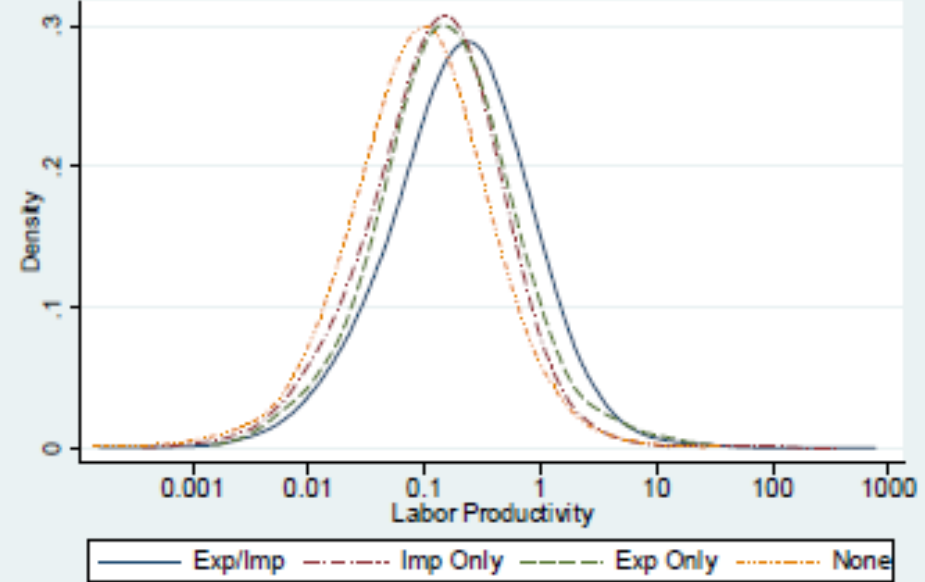
		Trade Shares in Industries (in %)				Totals
ISIC	Industry	Export/Import	Import Only	Export Only	None	(%)
15	Food	20.3	31.9	7.2	40.6	22.84
17	Textiles	39.0	25.6	10.5	24.9	10.54
18	Garments	31.4	33.1	7.0	28.5	10.18
24	Chemicals	36.8	42.2	3.4	17.6	20.23
20,36	Wood & Furniture	26.4	27.6	15.1	30.9	5.96
25,26	Non-metal & Plastic	25.1	30.5	8.5	35.8	5.83
28,29	Metals and machinery	33.4	31.6	9.5	25.6	7.24
-	Other manufacturing	36.1	31.3	8.3	24.3	17.18
Total		3963	4260	1099	4006	13,328

# Seker (2011) (ct'd)

### Employment Distribution



### Productivity Distribution



## Seker (2011) (ct'd)

	Log (Sales)	Log (Labor)	Log (Proy)	Log (TFP)
Export/Import	2.272 (0.062)***	1.722 (0.045)***	0.446 (0.043)***	0.154 (0.027)***
Export Only	1.486 (0.080)***	1.137 (0.053)***	0.322 (0.048)***	0.109 (0.034)***
Import Only	0.612 (0.059)***	0.385 (0.035)***	0.211 (0.034)***	0.042 (0.023)*
Log(Labor) <sub>t</sub>			0.061 (0.011)***	0.006 (0.008)
Log(Sales) <sub>t-3</sub>				
Log(Labor) <sub>t-3</sub>				
Log(Proy) <sub>t-3</sub>				
Observations	13328	16609	13358	8500
R-squared	0.391	0.279	0.466	0.013

## Seker (2011) (ct'd)

	Labor Growth	Sales Growth	Proy Growth	Log(Proy)	Prod Innov	Proc Innov	Foreign Lic	Quality Cert
Export/Import	0.035 (0.003)***	0.048 (0.006)***	0.029 (0.005)***	0.360 (0.046)***	0.211 (0.016)***	0.115 (0.015)***	0.120 (0.021)***	0.178 (0.029)***
Export Only	0.022 (0.004)***	0.021 (0.009)**	0.014 (0.007)**	0.195 (0.053)***	0.134 (0.019)***	0.104 (0.019)***	0.065 (0.027)**	0.104 (0.039)***
Import Only	0.011 (0.003)***	0.005 (0.006)	0.009 (0.005)**	0.186 (0.037)***	0.167 (0.015)***	0.080 (0.017)***	0.084 (0.016)***	0.017 (0.030)
Foreign ( $\geq 10\%$ )	0.015 (0.003)***	0.023 (0.007)***	0.024 (0.005)***	0.278 (0.033)***	-0.041 (0.016)***	-0.030 (0.022)	0.126 (0.021)***	0.048 (0.025)*
R&D Ind	0.024 (0.003)***	0.021 (0.005)***	0.001 (0.004)	0.178 (0.026)***	0.175 (0.016)***	0.264 (0.013)***	0.046 (0.010)***	0.080 (0.021)***
Training	0.026 (0.003)***	0.035 (0.005)***	0.007 (0.003)**	0.128 (0.022)***	0.144 (0.013)***	0.180 (0.016)***	0.059 (0.010)***	0.206 (0.021)***
Age	-0.001 (0.000)***	-0.000 (0.000)***	0.000 (0.000)***	-0.000 (0.001)	-0.000 (0.000)*	-0.001 (0.000)**	-0.000 (0.000)	0.001 (0.001)
Log(Labor) <sub>t-3</sub>	-0.019 (0.001)***			0.028 (0.012)**	0.014 (0.004)***	0.012 (0.006)**	0.029 (0.004)***	0.090 (0.008)***
Log(Sales) <sub>t-3</sub>		-0.016 (0.002)***						
Log(Proy) <sub>t-3</sub>			-0.058 (0.003)***					
Observations	10531	7865	8012	9678	11552	7189	7165	5653
R2 /Pseudo R2	0.106	0.120	0.190	0.478	0.146	0.208	0.172	0.431

## Ricci and Trionfetti (2011)

- 8,000 firms in 32 countries and 24 sectors
- Focus on export propensity (extensive margin)
- Interested in showing the importance of comparative advantage, in addition to firm-level determinants like size
- They also analyze the impact of foreign, domestic and communication networks on the probability of exporting.

## Ricci and Trionfetti (2011) (ct'd)

**Table 4**  
**The effect of comparative advantage and productivity on the probability of export**  
**Dependent variable: probability of export**  
**(errors clustered by country-industry)**

	(1)	(2)	(3)	(4)	(5)	(6)	(7)
Log of sales	0.088 (0.000)***			0.087 (0.000)***		0.045 (0.000)***	0.040 (0.000)***
Log of employment		0.130 (0.000)***			0.130 (0.000)***	0.080 (0.000)***	0.087 (0.000)***
Comparative advantage			0.088 (0.003)***	0.085 (0.003)***	0.093 (0.000)***	0.089 (0.001)***	0.089 (0.001)***
Log capital labor ratio							0.012 (0.089)*
Observations	7742	7822	7822	7742	7822	7742	7742
Pseudo R2:	0.254	0.260	0.165	0.258	0.265	0.275	0.276

\* significant at 10 percent; \*\* significant at 5 percent; \*\*\* significant at 1 percent.

Robust p values in parentheses.

Regressions include country and sector fixed effects

Coefficients reflect marginal effects



## Ricci and Trionfetti (2011) (ct'd)

Excerpt from Table 6: The effect of comparative advantage, productivity and networks on the probability of exporting

	(1)	(2)	(3)	(4)	(5)	(6)
Comparative advantage	0.089 (0.001)***	0.094 (0.001)***	0.080 (0.002)***	0.086 (0.001)***	0.089 (0.001)***	0.093 (0.001)***
Log of sales	0.045 (0.000)***	0.046 (0.000)***	0.038 (0.000)***	0.040 (0.000)***	0.035 (0.000)***	0.041 (0.000)***
Log of employment	0.080 (0.000)***	0.083 (0.000)***	0.111 (0.000)***	0.079 (0.000)***	0.073 (0.000)***	0.078 (0.000)***
Foreign financing		0.003 (0.000)***				
Foreign joint venture			0.133 (0.000)***			
Foreign participation				0.002 (0.000)***		
Firm uses email					0.201 (0.000)***	
Firm has website						0.131 (0.000)***

## Dollar et al. (2006)

- Dependent variable = dummy variable for export status
  - Model the probability of exporting
  - Interpret in terms of the extensive margin of exports
- Explanatory variables include business climate variables (hard and soft infrastructure):
  - Trade facilitation (days to clear customs at export and import)
  - Loss of sales due to power outages
  - Days to get a telephone connection
  - Access to finance
  - ...
- Selected countries only: Bangladesh, Brazil, China, Honduras, India, Nicaragua, Pakistan, and Peru.
- Business constraints tend to be lower in China than elsewhere

Dollar et al. (2006) (ct'd)

<i>City</i>	<i>Share of Firms Foreign Invested</i>	<i>Share of Firms Exporting</i>
Bangalore	0.05	0.30
Calcutta	0.03	0.24
Chengdu	0.11	0.21
Chennai	0.08	0.36
Chittagong	0.02	0.31
Dhaka	0.03	0.45
Guangzhou	0.28	0.42
Karachi	0.01	0.15
Shanghai	0.41	0.38
Tianjin	0.23	0.27
Sao Paulo	0.1	0.35
Rio de Janeiro	0.04	0.16
Minas Gerais	0.04	0.20
Bahia	0.06	0.18
Managua	0.14	0.19
San Pedro	0.2	0.49

Dollar et al. (2006) (ct'd)

<i>City</i>	<i>Days to Clear Customs</i>		<i>Loss Due to Power Outage (% of total sales)</i>	<i>Days to Get a Telephone Connection</i>	<i>Share of Firms with Overdraft Facility</i>
	<i>Imports</i>	<i>Exports</i>			
Bangalore	8.22	6.71	2.12	126.44	0.46
Calcutta	10.09	8.07	5.98	22.56	0.57
Chengdu	13.46	9.93	2.84	13.61	0.16
Chennai	6.65	4.54	6.44	24.03	0.75
Chittagong	12.8	8.56	3.05	53.38	0.66
Dhaka	11.46	8.88	3.35	168.47	0.66
Guangzhou	5.43	3.90	2.01	23.60	0.25
Karachi	10.55	15.78	6.14	18.43	0.33
Shanghai	6.67	4.40	1.45	13.18	0.37
Tianjin	7.63	6.03	1.56	6.96	0.16
Sao Paulo	12.87	7.7	1.18	13.42	0.74
Rio de Janeiro	14.78	8.78	3.77	28.7	0.72
Minas Gerais	12.25	9.13	1.46	15.55	0.79
Bahia	13.22	9.25	1.9	15.03	0.61
Managua	5.04	2.03	5.99	98.93	0.33
San Pedro	7.18	1.44	7.02	143.74	0.56

## Dollar et al. (2006) (ct'd)

	Probit Specifications				Marginal Effects for (3)
	(1)	(2)	(3)	(4)	
<b>Investment Climate Indicators</b>					
Days to clear customs, import (log)	-0.105 (3.96)**	-0.089 (3.24)**	-0.066 (2.31)*	-0.071 (2.40)*	-0.035 (3.96)**
Days to clear customs, export (log)	-0.070 (2.35)*	-0.066 (2.08)*	-0.070 (1.91)	-0.109 (2.82)**	-0.023 (2.35)*
Loss due to power outage, % of total sales (log)	-0.282 (11.61)**	-0.255 (9.23)**	-0.420 (10.10)**	-0.378 (8.62)**	-0.095 (11.61)**
Days to get a telephone connection (log)	0.216 (10.11)**	0.222 (9.07)**	0.185 (4.65)**	0.157 (3.72)**	0.073 (10.11)**
Share of firms with overdraft facility (log)	0.173 (6.25)**	0.157 (4.27)**	0.346 (6.31)**	0.122 (2.08)*	0.058 (6.25)**

## Li and Wilson (2009)

1. Business climate determinants of firm export performance, focusing on trade facilitation (import and export time)
2. Extensive and intensive margins of trade
  - Probability of exporting
  - Exports as a proportion of total sales
3. 64 countries, 13 manufacturing industries

Li and Wilson (2009) (ct'd)

	Export Probability		Export Intensity	
	(1)	(2)	(3)	(4)
Export Time, EXP_T (2005)	-0.008*** (0.001)		-0.004*** (0.001)	
Export Time, EXP_T (t)		-0.006** (0.003)		-0.005*** (0.002)
No. of Obs	21336	8270	21099	8099
No. of Obs not censored			6336	2624
Log-likelihood	-12303	-4243	-16245	-5469
Chi-Square	5847	2085		
F statistics			261	112
Pseudo R-squared	0.233	0.237	0.205	0.217

All regressions include firm characteristics, year fixed effects and industry fixed effects.

Robust standard errors in parentheses. Significance levels: \*=10%, \*\*=5%; \*\*\*=1%.

## Li and Wilson (2009) (ct'd)

	Export Probability				
	Coefficients				
	(1)	(2)	(3)	(4)	(5)
Time Interaction: ts1 X EXp_T(2005)	-0.013*** (0.002)	-0.013*** (0.002)	-0.014*** (0.003)	-0.012*** (0.002)	-0.013*** (0.003)
Time Remoteness Interaction: ts1 X RM		-0.004 (0.015)	-0.025 (0.018)	-0.005 (0.015)	-0.041** (0.019)
Capital Interaction: k X K			0.656*** (0.064)		0.678*** (0.065)
Skill Interaction: h X H			0.008 (0.016)		0.012 (0.016)
Financial Interaction: fd X CR				0.043 (0.113)	0.375*** (0.141)
ln(Firm Age)	-0.019 (0.014)	-0.019 (0.014)	-0.003 (0.017)	-0.019 (0.014)	-0.001 (0.017)
ln (Employment)	0.476*** (0.009)	0.476*** (0.009)	0.486*** (0.011)	0.476*** (0.009)	0.485*** (0.011)
Share of Foreign Ownership	0.619*** (0.044)	0.620*** (0.044)	0.509*** (0.053)	0.620*** (0.044)	0.503*** (0.053)
ln(Value Added/L)	0.083*** (0.009)	0.083*** (0.009)	0.101*** (0.010)	0.084*** (0.009)	0.102*** (0.010)
ln(Capital Stock/L)	0.013* (0.007)	0.013* (0.007)	0.017** (0.008)	0.014** (0.007)	0.017** (0.008)
No. of Observations	21336	21336	16567	21292	16567



## Li and Wilson (2009) (ct'd)

	Export Intensity				
	Coefficients				
	(1)	(2)	(3)	(4)	(5)
Time Interaction: ts1 X EXP_T(2005)	-0.010*** (0.001)	-0.010*** (0.001)	-0.010*** (0.002)	-0.009*** (0.001)	-0.009*** (0.002)
Time Remoteness Interaction: ts1 X RM		-0.009 (0.008)	-0.016* (0.009)	-0.01 (0.008)	-0.029*** (0.010)
Capital Interaction: k X K			0.491*** (0.038)		0.512*** (0.039)
Skill Interaction: h X H			0.030*** (0.009)		0.034*** (0.009)
Financial Interaction: fd X CR				0.062 (0.058)	0.284*** (0.072)
ln(Firm Age)	-0.076*** (0.008)	-0.076*** (0.008)	-0.071*** (0.010)	-0.075*** (0.008)	-0.069*** (0.009)
ln (Employment)	0.275*** (0.005)	0.275*** (0.005)	0.278*** (0.006)	0.274*** (0.005)	0.273*** (0.005)
Share of Foreign Ownership	0.427*** (0.022)	0.428*** (0.022)	0.318*** (0.025)	0.428*** (0.022)	0.300*** (0.023)
ln(Value Added/L)	0.043*** (0.005)	0.043*** (0.005)	0.053*** (0.006)	0.043*** (0.005)	0.047*** (0.005)
ln(Capital Stock/L)	-0.006 (0.004)	-0.006 (0.004)	-0.004 (0.005)	-0.005 (0.004)	-0.008* (0.004)
No. of Observations	21099	21099	16252	21055	16252
No. of Obs. not censored	6336	6336	4912	6330	4912

## Sheperd (2010)

- Dependent variable is trade-related bribes
- Independent variables include standard controls, and measures of trade facilitation (time to export or import)
- Key finding is that worse trade facilitation (longer trade times) is associated with higher rates of corruption
- Combine firm-level regressions, cross-country regressions, and a gravity model

## Sheperd (2010) (ct'd)

	1	2	3	4	5	6	7
Log(Import Time)	0.173*** [0.064]	0.176 [0.135]			0.169*** [0.065]	0.192*** [0.068]	0.186** [0.075]
Log(Productivity)	0.062 [0.049]	0.029 [0.060]	0.044 [0.044]	0.065 [0.053]	0.108 [0.068]	0.096 [0.070]	0.06 [0.077]
Foreign	-0.059 [0.173]	0.132 [0.210]	-0.13 [0.158]	-0.057 [0.195]	-0.043 [0.173]	0.009 [0.178]	0.091 [0.181]
Log(Export Time)		0.039 [0.115]					
Customs is a Business Constraint			0.603*** [0.128]				
Log(Import License Time)				0.233*** [0.045]			
Log(Total Sales)					-0.05 [0.056]	-0.028 [0.062]	-0.006 [0.067]
Log(Inventory)						0.013 [0.043]	0.022 [0.046]
Log(Capacity Utilization)						0.001 [0.165]	-0.025 [0.167]
Auditor							-0.18 [0.208]
ISO Certification							0.081 [0.203]
Observations	1773	772	3491	1612	1773	1591	1407
No. of Groups	146	87	188	103	146	138	132
<i>McFadden R</i> <sup>2</sup>	0.007	0.008	0.011	0.053	0.007	0.009	0.009
<i>Count R</i> <sup>2</sup>	0.288	0.322	0.263	0.34	0.26	0.297	0.311

## d) Conclusion

- The Enterprise Surveys dataset offers an attractive alternative to traditional firm-level data sources
  - Cross-country
  - Standardized methodology
  - Inclusion of data relevant to policy
- These data always need to be used carefully, however:
  - Accounting problems and under-reporting of sales for tax reasons
  - Possible non-comparability of business climate data across countries
  - Over-sampling of large firms and exporters
  - Often difficult to obtain robust measures of productivity

## d) Conclusion (ct'd)

- Wide range of possible applications:
  - Identification of exporter and importer premia
  - Business climate and trade
  - Trade facilitation
  - Determinants of corruption and other trade-related phenomena
  - Determinants of trade performance at the extensive and intensive margins