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LAYING THE FOUNDATION FOR GROWTH

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ANNEX B: PRIVATE SECTOR BACKGROUND

PAKISTAN PRIVATE SECTOR STRUCTURE: KEY CHARACTERISTICS

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ANNEX B: PRIVATE SECTOR BACKGROUND

PAKISTAN PRIVATE SECTOR STRUCTURE: KEY CHARACTERISTICS

A. Structure of Private Sector

1. As in many other developing nations, Pakistan has an enormous informal private sector estimated at over 62% of GDP.[1] It is estimated that of the 3.249 million businesses operating in Pakistan, 99% are categorized as small with a low capital and revenue base. Around 5% economic entities belong to the Government and the rest operate in the private sector. There are only 15,840 firms with more than 50 employees. The 2005 Pakistan Economic Census indicates that 84 % of enterprises reported sales below 0.5 million rupees (US$ 6,250) and 93% reported sales below 1 million rupees (US$ 12,500).

2. There are substantial differences between the way private sector operates in Pakistan from elsewhere in the world. The level of business constraints varies with their size, ownership structure and location. Over 90% firms are operating without having been registered and most also do not pay taxes.[2] These are not inspected by the tax inspectors, police authorities, or other government institutions. Their owners advertise, place signboards on their businesses and hire employees in addition to opening bank accounts and seeking financial services.[3] The district government is responsive to their requests and training is also available to them.[4]

3. Most businesses in private sector show little or no growth and are also reluctant to try the new technology.[5] A recent World Bank survey reported that only 3% of Pakistan's enterprises (employing 19 or less) have innovated their product or services in the past three years and there is only 2% increase in the number of exporting firms in the past five years.

4. The structure of private sector in Pakistan is complex due to the high degree of sectoral informality. However, below is the brief snapshot of private sector characteristics and major constraints faced by this sector.

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[1] It is estimated that the underground economy ranged between Rs 2.91 trillion and Rs 3.34 trillion (54.6 percent of GDP to 62.8 percent of GDP respectively) in 2005 and tax evasion ranged between Rs 302 billion and Rs 347 billion (5.7 percent of GDP to 6.5 percent of GDP respectively) in 2005. Source: PIDE Working Papers: 2007:13, A Fresh Assessment of the Underground Economy and Tax Evasion in Pakistan: Causes, Consequences, and Linkages with the Formal Economy, M. Ali Kemal, Pakistan Institute of Development Economics, Islamabad, 2007.

[2] There are estimated 1.9 million ***active*** tax filers in Pakistan, the number of salaried taxpayers was 440,000 and those filed under old self-assessment scheme were 275,000; source: interviews with World Bank personnel in-charge of tax reforms program.

[3] Assuming that they have the assets to secure and a reasonably good set of books. However, with the informal sector, it is rare that they meet either condition. The conditions for loans for the unregistered firm are precisely the same as for registered firms. The difference usually is that registered firms maintain better books in order to be compliant with the law, and are therefore better prepared for the loan application process..

[4] From interviews with unregistered firms.

[5] From 1968-2001, Korean Industrial Value-Addition increased by 40 times, Malaysia 27 times, Thailand's by 17 times and Pakistan's only by 7 times; Source: A Strategy For Rapid Industrial Growth, Ministry of Industries Production & Special Initiatives, 2005.

C. Ownership structure

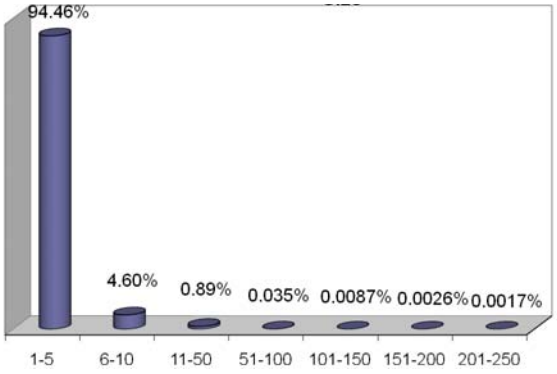
5. Ownership structure plays an important role in the development and growth of firm. Ideally, more formalized structure leads to better business services delivery from the business support institutions and should result in better business conditions for firms.

6. Ownership structure of these establishments is depicted in table: 1. Almost 91.3% of total enterprises are sole proprietor ship and 1.95% are partnerships. The ownership structure is very important in determining the degree of constraints. Sole proprietary concerns can more easily escape from the regulatory radar with out losing any advantages in term of access to business or resources. However, for the government, adequate planning and provision of effective business services have become more difficult to facilitate this larger segment of the economy. Informal economy has its roots in ownership structure of the firms and any effort to develop the private sector will help improve the investment climate.

D. Firm Size by Employment

7. The 2005 Census of Establishments provides the basis for statistical analysis of the 3.249 million economic establishments operating in the private sector. Around 91.1% enterprises (2.95 million) provided complete information. Data for remaining 8.9% i.e. 291,161 economic establishments could not be obtained due to reasons such as closure, refusal, non-contact etc. Out of these, 94.46% economic establishments have an employee base of 1-5. The employment pattern of these Establishments is such that of a total of 2.95 million, 2.78 million Units (94.46%) employed 1-5 persons, 0.14 million Units (4.6%) employed 6-10 persons, 0.02 million (0.89%) 11-50 persons, and 15,840 (0.048%) over 50 persons.

Figure B1: Percentage of SME Establishments by employment size



8. In the case of Manufacturing Establishments, 91.0% establishments have an employee base of 1-5 persons, 6.62% employ 6-10 persons, over 2.05% have 11-50 employees, and only 0.19% have over 50 workers. 98% of wholesale, retail, trade, and hotels and restaurants employed 1-5 persons. Similarly, 95% establishments in Community, Social and Personal Services sectors are also placed in 1-5 employees group. Due to their sheer numbers, size and nature of operations, this sector of the economy promotes indigenous sources of growth, employment generation and improving standard of living in rural as well as urban areas.

9. These SMEs are more vulnerable to the external shocks and cannot adjust as quickly as the large scale firms and hence face greater challenges than the large scale enterprises. SMEs in Pakistan are dealing with a plethora of issues that directly affect their productivity such as electricity breakdowns, expensive raw material, corruption, rising tariffs of utilities, demands of laborers to increase wages and so on. Large firms are in a better position to obtain government licenses and have greater investment incentives. They also have greater access to finance and modern technology as compared with SMEs.

E. Location

10. The Provincial distribution of firms across the country yet again points towards the nature and economic activity prevalent in the region. While Punjab houses 65.27% of firms, Sindh is home to 17.83% economic establishments followed by NWFP with 14.21% and Balochistan 2.10%. (Figure B2). Most of the enterprises related to manufacturing, mining, agriculture, whole sale and retail, construction and transportation are located in Punjab and Sindh (Figure B3).

Figure B2: Distribution of Establishments
by provinces

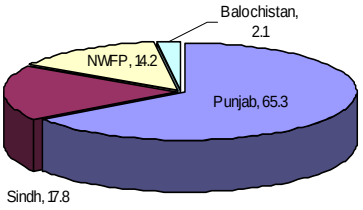
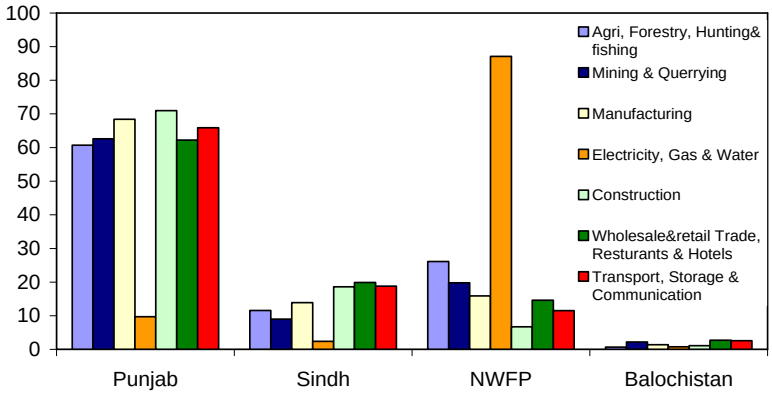


Figure B3: No. of Establishments
by division and provinces



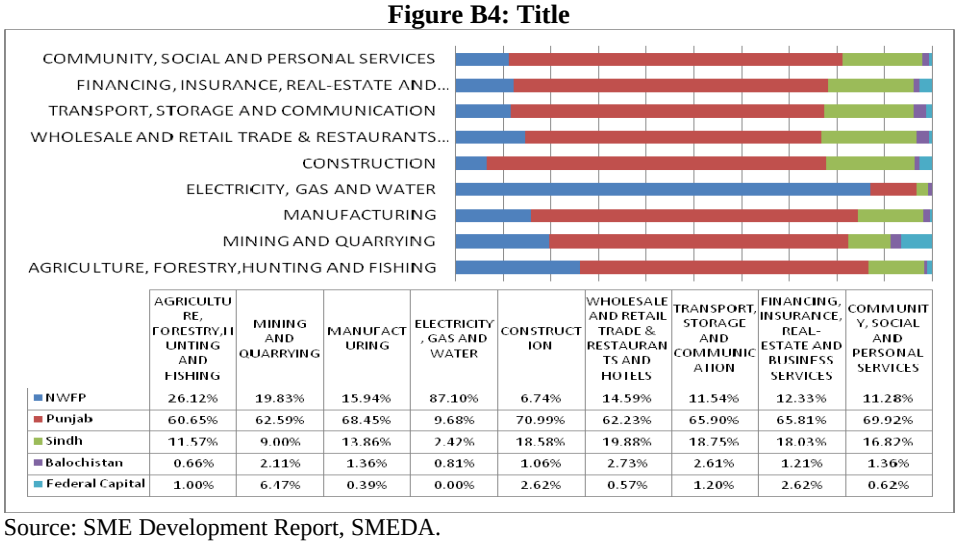
Source: Economic Census 2005.

11. Although the constraints may vary from region to region, generally certain locations in Pakistan pose extra burden on firms due to lack of infrastructure, electricity, access to industrial land, customs and trade regulations, establishment of industrial zone and provision of infrastructure.

F. Sectoral Classification

12. The nature of the economic activity largely determines the character of the economy. 52% of economic activity is associated with wholesale, retail trade, hotels and restaurants. While large hotels are few in number, the small street side hotels and restaurants provide employment to a large number of work force.

Figure B4: Title



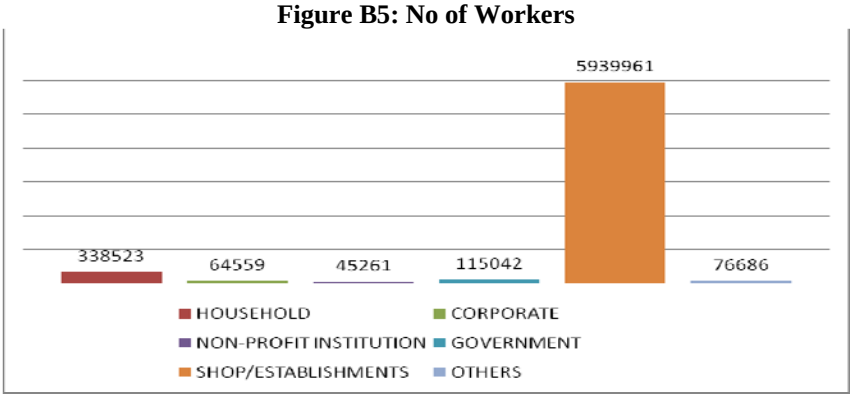
	AGRICULTURE, FORESTRY,HUNTING AND FISHING	MINING AND QUARRYING	MANUFACTURING	ELECTRICITY, GAS AND WATER	CONSTRUCTION	WHOLESALE AND RETAIL TRADE & RESTAURANTS AND HOTELS	TRANSPORT, STORAGE AND COMMUNICATION	FINANCING, INSURANCE, REAL-ESTATE AND BUSINESS SERVICES	COMMUNITY, SOCIAL AND PERSONAL SERVICES
NWFP	26.12%	19.83%	15.94%	87.10%	6.74%	14.59%	11.54%	12.33%	11.28%
Punjab	60.65%	62.59%	68.45%	9.68%	70.99%	62.23%	65.90%	65.81%	69.92%
Sindh	11.57%	9.00%	13.86%	2.42%	18.58%	19.88%	18.75%	18.03%	16.82%
Balochistan	0.66%	2.11%	1.36%	0.81%	1.06%	2.73%	2.61%	1.21%	1.36%
Federal Capital	1.00%	6.47%	0.39%	0.00%	2.62%	0.57%	1.20%	2.62%	0.62%

Source: SME Development Report, SMEDA.

13. The prominent manufacturing sectors are textile and garments, sports goods, leather products, cutlery, surgical instruments, food processing industry, electronics manufacturers and automobile. These industries are growing and have vast potential to absorb foreign investment.

14. The workforce employed across the 2.95 Million[6] economic establishments is approx 6.5 million out of which 5.9 million are employed in the shops/establishments industry.

Figure B5: No of Workers



Source: SME Development Report, SMEDA.

G. Investment and Sales

15. The investments made in establishments excluding land & building by various investment groups is less than PKR 1 million. The figure does not change much with the inclusion of land & building. Investment in private sector has not reached its capacity due to constraints and concerns with the business environment. The cost of compliance with the multiple types of tax filings, the lack of enforcement of contracts, and the uncertainty associated with titles has inhibited firms from fully investing themselves in the Pakistan market. Similarly in terms of Sales Revenue, the threshold of revenue generated is low (Table B1).

Table B1: Number of Establishments

(by major industry division & investment groups, excluding land & building, in million Rupees)

	Investment group			
Major Industry Division	***Total***	***Below 10***	***10 to 20***	***2000001 to 30***
Agriculture, forestry, hunting and fishing	**46,378**	46,096	189	93
Mining and quarrying	**709**	639	33	37
Manufacturing	**583,126**	578,212	2,569	2,345
Electricity, gas and water	**122**	116	3	3
Construction	**1,410**	1,388	9	13
Wholesale and retail trade & restaurants and hotels	**1,566,711**	1,565,358	868	485
Transport, storage and communication	**51,548**	50,756	410	382
Financing, insurance, real-estate and business services	**48,436**	48,115	209	112
Community, social and personal services	**659,619**	658,404	785	430

Source: SME Development Report, SMEDA.

[6] Establishments that provided complete information in the Census of Economic Establishments 2005, conducted by the Federal Bureau of Statistics.

Table B2: Number of Establishments
(by major industry division and sale revenue groups)

Major Industry Division	*Total*	*Sale revenue groups*			
		Below 0.5 million	*0.5 million to 1 million*	*1000001 to 20 million*	*20000001 to 250 million*
Agriculture, forestry, hunting & fishing	**46,170**	39,746	4,113	1,720	591
Mining & quarrying	**659**	214	117	181	147
Manufacturing	**577,715**	512,585	35,897	18,143	11,090
Electricity, gas & water	**119**	113	1	3	2
Construction	**1,386**	1,197	96	66	27
Wholesale, trade & restaurants & hotels	**1,547,471**	1,209,229	208,257	87,261	42,724
Transport, storage & communication	**51,255**	46,680	2,882	1,003	690
Financing, insurance, real-estate & business services	**47,757**	41,150	4,023	1,444	1,140
Community, social & personal services	**658,987**	636,253	16,165	4,838	1,731

Source: SME Development Report, SMEDA, Economic Census 2005.

H. Manufacturing Sub Sector Analysis

16. A deeper analysis of the Census of Economic Establishments provides interesting insight into the manufacturing sector. At the sub-sectoral level, out of a total of 583,329 manufacturing establishments, textile apparel and leather industries account for 252,111 economic establishments (43.22%), followed by 121,875 establishments (20.09%) of food and beverages manufacturers, and tobacco makers. Interestingly, the number of manufacturers in the fabricated metal products, and machinery and equipment sectors are 58,476 and in the basic metal industries are 4,511. In terms of numbers, only 10.80% manufacturing enterprises provide inputs to other industries for significant value addition. Given below is the sub-sectoral provincial distribution of manufacturing establishments. It is interesting to note that despite Sindh housing 17.82 percent of all economic establishments, NWFP has a greater number of economic establishments in the manufacturing sector i.e. 15.93 percent.

Table B3: Sector and Provincial Distribution of Manufacturing Establishments

Manufacturing Industry Division	*Total*	*Punjab*	*Sindh*	*NWFP*	*Balochistan*	*Federal capital*
Total	**583,329**	**399,219**	**80,868**	**92,975**	**7,951**	**2,316**
Food, beverages and tobacco	121,875	70,329	14,652	35,030	1,413	451
Textile, apparel & leather	252,111	167,141	43,331	35,863	4,684	1,092
Wood & wood products including furniture	63,087	46,766	5,182	10,045	890	204
Paper & paper products, printing & publishing	10,141	6,291	2,912	761	101	76
Chemicals and chemical products	5,781	4,170	1,185	362	22	42
Non-metallic mineral products	15,476	11,755	2,093	1,516	46	66
Basic metal industries	4,511	3,456	496	504	21	34
Fabricated metal products, & machinery	58,476	46,850	6,631	4,092	599	304
Other manufacturing industries	51,871	42,461	4,386	4,802	175	47

Source: SME Development Report, SMEDA.

17. In the manufacturing sector, 20% are household establishments. At the sub-sectoral 2 digit level, the proportion between household versus other than household establishments in textile wearing apparel and leather industries is 31.50 percent, which is greater than the overall percentage of household establishments in the total manufacturing sector. As opposed to this, in

the manufacturing of food, beverages and tobacco only 2.45 percent establishments are household. This shows a greater concentration of small businesses involved in the textile wearing apparel and leather industries sectors.

18. Within wholesale, retail trade & restaurants and hotels, percentage of number of employees is 42.93% of the total 6.58 million, while in the manufacturing sector the percentage is 28.79. The value of raw material used in the manufacturing sector is PKR 217.53 billion, the value added is PKR 439.17 billion. In the same sector, value of energy/fuel consumed is PKR 26.45 billion. The Gross Capital Investment in the same sector is PKR 165.44 billion that is 39.31 percent of total gross capital investment in the economy.

Table B4: Distribution of Establishments According to Building Status

Major Economic Activity	Ownership	Rent free	Rented
Total	**955,235**	**259,432**	**1,728,598**
Agriculture, Forestry Hunting & Fishing	**35989**	5563	4643
Mining & Quarrying	**207**	52	442
Manufacturing	**225456**	90469	264261
Electricity, Gas & Water	**69**	33	16
Construction	**291**	68	1047
Wholesale & Retail Trade and Restaurants & Hotels	**530529**	87581	944438
Transport Storage & Communication	**8559**	2759	40055
Financing, Insurance, Real Estate & Business Services	**9097**	6832	31127
Community, Social & Personal Services	**145038**	66075	442569

Source: SME Development Report, SMEDA

19. 32.48 percent economic establishments operate in own premises/buildings whereas 58.50 percent establishments operate in rented premises/buildings. The split of establishments vis-à-vis status of building is such that of the total owned premises, share of Punjab is the highest at 72.83 percent followed by Sindh & NWFP with 14.3 percent and 10.84 percent respectively.

20. Analysis of data at the District level also provides interesting insights into the physiognomy of the SME sector. In the province of NWFP, Peshawar is home to 2.34% manufacturing establishments followed by Mardan (1.71%), Swabi (1.51%) and Charsadda (1.28%) respectively. A look at the manufacturing establishments spread across Punjab identifies Faisalabad (7.88%), Sialkot (6.08%) and Lahore (5.77%) as the hub of manufacturing activity. Karachi (5.69%) and Quetta (0.41%) in Sindh and Balochistan respectively have a greater concentration of manufacturing firms in each of the province.

I. Services Sector

21. A look at the service sector in Pakistan reveals that the sector grew by 8.5% in 2006-07 as against 9.6% in the previous year. The finance and insurance sector remained the major driver of growth, while better performance in the wholesale and retail trade as well as the transport and communications sectors made their contributions.[7]

22. All components of the services sector registered strong growth in 2006-07, with the exception of ownership of dwellings, and public administration and defense. The finance and

[7] Trade in Services – An ITC - SMEDA Joint publication.

insurance sector posted remarkable growth in 2004-05, 2005-06 and 2006-07 with growth of 30.8%, 33.0% and 18.2%, respectively. The wholesale and retail trade, and transport, storage and communications sectors also registered strong growth of 7.1% and 5.8%, respectively.

23. The growth performance of the various economic sectors over time can be seen in the following table:

Table B5: Components Growth Performance of GNP
(percentage growth at constant factor cost)

Economic group	*1980s*	*1990s*	*2002-03*	*2003-04*	*2004-05*	*2005-06*	*2006-07*
Commodity Producing Sector	**6.5**	**4.6**	**4.2**	**9.3**	**9.5**	**3.4**	**6.0**
1. Agriculture	5.4	4.4	4.1	2.4	6.5	1.6	5.0
Major crops	3.4	3.5	6.8	1.7	17.7	-4.1	7.6
Minor crops	4.1	4.6	1.9	3.9	1.5	0.4	1.1
Livestock	5.3	6.4	2.6	2.9	2.3	7.5	4.3
Fishing	7.3	3.6	3.4	2.0	0.6	20.5	4.2
Forestry	6.4	-5.2	11.1	-3.2	-32.4	-43.7	-3.8
2. Mining & Quarrying	9.5	2.7	6.6	15.6	10.0	4.6	5.6
3. Manufacturing	8.2	4.8	6.9	14.0	15.5	10.0	8.4
Large scale	8.2	3.6	7.2	18.1	19.9	10.7	8.8
Small scale*	8.4	7.8	6.3	6.2	6.3	8.3	7.7
4.Construction	4.7	2.6	4.0	-10.7	18.6	5.7	17.2
5. Electricity & Gas Distribution	10.1	7.4	-11.7	56.8	-5.7	-23.8	-15.2
Services Sector	**6.6**	**4.6**	**5.2**	**5.8**	**8.5**	**9.6**	**8.0**
6. Transport	6.2	5.1	4.3	3.5	3.4	6.9	5.8
7. Wholesale & Retail Trade	7.2	3.7	6.0	8.3	12.0	8.7	7.1
8. Finance & Insurance	6.0	5.8	-1.3	9.0	30.8	33.0	18.2
9. Ownership of Dwellings	7.9	5.3	3.3	3.5	3.5	3.5	3.5
10. Public Administration & Defense	5.4	2.8	7.7	3.2	0.6	10.0	6.9
11. Services	6.5	6.5	6.2	5.4	6.6	6.3	8.5
12. GDP	6.1	4.6	4.7	7.5	9.0	6.6	7.0
13. GNP	5.5	4.0	7.5	6.4	8.7	6.4	6.9

Source: Economic Survey of Pakistan, 2006-07.

24. Value added in the wholesale and retail trade is based on the margins taken by traders on the transaction of commodities traded in the wholesale and retail market. In 2006-07, the gross value added in wholesale and retail trade increased by 7.1% over the previous year, compared to 8.6% growth in 2005-06. Value added in the transport, storage and communications sector is based primarily on the profits and losses of Pakistan Railways, Pakistan International Airlines and other airlines, Pakistan Post & Courier Services, Pak Telecom and motor vehicles of different kinds on the road. In 2006-07, this sector grew by 5.7% compared to 6.9% in 2005-06. The increase resulted primarily from strong consumer demand for mobile phones, Internet services of Pak Telecom, and motor vehicles on road.

25. Public administration and defense posted growth of 6.9% in 2006-07, while ownership of dwellings grew by 3.5% and the social services sector by 8.5%. The construction sector continued its strong showing, partly helped by activity in the private housing market, spending on physical infrastructure, and reconstruction activities in earthquake affected areas.

26. Telecom, energy (oil, gas and power), financial services, trade, construction, chemicals, food and personal services were the major recipients of FDI, accounting for almost 88% or US$3.7 billion. The telecom sector was the single largest recipient of FDI with US$1.4 billion, followed by the financial services (US$871 million), energy sector (US$585 million), food services (US$492 million), wholesale and retail trade (US$133.9 million), construction (US$117.1 million), personal services (US$74.1 million) and cement (US$15.2 million).

J. Services Sector Contribution to Real GDP Growth

27. Pakistan's economic growth is broad-based and is shared by all the major sectors of the economy. However, a major contribution towards growth has come from the services sector, which has emerged as a growth powerhouse over the past few years. The commodity producing sectors (agriculture and industry) have contributed two-fifths while the services sector contributed the remaining three-fifths of the 2006-07 real GDP growth of 7.0%. Agriculture and industry contributed 30.2%, or 2.9% percentage points, while the remaining 59.8%, or 4.2 percentage points, came from the services sector. Within the commodity producing sectors, agriculture contributed 1.1 percentage points or 15.1% to overall growth, while industry contributed 1.8 percentage points or 22.7% (see Table 6 for details).

Table B6: Sectoral Contribution to GDP Growth
(percentage points at constant factor cost)

Sector	***2002-03***	***2003-04***	***2004-05***	***2005-06***	***2006-07***
Agriculture	1.0	0.6	1.5	0.4	1.1
Industry	1.0	3.8	3.1	1.3	1.8
Manufacturing	1.1	2.3	2.7	1.8	1.6
Services	2.7	3.1	4.4	4.9	4.2
Real GDP	4.7	7.5	9.0	6.6	7.0

Source: Economic Survey of Pakistan, 2006-07.

28. Pakistan's reliance on agriculture is minimizing with the passage of time. It is encouraging to note that the contribution of wholesale and retail trade is increasing. It contributed 19.4% or 1.4 percentage points to GDP in 2006-07. This sector is highly labour-intensive and this higher growth may have contributed to the rise in employment and income level of people attached to the sector.

K. Services Sub-sectors

29. A closer look on the composition of sub-sectors that contribute most to the services sector shows that retail trade, wholesale trade, research and educational consultancy services, restaurants and hotels, financial, construction, and some business services, such as computer and information technology (IT) services, and professional services, such as engineering, legal and accounting services are the most significant in terms of scope and scale of export markets and the extent to which these services are currently being delivered. Professional services, such as legal and accounting, is a promising sector. While it is rare to find a Pakistani architectural firm with an office abroad, a handful of engineering companies have extended their presence outside Pakistan. Medical and health services are delivering primarily to foreign nationals in the domestic market.

Table B7: Statistics by Economic Sector 2005

Economic sector	*Median employment*	*Median sales PKR '000*	*No. of firms*	*Total sales PKR billion*	*Total employment*	*Contrib. to employment*
Retail Trade	2	216	1,439,340	697.299	2,371,419	28.47%
Research Services & Institutions	2	72	311,545	43.919	1,360,015	16.33%
Personal & Household services	2	72	463,728	51.576	820,281	9.85%
Government (excl. Defense)	6	108	21,207	5.073	456,445	5.48%
Restaurants & Hotels	2	180	145,922	43.151	344,654	4.14%
Wholesale Trade	2	480	89,574	274.603	212,207	2.55%
Real Estate & Business services	2	180	49,926	22.838	130,828	1.57%
Communication	1	144	49,892	12.706	117,340	1.41%
Recreation & Cultural services	1	84,	52,994	6.851	88,378	1.06%
Financial Institutions	6	720	8,252	332481	69,445	0.83%
Transport Storage	3	288	12,151	10.517	54,047	0.65%
Manufacturing, Paper & Paper Production/ Printing & Publishing	3	300	10,735	19.554	42,169	0.51%
Water Works & Supplies	2	62	3,155	30.532	11,682	0.14%
Insurance	4	480	874	1.453	6,235	0.07%
Const., Rep & Maintenance Drainage, Hydraulics	2	108	965	0.285	2,486	0.03%
Building Construction	2	120	653	1.215	2,065	0.02%
Construction/Repair/Maintenance of Streets, Roads	2	360	288	0.58	529	0.01%
Electricity Gas & Water	6	23	30	0.1	421	0.01%
Financing, Insurance, Real Estate & Business Groups	5	108	102	0.1	387	0.00%
Community Social & Personal services	181	-	2	-	181	0.00%
Construction Repair, Maintenance of Railway P	3	204	10	0.2	27	0.00%
Construction Group	2	90	14	0.018	26	0.00%
Transport Storage & Communications	4	42	6	0.00710	14	0.00%
Construction, Repair, Maintenance of Pipe Lines	3	480	1	0.005	3	0.00%
Construction, Repair, Maintenance of Sports Premises	2	-	5	-	3	0.00%

Source: Economic Census of Pakistan, Federal Bureau of Statistics (FBS) – tabulated by SMEDA.

30. The courier services sector stands out in terms of scale, and the Internet Service Providers distinguish themselves in terms of scope. Environmental services have significant experts in the area of environmental impact assessments. The banking sector is very prominent, while securities and asset management firms are also actively involved in international transactions mainly to solicit funds from foreign institutional and private investors. The insurance sector lags behind compared to the rest of the financial sector. Communications, distribution and transport services are significant in terms of scale of services traded but their supply is limited.

ANNEX C: WEIGHTED INVESTMENT CLIMATE VARIABLES

Table C1: Summary of Investment Climate Indicators (FY02 and FY07)

	FY07								
		Size			*State*				
	All	*Small*	*Medium*	*Large*	*Punjab*	*Sindh*	*Balu-chistan*	*NWFP*	*FY02*
Infrastructure									
Power supply:									
Average number of power outages suffered by month[1]	33.6	34.2	36.0	18.3	40.8	23.9	18.0	20.3	14.6
Average duration of power outages in hours[1]	2.2	2.2	2.4	1.6	1.8	2.8	1.4	2.0	.
Losses due to power outages as a percentage of total annual sales[1]	10.1	10.5	10.0	4.6	8.7	13.0	3.7	8.4	5.5
Percentage of establishments owning a generator	20.1	9.8	46.7	87.7	6.6	41.6	11.5	18.8	41.3
Percentage of electricity used from a generator	5.9	2.6	10.0	40.3	1.0	14.0	0.9	3.2	6.9
Water supply:									
Percentage of establishments experiencing insufficient water supply	20.5	14.6	33.2	65.8	8.8	39.3	12.6	12.3	.
No. of water outages by month[2]	2.0	1.6	3.4	4.5	0.9	4.0	0.1	0.6	4.4
Average duration of water outages in hours[2]	2.5	1.7	5.3	5.3	1.0	5.0	0.7	1.8	.
Percentage of water used from public sources	37.4	37.0	40.0	36.2	26.8	51.6	65.4	78.3	.
Transportation:									
Percentage of establishments owning transport to ship products to costumers	16.5	11.3	31.8	45.2	5.6	32.3	27.3	8.9	.
Percentage of products shipped with own transport	11.0	8.0	22.3	22.1	3.6	22.7	8.8	4.9	.
Percent of the value of products shipped to supply domestic markets lost because of theft in international sales	0.3	1.2	0.3	0.0	0.7	0.2	0.4	0.0	.
Percent of the value of products shipped to supply domestic markets lost because of theft in domestic sales	0.5	0.5	0.3	0.7	0.4	0.5	0.2	1.1	.
Trade:									
Average number of days to clear customs in exports	3.7	2.0	3.9	4.2	7.2	2.4	5.7	.	9.9
Average number of days to clear customs in imports	7.3	4.7	10.9	4.6	17.6	5.4	5.0	3.5	17.6
Other infrastructures:									
Percentage of establishments located in an industrial park	28.5	20.7	47.6	83.0	15.2	49.4	25.7	8.4	.
Average number of days that main intermediate material is kept in stock	21.4	16.3	34.4	55.0	15.5	29.5	30.1	24.0	26.7
Managers' perceptions:									
Percentage of managers considering electricity as a major or very sever obstacle for operation and growth	79.7	80.5	78.0	73.6	77.2	85.6	60.0	41.0	7.7
Percentage of managers considering transportation as a major or very sever obstacle for operation and growth	14.9	14.2	16.6	20.1	8.2	25.8	12.2	6.0	10.2
Percentage of managers considering customs and trade regulations as a major or very sever obstacle for operation and growth	5.8	4.6	10.9	5.1	1.3	10.1	11.4	10.9	24.4

Notes: In fiscal year 2007 all are weighted averages correcting for oversampling of large firms.
"." no information available.
[1] Conditional on the number of firms reporting having power outages.
[2] Conditional on the number of firms reporting having water outages.

Table C1: Summary of Investment Climate Indicators (FY02 and FY07) – *Cont*

	Pakistan FY077								
		Size			*State*				
	All	***Small***	***Medium***	***Large***	***Punjab***	***Sindh***	***Balu-chistan***	***NWFP***	***Pakistan FY02***
Economic governance									
Courts and crime:									
Perc. of establms. having conflicts with clients with a third part involved	4.7	3.2	7.7	16.9	3.0	5.7	23.5	5.3	16.3
Perc. of establms. conflicts with clients with a court involved	1.4	0.5	1.7	13.1	0.8	2.6	0.7	2.1	4.9
Security expenses as a percentage of total annual sales	4.0	5.4	1.1	2.8	2.6	6.5	1.7	8.4	1.4
Crime losses as a percentage of total annual sales	0.5	0.5	0.4	0.5	0.4	0.7	0.0	0.9	0.2
Red tape and regulatory burden:									
Percentage of manager's time spent in bureaucratic issues	2.2	1.7	3.9	4.5	1.7	3.0	0.9	1.5	9.9
Number of tax inspections by year	1.5	1.3	1.7	3.7	0.9	2.2	3.0	1.4	12.7
Number of labor inspections by year	1.3	0.9	3.1	2.6	0.8	2.2	1.6	0.7	10.1
Percentage of establishments enjoying a tax exemption	16.7	8.2	33.9	85.6	7.9	31.1	8.0	12.1	27.4
Average number of days waiting to obtain a construction permit	29.6	34.4	16.5	35.2	66.3	26.2	.	.	7.9
Average number of days waiting to obtain an operation license	19.2	37.7	6.0	3.0	71.6	9.4	5.9	.	17.6
Average number of days waiting to obtain a power supply	91.8	100.6	85.8	26.6	55.5	126.2	168.2	.	31.8
Average number of days waiting to obtain a water supply	234.4	446.6	31.0	11.5	107.4	258.2	17.7	3.0	.
Average number of days waiting to obtain a phone connection	40.2	48.1	14.3	32.6	75.3	13.4	15.9	125.4	25.3
Average number of days waiting to obtain an import license	14.2	60.0	11.0	30.0	29.9	5.9	.	.	6.4
Corruption:									
Perc. of establims. for which a gift were requested in tax or labor inspections	28.2	25.2	41.6	33.4	19.3	41.5	40.1	22.4	26.7
Payments to obtain a contract with the government as a percentage of contract value	0.8	0.8	0.7	1.6	1.8	0.5	0.0	0.9	.
Payments to 'get things done' with regard to bureaucratic issues as a percentage of total annual sales	34.4	33.0	38.1	42.3	41.1	25.9	16.5	11.1	2.0
Perc. of establms. for which a gift were requested to obtain a construction permit[3]	0.6	0.1	1.4	4.9	0.3	1.1	0.0	0.0	0.2
Percentage of establishments for which a gift were requested to obtain an operating license[3]	0.4	0.5	0.0	0.1	0.3	0.7	0.0	0.0	0.1
Percentage of establishments for which a gift were requested to obtain a phone connection[3]	1.4	1.2	3.1	0.5	0.5	2.9	0.0	5.8	3.0
Percentage of establishments for which a gift were requested to obtain a water supply[3]	1.6	0.6	4.4	7.6	0.4	3.5	0.0	1.2	.

	Pakistan FY077								
		Size			State				
	All	Small	Medium	Large	Punjab	Sindh	Balu-chistan	NWFP	Pakistan FY02
Percentage of establishments for which a gift were requested to obtain a power supply[3]	4.8	4.4	7.6	3.5	3.5	7.2	1.6	2.5	1.5
Percentage of establishments for which a gift were requested to obtain an import license[3]	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.3
Perc. of establishments for which a gift were requested to obtain any connection, supply, permit or license	7.1	5.7	11.1	15.9	4.5	11.6	1.5	9.3	3.8
Informality:									
Percentage annual sales *'typically'* reported for tax purposes	94.7	93.6	98.2	98.4	95.2	94.5	90.0	90.2	.
Percentage workforce *'typically'* reported for tax purposes	75.0	71.4	83.7	91.5	66.2	88.2	89.9	62.4	.
Managers' perceptions:									
Percentage of managers considering crime, theft and disorder as a major or very severe obstacle for op. and growth	32.6	28.6	52.0	35.4	26.7	44.8	2.5	44.3	21.4
Percentage of managers considering functioning of the courts as a major or very severe obstacle for operation and growth	36.4	34.1	49.1	51.0	23.4	70.3	45.5	49.0	.
Percentage of managers considering corruption as a major or very severe obstacle for operation and growth	56.7	54.1	61.8	76.8	43.2	78.1	59.6	98.0	40.3
Percentage of managers considering tax rates as a major or very severe obstacle for operation and growth	40.3	37.3	46.6	63.0	38.9	40.5	66.0	26.3	46.8
Percentage of managers considering tax administration as a major or very severe obstacle for operation and growth	23.2	21.5	25.4	39.9	20.9	24.8	48.5	16.7	47.0
Perc. of managers considering anti-competitive practices of formal firms as a major or very severe obstacle for operation and growth	14.1	11.0	28.2	14.0	7.0	26.1	19.6	10.7	21.4
Perc. of managers considering business licensing and permits as a major or very severe obstacle for operation and growth	16.9	18.1	13.5	11.9	16.3	18.1	15.4	11.0	14.7

Notes: In fiscal year 2007 all are weighted averages correcting for oversampling of large firms.
"." no information available.
[3] Conditional on the number of firms having requested such a connection.

Table C1: Summary of Investment Climate Indicators (FY02 and FY07) – *Cont*

	Pakistan FY07								
		Size			*State*				
	All	***Small***	***Medium***	***Large***	***Punjab***	***Sindh***	***Balu-chistan***	***NWFP***	***Pakistan FY02***
Finance									
Percentage of working capital financed by internal founds	84.3	86.4	76.6	76.2	85.6	81.6	91.0	95.0	65.3
Percentage of working capital financed by private banks	1.7	0.9	2.8	9.1	1.7	1.8	2.7	0.0	5.1
Percentage of working capital financed by state-owned banks	0.2	0.1	0.3	0.0	0.2	0.1	0.0	0.0	0.1
Percentage of working capital financed by family/friends	0.1	0.1	0.2	0.1	0.1	0.0	0.0	0.0	6.9
Percentage of working capital financed by non-bank financial institutions	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	.
Percentage of working capital financed by trade credit	14.1	12.8	20.7	14.8	12.1	18.3	6.3	5.1	4.9
Percentage of working capital financed by informal founds	0.1	0.0	0.2	0.0	0.0	0.1	0.8	0.0	1.4
Percentage of establishments having a checking or saving account	63.3	56.2	86.1	99.2	58.3	69.6	78.6	57.1	.
Percentage of establishments having access to a credit line	13.4	5.4	29.5	77.7	7.8	22.6	11.4	13.4	21.8
Percentage of establishments having a loan	8.5	3.4	11.7	67.8	3.1	17.3	3.5	13.2	19.6
Percentage of establishments having a loan with collateral	5.7	2.0	8.7	57.1	2.9	10.4	3.5	13.2	16.0
Average value of the collateral as a percentage of the total value of the loan[4]	9.5	4.6	13.3	65.3	3.7	19.0	3.5	13.8	11.7
Percentage of establishments with external auditory	17.9	7.2	47.3	87.8	5.8	36.6	19.8	4.9	40.1
Percentage of lands owned by the establishment	78.8	76.3	84.7	96.6	81.5	77.1	51.5	68.6	93.6
Percentage of purchases paid before delivery	6.8	5.5	10.3	15.4	5.2	9.8	0.1	39.4	10.7
Percentage of sales paid for before delivery	4.4	3.7	5.8	9.6	2.3	8.1	0.0	31.6	.
Managers' perceptions:									
Percentage of managers considering access to financing as a major or very sever obstacle for operation and growth	17.6	20.2	9.1	9.0	16.5	16.0	48.8	25.2	38.3
Percentage of managers considering access to land as a major or very sever obstacle for operation and growth	26.4	25.4	31.0	27.9	16.2	40.9	51.6	50.9	21.2
Innovation and competition									
Percentage of establishments with quality certification	8.7	1.4	22.2	70.7	3.6	16.7	9.0	7.0	17.4
Percentage of establishments using web page to communicate with clients and suppliers	94.7	98.9	87.3	99.9	100.0	92.9	100.0	100.0	14.5
Percentage of establishments using e-mail to communicate with clients and suppliers	25.6	12.7	63.0	98.8	11.3	47.5	29.6	1.5	30.4
Percentage of establishments having a foreign licensed technology	2.7	1.3	4.5	17.1	0.4	6.2	3.7	0.7	.
Percentage of establishments that	6.4	3.5	15.5	21.6	2.1	13.2	4.4	9.0	.

	Pakistan FY07								
		Size			State				
	All	Small	Medium	Large	Punjab	Sindh	Balu-chistan	NWFP	Pakistan FY02
introduced a substantial product innovation during FY06									
Percentage of establishments that introduced a substantial process innovation during FY06	7.0	2.6	19.3	33.2	1.7	15.8	2.6	3.2	.
Percentage of establishments that agreed a joint venture	0.6	0.1	2.2	3.6	0.4	1.0	0.2	0.0	.
Percentage of establishments outsourcing any part of the production activity	1.6	1.6	1.2	2.8	0.2	4.0	0.0	0.0	.
Percentage of firms subcontracting R&D activities	0.7	0.0	3.6	2.2	0.2	1.6	0.0	0.0	.
Percentage of computer controlled machinery used	3.0	0.8	9.4	15.6	0.4	7.2	1.0	1.1	.
Percentage of machinery and equipment that is less than 5 years old	23.2	20.7	26.1	47.5	13.1	39.0	23.4	33.5	13.2
Percentage of establishments receiving FDI inflows	0.8	0.1	2.3	6.4	0.3	1.7	0.0	0.8	1.3
Percentage of establishments importing	17.4	10.6	33.5	63.6	12.8	25.7	14.6	8.9	14.4
Percentage of establishments exporting directly	11.5	2.0	35.5	75.3	4.1	28.4	7.5	0.0	18.0
Average number of years of exporting experience	2.0	0.2	6.5	14.1	0.7	4.1	0.2	0.0	2.7
Percentage of establishments operating in a local monopoly	2.6	3.1	0.0	1.4	0.6	6.0	0.0	0.7	0.7
Percentage of establishments competing with less than 5 competitors	11.1	11.1	12.1	7.7	10.8	11.0	13.6	46.2	7.9
Percentage of establishments competing with more than 5 competitors	86.3	85.8	87.9	90.8	88.7	83.0	86.4	53.1	91.4

Notes: In fiscal year 2007 all are weighted averages correcting for oversampling of large firms.
"." no information available.
[4] Conditional on the number of firms having a loan.
[5] Conditional on the number of firms providing training.

Table C1: Summary of Investment Climate Indicators (FY02 and FY07) – *Cont*

	Pakistan fiscal year 2007								
		Size			*State*				
	All	***Small***	***Medium***	***Large***	***Punjab***	***Sindh***	***Balu-chistan***	***NWFP***	***Pakistan FY02***
Labor markets and skills									
Percentage of production workers in staff	78.8	78.5	78.5	83.0	79.5	77.5	79.7	85.5	70.1
Percentage of female workers in staff	1.2	0.5	3.2	5.1	0.5	2.0	5.7	0.0	2.5
Percentage of skilled workers in staff	64.5	65.7	62.3	54.5	66.7	60.7	68.0	75.5	76.7
Percentage of staff using computer at work	3.3	1.3	8.8	16.4	0.9	7.4	2.4	0.3	6.2
Percentage of staff with university education	0.0	0.0	0.0	0.0	0.0	0.0	0.1	0.0	0.0
Percentage of establishments providing (beyond on the job) training to employees	4.5	1.7	11.3	24.2	0.6	9.8	14.3	4.5	7.8
Percentage of production workers receiving trainng[5]	2.4	0.4	6.9	16.9	0.3	5.0	10.7	0.9	1.0
Percentage of non-production workers receiving training[5]	1.3	0.0	3.7	12.8	0.2	2.8	3.9	0.1	0.1
Number of years of experience of the manager	20.5	19.7	23.6	23.1	20.7	20.3	19.9	14.5	6.6
Percentage of managers having at least university education	34.1	21.5	73.5	99.6	23.8	50.4	29.1	27.2	72.6
Managers' perceptions:									
Percentage of managers considering labor regulations as a major or very sever obstacle for operation and growth	5.9	5.7	6.7	6.2	0.3	15.6	0.6	0.0	15.8
Percentage of managers considering inadequately educated workforce as a major or very sever obstacle for operation and growth	7.1	5.8	13.7	8.4	2.3	15.0	10.7	0.0	13.0
Corporate governance									
Percentage of publicly listed companies	2.5	0.5	5.5	21.8	1.4	4.5	0.1	0.0	3.3
Percentage of limited liability companies	9.6	4.1	23.4	46.7	5.2	16.1	14.1	0.8	50.8
Percentage of state-owned companies	0.5	0.0	2.7	1.0	0.7	0.3	0.0	0.0	0.9
Percentage of firms' share owned on average by the largest shareholder	85.5	91.8	66.6	51.0	88.8	79.9	89.4	92.8	.
Managers' perceptions:									
Percentage of managers considering macroeconomic instability as a major or very sever obstacle for operation and growth	56.5	55.6	58.9	62.9	53.0	65.0	30.6	46.0	34.5
Percentage of managers considering political instability as a major or very sever obstacle for operation and growth	46.8	45.0	54.3	51.6	33.5	69.3	38.6	61.8	40.4

Notes: In fiscal year 2007 all the averages are computed according to probability weights to correct for oversampling of large firms.
"." no information available.
In fiscal year 2007 all are weighted averages correcting for oversampling of large firms.

ANNEX D: SAMPLING METHODOLOGY

1. **Background.** Through a statistically robust and representative sampling methodology, the Pakistan Enterprise Survey (ES) enables researchers to construct around xxx indicators which characterize various aspects of the Pakistan's business environment from the perspective of the entrepreneur. The indicators, collected and calculated in a standardized fashion, measure subjective and objective dimensions of the investment climate, covering key dimensions, including infrastructure, market governance (red tape, bureaucracy, and corruption), courts & crime, competition & innovation, and factor markets (land, labor & finance). In addition, in order to enable analysis of the impact of the investment climate indicators on enterprise performance data is collected to measure sales, employment and productivity growth.

2. The indicators will allow researchers to benchmark investment climate of individual economies across the world and conduct firm performance analysis focusing on constraints to productivity and job creation in selected sectors. In addition, for this ES in Pakistan, in order to assess the impact of changes in the business environment on firm-level productivity and job creation over time, close to a third of the FY07 sample were drawn from the list of firms surveyed in 2002 (panel firms).

3. **Sampling Goals.** The sampling goals for the Pakistan ES were therefore to generate: (i) statistically significant and representative investment climate indicators which can be analyzed at level of the nation, four provinces, size category and industry breakdown, (ii) a dynamic panel of manufacturing firms surveyed in 2002 and 2006, and (iii) a complete list with address, sectors, size and other establishment characteristics of as a basis for future follow-up panels using the 2006 survey.[8] To accomplish these goals, the Economic Census of Pakistan 2005, carried out by the Federal Bureau of Statistics (FBS), Government of Pakistan,—the first and only comprehensive firm level census ever conducted in Pakistan - was used as the sampling frame representing the population from which was drawn a stratified random sample.

4. **Institutional Management.** As the Economic Census of Manufacturing is proprietary to the Government of Pakistan and kept by FBS to protect the confidentiality of the respondents, FBS agreed to carry out the sampling procedure itself based on World Bank specified guidelines for sampling procedures for Enterprise Surveys. Based on Government business policy, another Government agency needed to be the fee based requestor of the sampling and recipient of the enterprise lists generated by the sampling process.

5. The Small and Medium Enterprise Development Authority (SMEDA) as the technical counterpart for the Investment Climate Assessment (ICA-II) Survey, managed the primary interface with the FBS and entered into a contractual arrangement with FBS to provide four products: (i) a stratified sample, representative at the national, provincial and sectoral levels drawn from the 2005 Economic Census, (ii) replacement samples to account for refusals,

[8] The survey covered manufacturing sector and services and generated a large enough sample size for selected industries to conduct statistically robust analyses. With level of precision at a minimum 7.5 percent for 90 percent confidence intervals about estimates of population proportions and mean of log sales at the national, provincial and industry level.

closures and non-responses, (iii) sampling weights to maintain representativeness, and (iv) documentation of the sampling process, methodology, calculations, adjustments and caveats.

6. **Global Standards**. The Pakistan ES is based on guidelines for the uniform sampling methodology prescribed by the World Bank's Investment Climate Guide[9] to allow calculation of investment climate indicators that minimize sampling and non-sampling errors, are nationally and provincially representative and comparable across the world's economies.

7. The survey adhered strictly to the global guidelines in terms of target firms and sectors, as well as sampling requirements regarding sample design, field work and post survey adjustments through appropriately designed sample weights. In particular, formal, urban firms with employment size of at least 5 were targeted. Minimum stratification requirements and sample sizes were exceeded in the sampling strategy as well as minimum iterations were imposed regarding replacements for non-locatable and refusing firms.

Table D1: Pakistan ICA II Sampling Frame Distribution of Firms and Employment
(by size and provincial distribution)

Number of firms

	Manufacturing			*Services*			*Total*		
	<50 emp	***> 50 emp***	***Total***	***<50 emp***	***> 50 emp***	***Total***	***<50 emp***	***> 50 emp***	***Total***
Punjab	13,882	177	14,059	1,182	12	1,194	15,064	189	15,253
Sindh	4,665	429	5,094	3,258	13	3,271	7,923	442	8,365
Baluch	123	12	135	167	0	167	290	12	302
NWFP	993	36	1,029	574	4	578	1,567	40	1,607
Total	19,663	654	20,317	5,181	29	5,210	24,844	683	25,527

Reported formal employment

	Manufacturing			*Services*			*Total*		
	<50 emp	***> 50 emp***	***Total***	***<50 emp***	***> 50 emp***	***Total***	***<50 emp***	***> 50 emp***	***Total***
Punjab	137,697	41,509	179,206	9,470	1,724	11,194	147,167	43,233	190,400
Sindh	50,438	101,329	151,767	25,527	4,500	30,027	75,965	105,829	181,794
Baluch	986	3,053	4,039	1,440	0	1,440	2,426	3,053	5,479
NWFP	8,518	5,485	14,003	4,839	219	5,058	13,357	5,704	19,061
Total	197,639	151,376	349,015	41,276	6,443	47,719	238,915	157,819	396,734

8. **Sampling Frame**. The sampling frame used for manufacturing and services was drawn from the 2005 Economic Census of Pakistan, which included close to 3 million establishments. As the target population was formal, urban manufacturing and services establishments with more than 5 full time employees, the census identified 583,329 manufacturing firms and 1,566,722 establishments in Wholesale/Retail trade & Restaurants.

[9] The Pakistan Enterprise Survey II, followed the global standards set by the Investment Climate Department of the World Bank, as described in the publication, xxxxx.

9. For manufacturing, 86.7 percent of firms employ 1-5 workers, reducing the frame to 77,375 to cover firms with 6 or more employees and reduced further to 20,317 when including only firms from within the urban areas. For services, establishments in those services sectors with at least 5 employees and an urban location numbered around 31,000. The cities covered were: Karachi, Lahore, Peshawar, and Quetta and the total number of firms in the frame numbered around 5,200 (Table D2).[10] The employment coverage of the sampling frame shows 350,000 formal, full time employees in the manufacturing sector and another 45,000 employees in the service activities targeted.[11]

Table D2: Frame Statistics Sector
(by share of total)

	No.	*Employ.*
Food	7.0	10.4
Textile	48.6	51.8
Chem	6.8	11.2
Metals	19.5	16.5
Sports	2.9	1.8
Other	15.2	8.3
Manufact	100.0	100.0
Service	20.4	12.0
Total	100.0	100.0

10. The distribution of the frame by size, province and sector is shown above in Table 1. A significant dimension of the frame concerns the small average size of firms—with size represented as number of reported full time employees. As Table 1 reveals, firms with less than 50 workers account for the bulk of the frame—over 97 percent of firms and 60 percent of total reported full time employment. This is true for all provinces apart from Sindh, where larger firms (greater than 50 employees) make up a greater proportion of the total (6 percent) and account for almost 60 percent of employment, due to the higher prevalence of larger firms in Karachi.

11. The provinces of Punjab and Sindh account for the bulk of economic activity as represented by the sampling frame. Together they represent 94 percent of all firms and employment. However, owing to the small firm size in Punjab, Sindh firms account for almost half of employment, but only 25 percent of firms.

12. The breakdown of firms and employment into sector categories in Table 2 shows that about half of the manufacturing establishments in the frame involved textiles, garments and leather, with another fifth in metal working and electric machinery. The other significant sectors (Food and Chemicals) account for only 7 percent of firms each, but together cover over a fifth of employment. Services on the other hand, account for a fifth of total firms, but only 12 percent of employment.

13. **Sampling Methodology**. The sample followed a stratified random sampling approach; stratified probability proportional to size (PPS) sample design. In order to obtain statistically significance and representation at the provincial and sector level, eighty-four individual strata were used. In addition, due to the predominance of small firms in the frame, the non-proportional size (employment) variable was used to ensure the sampling process selected with due probability the entire range size categories.

[10] Based on need for a statistically significant service stratum in each province and an analysis of the city-wise distribution of these services, the 4 provincial capitals were selected as having the largest concentration of activities, in the services sector in order to reach a sufficient number of firms for each city out of the 150 total firms planned.

[11] The low share of frame as percent of the working population is due to (i) the census counting regular, formal employment as reported by firms, (with no cross-checking), (ii) the high employment which takes place in firms with less than 6 reported employees, (iii) the high number of firms in semi-urban areas which were not captured by the filter of urban firms.

14. In accordance with the size and make up of the economy, the manufacturing sector was stratified into five 2-digit Pakistan Standard Industrial Classification (PSIC) sectors: (i) food processing, (ii) textiles, apparel & leather, (iii) chemicals and products, (iv) metal and electric machinery, and (v) sports goods and handicrafts with a residual stratum based on the 14 largest cities from the four provinces of the country. Services establishments engaged in wholesale & retail trade, hotels & restaurants were grouped to constitute an independent stratum for each provincial capital.

15. In other words, within each industry, the total sample size was distributed to the provincial/city sub-strata based on proportional allocation in order to be representative of the nation, the industry groups and the urban areas of each of the four provinces. Given the domination of smaller firms in sample frame, a sampling approach which oversampled larger firms was employed to ensure a sufficient number of large enterprise which otherwise might be underrepresented.

16. The specific steps involved: (i) extracting from the frame and dividing into activity/industry groups with selection made in proportion to each group's contribution to total industrial employment, (ii) allocating the establishments selected in to each industry group across the provinces/cities selected using a proportional allocation, and (iii) selecting the establishments for each province/city sub-stratum with a probability of selection which is inversely proportional to size (i.e. larger firms will be selected with a higher probability). Due to the oversampling of larger firms, weights were computed so that inferences about the population could be extrapolated from the sample.

Table D3: 2006/07 Representative Sample Frame and Sample Distribution

Number of firms

	Punjab		***Sindh***		***Baluchistan***		***NWFP***		***Total Economy***	
	Population	*Sample*	*Population*	*Sample*	*Population*	*Sample*	*Population*	*Sample*	*Population*	*Sample*
Food	611	71	570	49	44	17	193	13	1,418	150
Textile	6,819	147	2,612	89	38	9	401	8	9,870	253
Chem	916	59	373	20	6	2	83	5	1,378	86
Metal	3,376	110	467	17	16	9	111	3	3,970	139
Sports	386	39	193	21	1	0	15	2	595	62
Other	1,951	53	879	22	30	11	226	8	3,086	94
All manuf	14,059	479	5,094	218	135	48	1,029	39	20,317	784
Service	1,194	35	3,271	56	167	30	578	30	5,210	151
Total	15,253	514	8,365	274	302	78	1,607	69	25,527	935

Formal full time employment

	Punjab		***Sindh***		***Baluchistan***		***NWFP***		***Total Economy***	
	Population	*Sample*	*Population*	*Sample*	*Population*	*Sample*	*Population*	*Sample*	*Population*	*Sample*
Food	11,704	2,547	21,842	2,932	406	259	2,178	700	36,130	6,438
Textile	89,103	4,734	86,145	9,092	2,009	528	3,662	316	180,919	14,670
Chem	16,355	3,195	18,598	5,973	13	13	4,085	1,121	39,051	10,302
Metal	41,755	4,488	13,481	2,470	1,264	522	952	76	57,452	7,556
Sports	3,541	594	2,334	989	8	0	527	337	6,410	1,920
Other	16,748	2,521	9,367	874	339	259	2,599	931	29,053	4,585
All manuf	179,206	18,079	151,767	22,330	4,039	1,581	14,003	3,481	349,015	45,471
Service	11,194	1,329	30,027	1,517	1,440	327	5,058	589	47,719	3,762
Total	190,400	19,408	181,794	23,847	5,479	1,908	19,061	4,070	396,734	49,233

17. **Sample Size.** The sample was drawn to satisfy the minimum sizes at provincial and industry levels and allocated for each city based on the relative share of each selected city out of the total frame.[12] The total number of manufacturing and service establishments to be included in the final sample was targeted at 1,350 taking into consideration the need for minimum sample at the sector and provincial level and to ensure a reasonable minimum number of panel observations.

18. The survey field work was able to complete, check and confirm 1,337 interviews, 935 of which were non-panel interviews making up the representative sample for 2006/07. Of this, the 784 manufacturing and 151 service firms making up the 'Non-panel' weighted sample exceeds the 674 and 117 minimum sample size, respectively, needed to accommodate the sampling goals and stratification variables. For individual stratum, Table 3 below shows the frame and sample distribution of Non Panel across individual strata used in the sampling methodology.

Table D4: Panel Sample 2001/2-2006/7
(by distribution of frame and sample)

	Number of establishments									
	Punjab		***Sindh***		***Baluchistan***		***NWFP***		***Total Economy***	
	Population	***Sample***	***Population***	***Sample***	***Population***	***Sample***	***Population***	***Sample***	***Population***	***Sample***
Food	182	13	160	26	35	2	112	22	489	63
Textile	1,601	146	1,041	55	44	4	17	1	2,703	206
Chem	215	29	121	11	28	2	31	3	395	45
Metal	1,129	52	82	4	45	0	51	7	1,307	63
Sports	261	25	0	0	0	0	0	0	261	25
Other	172	0	96	0	0	0	2	0	270	0
Total	**3,560**	**265**	**1,500**	**96**	**152**	**8**	**213**	**33**	**5,425**	**402**

19. **Panel Firms**. The survey strategy attempted to take advantage of the 2002 Pakistan Enterprise Survey in order to develop a dynamic panel.[13] The panel would enable analysis of responses from the same firm made in 2001/2 and 2006/7 in order to draw inferences about changes in the investment climate over time and to attempt to attribute causes to those changes.

20. However, important difference between the approach taken in 2002 and the 2006 survey limits the range of panel-type of analyses to some degree. In particular, as the frame in 2002 was not representative of the population, and as weighting was not done in 2002, inferences made from the panel analysis cannot be take as statistically representative of the population in 2001 nor 2006, but are rather indicative of changes in the investment climate over the 5 year period.

21. The Pakistan Enterprise Survey II sample was also designed to include up to 600 firms from the original sample of Pakistan Enterprise Survey I, out of a total of 846 establishments surveyed in 2002 (panel firms with location and other identifiers). The remaining 246 establishments were kept as potential replacements in case of non-response by an establishment

[12] Based on the global ES guidelines, the minimum sample size per industry (and province) to conduct statistically robust analyses is met to make inferences for 4 manufacturing sectors and services as well as for provincial analysis at the minimum 7.5 percent precision for 90 percent confidence.

[13] Some significant differences between the 2002 and 2006 ES limit the use of the panel approach, to some extent. In particular, (i) the common questions between the 2002 and 2006 sample are somewhat limited as the core survey instrument changed substantially over the period, (ii) the frame was constructed using non-representative lists from Provincial Governments, (totaling firms 11,000, of which 5,425 were firms with employment greater than 5), and (iii) the stratification, oversampling and weighting strategy was quite different from that employed in 2006.

of similar characteristics in the original panel sample. In the end, 402 firms were interviewed out of 795 firms contacted. The frame and sample distribution of the 402 panel firms is shown below in Table 4.

22. **Survey Response Rates.** Due to a high number of firms which could not be located, 3 replacement samples were drawn by FBS maintaining the original sampling parameters (firms were replaced from the same strata). Table 5 is drawn from survey field reports as reported by the Survey firm, to provide details on the sample, replacements and non-response rates.

Table D5: Survey Field Report

	Original	*Added Sample*	*Attempted Contact*	*Not Used*	*Completed*	*Not Found*	*Closed*	*Refused*	*Non Usable*
Panel	600	195	795	0	402	120	119	120	34
Non Panel	750	1,127	1,547	330	935	335	79	130	68
Total	1,350	1,322	2,342	330	1,337	455	198	250	102

23. The field work involved a sample of almost 2700 firms with more than 2,300 firms contacted in order to complete the survey of 1,337 firms - a seemingly low 57 percent success rate. However, of the 1,000 non-successful contacts, about 45 percent were not located due to poor contact information and 25 percent refused to participate.[14] Of the rest, only 20 percent were closed and 10 percent either were either non-responsive or produced non-usable data.[15] For the non-panel sample, the response rate was slightly higher at 60 percent, but of the 612 non-responding firms, 55 percent were not found due to insufficient contact information, 21 percent refused participation, 11 percent were non-usable and 13 percent were confirmed as closed.

24. **Calculation of Sampling Weights**. Based on the sampling approach described above, where the sample was drawn using stratification along two variables and the firms were chosen with a probability related to size, appropriate weights were needed to accommodate the oversampling of larger firms. Sampling weights were calculated based on the distribution of the frame across stratification variables (city and sector). Each establishment was weighted by the establishment's share of employment in the stratum to which the firm belongs. In other words, the weight is calculated as the inverse of the probability of selection which in turn is calculated by taking the employment of the firm, dividing by the employment of the firm's stratum and multiplying by the number of firms sampled from the firm's stratum.

[14] More detailed reports from the field, showing the distribution of success rates, indicates that the distribution of the non-located firms and firms refusing to participate was random and distributed proportionally across the sample, thereby having minimum impact on the sampling goals.

[15] Post survey adjustments in the sampling weights were not made, as there has not been a second census and therefore no information to calculate entry and exit. Only 20 percent of non-responders (4.4 percent of total firms contacted) were confirmed to have been closed and this was assumed to be proportional to the number of firms which have entered during the period. In addition, the firms which could not be located were presumed to exist but had poor contact information. Field work with FBS regional offices confirmed this presumption.

ANNEX E: ECONOMETRIC METHODS FOR PRODUCTIVITY AND INVESTMENT CLIMATE ANALYSIS

1. In the identification of the statistically significant investment climate effects on economic performance (productivity, demand for labor, real wages, probability of exporting and probability of receiving FDI) our main concern is to use the information contained in the IC survey to perform the estimation of the system and, at the same time, to control for all the contingent problems we are going to find: measuring productivity, simultaneous determination of the dependent variables of the system, endogenous regressors, over-identification, weak instruments as well as data quality issues such as missing values, outliers or measurement errors. In this appendix we briefly describe the methodology used and how we deal with the various methodological problems found. We follow Escribano and Guasch (2005 and 2008), Escribano et al (2008a and b) and Escribano, Guasch and Pena (2008). For more details on the econometric methodology applied in the ICA of Pakistan see Escribano, de Orte and Pena (2008).

2. The information we have for the analysis consists of three different sets of data. The firs dataset is a sample with 784 manufacturing establishments. The second one consists of 151 services establishments. Finally, the last dataset is a panel with information for 402 manufacturing firms in years 2001 and 2006.

3. Both manufacturing and services surveys provides information for production function variables for 2 years, although the information for IC variables is fixed. Nonetheless, we use information only for 2006 because we think information in 2005 is flawless, full of missing data and therefore too noisy to use it in the analysis. The description of the variables used, both dependent variables (productivity, employment, real wages, exports and FDI) and independent (set of more than 140 IC) variables can be found in tables 1.1 to 2.7.

4. We implement a different econometric methodology for each one of the three datasets. We first describe the methodology for the manufacturing sector and we follow with services and the panel. Most of the econometric difficulties described for manufacturing apply with almost no change to services and the panel.

Box 1: Summary of the econometric methods used to assess the IC effects on economic performance

Basically, the econometric methodology consists of two steps:

a. Identification of statistically significant IC effects on productivity, employment, wages, exporting propensity and FDI propensity.

For the identification of the statistically significant IC effects on economic performance, we propose a simultaneous equations system that relates the interactions between the investment climate with productivity, demand for labor, wages, exports and FDI inflows. In the estimation we always control for firms' size, state and sector. From the estimation we get the IC elasticities and semi-elasticities with respect to productivity, employment, wages, exporting propensity and FDI propensity.

b. Evaluation of relative IC contribution to aggregate (weighted average) productivity and the sample means (un-weighted average) of economic performance variables.

The IC elasticities and semi-elasticities give us a measure of the sensitiveness of outcome variables when the IC changes marginally. In order to consider the level of the IC in the population we also evaluate the relative contribution of the different IC variables on the sample means of the dependent or outcome variables (productivity, employment, wages, exports and FDI). For the case of productivity we go one step forward and we evaluate the IC on the terms of the Olley and Pakes (O&P) decomposition of aggregate productivity (or weighted average using as weights the share of sales) into average productivity and allocative efficiency term.

In what follows we describe the estimation procedure, and we address the main econometric difficulties as well as the solutions proposed.

Box 2: Estimation of IC effects on productivity, employment, wages, exports and FDI

The identification of the statistically significant IC impacts on the outcomes is done by a system of five equations as the following:

$$\log P_{it} = \alpha_P + \alpha'_{IC} IC_i^P + y_{it}^{Exp} + y_{it}^{FDI} + \alpha'_{DR} D_r + \alpha'_{Ds} D_j + \alpha'_{DM} D_m + (v_{P,i} + \varepsilon_{P,it}) \quad \text{(b2.1)}$$

$$logL_i = \gamma_L + \gamma_P \log P_i + \gamma_w \log W_i + y_i^{Exp} + y_i^{FDI} + \gamma'_L IC_i^L + \gamma'_{DR} D_r + \gamma'_{Ds} D_j + \gamma'_{DM} D_m + (v_{L,i} + \varepsilon_{L,i}) \quad \text{(b2.2)}$$

$$logW_i = \beta_W + \beta_P \log P_i + y_i^{Exp} + y_i^{FDI} + \beta'_{IC} IC_i + \beta'_{DR} D_r + \beta'_{Ds} D_j + \beta'_{DM} D_m + (v_{W,i} + \varepsilon_{W,i}) \quad \text{(b2.3)}$$

$$y_i^{Exp} = \delta_{Exp} + \delta_P \log P_i + y_i^{FDI} + \delta'_{IC} IC_i^{Exp} + \delta'_{DR} D_r + \delta'_{Ds} D_j + \delta'_{DM} D_m + (v_{Exp,i} + \varepsilon_{Exp,i}) \quad \text{(b2.4)}$$

$$y_i^{FDI} = \rho_{FDI} + \rho_P \log P_i + y_i^{Exp} + \rho'_{IC} IC_i^{FDI} + \rho'_{DR} D_r + \rho'_{Ds} D_j + \rho'_{DM} D_m + (v_{FDI,i} + \varepsilon_{FDI,i}) \quad \text{(b2.5)}$$

Where P is productivity, L is employment, W are wages per employee, y^{exp} and y^{FDI} IC^e e=P,L,W,Exp and FDI are the vectors of significant IC variables in each equation, D_r, D_j and D_m are the vectors of region, sector and size dummies respectively and v_e and ε_e are random error terms.

5. In the estimation of the system (b2.1)-(b2.5), productivity equation is of great importance. Since productivity enters as endogenous covariate in the remaining equation, we first estimate (b2.1) and we use the specification obtained in order to estimate the remaining equations by IV techniques. TFP as a residual is a black box that may contain any factor that affect the way firms transform inputs into outputs. Therefore we do not know what TFP exactly is. In addition, from now on, there is no a unified TFP theory (Prescott, 2004). The philosophy implicit in the estimation of productivity equation is to use the information contained in the IC survey of Pakistan to bring the abstruse TFP concept to the empirical world. That is, we fill the initially empty TFP measure with hard data numbers reflecting the way firms transform inputs into output and the factors mapping the differences between the more and the less efficient ones. Productivity estimation is summarized in Box 3.

Box 3: Summary of econometric issues in productivity equation

Productivity equation comes from a structural system of equations as the following

$$\log Y_i = \alpha_L \log L_i + \alpha_M \log M_i + \alpha_K \log K_i + \log P_i \quad \text{(b3.1)}$$

$$\log P_i = a_i + \alpha'_{DR} D_r + \alpha'_{Ds} D_j + \alpha'_{DM} D_m + \alpha_P + w_i \quad \text{(b3.2)}$$

$$a_i = \alpha'_{IC} IC_{P,i} + \alpha'_C C_{P,i} + \varepsilon_i \quad \text{(b3.3)}$$

where, Y is firms' output (sales), L is employment, M denotes intermediate materials, K is the capital stock, IC and C are time-fixed effect vectors of other investment climate and control time-fixed effects, and *Dr*, *Dj* and *Dm* are the vectors of state, industry and size dummies.

Econometric issues in productivity equation:

• **No single salient productivity measure** Since there is no single salient measure of productivity, any empirical evaluation of the productivity impact of the IC may critically depend on the particular productivity measure used.

Solution: Escribano and Guasch (2005, 2008) who–following the literature on sensitivity analysis of Magnus and Vasnew (2006)–suggest looking for empirical results (elasticities and semi-elasticities) that are robust to several productivity measures. The different productivity measures come from: i) different functional forms of the production function (b3.1) Cobb-Douglas and Trasnlog; ii) different sets of assumptions (technology and market conditions) obtaining two different approaches the two step estimation of the system (b3.1)-(b3.3) by applying the Solow residual to estimate firm level productivity and the single step estimation by parametric techniques of (b3.1)-(b3.3); iii) different levels of aggregation in measuring input-output elasticities of equation (b3.1) (at the industry level or at the aggregate country level). The productivity measures used in this report are summarized in the next table (for more details see Escribano, de Orte and Pena (2008):

Functional forms of production function	***Estimation procedure***	***Aggregation level of coefficients of PF***	***Result***
1. Solow´s Residual	Two-step estimation	1.1 Unrestricted coefficients 2.2 Unrestricted coefficient	2 (P) measures; 2 (IC) elasticities
2. Cobb-Douglas	Single-step estimation	2.1 Restricted coefficient 2.2 Unrestricted coefficient	2 (P) measures; 2 (IC) elasticities
3. Translog	Single-step estimation	3.1 Restricted coefficient 3.2 Unrestricted coefficient	2 (P) measures; 2 (IC) elasticities
Total			**6 (P) measures; 6 (IC) elasticities**

• **Endogeneity of the inputs.** There is an identification issue separating TFP from the production function (PF); when any PF inputs is influenced by unobserved common causes affecting productivity—such as a firm's fixed effects—there is a simultaneous equation problem in equation (b3.1) and therefore in the single step estimation procedure (2.2).

Solution: To address this well-known problem (Marschak and Andews, 1944, and Griliches and Mairesse, 1995), we follow the approach proposed by Escribano and Guasch (2005, 2008). That is, we proxy the usually unobserved firm-specific fixed effects (which are the main cause of inputs' endogeneity) by a long list of observed firm-specific fixed effects coming from the investment climate surveys. Controlling for the largest set of IC variables and plant C characteristics, we can get—under standard regularity conditions—consistent and unbiased least squares estimators of the parameters of the PF and the IC elasticities (or reduce the degree of endogeneity in the data).

The robust IC elasticities and semi-elasticities with respect to productivity (equation s b3.1, b3.2 and b3.3) can be found in Table 3. The IC elasticities and semi-elasticities with respect to the remaining economic performance measures (system b2.1-b2.5) are in Table 5. [please confirm reference]

Box 4: Summary of other econometric issues and solutions proposed

General econometric issues (applying to any equation of the system (b2.1-b2.5):

- **Endogeneity of IC variables**: For consistency in the estimation of (b2.1)-(b2.5) we want v_e and ε_e to be uncorrelated with any variable contained in the IC vector. It can be argued that the error terms might contain third party, unmeasured effects correlated with IC, what renders the OLS estimator inconsistent.
  - **Solution 1:** correction for observable fixed effects, by using the full set of information contained in the IC variable we are able to correct for more than 180 variables in the estimation, what eliminates a large degree of endogeneity and spurious correlations as we condition the expectation of the outcome variables in as much information as we can.
  - **Solution 2:** in spite of the observable fixed effect correction the exogeneity condition does not hold for all the variables in the model. Otherwise, we use the industry-region (or industry-region-size) counterparts of firm level IC variables, which is equivalent than applying a general IV estimator.
- **Endogeneity of outcome variables**: For some other explanatory variables like productivity, wages, exports and FDI, the endogeneity is intrinsic due to the simultaneous structure of the system of equations.
  - **Solution:** In these cases we instrument the corresponding outcome variable with a list of exogenous IC variables. We take the list of IC variables from the explanatory variables of the corresponding equation and we estimate the system by 2SLS.
- **Selection of the relevant model.** The population model is unknown and we have to approximate it starting from a broad set of more than 180 variables.
  - **Solution:** The econometric methodology applied for the selection of the variables goes from the general to the specific. The otherwise omitted variables problem that we encounter generates biased and inconsistent parameter estimates. We then start removing from the regressions—the less significant variables—one by one, until we obtain the final set of variables, all significant in at least one of the regressions and with parameters varying within a reasonable range of values. The set of significant IC variables is as well used as included instruments of the corresponding endogenous outcome variable in the remaining equations when estimated by IV techniques. Note that the set of explanatory variables are used as excluded instruments in the IV estimation as well.
- **Heteroskedasticity in the error terms.**
  - **Solution:** the heteroskedasticity of the errors is addressed by using robust (white) standard errors. We also compute cluster standard errors, allowing for correlation within industry and region.
- **Identification of the system of equations.**
  - **Solution:** In order to ensure the rank condition is satisfied in the system (b2.1)-(b2.5), we force the coefficient of certain IC variables to be 0 (exclusion restrictions) prior to start estimating the system.
- **Weak instruments and over-identification in IV estimation.**
  - **Solution:** We select instruments (either included or excluded) seeking a partial R-squared –or 'Shea' partial R-squared—as high as possible with the restriction that our model cannot be over-identified. To test over-identification we use the Hansen test, a robust to general heteroskedasticity variation of classic Sargan test. In addition we take into account significance and the R2 of the first stage estimates when removing instruments.

Box 5. Summary of econometric issues regarding data quality

Although the Investment Climate surveys are valuable instruments improving our understanding of the economic, social, political and institutional factors determining economic growth, particularly in emerging and transition economies, at the same time we have to overcome some difficult issues related with the quality of the information provided; measurement errors, outlier observations and missing data are frequently found in this datasets. The ICS of Pakistan is not an exception.

Econometric issues regarding data quality:

- **Missing data.** The number of missing values in 2006 (FY07) reduces the sample available from 784 to 358 observations in the complete case (45.6% of the sample). In 2005 the Operating with the complete case is only acceptable if missing data comprise a small percentage, say 5% or less, of the size of the sample (Schafer, 1996), and preserves the representativeness of the original sampling frame. In models with a large number of regressors missing data problem force us to leave out of the regression some explanatory variables with high proportion of missing values. As Cameron and Trivedi (2005) point out, this practice may lead to an *omitted variables* problem.
  - **Solution:** We input those missing values with the objective of preserving the sample representativeness, gaining efficiency in the estimation and retrieving for the analysis a large number of very expensive interviews. Basically, the imputation mechanism replaces the missing value by the expectation of the variable conditional on the information we have on sector, size and state (see Escribano and Pena, 2008 for more details). To check robustness we also estimate productivity equation under different inputation mechanisms and different assumptions on the missing data mechanism (MDM), see Escribano de Orte and Pena, 2008. After the imputation we are able to use 731observations, 93.2% of the sampling frame.
- **Endogenous missing data mechanism (MDM).** As Escribano and Pena (2008) signals, the missing data problem may also have important implications in the consistency of the IC parameters estimates when the pattern of missing values is determined by the IC variables.
  - **Solution:** We need to control for any IC variable correlated with the MDM to achieve consistency in the estimation of the system (b2.1-b2.5).
- **Outliers.**
  - **Solution:** We exclude from the analysis those outlier observations, understanding by outlier those observations with ratios of materials and/or labor cost to sales larger than one.

Box 6. Evaluation of IC effects on the Olley and Pakes (1996) decomposition

The Olley and Pakes (O&P) decomposition of aggregate productivity in logs is,

$$\log P = \log \overline{P} + N\,\hat{\mathrm{cov}}(s_{it}^{Y}, \log P_{it}) \cdot \qquad \text{(b6.1)}$$

Where logP is aggregate log-productivity (or weighted average productivity, where the weights are given by the share of sales), $\log \overline{P}$ is un-weighted average log-productivity and the last term is the covariance between share of sales and firm level productivity, or allocative efficiency term, describing the ability of the markets to reallocate resources from less to more productive establishments.

The useful additive property of equation (b6.1) in logarithms, allow us to obtain an exact closed form solution of the decomposition of aggregate log productivity according to (b2.2) and (b2.3). Following Escribano et al. (2008b), we can express aggregate log productivity as a weighted sum of the average values of the IC, C, dummy D variables, the intercept and the productivity average residuals; and, the sum of the *covariances* between the share of sales and investment climate variables IC, C, dummies D and the productivity residuals.

$$\log P = \hat{\alpha}'_{IC}\,\overline{IC}_P + \hat{\alpha}'_{C}\,\overline{C}_P + \hat{\alpha}'_{DR}\,\overline{D}_r + \hat{\alpha}'_{Ds}\,\overline{D}_j + \hat{\alpha}_p + \overline{\hat{u}}_i + N\,\hat{\alpha}'_{IC}\,\hat{\mathrm{cov}}(s_i^{Y}, IC_{P,i}) + N\,\hat{\alpha}'_{C}\,\hat{\mathrm{cov}}(s_i^{Y}, C_{P,i}) \qquad \text{(b6.2)}$$
$$+ N\,\hat{\alpha}'_{Ds}\,\hat{\mathrm{cov}}(s_i^{Y}, D_j) + N\,\hat{\alpha}'_{DR}\,\hat{\mathrm{cov}}(s_i^{Y}, D_r) + N\,\hat{\alpha}'_{DM}\,\hat{\mathrm{cov}}(s_i^{Y}, D_m) + N\,\hat{\mathrm{cov}}(s_i^{Y}, \hat{u}_i)$$

Concretely, we compute the IC contributions relative to aggregate productivity as follows

$$100 = {}^{100}\!/_{\log P}\,[\hat{\alpha}'_{IC}\,\overline{IC}_P + \hat{\alpha}'_{C}\,\overline{C}_P + \hat{\alpha}'_{DR}\,\overline{D}_r + \hat{\alpha}'_{Ds}\,\overline{D}_j + \hat{\alpha}_p + \overline{\hat{u}}_{it} + N\,\hat{\alpha}'_{IC}\,\hat{\mathrm{cov}}(s_i^{Y}, IC_{P,i}) + N\,\hat{\alpha}'_{C}\,\hat{\mathrm{cov}}(s_i^{Y}, C_{P,i}) \qquad \text{(b6.3)}$$
$$+ N\,\hat{\alpha}'_{Ds}\,\hat{\mathrm{cov}}(s_i^{Y}, D_j) + N\,\hat{\alpha}'_{DR}\,\hat{\mathrm{cov}}(s_i^{Y}, D_r) + N\,\hat{\alpha}'_{DM}\,\hat{\mathrm{cov}}(s_i^{Y}, D_m) + N\,\hat{\mathrm{cov}}(s_i^{Y}, \hat{u}_i)]$$

The whole results of equation (b6.3) are in Table A.2. Notice that from (b6.3):

- We can compare net contributions by isolating the impact of IC variables from the impact of industry dummies, the intercept, and the residuals (demean log-productivity, see next box);
- We can express what portion of aggregate productivity is explained by IC, and C variables (demean logP), and what proportion is due to the constant term, industry dummies and so on.
- We can get rid of the different directions (positive or negative) of the various IC effects by simply taking the percentage contributions in absolute value.
- Finally, we can compute the absolute percentage contributions to the average log-productivity by blocks of IC variables or by states, sectors or sizes.

The entire results of equation (b6.3) are in Table 4.

Box 7. International comparisons: demean log-productivity

Our knowledge of TFP is conditional on our knowledge of firms' operating conditions. Any productivity measure is subject to measurement errors, unmeasured third party effects, differences in the deflators used, etc.

To make cross-country comparisons based on IC impacts on productivity, to avoid the problem of comparing apples and oranges, it is desirable create an index (*demean* productivity). After subtracting the mean (that is, the constant term, time effects, industry effects and country-specific effects) from firm level log-productivity we can concentrate on the part of log-productivity explained by the IC variables. Thus, demean log-productivity at the firm level is simply

$$Demean \log P = \hat{\alpha}'_{IC}\overline{IC}_P + \hat{\alpha}'_C\overline{C}_P + N\hat{\alpha}'_{IC}\hat{\mathrm{cov}}(s^Y_{it}, IC_{P,i}) + N_q\hat{\alpha}'_C\hat{\mathrm{cov}}(s^Y_{q,it}, C_{P,i}) \quad \text{(b7.1)}$$

Expression (b7.1) is country by country comparable because we use almost the same set of IC variables in all countries (with some slight modifications depending on the specific characteristics of each economy) and we apply the same methodology to select the set of significant IC variables. In addition, we can easily compute the O&P decompositions based on this demean part of productivity to do international comparisons of IC impacts on aggregate productivity.

The share of aggregate log-productivity associated with the IC is in Table 4.

Box 8. Evaluation of IC contributions to the means of the economic performance variables

The objective now is to measure the *partial direct effect* of each IC variable on each dependent variable. For that purpose, we evaluate the impact of the average IC variable on the sample average values of the dependent variables (employment, wages, exports, FDI,). In what follows, we substitute all the unknown parameters from the system (3.5) to (3.9) by their corresponding 2SLS estimated values. The contributions are given by:

$$100 = \frac{\hat{\alpha}_L}{\log\overline{P}}100 + \frac{\hat{\alpha}'_{IC}\overline{IC}}{\log\overline{P}}100 + \frac{\hat{\alpha}'_{DR}\overline{D}_r}{\log\overline{P}}100 + \frac{\hat{\alpha}'_{Ds}\overline{D}_j}{\log\overline{P}}100 + \frac{\hat{\alpha}'_{DM}\overline{D}_m}{\log\overline{P}}100 \quad \text{(b7.1)}$$

$$100 = \frac{\hat{\gamma}_L}{\log\overline{L}}100 + \frac{\hat{\gamma}_P\log\overline{P}}{\log\overline{L}}100 + \frac{\hat{\gamma}_W\log\overline{W}}{\log\overline{L}}100 + \frac{\hat{\gamma}'_{IC}\overline{IC}}{\log\overline{L}}100 + \frac{\hat{\gamma}'_C\overline{C}}{\log\overline{L}}100 + \frac{\hat{\gamma}'_{DR}\overline{D}_r}{\log\overline{L}}100 + \frac{\hat{\gamma}'_{Ds}\overline{D}_j}{\log\overline{L}}100 + \frac{\hat{\gamma}'_{DM}\overline{D}_m}{\log\overline{L}}100 \quad \text{(b7.2)}$$

$$100 = \frac{\hat{\beta}_W}{\log\overline{W}}100 + \frac{\hat{\beta}_P\log\overline{P}}{\log\overline{W}}100 + \frac{\hat{\beta}'_{IC}\overline{IC}}{\log\overline{W}}100 + \frac{\hat{\beta}'_C\overline{C}}{\log\overline{W}}100 + \frac{\hat{\beta}'_{DR}\overline{D}_r}{\log\overline{W}}100 + \frac{\hat{\beta}'_{Ds}\overline{D}_j}{\log\overline{W}}100 + \frac{\hat{\beta}'_{DM}\overline{D}_m}{\log\overline{W}}100 \quad \text{(b7.3)}$$

$$100 = \frac{\hat{\delta}_{Exp}}{\hat{P}(Exp>0)}100 + \frac{\hat{\delta}_P\log\overline{P}}{\hat{P}(Exp>0)}100 + \frac{\hat{\delta}'_{IC}\overline{IC}}{\hat{P}(Exp>0)}100 + \frac{\hat{\delta}'_C\overline{C}}{\hat{P}(Exp>0)}100 + \frac{\hat{\delta}'_{DR}\overline{D}_r}{\hat{P}(Exp>0)} + \frac{\hat{\delta}'_{Ds}\overline{D}_j}{\hat{P}(Exp>0)} + \frac{\hat{\delta}'_{DM}\overline{D}_m}{\hat{P}(Exp>0)}100. \quad \text{(b7.4)}$$

$$100 = \frac{\hat{\rho}_{FDI}}{\hat{P}(FDI>0)}100 + \frac{\hat{\rho}_P\log\overline{P}}{\hat{P}(FDI>0)}100 + \frac{\hat{\rho}'_{IC}\overline{IC}}{\hat{P}(FDI>0)}100 + \frac{\hat{\rho}'_C\overline{C}}{\hat{P}(FDI>0)}100 + \frac{\hat{\rho}'_{DR}\overline{D}_r}{\hat{P}(FDI>0)}100 + \frac{\hat{\rho}'_{Ds}\overline{D}_j}{\hat{P}(FDI>0)}100 + \frac{\hat{\rho}'_{DM}\overline{D}_m}{\hat{P}(FDI>0)}100. \quad \text{(b7.5)}$$

The IC percentage contributions of equations (b7.1)-(b7.2) are in Table 6.

Box 9: Summary of econometric methodology for services sector

The econometric analysis of the services sector is based on the concept of labour-productivity, instead of total factor productivity. In particular, the log of labour productivity is explained by the prices of the inputs, the investment climate (IC) variables and other control variables, including dummy variables for industry, region and size.
The reduced form equation of labour productivity in terms of the input prices (w, r), investment climate (IC) variables and other control (C) variables is given by;

$$\log\left(\frac{Y}{L}\right)_{it} = \gamma_0 + \gamma_1 \log w_{it} + \gamma_2 \log r_{it} + \gamma_3' IC_i + \gamma_4' C_i + \gamma_5' D_{jt} + \gamma_6' D_{st} + \gamma_7' D_{mt} + \varepsilon_{it} \quad \text{(b9.1)}$$

where i=1,…, 150 an t=FY06 and FY07.

Econometric issues:

Most of the econometric issues commented and treated in the manufacturing probability model hold for the case of the services:

- In the endogeneity of (5.1) we are treating the investment climate (IC) variables as observable fixed effects, as was suggested in Escribano and Guasch (2005). After controlling for observable fixed effects. The possible endogeneity of certain IC variables.is addressed with the corresponding region-industry average.
- To control for heteroskedasticity we use robust standard errors allowing for clustering by sector and region.
- In the cleaning of data and replacement of missing values we apply the same procedure than in the manufacturing sector.
- The main difference with respect to the manufactures case is the way robustness is addressed here. We test robustness to the input prices used in (b8.1): wages, rental cost of capital; to the panel data dataset and to the cross-sectional dataset; and by using restricted and unrestricted by industry, region and industry/region input prices (we allow the elasticities of the input prices to vary by industry, region or both industry and region).

Evaluation of IC effects on labor log productivity:
In order to evaluate the contribution of each explanatory variable to labor-productivity we apply the O&P decomposition to the concept of labor productivity and we compute the contribution of each IC variable to the aggregate log labor productivity through average log labor productivity and allocative efficiency.
IC elasticities and semi-elasticities estimates of equation (b9.1) are in Table 7.

Box 10: Summary of econometric methodology for FY02-FY07 panel

The evolution of the TFP between 1999 and 2006 shows an increase in the aggregate productivity of the manufacturing sector of Pakistan. In order to have additional insight on which are the IC factors associated with the increase in productivity observed, we use the information available for the 402 panel manufacturing firms. As we have already pointed out the information is far of being a random sample representative of the real population, so careful is required in the interpretation of the results.
Concretely, we propose a model that relates the probability that productivity increase from 2001 to 2006 conditional on the investment climate establishments faced in 2001. We also control for productivity in 2001, and for region, size and sector. The population model is,

$$P(y_{it} = 1 \mid \log P_{it-5}, \mathrm{IC}_{it-5}, C_{it-5}, D_{rt-5}, D_{jt-5}, D_{mt-5}; \xi, \rho_{IC}, \rho_C, \varsigma_{DS}, \varsigma_{DR}, \varsigma_{DM}) = G(\xi \log P_{it-5} + \rho_{IC}' \mathrm{IC}_{it-5} + \rho_C' C_{it-5} + \varsigma_{DS}' D_{rt-5} + \varsigma_{DR}' D_{jt-5} + \varsigma_{DM}' D_{mt-5}) \quad \text{(b10.1)}$$

As usual, in the estimation of (b9.1) we use the classical specifications for the unknown function G(.). Concretely, we select the set of significant IC variables going from the general to the specific with a LPM. Once we have selected the significant IC variables we use Logit and Probit models to test robustness.
Most of the econometrics issues of the manufacturing econometric model also apply here. We address endogeneity of IC variables controlling for observable fixed effects and by using industry-region-size averages. The heteroskedasticity of the errors is addressed by using robust standard errors, allowing for clustering by region and size.
There are some additional caveats on this model. We do not attempt to model causal relations between the IC and the increase of productivity. The advantage of the model is that we get rid of some simultaneous relations that may arise otherwise when we use contemporaneous explanatory variables.

The estimation of IC effects on the probability of productivity increase according to equation (b10.1) is in Table 8.

ANNEX F: DEFINITIONS OF VARIABLES AND ECONOMETRIC RESULTS

Table F1: General information on plant level and production function (productivity) variables for the analysis of manufacturing sector

General information at plant level	Industrial classification	a) Food Processing, Beverages, and Tobacco; b) Textile and Leather; c) Wood and Wood Products, other than Pulp; d) Pulp, Paper, and Printing; e) Chemical, including Petrochemical; f) Non-Metallic Mineral Products; g) Iron, Steel, and Non-Ferrous Metal; h) Machinery; i) Miscellaneous Manufacturing Industries.
	Regional classification	a) Punjab; b) Sindh; c) Baluchistan; d) NWFP.
	Size classification	a) Small (< 25 employees); b) medium (>=25 & <100); c) large (>=100).
Production function variables	Sales	Used as the measure of output for the production function estimation. Sales are defined as total annual sales. The series are deflated by using the Producer Price Indexes (PPI), base 2002.
	Employment	Total number of permanent and temporal workers.
	Total hours worked per year	Total number of employees multiplied by the average hours worked per year.
	Materials	Total costs of intermediate and raw materials used in production (excluding fuel). The series are deflated by using the Producer Price Indexes (PPI), base 2002.
	Capital stock	Net book value of machinery and equipment. The series are deflated by using the Producer Price Indexes (PPI), base 2002.
	User cost of capital	The user cost of capital is defined in terms of the opportunity cost of using capital; it is defined as a 15% of the net book value of machinery and equipment.
	Labor cost	Total expenditures on personnel. The series are deflated by using the Producer Price Indexes (PPI), base 2002.
Dependent variables in equation regressions and linear probability models	Exports	Dummy variable that takes value 1 if exports are greater than 10%.
	Foreign Direct Investment	Dummy variable that takes value 1 if any part of the capital of the firm is foreign.
	Wages	Real wage is defined as the total expenditures on personnel (deflated by using the Producer Price Indexes (PPI), base 2002.) divided by the total number of permanent and temporal workers.
	Employment	Total number of permanent and temporal workers.

Source: Staff calculations with Pakistan ICS data.
All series figure in US dollars, data obtained from WDI, The World Bank, 2008.

Table F2: General information on plant level and production function (productivity) variables for the analysis of services sector

General Information at Plant Level	Industrial classification	a) Wholesale and retail trade; b) other services including IT, construction and transport.
	Regional classification	a) Punjab; b) Sindh; c) Baluchistan; d) NWFP.
	Size classification	a) Small (< 25 employees); b) medium (>=25 & <100); c) large (>=100).
Labor productivity variables	Sales	Used as the measure of output. Sales are defined as total annual sales. The series are deflated by using the Producer Price Indexes (PPI), base 2002.
	Employment (demand for labor)	Total number of permanent and temporal workers.
	Total hours worked per year	Total number of employees multiplied by the average hours worked per year.
	Electricity cost	Total annual costs of electricity. The series are deflated by using the Producer Price Indexes (PPI), base 2002.
	Communication cost	Total annual costs of communications services. The series are deflated by using the Producer Price Index (PPI), base 2002.
	Rental cost of capital	Total annual cost of rental of land/buildings, equipment, furniture. The series are deflated by using the Producer Price Indexes (PPI), base 2002.
	Labor cost	Total annual cost of labor (including wages, salaries, bonuses, social payments). The series are deflated by using the Producer Price Index (PPI), base 2002.

Source: Staff calculations with Pakistan ICS data.
All series figure in US dollars, data obtained from WDI, The World Bank, 2008.

Table F3: Definition of IC variables: infrastructure

Name	Definition
Days to clear customs to export	Average number of days to clear customs when exporting directly.
Longest number of days to clear customs to export	Longest number of days to clear customs when exporting directly.
Days to clear customs to import	Average number of days to clear customs when importing.
Longest number of days to clear customs to import	Longest number of days to clear customs when importing.
Power outages	Total number of power outages suffered by the plant in 2005.
Average duration of power outages	Average duration of power outages suffered in hours, conditional on the pant reports having power outages.
Total duration of power outages by year	Total duration of power outages suffered by the plant by month, in hours, conditional on the plat reports having power outages.
Losses due to power outages	Losses due to power outages as a percentage of total annual sales, conditional on the plant reports having power outages.
Wait for a power supply	Number of days waiting to obtain an electricity supply, conditional on submit an electrical connection.
Dummy for gifts to obtain a power supply	Gifts expected or requested to obtain an electrical connection, conditional on submit an electrical connection.
Dummy for own generator	Dummy variable taking value 1 if the firm has its own power generator.
Electricity from a generator	Percent. of the electricity used by the plat provided by a own generator.
Dummy for insufficient water supply	Dummy variable that takes value 1 if the firm has experienced Insufficient water supply for production during 2005.
Water outages	Total number of water outages suffered by the plant in 2005.
Average duration of water outages	Average duration of water outages suffered in hours, conditional on the plant reports having water outages.
Total duration of water outages by year	Total duration of water outages suffered by the plant by month in hours, conditional on the plant reports having water outages.

Name	Definition
Water from public sources	Percentage of water supply from public sources.
Wait for a water supply	Number of days waiting for a water supply, conditional on submit a water supply.
Dummy for gifts to obtain a water supply	Gifts expected or requested to obtain a water supply, conditional on submit a water supply.
Wait for a phone connection	Number o days waiting to obtain a phone connection, conditional on submit a phone connection.
Dummy for gifts to obtain a phone connection	Gifts expected or requested to obtain a phone supply, conditional on submit a phone connection
Dummy for webpage	Dummy variable taking value 1 if the plant uses its own web page to communicate with clients and suppliers.
Dummy for e-mail	Dummy variable taking value 1 if the plant uses the electronic mail to communicate with clients and suppliers.
Dummy for own transport	Dummy variable taking value 1 if the plant uses its own transport to make shipments to its costumers.
Products with own transport	Percentage of shipments to costumers that were transported by the establishment own transport as a percentage of annual revenue. Conditional on the plant reports having it own transport.
Shipment losses, exports	Percentage of the consignment value of the products shipped for direct export lost while in transit because of theft, breakage or spoilage.
Shipment losses, domestic	Percentage of the consignment value of the products shipped for import lost while in transit because of theft, breakage or spoilage.
Days of inventory of main input	Average number of days (measured in production days) that the main input is available on stock.
Wait for an import license	Total days to obtain an import license, conditional on submit an import license.
Dummy for gifts to obtain an import license	Gifts expected or requested to obtain an import license, conditional on submit an import license.
Dummy for industrial zone	Dummy 1 if the plant is located in an industrial zone.
Low quality supplies *	Percentage of supplies that are of lower than agreed upon quality
Sales lost due to delivery delays *	Percentage of sales lost due to delivery delays of key inputs.
Dummy for broadband internet connection**	Dummy variable taking value 1 if the establishment has a high-speed, broadband Internet connection on its premises.
Number of internet outages**	Average number of times per month the establishment experienced unavailability of Internet connection.
Average duration of internet outages**	In a typical month last fiscal year, average duration of unavailability of internet connection.
Dummy for security expenses for internet**	Dummy variable taking value 1 if security of Internet connections or authentication of parties in a transaction affects the volume and/or nature of purchases that the establishment makes over the Internet.

Source: Staff calculations with Pakistan ICS data.
* Available only in 2002 ICS, ** Available only in services survey.

Table F4: Definition of IC variables: economic governance

Name	Definition
Dummy for conflicts with clients with a third part	Dummy taking value 1 if the plant has conflicts with clients with a third part involved.
Dummy for conflicts with clients with a court involved	Dummy taking value 1 if the plant has conflicts with clients with a court involved (conditional on having conflicts with clients with a third part involved).
Weeks to judgment	Number of weeks that took the court to come to judgment in the last conflict with clients (conditional on having conflicts with clients with a third part involved).
Dummy for security expenses	Dummy taking value 1 if the plant has security expenses.
Security expenses	Security expenses as a percentage of annual total sales.
Dummy for crime losses	Dummy taking value 1 if the plant has experienced losses due to criminal attempts in 2005.
Crime losses	Crime losses as a percentage of annual total sales in 2005.
Manager's time spent in bur. issues	In typical week percentage of manager's time spent dealing with bureaucratic issues.
Weeks to bureaucracy	Total number of weeks spent by management dealing with bureaucracy in 2005.
Number of tax inspections	Total number of inspections of tax officials received by the plant in 2005.
Dummy for gifts in tax inspections	Gifts expected or requested in inspections with tax officials.
Dummy for payments to obtain a contract with the government	Dummy that takes value 1 if firms operating in the same sector of the surveyed plant have to offer informal payments to obtain a contract with the government.
Payments to obtain a contract with the government	Payments to obtain a contract with the government as a percentage of contract value.
Payments to deal with bur. issues	Gifts or informal payments to public officials to "get things done" with regard to customs, taxes, licenses, regulations, services etc, as a percentage of annual sales.
Sales reported to taxes	Percentage of total annual sales that a typical firm operating in plant's sector reports for tax purposes.
Workforce reported to taxes	Percentage of total work force that a typical firm operating in plant's sector reports for tax purposes.
Dummy for interventionist labor regulation	Dummy variable that takes value 1 if the labor regulation has affected plant's employment decisions.
Wait for a construction permit	Days waiting to obtain a construction permit (conditional on submit a construction permit).
Dummy for gifts to obtain a construction permit	Gifts expected or requested to obtain a construction permit, conditional on submit a construction permit.
Wait for an operation license	Days waiting to obtain a main operating license (conditional on submit a operating license).
Dummy for gifts to obtain an operating license	Gifts expected or requested to obtain an operating license, conditional on submit a operating license.
Dummy for tax exemption	Dummy taking value 1 if the establishment is currently using or benefiting from: customs duty drawback, export rebate, sales tax refunds and profit tax exemption.
Number of labor inspections	Total number of inspections of labor officials received by the plant in 2005.
Days of production lost due to absenteeism *	Total number of production days lost due to worker absenteeism.
Illegal payments in protection *	Total amount of illegal payments to prevent violence (e.g. organized crime).
Dummy for informal competition**	Dummy taking value 1 if the establishment competes against unregistered or informal trading firms.
Dummy for bribes to public officials**	Dummy variable taking value 1 if the establishment has paid any informal payment (payment required/expected) to the police, political party, etc. (i.e. Bhatha) to ensure security to your establishment (protection from robbery, arson, or any other crime).
Dummy for policy discussion with government**	Dummy taking value 1 if the establishment participated, directly or through its representative body, in policy discussions with the local, provincial or federal government bodies during the last Fiscal year.

Source: Staff calculations with Pakistan ICS data.

* Available only in 2002 ICS, ** Available only in services survey.

Table F5: Definition of IC variables: finance

Name of the variable	Definition
Purchases paid before delivery	Percentage of annual purchases paid for before the delivery.
Purchases paid on delivery	Percentage of annual purchases paid for on delivery.
Purchases paid after delivery	Percentage of annual purchases paid for after the delivery.
Sales paid before delivery	Percentage of annual sales paid for before the delivery.
Sales paid on delivery	Percentage of annual sales paid for on delivery.
Sales paid after delivery	Percentage of annual sales paid for after the delivery.
Working capital financed by internal founds	Percentage of firm's working capital financed with internal funds.
Working capital financed by private banks	Percentage of firm's working capital financed with funds from private commercial banks.
Working capital financed by state-owned banks	Percentage of firm's working capital financed with funds state owned banks.
Working capital financed by family/friends	Percentage of firm's working capital financed with family/friends funds.
Working capital financed bi non-bank financial institutions	Percentage of firm's working capital financed with funds from non-banking financial institutions.
Working capital financed by trade credit	Percentage of firm's working capital financed with credits from suppliers.
Working capital financed by informal founds	Percentage of firm's working capital financed with funds from informal sources.
New fixed assets financed by internal founds	Percentage of investments in new fixed assets financed with internal funds.
New fixed assets financed by private banks	Percentage of investments in new fixed assets financed with funds from private commercial banks.
New fixed assets financed by state-owned banks	Percentage of investments in new fixed assets financed with funds state owned banks.
New fixed assets financed by family/friends	Percentage of investments in new fixed assets financed with family/friends funds.
New fixed assets financed by non-bank financial institutions	Percentage of investments in new fixed assets financed with funds from non-banking financial institutions.
New fixed assets financed by trade credit	Percentage of investments in new fixed assets financed with credits from suppliers.
New fixed assets financed by informal founds	Percentage of investments in new fixed assets financed with funds from informal sources.
Dummy for checking or saving account	Dummy taking value 1 if the plant has a checking or saving account.
Own of the land	Percentage of the lands in which the plant operates owned by the firm.
Dummy for credit line	Dummy that takes value 1 if the firm has access to a credit line or overdraft facility
Dummy for loan	Dummy that takes value 1 if the firm has access to a loan line.
Dummy for loan with collateral	Dummy that takes value 1 if the firm has access to a loan line with collateral (conditional on having a loan line).
Value of the collateral	Value of the collateral as a percentage of the loan value (conditional on having a loan with collateral)
Dummy for debt	Dummy taking value 1 if any of the number of rejected loan applications is larger than the number of applications for a loan.
Dummy no loan because of complexity	Dummy that takes value 1 if the firm did not apply for loan because of its complexity.
Dummy no loan because of cost	Dummy that takes value 1 if the firm did not apply for loan because of its cost.
Dummy no loan because of collateral	Dummy that takes value 1 if the firm did not apply for loan because of its collateral.
Rejected credit applications	Percentage of rejected credit applications.
Accepted credit applications	Percentage of accepted credit applications.
Dummy for external auditory	Dummy that takes value 1 if the firm has its annual statements externally audited.
Dummy for trade association*	Dummy 1 if the establishment belongs to any trade association.
Percentage of credit line unused*	Percentage of the credit line currently unused.
Borrows in foreign currency*	Percentage of establishment’s borrows denominated in foreign currency.

Name of the variable	Definition
Wait to clear a check*	Days that it takes to clear a check with the establishment's banking institution.
Charges to clear a check*	Charge to clear a check with establishment's banking institution.
Wait to clear a domestic currency wire*	Days that it takes to clear a domestic currency wire with establishment's banking institution.
Charges to clear a domestic currency wire*	Charges to clear a domestic currency wire with establishment's banking institution.
Wait to clear a foreign currency wire*	Days that it takes to clear a foreign currency wire with establishment's banking institution.
Charges to clear a foreign currency wire*	Charge to clear a foreign currency wire with establishment's banking institution.
Dummy for clear title for owned land**	Dummy taking value 1 if out of the lands owned, the establishment has a clear title.

* Available only in 2002 ICS, ** Available only in services survey.
Source: Staff calculations with Pakistan ICS data.

Table F6: Definition of IC variables: innovation and competition

Name	Definition
Dummy for quality certification	Dummy taking value 1 if the firm has any kind of quality certification.
Dummy for foreign technology	Dummy taking value 1 if the plant uses technology licensed from a foreign-owned company.
Dummy for product innovation	Dummy taking value 1 if the plant has introduced any product innovation in the last 3 years.
Dummy for process innovation	Dummy taking value 1 if the plant has introduced any production process improvement in the last 3 years.
Dummy for joint venture	Dummy taking value 1 if the plant has agreed any new joint venture with a foreign company.
Dummy for outsourcing	Dummy taking value 1 if the plant subcontracts any part of the activity.
Dummy for R&D	Dummy that takes value 1 if the firm performed R&D activities during last year.
Computer controlled machinery	Percentage of plant's machinery that is controlled by computer.
Staff with computer	Percentage of staff using computer at job.
New equipment	Percentage of plant's equipment that is less that 5 years old.
Dummy for FDI	Dummy that takes value 1 if any part of firm's capital is foreign.
Dummy for importer	Dummy taking value 1 if the firm imports more than 10% of the total purchases of intermediate materials.
Share of imports	Share of imported inputs over total purchases of intermediate materials.
Dummy for exporter	Dummy taking value 1 if the firm exports more than 10% of the total annual sales.
Exporting experience	Number of years of exporting experience.
Share of exports	Share of exports over total annual sales.
Dummy for local monopoly	Dummy taking value one if the firm is a local monopoly.
Dummy for less that 5competitors	Dummy taking value one if the plant has more or equal than 5 competitors in the local market.
Dummy for more than 5competitors	Dummy taking value one if the plant has less than 5 competitors in the local market.
Number of competitors*	Total number of competitors within plant's main product line.
Dummy for new service offered**	Dummy taking value 1 if during the last 3 years the establishment introduced to the market any new or improved service.
Dummy for new methods of providing services**	Dummy taking value 1 if during the last 3 years the establishment introduced to the market any new or improved methods of providing services.
Dummy for investment in IT**	Dummy taking value 1 if during the last year the establishment invested in information technologies.

Source: Staff calculations with Pakistan ICS data.
* Available only in 2002 ICS, ** Available only in services survey.

Table F7: Definition of IC variables: labor markets and skills

Name	Definition
Staff - production workers	Percentage of production workers in staff.
Staff - female workers	Percentage of female workers in staff.
Staff - skilled workers	Percentage of skilled production workers in staff.
Staff - university education	Dummy taking value 1 if the typical production worker has at least one year of university education.
Dummy for training	Dummy taking value one if the firm provides formal (beyond on the job) training to its employees.
Training to production workers	Percentage of production workers receiving formal (beyond on the job) training
Training to non-production workers	Percentage of non-production workers receiving formal (beyond on the job) training
University education*	Manager experience in years.
Tenure*	Average tenure of the staff of the plant.
Experience of the manager	Number of years of experience of the manager in the establishment's sector.
Education of the manager	Dummy taking value 1 if the manager has at least a bachelor degree.
Education of the manager (post-grade) **	Dummy taking value 1 if the manager has a post-grade (MA, PhD).

Source: Staff calculations with Pakistan ICS data.
* Available only in 2002 ICS, ** Available only in services survey.

Table F8: Definition of IC variables: corporate governance

Name	Definition
Largest shareholder	Percentage of firm's capital owned by the largest shareholder.
Dummy for incorporated company	Dummy that takes value 1 if the firm is an incorporated company.
Dummy for limited company	Dummy that takes value 1 if the firm is a limited company.
Dummy for state-owned firm	Dummy that takes value 1 if any part of firm's capital is public.

* Available only in 2002 ICS, ** Available only in services survey.
Source: Staff calculations with Pakistan ICS data.

Table F9: Definition of IC variables: other control variables

Name	Definition
Age	Age of the firm in 2005.
Trade union	Percentage of workforce unionized
Capacity utilization	Percentage of capacity utilized.
Dummy for increased sales	Dummy taking value 1 if the plant has increased its sales
Dummy for decreased sales	Dummy taking value 1 if the plant has decreased its sales
Dummy for help from SMEDA	Dummy 1 if the plant is receiving support from SMEDA
Dummy for help from EPB	Dummy 1 if the plant is receiving support from EPB
Dummy for help from BOI	Dummy 1 if the plant is receiving support from BOI
Days of production lost due to strikes*	Total number of working days lost due to strikes
Days of production lost due to civil unrests*	Total number of production days lost due to civil unrests.
Dummy for materials from rural villages with direct purchase	Dummy 1 if the direct purchase at the source is the mechanism of supply used for raw materials originated from rural villages.
Dummy for materials from rural villages with local supplier	Dummy 1 if a regular supplier located in the rural area is the mechanism of supply used for raw materials originated from rural villages.
Dummy for materials from rural villages with supplier from	Dummy 1 if a regular supplier located establishment's city is the mechanism of supply used for raw materials originated from rural villages.
Dummy for materials from rural villages with sub-contractual	Dummy 1 if the sub-contractual arrangement is the mechanism of supply used for raw materials originated from rural villages.
Materials from rural villages	Percentage of the inputs used by the establishment originate from rural villages
Local area in square feet	Total area of the local occupied by the establishment in squared feet.
Dummy for initiatives to address AIDS	Dummy taking value 1 if the firm overcame any initiative to address AIDS among its employees during last fiscal year.

Source: Staff calculations with Pakistan ICS data.
* Available only in 2002 ICS, ** Available only in services survey.

Table F10: Robust IC elasticities and semi-elasticities with respect to productivity (manufacturing sector FY07)

Blocks of ICA variables	*Explanatory ICA variables*	*Two steps*		*Single step estimation*			
		Solow residual		*Cobb-Douglas*		*Translog*	
		Restricted	*Unrestricted*	*Restricted*	*Unrestricted*	*Restricted*	*Unrestricted*
Infrastructure	Number of power outages (log)(b)	-0.050*	-0.050*	-0.050*	-0.036	-0.044*	-0.026
	Dummy for own generator (b)	0.071	0.058	0.108	0.092	0.095	0.074
	Products with own transport (%)(b)	0.001	0.001*	0.001	0.002**	0.001*	0.001
	Days of inventory of main intermediate material (log)(b)	0.057**	0.060**	0.068***	0.075***	0.058**	0.065***
	Dummy for industrial zone	0.128*	0.131*	0.202**	0.199**	0.172**	0.159**
Economic governance	Dummy for conflicts with clients with a court involved (b)	0.543***	0.501***	0.542***	0.352**	0.503***	0.545***
	Dummy for security expenses (b)	0.085*	0.084*	0.099**	0.081*	0.090*	0.105**
	Crime losses (%)(b)	-0.005***	-0.005**	-0.003	-0.003*	-0.004**	-0.004**
	Payments to obtain a contract with the government (b)	-0.0002	-0.0002	-0.0003	-0.0001	-0.0003	-0.0004**
	Sales reported to taxes (%)(b)	0.001	0.002*	0.001	0.001*	0.001*	0.001
	Dummy for gifts in tax inspections (b)	-0.078	-0.079*	-0.070	-0.042	-0.068	-0.025
Finance	Purchases paid before delivery (%)(b)	-0.002	-0.002	-0.002	-0.001	-0.002*	-0.002*
	Working capital financed by internal founds (% (b)	-0.001	-0.001	-0.001	-0.002**	-0.001	-0.002*
	Working capital financed by private banks (%)(b)	0.004*	0.004*	0.005**	0.002	0.004*	0.002
	Working capital financed by family/friends (%)(b)	-0.013*	-0.012*	-0.011*	-0.011*	-0.010**	-0.010
	Working capital financed by informal founds (%)(b)	-0.019	-0.018	-0.025**	-0.026**	-0.022*	-0.025**
	Dummy for checking or saving account (b)	0.075	0.063	0.090	0.133**	0.085	0.111
Innovation and competition	Dummy for process innovation (b)	0.300***	0.291**	0.311**	0.265***	0.310**	0.267**
	New equipment (%)(b)	0.001**	0.001**	0.001*	0.001	0.001*	0.001
	Dummy for FDI (b)	0.191	0.238	0.260	0.267	0.343*	0.295
Labor markets and skills	Staff - female workers (%)(b)	-0.005*	-0.006*	-0.006**	-0.007***	-0.005*	-0.005*
	Dummy for training (b)	0.186*	0.179	0.262***	0.192**	0.268***	0.219*
Corporate governance	Largest shareholder (%)(b)	-0.002**	-0.002**	-0.002**	-0.002**	-0.002**	-0.001
Other control variables	Dummy for help from BOI (b)	0.272**	0.263**	0.324***	0.318***	0.302**	0.363***
	Dummy for materials from rural villages with local supplier (b)	0.144	0.108	0.217*	0.107	0.138	0.146
	Observations	727	727	727	727	727	727
	R-squared	0.22	0.21	0.92	0.93	0.93	0.94

Source: Staff calculations with Pakistan ICS data.

Notes: (1) Two steps estimation: in the first step estimation of equation (b2.1) by non-parametric techniques to compute productivity (Solow residual), in the second step estimate (b2.2) and (b2.3) by OLS using as dependent variable the Solow residual from the first step, either restricted or unrestricted. (2) Single step estimation: estimae (b2.1), (b2.2) and (b2.3) in a single step by OLS, where (b2.1) can be a Cobb-Douglas Production function or a Translogarithmic. (3) Restricted: equal input output for all the establishments in the country. (4) Unrestricted: equal inoput-output elasticites for all the establishments in the same sector. (5) *significant at 10%; ** significant at 5%; *** significant at 1% given by robust standard errors corrected for correlation between cluster (industry and region). (6) Each regression includes a set of industry, size and region dummies and a constant term. (a) Variables instrumented with the industry-region-size average. (b) Variables approximated with a proxy (only missing values replaced by the industry-region-size average).

Table F.11: IC and other variables percentage contributions to aggregate log-productivity, FY07
(manufacturing)

			Aggregate log-productivity	*Average log-productivity*	*Allocative efficiency*
Demean log-productivity	**Infrastructure**	Number of power outages (b)	-2.42	-4.93	2.51
		Dummy for own generator (b)	2.29	0.65	1.65
		Products with own transport (b)	0.50	0.46	0.04
		Days of inventory of main intermediate material (b)	8.99	5.60	3.39
		Dummy for industrial zone	2.53	1.45	1.08
	Economic governance	Dummy for conflicts with clients with a court involved (b)	2.18	0.55	1.63
		Dummy for security expenses (b)	2.50	1.61	0.89
		Crime losses (b)	-0.02	-0.10	0.09
		Payments to obtain a contract with the government (b)	0.00	-0.07	0.06
		Sales reported to taxes (b)	4.61	4.44	0.17
		Dummy for gifts in tax inspections (b)	-0.37	-0.58	0.21
	Finance	Purchases paid before delivery (b)	-0.19	-0.50	0.31
		Working capital financed by internal founds (b)	-2.56	-3.25	0.69
		Working capital financed by private banks (b)	4.05	0.61	3.44
		Working capital financed by family/friends (b)	0.00	-0.06	0.06
		Working capital financed by informal founds (b)	0.00	-0.02	0.02
		Dummy for checking or saving account (b)	2.52	1.91	0.61
	Innovation and competition	Dummy for process innovation (b)	5.67	0.93	4.74
		New equipment (b)	2.66	1.01	1.65
		Dummy for FDI (b)	1.85	0.15	1.70
	Labor markets and skills	Staff - female workers (b)	-1.24	-0.33	-0.91
		Dummy for training (b)	4.04	0.44	3.60
	Corporate governance	Largest shareholder (b)	-2.90	-5.84	2.94
	Other control variables	Dummy for help from BOI (b)	0.97	0.40	0.57
		Dummy for materials from rural villages with local supplier (b)	0.07	0.17	-0.10
Total contribution of IC (demean log-productivity)			**35.75**	**4.71**	**31.05**
Other stuff		Industry/region/size controls	-13.10	-4.40	-8.70
		Constant term	41.01	41.01	0.00
		Residual	36.34	0.00	36.34
Total contribution of other stuff			64.25	36.61	27.64
Total			**100.00**	**41.32**	**58.68**

Source: Staff calculations with Pakistan ICS data.
Notes: Results from equation (b6.3).
The contribution of IC to aggregate log-productivity is equal to the sum of the contributions to average log-productivity and to the allocative efficiency.
Demean log-productivity is the part of productivity associated with the investment climate
The productivity measure used is the restricted Solow residual.
(a) Variables instrumented with the industry-region-size average.
(b) Variables approximated with a proxy (only missing values replaced by the industry-region-size average).

Table F12: IC elasticities and semi-elasticities on economic performance measures, 2SLS estimation, FY07
(manufacturing sector)

		Productiv.	*Employm.*	*Wages*	*Exporting probability*	*FDI probability*
Productivity			0.264**	0.823***	0.106***	
Real wages			-0.157***			
Infrastructure	Days to clear customs to export (log)				-0.067 (a)	
	Days to clear customs for exports - interaction with firms that do export (log)		-0.159* (a)			-0.018** (a)
	Number of power outages (log)	-0.05 (b)				
	Losses due to power outages (%)			-0.020* (a)		
	Dummy for own generator	0.071 (b)				
	Electricity from a generator (%)		0.003* (b)		0.002** (b)	
	Dummy for insufficient water supply		-0.195*			
	Number of water outages (log)					-0.008* (b)
	Products with own transport (%)	0.001 (b)	0.003*** (b)	-0.002* (b)	0.001*** (b)	-0.0003** (b)
	Shipment losses, domestic (%)			-0.018** (a)		
	Shipment losses, exports (%)		-0.023*** (a)			
	Days of inventory of main intermediate material (log)	0.057 (b)	0.099*** (b)			
	Dummy for industrial zone	0.128				
Economic governance	Dummy for conflicts with clients with a court involved	0.543 (b)				
	Dummy for security expenses	0.085 (b)	0.396*** (b)			
	Security expenses (%)			0.007 (b)	0.001 (b)	0.007** (a)
	Dummy for crime losses			-0.239* (b)		
	Crime losses (%)	-0.005 (b)	-0.007** (b)			-0.001* (b)
	Payments to obtain a contract with the government (%)	-0.0002 (b)				-0.0004** (b)
	Sales reported to taxes (%)	0.001 (b)				
	Dummy for gifts in tax inspections	-0.078 (b)				
	Payments to deal with bur. issues (%)				0.001***(b)	
	Number of inspections (log)				-0.046** (b)	
	Number of labor inspections (log)				-0.011** (b)	
	Dummy for tax exemption				0.174*** (b)	
Finance	Purchases paid before delivery (%)	-0.002 (b)		-0.003* (b)		-0.0004** (b)
	Sales paid after delivery (%)		0.002* (b)			
	Working capital financed by internal founds (%)	-0.001 (b)			0.001* (b)	
	Working capital financed by private banks (%)	0.004 (b)		-0.011* (b)		0.001* (b)
	Working capital financed by state-owned banks (%)		0.010** (b)		0.009*** (b)	
	Working capital financed by family/friends (%)	-0.013 (b)		-0.025*** (b)		
	Working capital financed by informal founds (%)	-0.019 (b)				
	Dummy for checking or saving account	0.075 (b)	0.159*** (b)	0.145* (b)		
	Dummy for credit line		0.167*	0.378*** (b)		
	Own land (%)		0.002*** (b)		0.001** (b)	
	Dummy for external auditory		0.331***	0.204 (b)		
Innovation and competition	Dummy for quality certification		0.267** (b)	0.184* (b)	0.157*** (b)	0.032* (b)
	Dummy for foreign technology					0.148*** (b)
	Dummy for product innovation			0.221* (b)		
	Dummy for process innovation	0.3 (b)				
	Computer controlled machinery (%)		0.007* (b)			
	New equipment (%)	0.001 (b)				
	Staff with computer (%)		0.004* (b)	0.005* (b)		0.001* (b)
	Dummy for e-mail		0.236**	0.358* (b)	0.118*** (b)	
	Dummy for joint venture				0.182* (b)	
	Dummy for outsourcing					-0.206** (b)
	Dummy for FDI	0.191 (b)				
	Exporting experience (log)		0.166*** (b)			
	Dummy for more than 5 competitors		0.223** (b)		0.037* (b)	

		Productiv.	*Employm.*	*Wages*	*Exporting probability*	*FDI probability*
Labor markets and skills	Staff - production workers (%)		0.003*** (b)			
	Staff - female workers (%)	-0.005 (b)	0.015*** (b)			
	Staff - skilled workers (%)		0.005*** (b)			
	Dummy for training	0.186 (b)				
	Training to non-production workers (%)		0.006** (b)			0.003* (a)
	Experience of the manager (log)		0.082** (b)			
	Education of the manager		0.288*** (b)			
Corporate governance	Largest shareholder (%)	-0.002 (b)				
	Dummy for incorporated company		1.267*** (b)			0.173**
	Dummy for limited company		0.550***			
	Dummy for state-owned firm				-0.194*	
Other control variables	Trade union (%)		0.005** (b)			-0.001* (b)
	Capacity utilization (%)		0.003** (b)			
	Dummy for help from EPB		0.244** (b)		0.176** (b)	
	Dummy for help from BOI	0.272 (b)				
	Dummy for materials from rural villages with local supplier	0.144 (b)				
	Dummy for materials from rural villages with supplier from firm's city		-0.431*** (b)			
	Dummy for materials from rural villages with sub-contractual arrangement		0.393 (b)		-0.131* (b)	0.293* (b)
	Observations	727	690	724	673	725
	R-squared	0.22				
Instruments evaluation	First stage R-squared[1]		0.35	0.20	0.35	0.35
	Partial R-squared: productivity[2]		0.21	0.05	0.22	0.29
	Partial R-squared F test (p-value)[3]		0.00	0.00	0.00	0.00
	Hansen test (p-value)[4]		0.69	0.78	0.88	0.28

Source: Staff calculations with Pakistan ICS data.
Notes: Estimation by 2SLS of the system (b2.1)-(b2.5).
* significant at 10%; ** significant at 5%; *** significant at 1% (robust standard errors corrected for clustering by industry and region).
Significance of IC variables in productivity equation is in Table 3.
The productivity measure used is the restricted Solow residual. Robustness was tested to other productivity measures.
Each regression includes a set of industry, region and size dummies and a constant term.
(a) Variables instrumented with the industry-region-size average.
(b) Variables approximated with a proxy (only missing values replaced by the industry-region-size average).
1 Productivity, real wages, probability of exporting and probability of receiving FDI are endogenous and the list of variables used as excluded instruments comes from the list of explanatory variables from their corresponding equations.
2 First stage R-squared from the regression of productivity on both the included and the excluded instruments.
3 The partial R-squared measures the squared partial correlation between the excluded instruments and the productivity.
4 F-test of joint significance of the excluded instruments that corresponds to the partial R-squared.
5 The Hansen test is a test of overidentifying restrictions. The null hypothesis is that the instruments are valid instruments, that is, uncorrelated with the error term, and therefore the excluded instruments are correctly excluded from the estimated equation.

Table 6.13: IC percentage contributions to the means of economic performance measures, FY07
(manufacturing sector)

		Productiv.	*Employm.*	*Wages*	*Exporting probability*	*FDI probability*
Productivity			16.5	94.1	46.6	174.6
Real wages			-51.4			
Infrastructure	Days to clear customs to export (log)				-38.0	
	Days to clear customs for exports - interaction with firms that do export (log)		-1.9			-24.8
	Number of power outages (log)	-104.5				
	Losses due to power outages (%)			-14.9		
	Dummy for own generator	13.7			2.4	
	Electricity from a generator (%)		0.9			
	Dummy for insufficient water supply		-2.1			
	Number of water outages (log)					-19.0
	Products with own transport (%)	9.8	1.9	-2.9	3.9	-28.7
	Shipment losses, domestic (%)			-2.1		
	Shipment losses, exports (%)		-0.5			
	Days of inventory of main intermediate material (log)	118.7	13.6			
	Dummy for industrial zone	30.7				
Economic governance	Dummy for conflicts with clients with a court involved	11.7		-2.5		
	Dummy for security expenses	34.2	11.8		1.0	77.6
	Security expenses (%)			1.5		
	Dummy for crime losses		-0.3			
	Crime losses (%)	-2.2				-2.6
	Payments to obtain a contract with the government (%)	-1.4				-57.4
	Sales reported to taxes (%)	94.0				
	Dummy for gifts in tax inspections	-12.3				
	Payments to deal with bur. issues (%)				8.7	
	Number of inspections (log)				-9.5	-34.7
	Number of labor inspections (log)					
	Dummy for tax exemption				12.2	
Finance	Purchases paid before delivery (%)	-10.6		-2.0		-17.2
	Sales paid after delivery (%)		4.4			
	Working capital financed by internal founds (%)	-69.0			24.5	
	Working capital financed by private banks (%)	12.9		-5.8		18.0
	Working capital financed by state-owned banks (%)		0.3		1.8	
	Working capital financed by family/friends (%)	-1.3		-0.3		
	Working capital financed by informal founds (%)	-0.4				
	Dummy for checking or saving account	40.5	5.8	9.7		
	Dummy for credit line		1.7	8.7		
	Own land (%)		8.4		13.4	
	Dummy for external auditory		4.2	6.2		

		Productiv.	*Employm.*	*Wages*	*Exporting probability*	*FDI probability*
Innovation and competition	Dummy for quality certification		2.3	3.8	7.2	38.8
	Dummy for foreign technology					49.0
	Dummy for product innovation			2.8		
	Dummy for process innovation	19.7				
	Computer controlled machinery (%)		1.3			
	New equipment (%)	21.4				37.2
	Staff with computer (%)		1.0	2.9		
	Dummy for e-mail		3.8		10.8	
	Dummy for joint venture				0.6	
	Dummy for outsourcing					-33.6
	Dummy for FDI	3.2		0.7		
	Exporting experience (log)		3.0			
	Dummy for more than 5 competitors		9.7		11.8	
Labor markets and skills	Staff - production workers (%)		11.4			
	Staff - female workers (%)	-6.9	1.6			
	Staff - skilled workers (%)		14.9			
	Dummy for training	9.4				
	Training to non-production workers (%)		0.6			45.2
	Experience of the manager (log)		12.0			
	Education of the manager		6.2			
Corporate governance	Largest shareholder (%)	-123.5				
	Dummy for incorporated company		1.6			40.0
	Dummy for limited company		4.2			
	Dummy for state-owned firm				-0.3	
Other control variables	Trade union (%)		0.7			-10.2
	Capacity utilization (%)		12.5			
	Dummy for help from EPB		0.8		3.3	
	Dummy for help from BOI	8.6				
	Dummy for materials from rural villages with local supplier	3.7				
	Dummy for materials from rural villages with supplier from firm's city		-1.0			
	Dummy for materials from rural villages with sub-contractual arrangement		0.2		-0.4	

Source: Staff calculations with Pakistan ICS data.
Notes: Percentage contributions compute according to equations (b7.1)-(b7.5). IC elasticities and semi-elasticities used are those from Table 5.
The productivity measure used is the restricted Residual.

Table F.14: IC elasticities and semi-elasticities with respect to labor productivity, FY07

(services sector)

		Restricted estimation				*Unrestricted estimation*		
Dependent variable: log of labor productivity log(sales/employment)]		***Panel data 2004-2005***		***Cross-sectional data 2005***		***Unrestricted by industry***	***Unrestricted by region***	***Unrestricted by industry and region***
Input prices	Log of real wages	0.400(c)	0.407(c)	0.393(c)	0.389(c)			
	Log of rental cost of capital	0.06		0.055				
Infrastructures	Number of power outages (log)(e)	-0.806(b)	-0.799(b)	-0.839(b)	-0.821(b)	-0.796(a)	-0.792(a)	-0.709
	Dummy for own generator (e)	0.359(a)	0.352(a)	0.33	0.342(a)	0.356(a)	0.302(a)	0.3
Red tape, corruption and crime	Dummy for bribes from public officials (e)	-0.268	-0.288(a)	-0.35(a)	-0.375(a)	-0.297	-0.248	-0.284
	Manager's time spent in bur. issues (%)(e)	-0.046(b)	-0.048(b)	-0.038(a)	-0.041(a)	-0.045(b)	-0.042(b)	-0.042(b)
	Number of inspections (log)(e)	-0.237(a)	-0.23	-0.216	-0.203	-0.221	-0.233(a)	-0.221
	Sales reported to taxes (%)(e)	-0.002	-0.002	-0.001	-0.001	-0.001	-0.002	-0.001
	Dummy for informal competition (e)	0.459(b)	0.486(b)	0.380(a)	0.410(b)	0.428(b)	0.423(b)	0.382(b)
Finance and corporate governance	Working capital financed by trade credit (%)(e)	-0.027(c)	-0.026(b)	-0.026(b)	-0.025(b)	-0.028(c)	-0.027(c)	-0.029(c)
	Working capital financed by family/friends (%)(e)	0.008	0.011(a)	0.004	0.009	0.006	0.001	-0.001
	Owner of the lands (%)(e)	-0.003	-0.003	-0.002	-0.002	-0.003	-0.003	-0.003
	Dummy for loan (e)	0.743	0.806	0.804	0.821(a)	0.831	0.988(a)	1.096(a)
	Value of the collateral (%)(e)	-0.004(b)	-0.005(b)	-0.004(b)	-0.004(b)	-0.004	-0.006(b)	-0.007(b)
Innovation and competition	Dummy for quality certification (e)	0.412(a)	0.445	0.419	0.458(a)	0.415	0.521	0.537
	Staff with computer (%)(e)	0.008	0.008	0.008(a)	0.008	0.008(a)	0.006	0.006
	Exporting experience (log)(e)	0.357	0.381(a)	0.331	0.376(a)	0.315	0.422(b)	0.385(b)
Other control variables	Area of the local in square feet (log)(e)	0.136(a)	0.152(a)	0.123(a)	0.137(b)	0.127(a)	0.133(a)	0.124(a)
	Observations	277	277	143	143	277	277	277
	R-squared	0.63	0.62	0.64	0.64	0.63	0.65	0.65

Source: Staff calculations with Pakistan ICS data.

Notes: Estimation of equation (b9.1)

Restricted: equal input prices for all the establishments in the country.

Panel data estimation uses data for FY06 and FY07. Cross-sectional estimation uses data for FY07.

Unrestricted: equal input prices for all the establishments in the same sector, region or region/sector.

(a)significant at 10%; (b) significant at 5%; (c) significant at 1% given by robust standard errors corrected for correlation between cluster (industry and region).

Each regression includes a set of industry, size and region dummies and a constant term (also a set of time dummies in the panel data estimation).

(d) Variables instrumented with the industry-region-size average.

(e) Variables approximated with a proxy (only missing values replaced by the industry-region-size average).

Table F.15: IC effects on the probability of productivity increase between FY02 and FY07

Dependent variable: probability of productivity increase		*Linear Probability Model*	*Logit Model*		*Probit Model*	
			Coeffs.	*Odd ratios*	*Coeffs.*	*Marginal effects*
Infrastructure	Days to clear customs for imports - interaction with firms that do import (log)(d)	-0.043	-0.23	0.795	-0.13(a)	-0.049(b)
	Total number of power outages (log)(e)	-0.044(a)	-0.282(b)	0.754(b)	-0.170(b)	-0.064(b)
	Low quality supplies (%)(d)	-0.009(a)	-0.043(b)	0.958(b)	-0.026(b)	-0.010(b)
Economic governance	Security expenses (%)(e)	0.018	0.091(a)	1.095(a)	0.055	0.021
	Crime losses (%)(e)	-0.024(c)	-0.144(b)	0.866(b)	-0.091(c)	-0.034(c)
	Manager's time spent in bur. Issues(%)	-0.003(a)	-0.014	0.986	-0.008	-0.003
	Total number of inspections (log)(d)	-0.118(a)	-0.516	0.597	-0.335(a)	-0.126(a)
	Payments to deal with bur. issues (%)(e)	0.011(b)	0.119(b)	1.127(b)	0.073(b)	0.027(b)
	Total number of labor inspections (log)(e)	0.059(c)	0.305(c)	1.356(c)	0.181(c)	0.068(c)
	Illegal payments in protection (%)(e)	-0.044(a)	-0.246(a)	0.782(a)	-0.147(a)	-0.055(a)
Finance	Dummy for credit line	0.075	0.407	1.503	0.263(a)	0.096(a)
	Dummy for loan	0.165(b)	1.167	3.213	0.656(a)	0.225(a)
	Dummy for loan with collateral	-0.263(c)	-1.630(a)	0.196(a)	-0.934(b)	-0.359(b)
	Dummy for trade association	0.072	0.4	1.492	0.249(a)	0.094(a)
Labor markets and skills	Staff - female workers (%)(e)	-0.009(c)	-0.042(b)	0.959(b)	-0.027(c)	-0.010(c)
	Staff - university education (%)(e)	0.194	1.312	3.715	0.787	0.239
	Training to non-production workers (%)(d)	0.149(a)	0.715	2.045	0.392	0.148
Corporate governance	Dummy for state-owned firm	0.304(b)	1.444(a)	4.239(a)	0.894(a)	0.261(a)
	R-squared/Pseudo R-squared	0.17	0.14	0.14	0.14	0.14
	Observations	352	352	352	352	352

Source: Staff calculations with Pakistan ICS data.

Notes**:** stimation of equation (b10.1)

(a)significant at 10%; (b) significant at 5%; (c) significant at 1% given by robust standard errors corrected for correlation between cluster (industry and region).

Each regression includes a set of industry, size and region dummies and a constant term.

(d) Variables instrumented with the industry-region-size average.

(e) Variables approximated with a proxy (only missing values replaced by the industry-region-size average).