

Does Labor Market Informality Attract FDI? A Sectoral Analysis of Pakistan

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Jabbar Ul-Haq*, Usmanova Tufa
Jumaevna**, Anatolijs Krivins***,
Kainat Hameed****, Hubert Visas*****

Abstract

Informality and globalization are two distinct phenomena with significant links to less developed economies. In transitional economies, informal labor markets often operate alongside formal ones, with the informal markets characterized by lower labor costs and less regulation. Foreign Direct Investment (FDI) inflows depend on the presence of favorable location factors in the host country, including the structure of both the formal and informal labor markets. Countries with flexible labor market regulations offer investment-friendly environment for foreign investors. This study examines the relationship between informality and FDI using Pakistani sectoral panel data (i.e., manufacturing sectors) from 1996-2007. Employing the least square dummy variable (LSDV) approach, the study finds a significant positive relationship between informality and FDI in Pakistan, suggesting that informality in the labor markets play an important role

in attracting foreign investment, especially in the manufacturing sectors. The study goes beyond mere correlation by exploring the potential mechanisms through which informality influences FDI flows. Using a range of econometric techniques and sector-specific controls, our results are robust and insensitive. Analysis with lagged-informality also revealed a positive association between lagged-informality and FDI, which results however are not robust. While structural unemployment may persist in certain sectors, labor market flexibility is essential for attracting FDI, as it enables adaptation to industry needs and job creation, particularly in labor-intensive manufacturing industries.

Keywords: Foreign Direct Investment; Informality; Developing country

JEL Codes: F21, F61, J46, O17

1. Introduction

The importance of capital flows in driving economic and technological development has long been debated. Among various forms of capital flows, research consistently highlights foreign direct investment (FDI) as the most impactful (Elgin, 2021). FDI

* Department of Economics, Institute of Business Management, Karachi, Pakistan

** Department of Economic Theory and Economic Development, Technological University of Tajikistan, Tajikistan

*** Daugavpils University, Latvia

**** Department of Economics, University of Sargodha, Pakistan

***** School of International Trade & Economics, University of International Business and Economics, China, Corresponding Author

provides not just capital but also a package of technology, management expertise, and market access as it injects capital into host countries, transfers technology, managerial expertise, and increases market access. Consequently, the share of FDI in global GDP has more than tripled since the 1980s (Hijzen, Martins, Schank, & Upward, 2013).

In line with global trends, Pakistan began liberalizing its foreign investment policies in the late 1980s as part of the broader economic reforms. However, its FDI share in global inflows remained modest—accounting for only 0.2% in 1997, largely due to the Asian financial crisis that originated in Thailand and spread across other emerging economies, including Pakistan. FDI inflows rebounded significantly post-1997 and peaked around 2007. Attracting foreign investment has since become a key policy objective, particularly in developing countries where capital scarcity hinders economic growth (Coniglio, Prota, & Seric, 2015).

Neoclassical growth models suggest that FDI not only increases domestic investment but also enhances the efficiency and productivity of existing capital, leading to long-run economic gains and short-term growth spurts (Nair-Reichert & Weinhold, 2001). In addition to boosting capital and growth, FDI creates employment opportunities. When foreign enterprises develop strong linkages with domestic firms, these benefits are even more pronounced (Zebregs & Tseng, 2002).

Given these advantages, many governments actively competed to attract FDI by offering favorable conditions to investors (Lipsey, 2004). In many cases, FDI flows not only into the formal sector but also into the informal sector (Beladi, Dutta, & Kar, 2016; Nataraj, 2011). Firms in the formal sector have to pay taxes and conform to labor market

rules, putting them in a cost disadvantage position compared to informal organizations. Informal firms evade taxes and fees as well as regulations relating to price caps, licenses, and laws governing property rights (Bigsten, Kimuyu, & Lundvall, 2004). To attract foreign investors, some countries compromise on labor standards, as lower standards reduce labor costs and increase profit margins (Olney, 2013). An argument raised to support this notion is that foreign investors favor countries where there is a low labor standard as poorer labor standards result in lesser labor costs. The labor costs represent the income share of labor, and the profit is the rest (Kucera, 2002). According to Gupta and Nabli (2003), MNCs' time spent dealing with paperwork to secure the required certificates and licenses negatively impacted FDI inflow in 69 countries.

Trade costs are another significant determinant of FDI. High trade barriers discourage investment, whereas reduced tariffs and greater openness provide a more favorable investment climate (Paul & Jadhav, 2019). In Pakistan, trade costs in the form of tariffs persistently decreased throughout the period considered for this study (Wu, Ul-Haq, Zafar, Sun, & Jiang, 2019), potentially enhancing the country's attractiveness to foreign investors, as foreign investors prefer investing in countries with lower labor regulations and costs to maximize profits (Bayraktar-Sağlam & Sayek Böke, 2017).

It is worth mentioning that labor market laws and institutions play a crucial role in determining the relocation of internationally mobile firms, especially if they have concerns regarding employment protection legislations as well as redundancy payment and can adjust employment and output to prevailing economic conditions (Dewit, Görg, & Montagna, 2009).

Countries with more relaxed labor market laws and institutions easily attract FDI than those with more restrictive redundancy laws (Haaland & Wooton, 2002). More tertiary FDI is attracted by improved infrastructure and impartial judiciary, whereas secondary FDI is attracted by flexible labor and deeper finance markets (Paul & Jadhav, 2019). Therefore, it could be presumed that informality could be a potential pull factor for FDI as it might reduce costs for foreign investors (Elgin, 2021). Ali and Bohara (2017) provided empirical evidence supporting this notion, showing that the size of the shadow economy significantly influences FDI inflows under a gravity model framework. Recent empirical works have also highlighted the complex causality among FDI, institutional quality, and the shadow economy emphasizing that not only do institutions and informality affect FDI inflows, but FDI can influence the size and dynamics of the informal sector (Huynh, Nguyen, Nguyen, & Nguyen, 2020).

Although increasing informality is not something desirable, in many developing economies, it is often tolerated or indirectly supported as it provides employment where formal job creation is insufficient (Sandmo, 2012). Attracting foreign investment through flexible labor market regulations, bridges the gap created by limited employment opportunities in capital-deficient countries (Gerxhani, 2004). The informal sector's flexibility can insulate firms from negative economic shocks by minimizing job losses, and it can even act as an entry point for entrepreneurial activity where formal barriers are high (Estrin & Mickiewicz, 2012; Ulyssea & Ponczek, 2018). Therefore, it can be presumed that informality is one of the pull factors of FDI provided it decreases costs for foreign investors (Cuong, Luu, & Tuan, 2021).

Boeri and Garibaldi (2005) argued that despite government's strong monitoring capacity, informal labor is still "tolerated" because it helps in reducing unemployment. Similarly, Ulyssea (2010) demonstrates that as the government strengthens enforcement, unemployment rises and total welfare falls. Empirical evidence also confirms a causal link between FDI and the shadow economy, suggesting that informality plays a key role in shaping investment dynamics (Nikopour, Shah Habibullah, Schneider, & Law, 2009). This link between informality, FDI, and poverty reduction is also emphasized by Deilami (2010), who found that the shadow economy indirectly supported development by attracting foreign capital and alleviating poverty.

Thus, foreign investment raises employment and wages in the poorest section of a country working in the informal sector by using unskilled labor as a consequence of labor-saving technological progress and helps to reduce extreme poverty and hunger, which is the first Millennium Development Goal (MDG) (Nunnenkamp, 2004). So, the most substantial economic policy of the Planning Commission, 2005 is to provide an enabling climate for local and foreign investments to be encouraged and public and private savings to be increased (MOL, 2007). Therefore, FDI inflows are high in countries with the lowest labor cost per unit.

The informal sector includes firms that establish with less than 5 or 10 people involved and are less constrained to obey labor market regulations and employ low-quality labor. It includes part-time or temporary workers. The share of this sector is significant in many less-developed nations including Pakistan and accounts for between 50–60 percent of total employment (Goldberg & Pavcnik, 2003; Williams, Shahid, & Martínez, 2016; Wu et

al., 2019). The Pakistani economy, especially the manufacturing sector, is dominated by informal employment. The wholesale and retail trade market has the largest rate of informal employment 34.3%, of which the manufacturing sector accounts for 21.5 percent (Qazi & Ammad, 2020). If the government establishes strict labor market regulations it will deplete employment opportunities for the informal sector and results in the overall increase of unemployment in the economy.

While the existing literature explores a broad range of FDI determinants such as institutional quality, market size, labor costs, trade openness, human capital, interest rates, and inflation (Bacchetta, Ernst, & Bustamante, 2009; Dewit et al., 2009; Dhingra & Sidhu, 2011; Jadhav, Katti, & Choudhury, 2016; Kucera, 2002; Mugableh, 2015; Palit & Nawani, 2007; Parcon, 2008; Singhania & Gupta, 2011; Wei, 2005; Zheng, 2013; Zulfiqar, 2017), the specific role of informal employment as a determinant of FDI remains largely unexamined. This is indeed a fundamental problem in less-developed and emerging nations, where there is high concern that the prevalence of informal jobs has stayed persistently high, or even increasing, amid stronger economic and employment growth (Bacchetta et al., 2009). Yabuuchi, Beladi, and Wei (2005) incorporated informality into a theoretical model of FDI, empirical investigations on this topic remain limited. Bayar, Remeikiene, Androniceanu, Gaspareniene, and Jucevicius (2020) highlighted how the shadow economy alongside human development indicators, significantly shaped FDI inflows, especially in developing nations. Informality as a determinant of FDI remains unexplored with the exception of Baez (2020) cross-countries study. However, cross countries studies face considerable challenges, including the fact

that data from different countries may not be equal, and sample sizes may be limited (Atkinson, 1970; Topalova, 2007).

This study aims to fill this gap by empirically examining the role of informality as a sectoral determinant of FDI inflows in Pakistan, using micro-level data from 1996 to 2007. Unlike macro-level or cross-country analyses, this sector-specific, country-focused approach offers a more accurate understanding of FDI dynamics by addressing heterogeneity and data consistency issues. Moreover, this study explores the sectoral determinant of FDI in contrast to the macro determinant, enabling us to obtain a much more stratified view than we might get with country-specific macro-level data. This study is unique, and captures the accurate effect of included variables in the sense that during the selected timeframe, no major labor market reforms that could distort the findings were implemented (Ul-Haq, Khanum, & Raza Cheema, 2020; Wu et al., 2019).

The next section proceeds with a theoretical framework, followed by a description of the data, the methodology used for the analysis, a summarized result, and its main conclusions.

2. Theoretical framework

The case of growth induced and financed by foreign capital remains of critical importance among the diversified growth strategies available to open economies. Concerns about competition between countries or regions to attract FDI have increased alongside the expansion of FDI. Lack of resources to fund domestic projects and the lack of skills to undertake projects are factors responsible for this faster-growing competition in developing and emerging economies (Masron & Abdullah, 2010). While studying the impact of labor standards on the location of FDI, Rodrik

writes of “the conventional wisdom about low-standard countries being a haven for foreign investors” (Rodrik, 1996). International investors prefer countries with lower labor standards and lower labor costs which define the informal sector (Kucera, 2002). Regulatory and legislative duties can be avoided in most developing countries because governments are unable to implement all or any of their legislation. This lack of investment results in employment that doesn't comply with labor market regulations and is therefore regarded as informal labor. Informal economy accounts for up to half of the economic activities in developing countries.

According to Goldberg and Pavcnik (2003), Williams et al. (2016) and Wu et al. (2019) lower job quality and a lack of adherence to labour market legislation characterise the informal sector. Any legal or regulatory duty that a firm chooses to evade turns into a cost advantage that this firm maintains overall competing firms that have complied with these costs and have not avoided them. The emergence of avoidable regulatory costs influences the level of competition between formal and informal firms in a competitive manner. Formal organization has to pay taxes and conform to labor market rules, so it has a massive cost disadvantage in relation to informal organization. While informal firms may escape paying taxes and fees, as well as other regulations such as price caps, licences, and laws governing property rights (Bigsten et al., 2004). The cost of an informal organization will increase significantly if it joins the formal sector (La Porta & Shleifer, 2014).

Thus, FDI inflows are driven by cheap labor costs and a drop in production costs, especially in developing countries. A market system that has less structured companies'

regulatory and legal responsibilities would have a more concise expense menu that companies can opt to avoid. Therefore, the more regulations that exist, the greater the possible cost of production for investors that comply with all or either some of them.

3. Data and background

3.1. Pakistan investment reforms

After 1988, deregulation, privatization, and liberal reforms implemented as a condition to the Structural Adjustment Program (SAP) requirements assisted by the IMF) and the World Bank (WB) made Pakistan's efforts to attract FDI productive. Consequently, Pakistan began to assume a more open policy for foreign investors; consequently, FDI grew more rapidly at the start of the liberalization program (1991/1992) compared to the pre-opening period (1984/1985-1990/1991). Due to the currency-crisis of 1997 in Asia that originated in Thailand, and has then expanded to other Asian nations, comprising Pakistan, Pakistan accounted for only 0.2% of the world's FDI in 1997. Following that, FDI inflows grew rapidly until 2007 (see Figure 1, for overall trend of FDI inflows).

The financial-crisis of 2008 in the world, caused by a liquidity shortfall in the US banking-system leads to a significant decline in FDI. The economy of Pakistan had been showing marks of stress for a while, with power-outages and law & order problems, but it was plunged into a full-fledged economic and global financial-crisis in 2008. Along with a very tense local political scenario, the crash of global financial-markets has also led foreign investors in Pakistan to panic and anticipate the fall of the Karachi stock market in early 2008 (Haque, 2010). The share of trade inflows (i.e., exports) is about 15% of

GDP and was a significant means of foreign capital before the global financial crisis, but trade (i.e., both outflows and inflows) dropped sharply in 2009-the year subsequent to the crisis. Due to the non-availability of data before 1997 and strong delineation after the global financial crises of 2008, we precisely use data from 1997-2007 that has no fluctuations (for details, see Figure 1).

As a requirement of the structural adjustment program (SAP), Pakistan's trade policy reforms changed significantly after the 1980s. Foreign direct investment provides not only capital, but also a package of technology management and market access. As part of its overall economic reform initiative, Pakistan began to adopt a more liberal foreign investment policy at the end of the 1980s. The separate authorization rule was eliminated in May 1991. The government also liberalized the foreign exchange system. Residents and nonresidents of Pakistan as well as foreign nationals can now freely bring in and take out foreign currency and enjoy a tax holiday. In all sectors, import policy has been liberalized and tariffs have been reduced. In 2005, the mean protection-rates had reduced from 63 percent

in 1988 to 13 percent, and tariff levels for the manufacturing sector had decreased from 64 percent to 14 percent over the same time period. Special industrial zones (SIZs) have been established for foreign investors, and investments in these zones are exempt from the country's labor laws. This has increased the attractiveness of the country to foreign investors, as they now incurred fewer labor expenses and enjoyed a higher profit margin.

3.2. Household data

The study utilizes national household survey data for the empirical analysis from the year 1996-97 to 2007-08 collected by the Pakistan Bureau of Statistics. Surveys collect data on several aspects of the labor force on an annual basis since 1992 but in 1998, the Council of the European Union conducted the survey in quarters that helped to counter seasonal fluctuations of the national labor markets. Along with respondents' demographic background (age, gender, head of the family, literacy, level of education, profession, and population movement are all variables to consider), LFS provides data on labor status, employment characteristics,

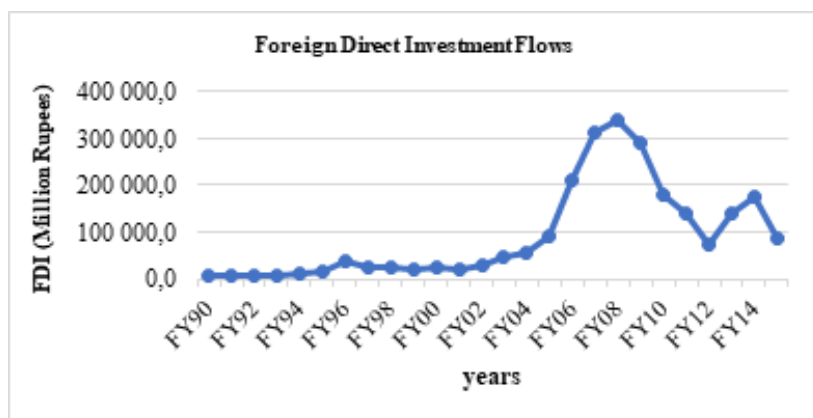


Figure 1. FDI Net flows of Pakistan from 1990 to 2015

Source: Hand Book of Statistics

underemployment, previous work experience of persons not in employment, labor status, workforce, and income.

The workforce data includes information on (a) working force classified by sector, informal and formal industries, occupation, employment status, number of working hours, and educational qualification; (b) workplace safety and health-related measures; and (c) unemployed categorized by education and work experience. Annual employment in the industry is in the double digits and spans 33 industries, including 9 manufacturing sectors

The LFS separates labor of formal-industry and informal-industry. Individual characteristics data of LFS has some shortcomings relating to Individuals' union membership status which is considered to be a contributing factor of workers' wages as well as lack of data on working experience. To explore the effect of education level, age and age square are used. FDI inflows to Pakistan increased dramatically as a result of liberalization and privatization, but then decreased in 2009 as a result of the global financial crisis and economic slowdown. This, in turn, affected employment generation. Furthermore, data on some variables under concern are not available for the years 1990, 1992, and 1994 and it is for this reason that we considered the period between 1996 to 2008 for this empirical analysis. The data of sectoral FDI inflows in manufacturing sectors is obtained from the State bank of Pakistan.

3.3 Pakistan's labour market

The Pakistan labour market is also of a dual nature and exudes both inflexibility and versatility like other developing countries. The formal sector is tightly regulated and organized, while the informal sector is much more versatile and adaptive to changes. The

labour market reforms that were introduced in Pakistan during our sample period are presented here.

According to MOL (2006) and Worldbank (2006), labor regulation in Pakistan has been strict relative to international standards, as indicated by data on a variety of market flexibility indicators. In comparison to other Asian nations, Pakistan's employment law indicator is considerably more conservative. The absence of a redundancy dismissal procedure contributes to the rigidity of the labour market. In Pakistan, fixed-term contracts are limited to a maximum of nine months. Countries such as New Zealand, China, Singapore, and Malaysia have not imposed restrictions on the length of term contracts. According to the investment climate survey, Pakistan is ranked 91st in the world for the ease of hiring and firing employees. Pakistan is ranked 126th for the cost of terminating an employee. In Pakistan, severance pay as a percentage of base salary is double compared to that of India and Bangladesh for a given duration of continuous work.

During the sample period, there was no change in the labour market (Worldbank, 2006). There were no new regulations introduced between 1996 and 2007. The most recent law is the Children's Work Act of 1991, which prohibits children from working in certain professions and establishes requirements for working conditions wherever they are permitted to work. Consequently, we anticipate that labor market legislation will have little to no impact on our analysis.

4. Informality and Foreign Direct Investment: Preliminary Facts

In table 1, we distinguished between Pakistan's informal and formal characteristics in 1996 and 2007, in accordance with the

Pakistan Labor Market Regulation to identify the present predicament at the beginning of the study span. Since the selected group of people in informal jobs is probably not arbitrary, we first evaluate how the two industries differ in individual attributes. It is anticipated that the majority of informal sector workers will be female, young, illiterate, and poorly educated. Additionally, it is commonly observed that workers in the informal sector are single. In our analytic context, these differences in the demographic labor force structures of both the formal and informal sectors increase

the weight of individual characteristics over sector data

Employees in both sectors have distinct job characteristics. It is widely assumed that work in the informal sector is of lower quality. Table 1 presents descriptive statistics from the 1996 and 2007 Pakistan Labor Force Survey which show an overview of the work characteristics and present sample averages of job characteristics of informal and formal jobs. All three indicators indicate in Table 1 that incomes are higher in the formal sector than in the informal sector. The low bargaining power of informal sector firms is one of the

Table 1. Informal and formal characteristics of Pakistan

Variables	1996		2007	
	Informal	Formal	Informal	Formal
Log Weekly salary	6.172	6.697	6.848	7.56
Wage per week (current PKR)	657.61	959.11	1176.73	2462.72
Wage per month (current PKR)	2373.5	3959.51	4706.94	9850.9
Male	0.465	0.905	0.469	0.912
Age	32.26	34.8	32.015	35.59
Literate	0.43	0.76	0.508	0.829
Below primary	0.59	0.26	0.517	0.192
Primary	0.11	0.09	0.142	0.096
Secondary	0.27	0.43	0.302	0.437
University	0.025	0.209	0.032	0.178
Being Married	0.658	0.759	0.616	0.7391
Share of skilled worker	0.2964	0.6438	0.333	0.616
HH Head	0.646	0.814	0.601	0.755
No. of children in HH (0–4)	0.7808	0.7801	0.854	0.797
No. of children in HH (5–15)	2.19	1.93	2.372	2.167
Average HH income	3395.7	3829	2797	8660
Size of family	6.987	6.51	8.164	7.613
Work with ten or more individuals	0.0068	0.1088	0.0086	0.042
Work in building	0.1418	0.8358	0.147	0.878
Hours worked within a week	49.84	46.41	47.77	46.52

Source: Author's calculations using LFS-1996 and LFS-2007 data.

major reasons for lower wages in the informal sector, among other aspects. Net revenue would favor a company with low bargaining power (Tsao, Wu, Hu, & Lin, 2019).

Work in the informal sector is viewed as unsatisfactory on the whole. The LFS lacks information on workplace conditions, on-the-job training, and job characteristics. Numerous benefits, including medical care, sick leave, insurance, pensions, and transportation, are exclusive to formal workers. Additionally, formal sector employees receive on-the-job training. Table 1 also demonstrates that informal employees work longer per week than formal employees (In 1996, the numbers were 49.84 and 46.41, respectively, and in 2005, they were 47.77 and 46.52.). The level of education of formal sector employees is greater than that of informal sector employees (0.20 and 0.17 in university in 1996, 0.02 and 0.03 in 2007, respectively).

Next, we addressed the question of whether the prevalence of informal employment in Pakistan has been increased by FDI. Figure 2 presents the total share of

informal workers in Pakistan during 1996-2007 in all industries and the manufacturing sector. The prevalence of informality in all industries rose from 0.26 in 1996 to 0.34 in 2007. Although in manufacturing, it increased from 0.24 in 1996 to 0.46 in 2005 after that, it fell to 0.31 in 2007. Until 2005, there was an upward trend in the proportion of informal jobs in both the manufacturing and non-manufacturing sectors. Destructions of the 2005 Earthquake added a greater potential to the expansion of the informal economy beyond the usual growing trend after which it shifted toward a normal trend (Gulzar, Junaid, & Haider, 2010). To sum up, the total share of informality in all industries was 34 percent and in manufacturing, 29 percent.

Another concern is that these increases in informal employment may lead to changes in the employment structure of the sector (i.e., FDI may increase employment in sectors that use a higher proportion of informal labour), or informality variations within the sector. This is because FDI may increase employment in sectors that use a higher proportion of

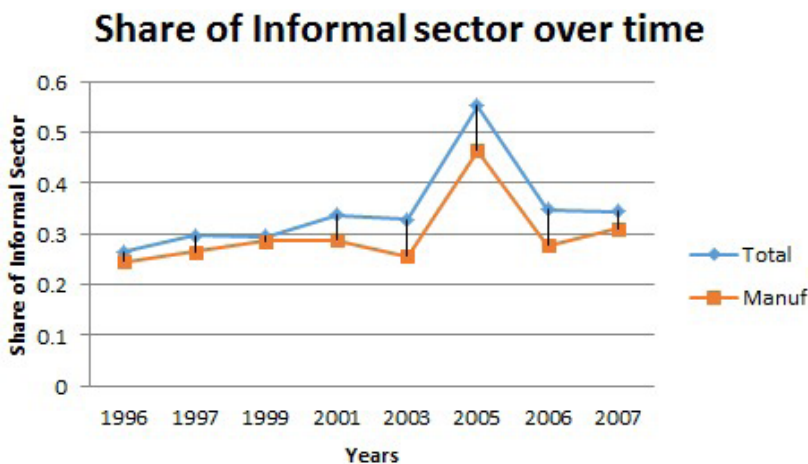


Figure 2. Share of Informal sector in Pakistan

Source: Author's calculations using LFS

Table 2. Decomposition of changes in the informal sector's employment

	Total	Within sector	Between sectors
Overall	0.02116	0.012667	0.008492
Manufacturing only	0.066941	0.049762	0.017179

Source: Author's calculation using LFS

informal labour (such as workers switching from formal to informal sector jobs in an industry). According to the statistics compiled in Pakistan, there is a movement of workers from the formal sector to the informal sector within the sector as a whole.

The breakdown of disparities in the informality proportion within and across sectors indicates that the increase in informality is due to the change of workers within sectors from formal to informal employment. The change of the proportion of informal workers in overall employment between 1996 and 2007 ΔI is broken down into shifts within and between sectors, respectively.

$$\Delta I = T_t - I\tau = \sum_j \Delta i_{jt} E_j + \sum_j \Delta E_{jt} i_j$$

where E_{jt} represents the share of sector j 's employment in overall employment at time t , i_{jt} represents the share of informal workers in overall employment in sector j , $E_j = 0.5(E_{jt} - E_{j\tau})$ and $i_j = 0.5(i_{jt} - i_{j\tau})$. The results of this classification are shown in Table 2. The migration of individuals from formal to informal employment within the manufacturing sector accounts for 74% of Pakistan's increase in informal employment. Migration across industries is dominated by people moving from formal to informal sectors within an industry. As a result, our analytical approach in the following section focuses on determining whether the foreign direct investment is linked to these shifts in informality within the sector.

According to this preliminary report, if investment policy had any influence on

the prevalence of informal employment in Pakistan, improvements in the structure of informal and formal industries within the industrial system would have sought to promote these outcomes. However, other factors, such as macroeconomic conditions and labor market regulations, can influence general trends.

4.1. Empirical Model

Given the relative scarcity of data on the scale of the informal economy, it is difficult to provide direct empirical support for our assertion. Despite the fact that the literature on the causes and impacts of the informal sector is continuously expanding, one of the difficulties in measuring the impact of informal sector on FDI is the multidimensional nature of the term informality. In practice, informality is measured using many dimensions, including firm characteristics, job characteristics, social protection coverage, and non-agricultural informal household sector value-added as a share of GDP (Munro, 2011).

Recently, Rani (2008) defined informality as it consists of enterprises with less than five employees, entrepreneurs with unaccounted workers, self-employed individuals (excluding skilled, administrative, and technical professionals), unpaid family members working for a family business, and domestic workers. Bacchetta et al. (2009) described informal employees as those who don't have social security (e.g., health insurance) and are not protected by labor regulations (e.g., hiring and firing legislation, minimum wage).

Goldberg and Pavcnik (2003) and Wu et al. (2019) define the informal sector as a sector that offers lower job quality and faces flexible labor market regulations and most probably has less than ten workers. Goldberg and Pavcnik (2003) and Wu et al. (2019)'s definition is appropriate and relevant for our purposes since it characterizes the informal economy keeping in view the data limitation in case of developing countries.

Following Baez (2020), Lee, Alba, and Park (2018), Olney (2013) and Parcon (2008), we investigated the impact of informality on foreign direct investment (FDI) using data from 1996-2007, we run a least square dummy variable (LSDV) model by taking FDI as our dependent variable and the share of informal employment as the independent variable. The main model can be written as follows:

$$FDI = f(IE) \quad (1)$$

After incorporating other control variables and a random error term, the empirical strategy used by the study is as followed:

$$LFDI_{jt} = \beta_0 + \beta_1 IE_{jt} + \beta_3 X_{jt} + \beta_4 M_{jt} + \beta_5 GDP_{jt} + \beta_6 GFCF_{jt} + \varepsilon_{jt} \quad (2)$$

Where $LFDI_{jt}$ represents the log amount of foreign investment in sector j at time t . IE_{jt} represents informality in sector j at time t . Information on the size of the informal economy has been compiled for this study along the lines suggested by the conceptual discussion. Following Wu et al. (2019) definition of informality, we measured the share of informal employment for informality in sector j at time t . β_1 - coefficient of informal employment (IE_{jt}) explains part of the variation in FDI_{jt} that is due to variation in IE_{jt} .

X_{jt} shows the control variable Exports (X), M_{jt} shows Imports (M), GDP_{jt} shows GDP contribution by sector, $GFCF_{jt}$ shows Gross Fixed Capital Formation (GFCF). ε_{jt} is

a stochastic error term. Although export and import variables are included in the model, measures of trade liberalization (that is trade ratios) are excluded because of inaccurate estimates due to over-invoicing of exports and under-invoicing of imports in developing countries (Bhagwati, 1964), and this issue exists in Pakistan too (Mahmood, 1997; Mahmood & Azhar, 2001; Sheikh, 1974). To make the analyses more robust, we apply the generalized method of moments (GMM) estimate in a panel setting, which fixes the endogeneity problem (Al-Malki, Hassan, & Ul-Haq, 2022; Hassan & Rousselière, 2022; Kripfganz, 2019). The GMM model incorporates lagged values of the dependent variable and internally transforms the data to account for endogeneity. The GMM model provides a superior estimation in this way.

5. Results and discussions

5.1. FDI and Informality in the manufacturing sector of Pakistan

The regression analysis estimates the relationship between FDI and informal employment (IE), while controlling for other factors. In the model presented in Table 3, a 1% increase in informal employment causes a 6.7% increase in FDI. To clarify, the model includes control variables that may influence FDI, but the coefficient of informal employment specifically reflects its unique contribution to explaining FDI inflows.

Table 3. FDI and Informality in the manufacturing sector of Pakistan

	(1)	(2)	(3)	(4)	(5)
Share of Informal	6.721* (3.650)	7.238* (3.868)	11.38** (5.316)	7.291* (4.045)	11.03** (5.364)
Log Exports (LX)		0.177 (0.333)	-0.0955 (0.370)		
Log Imports (LM)		0.834 (0.854)	0.528 (0.757)		
Log GDP			2.493 (1.742)		2.992 (1.778)
Log GFCF			-1.167*** (0.393)		-1.117*** (0.380)
LX*NEER				0.000940 (0.00309)	-0.00233 (0.00356)
LM*NEER				-0.00368 (0.0116)	0.00142 (0.00930)
R-Squared	0.840	0.844	0.886	0.841	0.887
Industry Indicators	Yes	Yes	Yes	Yes	Yes
Time Indicators	Yes	Yes	Yes	Yes	Yes

Note: Log FDI is the dependent variable in all models. The robust standard errors are presented in parentheses. The total number of observations in all models is 55. The number of asterisks shows a significance level (i.e. '****' for 1%, '***' for 5%, and '**' for 10%).

Source: Author's own estimation

There exists a statistically significant relationship between FDI and informality across the manufacturing sectors of Pakistan. The informal sector encourages foreign investors to invest in the host country, and our findings are not sensitive to the inclusion of other variables in the model. The findings are in line with those of (Bacchetta et al., 2009; Leibrecht & Scharler, 2009; Nordin, Zainudin, & Hameed, 2013; Shembavnekar, 2019) and contrast the study of (Feenstra & Hanson, 1997; Selwaness & Zaki, 2015; Zulfiqar, 2017).

We added multiple control variables to Equation (1) such as Exports (X), Imports (M), Sectoral Contribution to GDP, and Gross Fixed Capital Formation (GFCF) to show that our results are stable and robust. The logical assumption is that foreign investment comes

at the expense of domestic investment-we call this crowding-out if inward FDI reduces the amount of domestic investment, while crowding-in happens when inward FDI encourages domestic investment in the host country (Wang, 2010). FDI will crowd out the domestic investment of the host country if foreign firms simply substitute domestic firms due to their efficiencies. The sign of the GFCF (domestic investment measure) is negative and significant showing that any additional foreign investment decreases the domestic investment (Agosin & Machado, 2005). Additionally, Table 4 uses the GMM approach, and the econometric results of GMM confirms the same association.

Table 4. FDI and Informality in the manufacturing sector of Pakistan (GMM)

	(1)	(2)	(3)	(4)	(5)
Share of Informal	13.50** (6.502)	16.71** (8.233)	4.797 ^a (3.083)	17.01** (8.240)	5.667* (2.896)
Log Exports (LX)		-0.116 ^a (0.191)	-0.393*** (0.142)		
Log Imports (LM)		0.334 ^a (0.206)	0.361** (0.151)		
Log GDP			2.084*** (0.342)		1.988*** (0.353)
Log GFCF			-0.620 ^a (0.469)		-0.588 ^a (0.514)
LX*NEER				-0.000842 ^a (0.00264)	-0.00540*** (0.00187)
LM*NEER				0.00451 ^a (0.00322)	0.00698*** (0.00182)
Constant	12.62*** (0.366)	8.107*** (1.529)	-15.23** (5.974)	7.662*** (2.321)	-16.66*** (6.203)

Note: Log FDI is the dependent variable in all models. The robust standard errors are presented in parentheses. The total number of observations in all models is 55. The number of asterisks shows a significance level (i.e. '****' for 1%, '***' for 5%, and '**' for 10%). 'a' means significant at 12%.

Source: Author's own estimation

5.2. FDI and lagged-Informality in the manufacturing sector of Pakistan

Quite frequently, the impact of informality in period t can only be partially demonstrated in the current period and can last for more than one period. The linkage effects, for example, may take a couple of periods to occur. We include lagged share of the informal sector in the regression to capture such linkage effects, as well as other possible spillover effects of informality that might affect foreign investment. Thus, we investigate the relationship of informality as a determinant of FDI that might take time to appear by using the lag of informality. In our core lagged model, we regress a panel regression model in which lagged share of informal labor is

independent and foreign direct investment is the dependent variable.

In all models, the results indicate a significant relationship between the lagged share of informal labor and Foreign Direct Investment. The sign of lagged informal labor suggests that lagged informal labor increases FDI in Pakistan. To ensure the validity of the results, we included control variables such as Exports (X), Imports (M), Sectorial Contribution to GDP, and Gross Fixed Capital Formation (GFCF). Our core findings are unaffected by the inclusion of these additional variables. The results are summarized in Table 5. Additionally, Table 6 performs the GMM approach on lagged analysis, and the outcome confirms the same association.

Table 5. FDI and lagged-Informality in the manufacturing sector of Pakistan

	(1)	(2)	(3)	(4)	(5)
Lagged Share of Informal	5.565 (5.527)	7.162 (5.647)	10.77* (5.725)	7.113 (5.626)	10.68* (5.751)
Log Exports (LX)		0.173 (0.325)	-0.0163 (0.393)		
Log Imports (LM)		1.893** (0.804)	1.074 (0.928)		
Log GDP			2.312 (2.012)		2.011 (2.144)
Log GFCF			-0.944* (0.470)		-1.059** (0.466)
LX*NEER				0.00230 (0.00282)	0.000794 (0.00405)
LM*NEER				0.0275** (0.0104)	0.0228* (0.0115)
R-Squared	0.852	0.867	0.895	0.869	0.900
Industry Indicators	Yes	Yes	Yes	Yes	Yes
Time Indicators	Yes	Yes	Yes	Yes	Yes

Note: Log FDI is the dependent variable in all models. The robust standard errors are presented in parentheses. The total number of observations in all models is 48. The number of asterisks shows a significance level (i.e. '***' for 5%, and '**' for 10%).

Source: Author's own estimation

Table 6. FDI and Informality in the manufacturing sector of Pakistan (GMM)

	(1)	(2)	(3)	(4)	(5)
Lagged Share of Informal	13.34* (6.924)	11.25 (10.61)	1.412 (2.748)	11.86 (8.639)	0.0459 (3.225)
Log Exports (LX)		-0.0110 (0.240)	-0.329** (0.152)		
Log Imports (LM)		0.226 (0.195)	0.305** (0.149)		
Log GDP			1.978*** (0.333)		1.868*** (0.339)
Log GFCF			-0.350 (0.520)		-0.289 (0.568)
LX*NEER				0.000316 (0.00301)	-0.00424** (0.00199)
LM*NEER				0.00373 (0.00245)	0.00539*** (0.00156)
Constant	12.66*** (0.393)	8.458*** (1.143)	-18.16*** (5.924)	7.583*** (1.373)	-19.01*** (6.277)

Note: Log FDI is the dependent variable in all models. The robust standard errors are presented in parentheses. The total number of observations in all models is 48. The number of asterisks shows a significance level (i.e. '****' for 1%, '***' for 5%, and '**' for 10%).

Source: Author's own estimation

6. Conclusion

This study investigated the relationship between Foreign Direct Investment (FDI) and informal employment in Pakistan, revealing a statistically significant positive correlation. The study's focus on the pre-crisis period (1997–2007) ensures a stable dataset, free from distortions caused by the 2008 global financial crisis. The robustness of this relationship was confirmed through various econometric techniques, even after the inclusion of control variables such as Exports (X), Imports (M), sectoral contribution to GDP, and Gross Fixed Capital Formation (GFCF). The analysis also explored the lagged effects of informality on FDI, with findings indicating that prior levels of informality have a similar impact as current levels.

Labor market regulations play a central role in shaping informal employment. The absence of significant regulatory reforms during the study period provided a stable backdrop, making Pakistan a suitable case for examining the informality and FDI nexus. Interestingly, the study found that FDI does not always complement domestic investment. The negative coefficient for GFCF suggests that increased foreign investment may crowd out local investment.

These findings highlight the importance of labor market flexibility/informality in attracting FDI. Policymakers should prioritize reforms aimed at improving flexibility such as easing employment regulations, streamlining administrative procedures, and offering sector-specific incentives. Such reforms could help integrate informal labor into the formal economy while ensuring worker protection and encouraging foreign capital inflows.

Despite these contributions, the study has several limitations. It is based on micro-level data from 1996 to 2007, which may

constrain the generalizability of results to more recent periods or different national contexts. The focus on the manufacturing sector limits insights into the dynamics of services and agriculture. Furthermore, the data used may contain measurement errors, especially in capturing informal employment. Other potentially influential macroeconomic variables such as political stability, infrastructure quality, and access to finance were not included in the model.

Future research should address these gaps by extending the dataset to cover more recent years and including additional sectors of the economy. Incorporating broader macroeconomic indicators and using updated or more granular data could yield richer insights. Comparative cross-country analyses may also be valuable in testing the consistency of these findings across different institutional and economic environments.

Overall, this study underscores the complex yet critical relationship between labor market informality and FDI, providing valuable implications for economic policy and labor market planning in developing countries like Pakistan.

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