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INFORMAL EMPLOYMENT IN PAKISTAN: Survivalist or Structuralist?*

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Abstract

This study examines the increasing informality in Pakistan accompanying the fluctuating industrial growth in the wake of economic liberalization. The percentage distribution of labour in informal employment by major industry divisions is used as a proxy for the informal sector. A dynamic panel data model is constructed to analyze cyclicality and industry layering of informal employment. It is found that a declining tariff rate increases informality, confirming the structuralist hypothesis. There also exists a static subset which is marginal and growth-retarding. The results imply a structured and targeted policy for each subset to deal with undesirable features of informal employment.

Key Words: Informal Employment, Structuralism, Procyclicality, Panel Data, Pakistan.
JEL Classification: J08; J46; C32, E24.

I. Introduction

Informal employment is an evolving concept. Generally viewed as undesirable, even exploitative, "Informality encompasses a range of vulnerabilities and deficits in decent work" [ILO (2013)]. Scholars differ on the measurement of informality. It is measured in terms of enterprises, jobs and activities. Pakistan Labour Force Survey (LFS) officially measures the informal sector in terms of informal employment in legal activities. Informal employment comprises, both the self-employment in informal sector enterprises (i.e., small and/or unregistered) and a wage employment in informal jobs (i.e., without secure contracts, worker benefits, or social protection). Informal

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wage employment comprises employees of informal enterprises, as well as various types of informal wage workers who work for formal enterprises, households, or who have no fixed employer [LFS (1990-2013)]. In all developing countries, the share of self-employment in informal employment (outside of agriculture) is larger than the wage employment.

In Pakistan, informal employment is growing while formal employment is stagnant. Around 74 per cent of the employed (non-agricultural) labour force is in informal employment. According to the central bank, despite 'negatives', the resilience of the informal sector appears to be pushing the formal economy forward [SBP (2013)]. There are different views on the persistence of informal sector. Hart (1973) associated informal sector with underdevelopment, poverty and marginality. The dualistic character of the underdeveloped economies and low productivity were given as reasons for informal employment. Scholars taking the survivalist view explain informal sector as an undesirable feature of a developing economy to be overcome in the process of development. This assumption is that informal sector would disappear, once the developing countries achieve sufficient level of economic growth and if modern industrial development is not realized. Contrarily, informal sector is growing, providing employment and enjoying linkages with industrial and services sectors even in developed countries [Chen (2005)]. Most scholars in Pakistan [Khan and Khan (2009), Kemal and Mehmood (1998), Shaheed and Mumtaz (1981)] have held a survivalist view of informality based on what North, et al. (2013) describe as a limited access to social order.

This study is an effort to explain the structuralist features of the informal employment in Pakistan. Globalization has made informal sector a periphery of the world economy as core exploits cheap labour and re-appropriates economic value [Elgin (2012)]. Formal and informal firms interact with each other. Formal firms outsource labour intensive part of production process to informal firms. Trade liberalization offers growth opportunities to the informal sector. Following the activity based defintion, this study seeks to discuss the linkages between informal employment and formal employment through the lens of growth under a liberalized regime in Pakistan. It investigates as to how the formal employment, declining tariff rate, sectoral growth rate and direct taxes affects informal employment. Further, the study explains as to how the formal sector growth and employment affect informal employment and whether informal employment is procyclical or countercyclical.

Section II presents a brief review of literature. Section III uses LFSs to focus on the interaction between formal and informal sectors. Descriptive analysis is presented to understand the nature and conditions of employment in formal and informal sectors and how these relate to GDP growth and trade liberalization. Section IV conceptualize the issue, specifies a dynamic panel data model and discusses the data and sources. The section ends with the presentation of the results of the modelling exercise. The main findings and conclusions are given in Section V.

II. A Brief Review of Literature

Many scholars have looked at the question, whether informal sector is procyclical or countercyclical to growth in the formal sector. However, only few studies make an argument for procyclicality. Following the survivalist notion of Hart (1973), Portes and Schauffler (1993) find an element of exploitation and dependency associated with informal work. Others suggest that informal sector and formal sector are not related and no long-term relationship exists between the two sectors. Macroeconomic framework is not important to influence informal sector as its contribution to growth has changed marginally. Informal sector was thus seen as a hindrance to economic growth [Maloney (2004), Rakowski (1994), Stark (1982), Moser (1978)]. Livingstone (1991) relates informality with income inequality. Informal sector enterprises absorb excess labour supply in productive employment and provide cheap consumer goods. The higher is the income differential, the larger the degree of informality. Exploration of the link between informal sector and formal sector by Chen [(2005), (2012)] confirms the highly heterogeneous nature of informal sector. Earnings vary with nature, location, and work conditions. Informal employment is countercyclical, but it varies inversely with the size of informal labour.

Soto (1989) explains informal sector not as an involuntary solution to enter the job market but as a way to avoid costly government regulations. For formal sector firms, it is a cost effective strategy. Informal sector is thus a dynamic subset of the economy that complements the formal sector growth. Taking the argument further, a number of authors declare informal sector as casual work available for avoiding excessive state regulation and unrealistic production standards that increase the cost of doing business. It places abundant labour supply at the service of global capitalism. In this way, informal sector enjoys linkages with growth in the formal sector [Roberts (2014), Henley, et al. (2009), Schneider and Enste (2000), Kelley (1994), Portes (1994), Portes and Schauffler (1993)]. Informal sector employment is related with increasing tax burden, besides the regulatory framework [Schneider (2005), (2002), Schneider and Enste (2000)]. Elgin (2012) investigates the relationship between the shadow economy and business cycle to conclude that the size of the shadow economy is countercyclical. However, it is also possible that huge negative shocks adversely affect firms in formal sector and the informal sector starts growing. Cicek and Elgin (2011) found weak regulatory enforcement, low GDP growth and increasing tax burden in developing countries responsible for increasing informal sector employment. A group of authors explained that growth without improving employment and income distribution was less likely to contract the informal sector [Beneria (2001), Ghosh (1989) Tokman (1989)]. Another study saw informal sector playing an important role in the promotion of entrepreneurial activities [Webb, et al. (2013)].

Following the structuralist arguments, many scholars view globalization as making informal sector a component of the world economy. A core-periphery relationship ex-

ists between informal sector and the world economy because of an unequal international division of labour. Persistent capital accumulation in the periphery and the semi periphery of the world economy enables the core to exploit cheap labour and re-appropriate economic value through trade and investment [(Roberts (2014), Jon (2006) Kelley (1994), Portes and Schauffler (1993)]. Trade liberalization offered an opportunity for informal sector to grow, as it intensifies competition and provides greater demand internationally for domestically produced inputs in informal sector [Fugazza and Fiess (2010), Davies and Thurlow (2009)]. Informal firms can interact with formal firms. Informality is complementary and formal firms outsource labour intensive part of production process to informal firms [Dessy and Pallage (2003)]. Informal workers rise and fall with the fate of formal sector due to its linkages with formal sector industry, and its growth depends on production technology and the elasticity of substitution between the two [Schmitz (1982), Stark (1982)].

In literature, the focus is on informal sector, and not the informal employment. This paper picks up the strand in the literature of a dynamic subset in the informal sector to see how the formal sector employment and growth in a liberalized framework affects informal employment. It is a continuation of our earlier work on wage differentials as a link between formal and informal employment in Pakistan [Tahir and Tahir, (2012)].

III. Descriptive Analysis

In 2012-13, nonagricultural employment in Pakistan was 56.29 per cent of the employed labour force. Of this, 41.45 percentage points or 23.45 million relied directly on informal sector for their livelihood. The corresponding numbers were 37.4 per cent and 14.8 million in 2001-02. The contribution of the informal sector in the non-agriculture sector was approximately 74 per cent in 2012-13, compared to 65 per cent in 2001-02. It is evenly spread between rural and urban areas. Rural to urban migration rate is 26.2 per cent, which is higher for men (30.3 per cent) than the women (23.5 per cent). In 2012-13, employers in the formal sector constituted almost 1.3 per cent of the total employed and 2.9 per cent in the informal sector. The rest were wage workers and own account workers in informal sector. Wholesale and retail trade, construction and manufacturing are the major industry divisions for informal employed workers that, respectively, provide 33.8 per cent, 17.3 per cent and 22.1 per cent of the employment [GOP (2014), LFS (1990-2013)].

Table 1 shows the distribution of informal sector employment by status, area and gender. It has not changed much during 2002- 2013. Noticeably, the employers were only 2.49 per cent of the employed in 2012-13. Informal sector has very few organizations of own account status including helpers. Another aspect to note is the invisibility of women in household enterprises. Only 0.03 per cent women were recorded as employers, increasing from 0.02 per cent in 2001-02. Unpaid family workers were

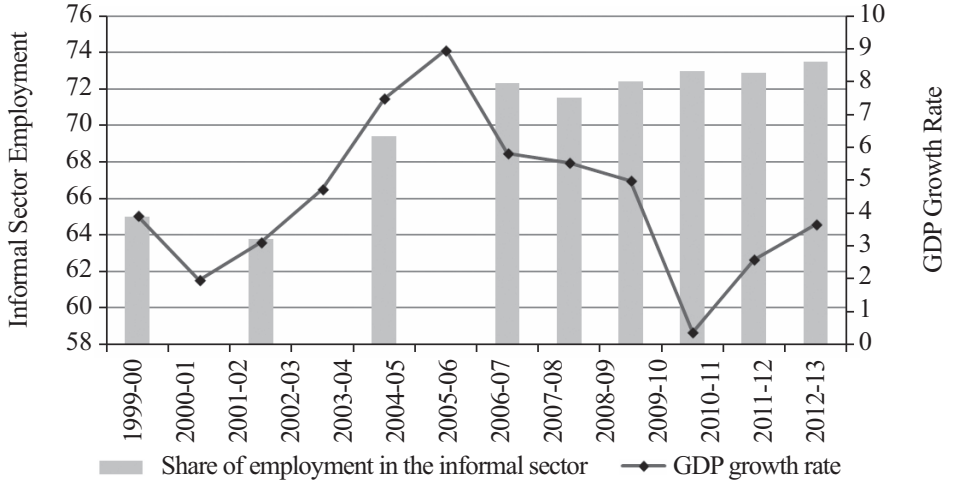
TABLE 1

Percentage Distribution of Employed Persons Engaged in Informal Sector by Employment Status, Area and Gender

	All areas 2012-13		Rural 2012-13		All areas 2001-02		Rural 2001-02	
	Total	Male	Total	Male	Total	Male	Total	Male
Total	100.00	90.64	52.30	47.16	100.00	98.00	51.30	47.18
Employer	2.49	2.46	0.59	0.59	1.00	0.98	0.40	0.40
Self-employed	40.51	37.39	20.95	19.02	43.56	40.86	22.78	21.47
Unpaid family worker	10.17	8.52	4.51	3.45	10.91	9.24	5.38	4.41
Employee	46.83	42.28	26.25	24.10	44.53	40.19	22.75	20.90

Source: LFS (Various issues).

1.65per cent, self-employed were 3.12 per cent and employees were 4.55 per cent. Women employment in the informal sector for all categories and areas has slightly increased. Figure 1 presents informal sector employment and GDP growth rate in Pakistan to illustrate links between the two. Informal sector is of a persistent nature. Since 2004-05, growth has declined and informal employment has been high. As growth picked up in 2012-13 from the lowest growth rate of 0.36 per cent in 2008-09 to 3.07 per cent, informality declined marginally from 74 per cent to 73.6 per cent. However,



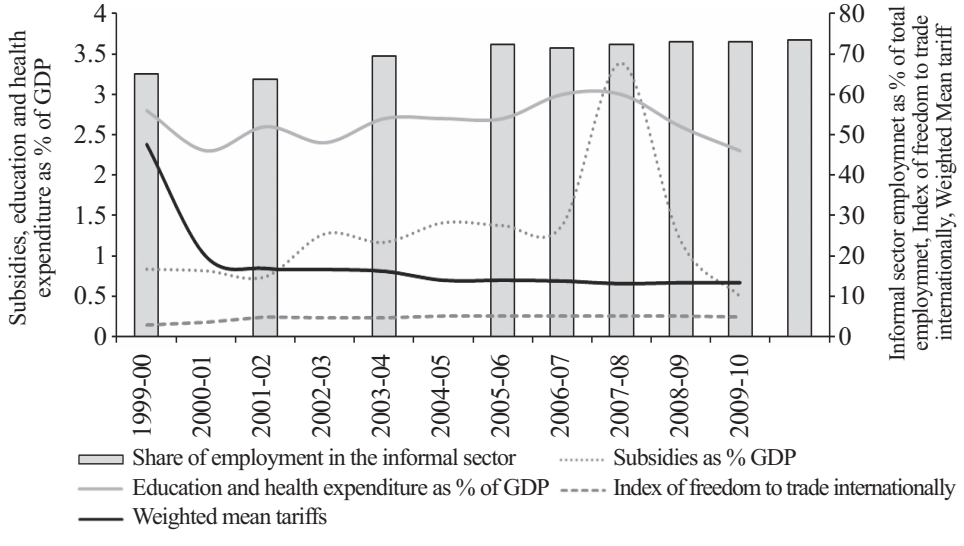
Source: LFS (Various issues), GOP (2012).

FIGURE 1

Informal Eployment and GDP Growth

there was generally a positive link between GDP growth and informal employment during 2000 to 2013 [GOP (2014)]. This seems to support the survivalist view of informal employment that declining GDP growth in a country without social security coverage pushes up employment in the informal sector.

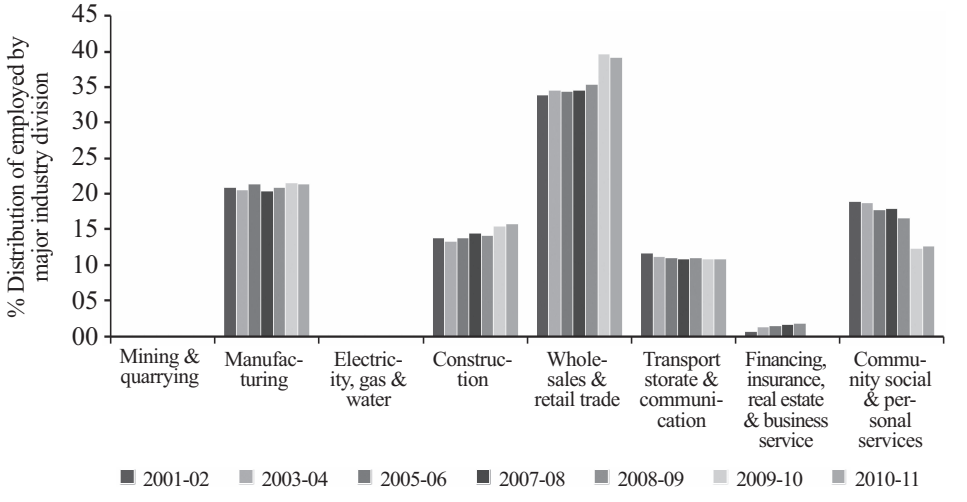
Recently, some researchers have linked the growth of informal sector employment with avoidance of complex business standards and trade liberalization. Like other developing countries, most informal employment in Pakistan is in the wholesale and retail trade. During 2000 to 2013, the country adopted a number of structural reforms. Under these reforms, average tariff rate reduced from 50 per cent to 13.5 per cent. The average import weighted tariff rate in 2006-07 was around 8 per cent. There is a significant decline in the number of regulatory duties. The index of freedom to trade internationally shows an improved rank for Pakistan. However, as Figure 2 indicates, trade liberalization represented by decreasing tariff rate and the increasing freedom to trade, is associated with increasing informal employment. This seems to confirm the structuralist hypothesis of informal employment. Industry division of employment is indicative of the link between the formal and informal sectors. It can be seen from Figure 3 that the wholesale and retail trade is the largest source of employment in the formal sector, followed by community, social and personal services, and the manufacturing. In informal sector, the largest source of employment is also the wholesale and retail trade, followed by manufacturing, and community, social and personal services. This is shown in Figure 4.



Source: LFS (Various issues), GOP (2012), Gwartney, Lawson and Hall (2012).

FIGURE 2

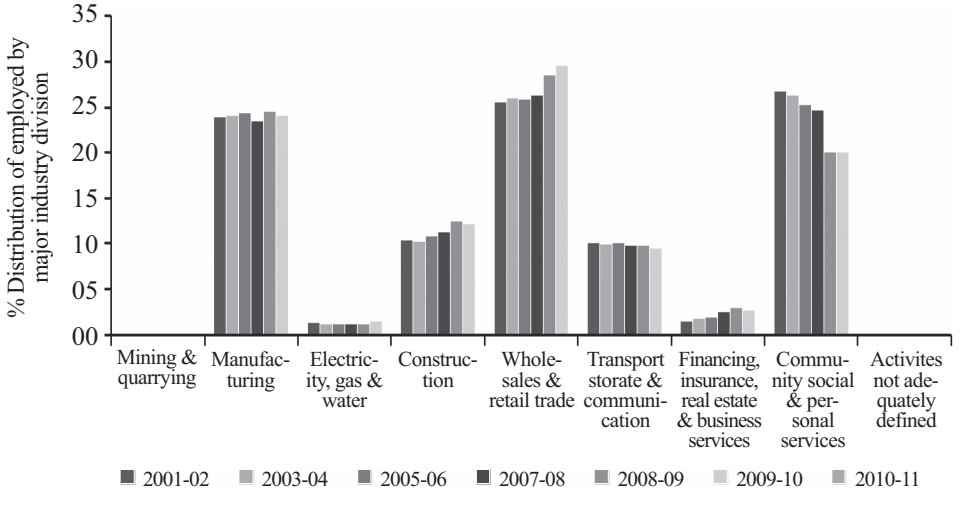
Informal Employment, Trade liberalization, Subsidies and Social Sector



Source: LFS (Various issues).

FIGURE 3

Industry Division of Formal Employment



Source: Labour Force Surveys.

FIGURE 4

Industry Division of Informal Employment

IV. Conceptual Framework, Empirical Model and Data

The conceptualization of the model of this study rests on the following narrative. Harris-Todaro (1970) model argues the reason for existence and persistence of informal sector, along with the formal sector. However, it does not explain the underlying structure of the informal sector. According to the model, when labour force participation rate exceeds the rate of growth of GDP, it indicates an expanding informal sector. Contradicting the Harris-Todaro model (1970), Soto (1989) claims that informal sector exists due to high government regulation. It is a voluntary act to enter the job market as well as a way to avoid costly government regulations. Informal sector is a dynamic subset of the economy that complements the formal sector growth. However, Soto's justification ignores survivalist workers who form the static part of informal sector [Portes and Schauffler (1993)]. In this way, subcontracting and layering is possible within the non-agriculture sector. Formal sector produces finished products for international as well as the domestic market, whereas informal sector produces or trades intermediate goods that are used in the production of finished industrial goods.

The model assumes that non-agriculture sector is comprised of a parent firm that operates in the formal sector and many informal firms. This parent firm has contractual arrangements with various suppliers. The firm outsources a part of its production process due to labour regulations and for avoiding taxes. In this way, informal firms produce a subset of output or intermediate product for formal firms. This does not only cuts the cost but also increases efficiency and productivity of formal firms by introducing specialization in the essential production process. Informal firms and employees are horizontally integrated and compete for market share to increase their revenue by producing less essential components of production.

Demand for intermediate products by formal firms generate earnings stream for informal employees and firms. The informal sector firms and employees are a source of effective demand for final goods produced for home market by the formal sector firms and for imports. Increasing informal employment raises earnings that have a strong linkage with growth in formal sector. Based on the above discussion, strict complementarity is assumed between formal and informal sectors. Informal firms function and operate as subsidiaries of firms in the formal sector. Increasing informal employment raises earnings that have a strong linkage with growth. The rejection of this assumption leads to a structulaist phenomenon.

There is a small open economy with traditional agriculture and non-agriculture sectors. Non-agriculture sector is subdivided into formal and informal sectors.

$$Y = Y_1 + Y_2$$

where, Y is the output of non-agriculture sector, Y_1 is the output of formal sector and Y_2 is the output of informal sector. Output of formal sector (Y_1) is a function of informal

sector output (Y_2) because formal sector outsources a part of its production to informal sector. Thus, informal sector output depends on formal sector growth, but this sector depends on the growth of economy. This is why it is treated as exogenous.

The Equation below explains that informal sector output is a weighted share of dynamic and static parts of informal employment

$$Y_1 = f(Y_2)$$

$$Y_2 = \alpha(s) + (1 - \alpha) * Ds + \varepsilon$$

where, Y_2 is the output of informal sector and α is the share of static subset in the informal sector output. Ds is the dynamic part of informal sector that directly depends on growth rate of the formal sector.

$$Ds = f(g)$$

where g is the growth rate of the formal sector. Starting with the standard production function of informal sector

$$Y_2 = Ae^{gt} L^{\alpha} K^{\beta} + e^{\mu} \tag{1}$$

where Y_2 is the informal sector output, A is a constant, K is capital, L is labour employed in informal sector, g is the formal sector growth rate which is exogenously determined, α and β are the relative shares of labour and capital in the output and μ is the random term. Solving Equation (1) for the representative firm, Equation (2) is the cost minimizing condition of the firm.

$$\frac{MP_L}{MP_k} = \frac{w}{r} \tag{2}$$

$$MP_L = \alpha * \frac{Ae^{gt} L^{\alpha} K^{\beta}}{L} = \alpha * \frac{f(g, L, K)}{L} \tag{3}$$

$$MP_K = \beta * \frac{Ae^{gt} L^{\alpha} K^{\beta}}{K} = \beta * \frac{f(g, L, K)}{K} \tag{4}$$

Equations (3) and (4) are derived from Equation (1). By substituting Equations (3) and (4) into Equations (2) and (1), respectively; the conditional demand functions of labour in informal sector is obtained.

$$\frac{\alpha K}{\beta L} = \frac{w}{r} \rightarrow K = \frac{\beta w}{\alpha r} * L \tag{5}$$

$$L^{\alpha+\beta} = \frac{Y_2}{Ae^{gt}\left(\frac{\beta w}{\alpha r}\right)^{\beta}} \rightarrow L = \left\{ \frac{Y_2}{Ae^{gt}\left(\frac{\beta w}{\alpha r}\right)^{\beta}} \right\}^{\frac{1}{\alpha+\beta}} \quad (6)$$

Equation (6) is the conditional demand function of labor. Taking log of both sides gives the following equation:

$$ln(L) = -\frac{1}{\alpha+\beta}\left[\left\{ln(A) + \beta\, ln\left(\frac{\beta}{\alpha}\right)\right\} + \beta\, ln\left(\frac{w}{r}\right) + gt - ln(Y_2)\right] \quad (7)$$

Substitution of Equations (7) into (5) gives the conditional demand function for K. Labour demand is derived and directly determined by output growth of the formal sector. The informal sector firms are involved in heterogeneous activities. It is, therefore, not possible to apply summation for obtaining the informal sector employment. Secondly, wages are low in informal sector and interest rate is high as compared to formal sector. The relative input price ratio in formal and informal sectors is ambiguous. To test this model empirically, it is assumed that demand for labour in the informal sector is derived in nature. Employment in the informal sector rises and falls with the formal sector. These workers are involved in the same type of activities as in the formal sector but opt to be informal. In this way, labor demand function in informal sector is given by:

$$Ln\,(E_{i.t}) = Ln\,(\alpha_0) + \alpha_1\, ln(Y_{i.t}) + \alpha_2\, ln(Tr_{i.t}) + \alpha_3\, ln(DT_{i.t}) + \alpha_3\, ln(FE_{i.t}) + \mu_{it}$$

where E_{it} is informal employment in '*i*' industry division and '*t*' year. The independent variable *Y* is sectoral growth rate in sector '*i*' and '*t*' year, *Tr* is applied weighted effective tariff rate, *DT* is the proportion of direct taxes in total taxes and *FE* is formal sector employment in '*i*' industry division and '*t*' year.

Ln(Ei,t) is the proxy for labour demand of informal sector in the '*i*' industry division. $Ln(Y_{it})$ is subsectoral growth rate of the economy. This proxy is used because informal sector employment constitutes 75 per cent of the non-agricultural sector employment in Pakistan. Its contribution to GDP is not estimated officially. Since the informal sector has a significant contribution in the sectoral growth rate, it is used as a proxy. The other two variables in the labour demand function are interest rate and wage rate of informal sectors. The data for these variables, by each industry division of the informal sector, is not available. Following the view that informal sector exists due to low wages and weak regulatory framework; direct taxes ln(DT) and effective tariff rate ln(Tr) is used as proxies for regulatory framework and input price differentials, respectively. Ln (FE) is used as a proxy for growth rate of formal sector employment.

To test the procyclicality, the coefficient α_1 is important. If $\alpha_1 \geq 0$, it confirms the procyclical nature of relationship between the sectoral growth and informal employ-

ment. To test the complementarity, the coefficient α_4 is important. If $\alpha_4 \geq 0$, it confirms the complementarity between informal employment and formal employment. An increase in formal employment pushes the informal employment demand upward. When $\alpha_1 \geq 0$ and $\alpha_4 \geq 0$, it jointly confirms strict complementarity between informal employment and formal sector growth and employment.

The effect of decrease in tariff rate on informality is ambiguous. When $\alpha_2 < 0$, it means that decreasing tariff rate would increase informality.This increase in informality is due to the survivalist hypothesis. When $\alpha_2 < 0$, the informal sector employment may decrease due to the presence of dynamic subset. Again, $\alpha_3 \geq 0$ confirms that in the presence of increasing direct taxes, informality would rise. A negative coefficient of α_2 and a positive coefficient of α_3 jointly confirms the structualist hypothesis. This study also assumes that a significant time effect model would show that informal sector is dynamic in nature. An insignificant time effect means that informal sector is static. Finally, informal sector is structuralist in nature if one subset displays a positive linkage and another a negative linkage with formal sector growth and employment.

1. Estimation Technique

The dynamic panel data technique was used in order to avoid problems of unobserved heterogeneity and exogeneity in small samples. Estimating fixed effect (FE) and random effect (RE) produces biased and inconsistent results.

In the model, endogeneity arises because employment in informal sector influences employment in the formal sector. The endogeneity which is there in some cases was formally tested, but not systematically. The time invariant characteristics of informal employment, viz., poverty, low skill content and casual nature, can have correlation with explanatory variables and be a source of fixed effect in error term. This inclined to estimate a dynamic GMM panel data model to generate more reliable results. The dataset has a larger time dimension (T=15) and a shorter industry dimension (N=8). In large T panel, error term declines with time and autocorrelation is insignificant. To deal with such a model, it is necessary to use Arellano and Bond (1991), Arellanoand Bover (1995) and Blundelland Bond (1998) techniques. All estimators are designed for small T and large N panels. The correlation between lagged dependent term and error term generates biased and inconsistent results. The inconsistency increases with large 'T'. Hsiao (1986) suggested the first difference transformation. It can resolve the problem of inconsistency of GLS estimator with large 'T' and small 'N' but may generate serial correlation when the sample is finite or small. To overcome this problem of serial correlation in small samples, we use general methods of moments (GMM) with instrumental variables to circumvent the problem of serial correlation. Moreover, large number of instruments provided by lagged variables can address the possible problems of endogeneity. For this purpose, Arellano (1989) used the second difference instead of difference at level, but it generated the problem of singularity.

$$E_{i,t} = \beta_0 + \beta_1 x_{i,t} + \beta_2 E_{i,t-1} \sum_{k=6}^{n} \beta_k x_{k,t} + \theta_i + \varepsilon_{i,t}$$

here, for industry division *i* in year *t*, informal employment depends on employment in the formal sector, sectoral growth rate, and tariff rate. $X_{ki,t}$ are various control variables included in the regression. E_{it}, the informal employment, is measured by the LFS definition - percentage distribution of employed persons (10 years of age and above) engaged in informal sector. It is given for major industry divisions and gender. Formal sector employment and growth rate of industry, applied effective tariff rate and direct taxes are the explanatory variables of the model.

2. Data

The LFS included informal sector in its questionnaire with effect from 1995. It comprises household enterprise and employment.[1] Data for this study was taken from the relevant issues of LFSs during 1997 to 2011, as the previous LFSs did not publish the data related to informal sector.[2] Again, the questionnaire design was changed three times during this period. Accordingly, some adjustments had to be made. Before 2005, the LFS had a different characterization of employment by major industry divisions. This forced to aggregate and merge certain categories. The estimation of the dynamic panel data model was based on aggregated labour force data. Incomplete panel data model [Baltagi (1998)] was used to deal with randomly missing observations. As 90 per cent of the employed labour force in informal sector is male, the panel data estimation uses the data for males to avoid the problem of heterogeneity.[3]

Data on the Index of Freedom to Trade Internationally was taken from Gwartney, et al. (2012). Data on weighted average of effectively applied tariff rates for all products and traded goods was obtained from Trade Analysis and Information System (TRAINS). Direct taxes data was taken from various issues of the Pakistan Economic Survey.

[1] "All household enterprises owned and operated by own-account workers, irrespective of the size of enterprise (informal own-account enterprises); enterprises owned and operated by employers with less than 10 persons engaged. It includes the owner(s) of the enterprise, the contributing family workers, the employees, whether employed on an occasional or a continuous basis, or as an apprentice, and excluded are all enterprises engaged in agricultural activities or wholly engaged in non-market production. Household enterprise or equivalently, an unincorporated enterprise, is a production unit that does not have a separate legal entity independent of the household(s) or household members that own it. It is neither a corporation nor has a complete set of accounts that would permit a clear distinction between the production activities of the enterprise from the other activities of the owner(s) i.e. it is not a quasi-corporation" [LFS (2010-11)].

[2] Labour Force Surveys are available for 1996-97, 1997-98, 2000-01, 2001-2002, 2003-2004, 2005-06, 2006-07, 2007-08, 2008-09, 2009-10, 2010-11.Data for the missing years was estimated for us by Iffat Ara of Social Policy and Development Centre, Karachi, Pakistan.

[3] However, we present the analysis of women employment in informal sector at the Appendix.

3. Results

A summary of the results of the panel data model, fixed effect as well as the random effect, is given in Table 2. Fixed Effect (FE) model is used to analyze the common effect of predicator which may or may not have a relationship with the outcome variable. It is also called within group effect. In this paper, a fixed effect model assumes that all factors influencing informal employment are the same. FE models cannot be biased because of the omitted time-invariant characteristics. In Random Effect (RE) models, there is an array of effects allowing variation. A fixed effects static approach excludes the explicit treatment of both the nonstationarity and endogeneity issues. Sectoral growth, tariff rate and formal sector employment are found to be significant in all the fixed effects regressions. Due to high volatility shown over time in sectoral growth rate and tariff rate, their effects are not likely to be absorbed by the industry division fixed effects. These have therefore, not been removed from estimation.

TABLE 2

Panel Data Estimates

Variable	Model 1 OLS	Model 2 Fixed effect	Model 3 Fixed effect	Model 4 Random effect	Model 5 Areg
fempm	0.49078***	0.4628***	0.46667***	0.46809***	0.46667***
	(0.01964)	(0.0220)	(0.02239)	(0.0216)	(0.02239)
tariffrate	-0.00848	-0.02677***	-0.02734***	-0.0273***	-0.027338***
	(0.02026)	(0.00294)	(0.00299)	(0.00296)	(0.00299)
Sgr	0.010768	-.00763317*			
	(0.01689)	(0.0032)			
Dtax	0.0395458				
	(0.072205)				
_cons	0.39394173	2.6445772***	2.561355***	2.5428357*	2.561355***
	(2.682539)	(0.287991)	(0.2915)	(1.126769)	(0.2915)
sigma_u	0.06198651	2.7140803	2.6997792	3.1087841	
sigma_e	1.0382895	0.41004919	0.41828092	0.41828092	
Rho					
N	120	120	120	120	120
r2	0.84493991	0.83520119	0.82694488		0.99608753
r2_a	0.83954652	0.82008203	0.81278583		0.99576742

legend: * p<0.05, ** p<0.01, *** p<0.001.

Source: Authors' calculation.

Model II represents FE estimates with group 1 (mining and quarrying) as a reference category. Assuming that employment is not constant for all major industrial employment groups, FE model is estimated in the informal sector of Pakistan. It allows to observe heterogeneity among various employment levels. Coefficients of FE model are significant and show that employment in informal sector is negatively associated with tariff rate and positively related to formal sector employment. Value of Rho in group effects shows that 98 per cent of variance is due to difference across panels. There is unobserved heterogeneity within groups, but the value of Rho in time effect shows very low heterogeneity across time. The parm test was conducted to find whether there is need to estimate time fixed effects in the estimation of the FE model. It is a joint test to see if dummies for all years are equal to zero; in which case no time fixed effects are required. On the basis of parm test, this study failed to reject the null hypothesis that coefficients for all years are jointly equal to zero; therefore, no time fixed effects are needed and the group effect is significant. The group effect thus calls for FE model and the time variation demands RE model. The Hausman test verifies whether the errors (ui) are correlated with the regressors. In this case, the probability turns out to be insignificant, which calls for RE.

The coefficient of formal sector employment regressor is the same in both the FE and RE models. It can also conclude that formal sector employment and declining tariff rate lead to higher informal employment. This means that there is not much unobserved heterogeneity over time. On the basis of Breusch and Pagan Lagrangian Multiplier test for RE, the null hypothesis is rejected and conclude that it is appropriate. There is significant evidence of differences across employment groups. The study implement the Arellano and Bond (1991) and Blundell and Bond (1998) Dynamic Panel Data Estimator. The approach is based on the Generalized Method of Moments (GMM). The formal sector employment, sectoral growth rate, tariff rate, share of direct taxes and lagged values of explanatory variables are used as instruments. Arellano and Bond (1991) suggested that GMM uses lagged values as instrument to gain efficiency and minimization of the bias. The results of these experiments are given in Table 3.

As expected, we find informality increasing with formal sector employment is found in all cases. Sectoral growth rate is negatively related to informal sector employment; as it is expected but the value of coefficient and the standard error are not consistent. The coefficient estimates are significant at least at 10 per cent in all regressions except in model 3, but these estimates exploded in the two step procedure of system dynamic panel data estimation (Model-7), with a robust standard error. The negative sign does not confirm the procyclical hypothesis of this study.

Tariff rate, as a measure of trade liberalization is negatively related to informality. It confirms that tariff reduction increases informality. It is significant in all cases and confirms the results of various macro studies. Overall, growth in economy decelerated but increased trade liberalization provided the opportunity for informal employment to grow. In all experiments, the results strongly verify the complementarity of employ-

TABLE 3

Dynamic Panel Data Estimates

Variable	Model 6 Arellano and Model 1Bond (1991)	Model 7 Arellano and Bond (1991)/ Blundell and Bond (1998)	Model 8 Blundell and Bond (1998)	Model 9 Blundell and Bond (1998)
iempm L1	0.34717671***	1.0334666***	0.76273626***	0.73270367***
	(0.0548203)	(0.0404884)	(0.047584)	(0.047584)
L2.	0.017512	-0.04417015		
	(0.0486927)	(0.033905)		
fempm	0.34491195***	0.44369535***	0.42978231***	0.42557768***
	(0.0189766)	(0.0183771)	(0.01866)	(0.0194357)
(L1)		-0.4324826***	-0.30682862***	-0.28839685***
		(0.0218524)	(0.0304393)	(0.0313639)
Tariffrate	-0.01071648*	-0.01515244***	-0.02028415***	
	(0.0046149)	(0.0043752)	(0.0036028)	
L1.	-0.00427594	0.00004115	0.00428802	
	(0.0049606)	(0.0045885)	(0.0038289)	
L2.	0.00805312	0.02195152***		
	(0.0054573)	(0.0045125)		
dtax	-0.00514762	-0.00373694		
	(0.0133923)	(0.0120245)		
L1.	-0.01829818	-0.01762168		
	(0.0118797)	(0.0107031)		
L2.	-0.01305284	-0.00014914		
	(0.0118757)	(0.0115059)		
sgr	-0.00570761**	-0.00182794	-0.0039318*	-0.00470331**
	(0.0017357)	(0.0016546)		0.0015947
L1.	-0.0050511*	-0.0002961	-0.00323745	-0.0035*
	(0.0020451)	(0.0019364)		0.0018738
L2.	-0.00417823*	0.00181756		
	(0.0021192)	(0.0019775)		
Year	0.05710466*	0.03785612	-0.01043506	0.02737242***
	(0.0257430)	(0.0228692)	(0.0096313)	(0.0060073)
_cons	-112.33146*	-75.366434		
	(51.17367)	(45.46882)		
N	96	104	104	104
Arellano-Bond test for AR(1) in first differences		z=-1.79 Pr>z=0.073	z=-1.80 Pr>z=0.072	z=-1.77 Pr>z=0.076

Source: Authors' calculation.

ment in informal sector with employment in the formal sector. Increased government sector regulations and minimum wage legislation have increased wages in the formal sector, creating a strong complementarity. The result increased informality. Formal sector employment is positively related and significant in all cases. Only the two lags and three instruments are used for avoiding any possibility of bias in results of the GMM models of this study. In all set-ups, results are not affected by the number of endogenous variables. In Model 6-9, GMM system was used as it estimates differences and levels, simultaneously. This estimator is based on Arellano and Bover (1995) and Blundell and Bond (1998). It gives similar results but these are biased and without much efficiency gains. Both models produce a smaller bias, and a lower standard deviation results in efficiency gains. There is a trade-off between the number of instruments and average bias,- and the efficiency gain of the estimator. In all the four models, the coefficient of formal employment is consistent.

V. Main Findings and Concluding Remarks

This paper investigates the empirical relationship between informal and formal employment by using employment in various industry divisions. It is found that informal employment is directly related to formal sector employment in various industry divisions to confirm complementarity between the two. The relationship is, however, negative with sectoral growth rate (counter-cyclicality) and tariff rate. Direct taxes are used as a control variable for regulatory framework, which is insignificant in all cases of men in informal employment but significant for women in informal employment. Due to non-availability of data on the contribution of informal employment to the value added and GDP in Pakistan, it was unable to use this variable in the methodology. In panel data modeling of this study, time effect is not significant and show less variation, but group effect is significant and confirms gender heterogeneity. Cross-sectional and time series properties of data appear to be in contrast to each other. However, it also confirms that similarities in informal sector are more striking than the differences.

The empirical results confirm the countercyclical hypothesis at macro level, but the group effect confirms layering and cyclicality in various industries. Productivity decreased in informal sector after the introduction of neoliberal reform in Pakistan. The outcome is consistent because it is procyclical in mining, gas, water and electricity, manufacturing, construction, community and social services. However, it is positive and insignificant in wholesale and retail trade and construction. Informal employment is highly concentrated in these industries, and consists mostly of the wage employment. Construction, the main contributor to wage employment in the informal sector, is least affected by declining tariff rates. The wholesale and retail trade sector is positively related to the declining tariff rate. These sectors are usually unregistered and the source of evading direct taxes. In addition, these sectors require comparatively better skills and are affected adversely by the low growth trajectory in Pakistan. It confirms yet

again, that informal employment is persistently increasing and positively related to formal employment. Informal sector exists due to a discriminatory regulatory framework and it is a strategic choice of the firms existing in this sector. The group effect is significant in case of manufacturing, wholesale and retail trade, transportation and community and social services when compared with reference to mining and quarrying sector employment opportunities (Appendix, Table A-1).

The study highlights the issues of cyclicality as well as industry and layering of informal employment. Formal sector employment is found positively related with informal employment in all industry divisions, which confirms the complementarity hypotheses. Informal labour enjoys subsidiary relationship with formal non-agriculture labour force. The complementarity relationship between informal and formal employment confirms the structuralist hypothesis. There exists a static subset that is marginal and retards growth and the other is a procyclical and dynamic subset. It may cause GDP to rise but growing informalization has negative implications for productivity. Gender heterogeneity is observed in the model that was tackled by estimating separately the employment of men and women. Our results confirm procyclicality hypotheses in case of manufacturing, construction and wholesale and retail trade; all other industry divisions are found countercyclical. Women informal employment is positively related with formal employment, but it is insignificant in all industry divisions except manufacturing and, wholesale and retail (Appendix III).

In a dynamic panel estimation methodology that accounts for endogeneity, informal employment increases with formal employment and with declining tariff rate. However, it is negatively related to sectoral growth rate and is positively related with direct taxes. Direct taxes are insignificant in all cases. In sum, informal employment is procyclical and has a structuralist subset. Informal and formal employment rise and fall together. As informal employment is not the desired form of employment, policy ought to be structured better and targeted for each subset of the informal sector, with a view to integrating the two. The key areas include the elimination of a discriminatory regulatory framework, better access to financial services, group dynamics and training to increase the proportion of employers. Better education and health facilities are likely to help in controlling survivalist behavior.

Bibliography

Arellano, M., 1989, A note on the Anderson-Hsiao estimator for panel data, Economics Letters, 31(4), 337-341.

Arellano, M., and S. Bond, 1991, Some tests of specification for panel data: Monte Carlo evidence and an application to employment equations, Review of Economic Studies, 58(2): 277-297.

Arellano, M., and O. Bover,1995, Another look at the instrumental variable estimation of error-components models, Journal of Econometrics, 68: 29-51.

Baltagi, B.H., (ed.), 1998, Panel data methods, New York: Marcel Dekker.

Beneria, L., 2001, Shifting the risk: New employment patterns, informalization, and women's work, International Journal of Politics, Culture, and Society, 15:(1): 27-53.

Blundell, R., and S. Bond, 1998, Initial conditions and moment restrictions in dynamic panel data models, Journal of Econometrics, 87: 115-143.

Chen, M.A., 2005, Rethinking the informal economy: Linkages with the formal economy and the formal regulatory environment, Research Paper 2005/010, Helsinki: UNU-WIDER.

Chen, M.A., 2012, The informal economy: Definitions, theories and policies, Women in informal economy globalizing and organizing, WIEGO working paper (1), Cambridge, Mass.:WIEGO.

Cicek, D., and C. Elgin C, 2011, Cyclicality of fiscal policy and the shadow economy, Empirical Economics, 41(3): 725-737.

Davies, R., and J. Thurlow, 2009, Formal-informal economy linkages and unemployment in South Africa, IFPRI discussion paper 00943. Washington, DC: IFPRI.

Dessy, S., and S. Pallage, 2003, Taxes, inequality and the size of the informal sector, Journal of Development Economics, 70(1): 2250233.

Elgin, C., 2012, Cyclicality of shadow economy, Economic papers, 31(4): 478-490.

Fugazza, M., and N. Fiess, 2010, Trade liberalization and informality: New stylized facts, Geneva: UNCTAD.

Ghosh, A., 1989, Informal sector saving potential: Some further thoughts, Economic and Political Weekly, 24:(13), 652-653.

GOP (Government of Pakistan), 2014, Pakistan Economic Survey 2013-14, Islamabad.

Gwartney, J., R. Lawson and J. Hall, 2012, Economic freedom dataset, in: Economic freedom of the World, 2012, Annual report, Vancouver: Fraser Institute.

Harris, J.R., and M.P. Todaro,1970, Migration, unemployment and development: A two-sector analysis, The American Economic Review, 60:(1):126-142.

Hart, K.,1973, Informal income opportunities and urban employment in Ghana, Journal of Modern African Studies, 11(1): 61-89.

Henley, A., G.R. Arabsheibani and F. G. Carneiro, 2009, On defining and measuring the informal sector: Evidence from Brazil, World Development, 37: (5), 992-1003.

Hsiao, C., 1986, Analysis of panel data. Cambridge: Cambridge University Press.

ILO, 2013, Global employment trends, Geneva: International Labour Office.
ILO (International Labour Office), 2013, Decent work and the informal economy, Geneva: ILO, p.2.
Jon, J., 2006, Cycling between vice and virtue: Assessing the informal sector's awkward role under neoliberal reform, Review of international political economy, 13:(2): 290-312.
Kelley, B., 1994, The informal sector and the macroeconomy: A computable general equilibrium approach for Peru, World Development, 22:(9): 1393-1411.
Kemal, A.R., and Z. Mehmood, 1998, The urban informal sector of Pakistan: Some stylized facts, Research report, 161, Islamabad: Pakistan Institute of Development Economics.
Khan, T., andR.E.A.Khan, 2009, Urban informal sector: How much women are struggling for family survival, The Pakistan Development Review, 48(1): 85-89.
Livingstone, I., 1991, A reassessment of Kenya's rural and urban informal sector, World Development, 19(6): 651-670.
LFS (Labour Force Survey), 1990-2013, Islamabad: Pakistan Bureau of Statistics.
Maloney, W.F., 2004, Informality revisited, World Development, 32:(7): 1159-1178.
Moser, C.O.N., 1978, Informal sector or petty commodity production: Dualism or dependence in urban development? World Development, 6(10): 1041-1064.
North, D. C., J.W. Josephand, B.R.Weingas, 2013, Violence and social orders: A conceptual framework for interpreting recorded history, Cambridge: Cambridge University Press.
OECD, 2002, Measuring the non-observed economy. A handbook, Paris: OECD.
Portes, A., and R. Schauffler, 1993, Competing perspectives on the Latin American informal sector, Population and Development Review, 19(1): 33-60.
Portes, A., 1994, The informal economy and its paradoxes, Princeton: Princeton University Press.
Portes, A., and R. Schauffler,1993, Competing perspectives on the Latin American informal sector, Population and Development Review, 19:(1), 33-60.
Rakowski, C.A., 1994, Convergence and divergence in the informal sector debate: A focus on Latin America, World Development, 22(4): 501-516.
Roberts, A., 2014, Peripheral accumulation in the world economy: A cross-national analysis of the informal economy, International Journal of Comparative Sociology, 54(5-6): 420-444.
SBP (State Bank of Pakistan), 2013, The state of Pakistan's economy, Second Quarterly Report, 2012-13, p.7 Karachi.
Schmitz, H.,1982, Growth constraints on small-scale manufacturing in developing countries: A critical review, World Development, 10: (6), 429-450.
Schneider, F., 2002, Size and measurement of the informal economy in 110 countries, paper presented at the workshop of Australian National Tax Centre, Canberra: ANU.
Schneider, F., 2005, Shadow economies around the world: What do we really know? European Journal of Political Economy, 21: (13), 598-642.
Schneider, F., and D. Enste, 2000, Shadow economies: Size, causes and consequences, Journal of Economic Literature, 38(1): 77–114.

Shaheed, F., and K. Mumtaz K., 1981, Invisible workers: piecework labourer among women in Pakistan in Lahore. Islamabad: Women Division, Government of Pakistan.

Soto, H.D., 1989, The other path: The economic answer to terrorism, New York: Basic Books.

Stark, O., 1982, On modelling the informal sector, World Development, 10(5): 413-416.

Tahir, N., and P. Tahir, 2012, Is informal economy marginal to formal sector growth? The Pakistan Development Review, 51(4): 543-564.

Tokman, V.E., 1989, Policies for a heterogeneous informal sector in Latin America, World Development, 17(7): 1067-1076.

Webb, J.W., G.D. Bruton, L. Tihanyi and R.D. Ireland, 2013, Research on entrepreneurship in the informal economy: Framing a research agenda. Journal of Business Venturing, 28:(5), 598-614.

APPENDIX–I

	Group	Coefficient (P-Value)
Group 2	**MANUFACTURING (MALE)**	**21.02599 (0.000)**
Group 3	ELECTRICITY, GAS AND WATER SUPPLY (MALE)	-0.221876 (0.809)
Group 4	**CONSTRUCTION (MALE)**	**12.99147 (0.000)**
Group 5	**WHOLESALE AND RETAIL TRADE, REPAIR & HOTELS AND RESTAURANTS (MALE)**	**36.29655 (0.000)**
Group 6	**TRANSPORT, STORAGE AND COMMUNICATION (MALE)**	**10.82721 (0.000)**
Group 7	FINANCIAL INTERMEDIATION (MALE)	1.456234 (0.114)
Group 8	**COMMUNITY, SOCIAL AND PERSONAL SERVICES (MALE)**	**16.1882 (0.000)**
Group 9	MINING AND QUARRYING (FEMALE)	-0.3433643 (0.761)
Group 10	**MANUFACTURING (FEMALE)**	**5.230658 (0.000)**
Group 11	ELECTRICITY, GAS AND WATER SUPPLY (FEMALE)	-0.2607427 (0.817)
Group 12	CONSTRUCTION (FEMALE)	-0.06074 (0.947)
Group 13	WHOLESALE AND RETAIL TRADE,REPAIR &HOTELS AND RESTAURANTS(FEMALE)	0.5953732 (0.519)
Group 14	TRANSPORT, STORAGE AND COMMUNICATION (FEMALE)	-0.2236219 (0.808)
Group 15	FINANCIAL INTERMEDIATION (FEMALE)	-0.1380083 (0.88)
Group 16	**COMMUNITY, SOCIAL AND PERSONAL SERVICES (FEMALE)**	**2.871128 (0.002)**
Cons	MINING AND QUARRYING (TOTAL EMPLOYMENT)	0.5049788 (0.46)

*significant and procyclical.
Source: Authors' calculation.

APPENDIX–II

Panel Data Model with Lags
(Procyclical Relationship with first lag)

VARIABLES	(1) OLS lnife	(2) FE lnife	(3) RE lnife	(4) AREG Lnife	(5) FE Lnife
L.lnife	1.027***	0.759***	1.025***	0.800***	0.795***
	(0.017)	(0.119)	(0.023)	(0.106)	(0.092)
Lnfe	-0.0544**	0.062	-0.0449*	0.115	0.091
	(0.023)	(0.084)	(0.026)	(0.106)	(0.070)
Lntr		0.142	0.151	0.101	
		(0.113)	(0.119)	(0.109)	
L.lntr	-0.034	-0.182	-0.182	-0.148	-0.0613
	(0.033)	(0.108)	(0.120)	(0.119)	(0.035)
Lndtax		-0.301	-0.407	-0.225	
		(0.206)	(0.274)	(0.180)	
L.lndtax	0.179	0.188	0.204	0.291	0.227
	(0.223)	(0.263)	(0.315)	(0.263)	(0.242)
Lnsgr		-0.0640*	-0.0740**		
		(0.032)	(0.037)		
L.lnsgr	**0.0423**	**0.112****	**0.111*****	**0.0627*****	**0.0649****
	(0.026)	**(0.038)**	**(0.042)**	**(0.017)**	**(0.020)**
L.lnfe				-0.0323	
				(0.117)	
Constant	-0.556	0.66	0.789	-0.0871	-0.637
	(0.742)	(1.271)	(1.419)	(0.801)	(0.855)
Observations	97	83	83	97	97
R-squared	0.993	0.760		0.759	0.752
Number of unit		8	8	8	8

Robust standard errors in parentheses
*** p<0.01, ** p<0.05, * p<0.1
Bold indicates procylical relationship with sectoral growth with one lag.
Source: Authors' calculation.

APPENDIX–III

Dynamic Panel Data Estimates with
Strict Exogeneity Condition and Time Effect

VARIABLES	(1) Arellano-Bond dynamic panel data estimation Lnife	(2) Blundell-Bond linear dynamic panel data estimation Lnife	(3) System dynamic panel data estimation Lnife
L.lnife	0.856***	0.938***	0.970***
	(0.034)	(0.027)	(0.009)
Lnfe	-0.267***	-0.228**	-0.0419
	(0.103)	(0.097)	(0.132)
L.lnfe	0.353***	0.234***	0.0947
	(0.084)	(0.071)	(0.099)
L2.lnfe	0.128	-0.051	-0.0643
	(0.079)	(0.091)	(0.062)
Lntr	0.267***	0.615***	0.472***
	(0.084)	(0.135)	(0.111)
L.lntr	0.0345	0.0797	-0.0736
	(0.076)	(0.121)	(0.081)
L2.lntr	0.173***	-0.0348	-0.263**
	(0.063)	(0.092)	(0.117)
Lndtax	-2.155***	-3.969***	-3.007***
	(0.631)	(1.078)	(0.934)
L.lndtax	-0.345	-3.119**	-3.013**
	(0.878)	(1.479)	(1.414)
L2.lndtax	-2.012***	-3.038***	-1.603**
	(0.412)	(0.847)	(0.694)
Lnsgr	0.00109	-0.0142	-0.0388
	(0.019)	(0.035)	(0.029)
L.lnsgr	**0.0985*** **	**0.103** **	**0.0745** **
	(0.033)	**(0.041)**	**(0.031)**
L2.lnsgr	**0.124*** **	**0.0841*** **	**0.0384*** **
	(0.014)	**(0.012)**	**(0.014)**
yr1996	0.0472	0.108	0.139
	(0.067)	(0.106)	(0.099)
yr1997	-0.0484	-0.112	-0.0184
	(0.084)	(0.120)	(0.094)
yr1998	0.0779	0.00593	0.0459
	(0.071)	(0.128)	(0.078)
yr1999	0.108	0.0963	0.0929
	(0.074)	(0.121)	(0.106)

(Continue)....

APPENDIX–III *(Continued)*

Dynamic panel data estimates with strict exogeneity condition and time effect

VARIABLES	(1) Arellano-Bond dynamic panel data estimation Lnife	(2) Blundell-Bond linear dynamic panel data estimation Lnife	(3) System dynamic panel data estimation Lnife
yr2000	0.0699	0.047	0.0455
	(0.057)	(0.093)	(0.079)
yr2001	0.0141	-0.082	-0.102
	(0.089)	(0.106)	(0.108)
yr2002	-0.0167	-0.0739	-0.0529
	(0.066)	(0.136)	(0.105)
yr2003	-0.0053	-0.0383	-0.044
	(0.071)	(0.109)	(0.098)
yr2004	-0.0381	-0.291***	-0.298**
	(0.059)	(0.067)	(0.127)
yr2005	-0.351***	-0.862***	-0.606***
	(0.120)	(0.200)	(0.213)
yr2006	-0.816***	-1.659***	-1.200***
	(0.209)	(0.345)	(0.359)
yr2007	-0.440**	-1.036***	-0.718*
	(0.178)	(0.296)	(0.371)
yr2008	-0.640***	-0.522	-0.0254
	(0.231)	(0.443)	(0.296)
yr2009	-0.232	0.181	0.248
	(0.286)	(0.391)	(0.280)
yr2010	-0.281	0.0301	0.273
	(0.227)	(0.468)	(0.314)
yr2011	-0.485**	-0.333	0.0325
	(0.224)	(0.404)	(0.266)
yr2012	-0.882***	-0.752	-0.198
	(0.254)	(0.512)	(0.372)
yr2013	-1.257***	-1.260**	-0.448
	(0.266)	(0.548)	(0.417)
Year	0.134***	0.172***	0.0544*
	(0.026)	(0.053)	(0.032)
Constant	-253.8***	-310.2***	-82.39
	(53.82)	(107.80)	(62.53)
Observations	63	77	77
Number of id	8	8	8

Robust standard errors in parentheses. *** p<0.01, ** p<0.05, * p<0.1. Bold indicates procylical relationship after first lag.
Source: Authors' calculation.

APPENDIX–IV

Panel Data Estimation (Women)

Variable	Fixed	Random
Fempm	2.5047683***	2.5762459***
Sgr	-0.01290227	-0.01204245
Tariffrate	0.00374734	0.0037073
Dtax	0.2040465**	0.20993291**
_cons	-4.097423	-4.5767908
N	120	120
r2	0.63614156	
r2_a	0.59908191	
Hausman test	χ 2 (4) = 0.88	
	prob>χ 2= 0.9281	

legend: ** p<0.01, ***p<0.001.

Source: Authors' calculation.