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DURR-E-NAYAB

The middle class is primarily an urban phenomenon generally associated with professional occupations, service sector and salaried jobs. Yet despite a general acceptance of the important economic, political and social role that the middle class plays in society, the term itself remains ambiguous and arbitrary. In much of recent literature the middle class is equated with middle income which does not reflect what 'class' refers to in classical writings. The present paper takes a multidimensional approach to measure the middle class in Pakistan through a weighted composite index that takes into account all possible factors associated with the concept, including income, occupation, education, housing and lifestyle. Using the Pakistan Social and Living Measurement Survey (PSLM) 2007-08, the magnitude of the middle class in the country, as represented by the 'expanded middle class', is estimated at around 35 percent of the total population. The proposed measure of the middle class has a sense of stability attached to it, making it less susceptible to sudden inflationary shocks than an income-based measure.

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INTRODUCTION

'Middle class' is one of the most commonly used terms in social sciences. Despite its frequent use there is, however, no consensus on what the term exactly implies. Short of the context in which it is used, it remains ambiguous. It is viewed as the class that is between, and separates, the lower and the upper classes, that is the rich and the poor, but there is no agreement on the exact boundaries that separate them. Most of the definitions and measurements of the middle class continue to be somewhat arbitrary and vague.

Historically, the concept of 'class' has been there for long but the very recent interest in the middle class has stemmed from the emergence of this class in the Asian economies, especially India and China, which continued to grow even during the global recession. Consumer spending in the developing Asia continued to grow during a period when the developed world was struggling to keep their economies afloat at both the national and household levels. It was an important development, as the middle class has always been deemed critical to a country's socio-economic and political growth and ensuing stability. Hence, not surprisingly, the middle class has held the centre stage in most economic discourses, and depending on the stage of its development and state of the economy, the middle class has been described to be, among other things, 'growing' 'stressed', 'shrinking', 'powerful', 'threatened', 'burgeoning', mobilised', 'rising', or

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'marginalised'. In a world of globalised economies this raises the crucial question, 'who constitutes the middle class'? An Indian school teacher with an annual income of $2,500 is considered middle class but for an American family to earn that title the amount may have to be around $200,000 [Aho (2009)]. An income-based universal definition of middle class would therefore be meaningless.

The concept 'upper, middle and lower' class was mainly developed in sociology in reaction to the more rigid and deterministic Marxist concept of class, yet the concept to be clear and unambiguous needs an appropriate definition. The present paper first briefly describes the different ways of analysing and defining what is meant by class, and then discusses the importance of the middle class and the various means of estimating its size. It suggests a refined measure of estimating the middle class in Pakistan, a measure that captures all possible aspects of the class given in its various definitions. Finally, before concluding, the paper also explores the regional and occupational context of the middle class.

CONCEPT OF CLASS AND THE NOTION OF THE MIDDLE CLASS

As very aptly put by Streans (1979: 377), "The concept 'middle class' is one of the most enigmatic yet frequent in the social sciences". Part of this difficulty can be ascribed to the ambiguity regarding the very concept of class. The classical perspective on the concept of class can be traced back to Karl Marx with his classification based on the relationship to the means of production and Max Weber's categorisation on the basis of wealth, prestige and power.[1] In both Weberian and Marxist traditions there is a rejection of any simplistic gradational definition of class as they link people's social relations to economic resources of various kinds. These schools view social relations as having an impact on the material interests of people that form the foundation of conflict and cohesion in society. Marx and Weber, however, basically differ in their theoretical orientation, reflected in the Marxian notion of exploitation and the Weberian 'life-chances'.

There is a vast body of literature on the concept of class having its roots both in the Marxian and Weberian schools of thought with each arguing about inclusion of certain properties in defining classes. For instance, classes have been defined by position and role [Mosca (1939); Pareto (1963)]; authority relations [Dahrendorf (1959)]; status rank [Warner (1960); Lenski (1966)]; inter-marriage [Schumpeter (1951)]; cross-classification of property and authority [Ossowski (1963); Wright (1979)]; degree of structuration[2] [Giddens (1973)]; and property, employment and authority relations [Goldthorpe (1987), Erikson and Goldthorpe (1992)]. It would not be wrong to state that all these definitions of class in a broad way follow the Marxian and Weberian concept of class pursuing their respective notion of 'exploitation' and 'life-chances'—that is, intra-class conflict leading to 'exploitation' of one by the other, and class as a source of certain qualities and actions resulting in the associated 'life-chances'.

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[1]For a useful summary on both schools of thought read Wright (2003).

[2]Giddens proposed that what humans do is dependent on the pre-existing social structures that are governed by norms. All human actions are restricted by the elements that create the social structures. Giddens believed that structures (traditions, institutions and expectations) are universally steady but could be changed mainly by some unintentional consequences of action, for instance, when people begin to pay no attention to the social norms, replace them, or follow them in a different way.

Wright (2003, pp. 1–3) provides a useful summary of the different underlying themes resulting in the variety of class concepts. He divides these themes in five categories which are as follows:

(1) *Subjective position*—the way people locate themselves and others in a social structure characterised by inequalities.

(2) *Objective position*—distribution of people objectively on a gradational scale of economic inequality, represented mainly by income or wealth. This results in classes such as upper class, middle class, upper middle class, lower class and underclass.

(3) *Relational explanation of economic life chance*—also characterising the Marxian and Weberian schools of thought, it explains inequalities in economic life-chances including standards of living. Based on the relationship of people to income-generating resources or assets, class becomes a relational, rather than a gradational concept.

(4) *Historical variation in systems of inequality*—focussing on the macro-level instead of micro-level, it explains the variation across history in the social organisation of inequalities.

(5) *Foundation of economic oppression and exploitation*—looks into the nature of changes needed to eliminate economic exploitation within societies.

Where, then, in the above-mentioned scheme of things does the middle class fall? In relating it to the means of production, as done by Marx, we can consider the middle class to be falling somewhere in between those who own the means of production (the *bourgeoisie*) and those who must sell their labour for survival (the *proletariat*). A class that came to be referred to as the *petty bourgeoisie*, includes small producers/proprietors, like shopkeepers and small manufacturers. Similarly, in the Weberian notion of class, the middle class can occupy the mid-position on the continuum of wealth, power and prestige. In the *wealth* continuum, the middle class can be represented by individuals who are neither rentiers nor unskilled labourers. On the *power* continuum they can be the people who are not as weak as to carry out the command of others but not as influential to achieve their goals despite opposition. Similarly, they cannot be individuals who receive little respectful treatment nor the ones who are entitled to deferential and respectful treatment. The middle class is, thus, on the middle rung of all Weberian continuums.

Sridharan (2004), while analysing the Indian middle class, believes that the classical approach to the middle class is inadequate for analysing contemporary societies, especially those in the developing world. He argues that for over a century the growth of economies, specifically capitalist ones, has relied on advancements in knowledge and improvements in the regulatory state machinery leading to a growth of white-collar occupations, salaried and self-employed, marked by increasing degree of education. The income of this new group of professionals normally falls somewhere between those of the capitalists (the equivalent to Marxian *bourgeoisie*) and the manual workers (the Marxian *proletariat*), and signify the new middle class. The size and influence of this class has increased with time, affecting the political and ideological aspects of society. Their significance also grows as economies move towards the services sector.

This new middle class, however, is not considered a real class by Wright (1985). He considers it a "contradictory location within class relations" (p. 9). Wright considers this new class of professionals and white-collar workers different from the petty bourgeoisie comprised of small independent producers and shopkeepers. The relative autonomy of this new middle class, especially in the developing countries, distinguishes it from other classes—an autonomy that originates from the possession of skills and say in public affairs. Bradhan (1989, 1994) shares this view and considers professionals, including all white-collar workers, as the "dominant proprietary class" because of the level of human capital manifested in their higher education, technical expertise and possession of scarce skills. The dominant proprietary classes, thus, now comprise industrial capitalists, big farmers and the professionals, both civil and military.

WHAT MAKES MIDDLE CLASS IMPORTANT

The middle class is increasingly considered a precondition of stability in the social structures, a means of mitigating inequalities in a society, and a pathway to growth and development. This idea has gained strength from the events in China and India where the burgeoning middle class is believed to be holding the future of these countries. It may be mentioned here that the importance attributed to the role of the middle class is not a recent phenomenon. For instance, Landes (1989) talks about England's early dominance in terms of the English middle class of the 18th and 19th centuries. More recently, Birdsall, Graham, and Pettinato (2000) consider middle class the backbone of both market economy and democracy in the face of globalisation. Likewise, Easterly (2001) after analysing a large number of countries concluded that nations with a large middle class tend to grow faster, at least in situations of ethnic homogeneity.

"Thus it is manifest that the best political community is formed by citizens of the middle class, and that those states are likely to be well-administered in which the middle class is large ....where the middle class is large, there are least likely to be factions and dissension."

Aristotle 306 BC (quoted in Easterly, 2001:1)

The above-stated stabilising role of the middle class originates from the buffer role it seems to play between the polar tendencies of the lower and upper classes. Easterly (2001), for instance, shows that a higher share of income for the middle class is linked with higher growth, more education, better health and less political instability and poverty in a society. These qualities make a decline in the middle class a potential threat to economic growth and political stability. Esteban and Ray (1999), for example, show an occurrence of more frequent societal conflict in the presence of a weaker middle class.

The middle class is increasingly seen as a group gaining political influence that can be associated with the progressively larger role they are playing in the public and services sectors. The middle class is also linked with the nature of government a country has, as shown by Moore (1966) in his classical work associating democracy with the middle class. This idea is supported by Collier (1999) when he studies various democracies finding the middle class to have allied with the lower classes to push for an inclusive political system. On the contrary, however, he also found instances where the middle class formed an alliance with the upper class putting up with a restricted democracy or even a dictatorship. A similar relationship was also found by Leventouglu

(2003) when he observed an ambivalent behaviour of the middle class during political transition. Depending on the situation, the middle class could act as an agent of change or work for maintaining the status quo. If the middle class believed that their children would retain their middle class status then they would not resent semi-democracy or even encourage an autocracy to block any redistribution. On the other hand, if the middle class is not guaranteed their status they would strengthen the lower class so as to push for redistribution under democracy. This ambivalent behaviour makes the role of the middle class even more politically important, and as pointed out by Acemoglu and Robinson (2003, p. 8-1) the "decisive voters in democracy are often from the middle class".

All other roles of the middle class granted, including those discussed above, the most significant is the one that links it with the growth and development of economy. Banerjee and Duflo (2007) provide a useful summary of the relationship between the middle class and economy. Theorising back to Weber and using a vast body of literature, they delineate three reasons for considering the middle class vital for economies. These include:

(1) New entrepreneurs emerge from the middle class who create employment and opportunity of growth for the rest of society.

(2) The middle class with its strong values stresses on the accumulation of human capital and savings.

(3) The middle class consumer is willing to pay a little extra for quality, thus, encouraging investment in better quality production and competitive marketing, which spurs higher level of production and leads to increasing income for everyone.

All these aforementioned factors make the middle class vital for any economy. There are, however, words of caution. Singh (2005) and Basu (2003) while commenting on the middle class consumption pattern warn that although consumer spending enhances aggregate demand and stimulates the economy in the short run, it does not necessarily translate into higher sustainable growth. They also voice concern about the sustainability of these high levels of consumption, and the depressing effect they have on savings, and hence consequentially on investment.

MEASURING THE MIDDLE CLASS

After studying the middle class in various countries, Stearns concluded, "Recent theory does not even include a satisfactory statement on the size of the middle class, caught as it is between the dazzling power above and massive numbers below" (1979: 378). The desire to statistically measure socio-economic phenomenon, like the middle class, believes Cole (1950), originates from the success of such exercises in natural sciences. The task of quantification, however, is much tougher in social sciences due to the complexity and variability of social realities. Unlike facts in natural sciences, with their universal applicability, social realities dealt with by social sciences cannot be generalised even at the micro level, leave alone universally. Despite this handicap extensive literature can be found studying the middle class not just theoretically but empirically as well.

For the identification and measurement of the middle class, mainly two methods are used to define who is included, and who is not, in the middle class. One way to do it is in relative terms and the other one is the absolute way. The second issue is the premise of inclusion, be it in

relative or absolute terms. The most commonly used dimension is purely economic in nature as it bases the rationale of inclusion, or exclusion, in the middle class solely on personal income or expenditure. There is however criticism on this over reliance on income and for ignoring other factors, like occupation, wealth and labour market relations [Goldthorpe (2010)].

If we look at the various ways of quantifying the middle class, as presented in Table 1, we find that most of the definitions are absolute in nature using purely economic rationale for inclusion in the middle class. The definitions use intervals of income values, with lower and upper limits, to measure the middle class or define it by using different median values of income. Apart from having different upper and lower bounds, there is no major difference in the approach and rationale used behind these various definitions, as we can see from Table 1. But despite this lack of difference, varying upper and lower bounds have serious implications for the estimates they give for the size of the middle class in any country. This variance in estimates would be seen in the discussion to follow when all these definitions are applied to measure the size of the middle class in Pakistan.

Table 1

Selected Definitions and Methods of Measuring the Middle Class

No.	Author	Approach	Rationale/ Criteria	Definition
1.	Thurow (1987); Birdsall, Graham and Pettinato (2000)	Relative	Economic/ Income	75% to 125% of the median income
2.	Easterly (2001)	Relative	Economic/ Expenditure	Expenditure quintiles two to four
3.	Milanovic and Yitzaki (2002)	Absolute	Economic/ Income	Income of PPP $12-$50/day/person
4.	Ravallion (2010)	Absolute	Economic/ Expenditure	Expenditure of PPP $2-$13/ person/day
5.	Birdsall (2010)	Absolute	Economic/ Income	Income of PPP $10/ person/day but not in the top 5%
6.	Acs and Loprest (2005)	Absolute	Economic/ Income	Double the Poverty Line of PPP $2/person/day
7.	Wheary (2005)	Absolute	Economic/ Income	Double the national poverty line
8.	Nehru (2010), Yuan, *et al.* (2011)	Absolute	Economic/ Income	Income from PPP $2 to $20/person/day
9.	Banerjee and Duflo (2007)	Absolute	Economic/ Expenditure	Expenditure of PPP $2-$10/person/day
10.	Peichl, Shaefer and Schneider (2008)	Relative	Economic/ Income	Double the median income
11.	Brezenski (2010)	Relative	Economic/ Income	Three times the median income
12.	McKinsy (2010)	Absolute	Economic/ Income	Annual household income between PPP $13,500 to $113,000
13.	ADB (2010); Bhandari (2010); Chun (2010)	Absolute	Economic/ Income	Expenditure from $2 to $20/person/day
14.	Gilbert (2003)[1]	Relative	Economic/ Income and Occupation	Gradation based on income and nature of occupation
15.	Goldthorpe (1992)	Relative/ absolute	Economic/ Occupation	Three main clusters—the service class, the intermediate class, and the working class

Source: Found in References.

Note: PPP- Purchasing Power Parity.

   [1]See Figure A-1 in the Annex for details.

It would not be wrong to re-emphasise here the arbitrary nature of, and the lack of consensus on, the different ways of measuring the middle class. As is evident from Table 1, there is an absence of agreement on the upper and the lower limits demarcating the boundaries for the middle class in the total population, and thus separating it from lower and the upper classes.

ESTIMATING THE MIDDLE CLASS IN PAKISTAN

This brings us to the question, "How big is the middle class in Pakistan"? Using the Pakistan Social and Living Measurement Survey (PSLM),[3] conducted in 2007-08, the paper measures the magnitude of the middle class by the definitions given above in Table 1. It may be mentioned here that it is a household, and not an individual, that by all these definitions is categorised as the middle class. Depending on the definition applied, it is found that the size of the middle class ranges drastically in the country, as can be seen from Table 2. Applying the definitions having solely an economic rationale, we find the middle class to range from 60 percent of the population (Table 2, Definition One) to being totally non-existent (Table 2, Definition Five). Translating it in number of people, using the population base of 187 million as it stands on mid-year 2011 (USCB, 2011 and UN, 2009), the size of the middle class ranges from a huge 112 million to none. This variability, as stressed earlier, reflects the complexities and arbitrariness associated with defining and measuring the middle class.

Among all the definitions given above, Definition Eight and Definition Thirteen, based on gradation of income and expenditure per person per day, respectively, are currently the most extensively used measure employed to estimate the middle class (as also used by Chun (2010) and Bhandari (2010) among others).[4] This definition too, however, suffers from the same drawback of relying solely on one criterion. As also pointed out by Eisenhauer (2008), Atkinson and Bourguignon (1982), Kolm (1977), Bourguignon and Chakravarty (2003) and Gilbert (2003), being a part of the middle class should be ascertained by a person's socio-economic attributes holistically. Income is an important aspect but other qualities like level of health, wealth, education and specialised knowledge are also significant factors for constituting a class.

Technically speaking too, most of the definitions suffer from serious drawbacks. For instance, the 'quintile approach' can be useful in measuring or comparing income or expenditure growth but cannot be used as a method to estimate the middle class as the size cannot shrink or expand and by definition would permanently remain at 60 percent. Any denomination of the median income should also be used with caution in low income countries like Pakistan. Taking 75 percent of the median income might lead to the inclusion of people below the poverty line in countries with very low income levels.

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[3]The Pakistan Social and Living Standard Measurement (PSLM) survey is a nationally representative survey conducted annually by the Federal Bureau of Statistics (FBS). It was used for this study as it covers all the areas that were needed to be included in the composite index formulated to measure the middle class in the country, namely: education; income; occupation; housing; and possession of household durables that were to be included in the lifestyle sub-index. The PSLM 2007-2008 included 15512 households from 1113 urban and rural Primary Sampling Units (PSU).

[4]These definitions have been used to estimate the much-quoted Indian middle class to be as big as 250 million. Pakistan's around 80 million compares well with its neighbour's middle class.

Table 2

Estimation of the Middle Class in Pakistan by Various Existing Definitions

Class	Size of Classes by Definition Used (%)	
	Proportion (%)	Middle Class in Number (in millions)[1]
Definition One: 75% -125% of the Median income		
Lower	32.8	
Middle	**29.5**	**55.2**
Upper	37.7	
Definition Two: Quintile approach		
Lower	20.0	
Middle	**60.0**	**112.2**
Upper	20.0	
Definition Three: Income of PPP $12- $50 per person per day		
Lower	98.1	
Middle	**1.8**	**3.4**
Upper	0.1	
Definition Four: Expenditure of PPP $2- $13 per person per day		
Lower	56.1	
Middle	**42.9**	**80.2**
Upper	1.0	
Definition Five: Income of PPP $10 per person per day but not in the Top 5%		
Lower	97.3	
Middle	**0.0**	**0.0**
Upper	2.7	
Definition Six: Double the poverty line of PPP $2 per person per day		
Lower	87.3	
Middle + Upper	**12.7**	**23.7**
Definition Seven: Double the national poverty line		
Lower	80.7	
Middle + Upper	**19.3**	**36.1**
Definition Eight: Income from PPP $2 to $20 per person per day		
Lower Lower (< $1.25)	30.1	
Lower (<$1.25- $2)	28.2	
Lower Middle ($2-$4)	**28.5**	
Middle Middle ($4-$10)	**10.5**	**76.7**
Upper Middle ($10-$20)	**2.0**	
Upper (>$20)	0.8	
Definition Nine: Expenditure of PPP $2- $10 per person per day		
Lower	56.1	
Middle	**42.2**	**78.9**
Upper	1.7	
Definition Ten: Double the median income		
Below	83.5	**30.9**
Above	**16.5**	
Definition Eleven: Three times the median income		
Below	92.1	
Above	**7.9**	**14.8**
Definition Twelve: Annual HH income between PPP $13,500 to 113,000		
Lower	93.9	
Middle	**6.1**	**11.4**
Upper	0.1	
Definition Thirteen: Expenditure from PPP $2 to $20 per person per day		
Lower Lower (< $1.25)	21.3	
Lower ($ 1.25- $2)	34.8	
Lower Middle ($2-$4)	**32.4**	
Middle Middle ($4-$10)	**9.8**	**81.3**
Upper Middle ($10-$20)	**1.3**	
Upper (>$20)	0.4	

Source: Calculations based on PSLM 2007-2008.

Note: [1]Estimation of the approximate size in numbers is based on using the mid-year population of 187 million in the year 2011. Following these definitions, the size of the middle class in Pakistan has shown a growing trend (see A-9) so applying the 2007-2008 estimates to 2011 population can give an under-estimation/minimum size but not an over-estimation.

[2]Using PPP (Purchasing Power Parity) of US$1= Pak Rs 24.47 in 2008.

In the above-stated definitions and resulting estimates there are issues with the lower bounds set for inclusion in the middle class. While some of the definitions (like Definition Three and Five) set the limit too high,[5] resulting in a very small middle class or in the absence of a middle class altogether, there are other definitions that set the limit too low, like those that set the lower bound at $2 per person per day. Does the middle class begin where poverty ends? Ravallion (2010: 446) supports, "the premise that middle class living standards begin when poverty ends". This paper, however, supports the argument forwarded by Horrigan and Haugen (1988:5) when they posit, "to ensure that the lower endpoint of the middle class represents an income significantly above the poverty line". The middle class should, hence, include only those households that do not face the risk of experiencing poverty at all, and are not just those who are outside the realm of poverty at a particular time.

As also pointed out by Tilkidjiev (1998), it is not sufficient to be wealthy to be in the middle class, this paper also premises that 'middle income' should not be considered 'middle class'. The middle class has a multidimensionality attached to it and any useful measure should attempt to capture it. The middle class has certain intellectual, political and social connotations, along with economic ones, that differentiate it from the middle-income. While middle-income is purely an economic term, the middle class falls more in the sociological domain. The concept of class has many dimensions, including the economic, like wealth, income and occupation; political, including status and power; and cultural, such as values, beliefs, lifestyle, and education.

A REFINED MEASURE PROPOSED TO ESTIMATE THE MIDDLE CLASS IN PAKISTAN

Taking all the aforementioned factors into consideration, a refined measure of estimating the middle class is proposed using a *weighted composite index*. The suggested measure is a combination of relative and absolute approaches applied to estimate the middle class, and the rationale is not solely economic but a collection of various socio-economic factors. After the formation of the sub-indices, the Principle Component Analysis (PCA) was carried out to calculate the weights given to each component of the composite index. The calculation of these sub-indices followed an absolute approach, while the final gradation of the resulting composite index into different classes was done with a relative approach.

The suggested components of this *composite index*, their rationale and the method used to measure them are as follows:

(1) *Educational Index*: In today's world, college education is the minimum for any individual to succeed [Wheary (2005)]. With its low literacy levels, the presence of even one person with college education (completed or currently in college) in a household qualifies it to be categorised as middle class.

Quantification of the index: at least one individual in the household with college education= 1, no one in the house has college education = 0.

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[5]The much talked about Indian middle class also disappears following this definition, indicating the futility of applying it to the developing economies.

(2) *Income Index*:[6] Instead of using any upper and lower bounds or any percentage of median income, due to the shortcomings stated above, a household income of double the poverty line definition is used to form the Income Index. Being twice as much away from the poverty line, these households are believed to be facing minimised risk of poverty. The national poverty line was used for this purpose by inflating the officially accepted available poverty line to the year 2007-2008, which came up to Rs 1084.20 per person per month.

Quantification of the index: Households income is more than double the poverty line (i.e., number of persons in the household x double the poverty line per person) = 1, household income below double the poverty line= 0.

(3) *Housing Index*: Possession of a house is vital for the middle class status [Brandolini (2010), Banerjee and Duflo (2007), Wheary (2005)]. Considering most of the houses in Pakistan are self-owned, in order to differentiate between the classes, the housing index was disaggregated into ownership, persons per room, and availability of water, gas and electricity in the house.

Quantification of the index: (i) ownership of the house = 0.3, otherwise = 0 (ii) number of persons per room—1 = 0.4, 2 = 0.3, 3 = 0.2, 4 = 0.1, >4 = 0 (iii) availability of electricity = 0.1, otherwise = 0 (iv) availability of tapped water in the house = 0.1, otherwise = 0 (v) availability of gas = 0.1, otherwise = 0. All the sub-components adding to a maximum of 1 and a minimum of 0.

(4) *Lifestyle Index*: The middle class is associated with a certain lifestyle associated with expenditure on consumer durables—one of the primary reasons for considering the class a boon for the economy. These consumer durables also form part of the movable assets possessed by the household. The PSLM asks the households about the ownership of twenty-three consumer items and this index includes all of them.[7]

Quantification of the index: Each item owned = .0435. All the sub-components adding to a maximum of 1 and a minimum of 0.

(5) *Occupation Index*: After income, occupation is considered as the most important factor affecting any individual's or household's class categorisation. Occupations were divided into two categories in this index, namely, manual occupations and non-manual occupations. A drift away from manual occupations is deemed imperative to be in the middle class in a vast body of literature, including Brandolini (2010), Gigliarano and Mosler (2009), Beteille (2001), Grant (1983) and Cole (1950).

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[6]*Income Index* was created instead of an *Asset Index*, which by some is considered a better indicator of security against vulnerability [Sorenson (2000); Brandolini, Magri, and Smeeding (2010); and Bradhan (1989)], because of the nature of the topic understudy and inclusion of some of the asset variables in other indices. For instance: ownership of house was part of the Housing Index; possession of movable-durable assets was included in the Lifestyle Index; and non-material assets, like higher education, was a part of the Education Index.

[7]The consumer durables included in the PSLM include: refrigerator, freezer, air cooler, fan, geyser, washing machine, camera, microwave, cooking range/stove, heater, bicycle, car/vehicle, motorbike/scooter, TV, cassette player/radio, VCR, vacuum cleaner and sewing/knitting machine.

Using the detailed Pakistan Standard Classification of Occupations typology, as used in the PSLM, occupations were classified as being manual or non-manual. These two categories could be equated to the traditionally used terms of white collar and blue collar works, respectively. White collar occupations refer to office/desk work like the ones performed by those involved in professional, administrative and managerial jobs. Blue collar occupations, on the other hand, are those where the workers do manual jobs like those carried out by labourers in mining, construction or agriculture or the ones who operate/assemble any machine.

Quantification of the index: If the occupation of the head of the household or the person earning the most in the household is non-manual = 1, otherwise= 0.

The sub-indices, comprising the composite index, were then weighted through the PCA method and their scores were added up to give the total score for the households. The households were then categorised into seven classes based on their total scores on the index. Excluding the top 10 percent of the population (0.5 points on the composite index, in a maximum total score of 5.0) the remaining index score was divided into six equal classes (of 0.75 points each) to avoid arbitrariness, giving us the following class composition in the population:

(i)	Lower lower class	(LLC)	< 0.75
(ii)	Middle lower class	(MLC)	0.75- 1.5
(iii)	Upper lower class	(ULC)	1.5-2.25
(iv)	Lower middle class	(LMC)	2.25-3.0
(v)	Middle middle class	(MMC)	3.0- 3.75
(vi)	Upper middle class	(UMC)	3.75- 4.5
(vii)	Upper class	(UC)	> 4.5

Table 3 presents the weights assigned to each of the sub-index and the mean score achieved by the different classes on each index, and in total. The table presents an interesting trend with the 'Lifestyle Index', based on a household's possession of consumer durables carrying the maximum weight, followed by indices of income, education, housing and occupation. Is lifestyle the most distinctive factor in class differentiation? The answer would probably be in the affirmative if we look at the factors differentiating the UMC and UC, where the main difference between the two is for the Lifestyle Index. In this regard, it is also worth noting that housing and lifestyle indices are the ones that carry scores even for the lowest of classes, even when they score poorly on the income, occupation and education indices (see Table 3). As expected, as we go up the classes, households begin to score on all indices.[8] The upper middle class is almost similar to the upper class, as can be seen from the similar mean scores on the indices for income, education and occupation. The differences in the lifestyle and housing indices, however, separate the top two classes, as can be seen in Table 3.

[8]See Figure A-2 in the Annexure for the graphic representation of the composite index, and its components, for each class. See also Figure A-3 for the percentage share of each component index in a particular class's total score on the composite index. Interesting to see in the latter graph is the appearance, and increasing size, of indices, as opposed to a few indices having a major share.

Table 3

Estimation of Middle Class through a Weighted Composite Index

Classes	Indices					
	Income	Education	Housing	Occupation	Lifestyle	Total
Weights applied to each Index[1]						
	1.050	1.005	0.955	0.865	1.125	5.000
Mean total for each Index[1]						
Lower Lower	0.000	0.000	0.267	0.000	0.186	0.453
Middle Lower	0.016	0.014	0.462	0.336	0.268	1.097
Upper Lower	0.329	0.140	0.526	0.483	0.324	1.802
Lower Middle	0.554	0.528	0.496	0.720	0.364	2.662
Middle Middle	0.941	0.564	0.661	0.683	0.451	3.301
Upper Middle	1.050	1.004	0.682	0.862	0.494	4.092
Upper	1.050	1.005	0.870	0.865	0.802	4.592
Total	0.211	0.159	0.417	0.300	0.275	1.361

Source: Calculated from PSLM 2007-2008.

Note: [1]In order to avoid too many decimals for ease in comprehension, the weights were multiplied by 5 to form the composite index score. The weights used for the various indices as calculated by PCA are: Income 0.210; Education 0.201; Housing 0.191; Occupation 0.173; Lifestyle 0.225; and Total 1.00. The procedure does not in any way affect the classification of the sample.

Class structure as calculated by the composite weighted index shows that a large majority of the people in Pakistan falls in the lower classes, be it lower lower class (LLC), middle lower class (MLC) or upper lower class (ULC), as can be seen from Table 4. This trend is mainly due to the rural areas that are predominantly concentrated in the lower classes. A moderate proportion (33 percent) in the urban areas, however, can be categorised as belonging to the middle class (LMC, MMC and UMC put together). The biggest class, nevertheless, remains the LLC be it the urban or the rural areas (Table 4), and because of the very low index score it would not be inappropriate to label this category as 'deprived'. If we look at the index scores of the MLC, which is the second largest class, in Table 3, we find the households to be scoring on all sub-indices, unlike the LLC. These households can be considered the 'aspirants' for upward mobility. The next class, ULC, shows a marked improvement on all sub-indices (Table 3) and can rightfully be called a class of 'potential climbers'. If we look at their total index score, they are found to have crossed the mean score of the sample (1.36) with a score of 1.8 (see Table 3), and with a little arbitrariness in demarcating the class boundaries can be a part of the middle class.

Table 4

Size of Different Classes through a Weighted Composite Index in Pakistan

Class	Categorisation for Middle Class[1]	Proportion (%)			Numbers (in Millions)[2]		
		Total	Urban	Rural	Total	Urban	Rural
Lower Lower (LLC)	*Deprived*	41.9	23.6	55.2	83.7	20.1	63.6
Middle Lower (MLC)	*Aspirants*	23.0	21.8	23.9	41.9	16.4	25.6
Upper Lower (ULC)	*Potential Climbers*	15.8	20.8	12.3	28.5	15.9	12.6
Lower Middle (LMC)	*Fledgling middle class*	8.5	12.5	5.7	16.3	9.4	6.8
Middle Middle (MMC)	*Hard-core middle class*	4.3	8.1	1.6	6.7	5.2	1.5
Upper Middle (UMC)	*Elite middle class*	6.0	12.3	1.3	9.5	8.0	1.5
Upper (UC)	*Privileged*	0.4	0.9	0.1	0.6	0.6	0.0*
Total		100.0	100.0	100.0	187.2	75.6	111.6

Source: Calculated from PSLM 2007-2008.
Note: [1]Categories adapted from Sridharan (2004) and Tharoor (2010).
  [2]For the method employed to calculate these numbers see A-5.
  *Signifies value less than 0.1.

The middle class, as observed earlier, seems to be more of an urban phenomenon (Table 4) which is not surprising in the light of the poor literacy levels and the large association with manual jobs in the rural areas. Even in cases where the households score well on the income and housing indices, their scores go down because they perform badly on the education and occupation indices. Among the middle classes the LMC, termed as the 'Fledgling Middle Class', constitutes the largest share in both the urban and the rural areas (Table 4). In the urban areas, however, the size of the 'Elite Middle Class', that is the UMC, is bigger than the 'Hardcore Middle Class' (MMC)—a pattern not found in the rural areas. As expected, the size of the UC is small, being even smaller in the rural areas than the urban.

Sridharan (2004) advocates the inclusion of ULC and UC while demarcating the boundaries for what he refers to as the 'Broadest Middle Class'. Considering the stringent measurement method suggested to estimate the middle class in this paper, it makes sense to include at least the ULC in what is referred to as the 'Expanded Middle Class' here (see Table 5). This becomes even more logical for the reason stated above regarding the ULC having a composite index score crossing the midline. Using the 'Strict Middle Class' category, the middle class is found to be comprising one-fifth of the country, a proportion that increases to one-third if we take into account only the urban areas. Adding the 'Potential Climbers' to this estimate boosts the proportion of those in the middle class to 35 percent, swelling the urban middle class size to over half the population (54 percent), as can be seen from Table 5. The 'Broadest Middle Class' shows only a marginal increase in the share of the middle class in the total population as those in the 'Privileged' class comprise a very small proportion (Table 4).

Table 5

Size of the Middle Class in Pakistan Using a Weighted Composite Index

	Proportion (%)			Numbers (in Millions)[2]		
	Total	Urban	Rural	Total	Urban	Rural
Strict Middle Class						
(LMC + MMC + UMC)	18.8	32.9	8.6	32.5	22.6	9.8
Expanded Middle Class[1]						
(LMC + MMC+ UMC + ULC)	**34.6**	**53.7**	**20.9**	**61.0**	**38.5**	**22.4**
Broadest Middle Class[1]						
(ULC + LMC + MMC + UMC + UC)	35.0	54.6	21.0	61.6	39.1	22.4

Source: Calculated from PSLM 2007-2008.

Note: [1]As categorised by Sridharan (2004).

　　　[2]For the method employed to calculate these numbers see A-5.

Numbers are easier to comprehend than proportions. Hence, if we look at the numbers constituting the middle class in Pakistan we find the numbers to increase from 34 million (Strict Middle Class) to over 61 million (Broadest Middle Class) by widening its scope (Table 5).The middle class being more urban centric, as we saw in Table 4, amounts to nearly 39 million people if we go by the measure provided by the 'Broadest Middle Class' definition in Table 5. The present paper, however, prefers to subscribe to the 'Expanded Middle Class' estimate as representing the middle class in Pakistan. The UC has its peculiar characteristics and position in any society and should not be grouped with other classes. On the other hand, inclusion of the 'Potential Climbers' in the 'expanded middle class' is rationalised on the basis of closeness between the two classes. It is from this class that the households make the transition from having a deficit budget to a surplus one, a characteristic deemed essential by many [including, Brandolini (2010); Birdsall, Graham, and Pettinato (2000); Andersen (1992)] to be classified as the middle class.[9] The size of the middle class in Pakistan, using the 'Expanded Middle Class' categorisation, comes up to a substantial 61 million people.

It would be of interest to note how the size of the middle class estimated through the composite index compares with the most common prevailing method of measuring it. This is based on the gradation of the household's per person per day expenditure (Definition Thirteen in Table 2). As opposed to the latter, the composite index shows a much larger LLC and MLC, as can be seen in Figure 1. The only other class comparatively larger in the composite index is that of the UMC. The size of the UC, interestingly, remains the same in both the measures at a low 0.4 percent. Despite giving an estimate for the middle class that is much bigger and hence more attractive, this paper argues that measuring the middle class only on the basis of expenditure or income is insufficient as it does not encompass all the factors that contribute towards making a household a 'middle class household'. It is also premised that 'class' is quite a permanent category which cannot be affected by the mere fluctuation of income or expenditure. We would not go to the extreme of subscribing to the notion that 'class is permanent', as class mobility does and should take place, but it is not as impermanent to be altered by fickle changes in income or expenditure.

　　[9]For the graphic representation of households' income, expenditure and the balance between two see A-4. As can be seen from the graph, the 'Deprived' and the 'Aspirants' have a deficit budget and the trend reverses for the 'Potential Climbers', justifying the inclusion of the latter in the 'Expanded Middle Class'.

Fig. 1. Comparison of the Size of the Classes as Estimated by the Weighted Composite Index and the Prevailing Measure[1]
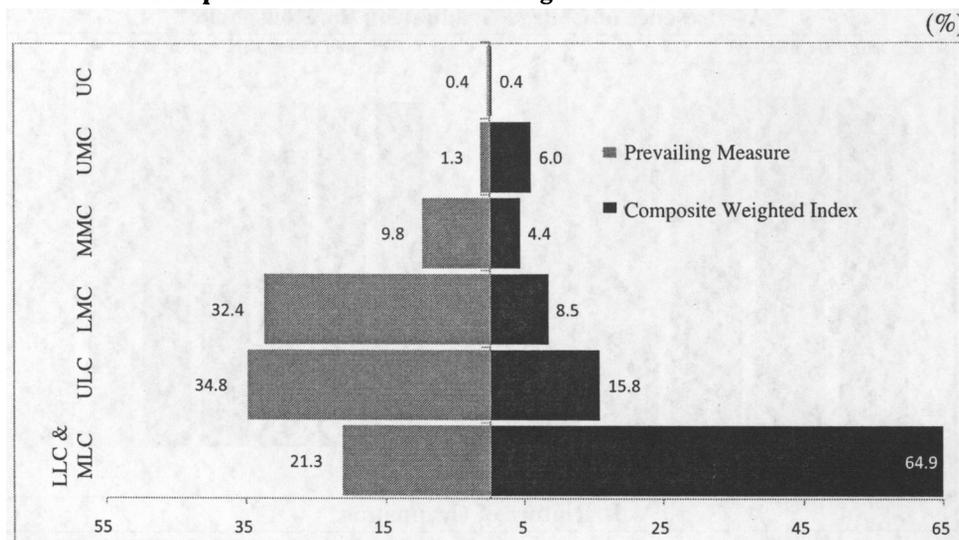
Source: Calculated from PSLM 2007-2008.
Note: [1]Definition Thirteen in Table 2.
    [2]Classes: Lower lower (LLC), Middle lower (MLC), Upper lower (ULC), Lower middle (LMC), Middle middle (MMC), Upper middle (UMC), Upper (UC).

Can we consider a household with only manual workers or with no individual having college education but having over PPP $2 per person per day income middle class in today's world? Following how the middle class is generally perceived, the answer in all probability would be in the negative. Figure 2 presents the comparison between the two measures, the composite index and the prevailing definition, on the nature of occupation and presence of a college graduate in the households belonging to different classes. The estimate through the weighted composite index appears more appropriate with those in the 'elite middle class' and the 'privileged class' being employed solely in non-manual occupations (Figure 2-Bii) and having at least one college graduate (Figure 2-Aii) in the household. On the contrary, the prevailing definition shows a substantial proportion doing manual jobs (Figure 2-Bi) and having no college graduate (Figure 2-Bi) in the household, something that cannot be associated with the middle class nowadays. Such a trend is, however, expected when only income or expenditure form the basis of the classification.

For the sake of comparison, it would have been an interesting exercise to apply the proposed methodology to estimate the size of the middle class to other countries in the region as well. Lack of access to household level data in these countries, however, hampered this effort at present. Nevertheless, if we compare the size of the middle class in the South Asian region, estimated by various current studies using the prevailing definition based on expenditure levels (Definition Thirteen in Table 1), we find the size of the middle class to be the largest in Pakistan with the exception of Sri Lanka (see A-9). In a comparable year of 2004-05, the size of the middle class in Pakistan was 40 percent of the total population while that of India was 25 percent (see A-9).

Figure 2: Nature of Occupation and Level of Education by Classes through the Weighted Composite Index and the Prevailing Definition[2]

A. **Presence of College Graduate in the Household**

(i) *Existing Definition*   (ii) *Weighted Composite Index*

B. **Nature of Occupation**

(i) *Existing Definition*   (ii) *Weighted Composite Index*
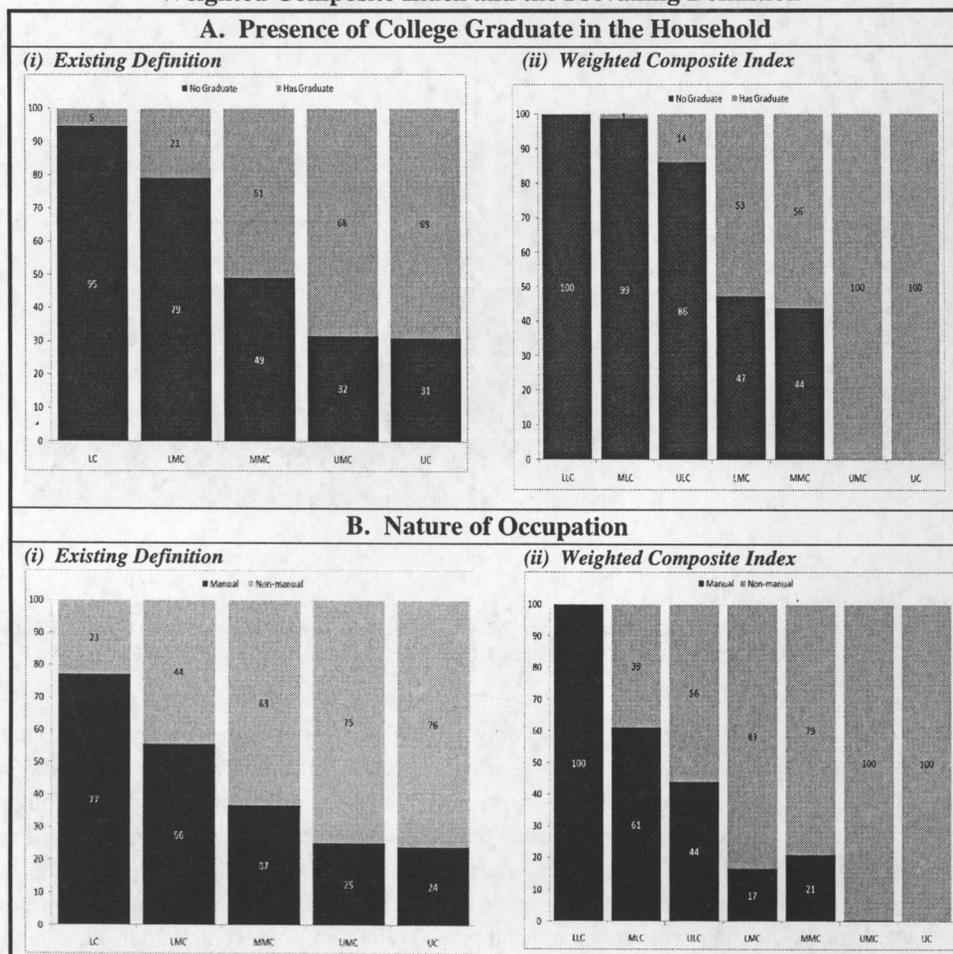
Source: Calculated from PSLM 2007-2008.

*Note:* [1]Classes: Lower lower (LLC), Middle lower (MLC), Upper lower (ULC), Lower middle (LMC), Middle middle (MMC), Upper middle (UMC), Upper (UC).

[2]Definition Thirteen in Table 2.

WHERE IS THE MIDDLE CLASS PRESENT IN PAKISTAN? REGION AND OCCUPATION

Once the middle class has been identified, it is of interest to see where those belonging to this class are present, geographically and sectorally. The provinces of Punjab and Sindh, having over 36 percent middle class households, fare better than the provinces of Khyber Pakhtunkhwa (KP) and Balochistan that marginally lag behind at 32 and 28 percent, respectively (see Table 6).[10] When we look at the regional comparisons, we observe the national level pattern to be replicated at the provincial level as well. The

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[10]The share of households covered in the PSLM sample from the province of Punjab, Sindh, Khyber Pakhtunkhwa and Balochistan is 44 percent, 23 percent, 19 percent and 14 percent, respectively.

size of the middle class is estimated to be much bigger in the urban areas as compared to the rural areas in all four provinces (Table 6), strengthening the argument that the middle class is more of an urban phenomenon. If we look at the inter-provincial differences, we find the size of the middle class to be positively associated with the proportion of the urban population in that province. The province of Sindh has the highest proportion of urban population and that of the middle class (56 percent) in the urban areas as well, as can be seen in Table 6. The provinces of Punjab, Balochistan and KPK have progressively smaller share of the population living in the urban areas and the size of their middle class reflects it through the estimated measures for the class at 55 percent, 50 percent and 49 percent, respectively. Although not having a one to one correspondence, an increasing urban concentration seems to aid the increase in the size of the middle class. On the contrary, the size of the middle class in the rural areas in all four provinces, as shown in Table 6, is much smaller than their urban counterparts.

Table 6

Regional and Provincial Classes Estimated by the Weighted Composite Index

(%)

Class	Punjab			Sindh			Khyber Pakhtunkhwa			Balochistan		
	Total	Urban	Rural	Total	Urban	Rural	Total	Urban	Rural	Total	Urban	Rural
Lower Lower	38.6	21.2	51.6	45.0	24.7	64.3	41.4	26.4	50.3	47.8	26.1	59.9
Middle Lower	23.7	22.4	24.7	18.4	18.4	18.2	26.5	24.3	27.9	23.3	23.2	23.4
Upper Lower	17.1	20.6	14.5	14.2	20.6	8.1	15.3	20.4	12.2	15.3	22.1	11.5
Lower Middle	8.4	12.6	5.3	9.7	12.3	7.2	8.6	12.2	6.5	6.8	12.6	3.6
Middle Middle	4.9	8.9	1.8	5.3	9.3	1.4	3.0	5.5	1.4	3.0	6.2	1.2
Upper Middle	6.5	12.8	1.9	7.2	14.1	.6	4.9	10.6	1.6	3.6	9.4	0.4
Upper	0.7	1.4	0.1	0.3	0.6	0.1	0.2	0.6	0.1	0.1	0.4	0.0
Total	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0
	Size of Middle Class[1]											(%)
	36.9	54.9	23.5	36.4	56.3	17.1	31.8	48.7	21.7	28.7	50.3	16.7

Source: Calculated from PSLM 2007-2008.

Note: [1]Based on the 'Expanded Middle Class'.

Any discussion on class is incomplete without investigating the relationship between class and occupation, as also stressed by Banerjee and Duflo (2007), Goldthorpe and McKnight (2006), Wright (1997), Erikson and Goldthorpe (1992). If we look at the nature of occupations within each of the estimated classes, we see that the LLC comprises mostly occupations like agriculture and fisheries, crafts and related trades, plant and machine operators and assemblers and other elementary occupations, as can be seen in Table 7. From the ULC onwards the occupational distribution exhibits a larger spread that tapers again for the highest two classes, the UMC and UC, which are confined to occupations like the armed forces, legislators, senior officials and managers, professionals, technicians and associate professionals, clerks and service and sales workers (Table 7). Thus, as we go up the class ladder the occupational share shifts from manual to non-manual jobs, which to some is the very essence of the middle class.[11]

[11]To find how class distribution varies by different occupations see Table A-6 in the Annexure. The share of the middle class, specifically the 'elite middle class', is much higher among professionals, legislators, senior officials and managers. Elementary occupations and those related to agriculture and crafts are dominated by the lower classes, with none of them making to the upper class. It is, however, worth noting to find a substantial proportion (25 percent altogether) of the professionals to be there in the lower classes. On further declassification of occupations it was found that majority of these 'professionals' were working as teachers, indicating the low remunerations to those working in the education sector in the country. Not surprisingly, the UC is almost confined to the armed forces, professionals, legislators, senior officials and managers.

Table 7

Occupational Distribution within Classes by Weighted Composite Index[1]

(%)

Occupation	Classes through Weighted Index						
	Lower Lower	Middle Lower	Upper Lower	Lower Middle	Middle Middle	Upper Middle	Upper
Armed Forces	0.0	0.8	0.7	1.1	0.6	1.3	3.2
Legislators, Senior Officials and Managers	0.0	0.3	0.9	2.9	8.2	20.7	30.6
Professionals	0.0	2.9	4.6	18.3	15.7	26.4	37.1
Technicians and Associate Professionals	0.0	7.0	10.0	19.3	14.2	21.3	9.7
Clerks	0.0	3.6	7.6	14.5	11.8	12.9	1.6
Service Workers and Shop/ Market Sales Workers	0.0	31.0	34.1	30.0	28.9	17.1	17.7
Agriculture and Fishery Workers	33.2	17.0	14.9	5.9	8.6	0.1	0.0
Crafts and Related Trade Workers	9.0	8.5	8.5	2.6	5.0	0.0	0.0
Plant and Machine Operators and Assemblers	11.9	9.2	7.1	2.1	3.1	0.0	0.0
Elementary Occupations	45.9	19.6	11.7	3.3	3.9	0.0	0.0
Total	100.0	100.0	100.0	100.0	100.0	100.0	100.0

Source: Calculated from PSLM 2007-2008.
Note: [1]Based on the selection criteria made for the occupation sub-index of the composite weighted index.

Worth noting in Table 7 are the occupational distributions for the 'elite middle class' and the 'privileged' class that are heavily tilted towards professionals and those associated with services. This trend, observed for the middle class globally, can be best summarised in the words of Banerjee and Duflo (2007: 21) when they say,

> *"Nothing seems more middle class than the fact of having a steady well-paying job. While there are many petty entrepreneurs among the middle class, most of them do not seem to be capitalists in waiting..... If they could only find the right salaried job, they might be quite content to shut their business down.....Perhaps the sense of control over the future that one gets from knowing that there will be an income coming in every month—and not just the income itself—is what allows the middle class to focus on building their own careers and those of their children."*

Is there any industrial variation *vis-à-vis* distribution of middle class in Pakistan? Table 8 shows that two industries, namely, of wholesale, retail trade, hotel and restaurants, and those comprised of community, social and personal services, have a heavy share of the 'expanded middle class'. It is interesting to find out that a noticeable share of the 'elite middle class' and the 'privileged' class is employed in manufacturing, financing, insurance, real estate and business services (Table 8). Not surprisingly, the LLC has a big share employed in agriculture, forestry, hunting and fishing.[12]

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[12]To find out the distribution of classes in each industry see Figure A-7 in the Annexure. With a big proportion of the population falling in the LLC it is expected to find them having big shares in almost all of the industries. Worth noticing in this table, however, is the dominance of the 'expanded middle class' in the industry comprising financing, insurance, real estate and business services, proving the observation of Banerjee and Duflo (2007), stated above, valid in Pakistan as well.

Table 8

Industrial Distribution within Classes[1]

(%)

Sectors	Lower Lower	Middle Lower	Upper Lower	Lower Middle	Middle Middle	Upper Middle	Upper
			Classes through Weighted Index				
Agriculture, Forestry, Hunting and Fishing	42.9	19.4	15.5	6.2	8.9	1.4	1.6
Mining and Quarrying	0.8	0.5	0.0	0.8	0.5	0.9	1.6
Manufacturing	9.3	8.8	9.3	7.6	9.7	11.6	12.9
Electricity, Gas and Water	0.6	1.5	2.4	2.6	2.6	2.7	1.6
Construction	19.1	8.3	5.1	2.5	2.7	2.1	1.6
Wholesale and Retail Trade, and Hotel/Restaurants	4.5	24.5	29.4	25.6	27.0	15.5	22.6
Transport, Storage and Communication	12.0	9.1	6.9	4.3	4.8	4.9	1.6
Financing, Insurance, Real Estate and Business Services	0.2	0.8	2.1	3.6	6.9	9.4	14.5
Community, Social and Personal Services	10.5	27.1	29.1	46.8	36.8	51.5	41.9
Total	100.0	100.0	100.0	100.0	100.0	100.0	100.0

Source: Calculated from PSLM 2007-2008.

Note: [1]Based on the selection criteria made for the occupation sub-index of the composite weighted index.

Relationship with the means of production has been a recurrent theme in the literature on class. As discussed earlier, the Marxian tradition considers this as the very foundation of class formation. Table 9 aims at looking into this very relationship and presents the shares of different statuses in employment within different classes. Large shares of paid employees in the 'expanded middle class' and the 'privileged' class tend to negate the relationship postulated by Marx regarding ownership of the means of production and class. As can be seen from Table 9, paid employees constitute 78 percent of the households in the UC. The Marxian notion can be seen to play some role in the increasing share of those who are self-employed in the non-agricultural sector in the 'expanded middle class' and those who employ more than 10 employees in the hard-core middle class, the elite middle class and the privileged class.[13]

Table 9

Status of Occupation within Classes[1]

(%)

Status of Occupation	Lower Lower	Middle Lower	Upper Lower	Lower Middle	Middle Middle	Upper Middle	Upper
			Classes estimated by Composite Weighted Index				
Employer with < 10 Employees	0.2	0.4	0.7	1.1	1.6	1.0	0.0
Employer with > 10 Employees	0.1	0.2	0.2	1.4	3.9	4.0	3.2
Self-employed Non-agriculture	8.7	25.8	28.8	27.5	27.0	16.9	22.6
Paid Employee	59.8	57.6	56.0	64.5	60.1	78.0	74.2
Unpaid Family Worker	0.1	0.1	0.0	0.0	0.0	0.0	0.0
Own Cultivator	18.1	11.9	12.0	4.7	6.3	0.1	0.0
Share Cropper	6.7	1.3	0.4	0.3	0.0	0.0	0.0
Contract Cultivator	2.7	0.8	1.0	0.3	0.6	0.0	0.0
Own Livestock	3.7	1.9	0.9	0.3	0.5	0.0	0.0
Total	100.0	100.0	100.0	100.0	100.0	100.0	100.0

Source: Calculated from PSLM 2007-2008.

Note: [1]Based on the selection criteria made for the occupation sub-index of the composite weighted index.

[13]For distribution of classes by status of occupation, see Figure A-8. It would not be wrong to infer from the table that the expanded middle classes and the privileged class are mainly found among: paid employees; self-employed in the non-agricultural sector; and employer with more than ten employees. The last two statuses in this regard justify the Marxian stance regarding class and relationship with the means of production.

CONCLUSIONS

Social realities are difficult to define, even tougher to measure and quantify, and the term 'middle class' is no exception. Just like 'poverty', it is variously defined in different countries at different levels of development. The definitions differ with the variance in approach and rationale applied in addressing the concept, thus leading to a lack of consensus in what the term actually means. The only agreement regarding the term 'middle class' is that it is the class between the lower and the upper class but where these lines are demarcated among them remains a debatable issue. Classifications made on cut-off lines based on income or expenditure continue to be the most commonly used way of measuring classes, and arbitrariness remains the hallmark of all these definitions. This arbitrariness is reflected in the range of estimates given for the middle class, varying from zero percent to 60 percent. The present paper, however, considers these definitions inadequate to capture the whole concept of the middle class, and suggests a weighted composite index to estimate its size.

The suggested measure is a composite of five weighted sub-indices of factors believed to be important for being part of the middle class, namely, education, occupation, income, lifestyle and housing. Using the 'expanded middle class' concept, it is estimated that Pakistan has a middle class that is around 35 percent of the total population, which approximates to a substantial 61 million. The middle class is found to be more of an urban phenomenon with its size being much larger in the urban areas at both the national and the provincial levels. A striking feature, however, is the association found between the professional occupations and the upper middle and upper classes. This fits in well with the general belief that professional occupations constitute, what in this paper has been referred to as, the elite middle class. Other white-collar occupations are taken up by the hard-core and fledgling middle class, and the manual occupations comprise the 'deprived' and the 'aspirants'. Likewise, the middle class is expected to have sufficient resources to fulfil all their needs and at least some of their wants, and have a surplus for savings. This criterion works for the estimated middle class in this paper as well and provides the very rationale of including 'potential climbers', who show a surplus/saving trend, in the 'expanded middle class' category.

It would be of interest to carry out a comparative study in the South Asian region using the proposed multidimensional approach to gauge the actual size of the middle class. However, using the existing definitions, when compared to its neighbours, barring Sri Lanka, Pakistan has a bigger middle class than all other countries including India. Of course, the Indian middle class would be bigger in numbers given its much larger population size but it comprises a smaller proportion that falls in the middle class category. Hence, harnessing the gains that are associated with having a big middle class are potentially available to the country. Is the middle class shrinking in Pakistan? Due to the recent inflationary trends, it is a fear that is much voiced in Pakistan, as in many other countries. For the period covered, however, applying the most commonly used existing definitions, the answer to this question is in the negative. The middle class in Pakistan has actually grown over time (see A-9). Likewise, the multidimensional definition of class proposed in this paper has a sense of stability linked to it, making the middle class less susceptible to fluctuations in income or expenditure. By differentiating between the concept of 'middle class' from that of 'middle income', we can understand why the

inflationary trends do not have an immediate effect on class structure, and hence the middle class. Otherwise as well, since all the factors linked to being a part of the middle class, reflected in their inclusion in the proposed weighted composite index, show an increasing trend over time in Pakistan, the size of the middle class is bound to increase in the country. The scenario cannot be better described than in the words of Burke (2010) when he uses the analogy of the car, Suzuki Mehran, for the middle class in Pakistan and says,

> *"In Pakistan, the hierarchy on the roads reflects that of society. If you are poor, you use the overcrowded buses or a bicycle. Small shopkeepers, rural teachers and better-off farmers are likely to have a $1,500 Chinese or Japanese motorbike.... Then come the Mehran drivers. A rank above them, in air-conditioned Toyota Corolla saloons, are the small businessmen, smaller landlords, more senior army officers and bureaucrats. Finally, there are the luxury four-wheel drives of 'feudal' landlords, big businessmen, expats, drug dealers, generals, ministers and elite bureaucrats. The latter may be superior in status, power and wealth, but it is the Mehrans which, by dint of numbers, dominate the roads."*

ANNEX

A-1. Class Structure Based on Income and Occupation
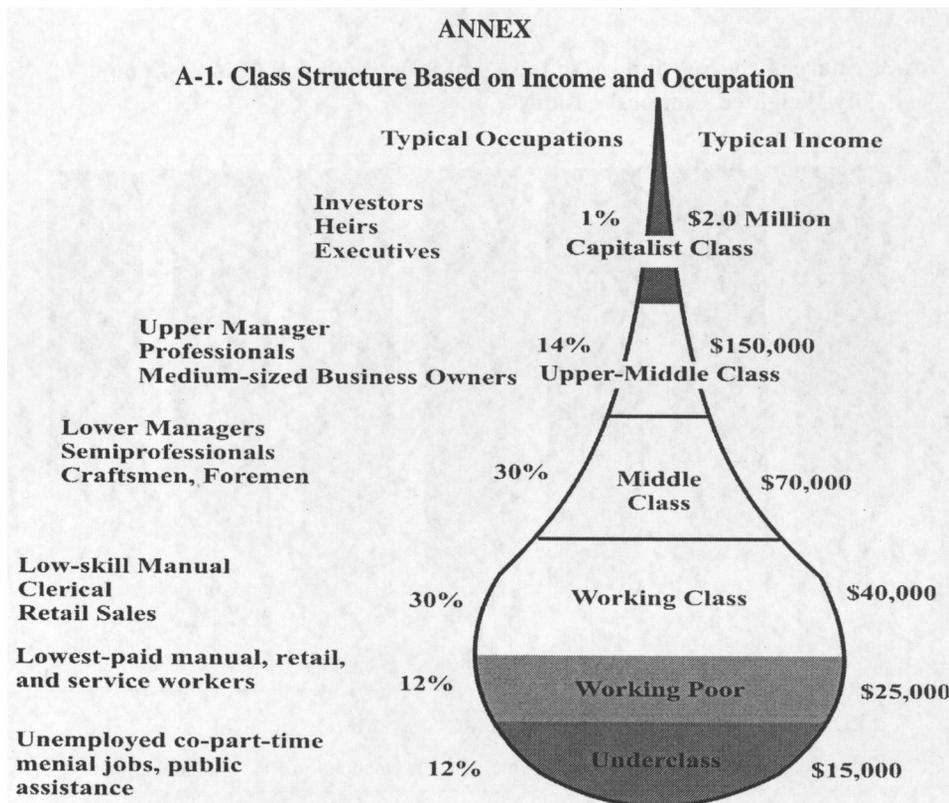
Source: Gilbert (2003, p. 8).

Durr-e-Nayab

A-2. Contribution of Each Sub-index in the Total Weighted Composite Index for Each Class
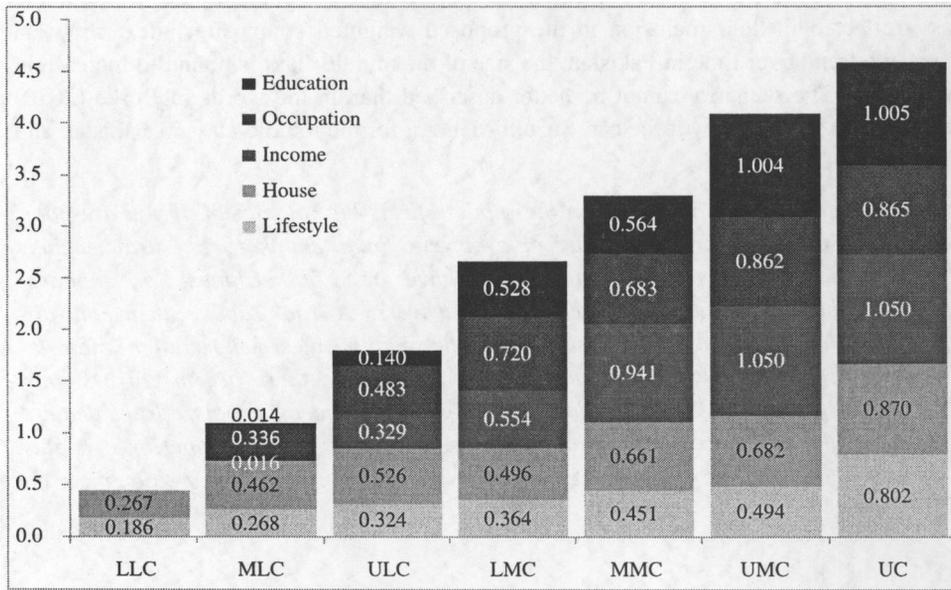
Source: Calculated from PSLM 2007-2008.

A-3. Share of the Sub-indices in the Total Score for Each Class Estimated by Weighted Composite Index
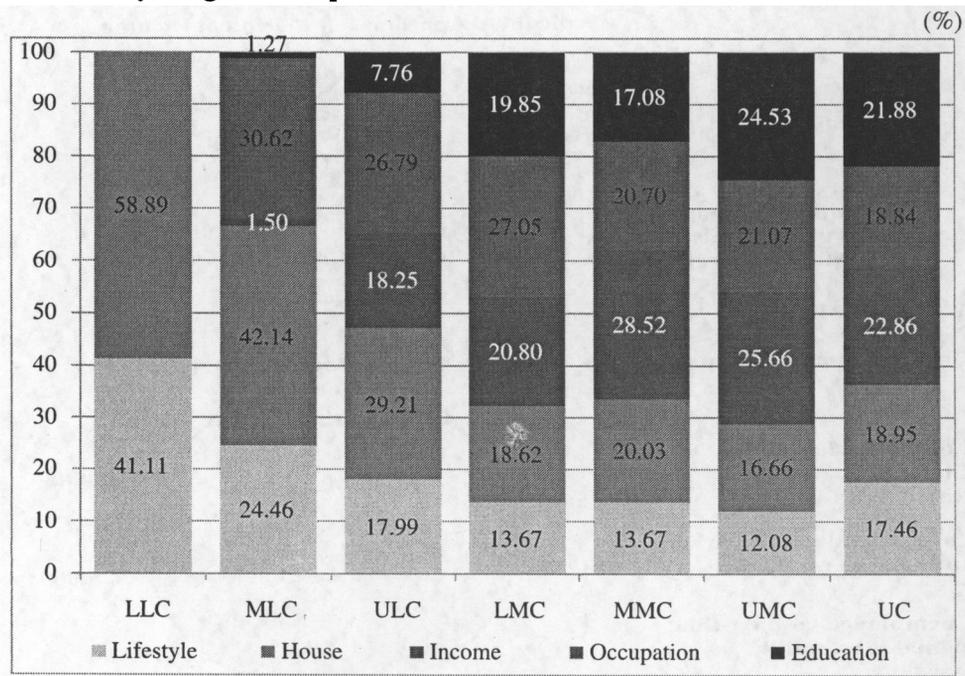
Source: Calculated from PSLM 2007-2008.

A-4: Mean Annual Household Income-Expenditure Balance by Different Classes as Estimated by Weighted Composite Index

(in '000 Pak. Rs.)
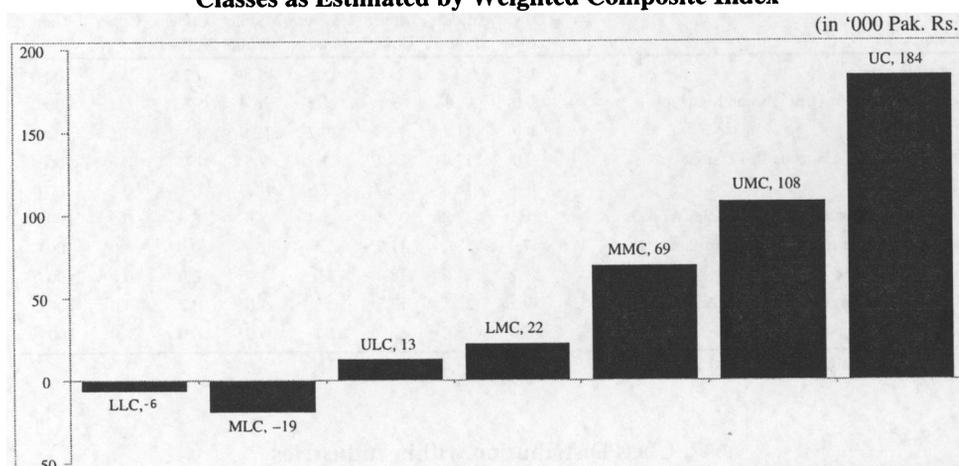
*Source:* Calculated from PSLM 2007-2008.

A-5: Method to Calculate Numbers in Each Class from the Proportions Achieved from Weighted Composite Index

The middle class status is assigned to a household and not an individual. Hence, the proportion estimated to be in each class is in fact the proportion of households and not the number of persons in a population belonging to any particular class. Instead of a crude estimation of numbers from the calculated proportions in all classes, the size of every class was measured according to the respective mean household size found in each class. The mid-year population of 187.2 million in 2011 was used as the base year for estimating the size of the middle class. The rural-urban ratio found in the sample, and applied in this calculation, was 60:40. The size of the middle class in Pakistan has generally shown a growing trend (see A-9), so applying the 2007-2008 estimates to 2011 population can give an under-estimation/minimum size but not an over-estimation. Otherwise too, the composite index would be only marginally affected by short run changes in income or expenditure.

The mean household size for each class used to calculate the numbers in different classes, by region, is as follows:

Class	Mean Household Size		
	Total	Urban	Rural
Lower Lower (LLC)	7.43	7.53	7.40
Middle Lower (MLC)	6.80	6.66	6.90
Upper Lower (ULC)	6.69	6.75	6.62
Lower Middle (LMC)	7.08	6.66	7.76
Middle Middle (MMC)	5.72	5.65	5.99
Upper Middle (UMC)	5.94	5.75	7.19
Upper (UC)	5.60	5.49	6.80
Total	6.97	6.68	7.18

Source: Calculated from PSLM 2007-2008.

A-6. Class Distribution within Occupations (%)

	Classes Estimated by Composite Weighted Index							
Occupations	Lower Lower	Middle Lower	Upper Lower	Lower Middle	Middle Middle	Upper Middle	Upper	Total
Armed Forces	0.0	34.8	21.7	18.8	5.8	15.6	2.9	100.0
Legislators, Senior Officials and Managers	0.0	2.6	6.4	11.3	16.4	57.2	6.1	100.0
Professionals	0.0	11.1	13.7	29.2	12.9	30.1	3.1	100.0
Technicians and Associate Professionals	0.0	21.4	24.1	24.8	9.5	19.7	0.6	100.0
Clerks	0.0	16.5	26.7	27.5	12.3	17.6	0.2	100.0
Service Workers and Shop/Market Sales Workers	0.0	37.8	32.5	15.4	7.6	6.3	0.5	100.0
Skilled Agriculture and Fishery Workers	67.0	17.0	11.7	2.5	1.9	0.0	0.0	100.0
Crafts and Related Trade Workers	51.2	24.0	18.7	3.0	3.0	0.0	0.0	100.0
Plant and Machine Operators and Assemblers	59.5	22.8	13.7	2.2	1.6	0.2	0.0	100.0
Elementary Occupations	75.0	15.8	7.4	1.1	0.0	0.0	0.0	100.0

Source: Calculated from PSLM 2007-2008.

A-7. Class Distribution within Industries

(%)

	Classes Estimated by Composite Weighted Index							
Occupations	Lower Lower	Middle Lower	Upper Lower	Lower Middle	Middle Middle	Upper Middle	Upper	Total
Agriculture, Forestry, Hunting and Fishing	70.4	15.7	9.9	2.1	1.6	0.3	0.0	100.0
Mining and Quarrying	56.3	17.2	1.1	11.5	3.4	9.2	1.1	100.0
Manufacturing	42.7	20.1	16.5	7.3	4.8	8.0	0.6	100.0
Electricity, Gas and Water	17.6	21.1	26.5	15.2	7.8	11.3	0.5	100.0
Construction	72.5	15.5	7.6	2.0	1.1	1.2	0.1	100.0
Wholesale and Retail Trade, and Hotel/Restaurants	11.7	31.2	29.4	13.7	7.5	5.9	0.6	100.0
Transport, Storage and Communication	56.1	21.1	12.6	4.2	2.4	3.4	0.1	100.0
Financing, Insurance, Real Estate and								
Business Services	5.4	8.8	18.4	16.5	16.5	31.0	3.4	100.0
Community, Social and Personal Services	18.5	23.5	19.7	17.0	6.9	13.5	0.8	100.0

Source: Calculated from PSLM 2007-2008.

A-8. Class Distribution by Status of Occupation (%)

	Classes Estimated by Weighted Composite Index							
Status of Occupation	Lower Lower	Middle Lower	Upper Lower	Lower Middle	Middle Middle	Upper Middle	Upper	Total
Employer with < 10 employees	13.6	15.2	22.7	19.7	15.2	13.6	0.0	100.0
Employer with > 10 employees	8.4	6.3	4.2	17.9	25.3	35.8	2.1	100.0
Self-employed non-agriculture	19.8	29.0	25.3	13.0	6.6	5.7	0.6	100.0
Paid Employee	42.0	20.0	15.2	9.4	4.5	8.2	0.6	100.0
Unpaid Family Worker	57.1	42.9	0.0	0.0	0.0	0.0	0.0	100.0
Own Cultivator	59.7	19.5	15.3	3.2	2.2	0.1	0.0	100.0
Share Cropper	88.6	8.4	2.3	0.7	0.0	0.0	0.0	100.0
Contract Cultivator	74.3	10.7	11.2	1.9	1.9	0.0	0.0	100.0
Own Livestock	72.4	18.7	6.8	1.0	1.0	0.0	0.0	100.0

Source: Calculated from PSLM 2007-2008.
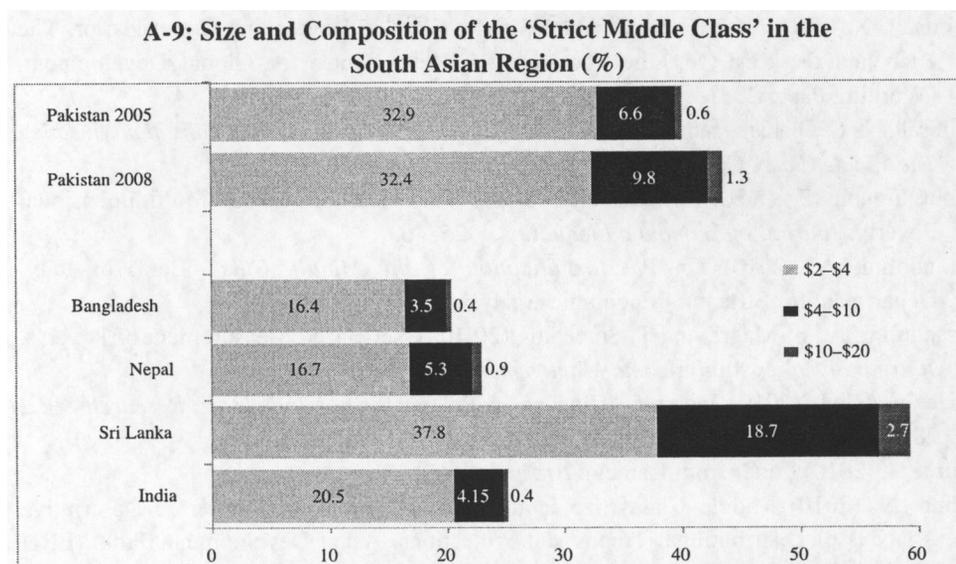
A-9: Size and Composition of the 'Strict Middle Class' in the South Asian Region (%)

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Interlinked Factor Markets and Allocative Efficiency: Evidence from Rural West Bengal, India

ARINDAM LAHA and PRAVAT KUMAR KURI

The issue of the implication of interlinkage of factor markets on the allocative efficiency level of the farm households deserves a special attention in the light of the controversy among two distinct schools of thought: the Neoclassical and the Marxist. An attempt has been made in the paper to measure allocative and cost efficiencies of the interlinked holding *vis-à-vis* a comparable group of non-interlinked holding in the framework of Data Envelopment Analysis. Empirical evidence establishes the Neo-classical proposition that interlinked factor markets can be considered as one of the "efficiency improving institutional change" in rural agrarian economy.

1. INTRODUCTION

Efficiency in resource allocation has a far-reaching impact on the observed level of agricultural output. In the process of enhancing allocative efficiency[1] in agricultural production, institutional inefficiencies in rural economy need to be addressed properly. But, it is difficult to do justice to the entire web of institutions that comprise rural society. However, two notable rural institutions which play a dominant role in providing economic well-being of the rural people are: the institutions of tenancy and rural credit. It is interesting to note that the terms and conditions of the institution of tenancy are often influenced by the transactions in other non-tradable factor markets, notably labour, draft animal and credit [Pant (1983); Bliss and Stern (1982); Jaynes (1982)]. The most obvious of these is the imperfectly developed credit market in the sense that asset poor tenants can overcome a credit constraint by developing their own "access institutions". Interlinked credit tenancy transactions are considered as an important form of institutional adaptations that the institution of tenancy has modified to substitute the imperfectly

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[1]A firm is said to have realised allocative efficiency if it is operating with the optimal combination of inputs, given their respective prices. Technical efficiency reflects the ability of a firm to obtain maximum output from a given set of inputs. These two measures are combined to provide a measure of total economic efficiency. The term economic efficiency can be interchangeably used as cost efficiency or overall efficiency [Coelli, *et al.* (2002)].

developed credit market. Peasant rationality, in this context, substantiates the Coase theorem argument that individuals would quickly get together to eliminate any sort of distortions in the allocation of resources which, in turn, would ensure the establishment of efficient institutional arrangement [Stiglitz (1989)].

In the existing literature, there are two distinct strands of thought on the issue of the implication of interlinking of factor markets and its repercussion on allocative efficiency: the Neoclassical and the Marxist. Marxists viewed interlinked transactions as a method of surplus extraction of the tenant at the hands of the landlord [Bhaduri (1973, 1977, 1983); Bharadwaj (1974, 1985); Pearce (1983); Prasad (1973, 1974)]. It is in the interest of the landlord to extract maximum surplus from his tenants and keep them in perpetual indebtedness. Bhaduri, a noted exponent of the Marxist approach, termed this phenomenon as 'forced commerce'. In a formal model, Bhaduri (1973) argued that a landlord who also provides consumption loans to his tenant may have no incentive to adopt yield-increasing innovations if his income from his loans to the tenant goes down sufficiently to offset his share of the increased yield. Thus, in the Marxist formulation, interlinkage is seen as a weapon for improving the effectiveness of surplus extraction, and thus an inefficient deal in some sense. On the other hand, in the Neo-classical framework, market interlinkages emerge in the presence of imperfections, asymmetry of information etc., and 'it is motivated by the desire for economic efficiency, not necessarily by the desire for further exploitation of the worker' [Stiglitz (1986)]. Interlinked markets are considered to be efficient because the tenant has imperfect access to certain input markets and interlinkage is an arrangement through which the landlord (principal) makes such inputs available to the tenant. Contrary to the Marxian approach which termed interlinkage as an exploitative mode of contract motivated by the unequal relations of power, rooted in the unequal access to productive resources, in Neo-classical literature it is considered as a voluntary contract among free economic agents [Bharadwaj and Das (1975); Mishra (n.d)]. However, the possibility of exploitation cannot be ruled out in Neo-classical framework if the tenant-borrowers are pushed to their reservation income and the remaining income is appropriated by the landlord-moneylenders [Braverman and Stiglitz (1982)]. Broadly, in the Neo-classical[2] interpretation, interlinked transaction is viewed as highly 'personalised' relation between transacting agents and is evolved to ensure the 'double coincidence of wants' without which non-monetised economies tend to be unfeasible or inefficient [Cheung (1969); Bardhan (1980); Braverman and Srinivasan (1981); Braverman and Stiglitz (1982); Basu (1983)]. An interlinked system of personalised transactions may overcome the problem of inefficiencies of incomplete and imperfect markets (particularly of credit and insurance) and thus facilitates increased efficiency and higher social welfare. This can be achieved by internalising the adverse externalities (like risk aversion, low work effort, loan default etc.) of imperfect markets. Moreover, interlinking of tenancy and credit contracts can act as a screening device to identify tenant's ability and thus leads to efficient allocation of resources [Braverman and Guasch (1984)]. In this situation, the landowner provides a consumption loan to the tenant to induce him to work harder in the presence of moral hazard, advances production loans to enable the tenant to adopt improved package of practices and shares in cost to increase the intensity of input use, all aimed at getting

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[2]A concise summary of Neo-classical theories on tenancy is given by Quibria and Rasid (1984).

increased agricultural yield [Braverman and Stiglitz (1982); Mitra (1983)]. Thus interlinkage can be viewed as a mechanism of increasing efficiency, higher production, and more rapid innovation—in short, higher social welfare [Ellis (1988)]. The Neo-classical school propagates for the superiority of interlinked contracts over non-interlinked ones under certain specified conditions: uncertainty [Newberry (1975)], limited liability [Newberry (1975); Basu, *et al.* (2000)], contract linearity [Ray and Sengupta (1989)], moral hazard [Braverman and Stiglitz (1982)], adverse selection [Banerji (1995)], landlord as the first mover in the sequential game [Basu, *et al.* (2000)] and monogamous tenancy[3] [Roy and Serfes (2002)]. Under this backdrop of controversy among two distinct schools of thought: the Neoclassical and the Marxist, an attempt has been made in the paper to evaluate allocative and cost efficiencies of the interlinked holding *vis-à-vis* a comparable group of non-interlinked holding in the framework of Data Envelopment Analysis (DEA).

The paper is divided into five sections. The next section deals with the data sources of the study. The methodological framework to estimate allocative efficiency is analysed in Section 3. Section 4 explores the nature of interlinked factor markets in the study area. In Section 5, an attempt has been made to evaluate the implications of interlinking of factor markets on allocative and cost efficiencies of the households by using primary data of rural West Bengal. In particular, we seek to evaluate the efficiency of interlinked households' *vis-à-vis* a comparable group of non-interlinked households. The section also deals with comparison between observed and optimal cost minimising input quantities at given levels of input prices. In addition, the section considers the association between allocative efficiency across operated farm size and participation under alternative interlinkage patterns. The concluding remarks have been presented in Section 6.

2. DATA SOURCES

The study is based on a field survey in rural West Bengal in the year 2006-07. The purpose of the survey was to explore the nature of interlinked transactions in land leasing markets and the role of credit in bringing out allocative efficiency in agriculture in West Bengal. Taking into consideration the extent and the incidence of tenancy practices, out of 18 districts of West Bengal, the district of Burdwan has been selected for the survey.[4] In the second stage, among the 31 blocks under Burdwan district, one block, namely, Raina I has been selected on the consideration of the existence of diversified nature of agricultural practices and the co-existence of varied farms of interlinked transactions. Again, block Raina I has been stratified into two distinct agro climatic zones-one, developed zone with canal irrigation and the other, underdeveloped zone with rain-fed

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[3]Roy and Serfes (2002) distinguish between two concepts of tenancy: polyandrous and monogamous tenancy. Polyandrous tenancy is the institutional arrangement where a tenant works for more than one landlord whereas under monogamous tenancy one tenant works under a single landlord.

[4]The district of Burdwan comprised of 7.83 percent of total leased in land (wholly and partly) in the state of West Bengal. Only two hill districts, Darjeeling and Jalpaiguri, comprised of 12.11 and 21.28 percent of leased in area respectively are above Burdwan district. However, terms of leasing in the hill districts are distinct from other districts of West Bengal (Agricultural Census, 2000-01). Thus the choice of the district of Burdwan as our survey area is purely based on the ground of the dominant practice of land leasing for crop cultivation in the state.

agriculture. From the developed zone, the villages, namely, Saktia and Anguna have been chosen, whereas the villages namely, Dhamash and Boro have been chosen from the underdeveloped zone under the same criteria.[5] Once the villages are selected, 203 sampling units, the farm-households, have been chosen using stratified random sampling of farmers with probability being proportional to the farm size so that the sample can represent the actual proportion of all the five strata of the farmers. It is to be noted that 203 households operate over 303 agricultural holdings under alternative mode of cultivation. Our empirical analysis is restricted to 303 holdings. The farm households have been divided into five categories covering landless agricultural labourers, marginal farmers (less than 2.5 acre), small farmers (2.5–5 acre), medium farmers (5–10 acre) and large farmers (above 10 acre).

3. METHODOLOGY: DATA ENVELOPMENT ANALYSIS

In the study, we have used Data Envelopment Analysis (DEA) to examine the cost minimising behaviour and in turn, measure the allocative efficiency of farm households. In such a DEA framework, a linear programming method is used to construct a non-parametric piecewise frontier over the data, so as to measure efficiencies relative to this surface. Following Coelli, *et al.* (2002), the allocative and cost efficiencies can be measured using the Constant Returns to Scale Input Oriented DEA model.[6] In our study a multi input-multi output DEA model is used.

Following Coelli, *et al.* (2002), let us consider the situation with N decision making units (DMU). Each of the n DMUs produce Q output using V different inputs. A cost minimising linear programming problem is solved for each *DMU*. The *CRS* input oriented *DEA* model for the *i*th *DMU* is given by

$$Min_{\lambda, x_i^*} \quad w_i' x_i^*$$

$$\text{subject to} \sum_{i=1}^{N} \lambda_i x_{ji} - x_{ji}^* \leq 0,$$

$$\sum_{i=1}^{N} \lambda_i y_{ki} - y_{ki} \geq 0$$

$$N1'\lambda_i = 1$$

$$\lambda_i \geq 0$$

Where w_i = vector of unit price of inputs utilised by DMU_i

x_i^* = vector of input quantities of DMU_i with respect to production cost minimisation

y_{ki} = amount of output k produced by DMU_i

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[5]The selection of district, block and villages are based on *a priori* information and hence it is purposive and non-random. For further details about the selection of sampling units based on primary and secondary data, see Laha (2009).

[6]This approach of non-parametric mathematical programming approach to frontier estimation was first developed by Charnes, Coper, and Rhodes (1978).

x_{ji} = amount of input j utilised by DMU_i

N_1 = an $N \times 1$ vector of one

λ_1 = dual variables.

The total cost efficiency (CE) or economic efficiency (EE) of the ith firm is measured by the ratio of minimum cost to observed cost as $CE = \dfrac{w_i' x_i^*}{w_i' x_i}$

The allocative efficiency is calculated residually by using the following relationship between cost efficiency (CE) and technical efficiency (TE) as

$$AE = \dfrac{CE}{TE}$$

The above mentioned production cost minimisation exercise can be solved by using a number of different computer programmes. In this study, we have used $DEAP^7$ *Version 2.1* for the measurement of both allocative and cost efficiencies.

4. NATURE OF INTERLINKED FACTOR MARKETS

In a rural agrarian economy, it is often seen that factor markets are not independent of one another, rather there is inter-connection among them in the sense that terms of one contract is contingent upon the terms of another. In such an interlinked deal, two or more independent exchanges are simultaneously agreed upon [Basu (1983)]. If an input dealer provides inputs to a farmer on a credit basis and the prices of input and interest rate are simultaneously agreed upon, then the input market and credit market are said to be interlinked. This issue of interlinkage has attracted much attention world-wide from anthropological enquiries[8] to various schools of development economics [Bharadwaj and Das (1975); Bardhan and Rudra (1978); Bardhan (1980); Braverman and Srinivasan (1981); Braverman and Stiglitz (1982); Basu (1983, 1987); Gupta (1987); Sarap (1991); Bose (1993); Bardhan and Udry (1999); Basu, *et al.* (2000); Gill (2000)]. Like other parts of India, several types of interlinked transactions are commonly observed in rural West Bengal [Bardhan (1984); Dutta (2002); Chaudhuri (2004); Bhattacharyya (2005, 2007)]. It is interesting to note that broadly we have come across the co-existence of two types of interlinked transactions: one-tier and two-tier interlinkages. One-tier interlinkage implies simultaneous transactions in two agrarian markets, e.g., credit-labour, credit-input and credit-product.[9] In the two-tier interlinkage, on the other hand, transactions take place in more than two markets where one landlord simultaneously acts as employer as well as producer and negotiates two types of interlinked transactions-credit-labour and credit-

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[7]See Coelli "A Guide to DEAP Version 2.1: A Data Envelopment Analysis (Computer) Programme". (CEPA Working Paper 96/08.)

[8]See Bardhan (1980) for a survey on anthropological research.

[9]In our study villages three ways of one tier interlinkage are found in practice: Credit-input interlinkage implies that the farmers take loan from the input dealer in kind and repaid in kind or cash. Credit-labour interlinkage implies that the agricultural worker takes loan from his employers and repaid in terms of his labour service. Credit-product interlinkage implies that the producer takes loan from the trader and sells at least a part of his product to him.

product [Gupta (1993); Dutta (2002)].[10] The two-tier interlinkage can be of various forms, as observed in our study area: the labour-cum-producer negotiates for two types of interlinked transactions—credit-labour and credit-product where the quantum of credit demand plays the instrumental role in simultaneous fixing of transactions. The demand for credit is attempted to be met by negotiating first-tier interlinked transactions in the form of credit-labour interlinkage, while, the unmet demand for credit is spilled over in the second-tier of interlinked transactions in the form of credit-product interlinkage. The two-tier interlinkage is also found in practices involving credit, labour, input and product markets. In our study on West Bengal, a significant percentage (61.58 percent) of sample households are involved in interlinked transactions. Credit-input interlinkage is the predominant form of one tier interlinkage in the study area; it accounts for 36 percent of total interlinked deals. This is followed by credit-labour and credit-product interlinkage. It is to be noted in this context that the types of interlinkages are sensitive to the nature of crop cultivation. Commercial crops, like potato and boro paddy cultivations, are usually associated with two-tier interlinkage where the same input dealer-cum-product seller is usually involved in input and product markets. In fact, there are three variant forms of 'two-tier' interlinkage encompassing credit, labour, input and product markets which together constitute 55.2 percent of total interlinked transactions.

The size-class distribution of various types of interlinked contract is presented in Table 1. Empirical evidence reveals that the incidence of interlinked transactions is associated with the size-class distribution of land ownership pattern. The proportion of interlinked households is largely confined to the marginal (65.57 percent) and small farmers (70.59 percent) irrespective of the types of interlinkage. The marginal and small farmers together constitute 83.2 percent of the total interlinked transactions in our study area. The size class classification of the proportion of households involved in interlinked transactions reveals that there is negative association between the farm size incidence of interlinked transactions.[11] However, the association is insignificant due to greater concentration of households in marginal and small farm categories.

It is to be noted in this context that the majority of small and marginal farmers enhance their operated land by leasing in land from the adjacent holdings of the landlords. About 87 percent of the tenants in our study area are under the category of landless and marginal farmers. This group of farmers is pre-dominantly involved in interlinked transactions. About 67 percent of asset poor tenant households borrow both for consumption and production purposes with pre-determined terms and conditions by linking their labour or crops with those of the landlord-cum-creditors. Such practices of

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[10]Dutta (2002) found that same employer-cum-producer is on the one hand involved in interlinked credit-labour contract, and on the other hand, involved in interlinked credit-product contract. The producer takes loan from the trader with the commitment that he will sell at least a part of this product to him and then uses that loan either in purchasing non-labour inputs or in giving further consumption loan to the workers. So with the same producer, there is simultaneous existence of credit-product interlinkage and credit-labour interlinkage. On the basis of the empirical observation, Gupta (1993) in a theoretical paper has given an explanation of this simultaneous existence of these two types of interlinkage using the consumption efficiency hypothesis of Leibenstein (1957).

[11]The value of Pearson measure of correlation is estimated at –0.73235.

Table 1

Number of Households Involved in Various Types of Interlinked Credit Transactions

Operated Land (in Acre)	No. of House-holds	One-tier Interlinkage			Two-tier Interlinkage			Total	Proportion of Interlinked Households (in percent)
		Credit-labour	Credit-input	Credit-product	Both Credit-labour and Credit-product	Both Credit-labour and Credit-input	Both Credit-input and Credit-product		
Landless	10	5 (62.5)	0 (0.00)	0 (0.00)	0 (0.00)	0 (0.00)	0 (0.00)	5 (4.00)	50.00
0.1-2.5	122	3 (37.5)	20 (44.44)	3 (100.00)	25 (86.21)	10 (83.34)	19 (67.86)	80 (64.00)	65.57
2.5-5	34	0 (0.00)	15 (33.33)	0 (0.00)	3 (10.34)	1 (8.33)	5 (17.86)	24 (19.20)	70.59
5-10	27	0 (0.00)	8 (17.78)	0 (0.00)	1 (3.45)	1 (8.33)	3 (10.71)	13 (10.40)	48.15
Above 10	10	0 (0.00)	2 (4.44)	0 (0.00)	0 (0.00)	0 (0.00)	1 (3.57)	3 (2.40)	30.00
Total	203	8 (100.00)	45 (100.00)	3 (100.00)	29 (100.00)	12 (100.00)	28 (100.00)	125 (100.00)	61.58

Source: Field Survey 2006-07.

Note: Figures in the parenthesis denote the percent of total interlinked transactions.

interlinked transactions in the study area are more pronounced in the fixed-rent tenancy[12] where the tenants are to bear all the costs of production. However, the limited liability clause [Basu, *et al. (*2000); Reddy (1996); Jones (1962)] is found to have empirical support; which means that in the event of crop failure the landlords come forward to forgo some of the contractual claims on the harvested crop. The limited liability clause is dominantly found in practice among the monogamous type of tenancy contract. The successful implementation of land reform programme in West Bengal has resulted in growing marginalisation of operated land in recent years. Under the circumstances, the transaction cost of acquiring lease in land constitutes a significant portion of total cost and thus, to reduce the transaction costs of negotiating with a multiple landlords, the tenants prefer monogamous type of tenancy. Over the years, they establish a relation of mutual cooperation with their respective landlords and take the advantage of limited liability in the event of uncertain outcome in agricultural production.

5. EMPIRICAL EVIDENCES: DATA ENVELOPMENT ANALYSIS

Measurement of Allocative and Cost Efficiencies

In this section, allocative and cost efficiencies of the interlinked holding *vis-à-vis* a comparable group of non-interlinked holding is measured in a disaggregated way. The allocative and cost efficiency levels have been measured at different interlinkage types (credit-input, credit-labour, and credit-product) as well as under alternative crop of cultivations (i.e., *amanswarna,*[13] paddy and all crops cultivation). Moreover, the impact

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[12]Coexistence of all three tenurial practices-fixed-rent, pure sharecropping without cost sharing and sharecropping with cost sharing is prevalent in our surveyed villages. Fixed rent tenancy occupies a significant 35 percent case of alternative mode of tenurial contract.

[13]*Amanswarna* is most preferred HYV variety in terms of coverage of area in our study villages. In fact, aman paddy accounts for about two-thirds of the net cultivated areas in West Bengal [Chandra (1974)].

of interlinked factor markets on the allocative efficiency across the two agro-climatic zones—irrigated and rain-fed areas—has also been measured (see Appendix).

The Constant Returns to Scale Input-Oriented Multi Input-Multi Output DEA model is used in the study by using *DEAP Version 2.1* statistical programme. The model is comprised of data on output quantities, input quantities and prices of inputs. Output is measured by three variants: output of a particularly paddy variety like *amanswarna*, output of all paddy varieties in general and output of all crops measured as an equivalent of *amanswarna*.[14] Three important input variables are chosen, viz. total operated area, total labour (both family and hired) used and total amount of fertiliser used in production.[15] For simplicity, we assume all firms face the same input prices.

In the case of credit-input interlinkage in *amanswarna* cultivation, 82 interlinked holdings and 132 non-interlinked holdings have been identified for the study. The credit-labour interlinkage dataset comprised of 42 interlinked holdings and 172 non-interlinked holdings. Similarly in the credit-product interlinkage the dataset included 16 interlinked holdings and 198 non-interlinked holdings. The estimated means of the efficiency scores for the three selected interlinkage patterns in three different cultivation practices are depicted in the following Tables 2, 3 and 4.

Table 2

Measurement of Allocative and Cost Efficiencies under Different Types of Interlinkage Pattern in Interlinked and Non-interlinked Holdings (Amanswarna Cultivation)

Items	Credit-Input	Credit-Labour	Credit-Product
Interlinked Holdings			
Number of Holdings	82	42	16
Allocative Efficiency			
Mean	0.856	0.916	0.880
Range	0.436-1.000	0.588-1.000	0.499-1.000
Standard Deviation	0.080	0.083	0.075
Cost Efficiency			
Mean	0.587	0.689	0.628
Range	0.216-1.000	0.261-1.000	0.42-1.000
Standard Deviation	0.110	0.106	0.103
Non-interlinked Holdings			
Number of Holdings	132	172	198
Allocative Efficiency			
Mean	0.730	0.748	0.730
Range	0.411-1.000	0.332-1.000	0.411-1.000
Standard Deviation	0.114	0.089	0.141
Cost Efficiency			
Mean	0.455	0.455	0.449
Range	0.089-1.000	0.089-1.000	0.089-1.000
Standard Deviation	0.122	0.147	0.140

Source: Field Survey 2006-07.
Note: The statistical analysis has been made using *DEAP* statistical package.

[14]To measure a composite index of output of all crops, outputs of individual crops are converted as an equivalent of *amanswarna*. Prices of all crops are taken into account to make the necessary conversion.

[15]In the study we have considered the potential econometric problem pertaining to the endogeneity of the interlinked contract. That is, more interlinked holdings may belong to smaller farmers. As a result, the Hausman (1978) method was used to test for the endogeneity of the interlinked contract. Instruments for the test included average years of schooling and availability of formal loan. The Hausman test failed to reject the null hypothesis of exogeneity.

Table 3

Measurement of Allocative and Cost Efficiencies under Different Types of Interlinkage Pattern in Interlinked and Non-interlinked Holdings (Paddy Cultivation)

Items	Credit-Input	Credit-Labour	Credit-Product
Interlinked Holdings			
Number of Holdings	106	49	20
Allocative Efficiency			
Mean	0.912	0.945	0.898
Range	0.495-1.000	0.854-1.000	0.566-1.000
Standard Deviation	0.082	0.039	0.109
Cost Efficiency			
Mean	0.687	0.717	0.723
Range	0.132-1.000	0.261-1.000	0.476-1.000
Standard Deviation	0.102	0.094	0.091
Non-interlinked Holdings			
Number of Holdings	146	203	232
Allocative Efficiency			
Mean	0.858	0.874	0.858
Range	0.307-1.000	0.241-1.000	0.307-1.000
Standard Deviation	0.187	0.178	0.178
Cost Efficiency			
Mean	0.339	0.339	0.336
Range	0.029-1.000	0.029-1.000	0.029-1.000
Standard Deviation	0.141	0.149	0.140

Source: Field Survey 2006-07.
Note: The statistical analysis has been made using *DEAP* statistical package.

Table 4

Measurement of Allocative and Cost Efficiencies under Different Types of Interlinkage Pattern in Interlinked and Non-interlinked Holdings (All Crops Cultivation)

Items	Credit-Input	Credit-Labour	Credit-Product
Interlinked Holdings			
Number of Holdings	168	70	54
Allocative Efficiency			
Mean	0.852	0.799	0.845
Range	0.257-1.000	0.182-1.000	0.278-1.000
Standard Deviation	0.179	0.179	0.190
Cost Efficiency			
Mean	0.302	0.241	0.277
Range	0.024-1.000	0.004-1.000	0.006-1.000
Standard Deviation	0.113	0.128	0.097
Non-interlinked Holdings			
Number of Holdings	135	233	249
Allocative Efficiency			
Mean	0.735	0.630	0.535
Range	0.116-1.000	0.128-1.000	0.116-1.000
Standard Deviation	0.202	0.215	0.201
Cost Efficiency			
Mean	0.154	0.151	0.156
Range	0.002-1.000	0.002-1.000	0.002-1.000
Standard Deviation	0.133	0.131	0.172

Source: Field Survey 2006-07.
Note: The statistical analysis has been made using *DEAP* statistical package.

In *amanswarna* cultivation, allocative and cost efficiency scores are 0.856, and 0.587 respectively for the credit-input interlinked holdings, whereas non-interlinked holdings accounts for 0.730, and 0.455 respectively (Table 2). This result indicates that even when there is an efficient resource allocation (in allocative sense) in both types of holdings, the credit-input interlinked holdings are, on average, more efficient in using the production input resources than the non-interlinked holdings. This trend remains the same irrespective of which efficiency measurement concept is taken into account. In addition, all the efficiency scores of credit-input interlinked holdings tended to be clustered around the value 1. This is evident from the smaller range and standard deviation of all three efficiency scores in case of interlinked holdings than that of the non-interlinked holdings (as for example, the values of the range and standard deviation of allocative efficiency are 0.436-1.000 and 0.080 for interlinked holdings and 0.411-1.000 and 0.114 for non-interlinked holdings respectively).

Like *amanswarna*, in paddy as well as in all crop cultivation, the interlinked holdings are found to be more efficient than the non-interlinked holdings (Table 3 and Table 4). From the estimated means of the different efficiency scores of interlinked and non-interlinked holdings (credit-input, credit-labour and credit-product interlinkages), it can be found that interlinked holdings are, on average, more efficient in the allocation of resources than non-interlinked holdings. The same pattern is observed irrespective of which efficiency measures (allocative or cost efficiency) or interlinkage pattern (credit-input, credit-labour or credit-product interlinkage) is taken into consideration. Moreover, the range and standard deviation of all efficiency measurement scores for interlinked holdings have been estimated to be smaller than that of the non-interlinked holdings.

The efficiency measures pertaining to the segregated contract types also re-inforces our earlier contention that interlinked farms are more efficient than the non-interlinked farms. In credit-input interlinkage, the lowest estimated allocative efficiency level is found to be 0.852 in all crops cultivation while the highest efficiency level is 0.912 in paddy cultivation. On the other hand, in credit-input non-interlinked holdings, the lowest estimated allocative efficiency level is 0.730 in *amanswarna* cultivation while the highest efficiency level is 0.858 in paddy cultivation. Thus it is observed that the credit-input interlinkage can induce the tenant to adopt the efficient level of input use and thus can overcome sub-optimal input use resulting from risk aversion on the part of tenants in the study area. In a further comparison of estimated allocative efficiency in credit-labour interlinkage, it can be found that paddy cultivation corresponds to the highest allocative efficiency score (i.e. 0.945) in credit-labour interlinked holding, while the lowest efficiency score (i.e. 0.630) is associated with the credit-labour non-interlinked holding under all crops cultivation. A similar pattern of movement of allocative efficiency is also observed in case of credit-product interlinkage.[16]

The above evidences support the neoclassical interpretation that the institution of interlinkage is one of the allocative efficiency improving institutions and thus, in turn, has a significant impact on more rapid adoption of innovation. In this interpretation, the interlocking of tenancy with production loans can ensure that tenants adopt efficiency in resources allocation and carry out those investments, which the profit-maximising

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[16]For figures relating to the allocative efficiency distributions of the credit-input, credit-labour and credit-product interlinked and non-interlinked holdings in paddy cultivation, see Laha (2009).

landlord considers most desirable. Again the interlocking of tenancy with labour service on the landlord's farm or with control over the marketing of farm output are all mechanisms which can be used by the profit maximising landlord to extract the greatest work effort from the tenant [Ellis (1988)]. In other words, interlocking markets permits a greater control on the lives of the tenants and thus the immediate virtue is reflected by greater efficiency, higher production and more rapid innovation.

Interlinkage and Optimum Input-Combinations

In the section, observed input quantities used by the farmer are compared with the optimal input quantities to determine whether farmers are allocating resources efficiently or not. The narrower the gap between observed and optimal input quantities, the more efficient is the allocation of resources. On the other hand, the greater the gap, the higher is the scope to reduce the costs of production while keeping the output constant.

The statistical software *DEAP, version 2.1*, routinely calculates cost minimising optimal input quantities at each farm level. The observed and optimal input quantities in paddy cultivation are presented in Table 5.[17]

Table 5

The Optimal Input Quantities with Respect to Cost Minimisation and the Observed Input Quantities in Paddy Cultivation

Inputs	Credit-Input		Credit-Labour		Credit-Product	
	Cost Minimising Input qt.	Observed Input qt.	Cost Minimising Input qt.	Observed Input qt.	Cost Minimising Input qt.	Observed Input qt.
Interlinked Holdings						
Land (Acre)	1.013	1.420	0.542	0.740	1.305	1.609
Labour (No/Acre)	40.498	41.925	26.25	30.323	41.923	42.588
Fertiliser(Kg/Acre)	125.283	152.89	112.235	112.493	152.885	163.51
Non-interlinked Holdings						
Land (Acre)	0.625	1.823	0.653	1.874	0.567	1.657
Labour (No/Acre)	39.973	43.89	39.97	45.40	39.97	42.45
Fertiliser(Kg/Acre)	39.508	85.89	39.505	105.545	39.505	110.71

Source: Field Survey 2006-07.

Note: The statistical analysis has been made using *DEAP* statistical package.

Table 5 suggests that in most of the cases, farmers are not using inputs in an optimal manner. It is evident that the optimal input quantities are distinctly different from the observed input quantities used by farmers. To achieve an optimal input combination, inputs should be used in lower proportion than are being applied presently. Thus there is a further scope to produce a given level of output by using the cost-minimising input ratios. Empirical evidences further suggest that credit-labour interlinked holdings are more efficient in the allocative sense than non-interlinked holdings. This is reflected in the observed differences between optimal and observed input quantities. The gap between the optimal and observed input quantities in credit-labour interlinked holding is smaller (observed and optimal input quantities are 0.542 and 0.740 respectively in land; 26.25 and 30.323 respectively in labour per acre; 112.235 and 112.493 respectively in chemical

[17]For all other tables relating to *amanswarna*, and all crops cultivation, see Laha (2009).

fertiliser used per acre) than credit-labour non-interlinked holding (observed and optimal input quantities are 0.653 and 1.874 respectively in land; 39.97 and 45.40 respectively in labour per acre; 39.505 and 105.545 respectively in chemical fertiliser used per acre).

Interlinkage and Farm-Size Efficiency

Allocative efficiency in agriculture is invariably associated with the farm-size classification of operated land holdings. An attempt has been made in this section to analyse the impact of farm size on allocative efficiency in the interlinked as well as non-interlinked holdings. The result in respect of paddy cultivation is presented in Table 6.[18] It is evident that interlinked holdings exhibit a higher level of allocative efficiency on average relative to the non-interlinked holdings irrespective of farm size. In paddy cultivation, there is significant difference in allocative efficiency estimates under interlinked holdings than the corresponding figure in non-interlinked holdings (as for example, in credit-input interlinkage the allocative efficiency estimates are 0.9026 and 0.8178 respectively in marginal holding, 0.912 and 0.8578 respectively in small holding, 0.9395 and 0.9387 respectively in medium holding). The general trend does not hold

Table 6

Measurement of Allocative Efficiencies Across Operated Land Sizes
in Different Pattern of Interlinkages (Paddy Cultivation)

Operated Land (in Acre)	Interlinked Holdings		Non-interlinked Holdings	
	Allocative Efficiency	Number (%) of Firms	Allocative Efficiency	Number (%) of Firms
Credit-Input Interlinkage				
Less than 2.5	0.9026	59 (55.66)	0.8178	87 (59.59)
2.5-5	0.912	25 (23.58)	0.8578	22 (15.07)
5-10	0.9395	19 (17.92)	0.9387	24 (16.44)
Above 10	0.9257	03 (2.84)	0.9747	13 (8.90)
Total	0.9119	106 (100.00)	0.8579	146 (100.00)
Credit-Labour Interlinkage				
Less than 2.5	0.9617	41 (83.67)	0.8132	105 (51.72)
2.5-5	0.9406	05 (10.20)	0.9141	42 (20.69)
5-10	0.9444	03 (06.13)	0.9515	40 (19.70)
Above 10	–	–	0.9709	16 (07.89)
Total	0.9451	49 (100.00)	0.8740	203 (100.00)
Credit-Product Interlinkage				
Less than 2.5	0.8661	15 (75.00)	0.8087	131 (56.48)
2.5-5	0.9947	03 (15.00)	0.8846	44 (18.96)
5-10	–	–	0.9447	43 (18.53)
Above 10	0.956	02 (10.00)	0.9755	14 (06.03)
Total	0.8976	20 (100.00)	0.8586	232 (100.00)

Source: Field Survey 2006-07.
Note: The statistical analysis has been made using *DEAP* statistical package.

[18]*Ibid*, Laha (2009).

true in large operated landholdings where interlinked holding above 10 acre of operated land exhibited a lower level of allocative efficiency on average relative to that of non-interlinked holdings. No such general conclusion can be drawn in regard to the pattern of credit-labour interlinkage due to insufficient number of observations in such interlinked holdings. In other disaggregated analysis of *amanswarna* cultivation and aggregative analysis of all crops cultivation; the general trend that interlinked holdings exhibit a higher level of allocative efficiency on average relative to the non-interlinked holdings irrespective of farm size holds true. Thus it seems plausible that the inclusion of interlinked contract has a significant impact on allocative efficiency in production.

In a further comparison of estimated allocative efficiencies between two groups of farmers (interlinked and non-interlinked) across operated farm sizes, it can be argued that the allocative efficiencies increase with the increase in the size of operated land in non-interlinked holdings. Large farmers are more efficient in allocating resources in production than small farmers. In paddy cultivation, the highest allocative efficiency (i.e. 0.9747) is found for large farms in credit-input interlinked holding, whereas the marginal farm is associated with the lowest efficiency measure (i.e. 8178). The general trend of increase in allocative efficiency with the increase in operated land sizes in interlinked holding is true irrespective of which interlinkage pattern (credit-input, credit-labour, and credit-product) or which crop (*amanswarna*, paddy or all crops) is taken into consideration. However, the general conclusion does not appear to be valid when we consider the association between allocative efficiency measurement and operated land size in interlinked holdings. In paddy cultivation, medium farmers (5-10 acre) are more efficient in credit-input interlinkage (the estimated allocative efficiency measure becomes 0.9395) than other categories of farmers. In credit-labour interlinkage marginal farmers (less than 2.5 acre) are more efficient in allocating resources than their other counterparts. In credit-product interlinkage, the highest efficiency measure is 0.9947 for small farmers (2.5–5 acre) compared to other categories of farmers. A similar trend is found in other cultivations (i.e. *amanswarna* and all crops) also. In fact in the analysis of other cultivations, small and middle farmers' categories comprising 2.5–5 acre and 5-10 acre of land respectively are more efficient in allocating inputs at optimal level. In few instances, marginal farmers have a higher level of allocative efficiency than the respective other categories of farmers in interlinked holdings.

6. CONCLUSIONS

In the backdrop of the controversy of two distinct schools of thought, the Neo-classical and the Marxist, this paper deals with the implications of interlinked rural factor markets on the allocation of resources. Empirical evidences from rural West Bengal, suggest that interlinked holdings are more efficient in using the farm inputs than a comparable group of non-interlinked holdings. The conclusion remains valid irrespective of types of crop and the nature of interlinkages. Thus the econometric estimation based on Data Envelopment Analysis supports the neoclassical presumption that interlinked transactions resulted in improving the allocative efficiency in agricultural production. However, allocative efficiencies between interlinked and non-interlinked holdings are not uniformly observed across operated farm size. Allocative efficiency is invariably found to be higher in interlinked transactions than their non-interlinked counterpart irrespective of

irrigated and rain-fed areas. Interestingly, both under interlinked and non-interlinked mode of cultivation, there appears to be a gap between observed and optimal input combinations. The gap is more pronounced in the case of non-interlinked mode of cultivation. This further strengthens our earlier conclusion that interlinkage is motivated by the desire for efficient institutional arrangements in the allocation of resources in the backdrop of factor market imperfections. In the process of transformation of Indian agriculture, the role of labour in interlinked credit transactions has declined whereas the input and output market has increasingly occupied a prominent role in interlinked transactions. In this perspective, an emphasis on the availability of institutional credit is expected to reduce the dependence of such interlinked transactions as such transactions are evolved to mitigate the imperfections of certain rural institutions. Thus, the policy requirement is to make these vital inputs, like credit, available to the tenant and not to encourage interlinked markets.

APPENDIX

An attempt has been made to examine how interlinked factor markets influence the allocative efficiency across the two agro-climatic zones-irrigated and rain-fed areas[19] (Table A1). The allocative efficiency scores for the credit-labour interlinked and non-interlinked holdings in case of irrigated area have been estimated as 0.800 and 0.613, whereas rain-fed area accounts for 0.799 and 0.647, respectively. Though the efficiency level of the interlinked holdings is significantly higher than the non-interlinked holdings, however, the level of variation in efficiency in two agro-climatic zones is insignificant. Thus interlinked holdings are found to be efficient in the allocation of resources irrespective of the nature of agro-climatic zones in the study area.

Table A1

Measurement of Allocative Efficiencies under Different Types of Interlinkage Across Irrigated and Rain-fed Surveyed Area (All Crops Cultivation)

Nature of Interlinkage	Holdings	Mean	Range	Standard Deviation
Irrigated Area				
Credit-labour Interlinkage	28	0.800	0.226-0.965	0.154
Credit-labour Non-interlinkage	118	0.613	0.128-1.000	0.245
Credit-input Interlinkage	67	0.866	0.305-1.000	0.191
Credit-input Non-interlinkage	79	0.738	0.257-0.916	0.173
Credit-product Interlinkage	16	0.840	0.116-0.999	0.198
Credit-product Non-interlinkage	130	0.558	0.278-1.000	0.209
Rain-fed Area				
Credit-labour Interlinkage	42	0.799	0.321-0.999	0.190
Credit-labour Non-interlinkage	115	0.647	0.182-1.000	0.198
Credit-input Interlinkage	101	0.842	0.266-1.000	0.186
Credit-input Non-interlinkage	56	0.731	0.116-0.999	0.208
Credit-product Interlinkage	38	0.849	0.128-1.000	0.203
Credit-product Non-interlinkage	119	0.480	0.309-0.775	0.110

[19]The larger extent of two-tier interlinkage in rain-fed area is a distinguishing characteristic of our survey area. Thus the complex nature of two-tier interlinkage is predominantly a characteristic of relatively backward agriculture.

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Corporate Governance and Firm Performance:
An Analysis of Family and Non-family
Controlled Firms

QAISER RAFIQUE YASSER

The aim of this study is to scrutinise the impact of corporate governance mechanism on on the performance of family and non-family controlled firms in Pakistan. It has been found that a corporate governance structure influences the performance of both family and non-family controlled companies significantly. However all corporate governance mechanisms are not significant as the significant variables differ between family and non-family controlled companies. Thus, regulators need to be cautious in setting codes for different companies.

JEL classification: G34, L21, L25
Keywords: Corporate Governance, Firm Performance

1. INTRODUCTION

Family firms form the basic building block of businesses throughout the world. The economic and social importance of family enterprises has now become more widely recognised. Internationally they are the dominant form of business organisation. One measure of their dominance is the proportion of family enterprises to registered companies; this is estimated to range from 75 percent in the UK to more than 95 percent in India, Latin America and the Far and Middle East [Yasser (2011)]. The manner in which family firms are governed (the way in which they are directed and controlled) is therefore crucial to the contribution they make to their national economies as well as to their owners.

Family-owned listed companies are the backbone of Pakistan's economy. However, traditionally these companies are either unaware of the general principles of good corporate governance, or work in a relatively less open environment. Promoting basic principles of good governance for family-owned companies is crucial for economic growth.

Anderson and Reeb (2003) conclude from the US data that family companies outperform non-family companies. The same conclusions are also drawn from the studies of Miller and Breton-Miller (2006) and Villalonga and Amit (2006). Meanwhile, research in Western Europe has found that family-controlled companies have lesser agency problems between owner and manager but experience problems between family and

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minority shareholders [Maury (2006)]. However, studies show that owner-manager companies are less efficient in generating profits than professional non-owner manager companies [Lauterbach and Vaninsky (1999)].

In sum, a host of studies on family companies have been conducted worldwide, but few studies concern the situation in Pakistan. This study attempts to fill this research gap. Most Pakistani companies are family-owned and controlled. The researchers' aim is to find out whether Pakistani family-controlled companies perform better than non-family controlled companies or vice versa under corporate governance mechanism.

In this study financial performance has been analysed in two perspectives: accrual based and cash flow based. Accrual-based profit measures are claimed to be open to manipulations by managers [Teoh, Wong, and Rao (1998)]. Therefore, the alternative performance measure based on cash flows may be preferable. Cash flow-based studies have been carried out by several researchers [Kaplan (1989); Jain and Kini (1994); Kim, Kitsabunnarat and Nofsinger (2004)] who argue that operating cash flows are a useful measure in determining the firm's value and less sensitive to manipulation by managers. In terms of corporate governance mechanisms, this study introduces two new variables—directors' qualifications and independent directors with professional qualifications—that are expected to affect the firm's performance.

The presentation format of this study is as follows:

First, the theoretical framework on family and non-family companies' performance and corporate governance mechanism is discussed in the literature review section. The research methodology is then explained followed by the research findings and discussion. Finally, the research findings are summarised giving the study's limitations and recommendations are made for future studies.

2. THEORETICAL BACKGROUND AND HYPOTHESIS DEVELOPMENT

This section develops the hypotheses regarding the effects on performance of family-controlled and non-family controlled companies under corporate governance mechanisms.

2.1. Family and Non-family Companies' Performance

A study conducted by Daily and Dollinger (1992) shows that family companies reported higher sales growth and greater improvement in net margins than non-family companies. McConaughy, Walker, Henderson, and Mishra (1998) examine differences in efficiency and value, depending on whether the firm was founding family-controlled firm (FFCF) and had a CEO who was the founder/a descendant of the founder, or was a non-FFCF. The findings show that FFCFs are more efficient and valuable than NFFCFs in respect of industry, size and managerial ownership.

McConaughy, Matthews, and Fialko (2001) found that family companies have higher Tobin's Q than their counterparts. The family companies controlled by the founding family have greater value, operate more efficiently and carry less debt than other companies. Miller and Breton-Miller (2006) note that family companies perform better than non-family companies when the family companies have the intention to pass on the businesses to their progenies. A study by Maury (2006) in 13 Western European

countries found that active family control continued to outperform non-family controlled firms in terms of profitability in different legal regimes. In 2008, a survey conducted by Pakistan Institute of Corporate Governance (PICG) indicated that 80 percent of firms cannot reach the third generation of their founders in Pakistan.

Family companies have several incentives to reduce agency costs [Fama and Jensen (1983); Demsetz and Lehn (1985); Anderson and Reeb (2003)]. As a family's wealth is closely linked to the firm's welfare, there is a strong incentive to monitor managers and minimise the free-rider problem inherent in small, atomistic shareholders [Demsetz and Lehn (1985)]. Research also claims that executives who are stewards are motivated to act in the best interests of their principals [Donaldson and Davis (1991)]. Stewardship philosophy has been practised and is common among successful family companies [Corbetta and Salvato (2004)]. Keen involvement encouraged by stewardship philosophy creates a sense of psychological ownership that motivates the family to behave in the best interest of the firm [Zahra (2005); Corbetta and Salvato (2004)].

However, it is difficult for family companies to avoid the misalignment between principal and agents. The agency cost in family companies can take place between minority owners and the major family owners who serve as their potentially exploitative de facto agents [Morck and Yeung (2003); Villalonga and Amit (2006)]. Amran and Ahmad (2009) found that there is no difference in performance between family-controlled businesses and non-family controlled businesses for companies listed from 2000 to 2003. Firm performance diminishes as large shareholders remain active in management although they are no longer competent or qualified to run the firm. The implication is that firm performance is even worse for older family companies than for non-family companies [Shleifer and Vishny (1997)]. Hence, based on the arguments, the researcher hypothesised that:

H1: Family companies have higher financial performance than non-family companies.

2.2. Board Composition

Non-executive directors are needed on boards to monitor and control the actions of executive directors due to their opportunistic behaviour and act as checks and balances in enhancing the boards' effectiveness [Jensen and Meckling (1976)]. Additionally, non-executive directors might be considered to be "decision experts" [Fama and Jensen (1983)], independent and not intimidated by the CEO [Weisbach (1988)], able to reduce managerial consumption of perquisites [Brickley and James (1987)] and act as a positive influence over the directors' deliberations and decisions [Pearce and Zahra (1992)]. According to Tricker (1984) the presence of non-executive directors on boards provides "additional windows on the world". This is congruent with the resource dependence theory, which proposes that non-executive directors act as middlemen between companies and the external environment due to their expertise, prestige and contacts.

According to Pakistani Code of Corporate Governance (2002), boards of directors to be balanced should not have more than 75 percent executive directors. Empirical studies [Ward and Handy (1988); Ward (1991); Felton and Watson (2002); Newell and Wilson (2002)] show that family companies prefer to have independent non-executive directors in their boards. Independent directors provide neutral insights, bring in fresh,

creative perspectives and help in decision-making by bringing in new dimensions of experiences that may not be found among family directors. In family companies, the representatives of non-family directors on the board can offer a functional counterpoint in decision-making. Ward and Handy (1988) report that 88 percent of companies using non-executive directors believe that their boards are more useful and valuable as corporate governance agents of performance.

In contrast, a high proportion of non-executive directors on boards, as proposed by agency and resource dependency theories, also have drawbacks. Arguments against boards dominated by non-executive directors include stifling strategic actions [Goodstein, Gautam, and Boeker (1994)], excessive monitoring [Baysinger and Butler (1985)] and lack of real independence [Demb and Neubauer (1992)]. However, research by Klein, Shapiro and Young (2005) found no evidence that board composition affects firm performance. In family-owned companies, a high level of board independence does not automatically lead to better performance. Chin, Vos, and Casey (2004) also claim that the percentage of non-executive directors has little impact on overall firm performance. It means that the composition of independent non-executives directors seem has a mixed impact on performance. Therefore, the authors hypothesised that:

H2: There is a significant association between proportion of independent non-executive directors and financial performance.

2.3. Director's Qualification

The Code of Corporate Governance (2002) recommends that directors should use their qualities (skills, knowledge and experience, professionalism and integrity) in carrying out their duties. This is consistent with the resource dependence theory. Castillo and Wakefield (2006) show that educational background and skills may influence family companies' performance. A family's special technical knowledge concerning a firm's operations may put it in a better position to monitor the firm more effectively. Also, families have incentive to counteract the free rider problem that prevents atomised shareholders from bearing the costs of monitoring, ultimately reducing agency costs. Sebora and Wakefield (1998) find a positive relationship between education of the incumbent and conflict over money, management control and strategic vision. Educated incumbents may have been exposed to better financial management than their less educated counterparts. Based on the arguments, the authors hypothesised that:

H3: There is a relationship between proportion of directors' qualification and financial performance.

2.4. Independent Director's with Professional Qualification

Independent directors' background and competence are essential factors as they contribute positively to the family-owned companies [Johannisson and Huse (2000)]. However, Hartvigsen (2007) claims that companies are facing challenge in searching for qualified directors to sit on the boards. Most of the families prefer interlock directorship to secure their point of view in business operations. A survey conducted in the US by Ernst and Young reports that many companies in Europe and America complain that they struggle to find qualified directors for their boards [*The Economist* (2006)]. Hendry (2002) also highlights that family companies face problems of having competent and expert agents.

Moreover, Berube (2005) notes that companies cannot contend with directors who simply put in a token appearance. Companies seek qualified directors, together with their expertise. A report from Christian and Timbers in New York also reflects the tough competition for qualified outside directors [Bates (2003)]. Therefore, the authors hypothesised that:

H4: There is a relationship between the proportion of independent directors with professional qualification and financial performance.

2.5. Board Meetings

The corporate governance view is that the board should meet regularly to discuss matters that arise. There are various suggestions for the frequency of board meetings. In the US, six meetings per year in alternate months is thought to be a good balance for most companies, when supplemented by occasional special meetings [Moore (2002)]. Boards meet formally at least four times per year, supplemented by additional monthly executive committee meetings attended by directors, the chairman, the CEO and senior managers [Ward (1991)].

Pakistani Code of Corporate Governance (2002) proposes that the board should meet regularly, with due notice of issues to be discussed but should meet at least once in a quarter.

The board should disclose the number of board meetings held in a year and the details of attendance of each individual director; it should also maintain minutes of meetings. Based on the above literatures, the authors hypothesised that:

H5: There is a relationship between the number of meetings and financial performance.

2.6. Leadership Structure

The corporate governance perspective views the CEO duality to arise when the post of the CEO and Chairman are managed by one and the same person. The agency theory claims that there must be a separation between ownership and control. The separate leadership structure can curb agency problems, and enhance the firm's value [Fama and Jensen (1983)].

In contrast, duality leadership is common among family companies [Chen, Cheung, Stouraitis and Wong (2005)]. The founder-CEOs as more concerned about the survival of their companies and are willing to protect their legacy for future generations. In the US, Moore (2002) finds that some companies have the CEO as the board chairman in order to focus the company's leadership. In addition, by splitting the role of the chairman and CEO, it reduces the CEO's freedom of action [Felton and Watson (2002)]. Other researchers find that stewards who hold the position of a board executive and a chairman concurrently have significantly higher corporate performance [Donaldson and Davis (1991); Finkelstein and D'Aveni (1994)].

Still others suggest there is no significant difference in firm performance between executive and non-executive chairmen [Chaganti, Mahajan and Sharma (1985); Molz (1988)]. The CEO-chair is responsible for the firm and the CEO has the power to determine strategy without fear of counter demands by an outside chair of the board

[Finkelstein and D'Aveni (1994); Davis, *et al.* (1991)]. Based on these mixed findings, the authors hypothesised that:

H6: There is a significant association between financial performance and the practice of separate leadership.

2.7. Control Variables

The control variables in this study are debt, firm age and firm size. Companies do appear to make their choice of financing instrument as though they had target levels in mind for both the long-term debt ratio, and the ratio of short-term total debt [Marsh (1982)]. A study by Welch (2003) finds that there is a negative correlation between a firm's debt levels and corporate performance.

Ongore (2011) argues that all companies around the globe choose internal over external finance and debt over equity. Companies do not aim at any target debt ratio; instead, the debt ratio is just the cumulative result of hierarchical financing over time. Companies that face a financial deficit will first resort to debt, and will be observed later at a higher debt ratio [Myers and Majluf (1984)].

Next, the firm age is an important determinant of firm growth, the variability of firm growth and the probability of firm dissolution [Evans (1987)]. A study relating to firm age conducted by Dunne and Hughes (1994) finds that smaller companies were growing faster than the larger ones, though with more variable growth rate patterns. The smaller companies also shared a relatively low death rate from takeover as compared to the large companies, while medium sized companies were most vulnerable to takeover. The findings also revealed that younger companies, for a given size, grew faster than older companies.

Firm size can be "retarded" if a family management team is reluctant to raise external funds because it fears it will entail a loss of family control [Yasser (2011)]. Daily and Dollinger (1992) argue that some family companies operate without growth plans. As a result, some family companies only grow at a pace consistent with meeting the advancement needs of organisational members in the family system. Cromie, Stephenson, and Montieth (1995) found that family companies were smaller in terms of employment and sales turnover than non-family companies. Trow (1961) argues that larger companies have more resources, making it easy to attract, train, and develop potential successors and to engage outside advisers who may encourage continuity planning [Yasser (2011)].

3. RESEARCH METHODOLOGY

3.1. Data

The researcher gathered data from a sample of Pakistani companies listed on the Karachi Stock Exchange over the period of 2003 to 2008. This period was selected because this study seeks to examine the post effect of the implementation of the Code of Corporate Governance issued in 2002. A total of 134 companies have been selected for the study so the sample size for six years' observations was 804. This study adopted panel regression model analysis to determine the coefficient correlation between independent and dependent variables [Gorriz and Fumas (2005); Anderson and Reeb (2003)].

The definition of family-controlled firm was consistent with previous studies [Anderson and Reeb (2003); Villalonga and Amit (2006)]. In determining the family companies, the information on directors' profile and shareholdings were collected from the annual reports and

corporate websites of companies. Data on board composition, directors' education, independent directors with professional qualification, number of meetings and leadership structure were also obtained from the annual reports. Financial data such as market value of ordinary shares, total assets, net income, earnings before interest, tax, depreciation and amortisation (EBITDA), shareholder's equity, return on assets (ROA), long term debt and operating cash flow were gathered from independent financial analysts. Then, the financial data was cross-checked with the printed annual reports to make the information more reliable.

3.2. Research Model and Measurement

In this study, the research model is as follows:

Model for total sample:

$$FPERF_{it} = b_0 + b_1 FCP_{it} + b_2 BCOMPO_{it} + b_3 DIRQUAL_{it} + b_4 PROQUAL_{it} +$$
$$B_5 MEETG_{it} + b_6 LSHIP_{it} + b_7 DEBT_{it} + b_8 FAGE_{it} + b_9 FSIZE_{it} + \alpha_i + \lambda_t + \mu_{it} \quad (1)$$

Model for family-controlled companies and non-family controlled companies:

$$FPERF_{it} = b_0 + b_1 FCP_{it} + b_2 BCOMPO_{it} + b_3 PROQUAL_{it} + b_4 MEETG_{it} +$$
$$B_5 LSHIP_{it} + b_7 DEBT_{it} + b_8 FAGE_{it} + b_9 FSIZE_{it} + \alpha_i + \lambda_t + \mu_{it} \quad \dots \quad (2)$$

3.3. Model Specification

Variables, definitions and measurements are given in Table 1 mentioned below.

Table 1

Variables, Definitions and Measurements

Variable	Measurement
Dependent Variables	
Tobin's Q (Q)	Market value of common equity plus book value of preferred shares and debt divided by book value of total assets.
Return on assets (ROA)	Net income divided by book value of total assets.
Operating cash flow (OCF)	Ratio of cash flow from operating activities to total assets.
Independent Variables	
Family-controlled firm (FCF)	Family-controlled firm is defined as: (1) Founder is the CEO or successor is related by blood or marriage, (2) At least two family members in the management, and (3) Family directors have managerial ownership (direct and indirect shareholdings) of minimum 20 percent in the firm. It is coded as 1 if it is a family-controlled firm, 0 for non-family controlled firm.
Board composition (BCOMPO)	% of independent non-executive director/ total directors.
Director's qualification (DIRQUAL)	% of directors' with degree/ total directors.
Professional qualification (PROQUAL)	% of independent director with professional qualification/ total directors. Professional is defined as an individual that hold the professional title (CA, CMA, CPA, and ACCA), engineering, information technology, law and others.
Meeting (MEETG)	The frequency of meetings per year.
Leadership structure (LSHIP)	Firm practice whether separate or duality leadership. It is coded as 1, if firm practice separate leadership, 0 for duality separate or duality leadership.
Control Variables	
DEBT	The book value of long-term debt/ total assets.
Firm Age (FAGE)	The number of years since incorporated.
Firm Size (FSIZE)	The natural log of the book value of total assets.

Source: Developed for this research.

3.4. Panel Data Approach

In order to test the proposed model equations, this paper employs panel data approach because it facilitates elimination of the unobservable heterogeneity that the different companies in the sample data could present [Himmelberg, *et al.* (1999)]. Yasser (2011) describe that a panel data regression has some advantages over regression that run cross sectional or time series regression independently. First, combining time series and cross sectional observation panel data gives more informative data, variability, less co-linearity among the variables, more degree of freedoms, and more efficiency. Secondly, by making data available for several thousand units, a panel data can minimise the bias that might result if individual or firm level data are divided into broad aggregates. Last, panel data can better detect and measure effects that simply cannot be observed in pure cross-section or pure time series data [Gujarati (2003); Baltagi (2001)].

The classical normal linear regression assumes that the error term is constant over time periods and locations. If such assumption is true than it is said that homoskedasticity exists. However, if there are variations in the observation, it may cause the variance of the error term produced from the regression not to be constant and as a result, the problem of heteroskedasticity prevails. If that occurs, the estimates of the dependent variable become less predictable [Gujarati (2003)].

4. RESULTS AND ANALYSIS

4.1. Descriptive Analysis

Table 2 summarises the statistics on all companies, family-controlled companies and non-family controlled companies with relation to the sector. Overall, the highest sector in this sample was properties (27.4 percent), followed by industrial products (26.71 percent), trading services (15.75 percent), consumer products and plantations (10.96 percent). Then, the sample was split into family-controlled and non-family controlled companies. For family-controlled companies, the first place is industrial products (27.38 percent), followed by properties (26.19 percent), and trading services (16.67 percent). Meanwhile, for non-family controlled companies, properties sector (29.03 percent) was in the top rank, followed by industrial products (25.81 percent).

Table 2

Descriptive Analysis

Sectors	All Companies	%	FCF	%	NFCF	%
Personal Goods	198	21.21%	132	26.51%	66	21.57%
Industrial Product	102	12.88%	66	13.25%	36	11.76%
Insurance	60	4.55%	24	4.82%	36	11.76%
Household Goods	48	5.30%	24	4.82%	24	7.84%
Construction and Material	42	3.79%	24	4.82%	18	5.88%
Food Producer	180	34.85%	144	28.92%	36	11.76%
Chemical	66	6.82%	42	8.43%	24	7.84%
Financial Services	72	6.82%	18	3.61%	54	17.65%
Automobile and Parts	36	3.79%	24	4.82%	12	3.92%
Total	804	100%	498	100%	306	100%

Source: Developed for this research.

Notes: FCF = Family-controlled companies, NFCF = Non-family controlled companies.

4.2. Univariate Tests

In Table 3, t-test results show that there was a difference in performance (as measured by TOBINS Q) between family and non-family controlled companies. Family-controlled companies have shown higher mean value (0.828) as compared to non-family controlled companies (0.674). It implies that family-controlled companies have better firm performance. These findings are in line with previous studies [Daily and Dollinger (1992); McConaughy, *et al.* (1998); Anderson and Reeb (2003); Miller and Breton-Miller (2006); Martinez, Stohr, and Quiroga (2007)] which indicate that family-controlled companies are likely to achieve higher performance than non-family controlled companies. Family companies have greater firm value, operate more efficiently and families have the intention to keep the business for their next generations. In contrast, when OCF is used as dependent variable, it is evident that non-family controlled companies have a higher mean of OCF (0.062) compared to family-controlled companies (0.038). It shows that non-family controlled companies are better at managing the companies' cash flows.

Table 3

Means, Standard Deviation and Tests of Differences in Means between Family and Non-family Controlled Companies and Corporate Governance Mechanisms with Performance Indicators

	All Companies		FCF		NFCF			
	Mean	S.D	Mean	S.D	Mean	S.D	Dif. In Mean	t-value
Tobin Q	0.773	0.132	0.828	0.116	0.674	0.138	0.026	4.306*
ROA	0.042	0.079	0.049	0.057	0.041	0.101	0.002	0.258
OCF	0.048	0.136	0.038	0.070	0.062	0.192	−0.025	−2.41*
BCOMPO	0.396	0.115	0.372	0.090	0.429	0.136	−0.056	−6.755*
DIRQUAL	0.770	0.198	0.725	0.199	0.839	0.174	−0.119	−8.397
PROQUAL	0.168	0.131	0.157	0.119	0.183	0.146	−0.026	−2.649*
MEETG	5.305	1.999	4.967	1.212	5.765	2.658	0.798	5.434
DEBT	0.121	0.137	0.125	0.136	0.117	0.146	0.008	0.796**
FAGE	11.830	13.910	10.971	12.264	12.994	15.817	−2.022	−1.945
FSIZE	13.599	0.801	13.655	0.812	13.524	0.780	0.131	2.184
LSHIP	0.898	0.295	0.850	0.358	0.970	0.174	−0.120	−7.683***

Source: Developed for this research.

Notes: *Significant at 0.05 (1 tailed); ** significant at 0.01 (1 tailed); Tobin Q=Market value of common equity plus book value of preferred shares and debt divided by book value of total assets, ROA=Net income divided by book value of total assets, OCF=Ratio of cash flow from operating activities to total assets, LSHIP=Type of leadership that a firm practice, whether separate leadership or duality leadership, BCOMPO = Percentage of independent non-executive director divided by total directors, DIRQUAL = Percentage of directors' with degree and above divided by total directors, PROQUAL = Percentage of independent director with professional qualification divided by total directors, MEETG = The frequency a firm conducts meetings per year, DEBT = The book value of long-term debt by total assets, FAGE = Number of years since incorporated, FSIZE = Natural log of the book value of total assets; # For LSHIP, a chi-square test was applied.

In terms of PROQUAL, the mean for non-family controlled companies (0.183) is higher than that of family-controlled companies (0.157). The results show that non-family controlled companies prefer to have more independent professional directors on their boards as compared to family-controlled companies. The independent directors, it is claimed bring in fresh creative perspectives, are more objective, have new dimensions of experience, are more

open in discussions and enhance management accountability [Ward and Handy (1988)]. On the other hand, owners of family-controlled companies were reluctant to appoint independent directors because they were afraid of losing control, did not believe that the non-executive directors understood the firm's competitive situation, were afraid of opening up to new, external ideas and their boards spent a lot of time on more urgent, operational issues [Ward (1991)]. Executives provide rich firm-specific knowledge and strong commitment to the firm [Sundaramurthy and Lewis (2003)]. The LSHIP variable is significant, whereby there are differences between leadership structure practised by family and non-family controlled companies. For DEBT, family-controlled companies favour the use of debt more than non-family controlled companies. The mean value of debt for family-controlled companies was 0.125, while that for non-family controlled companies was 0.117.

The use of debt is preferred by family-controlled companies because they prefer internal to external fund. This finding supports Myers and Majluf's study (1984). On the other hand, non-family controlled companies prefer to have lower usage of debt and use other sources of financing to run their business operation. This finding supports Welch's study (2003). However, the results discussed above only give directions for the hypotheses. The next section discusses the multivariate analysis which is more robust.

4.3. Multivariate Tests

4.3.1. Pooled OLS

On the bases of the results reported in Table 4, when data is pooled together (for all companies), results reveal that family-controlled firm (H1) and board composition (H2) hypotheses are supported using Q, ROA and OCF.

Table 4

The Pooled Ordinary Least Square by Using Q, ROA and OCF (All Companies)

	Tobin Q		ROA		OCF	
	Coefficient	t-value	Coefficient	t-value	Coefficient	t-value
FCF	0.034	3.54***	0.018	3.07***	-0.016	-2.57
BCOMPO	-0.089	-2.15	-0.08	-3.32	-0.062	-2.34
DIRQUAL	0.041	1.71***	0.017	1.25	-0.009	-0.57
PROQUAL	0.098	2.72***	0.021	0.99	0.034	1.51
MEETG	0.001	0.38	-0.004	-2.99	-0.001	-1.06
LSHIP	-0.022	-1.45	0.008	0.84	0.001	0.15
DEBT	0.046	1.65**	-0.051	-3.13	-0.053	-3.02
FAGE	0.00	0.85	0.00	-2.21	-0.001	-3.82
FSIZE	-0.024	-5.78	0.016	6.79***	0.009	3.6***
F-statistic	7.44		11.74		5.37	
R^2	0.04		0.07		0.03	

Source: Developed for this Research.

Notes: *Significant at 0.1 (1 tailed); **significant at 0.05 (1 tailed); *** significant at 0.01 (1 tailed); Q = Market value of common equity plus book value of preferred shares and debt divided by book value of total assets, ROA = Net income divided by book value of total assets, OCF = Ratio of cash flow from operating activities to total assets, FCF = Family-controlled firm, LSHIP = Type of leadership that a firm practice, whether separate leadership or duality leadership, BCOMPO = Percentage of independent non-executive director divided by total directors, DIRQUAL = Percentage of directors' with degree and above divided by total Directors, PROQUAL = Percentage of independent director with professional qualification divided by total directors, MEETG = The frequency a firm conducts meetings per year, DEBT = The book value of long-term debt by total assets, FAGE = Number of years since incorporated, FSIZE = Natural log of the book value of total assets.

The director's qualification (H3) and independent directors with professional qualification (H4) are only supported when Q is used as indicator to measure firm performance. Meeting (H5) and leadership structure (H6) are supported only when ROA is applied.

The findings reveal that family-controlled companies have higher firm performance as compared to non-family controlled companies. Thus, H1 is accepted. This is in line with previous studies [McConaughy, *et al.* (2001); Anderson and Reeb (2003); Maury (2006); Matinez, Stohr, and Quiroga (2007)]. In terms of board composition, the results indicate that higher proportion of independent directors leads to lower firm value. These results may explain that independent directors that dominated the board may act as "additional windows" [Trickers (1984)] and lack of real independence [Demb and Neubauer (1992)]. So, this study does not support H2.

When Q is used as a performance indicator, the results show that DIRQUAL and PROQUAL are significant. Thus, H3 and H4 are accepted. The results indicate a positive direction whereby directors with qualifications may enhance firm performance. Moreover, when the board consists of higher numbers of independent directors with professional qualifications, the firm's value increases. This is because the educational background, competence and skills are used to manage the companies. Thus, these findings support previous studies [Johannisson and Huse (2000); Castillo and Wakefield (2006)].

However, when ROA is used as the performance indicator, it is found that MEETG is negatively related with firm performance. It explains that greater frequency of meetings is not an effective factor, it can deteriorate the firm value.

So, H5 is not supported. DEBT and FAGE are negatively related with firm performance. Debt findings and firm age results are in line with studies by Dunne and Hughes (1994). This research found FSIZE to be positively related to firm performance. This is consistent with a previous study by Trow (1961).

4.3.2. Panel Data Regression

Besides using the Pooled Ordinary Least Square (OLS), a Hausman test was carried out to determine whether the Fixed Effect Model (FE) or Random Effect Model (RE) is appropriate in this study. The result of the Hausman test shows that the p value was significant, so the F-statistic result, FE is more applicable in this study.

Table 5 explains that board composition for family and non-family controlled companies is negatively related with firm performance. It explains that when more independent directors sit on the board, the firm's performance decreases. Thus, companies do not fully utilise the roles of the independent directors. The directors may sit on the board to fulfill the board composition requirements or to show that the board is "*independent*", but in reality it is not. These findings do support previous studies [Trickers (1984); Demb and Neubauer (1992)].

In terms of the director's qualifications, only non-family controlled companies show positive relations with performance. Higher qualifications of directors help companies to achieve higher firm performance. The directors' educational background, competence and skills are used to manage the companies. This finding supports previous studies [Castillo and Wakefield (2006)]. For variable PROQUAL, family and non-family controlled

Table 5

Tobin Q, ROA and OCF (Family and Non-family Controlled Companies)

	Tobin Q		ROA		OCF	
	FCF Coefficient	NFCF Coefficient	FCF Coefficient	NFCF Coefficient	FCF Coefficient	NFCF Coefficient
FCF	0.000	–0.0073	0.0002	0.000	0.0000	0.0007
BCOMPO	–0.024	0.103***	–0.021	–0.105***	–0.009	–0.091
DIRQUAL	–0.008	0.116***	–0.004	0.053**	–0.011	–0.029
PROQUAL	0.314***	–0.106***	0.050***	0.004	–0.012	0.088**
MEETG	0.011**	–0.000	0.000	–0.006***	0.001	–0.003
LSHIP	–0.017	–0.064	0.002	0.045	0.003	0.007
DEBT	0.021	0.103***	–0.009	–0.130***	–0.021	–0.121
FAGE	0.000	0.000	–0.000***	–0.000	0.000*	0.001
FSIZE	–0.022*	–0.028	0.000	0.029***	0.002	0.017
F-statistic	21.00	12.21	8.24	2.42	10.65	3.92

Source: Developed for this research.

Notes: *Significant at 0.1 (1 tailed); **significant at 0.05 (1 tailed); *** significant at 0.01 (1 tailed); FCF = Family-controlled companies, NFCF = Non-family controlled firm, Tobin Q = Market value of common equity plus book value of preferred shares and debt divided by book value of total assets, ROA = Net income divided by book value of total assets, OCF = Ratio of cash flow from operating activities to total assets, LSHIP = Type of leadership that a firm practice, whether separate leadership or duality leadership, BCOMPO = Percentage of independent non-executive director divided by total directors, DIRQUAL = Percentage of directors' with degree and above divided by total Directors, PROQUAL = Percentage of independent director with professional qualification divided by total directors, MEETG = The frequency a firm conducts meetings per year, DEBT = The book value of long-term debt by total assets, FAGE = Number of years since incorporated, FSIZE = Natural log of the book value of total assets.

companies show a negative relationship with the firm performance. The results indicate that having a higher number of independent directors with professional qualifications, does not improve a firm's performance. This explains that family and non-family controlled companies may have problems getting competent directors on their boards [Henry (2002)].

Family-controlled companies favour more meetings to enhance firm performance. This may be due to the fact that the more regularly they meet; the more they discuss matters without being constrained by time. Decision-making is taken seriously because the companies seek to have their assets transferred to future generations. In contrast, for non-family controlled companies, several meetings are ineffective. Non-family controlled companies usually comprise more outsiders. So, these outsiders work professionally such that when conducting meetings, every matter is taken seriously and time is used wisely.

The LSHIP variable for non-family companies is negatively related with firm performance. It shows that separate leadership actually enhances firm performance. In terms of control variables (debt, firm age and firm size) the results show a negative relationship with firm performance. Non-family controlled companies do not favour the use of debt which is consistent with previous studies by Welch (2003). Family and non-family controlled companies support the notion that a firm's value decreases as it ages, and this is in line with studies by Dunne and Hughes (1994). The finding supports research by Daily and Dollinger (1992). The research found that being non-family controlled enhances firm performance (when ROA and OCF are used as firm performance indicators). Thus, this finding also supports previous studies by Trow (1961).

5. CONCLUSION

Overall, this study finds that there are significant differences between family and non-family controlled firms' performance when measured by Tobin Q, ROA and OCF. For family-controlled companies, only two variables (PROQUAL and MEETG) are significant. Boards that have higher composition of professional directors show higher firm performance. But board meetings' frequency constitutes a variant trend. Family-controlled companies do show lower number of meetings. For non-family controlled companies, the board governance variables (BCOMPO, DIRQUAL, PROQUAL, MEETG and LSHIP) as suggested by Pakistan's Code of Corporate Governance (2002) have improved the firm performance. In addition, debt, firm size and firm age affect a firm's performance. It shows that corporate governance does play a vital role in influencing Pakistani companies' financial performance. Family-controlled companies do not comply with the guidelines provided by the Securities and Exchange Commission of Pakistan (2002). Thus, regulators need to take note that family and non-family controlled companies apply different sets of practices in managing their companies.

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Formal Participation in a Milk Supply Chain and Technical Inefficiency of Smallholder Dairy Farms in Pakistan

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This paper provides empirical evidence on the impact on technical inefficiency of smallholder dairy producers when they formally participate in a milk supply chain. Here the stochastic production frontier and technical inefficiency effects model are estimated based on the data gathered from 800 smallholder dairy farms in Pakistan. The results suggest that the technical inefficiency of the participating farms is significantly reduced. A strong impact of the supply chain is also detected in reducing technical inefficiency of farms that are located in remote areas and on those that have larger herd-size. Experienced farmers upto the age of 36 years have the advantage of reducing technical inefficiency. The remaining differences in relative inefficiency of dairy farms are accounted for by severe long-term depressive disorders.

JEL classification: D24, Q12, Q13, Q18
Keywords: Agri-food Supply Chain, Production Frontiers, Dairy Efficiency, Food Policy, Pakistan

1. INTRODUCTION

Agri-food supply chain systems have undergone dramatic transformation lately in many developing countries. Urbanisation, in conjunction with rapid growth in incomes, has caused the character of urban diets in these countries to shift away from low quality staple grains towards high quality cereals, then to livestock and dairy products, and vegetables and fruits [Pingali (2006)]. A combination of these factors have forced many developing countries to re-orient their production and marketing systems by linking local producers with the organised commodity networks and super markets to meet the increasing domestic and global consumer demands. Hence numerous supply chains of agricultural and food products have been formed by agents engaged in production, processing, marketing and distribution of these products. The consequences of linking smallholder producers with the organised supply chain networks catering to domestic or

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international markets are not fully known: Who are the winners and who the losers in an integration of this kind; how participation in these supply chains affects the relative inefficiency of smallholder producers; and how does the buyer-side market structure affects the sustainability of the participating farms? This paper attempts to answer these questions.

Much of the research into supply chain networks continues to rely on agribusiness theory [e.g., Dolan and Humphrey (2000); Islam (2008); Sartorius and Kirsten (2007)]. A vast literature also examines production and distribution planning of supply chains [see, among others, Ahumada and Villalobos (2009)], while many others address issues related to public health as in Jevsnik, *et al.* (2008). A few papers such as Gow and Swinnen (1998) and Key and Runsten (1999) show that foreign direct investment in developing nations helps in enforcement of contracts and adoption of new technologies, yet others [e.g., Dolan and Humphrey (2000) and Weatherspoon and Reardon (2003)] conclude that FDI negatively affects small local suppliers. Gow and Swinnen (2001) and Dries and Swinnen (2004) show that FDI related vertical and horizontal integration contributes to increased access to finance, inputs and productivity growth while Gorton, *et al.* (2006) illustrate how asymmetric information between dairy farmers and milk processors leads to market failure. Some recent studies have voiced concerns about exclusion of small-scale farmers in developing countries from profitable niche markets due to tighter alignment of supply chains producing for international super markets [e.g., Reardon and Barrett (2000); Stanton (2000); Unneveher (2000); Sartorius and Kirsten (2007)]. Yet there is no empirical evidence on the effects of participation of smallholder producers in supply chain network on their productive efficiency.

This paper provides evidence from the supply chain of milk processing industry in Pakistan and evaluates how participation of commercial dairy farms in milk supply chain network, also known as milk district, affects technical inefficiency of the participating dairy farms, especially in comparison with the record of their rival, traditional milk collectors or *dodhis*. Milk supply chain functions on the basis of: (a) self-collection of farmers' milk by the milk plants, e.g., Nestlé's milk collection model; (b) third-party milk collection on behalf of processing units, e.g., Haleeb, Nirala, Noon, etc.; and (c) farmer cooperatives, e.g., HALLA (Idare-e-Kisan).[1]

Pakistan is the fourth largest producer of milk in the world where three-fourth of the total milk supply is produced in the Punjab province. The hallmark of the dairy economy in Pakistan is the dominance of subsistence dairy households that keep buffalos and cows in small herd-sizes [Burki, *et al.* (2004)]. Punjab is also home to one of the largest milk supply chains in Asia. Punjab has the unique feature of having more than 20 private milk processing companies competing to collect farmer milk, including global giant Nestlé, Haleeb Foods, and Halla. Nestlé Pakistan has, this year, completed 23 years of milk collection from rural Punjab while other milk processing units have also made significant inroads over the last 15 years. While commercial dairy farms are evenly spread, the milk supply chain mostly consists of central and southern districts of the Punjab province where population density is relatively low and milk is surplus. However,

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[1]Nestlé Pakistan is the biggest processing industry of the sector, collecting 1040 tons of milk daily from over 140,000 farmers in about 3500 villages. Other major industry players include Haleeb, Nirala, Halla, Noon, Millac, Dairy Bell, Dairy Crest, Premier, Army Dairies and Engro Foods.

this is not the case in northern districts of Punjab, where a vast informal network of traditional milk collectors, known as *dodhis*, is still collecting milk from dairy farmers, as was the case in southern Punjab before the emergence of the milk supply chain. Gains in technical efficiency of participating dairy farms are expected on account of better decision-making.

The milk supply chain creates favourable production conditions in the form of modern milk storage facilities, better and dependable transportation even to remote areas, regular payment schedules and buyer-side competition leading to higher farm-gate prices.[2] In effect it is expected that the presence of milk supply chain would lead to gains in technical efficiency of the participating dairy farms.

This paper uses a rich data set of 800 smallholder dairy producers to examine the extent to which participation in milk supply chain contributes to reducing the technical inefficiency of these farms. The results suggest that dairy farms in milk supply chain improve their long term viability by establishing a steady and secure link with the processing industry. In general, while technical inefficiency of dairy farms located in the milk supply chain is significantly reduced, the stronger power of the supply chain is detected in further reducing technical inefficiency of farms situated in remote areas or those with relatively large farm size.

The paper is organised in six sections. Section 2 outlines the survey of dairy households and sampling methods; Section 3 describes the empirical framework; Section 4 data and variables; Section 5 analyses the estimation results and examines the impact of milk supply chain on dairy efficiency; Section 6 presents the conclusions of this study.

2. SURVEY OF DAIRY HOUSEHOLDS AND SAMPLING METHODS

A survey namely, the LUMS[3] Survey of Dairy Households in Rural Punjab 2005, was designed to draw a representative sample of 800 dairy households from rural Punjab, who owned at least one milching animal (buffalo or cow), sold milk for at least 6 months, and did not share ownership of farm resources with other households during the calendar year 2005.[4] Punjab is the most populous of the four provinces, which produces nearly 70 percent of total fresh milk supplies in the country. While the dairy farms are evenly spread in Punjab, the milk supply chain is mostly concentrated in central and southern Punjab. The dairy survey was conducted between January and April 2006.

The authors used a probability sampling plan where sampled area (rural Punjab) was divided into sections according to agro-climatic (crop) zones, *mouzas*/villages and target groups. To accommodate the different environmental production conditions faced by the dairy households, Pinckney (1989) was followed and the districts were classified into five agro-climatic (or crop) zones consisting of (1) wheat-rice, (2) wheat-mix, (3) wheat-cotton, (4) low intensity barani (rain-fed), and (5) barani regions.

[2]For instance, Nestlé's milk supply chain model generally functions by setting-up rural milk collection centres, which provide access to chillers in remote rural areas. Some milk collection networks also provide dairy extension services.

[3]LUMS is short for the Lahore University of Management Sciences.

[4]The authors organised and supervised the survey, which was carried out by a three-member team of trained professional surveyors. A 26-page survey questionnaire was developed and appended by the WHO's self reporting questionnaire (SRQ-20), meant for measuring prevalence of depressive disorders in the surveyed dairy farmers.

In stage 1, ten districts were randomly picked (two from each agro-climatic zone) from 34 districts of Punjab.[5] In stage 2, four *mouzas*[6]/villages were randomly drawn from each selected district based on the list obtained from *Pakistan Mouza Statistics 1998* [Pakistan (1999)]. Out of 40 *mouzas*/villages sampled, 26 had at least one player from milk processing industry collecting milk. In stage 3, lists of commercial dairy households in selected *mouzas*/villages were prepared in consultation with notables of the areas and local milk collection units of the processing industry. Based on the lists, 20 dairy households were randomly selected from each mouza/village, with equal probability. Five replacement dairy households were also selected from each *mouza*/village to replace those who could not be interviewed. Of the 800 dairy households sampled, 160 were drawn from each agro-climatic zone. Around 77 percent of the farms owned up to 4 milching animals, 21 percent owned 5–10 animals and only 2 percent owned 11–30 animals. Thus small and subsistence dairy farms, which are the hallmark of Pakistan's dairy economy, were well represented in the survey design.

3. ESTIMATION PROCEDURES

The empirical framework employed in this paper involves the stochastic frontier approach, first introduced by Aigner, *et al.* (1977) and Meeusen and Van den Broeck (1977), which postulates the existence of technical inefficiency in the production process. This approach uses the concept of a frontier that depicts maximum output obtainable from given inputs, where technical inefficiency of a farm is estimated by deviations from the frontier. To illustrate, let the milk production technology be represented by

$$y_i = f(x_i\ ;\ \beta)\ e^{v_i - u_i}$$

where y_i is the output of the ith dairy farm, x_i ($i = 1,...,n$) is a $1 \times k$ vector of values of known functions of inputs for the ith dairy farm, β is a $k \times 1$ vector of unknown parameters to be estimated, and $f(x_i\ ;\ \beta)$ is the frontier production function (usually assumed as Cobb-Douglas). As usual in frontier literature, the stochastic composite error term in Equation (1) is decomposed into v_i and u_i where v_i is typically the symmetric error term taken as normal, independently and identically distributed (iid) as $N(0, \sigma_v^2)$, which captures the random effects of measurement errors in output, external shocks and events outside a farm's control, while $u_i \geq 0$ is the asymmetric technical inefficiency measure (usually assumed as half-normal, exponential, gamma or truncated normal distribution) representing farm-specific inefficiency effects reflecting the extent of the stochastic shortfall of the ith dairy farm output from the frontier. Following Battese and Coelli (1993, 1995), technical inefficiency is related to a vector of farm specific attributes Z_i in such a way that $u_i = Z_i\ \delta + w_i \geq 0$, where δ represents a vector of parameters to be estimated, and w_i is distributed as $N(0, \sigma_w^2)$, which is obtained by truncation from below where the point of truncation occurs at $-Z_i\ \delta$, or $w_i \geq -Z_i\ \delta$.

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[5]The sample districts were Hafizabad and Narowal in wheat-rice zone, Sargodha and Okara districts in mixed-cropping zone, Pakpattan and Khanewal districts in wheat-cotton zone, Muzaffargarh and Layyah in low-intensity zone, and Jhelum and Attock in barani zone.

[6]*Mouza* is the smallest administrative unit under the revenue department which may consist of one big village or few small villages. Punjab province has 23385 *mouzas* with an average of 600 *mouzas* in each district.

The start is taken with the translog specification for the stochastic production frontier,[7] which offers the advantage of being a second-order Taylor series expansion to an arbitrary technology, written as

$$\ln y_i = \beta_0 + \sum_i \beta_i \ln x_i + 0.5 \sum_i \sum_j \beta_{ij} \ln x_i \ln x_j + v_i - u_i \qquad \ldots \qquad \ldots \qquad (2)$$

where the technical inefficiency effects, u_i, are assumed to be defined by a linear function of explanatory variables given by

$$u_i = \sum_{j=1}^{N} \delta_j Z_{ij} + \eta_k + w_i \qquad \ldots \qquad \ldots \qquad \ldots \qquad \ldots \qquad \ldots \qquad \ldots \qquad (3)$$

where y and x are the indicators of output and inputs for the ith dairy farm, and the Cobb-Douglas technology is nested within the translog production technology, i.e., when all β_{ij} = 0. Moreover, Z_{ij} is a set of environmental or managerial variables influencing technical inefficiency, u_i, of dairy farms, while η_k captures unmeasured determinants of u_i that are fixed within a district (district fixed-effects).

4. THE DATA AND VARIABLES

Table 1 presents descriptive statistics of the relevant variables. The dependent variable in the production function is the estimated gross value of milk,[8] and other dairy products sold during the year. The value of milk income is calculated at the price quoted by the dairy farms. The average value of production of milk and other dairy output is Rs 88,520 per farm, which translates into around Rs 243 per day per farm. Based on the size, dairy production varies across dairy farms ranging from only Rs 900 to around Rs one million.

Seven input variables used in the frontier production function are (1) shed and structure capital, (2) animal capital, (3) fodders, (4) straws and concentrates, (5) molasses, (6) feed water, and (7) hired and family labour. Shed and structure capital measures the user cost of sheds, structures and electricity costs, etc. The average shed and structure capital is Rs 5,713, which is highly variable ranging from only Rs 20 to Rs 66,000 because subsistence farms do not use shed or structures for their dairy animals. The animal capital variable is calculated by taking user cost of each animal worked out on the basis of price and remaining life-span of the dairy animals. Prices of dairy cattle and buffaloes significantly vary depending upon, among other things, on their breed, genetic endowments and age, etc. Animal capital turns out to be a major component of dairy cost with an average amount of Rs 12,583 per farm. Two other major inputs in dairy production are fodders, and straw and concentrate with average use of 0.81 acres for fodders and 2,520 kg (63 × 40 kg) of straw and concentrate.

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[7]For a recent review of studies that have used the stochastic frontier model in farming sector, see Bravo-Ureta, *et al.* (2007).

[8]Due to long recall period (i.e., one-year), milk production reported by dairy farms is subject to large measurement error. To avoid the obvious measurement problem in a key variable, we adopt a procedure, due to Khan (1997, 2000), and predict daily milk production of each dairy animal in our sample. We obtain estimates of daily milk production by using the parameter estimates from Khan (2000) for the respective lactation length of each animal separately for first calves, later calves, and for the summer and winter months together with (i) the reported milk production for each animal on the interview day, and (ii) reported peak time daily milk production of each animal.

Table 1

*Descriptive Statistics for the Variables of the Frontier Production
Function and Inefficiency Model*

Variables	Mean	Std. Dev	Min	Max
Frontier Production Function				
Output				
Milk Production and other Dairy Outputs (Rs)	88517.9	87053.1	900.2	958176
Inputs				
Shed and Structure Capital (Rs)	5713	5486.3	19.6	66220.8
Animal Capital (User Cost)	12583	10709	720	131850
Fodders (Acres)	0.81	0.7693	0.0085	9.1882
Straws and Concentrates (40kg)	62.81	118.797	5.13	2811.50
Molasses (Yes=1, No=0)	0.025	0.156	0	1
Feed Water (No. of Times Feed Water to Animals)	2.34	0.51	1	4
Family and Hired Labour (Hours)	2097	1380.70	104	7488
Technical Inefficiency Model				
Farm Characteristics				
Herd-size (Number)	3.51	2.73	1	30
Head Age (Years)	49.25	13.58	17	95
Depression (if SRQ≥8=1, Otherwise=0)	0.119	0.324	0	1
Head Literate (Yes=1, No=0)	0.447	0.497	0	1
Location Variable:				
Distance *Pucca* Road (km)	0.861	1.06	0	8
Milk Supply Chain				
Milk Supply Chain (Yes=1, No=0)	0.525	0.499	0	1
No Player (No Industry Player in *Mouza*, Yes=1, No=0)	0.425	0.495	0	1
One-player (One Player in *Mouza*, Yes=1, No=0)	0.250	0.433	0	1
Two-players (Two Players in *Mouza*, Yes=1, No=0)	0.225	0.418	0	1
Three-players (Three Players in *Mouza*, Yes=1, No=0)	0.10	0.300	0	1
District				
Sargodha (Yes=1, No=0)	0.1	0.300	0	1
Narowal (Yes=1, No=0)	0.1	0.300	0	1
Hafizabad (Yes=1, No=0)	0.1	0.300	0	1
Pakpattan (Yes=1, No=0)	0.1	0.300	0	1
Okara (Yes=1, No=0)	0.1	0.300	0	1
Muzafargarh (Yes=1, No=0)	0.1	0.300	0	1
Layyah (Yes=1, No=0)	0.1	0.300	0	1
Khanewal (Yes=1, No=0)	0.1	0.300	0	1
Jhelum (Yes=1, No=0)	0.1	0.300	0	1
Attock (Yes=1, No=0)	0.1	0.300	0	1
Sample Size	800	–	–	–

Source: LUMS Survey of Dairy Households in Rural Punjab, 2005.

Feeding molasses to dairy animals is expected to have a positive impact on productivity. Molasses is a dummy variable that equals one for farms who feed molasses and zero otherwise. Only 2.5 percent of farms feed molasses to their animals. It is generally believed that if milching animals are fed sufficient water they yield more milk. But conventionally, most cows and buffaloes are tied all day due to which they are not free to drink water at will. Therefore, to gauge the effects on productivity, the frequency of feeding water to animals is used, which ranges from 1 to 4 times per day with mean value of 2.34. The labour input includes hired and family labour expressed in hours. The average use of family and hired labour is 2097 hours, which translates to 40 hours per week ranging from only 2 hours per week to 144 hours per week. In one sense this is hardly a surprising

result for a country like Pakistan where small dairy households rarely employ full-time dedicated workers for day-to-day management of dairy animals. Therefore, family and hired labour is measured in hours worked per day rather than person-days. In this way, the likely underemployment of family labour is also discounted for.

Several features of the technical inefficiency model in Equation (3) should be highlighted. The milk supply chain is the variable of interest, which reflects the status of a dairy farm and is equal to 1 if the farm is located in the milk supply chain region of the processing industry, and 0 otherwise. It is noted that 52.5 percent of the sample area is located in the milk supply chain. In the rest of the sample area, the processing industry is not present due to which only traditional milk collecting agents are buying farmer milk. The coefficient on milk supply chain identifies the differential effects of farm location in the milk supply chain and the non-milk supply chain district on technical inefficiency of the dairy farms.

Another set of important explanatory variables included in the specification of the technical inefficiency model captures the differential effects on technical inefficiency attributable to the buyer side market structure. The number of milk processors competing for farmer milk in a village indicates the extent of imperfect competition in farmer milk market.[9] To this end, four dummy variables are introduced. No-player is a dummy variable indicating that no industry player is present in the *mouza* due to which the traditional milk collecting agent (*dodhi*) enjoys the monopsony power in buying farmer milk. In the study data, 42.5 percent of the respondents sell milk directly to *dodhi* or other traditional milk collecting agent. One-player, two-players and three-players indicate presence of one, two or three industry players (or their agents), respectively competing in a village for the farmer milk. Roughly, 25 percent of the respondents are located in *mouzas* where one-player is present, 22.5 percent where two-players are present and 10 percent where three-players are present.

The variable, distance from *pucca* (metalled) road, is taken as an indicator of location of *mouza*. The average distance of dairy farms from *pucca* road is 0.86 km where the maximum distance from a farm is 8 km. Because distance from *pucca* road is roughly common to all dairy farms in a *mouza*/village, it also captures some location-specific unobserved heterogeneity in the sample. Two interactive terms are incorporated in the model i.e. (milk supply chain × distance *pucca* road, and milk supply chain × herd-size) to capture additional effects on technical inefficiency associated with presence of milk supply chain with distance from *pucca* road, and herd-size.

Control variables are also introduced to capture variation in technical inefficiency across farms on account of differences in farm characteristics. Here the relevant variables are herd-size, head age, depressive disorder and head literate. For the measure of depressive disorder, an index of depressive disorder is used. The psychiatric epidemiological studies show that anxiety and depressive disorder is not only common occurrence in Pakistan, but is also associated with disability [Mirza and Jenkins (2004)]. It is expected that farmers with major depression to operate at much less than their full potential. Therefore, the degree of long-term major depression is measured from the number of yes answers to the 20 questions in WHO's self-reporting questionnaire (SRQ-20). In the present sample, 12 percent of dairy farmers suffer from major depression measured by 8 or more yes answers to SRQ-20.

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[9]The market structure is said to be a monopsony when there is a single buyer of fresh milk, e.g., traditional rural milk collecting agent. This monopsony market structure closely resembles the picture prevailing in the non-milk supply chain in Pakistan. When there are two buyers of fresh milk a duopsony is said to exist; if there are several buyers oligopsony is the proper title.

Dairy farms located in various districts differ in many characteristics (e.g. differences in climate, soil conditions, temperature, rainfall and water availability). These factors might independently affect relative technical inefficiency of dairy farms across districts and thus bias the estimate of the coefficients in this study. Therefore, a complete set of all district dummy variables is also taken to control for district fixed-effects.

5. ESTIMATION RESULTS

The frontier production function, Equation (2), and the inefficiency effects, Equation (3), models are simultaneously estimated using the procedure in computer programme FRONTIER 4.1 [Coelli (1996)]. The hypothesis testing regarding functional forms and specifications is conducted on the basis of generalised likelihood ratio tests,[10] which have approximately a χ^2 distribution, except cases where the null hypothesis also involves the restrictions of $\gamma = 0$. In such cases, the asymptotic distribution of the likelihood ratio test statistic is a mixed $- \chi^2$ distribution and therefore the appropriate critical values are drawn from Kodde and Palm (1986). The hypothesis tests are conducted on the basis of empirical specification in model 1.

An important null hypothesis of interest is whether the Cobb-Douglas production frontier is an adequate representation of the dairy sector data versus the translog production frontier model. Table 2 presents the results of the hypothesis test, which shows that the translog production frontier is rejected in favour of the Cobb-Douglas production frontier at the 1 percent level of significance. Table 2 also reports the generalised likelihood ratio test that technical inefficiency effects are absent, or $\gamma = \delta_0$ $=...= \delta_{19} = 0$, which is strongly rejected at the 1 percent level of statistical significance; it confirms that most of the dairy farms are operating below the production frontier due to which the estimated inefficiency of these farms is high. Continuing, the null hypothesis, γ $= 0$, implies that the inefficiency effects are not stochastic, which is rejected at the 1 percent level of statistical significance. Finally, the null hypothesis, $H_0 : \delta_0 = \delta_1 =...= \delta_{19}$ $= 0$, entails that all the explanatory variables in the inefficiency model are jointly zero is also rejected. This result suggests that the linear explanatory variables accounting for the sources of technical inefficiency are significant even though the individual parameters of some variables may not be significant.

Table 2

Generalised Likelihood Ratio Hypothesis Tests

Null Hypothesis	Critical Value $(\alpha = 0.01)$	Test Statistics	Decision
H_0: Cobb-Douglas vs. Translog Production	30.58	21.79	Fail to Reject H_0
$H_0 : \gamma = \delta_0 = \delta_1 =...= \delta_{19} = 0$	41.02[a]	512.7	Reject H_0
$H_0 : \gamma = 0$	6.63[a]	281.21	Reject H_0
$H_0 : \delta_0 = \delta_1 =...= \delta_{19} = 0$	40.29	315.42	Reject H_0

[a] Critical values are taken from Table 1 of Kodde and Palm (1986) using 1 percent level of significance.

[10]The generalised likelihood-ratio test is defined by $LR= -2$ $\{\ln[L(H_0)/L(H_1)]\}= -2\{\ln[L(H_0)]-\ln[L(H_1)]\}$ where $L(H_0)$ and $L(H_1)$ denote the values of the likelihood function under the null and alternative hypothesis, respectively [Coelli, *et al.* (1998)]. Under the null-hypothesis the test statistic has approximately chi-square distribution with parameters equal to difference between the parameters involved in the null and alternative hypothesis.

(a) Production Frontier Results

The estimated parameters of the stochastic frontier and the technical inefficiency effects models are presented in Table 3. We begin with model 1 as a parsimonious model

Table 3

Estimation Results for the Frontier Production Function and Inefficiency Model

Variables	Model 1	Model 2	Model 3
Frontier Production Function			
Constant	2.933***	2.899***	2.93***
	(13.32)	(11.81)	(13.49)
Shed and Structure Capital	–0.003	–0.003	–0.003
	(–0.29)	(–0.29)	(–0.30)
Animal Capital	0.886***	0.892***	0.885***
	(30.35)	(29.89)	(29.32)
Fodders	0.042**	0.044**	0.039*
	(2.01)	(2.13)	(1.85)
Straws and Concentrates	0.039*	0.031*	0.045*
	(1.76)	(1.17)	(1.74)
Molasses (Yes=1, No=0)	0.053	0.052	0.048
	(0.94)	(0.96)	(0.87)
Feed Water (No. of Times)	–0.029	–0.033	–0.027
	(–1.23)	(–1.40)	(–1.19)
Family and Hired Labour	0.010	0.012	0.009
	(0.56)	(0.70)	(0.55)
Technical Inefficiency Model			
Constant	2.246**	1.901***	2.283***
	(4.41)	(3.76)	(4.14)
Herd-size (Number)	–0.156***	–0.050	–0.160***
	(–13.15)	(–1.52)	(–13.75)
Head Age	–0.071***	–0.063***	–0.075***
	(–3.32)	(–3.12)	(–2.99)
Head Age^2	0.001***	0.000**	0.001***
	(2.83)	(2.48)	(2.63)
Depression (if SRQ≥8=1, Otherwise=0)	0.629***	0.611***	0.620***
	(4.17)	(3.42)	(3.78)
Head Literate (Yes=1, No=0)	0.035	0.038	0.038
	(0.38)	(0.43)	(0.40)
Distance *Pucca* Road (km)	0.169***	0.200***	0.188***
	(3.83)	(3.57)	(3.05)
Milk Supply Chain (Yes=1, No=0)	–0.515***	–0.054	–
	(–3.41)	(–0.34)	
Milk Supply Chain × Distance *Pucca* Road	–	–0.262**	–
		(–2.22)	
Milk Supply Chain × Herd-size	–	–0.117***	–
		(–3.51)	
One-player (Yes=1, No=0)	–	–	–0.751***
			(–3.26)
Two-players (Yes=1, No=0)	–	–	0.115
			(0.66)
Three-players (Yes=1, No=0)	–	–	–1.304***
			(–2.94)
District Fixed-effects	Yes	Yes	Yes
$\sigma^2 = \sigma_u^2 + \sigma_v^2$	0.882***	0.769***	0.903***
	(5.85)	(5.20)	(4.35)
γ	0.962***	0.958***	0.963***
	(126.139)	(116.89)	(107.01)
Log-likelihood	–253.57	–250.69	–249.93
Sample Size	800	800	800

*, ** and *** indicate statistically significant at the 90 percent, 95 percent and 99 percent confidence level, respectively.

in which the milk supply chain is included as a key variable along with control variables included in all models. In model 2, it is shown how technical inefficiency of farms participating in milk supply chain is influenced when they are located in remote areas, i.e., interaction term "milk supply chain × distance *pucca* road", or they have large herd-size, i.e., "milk supply chain × herd-size". Model 3 explores how increased competition among the buying networks affects technical inefficiency of dairy farms. The extent of competition is introduced by four dummy variables ranging from "no industry player" to "three players" present in *mouza*/village.

The estimated coefficients of the Cobb-Douglas frontier production function model indicate that all input elasticities possess expected signs and the estimated coefficients are similar in magnitude in all the specifications. Animal capital, fodder, and straw and concentrate continue to be the most important determinants of raising output in smallholder dairy operations, while molasses, feed water, family and hired labour, and shed and structure capital do not significantly increase dairy output. To illustrate, the coefficient of animal capital is large, positive and statistically significant indicating that every 1 percent increase in the value of animal capital results in about 0.89 percent increase in dairy output.

Similarly, dairy output is statistically significantly correlated with fodder and straw and concentrate. The estimated fodder, and straw and concentrate elasticities are relatively much smaller (at approximately 0.042 and 0.039, respectively) and marginally significant suggesting that these inputs are not much of a limitation. By contrast, shed and structure capital, molasses, feed water and family and hired labour are not a constraint in raising dairy production, as suggested by their statistically insignificant coefficients. While the observed pattern for family and hired labour is explained by disguised unemployment of family labour, these results suggest that excess supply of straws and concentrate, and family labour can be used more productively by further expanding the capacity of the dairy farms (e.g., by purchasing more dairy animals). The policy makers can help by devising simpler and dairy-friendly credit policies, which may have substantial potential for dairy development in the country.

The estimated scale elasticity is measured by the sum of all the input elasticities. The estimated returns to scale is less than one (0.998), and the null hypothesis of constant returns to scale by using the Wald test is not rejected. In other words, a proportionate increase in the use of all inputs brings about a proportionate growth in dairy output.

(b) Milk Supply Chain Effects on Dairy Inefficiency

In the technical inefficiency model (Table 3), the dependent variable is measured in units of inefficiency ranging over the $(0, \infty)$ interval so that a score of zero indicates full efficiency and scores of more than zero indicate inefficiency. Likewise, coefficients with positive signs indicate increase in inefficiency, and vice versa. The estimated relationships between technical inefficiency and its correlates are qualitatively similar and robust in all regressions.

It may be noted that model 1 takes milk supply chain as a combined variable capturing milk supply chain effects plus other control variables. The estimate for γ parameter is significantly greater than zero, which suggests that the production frontier model is a significant improvement over the standard OLS regression model. In model 1,

the parameter for herd-size indicates that, *ceteris paribus,* keeping one additional milch animal significantly decreases technical inefficiency of dairy farms. The negative and positive coefficients for head-age and age-square predict that, on average, technical inefficiency of farmers continues to decrease until they reach the age of 36 years and increases thereafter. The significantly positive coefficient on the dummy variable for depression indicates higher inefficiency of farmers who suffer from severe long-term depression.

Farms located in remote areas do not face favourable operating conditions. It makes intuitive sense when it is found that distance from *pucca* road is positive and highly significant. For example, in model 1, the parameter $(0.169, t = 3.83)$ indicates that technical inefficiency significantly increases with an additional kilometre distance of dairy farm from *pucca* road. In other words, we detect that remoteness of dairy farms clearly has unfavourable effect on technical inefficiency.

The primary interest in this paper is to explore the differential impact of milk supply chain on technical inefficiency of dairy farms, holding all else as constant. It is clear from the results that the presence of milk supply chain indeed decreases technical inefficiency of smallholder dairy farms. The milk supply chain variable[11] has a negative estimated coefficient; this effect is statistically significant at the 1 percent level in model 1. The results suggest that it is important to build supply chains in rural areas if the policy makers are really interested in increasing productivity and growth of smallholder producers.

In model 2, the results suggest that while distance from *pucca* road increases technical inefficiency $(0.200, t = 3.57)$, building of milk supply chain clearly benefits dairy households in remote *mouzas*. For example, the negative and statistically significant coefficient of the interaction term $(-0.262, t = -2.22)$ reveals that building of milk supply chain tends to decrease inefficiency of dairy farms with their increasing distance from the *pucca* road. This is an interesting result since remoteness of rural communities remains a key feature in many developing countries including Pakistan. Given that local population in remote rural areas is partially or completely excluded from the facilities available to the rest of the population, building of milk supply chain in these *mouzas* enables producers to reap such benefits as fair prices, weekly payments, transparent milk-grading, and training in farm management. These services, in turn, help dairy producers to decrease relative technical inefficiency.

The question arises whether location of dairy farms in milk supply chain influences their technical inefficiency on the basis of small vs. large herds. The interaction term (milk supply chain × herd-size) in model 2 also allows the differential effects of milk supply chain to vary by herd-size, holding all else as constant. From the parameter of the interaction term $(-0.177, t = -3.51)$ we further predict that the inefficiency reducing effect of large herd-size becomes even stronger when farms are located in the milk supply chain, as suggested by the difference in the two delta coefficients $(-0.050 -0.177)$, which is -0.227 and in the same direction. The combined effect of the two interaction terms suggests that milk supply chain benefits sample dairy

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[11]Here milk supply chain variable accounts for the possibility that if differential effects associated with milk supply chain are indeed present then predicted inefficiency should vary across farms in milk supply chain and non-milk supply chain.

producers disproportionately more when they are located at a distance from *pucca* road, and they maintain relatively larger herds.

Finally, as conditions become more competitive with entry of other industry players, farmers look for better prices, improved dairy extension services, and more economical ways to manage their dairy farms. To this end, three dummy variables (one-player, two-players, and three-players) are introduced in model 3 indicating the number of milk processors competing for fresh milk in a *mouza*, while no industry player is the excluded category. With increase in number of industry players, technical inefficiency of dairy farms decreases in this sample. The estimated coefficients for one-player (–0.751, t = –3.26) and three-players (–1.304, t = –2.94) are large, negative and statistically significant at the 1 percent level, which indicates that, on average, dairy farms located in *mouzas* where one industry player and three industry players are present are relatively less inefficient than the excluded category. The difference in the estimated delta coefficient (–0.751 –1.304) is –2.055, predicting that improvement in technical inefficiency of farms dealing with three players is much higher than those dealing with one-player. These results clearly show that increase in the number of industry players tends to decrease technical inefficiency of dairy farms. It appears that industry players pay higher prices where they have more competition in villages. While the statistically insignificant coefficient for two-players (0.115, t = 0.66) is surprising; it may be blamed on high collinearity between two-players and district fixed-effects.

(c) Cross-sectional Properties of Technical Efficiency

Table 4 reports summary statistics of the predicted mean technical efficiency scores derived from the stochastic frontier and technical inefficiency effects models.[12] It is worth noting that the mean and the median technical efficiency in this sample is 73 percent and 81 percent, respectively, which is comparable to the averages presented by Bravo-Ureta, *et al.* (2007) for the stochastic frontier models in the dairy sectors of other countries. This suggests that an average dairy farm loses about 37 percent of dairy output due to being technically inefficient.

Farms that participate in formal milk supply chain appear to be far more efficient than those in non-milk supply chain. Moreover, the standard deviation of technical efficiency is also relatively lower in a milk supply chain. It shows that farms located in milk supply chain cluster closely to the production frontier than farms in non-milk supply chain.

Superior efficiency performance of dairy farms in milk and non-milk supply chain is also indicated in Figure 1 where the empirical cumulative distribution functions of the estimated technical efficiency scores are plotted. Further insights are provided in Figure 2 where the frequency distribution of mean technical efficiency of dairy farms in milk and non-milk supply chain is compared. For the milk supply chain sample, a relatively large number of dairy farms cluster closely to the higher-end of technical efficiency than at the lower-end, which is in sharp contrast to the efficiency levels of farms in non-milk

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[12]The relationship between efficiency (Eff) and inefficiency (u_i) is given by Eff = $1/(1+u)$. Thus a score of 0 on u implies 100 percent or full-efficiency, and a score of 1 means 50 percent efficiency. Alternatively, u = ($-$ Eff)/Eff. In other words, the 70 percent (or 0.70) efficiency entails 42.86 percent inefficiency.

Table 4

Descriptive Statistics of Estimated Efficiency of the Dairy Farms

Estimated Efficiency of Farms by	Mean	Median	Std. Dev	Min	Max	N
Milk Supply Chain Effects						
Milk Supply Chain	0.794	0.846	0.145	0.096	0.949	420
Not in Milk Supply Chain	0.662	0.727	0.228	0.016	0.961	380
No Industry Player	0.658	0.725	0.231	0.016	0.961	340
One Industry Player	0.783	0.840	0.156	0.263	0.949	200
Two Industry Players	0.776	0.839	0.164	0.096	0.933	180
Three Industry Players	0.809	0.852	0.116	0.332	0.939	80
Farm Characteristics						
Herd-size						
Herd-size 1-2	0.679	0.753	0.219	0.219	0.961	369
Herd-size 3-4	0.757	0.824	0.178	0.016	0.959	243
Herd-size 5-6	0.779	0.848	0.168	0.024	0.949	108
Herd-size 7-10	0.825	0.879	0.123	0.394	0.955	63
Herd-size 11-15	0.805	0.890	0.204	0.200	0.925	12
Herd-size 16 or More	0.907	0.893	0.028	0.885	0.952	5
Farmers' Long-term Stress Levels						
With Major Depression	0.681	0.769	0.218	0.016	0.961	95
Without Major Depression	0.738	0.821	0.197	0.024	0.959	705
Full Sample	0.731	0.813	0.200	0.016	0.961	800

Source: Authors' estimations.
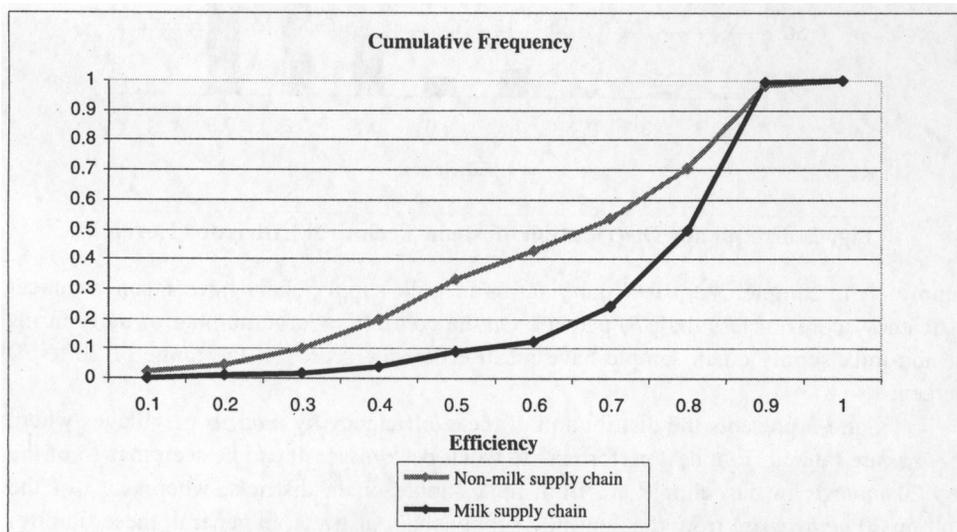
Fig. 1. Cumulative Distribution Function for Estimated Technical Efficiency
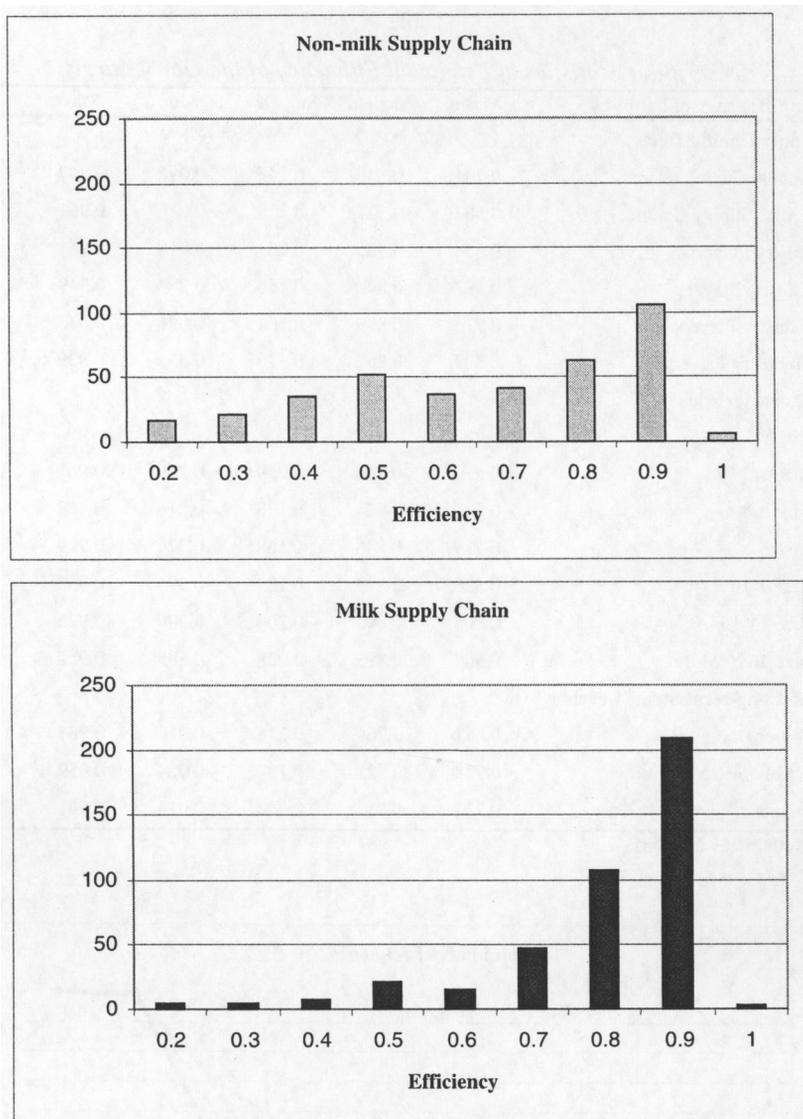
Fig. 2. Frequency Distribution of Mean Technical Efficiency Levels

supply chain sample. Very few dairy farms in milk supply chain have mean technical efficiency scores of less than 70 percent. On the contrary, a large number of dairy farms in non-milk supply chain sample have mean efficiency scores in the range of 20 to 70 percent.

Figure 3 presents the distribution of mean efficiency by *mouzas* or villages where *mouzas* are ranked from best performers to worst performers. It can be seen that 15 of the top 20 *mouzas* in our sample are from milk supply chain districts, whereas 13 of the bottom 20 *mouzas* are from the non-milk supply chain districts. In general, these findings tend to corroborate the positive contribution and efficacy of milk supply chain districts in contributing to increased productive efficiency of smallholder dairy producers.
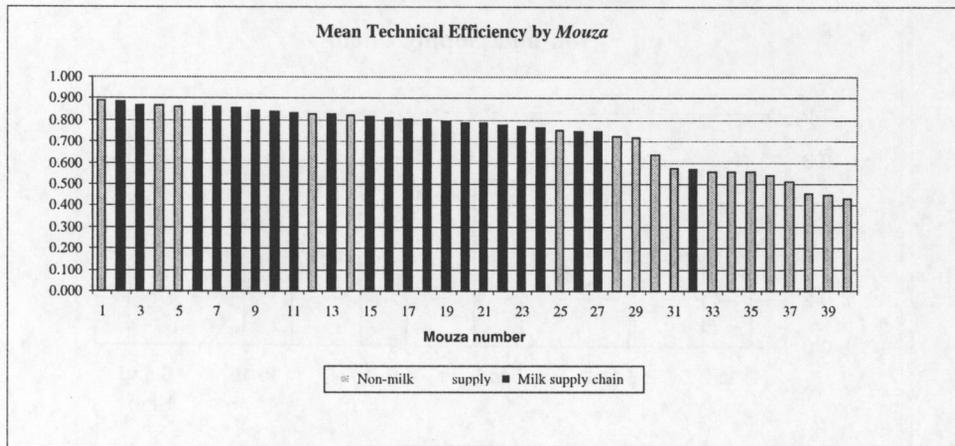
Fig. 3. Mean Technical Efficiency Levels by *Mouza*

Table 4 also shows that technical efficiency of the dairy farms is positively correlated with the number of industry players in a *mouza*. The highest mean technical efficiency is achieved when market structure resemble oligopsony (three players) while the lowest mean technical efficiency is achieved when market structure resembles monopsony (no-player). Furthermore, the difference in mean and median technical efficiency between two-players and no-player is statistically significant at the 1 percent level, which corroborates the view that statistically insignificant coefficient for two-players in Table 3 is indeed explained by the suspected collinearity between two-players and the district fixed-effects.

Table 4 and Figure 4 (panel A) show that in general technical efficiency is positively correlated with herd-size. Technical efficiency estimates are more fat-tailed for larger farms. Major efficiency gains occur when we move from herd-size 1–2 to herd-size 3–4. Stacked up against each other, panels B and C depict efficiency estimates by herd-size for farmers who participate or do not participate in a milk supply chain. In the milk supply chain, the mean technical efficiency levels for herd-size 1–2, 3–4 and 5–6 are much higher than otherwise.


Panel A

Non-milk Supply Chain

Panel B

Milk Supply Chain
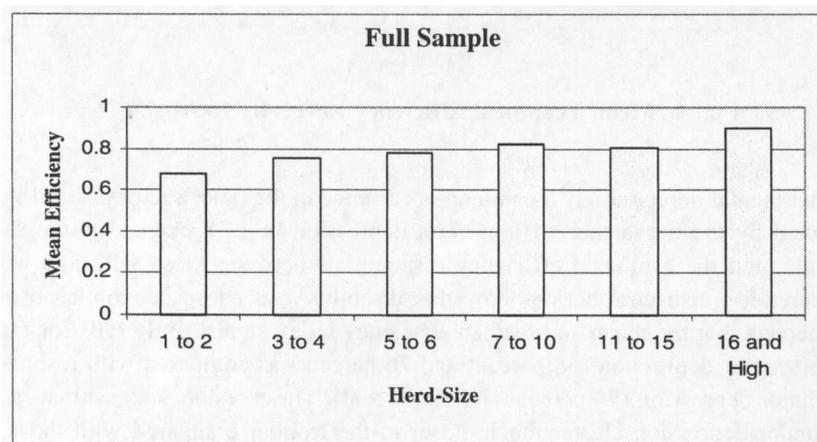
Panel C
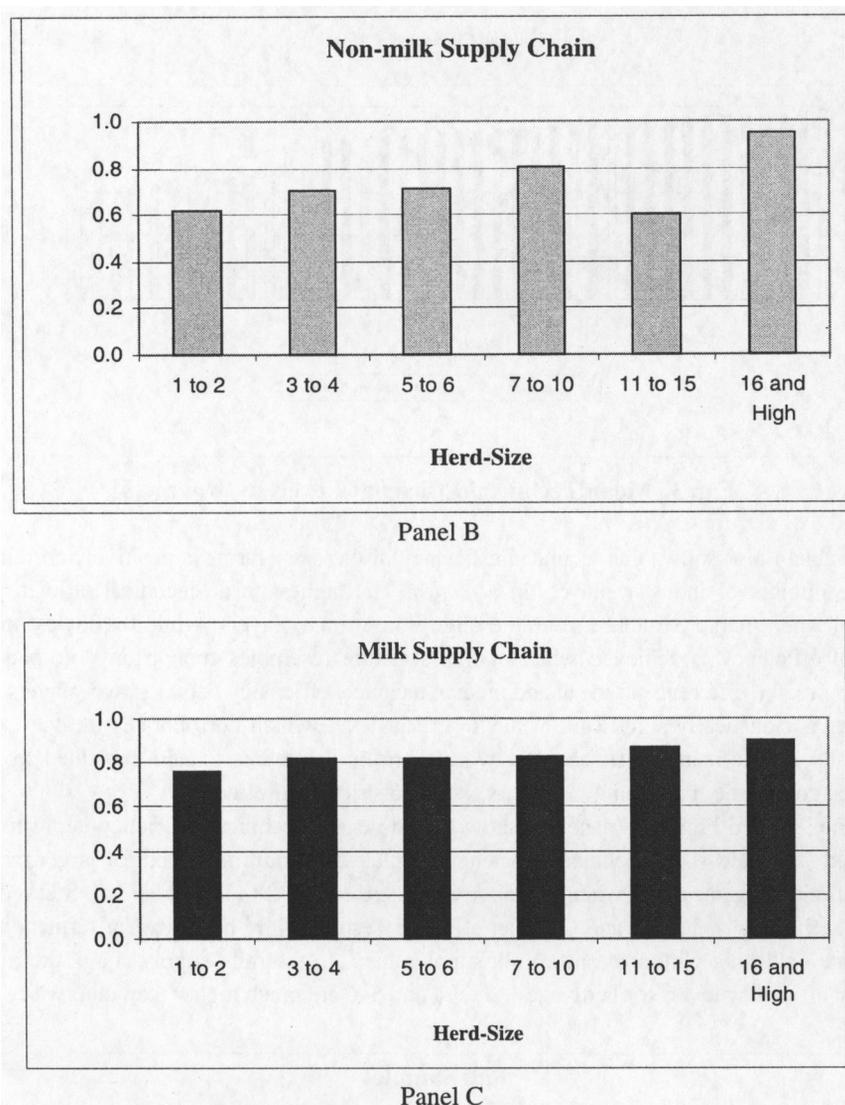
Fig. 4. Mean Technical Efficiency Levels by Herd-size

That mental depression is a common occurrence in the dairy sector of rural Punjab is confirmed by the prevalence of long-term depression in 11.8 percent of the sample respondents, and the estimated efficiency differentials between those with and without major depression also corroborates how this disability can cause economic adversity. Table 4 depicts that the mean and median efficiency index significantly falls for farmers who report major depression (68 percent and 76 percent) as compared with respondents with no major depression (74 percent and 82 percent). These results suggest that farmers without major depression cluster much closer to the frontier compared with those with major depression.

6. CONCLUSIONS

This paper provides empirical evidence on how formal participation in a milk supply chain affects smallholder technical inefficiency. This relationship has been examined on the basis of survey data of 800 smallholder commercial dairy farmers taken from milk supply chain and non-milk supply chain districts in Punjab, Pakistan. The frontier inefficiency effects model and the Cobb-Douglas production technology has been used to examine the differential impact on relative inefficiency of smallholder dairy producers. The results show that animal capital, fodder, and straw and concentrate continue to be most important determinants of raising dairy output, while labour, shed and structure capital, feeding of water and molasses do not significantly increase dairy output in our sample. The marginal significance attached to hired and family labour is attributed to the disguised unemployment of family labour. The scale elasticity estimates in this study show that if the present trends continue, dairy producers are expected to bring about a proportionate increase in dairy output with proportionate increase in inputs.

While the location of the dairy households is exogenously determined, the building of milk supply chain network indeed decreases technical inefficiency of smallholder dairy households in this sample. Evidence in the present case suggests that dairy farms located in milk supply chain districts employ fewer resources relative to those located in non-milk supply chain districts to produce the given output levels. In considering the mechanism through which a milk supply chain affects technical inefficiency, the results of this study suggest that it benefits disproportionately those farms more that are located away from *pucca* road and are relatively large in size. In general, remoteness of rural communities remains a key feature in Pakistan where local population is often excluded from the basic facilities. For the same reason, distance of a farm from *pucca* road clearly has unfavourable effect on their technical inefficiency. Likewise, we find that farms away from *pucca* road are technically more inefficient, but this disadvantage tends to decrease significantly when farms are located in a milk supply chain area. Similarly, it is shown that sample farms with larger herds are less inefficient than those with smaller herds, yet the inefficiency reducing effect of herd-size becomes stronger when large farms are located in milk supply chain regions. The study also shows that increase in the number of industry players buying farmer milk in the supply chain leads to decrease in technical inefficiency of dairy farms. From the results it is concluded that technical inefficiency is highest where the market structure resembles monopsony and lowest where the market structure resembles oligopsony.

If policy makers are indeed interested in increasing productivity and growth of smallholder dairy producers then they should promote building of supply chains in rural areas. However, efficiency and productivity gains are far greater if the supply chains also bring into their fold medium and relatively large farmers based in remote rural areas. The results in this article further suggest that the buyer-side market structure holds the key for the success or failure of the emerging agro-food supply chain systems in developing countries. If anything, the advice to policy makers from these results conforms to the standard economic view that market competition, which is long viewed as key to economic development, leads to enhanced levels of technical efficiency of smallholder producers. Without government intervention in the milk supply chain, profit motive alone provides incentives to dairy farms to move toward greater efficiency.

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Book Reviews

Lopamudra Banerjee, Anirban Dasgupta, and Rizwanul Islam (eds.). *Development, Equity and Poverty: Essays in Honour of Azizur Rehman Khan.* India: Macmillan Publishers India Ltd. 2010. Hardback, 542 pages, Indian Rs 2100.00.

The book, as the title indicates, is collection of articles by the experts in the field of development economics. It is compiled in honour of Professor Azizur Rehman Khan, guru in the field of development economics. Unfortunately, I have not met Professor Khan but his writings were always a source of inspiration. This book is the best present to Professor Khan on his seventieth birthday.

Acknowledging the fact that development challenges are becoming more complex and multidimensional, the collection of articles is based on following six themes: First theme focuses on Macroeconomics of Development. Second theme is Growth, Poverty and Inequality Linkages and third is Analysis of Poverty. The forth theme relates to issues of Employment-Intensive Growth. Fifth theme reviews the Labour Markets, Wages and Productivity and the final focus is on Rural Development.

Three articles on *Macroeconomics of Development* focus on role of pricing structure, investment, sources and structure of growth in China and the macroeconomic policy framework to ensure stability, growth and employment. Keith Griffin critically evaluates the existing development theories. In the first instance, he questions the role of relative prices in resource reallocation resulting in change in economic structure. Griffin evaluates different dimensions of the argument. For example the degree of mobility of factors of production across sectors which can impose additional costs. Furthermore, he argues, it may not be the price signal that affects the resource allocation. It is the investment decision that, "...determines how resources in fact are allocated".

Victor D. Lippit discusses the sustainability of economic growth in China. He argues that Chinese rapid growth is not sustainable because it has resulted in high resource degradation imposing environmental costs, rising inequalities and dampening domestic consumption because of focus of growth strategy on exports and investment. Growth sustainability will require government intervention to correct for these problems. The study concludes that recent steps taken by the Government of China will reduce the inequality and poverty and expand domestic consumption, however, the environmental concerns need more attention.

Muhammed Muqtada presents a historical perspective of the role of macroeconomic policies in development. It analyses the structural adjustment programmes, macroeconomic policies and poverty reduction papers. Based on the assessment of various programmes, and PRSPs, the author argues that, in developing countries, autonomous macroeconomic policies are required to achieve the objectives of employment expansion and pro-poor growth.

The second part of the book focuses on the *Linkage between Growth, Poverty and Inequality*. The theme is closely linked to the work of Professor Khan. The articles selected for this part focus on income inequality, educational inequality and regional inequalities. In this part the article by Achin Chakraborty raises the concern that it is not just the income inequality that matters but it is 'outcome inequality' which is more critical. He develops 'education concentration index' for selected Indian States, for measuring inequality in education across economic classes and across socially classified group. The study finds strong correlation between the two sets of indices and finds strong correlation between two sets of indices. However, he finds various outliers in the index. His conclusion is, "... find a strong correlation between two types of inequalities across the states of India. We also find, as one would expect, that the inequality index values are negatively correlated with the average years of education. However, in actual policy context, analysis of the outliers might be more illuminating than studying the general pattern".

Arthur MacEwan argues that success of poverty reduction efforts depends on prevailing income inequalities. He argues that reduction in inequality is essential for reduction in poverty, however, the issue of equality of opportunity and equality of outcome are critical. The paper argues that relative equality may be a more desirable social goal and the macroeconomic policies focusing on redistribution may help to achieve better results.

The paper by Terry McKinley supports the viewpoint that growth is critical for poverty reduction and provides insights in the evolution of the concept of pro-poor growth. His review of literature on the nexus between growth and poverty suggests that dynamic of growth are important for poverty reduction, and the role of inequality is only instrumental. The major findings of the study are: there is a need to focus on "structural causes of the secular trends in both inequality and growth and, by implications, trends in poverty"; redistribution may be possible without significant impact on inequality; need to focus on issues of absolute inequality; qualitatively the 'pro-poor growth' and 'inclusive growth' may lead to same outcome; tying growth and redistributive policies too strictly may not be desirable; redistribution of physical and human capital may be more desirable; and finally the political costs of redistribution should also be taken into account.

Carl Riskin focuses on inequality in China. According to Riskin, inequality in China is highest among Asian countries, however, it is more rural-urban and regional phenomena. The policies pursued for health, education and social security, given the employment intensity of these sectors, will play a critical role in reducing the regional disparities.

Binayek Sen explores the role of human capital formation in reducing inter-regional consumption inequalities in Sri Lanka for the periods 1990-91 and 2001-02. Sen provides important insights into inequality in Sri Lanka. The result, based on quantile decomposition technique, show that returns to education are higher in leading states. The results also show that returns to education are higher in upper quantile relative to the lower quantile and differences in returns to covariates (education, ethnicity, demographics and geography) are important to explain the gap in welfare among regions in the two survey periods. Sen concludes, "Upward mobility through deliberate 'human capital accumulation' thus anticipates initial investments in reducing risk and uncertainty

in the lagging region. Food security as a pre-condition for educational and health human capital accumulation, for instance, is a case in point".

Third theme focuses on the *Poverty Reduction Strategies*. First paper by Rashid Amjad focuses on the significance of the remittances in poverty reduction. According to Amjad, based on data for Pakistan, who sends the money from abroad and the channel of money transfer are important for poverty reduction. The paper reports that the elasticity of poverty with respect to remittances is equal to –0.15. The study concludes that remittances sent by members of poor households (semi-skilled and unskilled workers) and sent through formal channels have larger impact on poverty reduction. This result will have important implications for future channels of poverty reduction as the workers, particularly the workers from the poorer households, return home.

Gary A. Dymski examines the impact of micro-lending and community based banking (Grameen Bank) on poverty reduction in Bangladesh. He compares the outcomes of these initiative in Bangladesh to the outcomes of the similar initiatives taken in USA (South-Shore and others). After critically comparing the characteristics of socially excluded in the two countries, Dymski, concludes "….that strategies aimed at poverty alleviation and ethnic divides, no matter how noble, must have the right pre-conditions in place to succeed. To succeed, Grameen or South-Shore initiatives require political will, sufficient resources, and the reconstruction of financial and non-financial market structures in US inner-cities. Experiments may lead to yet financial model for inner-city revitalisation; but experiments large enough to make a difference require the political recognition that nothing worthwhile comes free, including initiatives aimed at creating wealth through market processes".

The study by Mahabub Hossain and Nigar Nargis focused on poverty dynamic and economic mobility in Bangladesh. The analysis is based on longitudinal data for the years 1987-88, 2000, 2003-04 and 2007. The paper examines the impact of shocks like floods and rise in food prices on poverty. The multivariate analysis suggests that remittances, engagement in non-farm activities and accumulation of assets help the households to move out of poverty whereas the shocks like floods and natural disaster and rise in prices of food push the households into poverty. The study concludes "…negative elasticity of income growth with respect to base year income suggests gradual conditional convergence of income growth overtime. The benefits from this convergent growth path associated with the structural transition in the rural livelihood system have remained beyond the reach of a major segment of the poor population, the chronic poor".

The focus of Qazi Shahabuddin's study is on the role of location factors on perpetuating chronic poverty in Bangladesh. The results show that distance from the urban and unfavourable agricultural conditions contribute to poverty rise. Asset holding is critical in persistence of poverty. However, the non-farm employment opportunities have contributed to reduction in chronic poverty in Bangladesh.

The forth theme focuses on the *Employment Intensity and Growth Linkage*. The first paper on the theme is by Rizwanul Islam. Islam argues, based on cross-country data analysis, that structural transformation plays a critical role in employment intensive growth. The second paper on the theme is by S. R. Osmani. He decomposes the employment growth in output effect and elasticity effect. The elasticity effect is further decomposed into output effect and choice of technique effect. Applying this technique to

manufacturing employment in ten Asian economies, the study concludes that disaggregated sectoral level analysis is critical to understand the employment intensity of the growth process.

The paper by Eduardo Zepeda, Diana Alarcon, Fabio Veras Soares and Rafael Guerreiro Osorio focuses on employment growth linkage in three major Latin American economies, viz., Brazil, Chile and Mexico. The study highlights the importance of labour income in household income and its pro-poor effect. The authors decompose the change in per capita household labour income into changes in earnings per worker and change in rate of employment. The study shows that change in earnings has a larger impact on poverty reduction. However, the employment ratio becomes important during the period of economic stress. The study highlights the importance of distributional patterns in periods of high growth when the income gap between the poor and non-poor widens.

The fifth theme of the book is *Labour Markets, Wages and Productivity*. Lopamudra Banerjee examines the relationship between agriculture wage rate and rise in labour productivity in the short run. The study argues that institutional arrangements play a critical role in output sharing practices in Bangladesh.

The study by Rushidan Islam Rahman deals with the critical issue of conceptual and measurement inconsistencies in the data. Analysing these inconsistencies and advocating the collection of reliable urban and rural wage data, she argues that fluctuations in real wages affect the living conditions in the short run. The study shows employment reduces the incidence of poverty. In addition, sectoral differences, urban-rural divide and gender dimensions affect the wages significantly. The study finds that human capital can help to reduce wage inequality.

Robert Pollin, reviews the efficiency of labour market in Kenya. He disagrees with the IMF-WB view that labour market rigidities and the excessive labour costs discourage employers from hiring labour. According to Pollin, minimum wage laws and presence of unions protects the workers and these institutions should not be weakened. He argues that government can play an important role in reducing the labour cost.

Selim Jehan studies the critical issue of gender dimensions of development strategies. He argues that ignoring the gender dimensions, in the labour market and at home, affects females adversely. The study proposes engendering of the macroeconomic policies and incentive mechanism, keeping in view the productive and reproductive role of the females.

The final theme of the book is *Rural Development*. The article by Anirban Dasgupta reviews the land reforms experience of West Bengal, India. The study argues that unequal distribution of land and role of state, particularly in acquiring land for industrialisation, affect the agenda of inclusive development. The land acquisition by State was considered important as there were limits to employment generation in the agriculture and to provide the employment opportunities to the surplus labour. However, the corporate led industrialisation is criticised and the author argues that, "For a state like West Bengal with a progressive left government in charge, it should have been natural to look for alternatives in terms of people-centred, locally based, labour intensive option for industrialisation. Instead, the LFG was only to ready to jump into the bandwagon with other competing states to lure corporate capital with the promise of acquiring any land of their choice".

The six themes selected in the book are very close to the ideas pursued by Professor Khan. Since it covers some of the major themes pursued in the development economics, it can be compulsory reading for the students of economics. It can be part of compulsory reading material in the reading list of a course in Development Economics and Policy. The development practitioners and policy makers can also benefit from the evidence provided in book.

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David J. Grimshaw and Shalini Kala (eds.). *Strengthening Rural Livelihoods—The Impact of Information and Communication Technologies in Asia.* International Development and Research Centre (IDRC). Canada: Replika Press Pvt. Ltd. 2011. 152 pages. Paperback. CDN $16.27.[1]

We live in the age of information in which Information and Communication Technology (ICT) usage has diffused throughout the world. In many developing countries, making a call overseas has now become cheaper than buying a piece of bread. In this context, it has been observed that ICTs have a tremendous potential to stimulate growth by reducing transaction costs and travel times, creating jobs, encouraging greater social networking, enhancing labour productivity, and facilitating the diffusion of innovations [UNDP (2001)]. This way ICTs have a crucial role to play in economic development and poverty reduction. But to what extent can this claim be advocated? Critics argue that the emerging global digital divide is also here to stay and that the success of the ICTs will be determined by education and income levels in a society. *Strengthening Rural Livelihoods—The Impact of Information and Communication Technologies in Asia* is a collection of six case studies that investigate the extent to which ICTs can be a driver of local economic development in Asia. In particular they evaluate the relationship between ICTs and rural economic growth by focusing on diffusion of useful information in rural areas through mobile phones and the internet. Each of the case studies in this book was a part of a research programme on 'Knowledge Networking for Rural Development in Asia Pacific'. The programme aimed at investigating the extent to which ICTs enable farmers to sell their produce at competitive prices and measure the gains in connecting geographically distant areas. The six studies provide some of the latest evidence from the field in Asia.

The case study by Sriganesh Lokanathan, Harsha de Silvia and Iran Fernando in Chapter 2, explores the issue of how small farmers in Sri Lanka can benefit from price transparency. The ICT intervention took the form of access to an agricultural platform through which farmers could obtain information on current and forward market crop prices via SMS or by calling a dedicated phone line reserved to answer their queries free of cost. The experiment resulted in increasing incomes of farmers who were part of the intervention and sold their produce only after acquiring market price information. Similarly, Chapter 3 discusses an ICT intervention in one of the poorest districts of Tamil Nadu in India. The authors Daniel Anand Raj, Poo Murugesan, Vijay Pratap, Singh Aditya, S. Olaganathan, and K. Sasikumar, made a crop nutrient support system which provided crop nutrient, weeding, and field preparation information to small farmers via SMS or free calls via mobile phones. The intervention was extremely successful as the farmers who were registered with the system experienced a 100 percent increase in their gross incomes. In the case study in Chapter 4, Haider Rizvi, introduced a phone-based agricultural advisory service called *Lifelines* to a group of small farmers in Haryana district's Mewat village in 2009. Farmers in the intervention group accessed the service with questions regarding their agricultural practices and found that to be a more convenient and cost effective advice seeking method as compared to discussing their problems with local farmers and experts often located at a distance from their village. The positive impact of this intervention

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[1]Students can access the book on IDRC's website in pdf:
http://idl-bnc.idrc.ca/dspace/bitstream/10625/45947/1/132419.pdf

included improved soil health, increased savings and incomes, and decreased local borrowing for 75 percent of the farmers who used the service. It also influenced the non-agricultural characteristics of farmers, such as their local education and, skill levels, and the frequency of inter-village networking. In Chapter 5, the authors Amila Balasuriya and Nilakshi de Silva investigate the impact of ICTs on wage workers in rural Sri Lanka. They introduced a job portal which matches the demand and supply for agricultural as well as non-agricultural work by connecting relevant workers and employers via mobile phones. It concludes that when waged workers turn to ICTs for job information instead of seeking advice from friends and families, they are able to find much better jobs that fit their needs and requirements. The intervention also highlighted the positive change in perception of rural waged workers towards ICT usage.

The last two chapters of this book consist of case studies that differ from the above mentioned studies since they focus on interventions that used the internet instead of a mobile phone. While Chapter 6 evaluates the impact of the launch of an e-AGRIKultura internet project in an agrarian reforms community of the Philippines, Chapter 7 analyses a rural information support project conducted in Ningzia Province in China. In both the cases an internet based agricultural advisory service was introduced to a group of local farmers and their perceptions were surveyed later on. The case studies in this book have demonstrated that when farmers are provided information on market prices, soil preparation, and nutrients the vulnerability induced by shocks and seasonalities in their lives are considerably reduced. Hence the incorporation of ICTs into rural livelihoods can play an important role in fostering local economic development since agriculture still remains the backbone of most Asian economies.

While the evidence from this book is quite encouraging in demonstrating the willingness of rural communities to adopt ICTs in traditional practices, it should be noted that in four out of the six case studies, at least 50 percent of the population that has been treated has had at least 6-10 years of education. A bigger challenge than the incorporation of ICTs into rural lives will be to ensure the sustainability of ICT interventions in poor rural families across the world. Four out of the six case studies consist of less than 250 people in the intervention group, and extending such projects to wider populations could prove to be extremely difficult. Moreover, high social cohesiveness in the communities investigated could also have increased the success rates of the interventions. The case studies could have been more useful if the differing impact of ICTs on rural males and females had been discussed.

However, despite the above mentioned caveats, this book contributes to the much needed literature that investigates the links between ICTs and poverty. Each of the case studies is an interesting application of how Randomised Control Trials can be applied to evaluate technology interventions elsewhere in the world. The book provides some excellent research questions that can also form the basis of postgraduate research work for students in which they may also consider the above mentioned caveats. It will also appeal to academics, public policy makers, and civil society organisations who are interested in investigating the effects of ICTs on rural communities.

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Islamabad.

Devaki Jain and Diane Elson (eds). *Harvesting Feminist Knowledge for Public Policy.* Sage Publications Pvt. Ltd. 2011. 396 pages. US$ 43.26.

Harvesting Feminist Knowledge for Public Policy comprises 14 articles by feminist thinkers from all over the world, reflecting on problems of current patterns of development and calls for political, economic, and social changes to promote equality. In general the articles are about the "triple crises" of food, fuel, and finance and draw on the diversity of socioeconomic experiences of women in different countries. The authors argue for new ways of thinking about development, and offer ideas for reformulating development to secure social, economic, and political justice.

The article *Economics for a Post-Crisis World: Putting Social Justice First*, focuses on how to reframe the understanding of development by giving greater role to social investment, production, and consumption. The second article, *"Rebooting" Is Not an Option: Toward Equitable Social and Economic Development*, discusses how the neoliberal macroeconomic policies set in motion since the early 1970s have undermined the goals of dignified work, security, and inter-group equality, focusing in particular on the liberalisation of the financial sector and reorientation of central banks away from employment creation. The writer offers examples of policies for reform of the financial sector and central banks to make them capable of supporting the equitable creation of wealth and jobs, and the equitable enjoyment of human well-being.

The article *Globalisation, Labour, and Women's Work: Critical Challenges for a Post-Neoliberal World* examines the key challenges in labour market trends, including the changing processes of labour organisation, the growth of the informal economy, and the reorganisation of the care economy through feminisation of international migration. The author raises fundamental questions on how labour markets would need to be restructured if gender equality is to be achieved. Likewise, work and labour markets are also the subject of the article *Gender Dimensions of the World of Work in a Globalised Economy.* The issues are discussed in the context of the standards and procedures agreed through the International Labour Organisation.

The article *Gender, Global Crises, and Climate Change* explores the impact of climate change on access to food, water, and energy, discussing how women and men are differently affected, and how gender inequalities intersect with adaptation and mitigation strategies. Access to food and water is the key issue in the article *The Cost of the Commoditisation of Food and Water for Women.* It is based on the analysis of the costs of market driven policies for agriculture and water provisioning in Africa. It shows how these policies, in which officials and corporations collude, are curtailing the realisation of the right to water and the right to food, and deepening women's economic insecurity. The article *Questioning Economic Success through the Lens of Hunger* is also concerned with the inequalities produced by market forces, and critically examines India's economic success in the realm of food security. The writer calls for more proximate production systems, especially led by women farmers, as an insurance against food insecurity for poor households.

Modernity, Technology, and the Progress of Women in Japan: Problems and Prospects, Equity in Post-crisis China: A Feminist Political Economy Perspective, and *Cuban Development Alternatives to Market-driven Economies: A Gendered Case Study*

on Women's Employment consider the pressures that have limited the realisation of gender equality in development, drawing on the experiences of their respective countries: the Philippines, Japan, China, and Cuba.

In the article, *Removing the Cloak of Invisibility: Integrating Unpaid Household Services in the Philippines' Economic Accounts* it is argued that unless all of women's contributions to the economy are recognised, women will continue to be second-class citizens. The author discusses the attempts to measure unpaid work and include it in the GDP of the Philippines, charting both progress and setbacks. New economic measures that take into account women's unpaid work cannot be established without a strong, politically motivated, and united push by the women's movement.

The remaining three articles focus on feminist or women-led mobilisation to achieve equality. They emphasise that women workers in the informal sector—even though they are not protected by labour laws—can change their circumstances through collective organising.

All in all, the writers note the difficulties involved in trying to scale up local-level organisations in ways that retain women's autonomy. All the chapters, in diverse ways, offer proposals for alternative strategies to address the limitations and contradictions of currently dominant ideas and practices in development. They also recommend reforms in economic reasoning, growth that "Bubbles Up" rather than "Trickles Down", socially useful banking and finance at macro as well as micro levels, just and democratic public finance, socially responsible markets and fair trade, support for equitable property rights, economic and social rights as an objective of economic policy. In short, the authors insist that feminist analysis and women's voices should be in the forefront of these debates, putting forward ideas not about how more women can participate in economic and political spaces as they are, but how those spaces can be transformed to become more equal and sustainable for everyone.

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Shorter Notices

Jacqueline Suthren Hist and John Zavos. *Religious Traditions in Modern South Asia*. USA and Canada: Routledge Publications. 2011. 319 pages. $ 35.51.

South Asia constitutes of 23 percent of the global populations, makes a significant impact on the global geo-political front, and is amongst the fastest growing regions in the world. However at the same time it is also the world's poorest region. One of the salient features of region is its religious traditions. This book is a combined effort of senior lecturers in South Asian Studies at the University of Manchester, UK. The authors have investigated the well-worn phrase "South Asia is region of great religious diversity", by exploring the development of its religious traditions in a range of social and political contexts.

In part one the book focuses on what have often been considered essential features of 'religion' as a generic category: deity, sacred texts, myth, rituals and teachers. These concepts give clear picture of what religion is, but this book has tackled it in different manner. It is an attempt to disrupt a single notion of religion and show multiple ways of looking at it that have been in the past and can be in present. In modern settings religion does not mean just to be aware of great diversity of contexts in which religious traditions are played out. The need is to explore impact of aspects of modernity on traditions that have endured and developed over many centuries by acknowledging the emergence of new systems of knowledge, new methods of communication, and new forms of social mobility. The challenge is to identify complex interactions that fashion development in multiple and sometimes contradictory ways. In part two such complex interactions have been focused, i.e. how Buddhism, Hinduism, Islam and Sikhism in South Asia have been shaped in modern period. As a whole this book considers the impact of gender, politics, and the way religion itself is understood in South Asia. It will interest researchers and students who are interested in obtaining a critical understanding of social, political and historical context of religion in South Asia. (*Amna Rubab*)

John Cockburn and Jane Kabubo-Mariara (eds.). *Child Welfare in Developing Countries*: New York, USA: Springer Science. 2010. 350 pages. Paperback. US$ 15.00.

In developing countries there has been relatively little empirical work on the analysis and measurement of child poverty. This book is a collection of six articles in which the first three articles analyse "Multidimensional Child Poverty Analysis", while the final three articles discuss studies that have utilised "Impact Evaluation" to investigate child welfare in developing countries. The book based on original research in

Africa and South America using multidimensional poverty indicator approach, it identifies the existence of inequalities in child welfare, analyses their sources and evaluates the impact of policy responses to those inequalities. The main research questions that have been addressed in this book include a discussion on the: factors that affect child welfare and the policies to improve child welfare. The main topics considered in this collection include monetary poverty, asset poverty, nutrition, child mortality, access to education, school attendance, child labour, and access to health services. The main findings from this book demonstrate that while government programmes offering financial assistance, supplementary food and subsidised education and health care have a positive impact on child welfare, these outcomes require further improvement for which several policy prescriptions have been proposed. This book is recommended for researchers on poverty and inequality, professionals in international development and graduate students. (*Sarah Rabbani*)

NOTES FOR CONTRIBUTORS

1. Manuscripts (hard copy) of articles, notes, review-articles, comments, rejoinders, and book reviews—in English only—should be sent in triplicate together with a soft copy on CD to the Editor, *The Pakistan Development Review*, Post Box 1091, Islamabad-44000, Pakistan. Submissions via e-mail (as attachment) are acceptable for consideration. Submissions and queries regarding submission may be sent to <publications@pide.org.pk>. Each request for a book review in the journal must be accompanied by two copies of the relevant book, which should be submitted to the Book Review Editor.

2. Manuscripts will be accepted for consideration on the understanding that they are original contributions to knowledge in social science fields.

3. So far as possible, all articles and research notes should be organised into the following sections: (i) Introduction, (ii) Basic Hypotheses, (iii) Methodological Issues involved, (iv) Basic Results, (v) Limitations of Analysis, (vi) Policy Implications, and (vii) Conclusions. Sub-sections should carry clear and distinct sub-headings.

4. Each manuscript should be typed double-spaced (except for footnotes and verbatim inset quotations) in font size 12 (MS WORD) on one side of quarto sheets, and should carry a margin of an inch and a half on the left-hand side of the typed page and of at least an inch on each of the remaining three sides.

5. The first page of the manuscript should contain: the title of the paper, the name(s) of author(s), and a footnote giving the current affiliation of the author(s) and any acknowledgements. Each article will be prefaced by a short abstract of 150 words. The abstract should state the theme and structure of the article, the approach(es) taken, the specific advance made on previous inquiries and any policy prescriptions. The abstract should be followed by *JEL* classification and keywords.

6. As a courtesy to referees, detailed derivations of the main mathematical results reported in the text should be submitted separately along with the articles.

7. Tables for the main text and each of its appendices should be numbered serially and separately. The title of each table as well as the captions of its columns and rows should be clearly expressive of the contents. The source of the table should be given in a footnote immediately below the line at the bottom of the table; but, unlike other footnotes, which must be numbered consecutively, it should not be numbered.

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9. All references used in the text should be listed in the alphabetical order of the authors' surnames at the end of the text. References in the text should include the name(s) of author(s) with the year of publication in parentheses. In all cases, the submissions should conform to the *PDR* style. Further information on questions of style may be had from the Literary Editor, *PDR*, Post Box 1091, Islamabad-44000, Pakistan (<publications@pide.org.pk>).

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