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Up and Why They Are Not Coming Down

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## Remittances in Pakistan: Why They Have Gone Up and Why They Are Not Coming Down

UDO KOCK and YAN SUN

The flow of workers' remittances to Pakistan has more than quadrupled in the last eight years and shows no sign of slowing down, despite the economic downturn in the Gulf Cooperation Council and other important host countries for Pakistani workers. This paper analyses the forces that have driven remittance flows to Pakistan in recent years. A methodological innovation is that we study the behaviour of per capita remittances and draw a close link between remittances and remitters' earning capacity, in the belief that higher earning power leads to more remittances. Our main conclusions are that (i) the growth in the inflow of workers' remittances to Pakistan is in large part due to an increase in worker migration, (ii) the higher skill levels of migrating workers has helped boost remittances, and (iii) other important determinants of remittances to Pakistan are agricultural output and the relative yield on investments in the host and home countries.

*JEL classification:* F22, F24

*Keywords:* Workers' Remittances, Migration, Pakistan

### I. INTRODUCTION

The flow of workers' remittances to Pakistan has more than quadrupled in the last eight years. It reached more than \$7 billion in 2008 or 4.2 percent of GDP. The strong increase in remittances makes them the most important source of foreign exchange after exports of manufactured goods. There is no sign of slowing down, despite the economic downturn in the countries of the Gulf Cooperation Council (GCC) and other important host countries for Pakistani workers. This paper analyses what is behind this strong increase in workers' remittances to Pakistan.

Our methodology for analysing remittances builds on and departs in some key aspects from traditional studies on drivers of remittances. Most of these studies, while aiming to explain individual motives for remittances, actually analyse aggregated flows of remittances. We focus instead on remittances per capita. From this perspective, the study identifies earning power in the host countries (proxied by the skill-type of jobs held prior to emigration) as a key driver of remittances. In addition, we regard remittances as part of an investment decision of the migrant/immigrant, which is influenced by factors that affect relative financial returns in both the home and host countries, such as interest rates, inflation, and exchange rates. We incorporate these new perspectives in the empirical investigation of Pakistan's remittances from a diverse group of host countries.

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*Authors' Note:* We thank Andreas Bauer, Adnan Mazarei, and the referees for helpful comments and suggestions, and Suheir Jaouni for editorial assistance.

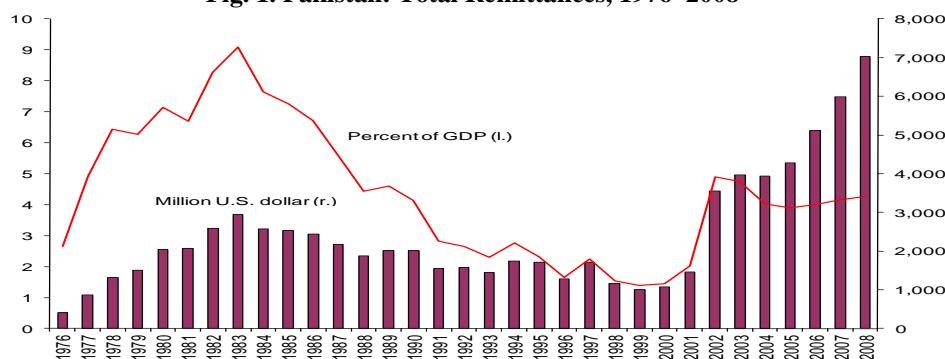
Our main conclusions are that (i) the growth in the inflow of workers' remittances to Pakistan is in large part due to an increase in worker migration, (ii) higher skill levels among migrating workers have helped drive and sustain the increase in remittances, and (iii) other important determinants of remittances to Pakistan are domestic agricultural output and the relative return on investments in the host and home countries.

Section II presents stylised facts on workers' remittances in Pakistan. We look at recent trends in the sources and volume of remittances, trends in the volume and destination of worker migration, and then compare Pakistan to other countries that rely heavily on workers' remittances. Section III briefly surveys the existing literature on modelling remittance behaviour and then discusses empirical results based on a model that focuses on remittance per migrant worker. Section IV concludes the paper.

## II. STYLISED FACTS

Remittances have long been an important source of foreign exchange for Pakistan, and its importance has grown in recent years.<sup>1</sup> In the 1970s and early 1980s, remittances grew rapidly to about 9 percent of GDP (about \$3 billion). By the end of the 1990s, remittances had declined to a low of 1.5 percent of GDP as they dropped to about \$1 billion while GDP grew rapidly in the 1980s supported by improved policies and deregulation. More recently, remittances quadrupled to more than \$7 billion (4.2 percent of GDP; Figure 1) during the period 2002–2008.<sup>2</sup> The recent increase in the flow of remittances to Pakistan originates mainly from host countries in the Gulf (Figure 2). The rise in remittances from the United Arab Emirates (UAE) has been particularly strong (doubling in 2006–07–2008–09), bringing remittances from that country close to the level of remittances from the US (\$1.7 billion in 2008–09). Remittances from Saudi Arabia and other GCC countries tripled in 2005–06–2008–09, while remittances from the US and Europe (including the UK) have risen only moderately.

**Fig. 1. Pakistan: Total Remittances, 1976–2008**

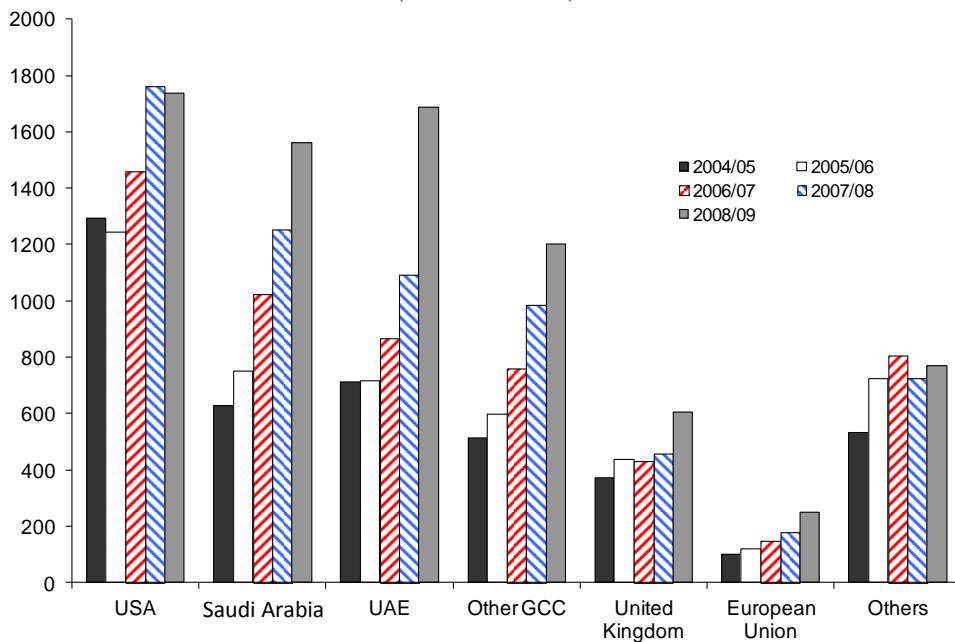


Source: World Bank, IMF, and authors' calculations.

<sup>1</sup> Remittances are known to be an important source of growth for many developing countries. Iqbal and Sattar (2006) and Ahmed, *et al.* (2011), for example, provide empirical evidence for the case of Pakistan.

<sup>2</sup> Data on remittances are vulnerable to changes in measurement and only include remittances processed through formal (banking) channels. One should, therefore, be cautious when interpreting the data. In particular, in early 2000, Pakistan's foreign exchange system was liberalised, and since then spreads between the official exchange rate and the curb rate have been small. This may have resulted in a shift of remittance transfers from the *hawala* system to formal channels.

**Fig. 2. Pakistan: Remittances by Host Country, 2004-05–2008-09**  
(in USD million)



Source: IMF, State Bank of Pakistan, and authors' calculations.

By 2007 remittances had become the second most important source of foreign exchange after exports of manufactured goods. Even in the boom years of 2005–07, remittances were a more important source of foreign exchange inflows than direct and portfolio investment. Currently, remittances provide enough foreign exchange to finance almost 80 percent of Pakistan's oil imports. Historically, remittances have been relatively stable compared to direct investment and portfolio inflows; more recently, remittances have also been more stable than aid inflows [Table 1; see also Ahmed, *et al.* (2010)].<sup>3</sup> Mughal and Makhlof (2011) find that remittances from Europe are the least volatile, while remittances from the Middle East and North America are more volatile, mainly due to fluctuations in the output of the host countries. The steadily growing remittances have become an important stabiliser of Pakistan's external account balance.

Table 1

*Volatility of Remittances and Other Balance of Payments Flows*

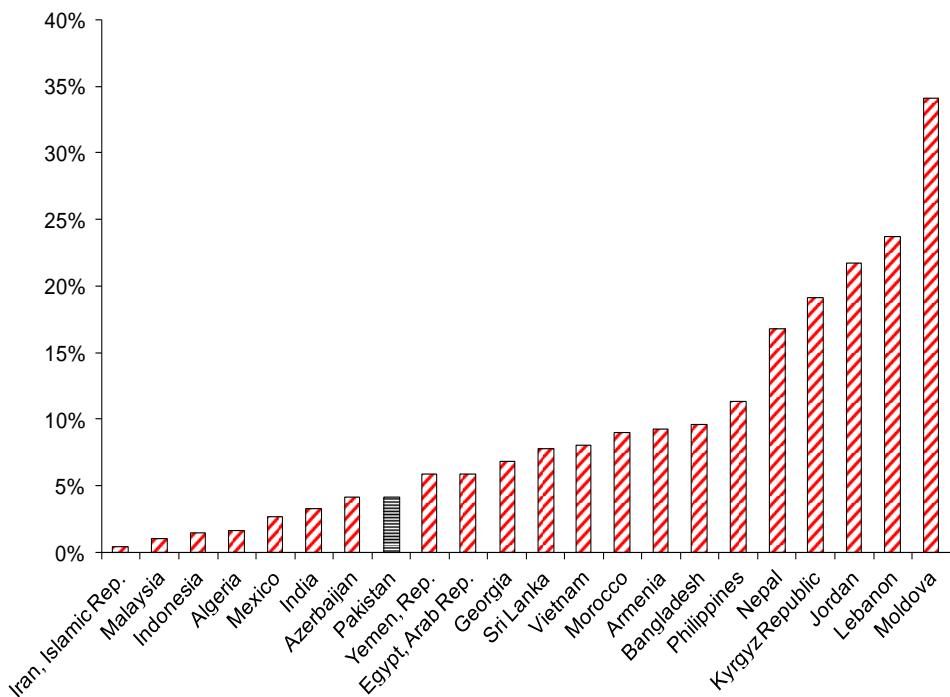
	Remittances	Exports	Aid*	FDI	Portfolio
1980-2009	50	15	47	96	227
1980-1989	22	15	39	42	121
1990-1999	32	4	31	34	144
2000-2009	31	6	59	73	444

\*Aid includes official transfers and official loans to the government.

<sup>3</sup>The high volatility of FDI is associated with the privatisation of public enterprises.

Despite the recent surge in nominal terms, Pakistan's remittance inflow remains modest as a percentage of GDP, and it is sourced from a limited number of host countries. In 2008, Pakistan's remittances were only 4.2 percent of GDP, which is significantly lower than some of its peers (Figure 3). Other developing and middle-income countries such as Lebanon (24 percent), Jordan (22 percent), and the Philippines (11 percent) seem to benefit much more from their export of labour. More than half of the remittances originate from the GCC region, with the US (22 percent) and the UK (8 percent) as other important sources. This regional pattern closely mirrors the destinations of Pakistani labour migrants. According to official estimates, there were about 4 million registered overseas Pakistani (workers and students) in 2004, of whom 1.9 million were employed in the Middle East (most in Saudi Arabia), followed by Europe (1.1 million, of whom about 800,000 are in the UK), and the US and Canada (850,000). Including illegal immigrants, the total number of overseas Pakistanis is estimated at around 7 million.<sup>4</sup> The majority of these workers are employed in construction, while many others are employed in retail, transportation services, and tourism.

**Fig. 3. Remittances in Selected Low- and Middle-Income Countries, 2008**  
(in percent of GDP)



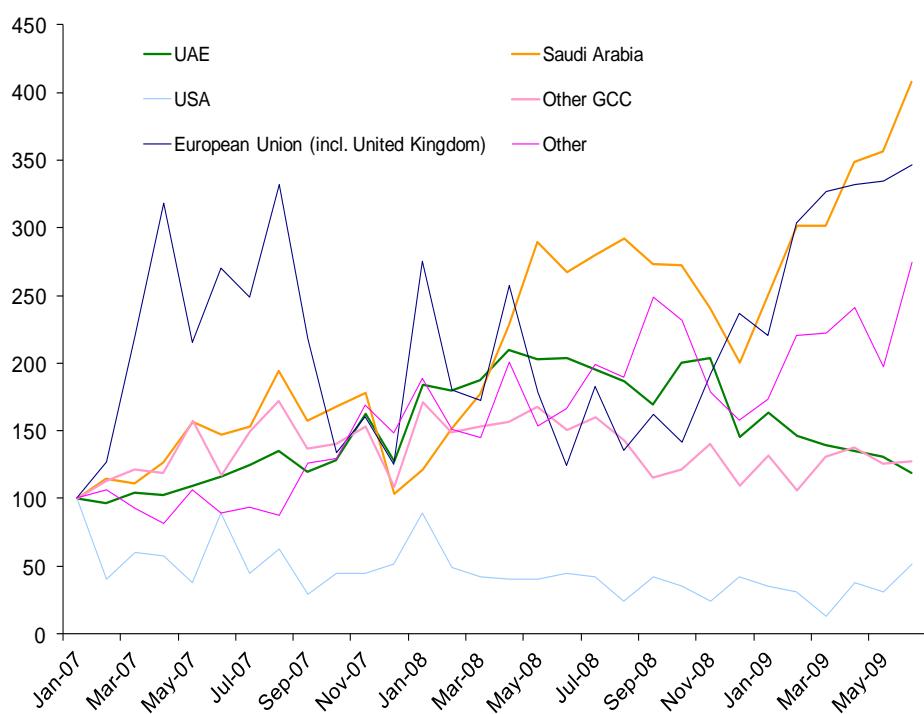
Source: World Bank.

The recent increase in workers' remittances to Pakistan appears to have coincided with a sharp rise in migration. For example, migration has doubled since January 2007 to almost 38,000 per month in June 2009. Worker migration to the UAE, however, has

<sup>4</sup>Pakistan (2006).

declined by 43 percent from its peak in April 2008 to about 12,000 workers in June 2009 (Figure 4). While in 2008 the UAE was the destination for about half of all Pakistani migrant workers. The drop in migration to the UAE was offset by an increase in migration to Saudi Arabia (from a monthly average of 11,500 in 2008 to 18,400 in the second quarter of 2009).<sup>5</sup> Labour migration to the European Union (including the UK) tripled from January 2007 to June 2009, but the volumes are still small (400–600 workers per month). Labour migration to the US is also small (only a few dozen workers per month), which indicates that the high volume of remittances from this host country comes from the large Pakistani diaspora—as is also true for the UK.

**Fig. 4. Pakistan: Labour Migration Indices by Host Country,  
January 2007–June 2009**  
(January 2007 = 100)



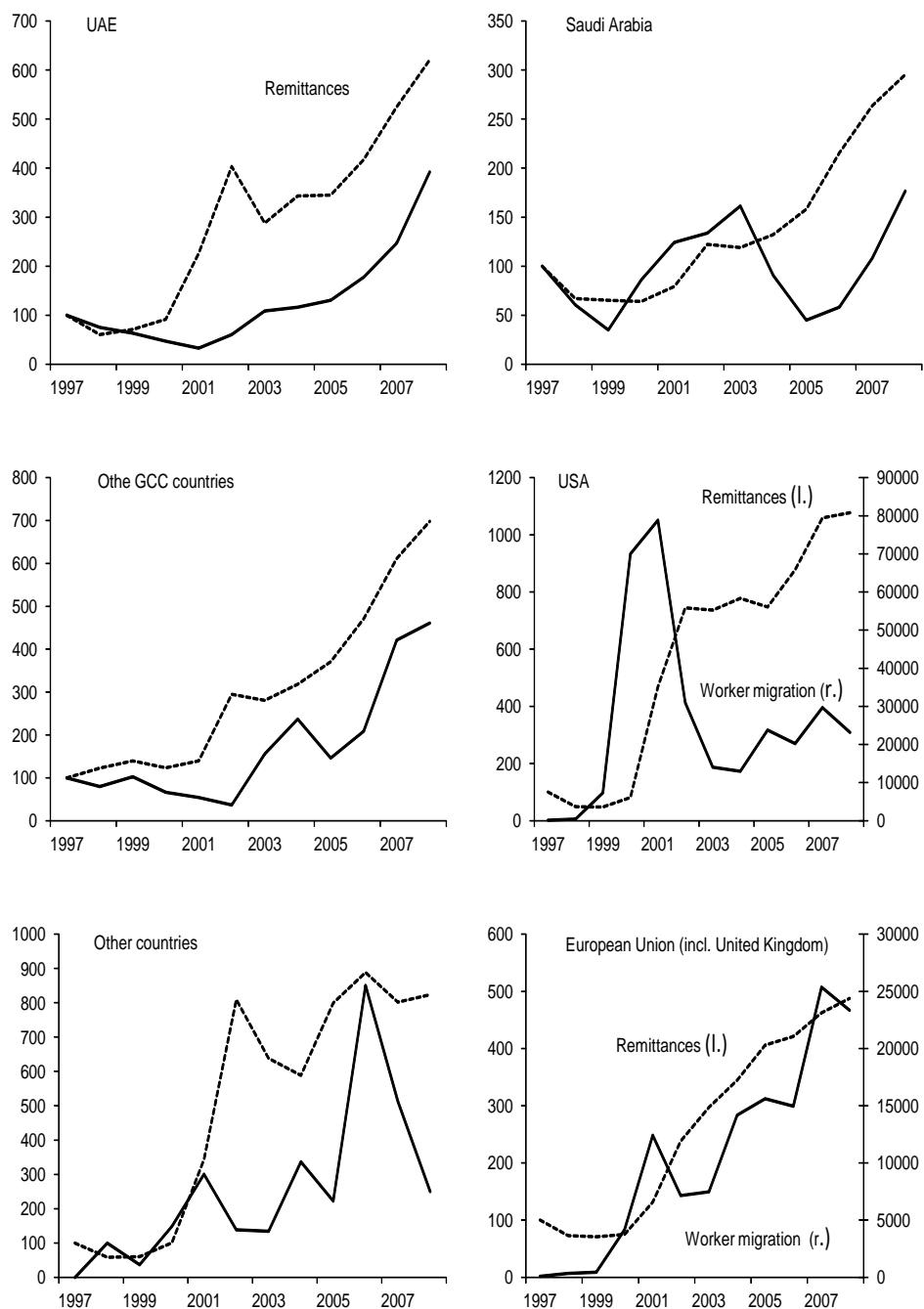
Source: Pakistan Bureau of Overseas Employment and authors' calculations.

In addition, over the past decade all host countries have seen the increase in the outflow of remittances to Pakistan outpace the inflow of workers from Pakistan, except for the European Union (Figure 5) indicating rising per capita remittances. The trend growth in per capita remittances has been particularly strong from host countries in the Gulf, with a similar pattern for the US and the European Union (including the UK).

<sup>5</sup>Saudi Arabia is an important source of remittances not just for Pakistan, but for many countries in the region [IMF (2009)].

**Fig. 5. Remittances and Worker Migration, 1997–2008**

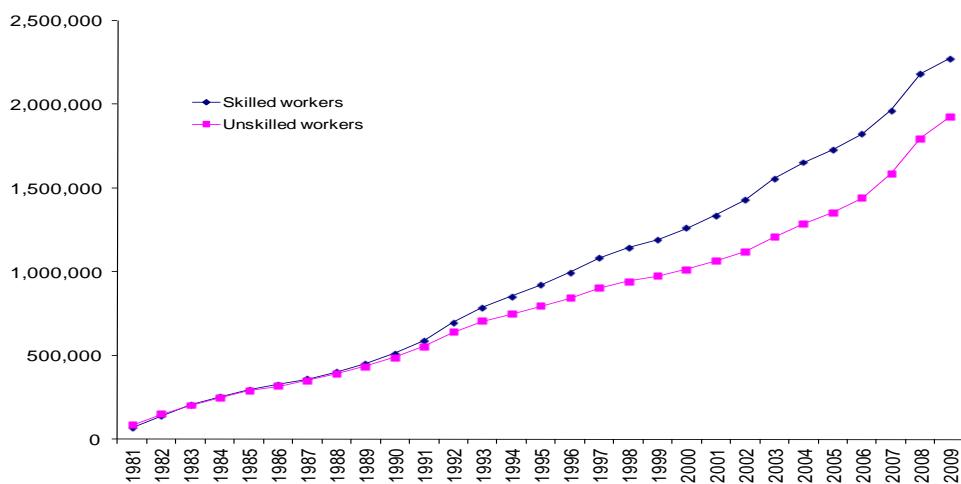
(1997 = 100)



Source: Pakistani authorities and authors' calculations.

One potential explanation for the increase in remittances per migrant worker—which we will explore further in the next section—is the increase in the share of skilled labour exported by Pakistan. In recent years, the proportions of skilled and unskilled workers migrating from Pakistan have been about even. From 1994–2003, however, the share of skilled workers was 60 percent. As a result, the current pool of Pakistani workers overseas is likely to be more skilled than two decades ago (Figure 6), which may help explain why remittances from the Gulf countries increased faster than the number of Pakistani workers migrating to these countries. Skilled workers are less likely to be laid off during a recession, which may also explain why the global crisis so far has had no impact on the flow of remittances to Pakistan. This is also consistent with micro-data analysis by Nishat and Bilgrami (1993), who somewhat counter-intuitively suggest that higher skilled workers remit about 5.5 percent less than semi-skilled and unskilled workers. They also find, however, that remittances are highly correlated with income: higher skilled workers increase their remittances more than semi-skilled and unskilled migrants.

**Fig. 6. Pakistan: Labour Migration by Skill Level, January 1981–June 2009  
(Cumulative)**



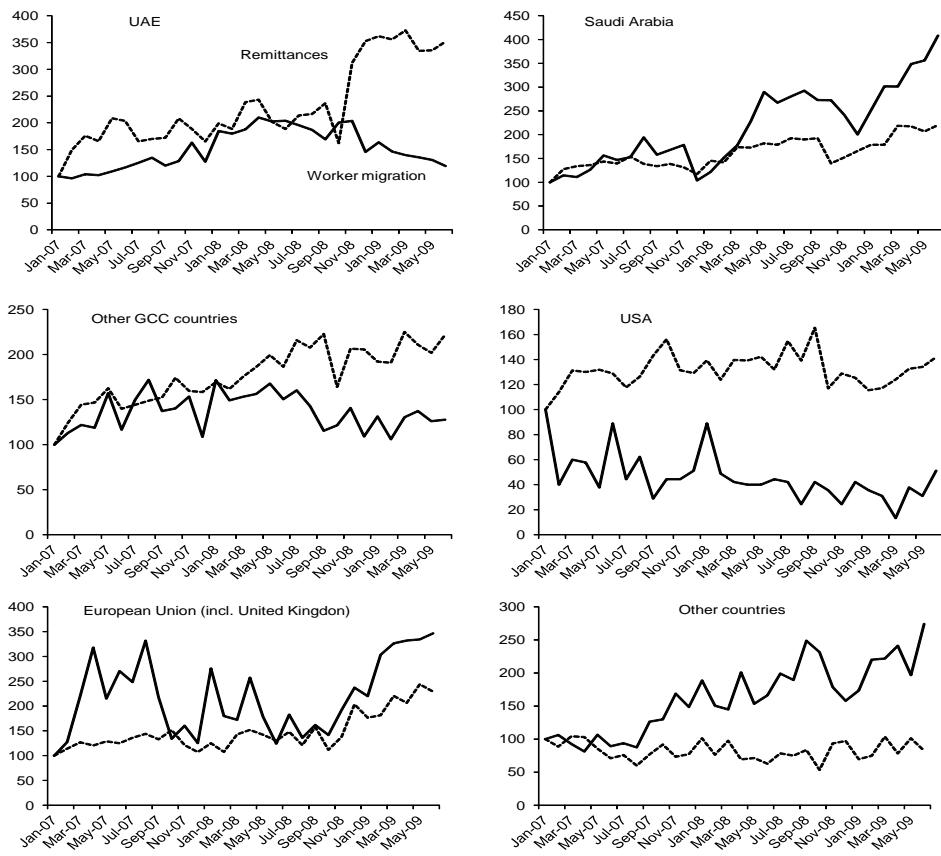
Source: Pakistan Bureau of Overseas Employment and authors' calculations.

Another interesting observation is the shift in the pattern of labour migration from Pakistan since the beginning of the global crisis and the contrast with remittances (Figure 7). The number of Pakistani workers migrating to the UAE has gradually declined since mid-2008, while the opposite is true for migration to Saudi Arabia and a diverse set of other countries (although the absolute numbers are much smaller for that group of host countries). However, the total remittance flow from the UAE has actually increased, while the increase in the number of Pakistani workers migrating to Saudi Arabia has outstripped the increase in remittances from Saudi Arabia. For the UAE, we observe a surprising break in the amount of remittances in November 2008. In the nine months before that date, average monthly remittances were \$98 million, compared to \$162 million in the nine months thereafter. Both the shift in host country and the jump in remittances from the UAE may be related to the global crisis, which has had a different

impact in Saudi Arabia and the UAE. In Saudi Arabia, the impact of the global crisis was mitigated by a large fiscal stimulus package, the absence of a real estate boom, and relatively sound banking practices. The UAE, on the other hand, was hit hard when the real estate bubble collapsed. This may help explain the shift in migration of Pakistani workers from the UAE—where many Pakistani workers are employed in the construction sector—to Saudi Arabia. These shifting remittance patterns suggest that remittances are clearly affected not just by wage income, but also by other factors such as immigrant workers' savings and investment decisions.

Geopolitical events can also affect remittances, especially in the case of Pakistan. In the wake of the 11 September 2001 terrorist attacks, the US and other Western countries increased scrutiny of the bank accounts of Pakistani nationals. Some anecdotal evidence suggests that, to avoid the risk of their funds being frozen or confiscated, Pakistanis abroad transferred part of their accumulated savings to Pakistan and increased the share of their monthly savings held in Pakistan.

**Fig. 7. Remittances and Worker Migration, January 2007–June 2009**  
(January 2007 = 100)



Source: Pakistani authorities and authors' calculations.

### III. EMPIRICAL STUDY

As previewed in the previous section, remittances seem to have been driven by a host of factors such as migration, workers' skills, and economic conditions in the host country. This section tries to analyse empirically the various drivers of remittances after a brief review of the existing literature.

#### (a) Existing Empirical Studies and Our Model

The economic literature on remittances has been growing and falls into two broad categories: the drivers of remittances and the impact of remittances on growth, investment, and consumption in the receiving country. Chami, *et al.* (2008) provide a comprehensive overview of the recent theoretical and empirical literature on remittances.

The literature on remittance behaviour at the individual level identifies two motives for remitting, which can operate simultaneously in a remitter's decision to remit. The first is altruism [Johnson and Whitelaw (1974)]. The second is self-interested exchange from the remitter [Lucas and Stark (1985) and Hoddinott (1994)], where remittances are paid as compensation for relatives in the home country who provide services such as child care, financing of emigration, and tending to businesses interests. Becker's work on merit goods (1991) complements this literature by providing a theoretical framework for a more unified analysis of remittance decisions [see also Chami (1998) and Mulligan and Philipson (2000)]. A particularly important relationship between the remitter and relatives in the home country is protection from income shocks, which can be in both directions. For example, Yang and Choi (2007) show that agricultural families in the Philippines use remittances to compensate for income shocks, while in Amuedo-Dorantes and Pozo (2006), the family provides insurance to the remitter, with the remittances as the insurance premiums. The International Labour Organisation (2009) provides a case study for Pakistan on these issues.

Regardless of the motive to remit, the amount remitted is determined by the economic fortunes of the remitter and the recipient, among other variables. Economic growth in the host country is often used as a proxy for the remitter's economic fortunes, with higher growth leading to higher remittances. Similarly, economic growth in the home country is used as a proxy for the recipient's economic fortunes, with lower growth leading to higher remittances. Another important factor that drives remittances is the real value of remittances—which depends on the exchange rate (including black market exchange premiums) and inflation in the recipient's country—because it is the amount of real resource represented by remittances that has a direct bearing on the recipient's welfare. Many empirical studies also include factors that affect the opportunities available for use of remittances, which may include financial variables such as interest rates in the home country and proxies for political risk.

Either by design or by omission, many existing empirical studies are limited to analysing remittances using aggregate-level data to explain essentially individual behaviour, namely the motivation of the individual remitter to remit. For example, most studies focus on macroeconomic variables that affect the total amount of worker remittances and by how much—sometimes scaled in either host or home countries' GDP. This deficiency seems to reflect to a large extent the paucity of micro data on remittances.

In our empirical model, we depart from this approach in several ways. First, we try to model remittance behaviour more accurately by focusing on per capita remittances instead of aggregated remittances or the growth of remittances. As explained before, while remittance theory is often postulated at the individual remitter's level, existing cross-country studies that we are aware of focus on aggregate remittances, often scaled by the host country's GDP, as a way to control for cross-country difference. This makes it difficult to interpret the results because worker migration is often not accounted for.<sup>6</sup> In this study, we scale the aggregate remittance by immigrant population and study the behaviour of per capita remittances.

Second, we draw a close link between remittances and remitters' earning capacity in the belief that higher earning power leads to more remittances. Earning capacity is determined by an immigrant's human capital, which is reflected in the type of job he or she held in the home country prior to emigration. Clearly, migrant workers who have held more skilled jobs before immigration are better educated and have more human capital, and tend to have more skilled jobs with higher earnings after immigration, and will therefore remit more. Search and recruitment costs for these workers are higher than for lower skilled workers due to their job-specific skills and, hence, they tend to have more job security. This complements the traditional macroeconomic link between the host country's general economic conditions and remittances.

For Pakistani workers going overseas, information on a worker's occupation prior to emigration is collected by the Bureau of Emigration and Overseas Employment. Workers are classified into the following categories: highly skilled, highly qualified, skilled, semi-skilled, and unskilled. Based on this data, we construct a (normalised) skill index as follows with higher weights for the more skilled workers:<sup>7</sup>

$$SK = (1/25)(7HS + 6HQ + 5S + 4SS + 3U)/(HS + HQ + S + SS + U)$$

where  $HS$ ,  $HQ$ ,  $S$ ,  $SS$ , and  $U$  denote the number of persons classified in the respective highly skilled, highly qualified, skilled, semi-skilled, and unskilled categories, and the skill index variable ( $sk$ ) is used to test the hypothesis.<sup>8</sup> Detailed information on the construction of the skills index is provided in the data Appendix I.

Third, we regard remittances explicitly as part of an investment decision for an emigrant worker, and believe that investment opportunities in the host and home country affect remittance decisions as standard portfolio allocation theory would suggest. This emphasis comes in part from the fact that remittance data for Pakistan includes not just workers' remittances, but also employee compensation and migrants' transfers. The latter two categories have been found to be more pro-cyclical in many empirical studies; for

<sup>6</sup>One exception is Cuc, *et al.* (2005), which studies remittances and migration in Moldova.

<sup>7</sup>The combined weight for highly skilled and highly qualified workers is 52 percent compared to 40 percent if all skills are equally weighted. So, relative to an equally weighted index, this index skews the weights of higher skilled workers by 30 percent. The relatively high weight for higher skill workers is consistent with the higher income that these workers enjoy, which reflects their higher productivity compared to lower skilled workers. Other weighting schemes can also be used and the results would be similar after adjusting for the weights.

<sup>8</sup>Our skill index only measures skills acquired before emigration and does not take into account skills acquired through formal or on-the-job training in the host country.

example, Chami, *et al.* (2008) notes that “employee compensation and migrants’ transfers are procyclical on average, a finding that is more consistent with the behaviour of private capital flows than remittances as compensatory income transfers.” Similar findings are also noted in Frankel (2009). Anecdotes from Pakistan officials and friends also suggest that a significant part of the change in remittances from the Gulf region (for example, Dubai) is associated with changes in the real estate investment of Pakistanis in both Dubai and in Pakistan. We therefore model the investment aspect of remittances with such variables as returns on investment in the host and home countries and exchange rates, among other variables. We construct an investment return variable for both the host and home countries that tracks the return of a hypothetical portfolio with 80 percent in deposits (considered risk-free) and the remaining in equities.<sup>9</sup>

$$ir = 0.8R^* + 0.2Re$$

where  $R^*$  is the deposit rate, and  $Re$  is calculated as the return on the stock market index ( $I_t$ ), i.e.,  $Re = 100 * \left( \frac{I_t}{I_{t-1}} - 1 \right)$ .

### (b) Estimation Results

The estimation is based on a panel of 15 countries with bilateral remittance flows to Pakistan, using data from 1997 to 2008.<sup>10,11</sup> Sources of the dataset and explanatory notes can be found in Appendix I and a summary plot of the main variables by country is given in Appendix II. The panel approach helps to overcome empirical challenges such as small sample size. Our regression model is based on average remittances per worker ( $r_t$ , in US dollars) and four sets of explanatory variables:

- Job skill index ( $sk$ )
- Investment return ( $ir$ ,  $ir_{pak}$ )
- Proxy for recipients’ economic conditions in Pakistan
- Proxy for real value of remittance

As a good proxy for a recipient’s economic conditions in Pakistan, we use output of major agricultural crops ( $mc_{rpak}$ ). Another variable—total agricultural output—yields similar results. Both are shown to be better indicators, in terms of statistical significance, than GDP-related variables such as real GDP. Given that Pakistan has a relatively large

<sup>9</sup>This portfolio basket is consistent with a relatively risk-averse investor, which we would surmise to be representative of the average migrant given their income and wealth level. Interpretation of the empirical results would need to take into account the composition of the benchmark portfolio. The results for different weights vary somewhat but all are statistically significant.

<sup>10</sup>The countries are Bahrain, Germany, Greece, Italy, Japan, Kuwait, Oman, Qatar, Saudi Arabia, Spain, Sweden, Switzerland, the UAE, the UK, and the US. The estimation results that we obtain are an average of the bilateral remittance flows between these countries and Pakistan. In practice, bilateral remittance flows are more important to some countries than to others; consequently, the behaviour of aggregate remittances is a weighted average of the individual relationships.

<sup>11</sup>While the informal *hundi* system is another important channel for remittance flows into Pakistan, the constraints on data availability mean that remittances through the *hundi* system were not included in this study. However, there is evidence that the increase in remittances through the formal channel is in part the result of crackdowns on illegal fund transfers, and the increased outreach of Pakistani banks that have arrangements with overseas entities [State Bank of Pakistan (2010)].

agricultural sector that employs the majority of the workforce and that many immigrant workers have families or relatives in the rural areas, this result is not surprising. Both the nominal exchange rate ( $e$ ) and the real effective exchange rate ( $reer$ ) are used to adjust for fluctuations in the real value of remittances. The estimated equation reads:

$$r_1 = \alpha + \beta_1 sk + \beta_2 reer + \beta_3 ir + \beta_4 e + \beta_5 ir_{pak} + \beta_6 mc_{rpak}$$

The model is estimated using several techniques. First, it is estimated as a pooled model, and the estimation is then carried out allowing fixed and random effects for country-specific intercepts. These models are re-estimated using a Bayesian approach, with broadly similar results. For the Bayesian estimation, the maximum likelihood ratios appear not to favour the fixed-effects model under a non-hierarchical prior. Instead, the ratios seem to slightly favour the random coefficient model over the pooled model and fixed-effects model under a hierarchical prior, but the maximum likelihood ratios are rather close.<sup>12</sup> Therefore, the Bayesian results reveal some model uncertainty. Nevertheless, the coefficients are broadly similar even under the Bayesian estimation.

With limited data points, no short-term dynamics are attempted; instead, we focus on the long-term relationship, given that many variables are strongly trended. The potential endogeneity issue cannot be addressed directly due to the limitations of the dataset, and would require some form of system estimation. The results are shown in Tables 2 and 3.

Our analysis yields the following main results:

- The skill level of emigrants appears to be highly significant in explaining the level of remittances when using the OLS approach, although less so when using the Bayesian approach. Indeed with the inclusion of the skill variable, host country GDP is no longer significant, suggesting that the skill variable is a superior indicator of earning capacity and driver of remittances.
- The investment return in both the host country and Pakistan is highly significant, and has the expected signs (under both the OLS approach and most Bayesian models), indicating that remitters respond to variations in investment opportunities both in the host country and in Pakistan.
- Remittances are also affected both by the nominal and real effective exchange rates, suggesting that remitters adjust for nominal and real exchange rate fluctuations when deciding on the dollar amount of remittances. This is in line with previous studies.<sup>13</sup>
- The results also confirm that changes in domestic economic fortunes—proxied by the output of major agricultural crops—are significant in explaining remittance behaviour. Somewhat surprisingly, we find that better agricultural harvests are related to higher remittances and transfers, i.e., they are procyclical.<sup>14</sup> This result is consistent with other studies as noted earlier, since our

<sup>12</sup>Given the uncertainty on the distribution of the coefficients, even the small log marginal likelihood of the non-hierarchical model cannot be used as direct evidence of low model support.

<sup>13</sup>The real effective exchange rate is less significant under Bayesian estimation, but nominal exchange rates are significant in most Bayesian estimations.

<sup>14</sup>The average correlation of per-capita remittances and agricultural GDP is around 0.6 and 0.8, respectively, for the two definitions of agricultural GDP.

data on remittances includes migrant transfers, which together tend to behave more like private capital flows. As other studies have shown, remittance-only data often has a small negative correlation with real GDP [see Chami, *et al.* (2008)], which could be true for Pakistan, but which we could not verify because of data constraints. One should also bear in mind that, since our results are from a single equation estimation, other variables—such as exchange rates (real and nominal), which tend to fluctuate along with the real economy—may have already picked up some of the intended effects on remittances.

Table 2  
*Regression Results—OLS Approach*

R1 =  $\alpha + \beta_1 SK + \beta_2 reer + \beta_3 IR + \beta_4 E + \beta_5 IR\_PAK + \beta_6 MC\_RPAK$   
(See notation below)

(i) Coefficients (standard errors)		Pooled Model	Fixed Effects	Random Effects	
$\alpha$	-73.724	(11.239)	-76.119	(11.252)	-91.189 (7.299)
SK	-0.480	(2.856)	5.885	(2.395)	5.182 (2.339)
reer	1.550	(0.865)	3.379	(0.856)	4.039 (0.709)
IR	-0.071	(0.016)	-0.045	(0.010)	-0.044 (0.010)
E	0.411	(0.035)	1.871	(0.739)	0.436 (0.093)
IR_PAK	0.404	(0.193)	5.386	(0.614)	6.139 (0.463)
MC_RPAK	5.742	(0.788)	0.305	(0.113)	0.339 (0.112)
SER	1.3025		0.660		0.670
R <sup>2</sup>	0.5615		0.865		0.606
Adjusted R <sup>2</sup>	0.5463		0.848		0.593
Durbin-Watson stat			1.164		1.099
F-statistic (p-value)			51.112 (0.000)		44.406 (0.000)
(ii) Error Component		Share of Total			
		S. D.	Variance		
Cross-section Random	0.936	0.668			
Idiosyncratic Random	0.660	0.332			
(iii) Tests of Fixed and Random Effects					
Redundant Fixed Effects Tests					
Effects Test		Statistic	d.f.	Prob.	
Cross-section F	25.64		-14.159	0.000	
Cross-section Chi-square	212.59		14	0.000	
Hausman Random Effect Tests 1/					
Variable	Fixed	Random	Var. (Diff.)	Prob.	
SK	5.885	5.182	0.266	(0.173)	
LOG(REER)	3.379	4.039	0.230	(0.169)	
IR	-0.045	-0.044	0.000	(0.465)	
LOG(E)	1.871	0.436	0.537	(0.050)	
LOG(MC_RPAK)	5.386	6.139	0.163	(0.062)	
LOG(IR_PAK)	0.305	0.339	0.000	(0.031)	

\*Cross-section test variance is invalid. Hausman statistic is set to zero.

R1 = per capita remittances (in US\$)

SK = constructed skill index of immigrants

reer = real effective exchange rate

IR = return on investment (constructed)

E = exchange rate (currency per US\$)

MC\_RPAK = major agricultural crop of Pakistan

Table 3

*Regression Results—Bayesian Approach*

$R1 = \alpha + \beta_1 SK + \beta_2 reer + \beta_3 IR + \beta_4 E + \beta_5 IR\_PAK + \beta_6 MC\_RPAK$   
 (See notation below)

(i) Coefficients (Standard errors), followed by nse												
	Fixed Effects		Random Effects		Pooled Model		Random Coefficients					
$\alpha$			-0.382	(0.817)	0.0082	-0.450	(1.00)	0.0100	-0.1856	(0.993)	0.0057	
SK	0.037	(0.954)	0.0095	0.018	(0.967)	0.0097	-0.266	(0.955)	0.0096	0.5882	(0.985)	0.0057
reer	-0.699	(0.605)	0.0061	-0.501	(0.714)	0.0071	-0.545	(0.632)	0.0063	-1.0793	(0.616)	0.0036
IR	-0.055	(0.013)	0.0001	-0.056	(0.019)	0.0002	-0.070	(0.017)	0.0002	-0.0457	(0.184)	0.0011
E	0.493	(0.101)	0.0010	0.468	(0.129)	0.0013	0.394	(0.037)	0.0004	0.5643	(0.771)	0.0045
IR_PAK	0.496	(0.155)	0.0016	0.494	(0.214)	0.0021	0.537	(0.208)	0.0021	0.25	(0.244)	0.0014
MC_RPAK	0.751	(0.223)	0.0022	0.706	(0.271)	0.0027	0.715	(0.243)	0.0024	0.8358	(0.331)	0.0019
$1/\sigma^2$	1.1645	(0.130)	0.0013	0.746	(0.283)	0.0028	0.624	(0.066)	0.0007	4.2532	(0.554)	0.0032
Log of Marginal Likelihood			-940.9			-332.3			-401.8		-290.3	

**IV. CONCLUSIONS**

Remittances have become a major source of inflows for Pakistan in recent years, and there are no signs of a reversal. In this paper, we use a new approach to explain the strong flow of remittances to Pakistan. The results are encouraging as they show that the skill level of immigrants, investment returns in the host country and in Pakistan, exchange rates (real and nominal), and Pakistan's economic conditions all play a significant role in explaining remittances.

These results help explain why remittances to Pakistan appear more resilient than those to other countries in the region. In the period 2009-2011, following the global crisis of 2008, the average annual growth of remittances to Pakistan was 2 percentage points higher than in the three years preceding the crisis (2006-08). Bangladesh, Nepal, and India, on the other hand, witnessed a drop in average annual remittance growth between 17 and 23 percent. Sri Lanka was able to match Pakistan's performance and witnessed an increase in average remittance growth from 14 to 21 percent. Sri Lanka, Bangladesh, and Pakistan have all experienced a surge in labour migration since 2005, while migration from Nepal has remained stable. GCC countries are the main source of remittances for all these countries. It thus seems that the increase in remittances to Pakistan can be explained only in part by an increase in worker migration and the economic boom in the GCC countries in the years prior to the crisis. The increase in the share of higher skilled workers in Pakistan's labour migration explains part of this discrepancy.

In the long run, the question whether Pakistan will be able to sustain the recent increase in remittances depends on whether the rise in labour migration is to continue and, more importantly, if the composition of the migrating workforce continues to tilt in favour of higher skilled workers. Obviously, any positive impact of the continued export of higher skilled labour should be carefully weighed against the potential cost of this 'brain drain'.

***Appendices*****APPENDIX I****DATA SOURCES AND EXPLANATORY NOTES**

Data on remittances, interest rates, and stock market indices was collected from Haver Analytics. Major agricultural crop and agricultural output data for Pakistan is also from Haver Analytics, sourced from the Pakistan Federal Bureau of Statistics. Data on the real effective exchange rate and nominal exchange rate is from the IMF's International Financial Statistics database.

Data for the skill index (SK) was collected from the annual "Statement showing the number of workers proceeded abroad for employment registered by Bureau of Emigration and Overseas Employment, broad categories of workers",<sup>15</sup> which classifies immigrant workers as highly skilled, skilled, semi-skilled, and unskilled.<sup>16</sup>

The migration data that we have used covers all migration to the Middle East, but for destinations other than the Middle East, only labour migration is covered. There is therefore some under-coverage of migrants who are eventually employed in the host country although they did not initially migrate to find employment. Nevertheless, given that the bulk of migration is for employment purposes, this under-coverage of migration to non-Middle East destinations is ameliorated as the skill set of people who migrate could be considered broadly the same for the same destination. It should also be noted that there may be some underreporting in our data of highly skilled workers, who do not necessarily emigrate through the Bureau of Emigration [Gilani (2011)].

The skill index is a weighted index of the share of different skill workers. The weights assigned are relatively skewed towards higher skills to reflect the relative difference in income earning capacity. The ratio of highest to lowest skills is around 1.75 (7/4), which can be considered in line with relative income differentials. The index is constructed as follows:

$$SK = (1/25)*(7*HS+6*HQ+5*S+4*SS+3*U)/(HS+HQ+S+SS+U), \text{ where}$$

HS = highly skilled

HQ = highly qualified

S = skilled

SS = semi-skilled

U = unskilled

The per capita remittance ( $r_I$ ) is calculated as follows:  $r_I = \text{remittance} / \text{estimated immigrant stock (IS)}$

<sup>15</sup>Source: Bureau of Emigration and Overseas Employment. Ministry of Labour, Employment and Overseas Pakistanis.

<sup>16</sup>The Bureau of Emigration classifies workers into five categories depending on their occupation: highly qualified (engineers, doctors, accountants, computer programmers, pharmacists), highly skilled (nurses, teachers, managers, stenographers, designers, craftsman), skilled (welders, storekeepers, clerk/typists, foremen, carpenters, cooks, plumbers, electricians, steel-fixers, painters, technicians, mechanics, cable jointers, drivers, operators, tailors, surveyors, fitters, goldsmiths, salesmen, photographers, artists, masons), semi-skilled (blacksmiths, waiters, riggers), and unskilled (labourers, agriculturists).

The immigrant stock series (IS) is estimated using the following transition equation:

$$IS(t) = IS(t-1) + EMI(t), \text{ where}$$

EMI(t) is migration out of Pakistan. The immigrant stock IS in 2004 is based on estimates from the Pakistani authorities [Pakistan (2006)] and the immigrant stock for other years is estimated using flow data from the Pakistan Bureau of Overseas Employment. Per capita remittance is then calculated by scaling the total remittances with the estimated immigrant stock.

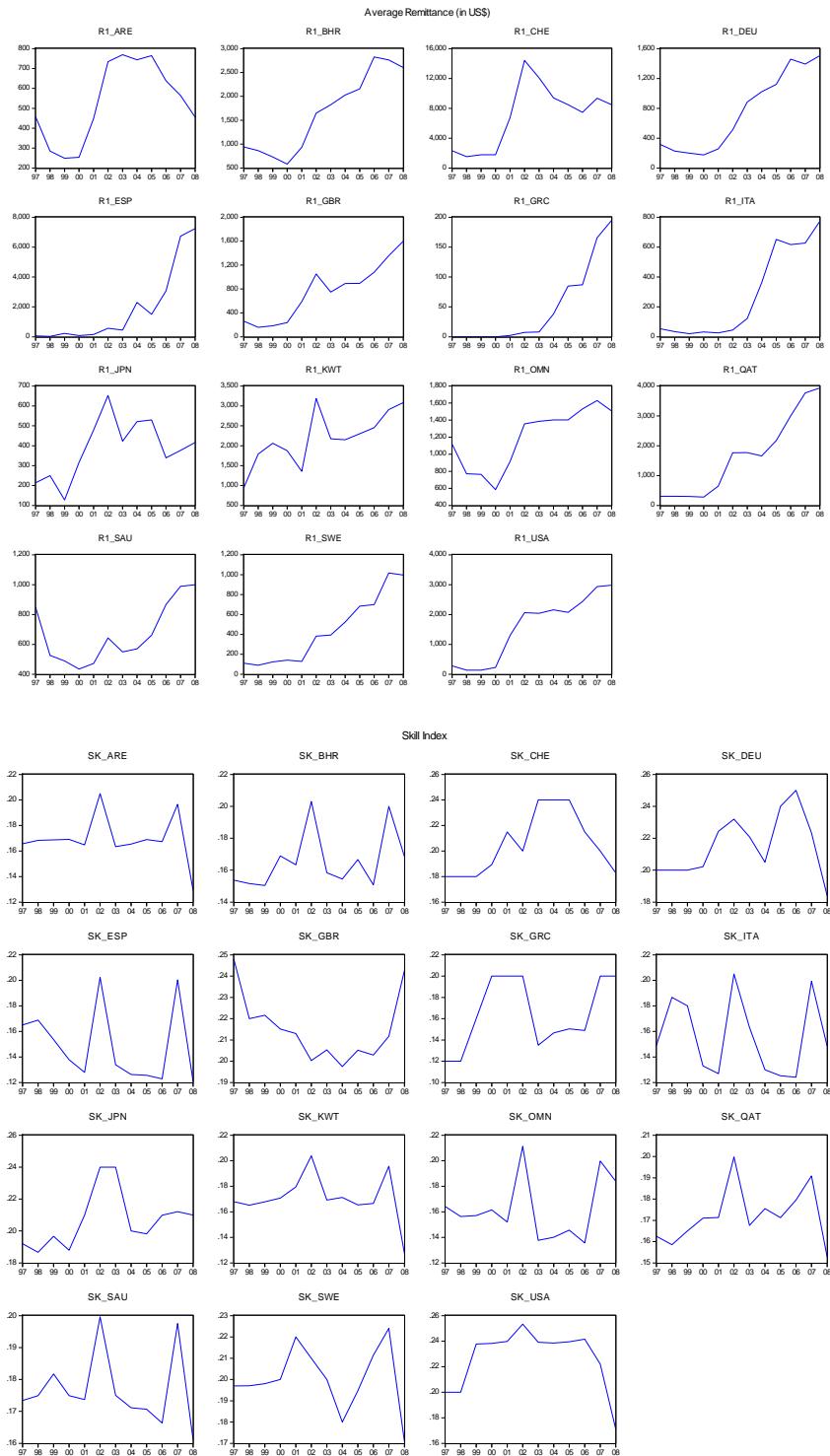
Investor return ( $r$ ) series are estimated using the weighted average of key deposits rates (80 percent weight) and changes in the main index of the stock market (20 percent weight) for the countries in the sample.

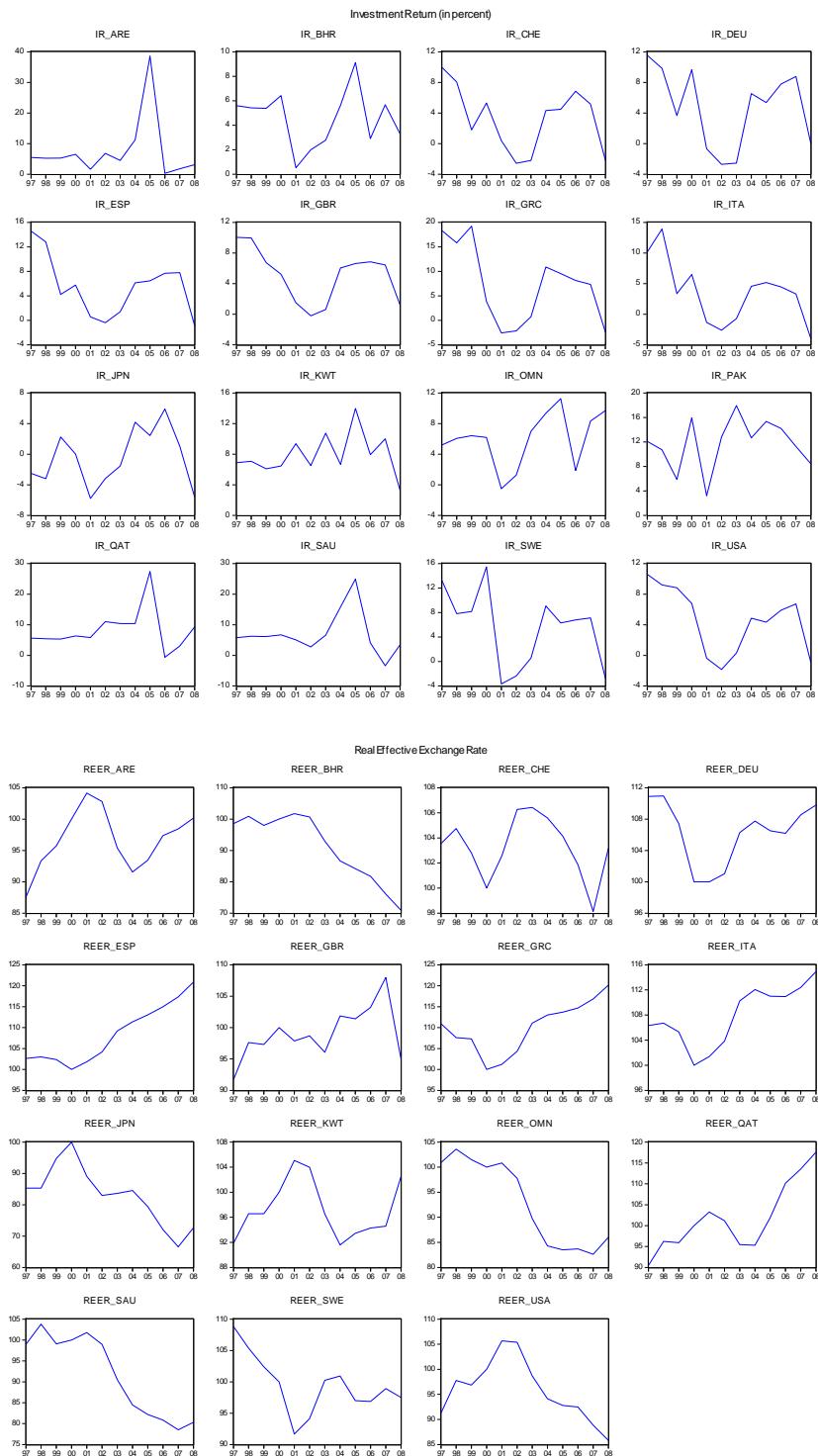
## APPENDIX II

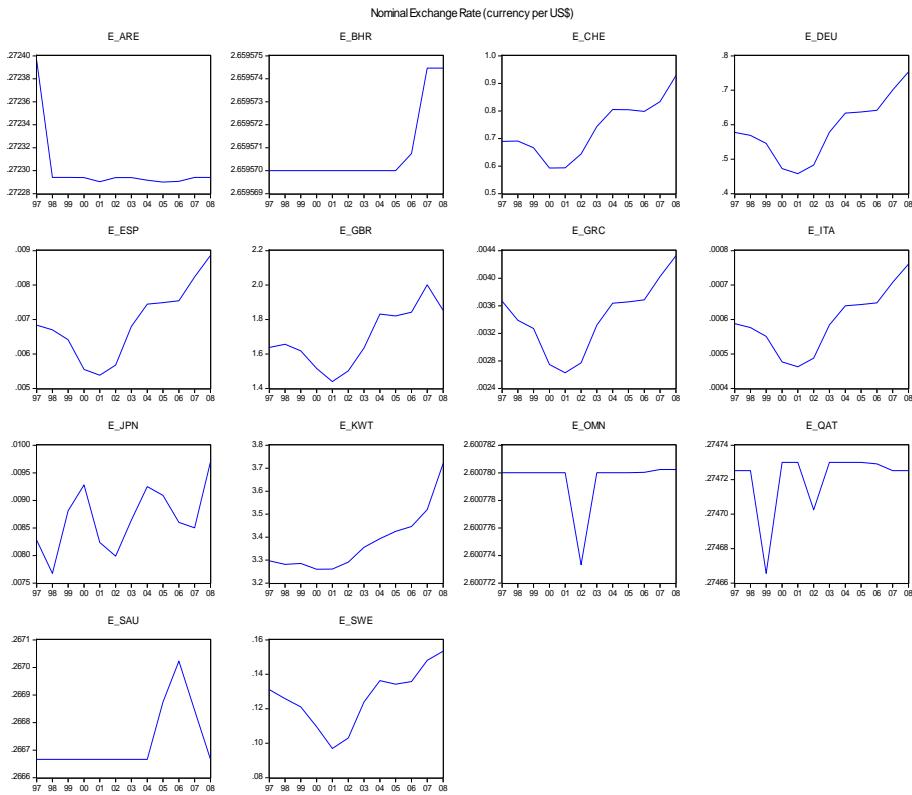
### OVERVIEW OF REGRESSION VARIABLES

In the following charts, the abbreviations used for country names are:

ARE	UAE
BHR	Bahrain
CHE	Switzerland
DEU	Germany
ESP	Spain
GBR	UK
GRC	Greece
ITA	Italy
JPN	Japan
KWT	Kuwait
OMN	Oman
PAK	Pakistan
QAT	Qatar
SAU	Saudi Arabia
SWE	Sweden







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## The Integration of Financial Markets in GCC Countries

SHABBIR AHMAD

The real interest parity (RIP) condition states that the interest rate differential between two economies is equivalent to the differential between the forward exchange rate and the spot exchange rate. This study examines the integration of financial markets in the GCC countries by verifying the validity of RIP in their economies. Using univariate and different panel unit root tests, we find evidence supporting the RIP theory, which indicates that the financial markets in these countries are well integrated and that the adoption of a common currency would be relatively easy.

*JEL classification:* F21; F36; C23

*Keywords:* Real Interest Parity, GCC Countries, Panel Unit Root Tests, Monetary Union

### 1. INTRODUCTION

The launch of the European Monetary Union in 1999 gave new impetus to the idea of establishing a common currency among six Gulf countries.<sup>1</sup> At the 2000 Bahrain Summit, the Gulf Cooperation Council (GCC) leaders approved the US dollar as a common peg to their currencies to stabilise exchange rates among member countries. It was further planned that the GCC states would work towards launching a single currency in 2010. Since then, there have been some setbacks to these arrangements: Oman pulled out of the plan in 2006 and Kuwait adopted a managed floating exchange rate regime in 2007. The recent decision of the United Arab Emirates to withdraw from the GCC monetary union in 2009 was another major blow to the planned monetary union. Despite these hindrances, many believe that the plan will materialise, though it may take longer than initially expected.

Examining the extent of market integration among GCC members is important for a successful and beneficial monetary union among these countries. Louis, Balli, and Mohammad (2008) test the symmetry of aggregate demand and non-oil aggregate supply shocks in the Gulf countries. They find that demand shocks are clearly symmetrical but that non-oil supply shocks are weakly symmetrical across these countries, which favours the idea of a monetary union. In a recent paper, Espinoza, Prasad, and Williams (2010)

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<sup>1</sup>Bahrain, Kuwait, Oman, Qatar, Saudi Arabia, and the United Arab Emirates are members of the GCC.

investigate the extent of financial integration among GCC members, and their results generally support regional integration. Based on equities data on cross-listed stocks, they find that stock markets are fairly well integrated compared to other emerging market regions. The results on the basis of interest rate data also indicate that convergence exists and that any difference in the interest rates of these countries is relatively short-lived.

The current study attempts to examine the extent of market integration among GCC members by testing for the presence of a well-known condition of interest parity, using univariate and other panel unit root tests.

It is well documented that unit root tests have low power in small sample sizes and often fail to distinguish nonstationary series from stationary series. The utilisation of panel data helps us resolve this issue by increasing the number of data observations. The second benefit of panel unit root tests comes from certain circumstances where data allows better control for unobservables that would otherwise spoil the regression estimation. Levin, Lin, and Chu (2001) demonstrate that, in a Monte Carlo simulation, asymptotic results approximate to the test statistics in panels of moderate size, and the power of a panel unit root test is considerably higher than that of a unit root test for each individual time series that has a non-standard asymptotic distribution. A compression of both types of tests in the application of real interest parity (RIP) in this study reinforces this notion. Moreover, no other study has used this methodology to test for the integration of financial markets in GCC countries; this study therefore represents another contribution to the literature.

RIP theory is a cornerstone of assessing the efficiency of foreign exchange markets, linking interest rates, spot exchange rates, and foreign exchange rates. It combines two fundamental theories: *ex ante* purchasing power parity (PPP) and uncovered interest parity (UIP). RIP theory hypothesises that, if economic agents have rational expectations and goods and financial markets arbitrage is operational, the real interest rates between countries will match one another.

Validating the theory is important in the sense that the equality of real interest rates reflects international integration of goods and assets markets, or alternatively indicates the presence of frictionless markets. Successful empirical evidence of the theory implies that the scope for international portfolio diversification is minimal and that the role of monetary policy as a stabilising tool is restricted to the degree that it influences the foreign real interest rate.

The present study analyses the convergence of real interest rates in GCC countries using two types of exchange rates: the US dollar and Japanese yen. The GCC countries have been considering the integration of their goods and financial markets since 1981. Many of their macroeconomic indicators follow similar patterns and the countries are about to form a monetary union. Their economic and institutional organisation and markets are very similar because of their economies' heavy dependence on the oil sector, their fixed exchange rate to the US dollar,<sup>2</sup> and heavy reliance on imported labour. The validity of RIP in these economies indicates that capital mobility exists among member countries and that their financial markets are well integrated. Additionally, it makes the adoption of a single currency in the region relatively easy and the cost of replacing a national currency with a common currency, minimal.

<sup>2</sup>Kuwait follows an exchange rate arrangement where its currency is pegged to a basket of currencies.

The remainder of the paper has five sections. The literature on RIP is presented briefly in Section 2. Section 3 presents a theoretical model of RIP. Section 4 discusses the empirical methodology. The details of data and estimation results are given in Section 5. Section 6 concludes the paper.

## 2. A BRIEF OVERVIEW OF THE LITERATURE

Since the pioneering papers of Mishkin (1984), Cumby and Obstfeld (1984), and Cumby and Mishkin (1987), there has been a burgeoning interest in testing the RIP hypothesis. Though the studies mentioned above have generally rejected the RIP condition for the short run, Dreger and Schumacher (2003) and Argyrou, Gregoriou and Kontonikas (2007) believe that RIP is a long run attractor for real interest rates for the European Monetary Union. Studies by Gagnon and Unferth (1995), Ong, *et al.* (1999), Evans, *et al.* (1994), Chinn and Frankel (1995), Alexakis, *et al.* (1997), Cavaglia (1992), Phylaktis (1999), Awad and Goodwin (1998), Frankel and Okongwu (1995), Fujii and Chinn (2000) and Jorion (1996) conclude that the differences in real interest rates across countries are relatively temporary and mean-reverting but different from zero in the long run. Edison and Pauls (1993) find a unit root in the real interest rate differential, while Cavaglia (1992) and Wu and Chen (1998) report mean reversion in real interest differentials. Ferreira and Léon-Ledesma (2003) show the presence of RIP in industrialised and emerging economies. Their study finds evidence of strong market integration in developed countries while a non-zero mean indicates the presence of a risk premium for emerging markets. Studies such as Goodwin and Grennes (1994), Holmes (2002), Mancuso, Goodwin, and Grennes (2003), Carrion-i-Silvestre and Tamarit (2006), and Ahmad (2010) reveal that convergence is subject to non-linearities and structural breaks. Some favour the use of short-term interest rates while others have verified the existence of RIP using long-term rates.

## 3. THEORETICAL MODEL

To formally derive a simple version of real PPP, we use Fisher's equation for both its domestic and foreign counterparts [Moosa and Bhatti (1996)].

$$E_t[R_{t+1}] = i_{t,t+1} - E_t[\pi_{t+1}] \quad \dots \quad \dots \quad \dots \quad \dots \quad \dots \quad (1)$$

$$E_t[R^f_{t+1}] = i^f_{t,t+1} - E_t[\pi^f_{t+1}] \quad \dots \quad \dots \quad \dots \quad \dots \quad \dots \quad (2)$$

In Equation 1,  $E_t$  represents rationally formed expectations in the current period while  $R_{t+1}$  is the ex ante real interest rate with one period to maturity. This real rate is the difference between the actual nominal interest rate  $i_{t,t+1}$  minus expected inflation  $\pi_{t+1}$ . Equation 2 gives the same information except that the superscript  $f$  denotes the foreign counterpart.

The UIP condition states that the expected change in the spot exchange rate ( $e_t$ ) will be a result of movements in capital flows due to the interest rate differential in the relevant economies.

$$E_t([e_{t+1}] - [e_t]) = i_{t,t+1} - i^f_{t,t+1} \quad \dots \quad \dots \quad \dots \quad \dots \quad \dots \quad (3)$$

where  $e_t$  is the logarithm of the units of the domestic currency price of the foreign currency. This version of UIP assumes that investors are risk-neutral and that foreign and domestic assets are perfect substitutes. [For other versions of UIP, see Emre, Pinar, and Salih (2007)].

We can introduce ex ante PPP by writing the following equation:

$$E_t([e_{t+1}] - [e_t]) = E_t([\pi_{t+1}] - [\pi^f_{t+1}]) \quad \dots \quad \dots \quad \dots \quad \dots \quad (4)$$

which states that expected movements in the spot exchange rate reflect the expected inflation differential between the home country and foreign country. This version of PPP assumes no barriers to trade and the absence of transportation costs, implying perfect commodity arbitrage. [See Ahmad and Rashid (2008) for a useful discussion on PPP].

Using Equations 1 and 2, we obtain a real interest rate differential between the two countries:

$$E_t([R_{t+1}] - [R^f_{t+1}]) = (i_{t,t+1} - i^f_{t,t+1}) - E_t([\pi_{t+1}] - [\pi^f_{t+1}]) \quad \dots \quad \dots \quad (5)$$

Now, combining the information in 3, 4, and 5 we have:

$$E_t([R_{t+1}] - [R^f_{t+1}]) = 0 \quad \dots \quad \dots \quad \dots \quad \dots \quad \dots \quad \dots \quad (5a)$$

The equation above states that ex ante real interest rates in the domestic and foreign economy will be the same. However, in the presence of rational expectations the ex post real interest rate differential will be equal to the difference between potentially correlated forecast errors, which can be written as:

$$R_{t+1} - R^f_{t+1} = E_t[R_{t+1}] + \varepsilon_{t+1} - (E_t[R^f_{t+1}] + \varepsilon^f_{t+1}) = \varepsilon_{t+1} - \varepsilon^f_{t+1} \quad \dots \quad \dots \quad (6)$$

where  $\varepsilon_{t+1}$  and  $\varepsilon^f_{t+1}$  are serially uncorrelated error terms with a zero mean. From the equation above, we can conclude that, if UIP and PPP hold and if agents form rational expectations, the difference between the disturbance terms will be equal to an unforeseeable error related to the forecast of exchange rate depreciation. It can also be noted that if this differential reverts to its mean value, any shock will be transitory. A higher value of the estimated convergent autoregressive root implies that shocks will have a longer impact. Even in the presence of mean reversion, there is still the possibility that this is a non-zero mean. Transportation costs, differentials in the risk premium across countries, tax rate differentials, financial contagion, and peso problems may result in convergence to a non-zero mean.

#### 4. METHODOLOGY

The literature on testing for unit roots in panels is growing and many advances have been made in this field. Banerjee (2004), Baltagi and Kao (2000), and Choi (2004) provide a good review of the literature. In the first category of tests, often termed first-generation panel unit root tests, Levin, Lin, and Chu (LLC) (2002) and Im, Pesaran and Shin (IPS) (2003) have made notable contributions. These studies assume that idiosyncratic errors are cross-sectionally independent.

Instead, considering correlations across units as nuisance parameters, the second generation of tests uses these co-movements [Moon and Perron (2004), Bai and Ng (2004) and Pesaran (2007)].

The present study uses a variety of unit root tests to detect the presence of RIP among GCC countries. For comparison, we use a country-specific augmented Dickey-Fuller (ADF) and generalised least squares augmented Dickey-Fuller (ADF-GLS) test. The ADF-GLS test was proposed by Elliot, *et al.* (1996) and Ng and Perron (2001). Gutierrez (2006) finds this test more powerful than the ADF test. We then apply other panel unit root tests, including Maddala and Wu (1999), Breitung (2000), Choi (2001), LLC (2002), and IPS (2003). A brief introduction to these tests is given below.

The Breitung (2000) and LLC (2002) tests assume a common unit root process in the data series. They begin with a simple ADF equation:

$$\Delta y_{it} = \alpha y_{it-1} + \sum_{p=1}^{k_i} \beta_{ip} \Delta y_{it-p} + z_{it}\gamma + \varepsilon_{it} \quad \dots \quad \dots \quad \dots \quad \dots \quad (7)$$

where  $\alpha = k - 1$  or common unit root processes are assumed to exist. However, the lag orders are allowed to differ across the panel. The null hypothesis assumes that  $\alpha = 0$  (or the presence of a unit root) while the alternative hypothesis assumes the series is stationary.

The proxies for  $\Delta y_{it}$  and  $y_{it}$  are used to obtain  $\alpha$  in the LLC test. These proxies are standardised, free from autocorrelations, and follow a deterministic trend.

However, the Breitung test is distinguished from the LLC test in two ways. First, when constructing proxies for  $\Delta y_{it}$  and  $y_{it}$ , in contrast to the LLC test, only the autocorrelation component is removed from the proxies for  $\Delta y_{it}$  and  $y_{it}$ . Second, these proxies are de-trended and transformed. Once these modified proxies are attained,  $\alpha$  can be estimated from the pooled proxy equation:

$$\Delta y_{it}^* = \alpha y_{it-1}^* + v_{it} \quad \dots \quad \dots \quad \dots \quad \dots \quad \dots \quad \dots \quad (8)$$

Breitung has shown that the estimate for  $\alpha^*$  follows a standard normal distribution. Before estimation, the specification of numbers of lags in each cross-section ADF equation as well as exogenous regressors is required.

A second set of panel tests assumes that individual unit root processes exist across cross-sections or that  $k_i$  varies. In these tests, a panel-specific conclusion about the existence of a unit root is made on the basis of individual unit root tests. The IPS (2003) panel unit root test uses a separate ADF test for each cross-section to form a panel-specific statistic. The panel unit root statistic is obtained by taking the average of the t-statistics of the individual ADF statistic  $\bar{t}_{NT}$ . For the lag order zero in ADF equations, IPS have simulated critical values for diverse cross-sections and series lengths, and for equations including either intercepts or intercepts and time trends. For non-zero lags, IPS show that  $\bar{t}_{NT}$  follows a standard normal distribution, which is as follows:

$$W_{tNT} = \frac{\sqrt{N} \left( \bar{t}_{NT} - N^{-1} \sum_{i=1}^N E(\bar{t}_{iT}(P_i)) \right)}{N^{-1} \sum_{i=1}^N \text{Var}(\bar{t}_{iT}(P_i))} \quad \dots \quad \dots \quad \dots \quad \dots \quad \dots \quad (9)$$

where  $E(\bar{t}_{iT}(P_i))$  and  $\text{Var}(\bar{t}_{iT}(P_i))$  are the mean and variance of the ADF regression  $t$ -statistic, which are provided by IPS for various lags, lengths of series, and different test-equation assumptions.

In the third set of tests, Maddala and Wu (1999) and Choi (2001) use Fisher's (1932) results to derive tests that unite the  $p$ -values of individual unit root tests. Assuming  $\lambda_i$  is the p-value of any individual unit root test for cross section  $i$ , and under the null hypothesis that assumes that the unit root exists in all cross-sections, we obtain the following result asymptotically:

$$p = -2 \sum_{i=1}^N \log(\lambda_i) \rightarrow \chi^2_{2N} \quad \dots \quad \dots \quad \dots \quad \dots \quad \dots \quad \dots \quad (10)$$

Additionally, Choi has demonstrated that:

$$Z = \frac{1}{\sqrt{N}} \sum_{i=1}^N \Phi^{-1}(\lambda_i) \rightarrow N(0,1) \quad \dots \quad \dots \quad \dots \quad \dots \quad \dots \quad (11)$$

where  $\Phi^{-1}$  is the inverse of the standard normal cumulative distribution function.

## 5. DATA AND ESTIMATION

The data series for estimation are taken from *International Financial Statistics, World Development Indicators*, and the relevant country publications. Given that the interest rate data series for the UAE spanned only a few years, we have dropped it from our analysis. The RIP has been tested using two types of exchange rates: the US dollar and Japanese yen.<sup>3</sup> The interest rate series used in the analysis are: Kuwait (money market rate, 1981Q1-2008Q4), Saudi Arabia (deposit rate, 1986Q1-2009Q4), Bahrain (money market rate, 1985Q3-2006Q4), Oman (time deposit rate, 1986Q1-2009Q4), Qatar (deposit rate, 1981Q1-2009Q4), United States (T-bill rate, 1981Q1-2009Q4), and Japan (call money rate, 1981Q1-2009Q4). The selection of the data series and time period was influenced mainly by the availability of data. The inflation rate is formed as the annualised change of the consumer price index (CPI) from the last month of the previous quarter to the last month of the present quarter.

Table 1 presents the results of the univariate unit root tests to detect the presence of RIP in the GCC countries. For Bahrain, it is evident that, on the basis of the simple ADF test, the null of the unit root can be rejected at a 5 percent significance level using the US dollar. However, the ADF-GLS test result shows that this hypothesis cannot be rejected using either the US dollar or Japanese yen. For Kuwait, the null of the unit root cannot be rejected at the 5 percent significance level whether using the US dollar or Japanese yen exchange rate.

<sup>3</sup>The Euro area real interest rate was also tried but due to insufficient data observations (starting from 1998Q1) for the interbank rate (3 months), the results were not very meaningful. Therefore, the results for the Euro area were dropped from this analysis.

Table 1

Country	Univariate Unit Root Tests Results			
	ADF USA	ADF Japan	ADF-GLS USA	ADF-GLS Japan
Bahrain	-3.5729*	-3.204	-3.0558	-2.377
Kuwait	-2.624	-2.539	-2.440	-2.92
Oman	-3.372*	-1.17	-3.884*	-1.35
Qatar	-3.95*	-3.582*	-3.4319*	-4.888**
SA	-2.79	-1.739	-2.828	-1.869
Critical Values (Trend)				
1%		-4.083		-3.671
5%		-3.47		-3.106

\* and \*\* indicate rejection of the null hypothesis of non-stationarity at 5 percent and 1 percent levels of significance. All estimates include intercept and time trend. Optimal number of lags is selected on the basis of SIC.

The results for Saudi Arabia are also similar to those for Kuwait. For Oman, the null of the unit root is rejected at the 5 percent significance level on the basis of both tests when using the US dollar. When using the Japanese yen exchange rate, both tests are unable to reject the same hypothesis. For Qatar, the presence of a unit root in the real interest rate differential is rejected by both tests when using both exchange rates.

The country-specific individual unit root tests may not be powerful enough to capture international financial market interactions. To address this weakness, we use a variety of panel unit root tests in our estimations, listed in Table 2. It is evident from the table that the LLC and Breitung t-test are unable to reject the null of the unit root in the panel. All the other tests strongly reject the presence of a unit root in the real interest rate differential among GCC countries. Comparing the simple unit root test results and panel unit root test results, we observe that the panel estimates better support the evidence for RIP relative to the country-specific simple ADF or ADF-GLS tests. This result is in line with other panel unit root studies, which have found stronger links among series using panel unit root tests than when using simple unit root tests. The presence of RIP indicates financial market integration in the GCC economies in addition to evidence of goods and services market integration. This finding is consistent with Espinoza, *et al.* (2010) who found strong financial integration among the GCC countries. Our results indicate that, generally, investors in these economies are risk-neutral and that transaction costs are not very high. Furthermore, there are sufficient investors with enough funds for arbitrage in these markets.

Table 2

*Panel Unit Root Test Results*

Unit Root Test	Individual Intercept	Individual Trend and Intercept
Levin, Lin and Chu <i>t</i> -test	-0.4037	0.6886
Breitung <i>t</i> -statistic		2.068
Im, Pesaran and Shin W-test	-3.8006**	-3.1814**
ADF-Fisher Chi Square	34.2209**	26.4975**
PP-Fisher Chi-square	24.7154*	19.36**

\* and \*\* indicates rejection of null-hypothesis of non-stationarity at 5 percent and 1 percent level of significance except Hadri-test, which assumes a null hypothesis of the absence of a unit root. Results are on the basis of US dollar only.

**6. CONCLUSION**

This study has tested for the presence of a unit root in the real interest rate differential between the GCC countries and the US and Japan. For this, two types of tests were employed: univariate unit root tests and panel unit root tests. In panel unit root testing, we used a variety of tests, and our results showed that panel tests are relatively more successful in finding evidence for RIP than simple country-specific unit root tests. Generally, we can conclude that RIP exists among the GCC countries and that their financial markets are well integrated.

This conclusion supports previous studies that have found evidence of integration in the GCC markets. Examining the feasibility of a GCC monetary union by analysing the integration of markets in these economies can be attributed to the optimum currency area literature, which is known for its weaknesses. Another significant approach to analysing this issue would be to examine the political economy criteria for monetary integration. In this approach, the symmetry of influence among member countries, regional leadership, linkage politics, and regional community identity play an important role at the international level, and the distributional effects of monetary union and economic institutions at the domestic level are key factors in the formation of a monetary union. The GCC countries are major world oil producers and the formation of a monetary union among them is especially important, given the possibility that oil prices quoted in a union's common currency could have enormous and far-reaching benefits for its member countries.

**APPENDIX****INTEREST RATE DEFINITIONS**

Money market rate for Kuwait is defined as interbank deposit rate for 3 months.

Money market rate for Bahrain is defined as interbank deposit rate.

Deposit rate for Qatar is demand deposit rate. Saudi Arabian deposit rate is taken from IFS line 45660L..ZF...

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## The Utilisation of Education and Skills: Incidence and Determinants among Pakistani Graduates

SHUJAAT FAROOQ

This study estimates the incidence of job mismatch and its determinants in Pakistan, based on three categories: (i) qualification mismatch, (ii) skill mismatch, and (iii) field-of-study mismatch. It uses both primary and secondary datasets that target graduates employed by the formal sector. The study measures the qualification mismatch using three approaches and finds that about one third of the graduates sampled face a qualification mismatch. Similarly, more than one fourth are mismatched in terms of skill, about half are over-skilled, and half are under-skilled. The analysis also shows that 11.3 percent hold jobs that are irrelevant to their discipline and 13.8 percent have jobs that are slightly relevant to their discipline. Women are more likely than men to be over-qualified, and age has a negative association with over-qualification. Graduates who belong to political families have a better qualification match but a lower field-of-study match. While a higher level of schooling prevents graduates from being under-qualified, it also raises the likelihood of being over-qualified and over-skilled. Occupation-specific disciplines offer more protection against the possibility of job mismatch. Both full-time education and semester-system education reduce job mismatch, while distance learning raises job mismatch. The phenomena of being over-qualified and over-skilled is more prevalent in lower occupations, as is field-of-study mismatch.

*JEL classification:* I23, I24, J21, J24

*Keywords:* Education and Inequality, Higher Education, Human Capital, Labour Market

### 1. INTRODUCTION

Research on job mismatch has mushroomed in the developed world since the late 1980s. Although initial studies perceived it as a temporary phenomenon [Freeman (1976)], it was, later, not empirically supported [Groot and Maassen (2000a)]. Estimates of job mismatch led to the emergence of new theories, e.g., that of job competition and job assignment, which examined institutional rigidities, allocation problems, and skill heterogeneities.

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*Author's Note:* The author completed a PhD in Economics at PIDE in 2011. This paper is part of his doctoral dissertation. He is grateful to his supervisors, Dr G. M. Arif, Joint Director of PIDE, and Dr Abdul Qayyum, PIDE, for their valuable suggestions and guidance.

Economists and sociologists both term job mismatch a serious efficiency concern with pertinent socioeconomic costs at an individual level—wage penalties, lower levels of job satisfaction and involvement, and higher turnover rates<sup>1</sup>—as well as lower productivity and extra costs of screening, recruiting, and training at firm level [Tsang (1987); Sloane, *et al.* (1999)], lower national welfare, and the ‘bumping down’ of the labour market process at the national level [Battu, *et al.* (2000); McGuinnes (2006)]. Thus, rapid educational expansionary policies may not yield the desired real economic benefits [Budria and Egido (2007)].

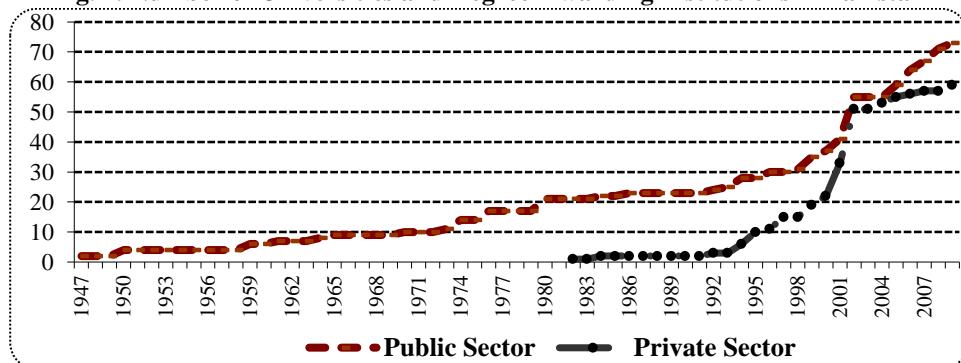
Although no direct study on job mismatch has been conducted in Pakistan, some studies have examined it in the context of educated unemployment and underemployment [various rounds of the Labour Force Survey, Ghayur (1989)]. Recent official reports related to labour market issues also highlight this phenomenon by connecting it to the prevailing low level of skills, poor government policies, lack of information, limited labour market opportunities, labour market rigidities, and rising share of youth in the labour force.<sup>2</sup> References to job mismatch also arise in various studies conducted on socio-demographic factors, educational systems, and labour market rigidities. In terms of socio-demographic factors, traditional norms and customs are regarded as a constraint to female labour market participation [Nazli (2004)]. Despite rising female participation, the gender gap remains high, with skewed labour participation across the sectors and occupations—more than two thirds of women still work in the agriculture sector and are more vulnerable than men [Pakistan (2010)]. The ongoing demographic transition in Pakistan may also be a cause of job mismatch—employment generation has not kept pace with the increase in the labour force [SBP (2004)] and the share of the informal sector and female unpaid family helpers has increased, while issues of vulnerable employment are rising [Pakistan (2007a, 2008a)].

The recent rapid expansion in higher education and establishment of new universities has raised educational participation, especially among female students (2.6 times among males and 3.5 times among females) from 2001-02 to 2007-08 (Figure 1).<sup>3</sup> The heterogeneity of skills across regions and institutions has also increased. With limited job opportunities for this educated influx, educated unemployment has risen while the returns to education have declined [Pakistan (2007a); Qayyum, *et al.* (2007)]. The education system in Pakistan is unable to cope with labour market demand because it imparts mainly education in conventional subjects. In addition to outdated curricula, frequent fluctuations in education policies, and limited spending, the system follows a variety of tiers: the O and A level system, the English-medium vs. Urdu-medium system, the private vs. public system, the madrassah system, the full-time education vs. part-time education system, and the semester vs. annual system [Pasha (1995); Nasir (1999)].

<sup>1</sup>Cohn and Kahn (1995), Dolton and Vignoles (2000), Dolton and Silles (2003), Chevalier and Lindley (2006).

<sup>2</sup>Pakistan (2007a, 2007b, 2008a, 2008b, 2010).

<sup>3</sup>In 1947, there were only two universities. The number jumped to 54 in 1999 and is 132 at present.

**Fig. 1. Number of Universities and Degree-Awarding Institutions in Pakistan**

Source: Higher Education Commission of Pakistan.<sup>4</sup>

Employment generation has not kept pace with the growing labour force, resulting in longer job search periods, the rising share of the informal sector, lower productivity, and a higher risk of vulnerability, especially for the youth population and females [Pakistan (2007a, 2008b)].<sup>5</sup> The rising rate of unemployment among the educated population in recent years could indicate the poor choice of educational fields [Pakistan (2007b)].

Keeping in view the importance of job mismatch for researchers and policy-makers, this study aims to contribute to the literature on two fronts. As a pioneering study on the national front, it can help planners make better decisions, especially for the youth population, which is the country's greatest asset. On the international front, the study extends the research on job mismatch by highlighting significant influential characteristics, i.e., family power, customs, and traditions, which have not been discussed in earlier studies. It also contributes to the existing literature by analysing skill mismatch and the determinants of field-of-study mismatch, which has been widely ignored.

The study has the following three objectives:

- (i) To estimate the three types of job mismatch: qualification mismatch, skill mismatch, and field-of-study mismatch.
- (ii) To analyse whether formal education is a good proxy for human capital (qualifications) by examining the association between qualification mismatch and skill mismatch.
- (iii) To explore which factors determine the three types of job mismatch identified above.

The study is organised as follows. Section 2 describes the method of measurement and presents a theoretical review of job mismatch. A discussion on data sources and methodology is given in Section 3. The results for the incidence of job mismatch and its determinants are given in Section 4, followed by conclusions and policy considerations in the final section.

<sup>4</sup><http://www.hec.gov.pk/InsideHEC/Divisions/QALI/Others/Statistics/Pages/DepartmentofStatistics.aspx>

<sup>5</sup>60.6 percent were considered vulnerable, meaning "at risk of lacking decent work" in 2006-2007 [Pakistan (2007a)].

## 2. DEFINITION AND THEORETICAL FOUNDATIONS OF JOB MISMATCH

### 2.1. Definition and Measurement Issues of Job Mismatch

Job mismatch has three dimensions: qualification mismatch, skill mismatch, and field-of-study mismatch. Qualification mismatch compares a worker's acquired qualifications with those required by his/her current job. The empirical literature has so far relied on formal education (in years) as a proxy for measuring qualification mismatch. Three main methods have been used to measure required qualifications. The first is the job analyst (JA) method (*objective approach*), in which professional job analysts grade jobs and recommend the minimum qualification (educational) requirements for a certain job/occupation. In the literature, this approach is based on the General Education Development (GED) and Specific Vocational Preparation (SVP) scores available from the Dictionary of Occupational Titles (DOT) (U.S. Department of Labour). The second method is the workers' self-assessment (WSA) method (*subjective approach*), where workers are asked directly for information on the minimum qualification (educational) requirements for their current job or whether they are mismatched or not [Sicherman (1991); Alba (1993)]. The third method, the 'realised match (RM)' approach, measures the degree of qualification mismatch using two variables: years of schooling and occupation. The distribution of education is calculated for each occupation; employees who depart from the mean by some ad hoc value (generally one) standard deviation are classified as mismatched workers [Verdugo and Verdugo (1989) and Ng (2001)].

Skill is a broad signal of human capital because it assimilates the other constituents of human capital (skills, experience) as well as formal qualification/education. Indeed, ability and on-the-job training has long been emphasised for improving competence [Neumark and Wascher (2003)]. Workers' attained skills may be lower or higher than those required by their prospective jobs, known as skill mismatch. Most studies have used formal qualifications as a proxy for skills,<sup>6</sup> but later studies have criticised this approach because it is difficult to quantify the magnitude of this proxy [Jim and Egbert (2005); Lourdes, *et al.* (2005)]. Of the two measurement approaches to skill mismatch, most studies have used the *subjective approach*, which is based on workers' perceptions [Green and McIntosh (2002); Lourdes, *et al.* (2005)], while some have used the *specific approach* by measuring workers' attained skills and those required by their current jobs [Lourdes, *et al.* (2005); Jim and Egbert (2005) and Chevalier and Lindley (2006)].

Field-of-study mismatch analyses the level of match between an individual's field of study and his/her job. Three studies in particular have adopted a combination of the subjective and education-occupation approach to measure field-of-study mismatch [Jim and Robert (2004); Robst (2007) and Martin, *et al.* (2008)].

The validity and choice of various measures of qualification mismatch depend on the data available and is subject to limitations. The 'subjective' measure of mismatch relies on employees accurately reporting the qualifications required by their job. Employees might report current hiring standards, which underestimate over-qualification in the presence of qualification inflation. Similarly, workers in smaller and less structured

<sup>6</sup>As Battu, *et al.* (1999), Frenette (2004), Groot (1996), Hersch (1995) and Ng (2001) did.

organisations may not always have good insight into the level of qualifications required [Cohn and Khan (1995); McGuiness (2006)]. The RM method is very sensitive to labour market changes and cohort analysis. In cases of excess supply, it will underestimate the level of over-qualification and overestimate it in cases of excess demand [Kiker, *et al.* (1997); Mendes, *et al.* (2000)]. Both the JA and RM approaches ignore the ability and possible deviation of job levels within a given occupation [Halaby (1994); Dolton and Siles (2003)]. Chevalier (2003) argues that widening access to higher education has increased the heterogeneity of skills, while Green, *et al.* (2002) highlights the potential heterogeneity effects that may arise because of grade drift in the UK.<sup>7</sup> It is worth noting that the choice of definition has a significant effect on the incidence of qualification mismatch. As reported in Appendix Table 1, most studies have used the JA and WSA approach and report mixed findings.

## 2.2. Theoretical Foundations of Job Mismatch

A significant segment of the literature on job mismatch considers how job mismatch is positioned within the context of the labour market, although there is no unified, accepted theory on qualification mismatch.

According to the *human capital theory (HCT)*, the labour market is competitive: overqualified workers are therefore as productive and receive the same wages as matched workers [Schultz (1962); Becker (1964)]. Opponents of the HCT argue that the theory fails to explain the underutilisation of skills, institutional rigidities, and non-competitive labour markets [Carnoy (1994)]. Tsang (1987) suggests that the relationship between qualifications/education and productivity is more multifaceted than the direct and positive relationship as suggested by the HCT. Some studies point out that the returns to education might not increase with the level of education [World Bank in "Knowledge for Development" (1999); Psacharopoulos and Patrinos (2002); Faheem (2008)].

In contrast to the HCT, the *job competition theory (JCT)* highlights institutional rigidities where earnings are associated with job characteristics [Thurow (1975)]. The allocation of jobs is based on the available supply of workers and jobs: workers may be more qualified and skilled than their jobs necessitate. In the extreme, a qualification may simply serve to obtain a job, and there is a zero return to human capital beyond that required to do the job.

A third strand of the literature concerns the *assignment theory* [Sattinger (1993)], which asserts that there is an allocation problem in assigning heterogeneous workers to jobs that differ in their complexity. Job mismatch is the result of a mismatch in frequency distributions on the demand and supply side if the job structure is relatively unresponsive to changes in the relative supplies of educated labour. The majority of studies on qualification mismatch support the job assignment theory.<sup>8</sup>

According to the theory of *occupational mobility*, individuals may choose jobs with a lower entry level than those with other feasible entry levels with a higher

<sup>7</sup>Grade drift is a drop in the quality of education, and becomes evident when employers are found increasing educational requirements for younger workers. The concept of grade drift is related to heterogeneity as individuals with similar education potentially have significantly different ability levels [McGuiness (2006)].

<sup>8</sup>Alba (1993); Groot (1996); Sloane, *et al.* (1999); Dolton and Silles (2001); Kler (2005); Chevalier and Lindley (2006); Martin, *et al.* (2008) etc.

probability of promotion [Sicherman and Galor (1990)]. According to the *job screening model*, qualification is used as a signal to identify more able and productive workers when the labour market is not perfect [Spence (1973)]. The *matching theory* assumes that the labour market is not opaque [Rosen (1972); Jovanovic (1979)]. To avoid search costs, both employees and employers may have a mutual incentive to agree on a non-optimal match.

Other explanations have also been put forward that appear to be largely unrelated to any major theoretical framework. The theory of *differential over-qualification* explains the higher probability of being over-qualified among married women [Frank (1978)]. McGoldrick and Robst (1995) and Buchel and Ham (2003) suggest that ethnic minorities are likely to be more severely affected. Robst (1995) notes: "those who attend the lowest quality schools may be over-educated throughout their career." Dolton and Silles (2001) find that regional mobility has a positive influence on the quality of the match. Green and McIntosh (2002) argue that if the quality of education falls, this too may encourage employers to upgrade the educational requirements of a job, known as *grade drift*. Over-qualified workers may belong to a poorer class or lack social and cultural capital [Battu, *et al.* (1999)]. Green, *et al.* (1999) find that attaining higher scores in mathematical subjects reduces the likelihood of being mismatched. Büchel and Schult (2001) note that poor educational grades have a strong effect on the likelihood of over-qualification. Wolbers (2003) finds that an occupation-specific field of study reduces the probability of qualification mismatch. Job mismatch is also the result of family commitments, geographic immobility, and lack of information [Green, *et al.* (2002); Dolton and Silles (2003)]. Trade unions may also restrict work practices [Dolton and Silles (2003)] while variations in education systems and labour market regulations can influence the integration of youth into the labour market [Wolbers (2003)].

### **3. METHODOLOGICAL FRAMEWORK AND DATA DESCRIPTION**

#### **3.1. Data Description**

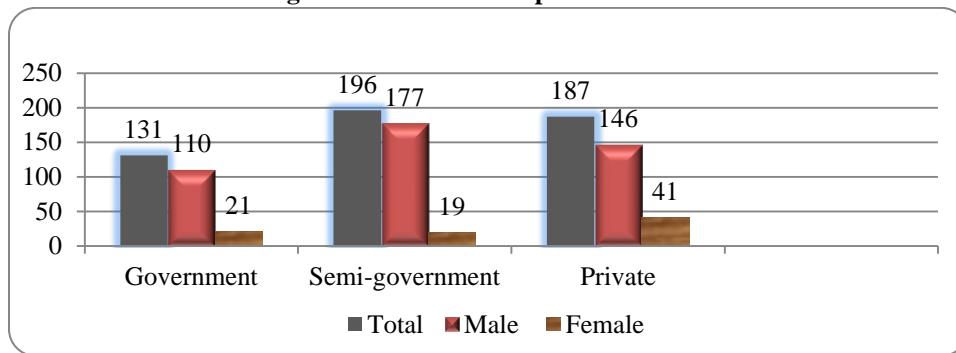
The present study uses both secondary and primary datasets, targeting employed graduates working in the formal sector with 14 or more years of education, i.e., with a Bachelor's, Master's, or doctoral degree—designated 'graduate workers'. As a secondary dataset, we have used the two Labour Force Surveys (LFS) carried out in 2006-07 and 2008-09. The LFS 2006-07 comprises 2,839 employed graduates while the LFS 2008-09 comprises 3,896 employed graduates. In both LFS datasets, about 84-85 percent are male while the rest are female.

Keeping in view the lack of key information in the LFS dataset—required level of qualifications, attained and required level of skills, relevance of field of study to occupation, socio-political family background, field of study, quality of education (part-time vs. full-time, semester system vs. annual system, etc.), satisfaction with current job etc.—a primary survey, the Survey of Employed Graduates (SEG) was conducted in early 2010 in two major cities of Pakistan, Islamabad and Rawalpindi, to study job mismatch in depth. At a broad level, the targeted universe in the SEG dataset was divided into three major groups: graduates employed in the federal government, those employed in autonomous/semi-autonomous bodies under the federal government, and those in the

private sector. The Thirteenth Census Report of the Federal Government Civil Servants (2003-04)<sup>9</sup> and *Annual Statistical Bulletin* of the Federal Government and Semi-government (2007-08)<sup>10</sup> have been used to estimate the number of graduate employees in federal government and semi-government service. For the private sector, the relevant information was gathered from the documented records of a number of private departments, such as banks, hotels, telecom companies, international donor offices, and media organisations (newspaper and broadcasting companies). For the remaining private sector, such as hospitals, educational institutions, NGOs, manufacturing and industry etc., we used the Internet and other sources to determine the total number of units located in Islamabad/Rawalpindi and a rapid sample survey to obtain information on employed graduates.

To avoid sampling bias and errors, we adopted a proportional stratified random sampling technique, where the published BPS grades for the government and semi-government sectors and the private sector's three-digit occupational codes are used as 'strata'. Figure 2 shows the distribution of the complete sample of 514 graduates across the three major groups according to their relative employment share. All the questionnaires were completed during face-to-face interviews.

**Fig. 2. Sector-Wise Sample Distribution**



### 3.2. Methodological Framework for Estimating Job Mismatch

The literature is mixed on the use of labels for the three types of job mismatch. Some studies use the term 'qualification mismatch' [Green and McIntosh (2002)] and 'education mismatch' [Verdugo and Verdugo (1989), Battu, *et al.* (2000), Lourdes, *et al.* (2005)] for the first type of job mismatch (qualification mismatch). Similarly, different labels have been used for the second type of job mismatch (skill mismatch), e.g., 'qualification mismatch' [Lourdes and Luis (n.d.)], 'competence mismatch' [Lourdes, *et al.* (2005)], and 'skill mismatch' [Green and McIntosh (2002), Jim and Egbert (2005)]. We use the following three labels: qualification mismatch, skill mismatch, and field-of-study mismatch. Under qualification mismatch, graduates are classified as over-qualified,

<sup>9</sup>Government of Pakistan (2003-04) "Thirteenth Census of Federal Government Civil Servant". Pakistan Public Administration Research Centre, Management Services Wing, Establishment Division, Islamabad.

<sup>10</sup>Government of Pakistan (2007-08) "Annual Statistical Bulletin of Federal Government". Pakistan Public Administration Research Centre, Management Services Wing, Establishment Division, Islamabad.

under-qualified, or adequately qualified. Under skill mismatch, graduates are classified as over-skilled, under-skilled, and matched in skills. Under field-of-study mismatch, graduates' fields of study are classified as irrelevant, slightly relevant, moderately relevant, or completely relevant.

### 3.2.1. Measuring Qualification Mismatch

We measure qualification mismatch using three methods: the JA method, the WSA method, and the RM method, on the basis of the SEG 2010 dataset. However, the secondary datasets (LFS 2006-07, 2008-09) fulfil the measurement requirements only for the RM method. Attained education (number of completed years) is used as a measure of qualifications, while required qualifications (education) are also measured in years. For the JA method in the SEG dataset, the required level of qualifications in terms of years was measured by asking sampled graduates, "*In your opinion, what level of formal education (years) and experience (years) is demanded by your employer/organisation to get a job like yours?*" For the WSA approach in the SEG dataset, graduates were asked, "*In your opinion, how much formal education (years) and experience (years) is required to perform your current job well?*" Graduates are classified into three categories: over-qualified, under-qualified, and matched, as follows.

If  $E$  is the actual number of years of qualification and  $E^r$  is the number of years of qualification required for a job, then over-qualification ( $E^o$ ) is represented by:

$$\begin{aligned} E^o &= 1 \quad \text{if } E > E^r \text{ and} \\ &\quad \dots \quad \dots \quad \dots \quad \dots \quad \dots \quad (1) \\ E^o &= 0 \quad \text{otherwise} \end{aligned}$$

Similarly, under-qualification ( $E^u$ ) is determined as follows:

$$\begin{aligned} E^u &= 1 \quad \text{if } E^r > E \text{ and} \\ &\quad \dots \quad \dots \quad \dots \quad \dots \quad \dots \quad (2) \\ E^u &= 0 \quad \text{otherwise} \end{aligned}$$

For the third RM measure in the both SEG and LFS datasets, we follow the methodology of Verdugo and Verdugo (1989), Kiker, *et al.* (1997), and Ng (2001) to measure required qualifications on the basis of two variables: completed years of schooling and occupation. The mean years of schooling in a two-digit occupational classification are used as a measure of required qualifications by assuming that graduates working in a similar occupation require the same level of qualifications (the mean required qualifications for two-digit occupations is reported in Appendix Table 3). After computing the required qualifications, we estimate the qualification mismatch by comparing the attained and required qualifications with (+/-) one standard deviation of the mean.<sup>11</sup> Graduates with attained qualifications greater than one standard deviation are defined as overqualified. Similarly, graduates with attained qualifications less than one standard deviation are defined as under-qualified. The middle range, within +/- one standard deviation, comprises matched workers.

To factor in skill heterogeneity among overqualified graduates, we relax the assumption that graduates with the same level of qualifications are perfect substitutes and hypothesise that they may not have the same skill endowment. This assumption also

<sup>11</sup>+/- One standard deviation was used since the actual mean deviation of the difference between attained and required qualifications was 0.989, i.e., close to 1.

captures the widening access to higher education in Pakistan, which has increased skill heterogeneity among fresh graduates. Following Chevalier (2003), we adopt a measure of qualification mismatch and occupation satisfaction to capture idiosyncratic characteristics by dividing overqualified graduates into two categories: those who are satisfied with their mismatch are defined as *apparently* over-qualified, and those who are dissatisfied are classified as *genuinely* over-qualified.<sup>12</sup>

### **3.2.2. Measuring Skill Mismatch**

As discussed in Section 2.1, two measurement approaches emerge from the literature to measure skill mismatch: the subjective approach and the specific approach. Both approaches are based on workers' perceptions of skill mismatch. The SEG questionnaire initially attempted to measure skill mismatch using the subjective approach on the basis of two questions: "*Do you feel that your overall skills and training provide you sufficient knowledge to perform your current job well?*" and "*Do you feel that your overall skill and training and your personal capacities allow you to perform a more qualified job?*" Respondents who answered 'yes' to both questions would be classified as over-skilled, while those who answered 'yes' to the first question and 'no' to the second would be classified as accurately skilled. Finally, those who answered 'no' to the first question would be classified as under-skilled, irrespective of their answer to the second question. However, in the pilot SEG survey, it was found that graduates were over-emphasising their answers as most responded with 'yes' to both questions.

To resolve this potential bias, this study follows the specific approach whereby graduates in the SEG survey were asked to respond to questions on a five-point scale ranging from 1 ('not at all') to 5 ('a lot'), concerning nine specific attained and required skills. In Pakistan, graduates similar in terms of attained qualifications (in completed years) may differ in terms of skills attained due to innate ability and skill heterogeneity as a result of different education systems and disciplines. Details of the questions asked concerning the nine attained and required skills are given in Appendix A.

Using the principal component analysis (PCA) method, weights are estimated on the basis of the mean required level of nine skills in two-digit occupations by assuming that workers in similar occupations require similar skills in two-digit occupational classifications. Since the various components have different eigenvalues, the eigenvector with the highest eigenvalue is the principle component of the dataset, and we select the associated weight of the highest eigenvalue. After normalising, these mean values are used as weights by multiplying them by each attained and required skill. This yields a weighted aggregate attained skill index and a weighted aggregate required skill index that capture the individual nine weighted average values (the estimated weight of each skill in the two-digit occupational classification is given in Appendix Table 2).

Finally, the skill mismatch is estimated by comparing the attained skill index and required skill index with (+/-) 0.08 standard deviation (SD) of the mean.<sup>13</sup> Graduates

<sup>12</sup>Job satisfaction is measured on a five-point Likert scale that ranges from 'very dissatisfied' to 'very satisfied'. The range 1 ('very dissatisfied') to 2 ('dissatisfied') is used for *apparently* over-qualified workers and the range 3 to 5 is used for *genuinely* over-qualified workers.

<sup>13</sup>The difference series of the attained skill index and required skill index has mean 0 and standard deviation 0.08. This estimated standard (0.08) is used to calculate the skill mismatch.

with attained skills that exceed 0.08 standard deviation of the mean of required skills are defined as over-skilled. Those with attained skills that are below 0.08 standard deviation of the mean of required skills are defined as under-skilled. The middle range comprises skill-matched graduates.

### **3.2.3. Consistency Among Qualification Mismatch and Skill Mismatch**

The joint distribution and non-parametric (Spearman rank correlation test, Kendall tau rank correlation coefficient test, and Kruskal Wallis test) approaches are used to analyse the statistical association between qualification mismatch and skill mismatch.

### **3.2.4. Measuring Field-of-Study Mismatch**

One of the most significant types of mismatch in Pakistan, field-of-study mismatch, is estimated in the SEG dataset using the subjective approach with the question: '*How relevant is your current job to your area of education?*' The four possible options are: irrelevant, slightly relevant, moderately relevant, and completely relevant.

### **3.2.5. Methodological Framework for Determinants of Job Mismatch**

We estimate the following equations to find out the determinants of the three types of job mismatch:

$$MIS^{sa}_{ki} = \alpha_0 + \alpha_1 I_{ki} + \alpha_2 Ed_{ki} + \alpha_3 Wk_{ki} + \mu_{2i} \quad \dots \quad \dots \quad \dots \quad (3)$$

$$MIS^j_{ki} = \alpha_0 + \alpha_1 I_{ki} + \alpha_2 Ed_{ki} + \alpha_3 Wk_{ki} + \mu_{1i} \quad \dots \quad \dots \quad \dots \quad (4)$$

$$MIS^q_{ki} = \alpha_0 + \alpha_1 I_{ki} + \alpha_2 Ed_{ki} + \alpha_3 Wk_{ki} + \mu_{3i} \quad \dots \quad \dots \quad \dots \quad (5)$$

$$MIS^h_{ki} = \alpha_0 + \alpha_1 I_{ki} + \alpha_2 Ed_{ki} + \alpha_3 Wk_{ki} + \mu_{4i} \quad \dots \quad \dots \quad \dots \quad (6)$$

Equations 3 and 4 estimate the determinants of qualification mismatch using the WSA and JA measure, respectively. Equation 5 measures the determinants of skill mismatch. Multinomial logistic regression is applied to the first three equations where the matched workers serve as the reference category. In Equation 6, the four outcomes of field-of-study mismatch are combined into two categories; the first two categories are labelled 'irrelevant field of study' while the last two are labelled 'relevant field of study', and binary logistic regression is carried out. On the right-hand sides of the four equations,  $I_{ki}$  is the vector of independent variables measuring individual characteristics, vector  $Ed_{ki}$  measures educational characteristics, and vector  $Wk_{ki}$  measures job characteristics. It is worth noting that this is a pioneering piece of research to find out the determinants of field-of-study mismatch.

## **4. RESULTS**

### **4.1. Incidence of Job Mismatch**

Using the RM measure, the LFS datasets show that 30-31 percent of the graduates sampled are mismatched at the national level, with a rising incidence of over-qualification and a falling incidence of under-qualification between 2006-07 and 2008-09. In both rounds, female graduates are seen to face more qualification mismatch than males with more over-qualification among females and more under-qualification among

males (Table 1). For the SEG dataset, the estimates show that the incidence of qualification mismatch varies by each measure. Both the WSA and JA measures show that the level of over-qualification and under-qualification are close to each other compared to the RM measure (Table 1). There is a high statistical relationship between the WSA and JA measures, but a poor association between the RM and JA and RM and WSA measures.<sup>14</sup> These estimates are consistent with earlier findings that the RM method reports a lower incidence of over-qualification [the meta-analysis of Groot and Maassen (2000a) and McGuinnes (2006)]. The higher incidence of under-qualification in the SEG dataset and the lower incidence in the LFS dataset through the RM measure reflects the excess supply of graduates in the SEG dataset, which overestimates the level of under-qualification and underestimates the level of over-qualification.

Table 1

*Level of Qualification Mismatch by Various Approaches (%)*

Datasets	Measures	Matched	Under-Qualification	Over-Qualification	N
RM Method applied to LFS 2006-07	Female	65.7	4.4	30.0	457
	Male	69.4	9.7	20.9	2,382
	<b>Total</b>	68.8	8.9	22.3	2,839
RM Method applied to LFS 2008-09	Female	60.5	4.2	35.4	577
	Male	71.2	2.3	26.6	3,319
	<b>Total</b>	69.6	2.5	27.9	3,896
SEG, 2010	<b>WSA Method</b>	65.4	9.9	24.7	514
	<b>JA Method</b>	69.5	4.5	26.1	514
	<b>RM Method</b>	63.4	21.6	15.0	514

In dividing over-qualified workers into ‘*apparently over-qualified*’ and ‘*genuinely over-qualified*’, Table 2 shows that under the WSA and JA approaches, about 57 to 63 percent of over-qualified respondents in non-graduate jobs are *apparently* over-qualified while the rest (37 to 43 percent) are classified as *genuinely* over-qualified.

Table 2

*Level of Genuine and Apparent Over-Qualification (%)*

Qualification Mismatch	WSA Approach	JA Approach	RM Approach
Matched	65.4	69.5	63.4
Under-Qualified	9.9	4.5	21.6
Genuinely Over-Qualified	10.7	9.7	4.7
Apparently Over-Qualified	14.0	16.3	10.3

The results for skill mismatch are reported in Table 3, which shows that more than one fourth of the graduates surveyed are mismatched in terms of skill, either because they are over-skilled or because they are under-skilled. The proportion of ‘matched graduates’ is considerably higher among males (73 percent) than among females (67 percent). A smaller proportion of female graduates are under-skilled, while more are over-skilled. This reflects the higher under-utilisation of females’ skills in their jobs in Pakistan.

<sup>14</sup>Parametric *t*-test and Spearman rank correlation tests were applied.

Table 3

<i>Distribution of Respondents by Level of Skill Mismatch (%)</i>			
	Matched Graduates	Under-Skilled	Over-Skilled
Female	66.7	11.1	22.2
Male	72.8	13.9	13.4
<b>Total</b>	<b>71.8</b>	<b>13.4</b>	<b>14.8</b>

To analyse whether or not formal education is a good proxy for skill level, Table 4 reports the results for marginal and joint distribution. A poor level of consistency is found between qualification mismatch and skill mismatch: 59 percent under the JA method and 57 percent under the WSA method. The Spearman rank correlation test and Kendall tau rank test shows a lower level of correlation between qualification mismatch and skill mismatch (0.11 to 0.13). Applying the Kruskal Wallis Rank test, we find that the estimated Chi-square tie values are less than the tabulated values (124.3 at 5 percent), which supports the null hypothesis that there is a significant difference between qualification mismatch and skill mismatch.

Table 4

<i>Marginal and Joint Distribution of Qualification and Skill Mismatch (%)</i>				
	Matched	Under-Skilled	Over-Skilled	Qualification Match
<b>JA Method</b>				
Matched	52.0	10.3	7.2	69.5
Under-qualified	3.5	0.4	0.6	4.5
Over-qualified	16.3	2.7	7.0	26.1
<b>Skill Match</b>	<b>71.8</b>	<b>13.4</b>	<b>14.8</b>	<b>100</b>
<b>WSA Method</b>				
Matched	48.8	9.0	7.6	65.4
Under-qualified	6.8	2.1	1.0	9.9
Over-qualified	16.2	2.3	6.2	24.7
<b>Skill Match</b>	<b>71.8</b>	<b>13.4</b>	<b>14.8</b>	<b>100</b>

The results for field-of-study mismatch are reported in Table 5, which shows that 11 percent of the graduates surveyed considered their current jobs to be totally irrelevant to the disciplines they studied. Another 14 percent reported their jobs as being slightly relevant, followed by 38 percent with ‘moderately relevant’, and 37 percent with ‘completely relevant’. An important finding is that female graduates face more field-of-study mismatch than male graduates: one third of female graduates are mismatched, either falling in the ‘irrelevant’ or ‘slightly relevant’ category, while less than one fourth of male graduates fall in these two categories (Table 5).

Table 5

*Percentage Distribution of Respondents by Field-of-Study Mismatch*

Level of Mismatch	Female	Male	Total
Irrelevant	14.8	10.6	11.3
Slightly Relevant	18.5	12.9	13.8
Moderately Relevant	33.3	39.3	38.3
Completely Relevant	33.3	37.2	36.6

**4.1. Determinants of Job Mismatch****4.2.1. Determinants of Qualification Mismatch**

Table 6 reports the relative risk ratios (RRRs) for the determinants of qualification mismatch, using the WSA and JA approaches. Using the ‘spost’ STATA commands, a comparison of being ‘under-qualified’ and ‘over-qualified’ is given in Appendix Table 4. The predicted probabilities for selected indicator control variables are reported in Appendix Table 5 in which each control variable has been fixed at its mean and the probability of the other has been calculated. The first important finding is that qualification mismatch is associated with gender in Pakistan, supporting the results of Frank (1978), Lassibille, *et al.* (2001), and many others. Moreover, the results of the WSA and JA methods show that age is negatively associated with over-qualification. The socioeconomic background of a graduate’s family also influences the level of match: the results of the WSA approach show that graduates from political families or those with close relatives holding positions of political authority are better matched than other matched graduates.

Although higher levels of schooling prevent graduates from being under-qualified, they do raise the likelihood of over-qualification (Table 6). It might be testing to use qualification as an explanatory variable since the dependent variable itself has been calculated on the basis of attained qualifications minus required qualifications. However, we have added it for two reasons. First, attained and required qualifications vary across graduates and we expect those with higher qualifications (e.g., PhDs) to hold jobs that demand correspondingly higher required qualifications and vice versa for graduates who have fewer years of education (i.e., less than 14), thus leaving the estimated qualification mismatch independent of attained and required qualifications. The estimated correlation between attained and required qualifications is found to be 0.59 and 0.65 for the WSA and JA measures, respectively, which, though high, is acceptable as it is below 0.8.

Second, the attained qualifications variable can affect the level of qualification mismatch itself, especially when a rapid expansion in higher education takes place, e.g., as was the case in Pakistan in the last decade when many of the graduates produced could not be absorbed by the labour market. In this case, higher qualifications raise the level of over-qualification. To control this effect, it is necessary to examine the impact of qualifications on qualification mismatch as a number of studies in developed countries have done [Battu, *et al.* (1999), Dolton and Silles (2001), Chevalier (2003), Dieter and Omey (2004, 2009), Chevalier and Lindley (2006), etc.]. The probability of over-qualification is smaller among those graduates who have completed their education as full-time students or through a semester system than among those who have studied part-time or through an annual system. Graduates who have studied occupation-specific subjects are better qualified than those who have studied traditional subjects and humanities (Table 6).

Table 6

*Determinants of Qualification Mismatch: Multinomial Logit Model  
(Relative Risk Ratios)*

Regressors	WSA Approach				JA Approach			
	Under/Match		Over/Match		Under/Match		Over/Match	
	RRR	Std. Error	RRR	Std. Error	RRR	Std. Error	RRR	Std. Error
Sex (Male = 1)	0.651	0.368	0.334**	0.449	0.398	0.417	0.498**	0.502
Age (Years)	1.251	0.237	0.797**	0.109	1.290	0.354	0.785**	0.102
Age Square	0.997	0.002	1.002	0.002	0.997	0.003	1.003**	0.002
Relative in Govt. (Yes = 1)	0.309**	0.224	0.392*	0.182	0.905	1.094	0.727	0.317
Family Election Contest (Yes = 1)	1.307	0.701	0.513**	0.189	1.935	1.738	0.748	0.269
Education (Years)	0.236*	0.068	2.494*	0.411	0.064*	0.047	3.258*	0.563
Field of Study (Traditional Subjects as Ref.)								
Computers	2.106	1.823	0.778	0.475	8.968	13.129	0.674	0.389
Administration, Marketing, Finance	0.895	0.511	0.696	0.281	0.820	0.705	0.388*	0.163
Law, Journalism	0.282	0.330	0.520	0.271	2.356	3.873	0.203*	0.116
Statistics, Mathematics, Economics	1.121	0.845	0.334*	0.176	1.461	1.870	0.355*	0.182
Health	0.844	0.792	0.335	0.298	1.870	3.456	0.155*	0.139
Natural Sciences, Engineering	0.601	0.440	0.384**	0.212	0.317	0.439	0.453**	0.234
Full-Time Degree (Yes = 1)	1.051	0.553	0.562**	0.190	1.650	1.431	0.559	0.189
Annual System (Yes = 1)	1.875	0.966	2.229*	0.813	0.565	0.524	1.510	0.536
Occupation (Elementary and Other Lower Occupations as Ref.)								
Manager	1.770	9.630			9.770	1.150		
	E+08*	E+08	0.017*	0.016	E+08**	E+10	0.007	0.007
	1.730E+	9.480			1.980E+0	2.290E+		
Professional	08*	E+08	0.032*	0.026	8**	09	0.016	0.014
	7.130E+	3.770			2.000E+0	2.280E+		
Associate Professional	07*	E+08	0.090*	0.065	8**	09	0.027	0.022
	5.044E+	2.690						
Clerk	06*	E+07	1.356	0.973	0.000	0.016	0.619	0.494
LR chi-2(66)			307.91			295.11		
Prob > chi2			0.0000			0.0000		
Log Likelihood			-282.438			-231.469		
Pseudo R <sup>2</sup>			0.354			0.389		
N					512			

\* Denotes significance at 5 percent, \*\* denotes significance at 10 percent.

Note: Models also include sex, marital status, quality of institution, distinction, type of organisation, type of job, and sector of employment.

Occupational choices also play an important role in determining qualification mismatch. In comparison with the elementary occupation graduates holding matched jobs, other occupational groups are more likely to be under-qualified. The peculiar RRRs in the case of under-qualification are due to the higher coefficient values of the occupational groups, and the exponentials of these coefficients yield even higher values. A similar trend is seen in the case of over-qualification, where all occupational graduates are less likely to be over-qualified (Table 6). These results lead us to conclude that under-qualification is most likely to occur in higher occupations, i.e., among managers and professionals, while over-qualification is found in lower occupations. In line with current enrolment in Pakistan and Sattinger's (1993) theory of job assignment, higher enrolment in Pakistan is generating an excess supply of graduates in some occupations. This progression may lead to a 'bumping down process' in the labour market where these educated graduates may end up with low-level mismatched jobs.

#### 4.2.2. Determinants of Skill Mismatch

Table 7 reports the RRRs for the determinants of skill mismatch. A comparison of ‘under-skilled’ and ‘over-skilled’ is given in Appendix Table 4. In line with Table 7, the predicted probabilities for selected indicator control variables are given in Appendix Table 5, in which each control variable has been fixed at its mean and the probability of the other has been calculated. Table 7 shows that age has a positive association with being ‘under-skilled’ and a negative association with being ‘over-skilled’. This suggests that older workers have not updated their skills over time especially in computers, business administration, and finance. Younger graduates are more likely to have these skills, but their skills are being underutilised. Again, graduates from political families are under-skilled as compared to matched graduates from non-political families.

Over-skill is positively associated with a graduate’s level of education, while those who were educated through a semester system and/or as full-time students have a reduced probability of being over-skilled. There is a better skill match among graduates who have studied occupation-specific subjects in their highest degree. The probability of over-skill is lower among managers, professionals, and associate professionals than among graduates in lower occupations (Table 7).

Table 7

#### *Determinants of Skill Mismatch: Multinomial Logit Model (Relative Risk Ratios)*

Regressors	Under/Match		Over/Match	
	RRR	Std. Error	RRR	Std. Error
Sex (Male = 1)	0.669	0.303	0.655	0.243
Age (Years)	1.382*	0.207	0.784**	0.118
Age Squared	0.996*	0.002	1.002	0.002
Relative in Govt. (Yes = 1)	1.059	0.480	0.602	0.282
Family Election Contest (Yes = 1)	2.315*	0.807	0.756	0.312
Education	1.252	0.191	1.302**	0.208
Field of Study (Traditional Subjects as Ref.)				
Computers	0.471	0.331	1.269	0.754
Administration, Marketing, Finance	0.274*	0.135	0.79	0.337
Law, Journalism	0.168*	0.109	1.407	0.821
Statistics, Mathematics, Economics	0.29*	0.173	0.141*	0.116
Health	0.259**	0.182	0.619	0.536
Natural Sciences, Engineering	0.165*	0.118	1.532**	0.928
Full-Time Student (Yes = 1)	0.50**	0.205	1.11	0.491
Annual System (Yes = 1)	1.73	0.664	0.467**	0.198
Occupation (Elementary Occupation as Ref.)				
Manager	0.755	0.771	0.065*	0.065
Professional	0.53	0.529	0.188*	0.151
Associate Professional	0.691	0.661	0.228*	0.171
Clerk	0.889	0.858	0.453	0.342
LR Chi-2(62)			138.03	
Log Likelihood			-325.212	
Pseudo R <sup>2</sup>			0.1751	
N			513	

\*Denotes significance at 5 percent, \*\*denotes significance at 10 percent.

Note: Model includes marital status, quality of institution, distinction, type of organisation, type of job, and sector of employment.

#### **4.2.3. Determinants of Field-of-Study Mismatch**

The odd ratios of the logistic regression model for the determinants of field-of-study mismatch in Table 8 show that males are about 1.5 times more likely than females to hold a job that is relevant to their field of study. The insignificant coefficient of education reflects the real scenario in Pakistan, i.e., that a higher level of education does not necessarily mean a match between field of study and job. The coefficients (odd ratios) show that moving towards an occupation-specific subject raises the probability of being in a relevant job. Graduates who were educated as part-time students face more issues of mismatch, having obtained their education in conventional subjects from distance-learning institutions and lacking the skills demanded by the labour market.

Table 8

#### *Determinants of Field-of-Study Mismatch Logistic Regression*

Regressors	Odd Ratio	Std. Error
Sex (Male = 1)	1.501**	0.357
Relative in Govt. (Yes = 1)	1.297	0.553
Family Election Contest (Yes = 1)	1.136	0.397
Education (Years)	1.163	0.182
Field of Study (Traditional Subjects as Ref.)		
Computers	6.800*	4.945
Administration, Marketing, Finance	3.920*	1.520
Law, Journalism	1.326	0.625
Statistics, Mathematics, Economics	3.975*	2.156
Health	5.839**	6.375
Natural Sciences, Engineering	11.706*	8.444
Full-Time Degree (Yes = 1)	2.234*	0.804
Annual System (Yes = 1)	0.855	0.311
Occupation (Elementary as Ref.)		
Manager	9.103*	7.588
Professional	11.944*	9.288
Associate Professional	6.913*	5.015
Clerical Support Workers	1.550	1.121
Pseudo R2	0.34	
N	513	

\* Denotes significance at 5 percent, \*\* denotes significance at 10 percent.

Note: Equation also includes marital status, age, type of organisation, and sector of employment.

Occupational choice also determines the level of field-of-study mismatch. The coefficients (odd ratios) show that graduates employed in specialised occupations—managers, professionals, and associate professionals—are more likely to hold well matched jobs than those in elementary occupations, i.e., mismatched graduates.

## **5. CONCLUSIONS AND POLICY IMPLICATIONS**

The main aim of this study has been to estimate the three types of job mismatch and analyse its determinants. We have found evidence of all three

categories of job mismatch (qualification mismatch, skill mismatch, and field-of-study mismatch) among Pakistani graduates. The choice of measurement method has a significant effect on the incidence of qualification mismatch. The estimates suggest that formal education is not a good proxy for skill because there is a poor association between qualification mismatch and skill mismatch. The determinants of the three types of job mismatch highlight a number of factors and/or imperfections prevailing at the individual level in the educational system and labour market, which cause this phenomenon.

Overall, the incidence of job mismatch does not support the human capital theory [Becker (1964); Schultz (1962)], which assumes a competitive labour market; in a pure human capital framework, the concept of job mismatch may be meaningless when wages are linked to productivity. However, we cannot necessarily reject the human capital theory on the basis of the cross-sectional dataset since the mismatch phenomenon could be temporary.

Our results support the job assignment theory [Sattinger (1993)] as both individual and job characteristics determine the level of job mismatch, i.e., gender, age, family background, educational characteristics, and occupation title. The lower prevalence of over-qualification and over-skill among older workers than among younger workers supports the theory of occupational mobility, according to which individuals choose lower-level jobs with better chances of moving to higher-level jobs over time. Similarly, greater qualification mismatch among female graduates supports the theory of differential over-qualification.

The incidence of over-qualification does not mean that the level of education should be lowered; instead, it suggests the need for better-quality education and skills. Our findings lead to the following policy implications and recommendations primarily in two areas: reforms in human resource development and labour market institutions.

- The prevalence of job mismatch suggests that there should be closer coordination between the various demand- and supply-side stakeholders of the labour market for a better understanding of issues in order to formulate the right policies.
- Skill heterogeneity, the various tiers of Pakistan's education systems, and the statistics on under-skill indicate the need for educational reforms to ensure equality across universities and regions, and for a planned skills-based education system according to the demands of the labour market. Tracer studies may be useful for better understanding the employment patterns and skills that various sectors and occupations demand, not only to guide planners and enrolled students in labour market opportunities and the types of skill needed, but also to project future educational needs.
- Rapid enrolment accompanied by limited labour participation and further job mismatch for females makes it necessary to address socio-cultural constraints and labour market discriminations against women. Policies and programmes are needed that will not only increase their participation but also provide them with greater entrepreneurial opportunities.

- Pakistan's youth faces rising job search periods (highlighted by official statistics) and over-qualification issues (estimated by this study, based on the LFS dataset). Further research is required to determine whether these are temporary phenomena—as argued by the occupational mobility theory—or whether they are the result of a weak educational system and labour market imperfections. If the latter also prevails, then a major intervention is required in the shape of creating more jobs and knowledge-based activities to minimise current and future socioeconomic risk.
- Our estimates of job mismatch, especially field-of-study mismatch, highlight the prevalence of labour market rigidities and imperfections. There is a need to design and promote policies that will ensure the six dimensions of decent work: opportunities for work, conditions of freedom, productive work, and equity, security, and dignity at work. 'Merit' norms and equal job opportunities should be ensured for all segments of society.
- At present, Pakistan is one of the largest recipients of foreign remittances in the developing world. The population of overseas Pakistanis is about 4.4 million with an annum average of 234,379 migration outflows in the current decade. Recent statistics show the declining share of skilled labour and the rising share of unskilled labour during 2002-03 and 2007-08.<sup>15</sup> A technical and vocation-based education policy would raise the share of highly skilled emigrants, which, in turn, would increase foreign remittances.
- The present labour market information system is inadequate. It depends mainly on the Labour Force Survey (LFS), which does not provide job seekers with sufficient or up-to-date information. The LFS questionnaire on skills assessment, labour market opportunities, and job mismatch needs to be improved. Moreover, the LFS should include a module on the history of employment.

<sup>15</sup> National Migration Policy (2008), Government of Pakistan, Ministry of Labour, Manpower and Overseas Pakistanis, Islamabad.

*Appendices***APPENDIX A**

C04. How far has your education provided you with the following skills?	<b>1</b>	<b>2</b>	<b>3</b>	<b>4</b>	<b>5</b>
a. Supervising a group of people without the guidance of seniors	<input type="checkbox"/>				
b. Writing presentations, letters, etc., in English easily	<input type="checkbox"/>				
c. Speaking English fluently	<input type="checkbox"/>				
d. Calculating and dealing with mathematical numbers/accounts	<input type="checkbox"/>				
e. Working together with other people	<input type="checkbox"/>				
f. Solving management problems with the best solutions	<input type="checkbox"/>				
g. Working with computers	<input type="checkbox"/>				
h. Thinking of new ideas and carrying out research activities	<input type="checkbox"/>				
i. Completing job assignments/tasks on time	<input type="checkbox"/>				
 C05. How much are the following skills required in <i>your current job?</i>	<b>1</b>	<b>2</b>	<b>3</b>	<b>4</b>	<b>5</b>
a. Supervising a group of people without the guidance of seniors	<input type="checkbox"/>				
b. Writing presentations, letters, etc., in English easily	<input type="checkbox"/>				
c. Speaking English fluently	<input type="checkbox"/>				
d. Calculating and dealing with mathematical numbers/accounts	<input type="checkbox"/>				
e. Working together with other people	<input type="checkbox"/>				
f. Solving management problems with the best solutions	<input type="checkbox"/>				
g. Working with computers	<input type="checkbox"/>				
h. Thinking of new ideas and carrying out research activities	<input type="checkbox"/>				
i. Completing job assignments/tasks on time	<input type="checkbox"/>				

*Codes for C04 & C05: 1 = Not at all, 2 = A little, 3 = Average, 4 = Nearly good, 5 = A lot*

Appendix Table 1

*A Reviewed Summary of the Incidence of Qualification Mismatch with Variations in Estimates by Various Approaches*

Author(s)	Country	Type of Definition	Estimated Results of Qualification Mismatch
Hartog and Oosterbeek (1988)	Netherlands	Job Analyst Subjective (WSA)	<b>JA:</b> 7% OQ, 35.6% UQ for 1960; 13.6% OQ, UQ 27.1% UQ for 1971 <b>WSA:</b> 17% OQ, 30% UQ for 1974
Hersch (1995)	US	Subjective and Job Analyst	<b>WSA:</b> 29% OQ, 13% UQ; <b>JA:</b> 33% OQ, 20% UQ
Cohn and Khan (1995)	US	Subjective and Realised Match (RM)	<b>WSA:</b> 33% OQ, 20% UQ; <b>RM:</b> 13% OQ, 12% UQ
Battu, <i>et al.</i> , (2000)	UK	Subjective - satisfaction Job Analyst Subjective - degree requirement	<b>WSA-satisfaction:</b> 40.4% OQ <b>JA:</b> 40.7% OQ <b>WSA - degree requirement:</b> 21.75% OQ <b>JA:</b> 13% OQ in 1985, 18.9% (male); 14.7% OQ in 1985, 21.6% (female) <b>WSA</b> 33.8% OQ in 1985, 33.8% (male); 30.9% OQ in 1985, 30.9% (female) <b>WSA</b> 8.7% OQ, 3.8% UQ (male), 13.6% OQ, 2.1% UQ (female)
Chevalier and Walker (2001)	UK	Job Analyst Subjective	<b>JA</b> 12.3% OQ, 13.3% UQ (male), 19.5% OQ, 5.7% UQ (female) <b>RM</b> 11.5% OQ, 16.7% UQ (male), 12.2% OQ, 14.2% UQ (female)
Groot and Maassen (2000b)	Holland	Subjective Job Analyst Realised Match	<b>Mean Index:</b> 12.3% OQ, 10.4% UQ (male), 10.7% OQ, 15.6% UQ (female) <b>Mode Index:</b> 30.8% OQ, 20.6% UQ (male), 29.9% OQ, 37% UQ (female)
Bauer (2002)	Germany	Realised Match using Mean and Modal Values	<b>JA:</b> 17% OQ <b>WSA:</b> 32.4% OQ <b>WSA- Job requirements:</b> 16.2% OE
Chevalier (2003)	UK	Job Analyst Subjective Subjective - Job requirements	<b>RM:</b> 19% OQ, 11% UQ (male), 17% OQ, 13% (female) <b>JA:</b> 7% OQ, 45% UQ (male), 10% OQ, 50% UQ (female)
Kler (2005)	Australia	Realised Match Job Analyst	<b>Education Mismatch:</b> 35% OE, 26% UE <b>Skill Mismatch:</b> 34% OS, 44% US
Lourdes, <i>et al.</i> (2005)	Spain	Subjective approach to measuring education and skill mismatch	<b>WSA:</b> OQ 39.2%, UQ 3.4%; <b>JA:</b> OQ 26.4%, UQ 4.9%
Dieter and Omey (2006)	Belgium	Subjective and Job Analyst	

Note: OQ for over-qualification, UQ for under-qualification, AQ for qualification, OS for over-skill, and US for under-skill.

Appendix Table 2

*Estimated Weights of 2-Digit ICSO 2008 Occupational Classifications Based on  
9 Required Skills (PCA Approach)*

Occupations	Supervisory	Writing	Speaking	Numeracy	Team-work	Management	Computers	Research	Time management
12	0.096	0.140	0.160	0.087	0.140	0.103	0.106	0.106	0.064
14	0.102	0.137	0.133	0.078	0.137	0.127	0.055	0.093	0.137
21	0.120	0.118	0.138	0.101	0.045	0.128	0.137	0.131	0.081
22	0.199	0.024	0.117	0.125	0.143	0.179	0.076	0.129	0.008
23	0.105	0.128	0.136	0.106	0.080	0.118	0.128	0.122	0.078
24	0.100	0.123	0.154	0.084	0.108	0.089	0.061	0.160	0.121
25	0.151	0.152	0.068	0.113	0.081	0.143	0.094	0.083	0.115
26	0.122	0.100	0.076	0.104	0.109	0.135	0.110	0.129	0.117
32	0.123	0.122	0.097	0.093	0.110	0.120	0.105	0.112	0.117
33	0.121	0.140	0.121	0.108	0.118	0.099	0.095	0.087	0.110
35	0.132	0.129	0.122	0.077	0.084	0.139	0.102	0.089	0.126
41	0.099	0.121	0.092	0.094	0.142	0.114	0.120	0.078	0.142
42	0.107	0.115	0.092	0.124	0.102	0.114	0.140	0.100	0.107
52	0.137	0.113	0.141	0.049	0.056	0.138	0.085	0.144	0.137

Appendix Table 3

*Estimated Mean Levels of Required Qualifications at 2-digit  
Occupational Classification*

Occupation code*	Estimated Mean Required Qualification	N
12	15.7667	30
14	15.7143	35
21	16.4737	34
22	16.4167	32
23	16.2029	39
24	15.7000	34
25	16.2667	27
26	16.3158	38
32	15.0476	31
33	15.3307	103
35	15.2609	23
41	14.7647	34
42	14.6842	19
52	14.6286	35

*Note:* The higher number of observation against the 33 occupation (Business and administration associate professionals) is due to the higher share of business services sector in Islamabad/Rawalpindi.

\*International Standard Classification of Occupations (ISCO) 2008.

Appendix Table 4

*Factor Change with Odds Comparing Under-Qualified/Under-Skilled to Overqualified/Over-Skilled (Odds when  $P > |z| < 0.10$ )*

Regressors	WSA Approach	JA Approach	Skill Mismatch
	Coeff.	Coeff.	Coeff.
Age (years)	0.451	0.50	0.57
Age-squared	-0.005		-0.007
Education	-2.36	-3.94	
Computer		2.59	
Administration, marketing, finance			-1.06
Law, journalism			-2.13
Statistics, mathematics, economics			
Health			
Natural sciences, engineering			-2.47
Full-time degree (yes = 1)			
Annual System (yes = 1)			1.31
Manager	23.09	25.63	2.46
Professional	22.407	23.26	
Associate professional	20.49	22.74	
Clerk	15.13		

Note: only significant has been reported with selective variables, parallel to Tables 6.12 and 6.13.

Appendix Table 5

*Predicted Probabilities for Three Outcomes of Qualification and Skill Mismatch with Selected Indicator Variables (Multinomial Logit)*

Regressors	WSA Approach			JA Approach			Skill Mismatch			
	Under	Over	Match	Under	Over	Match	Under	Over	Match	
Sex	Male	0.02	0.15	0.83	0.00	0.15	0.85	0.13	0.05	0.82
	Female	0.01	0.17	0.82	0.00	0.18	0.82	0.09	0.04	0.88
Relative in govt.	No	0.02	0.18	0.80	0.00	0.18	0.82	0.09	0.04	0.87
	Yes	0.01	0.08	0.91	0.00	0.14	0.86	0.10	0.02	0.88
Family election contest	No	0.01	0.18	0.80	0.00	0.18	0.82	0.08	0.04	0.88
	Yes	0.02	0.10	0.88	0.00	0.14	0.86	0.17	0.03	0.80
<b>Field of study (traditional subjects as ref.)</b>										
Computer studies	No	0.01	0.17	0.82	0.00	0.18	0.82	0.10	0.04	0.87
	Yes	0.03	0.13	0.84	0.00	0.12	0.88	0.05	0.05	0.90
Administration, marketing, finance	No	0.02	0.17	0.81	0.00	0.20	0.80	0.12	0.04	0.84
	Yes	0.01	0.13	0.86	0.00	0.09	0.91	0.04	0.03	0.93
Law, journalism	No	0.02	0.17	0.81	0.00	0.19	0.81	0.11	0.04	0.86
	Yes	0.00	0.10	0.90	0.00	0.05	0.95	0.02	0.05	0.93
Statistics, mathematics, economics	No	0.01	0.18	0.81	0.00	0.19	0.81	0.11	0.04	0.85
	Yes	0.02	0.07	0.91	0.00	0.08	0.92	0.03	0.01	0.96
Health	No	0.02	0.17	0.81	0.00	0.19	0.81	0.10	0.04	0.86
	Yes	0.01	0.07	0.92	0.00	0.03	0.97	0.03	0.03	0.94
Natural science, engineering	No	0.02	0.18	0.81	0.00	0.19	0.81	0.11	0.03	0.86
	Yes	0.01	0.08	0.91	0.00	0.09	0.91	0.02	0.07	0.91
Full-time degree	No	0.01	0.23	0.75	0.00	0.24	0.76	0.15	0.03	0.82
	Yes	0.02	0.15	0.84	0.00	0.15	0.85	0.08	0.04	0.88
Annual system	No	0.01	0.12	0.87	0.00	0.14	0.86	0.07	0.05	0.88
	Yes	0.02	0.23	0.75	0.00	0.20	0.80	0.12	0.02	0.86
<b>Occupation (elementary occupation as ref.)</b>										
Manager	No	0.00	0.25	0.75	0.00	0.28	0.72	0.10	0.05	0.85
	Yes	1.00	0.00	0.00	0.38	0.00	0.62	0.08	0.00	0.92
Professional	No	0.00	0.42	0.58	0.00	0.49	0.51	0.11	0.07	0.82
	Yes	1.00	0.00	0.00	0.00	0.02	0.98	0.07	0.01	0.92
Associate professional	No	0.00	0.30	0.69	0.00	0.40	0.60	0.10	0.06	0.84
	Yes	1.00	0.00	0.00	0.00	0.02	0.98	0.08	0.01	0.91
Clerk	No	0.00	0.16	0.84	0.00	0.18	0.82	0.09	0.04	0.87
	Yes	1.00	0.00	0.00	0.00	0.12	0.88	0.09	0.02	0.89

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## The Role of Global Economic Growth in Pakistani Agri-Food Exports

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This analysis uses least squares and Heckman maximum likelihood estimation procedures with fixed effects to explore the role of economic growth in 36 developed and developing economies—categorised as low-, lower-middle-, upper-middle-, and high-income—in explaining their agri-food import of 29 products from Pakistan during 1990 to 2000. We reject the hypothesis that the economic growth of these economies does not influence Pakistani agri-food product exports. However, the estimated income elasticities are statistically elastic only for lower-middle income countries, suggesting that their expenditure on Pakistani agri-food exports will increase disproportionately as their economies grow. Hence, lower-middle-income countries provide good export opportunities for Pakistan's agri-food products.

*JEL Classifications:* F14, Q17

*Keywords:* Economic Growth, Agri-food Trade, Income Elasticities, Developing Countries

### 1. INTRODUCTION

The agriculture sector is still the largest sector of Pakistan's economy despite structural shifts towards industrialisation. The sector accounted for 26 percent of gross domestic product (GDP) in 2000, but gradually shrank to 21 percent in 2007. It employed 44 percent of the total employed labour force in 2007, and is the mainstay of the rural economy around which socioeconomic privileges and deprivations revolve [Pakistan (2009)]. The agriculture sector consists of the crops, livestock, fishing, and forestry subsectors, with the crop subsector further divided into major crops consisting of wheat, cotton, rice, sugarcane, maize, and gram, and minor crops consisting of pulses, potatoes, onions, chillies, and garlic. Historically, the crops subsector accounted for the bulk of the agricultural portion of GDP but its share has been declining since 2000, accounting for 48 percent—a little more than the livestock subsector (47 percent). By 2007, the contribution of the crops subsector had declined to 45 percent while the livestock subsector had increased its share to 52 percent. Since 2000, trade (i.e., the sum of exports and imports) has accounted for about one third of the country's real gross national product (GNP), and agricultural trade for 80 percent of total trade. Hence, the performance of the agriculture sector affects the performance of the country's entire economy.

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Pakistani exports are highly concentrated among a few countries and consist of a small number of commodities; consequently, they are vulnerable to external shocks. The major markets for Pakistani exports are the US, the UK, Germany, Hong Kong, and the United Arab Emirates (UAE). Exports to the US accounted for 20 percent, Hong Kong (24 percent), UK (13 percent), Japan (13 percent), and Germany (7 percent) in 2007. Such a high concentration of exports to a few destinations raises the question whether there is any opportunity for Pakistani agri-food exports to other developing and developed countries. This question becomes more important as developing countries outperform developed countries in economic growth and we need to know whether Pakistani exports benefit from this disproportionate global economic growth. It is also important to mention that, due to their rising income, developing countries' share of agri-food trade has increased. They import half of the agricultural products produced by developed countries and export 61 percent of their agricultural products to the latter. Similarly, developing countries as a group are the second-largest traders with the European Union, with exports of \$162 billion and imports of \$128 billion of agricultural products in 2000-2001 [Aksoy and Beghin (2005)].

This study investigates the role of income in agri-food exports from Pakistan by estimating the income elasticities of developed and developing countries for these exports. The study tests a number of specific hypotheses about the estimated income elasticities. We hypothesise that (i) the income of developed and developing countries does not determine the import of agri-food products from Pakistan, (ii) the income of developing countries does not determine their import of agri-food products from Pakistan, (iii) the demand for Pakistan's exports of agri-food products is statistically elastic in the importing countries, and (iv) the income elasticities of Pakistani agri-food products are the same for developed and developing countries. The results of these tests will also help to understand the heterogeneity of preferences for the country's exports to other developed and developing countries.

The article is organised into five sections. The next section presents theoretical and empirical models. The third section describes the data used in the analysis, followed by a discussion of results in Section 4 and conclusions in Section 5.

## 2. THEORETICAL AND EMPIRICAL MODELS

We use the theoretical and empirical frameworks developed by Hallak (2006) and modified by Haq and Meilke (2007, 2008, 2010). The framework assumes that demand in each country  $i$  is generated by a representative consumer with a two-tier utility function. The upper-tier utility function is weakly separable in sub-utility indices defined over differentiated goods  $X_f$  where  $f = 1, \dots, F$  and for each homogenous product  $X_h$  where  $h = F+1, \dots, H$ . The sub-utility index  $u_f^i$  is assumed to have a constant elasticity of substitution (CES) utility function. Maximising the CES approximation of preferences subject to the expenditure on imports generates demand functions for each variety of product  $f$ . It is further assumed that importing country  $i$  consumes different varieties in sector  $f$ , of the same quality and price. Hence, the value of the bilateral trade flow of country  $i$ 's imports from country  $j$  in sector  $f$  in year  $y$  ( $imp_{ijfy}$ ) is given as

$$imp_{ijfy} = \frac{(P_{jfy} \tau_{jfy})^{1-\sigma_f} \bar{I}_{ly}}{\sum_{f=1}^F (P_{jfy} \tau_{jfy})^{1-\sigma_f}} \quad \dots \quad \dots \quad \dots \quad (1)$$

where  $\sigma_f$  is the elasticity of substitution between any two products within a sector faced by a consumer in country  $i$ ;  $\tau_{jfy}$  is the trade associated cost between countries  $i$  and  $j$  for product  $f$ ;  $P_{jfy}$  represents the price of each variety  $f$  in country  $j$  in year  $y$ ;  $P_{jfy} \tau_{jfy}$  represent the trade cost-adjusted price of the product  $f$ ,  $\sum_{f=1}^F (P_{jfy} \tau_{jfy})^{1-\sigma_f}$  represents the price index of all the varieties and  $\bar{I}_{iy}$  is the average per capita income of country  $i$ , and represents the expenditures made on any sector  $f$  in country  $i$  since no expenditure data is available.

We assume that trade costs ( $\tau_{jfy}$ ) are determined by distance (dist), trade partners sharing a common border (DCB), landlocked countries (Landl), island countries (Island), a common language (DComlang), bilateral trade partners colonising each other (DColony), and trade protocol among developing countries (DPTN).<sup>1</sup> This relationship is given in Equation (2) and based on the insights from previous studies [Hallak (2006)].

$$\ln \tau_{jfy} = \beta_1 \ln dist_{ij} + \beta_2 DCB_{ij} + \beta_3 landl_i + \beta_4 Island_i + \beta_5 DComlang_{ij} + \beta_6 DColony_{ij} + \beta_7 DPTN_{ij} + v_{ij} \dots \dots \dots \dots \quad (2)$$

Taking the logarithm of both sides of Equation (1) and substituting for transaction cost ( $\tau_{jfy}$ ) in Equation (1), we obtain the following equation for the value of imports:

$$\begin{aligned} \ln imp_{ijfy} = & (1-\sigma_f) \ln P_{jfy} - (1-\sigma_f) \ln \sum_{f=1}^F P_{if} + (1-\sigma_f) \beta_1 \ln dist_{ij} + (1-\sigma_f) \beta_2 DCB_{ij} \\ & + (1-\sigma_f) \beta_3 landl_i + (1-\sigma_f) \beta_4 Island_i + (1-\sigma_f) \beta_5 DComlang_{ij} \\ & + (1-\sigma_f) \beta_6 DColony_{ij} + (1-\sigma_f) \beta_7 DPTN_{ij} + \beta_8 \ln \bar{I}_i + \varepsilon_{if}^j \dots \dots \quad (3) \end{aligned}$$

where  $\varepsilon_{if}^j = (1-\sigma_f) V_{if}^j$ . In Equation (3),  $P_{jfy}$  is captured by exporter fixed effects; however, since only Pakistan's exports are being considered, these fixed effects are not required. The variable  $\sum_{f=1}^F P_{if}$  represents importing country-specific effects, and importing country fixed effects ( $\psi_i$ ) capture these effects. These importing country-specific fixed effects also allow us to control other unobserved factors such as product quality characteristics and technical and non-technical barriers. The analysis covers 29 agri-food products over 11 years, therefore product- ( $\psi_f$ ) and year- ( $\psi_y$ ) specific fixed effects are also added to Equation (3) to account for the product and time dimensions. Let  $(1-\sigma_f)\beta_1 = \gamma_1$ ,  $(1-\sigma_f)\beta_2 = \gamma_2$ ,  $(1-\sigma_f)\beta_3 = \gamma_3$ ,  $(1-\sigma_f)\beta_4 = \gamma_4$ ,  $(1-\sigma_f)\beta_5 = \gamma_5$ ,  $(1-\sigma_f)\beta_6 = \gamma_6$ ,  $(1-\sigma_f)\beta_7 = \gamma_7$  and  $\beta_8 = \gamma_8$  so that Equation (3) can be rewritten, including the fixed effects as:

$$\begin{aligned} \ln np_{ijfy} = & \gamma_1 \ln dist_{ij} + \gamma_2 DCB_{ij} + \gamma_3 landl_i + \gamma_4 Island_i + \gamma_5 DComlang_{ij} + \gamma_6 DColony_{ij} + \gamma_7 DPTN_{ij} + \gamma_8 \ln \bar{I}_i + \varepsilon_{if}^j + \varepsilon_{iy} \dots \dots \quad (4) \end{aligned}$$

<sup>1</sup>Factors affecting the tariff structure between trade partners, such as preferential trade agreements, are not included because Pakistan does not have such arrangements with the countries in the sample for the years 1990-2000.

Since the study tests a number of hypotheses that require product-specific income elasticities for low-, lower-middle-, upper-middle-, and high-income countries, the per capita income variable in Equation 4 is split into  $\bar{I}_{LI}^i$ ,  $\bar{I}_{LM}^i$ ,  $\bar{I}_{UM}^i$ , and  $\bar{I}_{HI}^i$ , representing the per capita income of low-income, lower-middle-income, upper-middle-income, and high-income countries, respectively, thereby allowing for different income elasticities. Per capita income ( $\bar{I}_{iy}$ ) is interacted with dummy variables representing the level of economic development to obtain income elasticities for low-, lower-middle-, upper-middle-, and high-income countries as follows:

where  $D_{LI}^i$ ,  $D_{LMI}^i$ ,  $D_{UMI}^i$  and  $D_{HI}^i$  are dummies that represent the development level of importing countries:  $D_{LI}^i$  is 1 for low-income countries and 0 otherwise,  $D_{LMI}^i$  is 1 for lower-middle-income countries and 0 otherwise,  $D_{UMI}^i$  is 1 for upper-middle-income countries and 0 otherwise, and  $D_{HI}^i$  is 1 for high-income countries and 0 otherwise. Equation (4) is augmented by the income shifters and reproduced below as Equation (6):

$$\begin{aligned} & \text{lni } np_{ij} \bar{k}_y \Psi_i + \Psi_y + \Psi_f + \gamma_1 \text{ndi } st_i \not\vdash \gamma_2 DB \quad i \not\vdash \gamma_3 Land \quad i \not\vdash \gamma_4 Isl and \not\vdash \\ & \gamma_5 DComl ang \quad i \not\vdash \gamma_6 DCol ony \quad i \not\vdash \gamma_7 DPIN \quad i \not\vdash \gamma_8 LI \text{lni } \bar{L}_{LI}^i + \gamma_9 LM \text{lni } \bar{L}_{LM}^i \not\vdash \dots \quad \dots \quad (6) \\ & \gamma_{10} UOM \text{lni } \bar{U}_{UM}^i \not\vdash \gamma_1 WH \text{lni } \bar{H}_{WH}^i + \varepsilon_{iiky} \end{aligned}$$

Equation 6 is used to test our proposed hypotheses and estimated using ordinary least squares (OLS) and the Heckman maximum likelihood (ML) procedure. The choice of the Heckman selection procedure is motivated by zero-trade flows in the data. Omitting these zeros from the analysis could lead to selection bias [Heckman (1979)]. The Heckman selection procedure corrects the selection bias by including the inverse Mills ratio (IMR) in the regression model. Omission of the IMR from the regression model, when it is statistically significant, leads to an omitted variable bias [Heckman (1979)].

The Heckman selection procedure consists of selection and outcome equations. The selection equation is specified as probit and the outcome equation as the least squares regression equation. Both equations are simultaneously estimated using the ML procedure. The Heckman model can also be estimated in two steps, but we have chosen to use the ML procedure because it estimates homoscedastic standard errors [Greene (2003)]. This is important in the context of this study since we are using cross-sectional data. In the case of the Heckman selection model, the specification of the selection equation is motivated by the earlier studies of Linder and de Groot (2006), Bikker and De Vos (1992), and Hillberry (2002). Finally, the Heckman ML procedure does not directly estimate the IMR but estimates rho and sigma, calculating the arc hyperbolic tangent of

rho and the natural logarithm of sigma, and then including these variables in the regression model to control for the selection bias.

### 3. DATA

The study uses trade data from the World Trade Analyzer (WTA) covering trade flows from 1990 to 2000<sup>2</sup> [Statistics Canada (2004)]. The data is organised by the Standard International Trade Classification (SITC), revision 3, at the four-digit level. The agri-food products included in the study are given in Table 1. The countries included in the analysis are given in Table 2. These countries are categorised as lower-income (LI), lower-middle-income (LMI), upper-middle-income (UMI), and high-income (HI), using World's Bank per capita GNP thresholds. The data on GDP and per capita GDP is from the World Bank's World Development Indicators. Estimates of the distance between capitals and border sharing are obtained from the World Bank's website [World Bank (2007)]. The data required for the other gravity variables in the trade model has been compiled from Glick and Rose (2002).

Table 1

*List of Selected Agri-Food Products at Four-Digit SITC Level*

No.	SITC Description	Number of Cases	Percent
1	Apples, fresh	55	1.48
2	Beans, peas, lentils and other leguminous	209	5.64
3	Cereal grains, worked/prepared	55	1.48
4	Chocolate and other food preparations	220	5.93
5	Crustaceans and molluscs, fresh, chilled	319	8.61
6	Crustaceans and molluscs, prepared or preserved	55	1.48
7	Edible nuts (excluding nuts used for extraction)	176	4.75
8	Edible products and preparations	308	8.31
9	Fish fillets, fresh or chilled	55	1.48
10	Fish, dried, salted or in brine; smoked	121	3.26
11	Fish, fresh (live/dead) or chilled	187	5.04
12	Fish, prepared or preserved	110	2.97
13	Fruit otherwise prepared or preserved	22	0.59
14	Fruit, fresh or dried	352	9.5
15	Fruit, temporarily preserved	33	0.89
16	Grapes, fresh or dried	110	2.97
17	Jams, fruit jellies, marmalades	77	2.08
18	Juices; fruit and vegetable	176	4.75
19	Malt extract; preparation of flour	33	0.89
20	Meat of bovine animals, fresh, chilled	44	1.19
21	Oranges, mandarins, clementines, and other	209	5.64
22	Other citrus fruit, fresh or dried	66	1.78
23	Other fresh or chilled vegetables	198	5.34
24	Other prepared or preserved meat	22	0.59
25	Potatoes, fresh or chilled	66	1.78
26	Tea	33	0.89
27	Vegetables, dried dehydrated or evaporated	154	4.15
28	Vegetables, frozen or in temporary preserved	22	0.59
29	Vegetables, prepared or preserved	143	3.86
	Total	3,707	100

<sup>2</sup>Although, this study uses data from 1990 to 2000, more recent data shows that the structure of trade has not changed much since 2000. In 2007, Pakistan exported about 64 percent of its agricultural products to high-income countries, 19 percent to low-income countries, 12 percent to lower-middle-income countries, and 5 percent to upper-middle-income countries.

Table 2

*Average Real GDP, Population, and Real per Capita GDP of Selected Countries for 1990–2000*

No.	Country	Income Level	Real GDP (Million \$)	Population (Million)	Real per Capita GDP* (\$)
1	Bangladesh	Low income	35,957	116.4	307.1
2	Brazil	Lower-middle income	528,485	161.5	3,265.5
3	Canada	High income: OECD	593,278	29.4	20,165.8
4	China	Lower-middle income	798,284	1202.9	657.6
5	Colombia	Lower-middle income	76,981	38.5	1,994.3
6	Denmark	High income: OECD	139,319	5.2	26,587.4
7	Egypt	Lower-middle income	80,270	61.3	1,301.9
8	Ethiopia	Low income	5,285	57.3	91.9
9	Finland	High income: OECD	100,593	5.1	19,722.5
10	France	High income: OECD	1,168,904	57.8	20,202.6
11	Germany	High income: OECD	1,720,911	81.3	21,148.1
12	India	Low income	350,419	932.5	373.1
13	Indonesia	Lower-middle income	148,019	192.6	765.8
14	Ireland	High income: OECD	64,168	3.6	17,588.6
15	Italy	High income: OECD	980,106	57.2	17,121.4
16	Japan	High income: OECD	4,470,770	125.3	35,667.3
17	Jordan	Lower-middle income	6,952	4.1	1,670.2
18	Madagascar	Low income	3,341	14.0	239.0
19	Mexico	Upper-middle income	480,735	90.8	5,279.8
20	Netherlands	High income: OECD	315,712	15.4	20,415.5
21	Norway	High income: OECD	141,007	4.4	32,277.0
22	Peru	Lower-middle income	44,866	23.8	1,872.3
23	Philippines	Lower-middle income	63,697	68.4	928.8
24	Poland	Upper-middle income	133,350	38.5	3,461.3
25	Portugal	High income: OECD	91,093	10.0	9,063.9
26	Romania	Lower-middle income	38,072	22.7	1,675.4
27	South Africa	Upper-middle income	117,730	39.3	2,995.5
28	Spain	High income: OECD	494,511	39.4	12,526.3
29	Sri Lanka	Lower-middle income	12,823	18.1	703.8
30	Sweden	High income: OECD	207,236	8.8	23,624.3
31	Switzerland	High income: OECD	226,814	7.0	32,415.9
32	Tanzania	Low income	7,662	30.7	249.4
33	Thailand	Lower-middle income	108,525	58.2	1,858.1
34	Turkey	Upper-middle income	168,673	61.8	2,721.7
35	United Kingdom	High income: OECD	1,243,523	58.3	21,307.0
36	United States	High income: OECD	8,155,109	266.1	30,558.2
	All Countries		647,866.1	111.3	10,911.2

\*In 2000 \$.

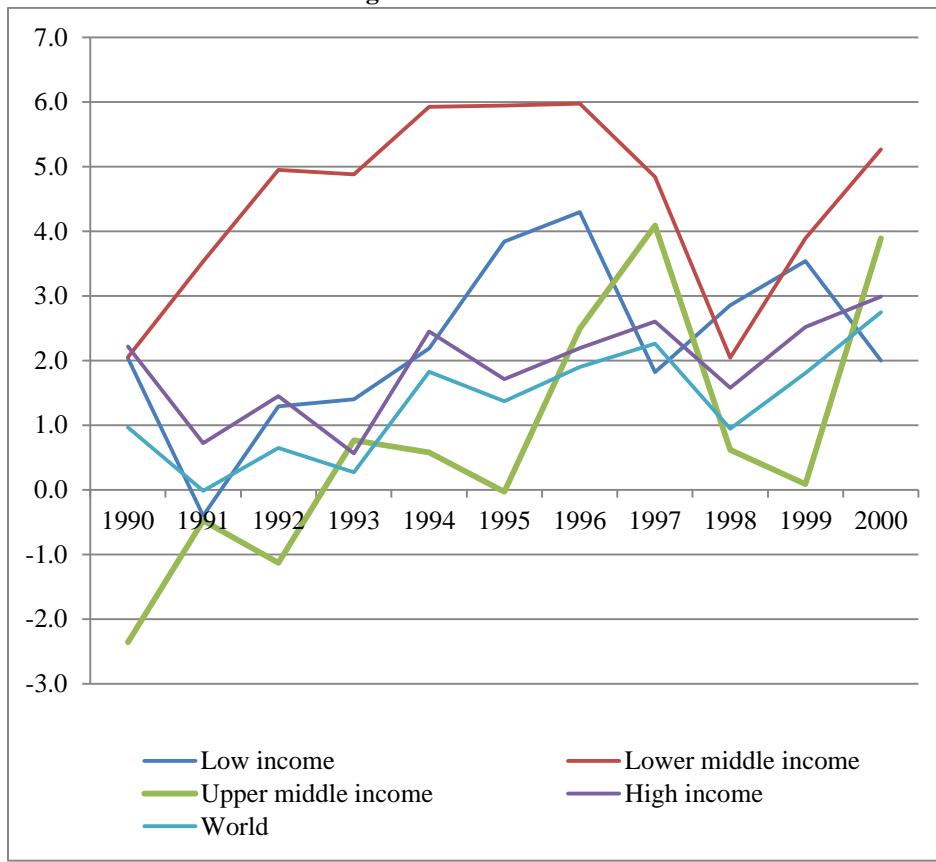
#### 4. RESULTS AND DISCUSSION

However, before discussing the estimated results, it is important to provide an overview of the per capita GDP, population, GDP, per capita GDP growth of the selected countries, and structure of trade between Pakistan and low-, lower-middle-, upper-

middle-, and high-income economies. The selected countries cover a wide range of importing countries, with real per capita incomes ranging from \$92 for Ethiopia to \$35,667 for Japan, with an average per capita income of \$10,911 during 1990-2000 (Table 2). Similarly, the average population of the selected countries ranges from 3.6 million in Ireland to 1,203 million in China. The inclusion of countries with such diverse economic characteristics helps explain the structure of agri-food trade.

During 1990-2000, the nominal per capita GDP in the world grew at 1.3 percent (Figure 1): lower-middle-income economies accounted for the highest average nominal per capita GDP growth of 4.5 percent, followed by low-income (2.3 percent), high-income (1.9 percent), and upper-middle-income (0.8 percent) countries. However, Figure 1 also shows that growth in high-income economies was more stable than in others. It is also important and relevant that, although the growth in high-income economies was lower than in other economies, the absolute increase in the former's GDP was greater than that in middle-income economies, given that the high-income countries had larger economies.

**Fig. 1. Nominal per Capita GDP Growth in the World: Low-Income, Lower-Middle-Income, Upper-Middle-Income, and High-Income Economies during 1990-2000**



Source: World Bank Economic Indicators [World Bank (2008)].

Table 3 shows the total value of Pakistan's agri-food exports to low-, lower-middle-, upper-middle-, and high-income economies. On average, Pakistan's agri-food exports were valued at \$154.3 million per year during 1990-2000. More than 66 percent of these exports were to high-income economies, followed by 18 percent to lower-middle-income and 14 percent to low-income economies. Upper-middle economies imported, on average, only 1 percent of agri-food exports per year from Pakistan during this period, but these exports showed higher growth (24.4 percent) than those of other economies. Overall, while the data shows a high degree of export concentration in high-income economies, there was higher export growth in the middle-income economies. Also, export growth was more stable in the developing economies (2 percent) than in high-income (7.9 percent) economies, as shown by the coefficient of variation.<sup>3</sup>

Table 3

*Total Value of Pakistani Agri-Food Exports to Low-, Lower-Middle-, Upper-Middle-, and High-Income Economies during 1990 to 2000 (Million \$)*

Year	Low-Income	Lower-Middle Income	Upper-Middle Income	High-Income	Total
1990	19.1 (14.4)	14.6 (11.0)	1.1 (0.8)	97.9 (73.8)	132.6
1991	10.5 (8.6)	21.5 (17.7)	1.1 (0.9)	88.1 (72.7)	121.1
1992	18.2 (14.5)	17.8 (14.2)	0.5 (0.4)	88.7 (70.8)	125.2
1993	20.3 (14.0)	17.0 (11.7)	0.8 (0.6)	107.2 (73.8)	145.3
1994	18.2 (12.9)	16.2 (11.5)	1.7 (1.2)	105.2 (74.5)	141.2
1995	18.5 (13.0)	15.2 (10.7)	1.9 (1.3)	106.3 (75.0)	141.9
1996	28.6 (17.3)	26.3 (15.9)	1.4 (0.8)	109.4 (66.0)	165.8
1997	26.1 (13.7)	29.2 (15.3)	2.1 (1.1)	133.5 (69.9)	191.0
1998	25.9 (15.4)	45.1 (26.9)	4.1 (2.4)	92.8 (55.3)	167.8
1999	24.2 (13.8)	57.1 (32.7)	4.7 (2.7)	88.8 (50.8)	174.8
2000	34.7 (18.2)	45.3 (23.8)	4.1 (2.2)	106.2 (55.8)	190.3
Average	22.2 (14.4)	27.8 (18.0)	2.1 (1.4)	102.2 (66.2)	154.3
	Growth/decay				
1990-91	-45.2	47.4	6.4	-10.0	-8.7
1991-92	73.4	-16.9	-52.5	0.7	3.4
1992-93	11.7	-4.8	55.6	20.9	16.1
1993-94	-10.4	-4.4	100.2	-1.9	-2.8
1994-95	1.6	-6.4	11.0	1.1	0.5
1995-96	55.2	73.3	-26.0	2.9	16.8
1996-97	-9.0	10.9	55.9	22.0	15.2
1997-98	-0.6	54.4	90.6	-30.5	-12.1
1998-99	-6.7	26.7	14.3	-4.3	4.2
1999-2000	43.6	-20.8	-11.3	19.6	8.9
1990-2000	81.7	210.9	289.8	8.5	43.5
Average	17.8	15.9	24.4	2.0	4.1
CV	2.01	2.06	2.04	7.86	2.47

*Source:* Authors' calculations from data.

Figures in parentheses show percentage of total value of trade within a given year.

<sup>3</sup>The coefficient of variation (CV) is a normalised measure of the dispersion of a probability distribution and is defined as the ratio of the standard deviation to the mean.

The estimated results are compiled in Table 4, while the hypotheses are tested in Table 5. Table 4 shows that importing country-specific effects and commodity fixed effects are statistically significant across all the procedures while time (year) fixed effects are statistically significant only for the Heckman ML procedure. Hence, omitting these fixed effects from the estimated equation would have produced biased estimates. The F-statistics yielded through OLS and the Wald test in the case of the Heckman ML procedure test the hypothesis that all the coefficients in the regression model (except the intercept) are zero. This hypothesis is consistently rejected at a 99 percent level of significance for all the procedures, indicating that the explanatory variables are collectively statistically significant in determining the per capita bilateral trade flows of Pakistani agri-food exports. The explanatory power of the model estimated using OLS shows that 49 percent of the variation in the dependent variable is explained by variations in the independent variables.

**Table 4**  
*Heteroscedasticity-Corrected Regression Results for Agri-Food Exports  
(Real 2000 Dollars) Using OLS and Heckman ML Procedures*

Variable	OLS			Heckman ML Procedure		
	Estimate	SE <sup>A</sup>	p-value	Estimate	SE	p-value
Log of Distance	-6.080	3.583	0.090	-11.939	4.279	0.005
Common Border	0.044	1.669	0.979	4.247	2.161	0.149
<b>Expenditure Elasticity of:</b>						
Lower-Income Countries	-0.331	1.219	0.786	-0.136	1.235	0.912
Lower-Middle-Income Countries	1.995	0.712	0.005	4.146	0.896	0.000
Upper-Middle-Income Countries	-1.089	0.747	0.145	-0.069	0.032	0.031
High-Income Countries	0.186	0.642	0.773	-0.556	0.764	0.467
Landlocked	-2.224	3.048	0.466	-5.582	3.581	0.119
Island	-0.629	0.478	0.188	0.334	0.598	0.576
Common Colonizer	10.517	6.209	0.091	29.254	8.027	0.000
Colony	5.093	3.325	0.126	15.922	4.337	0.000
Common Language	-4.720	3.692	0.201	-13.916	4.585	0.002
Protocol on Trade among Developed Countries	-4.530	5.472	0.408	-14.391	6.557	0.128
Arc Hyperbolic Tangent of rho	-	-	-	1.594	0.524	0.002
Log (sigma)	-	-	-	0.838	0.117	0.000
<b>Fixed Effects</b>						
Importing Country	18.0		0.000	45.8		0.000
Year	0.7		0.728	41.1		0.004
Commodity	26.1		0.000	82.1		0.000
<b>Summary Statistics</b>						
Uncensored Observations	1531			1531		
Total Number of Observations	-			3707		
F-Statistics	18.8		0.000	1345.2 <sup>B</sup>		0.000
R-squared	0.49			-		

<sup>A</sup>All standard errors are robust.

<sup>B</sup>Represent Chi test statistics.

Table 5

*Test of Hypotheses Using OLS and Heckman ML Procedures*

No.	Hypothesis	OLS		Heckman ML	
		F-Statistics	p-value	Chi-Test	p-value
1	Agri-food imports of low-income countries from Pakistan are statistically different from 1	1.3	0.264	1.2	0.275
2	Agri-food imports of lower-middle-income countries from Pakistan are statistically different from 1	2.1	0.152	2.0	0.162
3	Agri-food imports of upper-middle-income countries from Pakistan are statistically different from 1	8.2	0.004	7.8	0.005
4	Agri-food imports of high-income countries from Pakistan are statistically different from 1	1.7	0.194	1.6	0.205
5	The effect of developed and developing countries' income elasticities on trade is 0	2.8	0.026	2.0	0.162
6	The effect of developing countries' income elasticities on trade is 0	3.7	0.012	7.8	0.005

The estimated models included variables such as distance, trade partners sharing a common border, landlocked countries, island countries, common language, trade partners that have colonized each other, trade partners colonised by the same coloniser, and protocol on trade among developing countries. It is expected that an increase in distance between trading partners leads to a fall in trade while countries adjacent to each other, i.e., with a common border, trade more. Similarly, landlocked and island countries are expected to trade less while countries colonised by a common coloniser, with a common language, border, and colonial history are expected to trade more. Table 4 shows that the effect of distance on Pakistani agri-food exports is negative and statistically significant. The effect of common borders on Pakistani exports is statistically insignificant, which could be because, with the exception of China, Pakistan does not export intensively to its neighbours India, Afghanistan, Bangladesh, and Iran. The effects of other variables on exports are as expected when statistically significant. The direction of the effects of variables across the estimation procedures is consistent but the magnitudes of the estimated parameters are not directly comparable since the Heckman selection procedure does not directly yield marginal effects. Marginal effects can be generated for the Heckman selection model, but this is beyond the scope of this paper.

#### 4.1. Does Global Economic Growth Affect Pakistan's Agri-Food Trade?

The role of income in explaining the trade of differentiated agri-food products is explored by estimating the income elasticities of low-, lower-middle-, upper-middle-, and higher-income countries, and then testing specific hypotheses concerning the role of these income elasticities. Our analysis considers all commodities collectively and does not draw separate conclusions for different product sectors. The results imply that we can accept the hypothesis that income elasticities are different from 1 for low-income, lower-middle-income, and high-income countries when using either the OLS or Heckman procedures, but not for upper-middle-income countries. Interpreting the results of these hypotheses and income elasticities given in Table 4 suggests that, in the case of lower-

middle-income economies, the proportionate increase in their per capita income leads to a more-than-proportionate increase in their exports from Pakistan. The premise that developing countries' incomes do not determine trade is rejected when using both procedures (Table 5).

The individual significance of income elasticities (Table 4) for Pakistani exports shows that low- and high-income countries' incomes do not significantly determine Pakistani exports, when using either the OLS or Heckman procedures. The income elasticity of upper-middle-income countries is statistically insignificant when estimated by OLS but statistically significant when using the Heckman procedure. Hence, the choice of estimation procedure can change the results of the hypothesis testing. However, in the case of upper-middle-income economies, income elasticity estimated using the Heckman procedure is negative, indicating that the growth in per capita income of upper-middle-income countries leads to a decrease in their demand for Pakistani exports. Lower-middle-income countries' estimated income elasticities are statistically elastic, implying that, as their income increases, their expenditure on agri-food imports from Pakistan increases disproportionately. Hence, lower-middle-income countries are viable growth markets for Pakistani exports.

## 5. CONCLUSION

As the predominant sector of the country's economy, agriculture—including agri-food and cotton products—accounts for 80 percent of the country's exports. However, these exports are concentrated in very few markets, most of them, developed countries. The slow economic growth of developed countries, coupled with the recent financial crises, could negatively affect their demand for Pakistani exports. Using agri-food export data on 29 products exported to 36 developed and developing countries, this study has estimated a series of import demand functions and investigated the role of economic growth in the importing countries in their demand for Pakistani agri-food exports. The analysis shows that lower-middle-income countries are the best growth market for Pakistani agri-food exports since only economic growth in these economies can potentially enhance the demand for agri-food imports from Pakistan.

The overall policy implication of the analysis is that Pakistan should, accordingly, focus more heavily on middle-income economies and take advantage of their rising economic growth. Demand for Pakistani products in developed countries has declined and, given their economic growth and income elasticities, may decline further still. Further, Mustafa (2003) indicates that, compared to developing economies, developed economies have higher sanitary and phytosanitary (SPS) requirements, which Pakistan's weaker infrastructure is not necessarily equipped to deal with. Hence, the country must diversify its exports and take advantage of the higher economic growth in developing economies. However, further analysis is needed to identify those specific countries within the lower-middle-income bracket that drive these results. Such analysis could also determine which individual product sectors to focus on and investigate the rationale for bilateral and multilateral trade agreements to take advantage of the growth occurring in middle-income economies.

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## **Book Reviews**

**Michael K. Connors, Rémy Davison, and Jörn Dosch.** *The New Global Politics of the Asia Pacific.* (Second edition). London and New York: Routledge, Taylor & Francis Group. 2012. 274 pages. Price not given.

The updated edition of *The New Global Politics of the Asia Pacific* provides a framework for understanding the complexities of global politics in this region. The book focuses on crucial aspects such as realism, liberalism, and critical theoretical views. It sheds light on refined interpretations and covers current important issues, including security, terrorism, and the role of transnational actors. The edition is a good collection of constructive and thought-provoking papers by three authors, and serves as a useful tool for graduate students, researchers, and policymakers with which to understand political policy debates.

The book is divided into thirteen chapters, each containing a different insightful paper. The chapters cover various important aspects of the Asia Pacific region's geostrategic location against the backdrop of the Cold War. The region was divided between American allies (ASEAN, Japan, South Korea, and Taiwan) and the communist bloc (the former Soviet Union, China, North Korea, and Vietnam). The authors focus on the role of the US, China, Japan, Russia, India, Australia, and ASEAN, but also address the European Union's relations with the Asia-Pacific, before shifting the debate to regional security, globalisation, and regionalism. They discuss the political economy of two economic crises: the Asian financial crisis of 1997 and the global financial crisis of 2008-09. Transnational actors and Asian values are also brought up.

Chapter 1 ("Introduction: The Asia Pacific Century?") is about developments in the Asia Pacific during the Cold War, and discusses the location of the region in a Cold War scenario, and regional security. Approaches to international relations realism, liberalism, neo-Marxism, and constructivism are focused on for their importance in economic analysis and policymaking. Chapter 2 ("The United States in the Asia Pacific: Still the Hegemon?") explains that, in spite of the emerging security after the Cold War, US policies concerning East Asia remained consistent with before.

Chapter 3 ("The Rise of China in the Asia Pacific") focuses on the emergence of the People's Republic of China and its relations with other countries. Evaluating its global integration and policies, the authors point out that China has wide-ranging economic linkages with its neighbours and, despite being a great power, it has played a peaceful role in contrast to other superpowers. China's foreign policy has a profound and growing influence over the region.

Chapter 4 ("Japan: The Power that Dare Not Speak its Name?") presents a snapshot of Japan's role during the Cold War. A brief history of Japan is accompanied by a discussion on the motives and ideology of Japanese imperialism, including events prior to the Second World War. Japan has progressively improved its relations with China and

East Asia, and over time has sought an active role in the region. It is also a major contributor to global governance and cooperation with the United Nations.

Chapter 5 (“Russia and India in the Asia Pacific”) discusses key events in Russia and India from 1991 onwards, and shows the collaboration between the two countries as they emerged as strategic partners after resolving certain issues. Russia, India, and China formed a new Asian strategic triangle in view of their common interest in ensuring Asian energy security. Chapter 6 (“Australia: Between an Ally and a True Friend”) discusses Australia’s foreign policy, its commitment to the US alliance for security needs and its relationship with China, Japan, and ASEAN for economic interests. The discussion on Australia’s role in the Asia Pacific region offers readers enriching insights into the region’s politics.

Chapter 7 (“Southeast Asia: ASEAN and the Challenge of Regionalism in the Asia Pacific”) concerns the development and achievements of ASEAN since its establishment. Its achievements are based on four arguments for ASEAN being a collective actor on the international stage: its role as conflict mediator, ensuring the security of its community, building an interpersonal network, and developing a framework for economic development. The chapter debates the strengths and weaknesses of neo-realism, liberalism, and social constructivism.

Chapter 8 (“Europe and the Asia Pacific: Achievements of Inter-Regionalism”) follows with a discussion on the inter-regionalism discourse and the relations between the EU and ASEAN. The authors’ perspective on inter-regionalism interestingly captures a neo-realist perspective, an institutionalist perspective, and a social constructivist perspective. The discussion shows that the cooperation mechanisms of Europe and Asia have sound standing in the international system.

Chapter 9 (“Regional Security: Legacies and New Challenges”) discusses changing concepts of security and explains how political issues transform into security issues. Chapter 10 (“Globalisation versus Regionalism in the Asia Pacific?”) compares globalisation and regionalism, and argues that accelerating globalisation has brought about increased regionalisation. It also raises inter-regional and intraregional issues that states have been unable to solve.

Chapter 11 (“Political Economy Approaches to the Rise, Fall and Return of the ‘Asian Miracle’”) raises some important issues. The Asian economic crisis began in 1997 and the “Asian miracle” explained here refers to the rapid and equitable growth that certain East and Southeast Asian countries achieved. There are three important approaches discussed here that explain the growth: the liberal approach, realist approach, and radical approach.

Chapter 12 (“Actors Beyond Borders? Transnational Actors in the Asia Pacific”) explains why transnational actors play an important role in international relations since they are more influential than others and have links with particular geographical parts of the world. The chapter evaluates their impact on states’ national policy decisions. The last chapter (“Asian Values Redux? The International Politics of Rights, Democracy and Culture”) sheds light on Asian values in the domestic and international scenario. Glimpses into Asian values enrich the book’s conclusion.

Throughout the book, the authors have wisely focused on culture, nationalism, and identity to help readers understand recent developments in the Asia Pacific region. The

role, accomplishments, and potential of the Asia Pacific economies are examined in a global context. A good insight into liberal, realist, and radical perspectives of growth helps familiarise the reader with approaches to political economy. The authors have analysed numerous political and strategic issues. The new edition includes more refined connections than the previous one. Each chapter focuses on a detailed issue but the book needs a concluding note so that some of the important points about the politics of the Asia Pacific could have been summarised at the end.

The book is very insightful and provides an opportunity for readers to grasp the global politics of the Asia Pacific region. It is also useful for undergraduate students of Asian studies and international politics, and for researchers and scholars interested in the regional setup.

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**Muhammad Irfan.** *Institutional Barriers to Sustainable Urban Transport in Pakistan.* Karachi: Oxford University Press. 2010. xxi+298 pages. Pak Rs 795. Hardbound.

The mayor of Bogota, Gustavo Petro, recently hit the headlines with his incisive comment, “A developed country is not a place where the poor have cars. It’s where the rich use public transportation.” This quip defines how policymakers around the world should look at the issue of urban transport, or rather sustainable urban transport. Rapid economic growth in the postwar period and high urbanisation combined with a greater need for mobility have escalated problems of congestion, noise and air pollution, and road accidents, necessitating a focus on the sustainability of urban transport. Pakistan finds itself at the crossroads where it has to balance the increasing demand for mobility with environmental concerns. This book by Muhammad Irfan is an opportune contribution.

Irfan describes sustainable transport as a “system of transport which has a lower impact on the environment, society, and economy... transport systems in which the share of active and collective modes of transport is higher and continues to rise as compared to private modes of transport (such as cars and motorcycles)”. He begins by reminiscing about his childhood in Wah (a small town near Islamabad), and his frequent journeys to Lahore where he witnessed active (walking and cycling) and collective (public transport) modes of transportation. However, he contends that the rapid growth in urban population in the last few decades has led to a decline in these modes of (sustainable) transportation. One reason for this trend is the decline in urban density and greater preference for living on the periphery (urban sprawl), which in turn leads to greater demand for mobility, congestion, and associated problems. Moreover, urban planners in Pakistan have attempted to resolve road congestion by designing bigger roads and highways on the lines of what is called the “predict and provide” method, with little regard for sustainability.

Irfan analyses the issue within the framework of ‘path dependency’, where the institutional framework within which policymakers make decision is a result of historical patterns of behaviour. He argues that urban transport policies cannot be studied independently of the institutional environment in which policymakers conduct their business, and that many best-practice sustainable urban transport systems have failed due to institutional barriers. Citing the example of the Lahore Ring Road project with regard to the path dependence of urban transport policies, Irfan focuses on two important components: (1) critical juncture, a point at which “events combine to develop a particular path”, and (2) the reinforcing period, when “supportive forces stabilise the path according to the selection developed earlier”.

Acknowledging the paucity of material on transport policy in the early years of development of Pakistan, the author resorts to five-year development plans and annual development plans to determine the relative importance given to different modes of transport. He describes the period from 1955 to 1960 as a crucial juncture, i.e., the period when transport policies changed in favour of road development. The historical approach to understanding institutional barriers focuses on the individual actors and social forces that have shaped a certain course of history. This book identifies international development institutions (the Harvard Advisory Group and foreign consultants) as the social force that paved the way for a transport policy favouring road building. At the

time, Pakistan had the option of either developing its existing rail network or building more roads. Irfan argues that the second course was taken because it was what international development institutions had advocated. To substantiate this, he quotes figures from various development plans—initially developed by the Harvard Advisory Group—to show that more funds were allocated to road development and that this increased its share in the total allocation for transport infrastructure over time.

Developing his argument, he states that when “a particular option is selected it becomes progressively more difficult to return to the initial point when multiple alternatives were available”. Institutional economics takes the well-known position that inefficient institutions persist due to path dependence; i.e., once inefficient institutions are adopted, it is very difficult to reverse that pattern owing to high costs and prevailing social structures. Irfan also demonstrates this point, showing that successive transport policies in Pakistan have favoured road development vis-à-vis other modes of transport (especially rail networks), and have ‘reinforced’ the initial path taken. Examining the Lahore Ring Road project—an ambitious infrastructure plan to ensure the smooth flow of traffic in Lahore—he documents the evolution of the project since its inception in 1965. The author concurs that the main purpose of the ring road was to provide a circumferential road connecting main arterial roads to the south and southwest of the city (the area with a higher urban density) to reduce congestion on these roads. The ring road was to be built bordering the periphery to ensure the free and fast movement of traffic, with no pedestrian access or parking. Conceived by foreign consultants and relying on the financial support of multilateral institutions (the World Bank and Asian Development Bank), it was based on the ‘predict and provide’ method of transport planning—a supply-driven approach—with little regard for the sustainable ‘demand management’ approach. Successive project developments retained this basic characteristic, proving Irfan’s assertion of the path dependency of transport policies in Pakistan.

The book is based on the author’s doctoral thesis. An advantage is that it provides a detailed history of the transport sector in Pakistan, which is otherwise poorly documented, and thus serves as an encyclopedia for anyone planning to work on this issue. For a casual reader, however, the plethora of information becomes cumbersome. Two shortcomings are clearly visible. First, in studying the path dependency of transport policies, it would have been interesting to know how developed countries managed to break away from unsustainable transport policies to more sustainable ones. Second, it would have added to readers’ interest had the author outlined a vision of how Pakistan might move toward such a desirable situation. Notwithstanding these gaps, the book is necessary reading for anyone with a research interest in Pakistan’s transport sector in particular and urban issues in general.

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**Bashir Ahmad Khilji.** *Sixty Years of Human Resource Development in Pakistan.* Government of Pakistan, Higher Education Commission, Pakistan. Islamabad: HEC Printing Press. 2011. 283 pages. Price not given.

Human resource development (HRD) occupies a central position in the advancement of a society. It is obvious from the historical experience of industrialised countries that developing human capacity is essential for a self-reliant and self-sustaining pattern of growth. Almost all Asian countries, including Pakistan, continue to search for additional appropriate strategies to respond to the rapid changes in the global economy. Unfortunately, despite registering a satisfactory rate of economic growth, Pakistan's progress on the human front lags behind in terms of key indicators such as literacy, primary-level participation rate, basic health facilities, population welfare, water and sanitation, etc. Pakistan ranked 145th out of 179 countries in the world on the human development index in 2011.

In this scenario, the author of *Sixty Years of Human Resource Development in Pakistan* emphasises human development as a crucial factor in the highly competitive world of trade and commerce. Typically, Pakistan faces a situation where its burgeoning population is a challenge to policymakers. Years of neglect on the human development front have left a large proportion of the population without basic necessities such as education, health, and decent job opportunities. Developing their capacities is the only way to lift them out of poverty. To highlight the link between economic growth and demographics, 2011 was declared the 'population year'. This book is an opportune contribution because it examines the issue holistically, i.e., the impact of economic development on human resources as well as the effects of human resources on the economic development of Pakistan. It focuses on how a developing country like Pakistan can utilise its growing population as a dynamic factor in economic growth.

The book consists of eight chapters. Chapter 1 sets the stage for discussion, highlighting the role that human development has played in the advancement of societies and pitching it as the key factor that pulls people out of poverty and reduces inequality. It argues that Pakistan has failed to invest adequately in enhancing the potential of the majority of its population, not only impoverishing them, but forsaking its own growth potential as well. The rest of the chapter lays out the country's historical background, its geography, the structural changes it has gone through, and the present economic scenario. It also reviews the existing literature, which it divides into general studies, studies related to developed countries, and those related to developing countries. The author examines the data and methodological issues with model specifications.

Chapter 2 highlights the concept and meanings of human capital formation, its objectives, components, significance, and comparison of various countries. The author describes the needs of human capital formation in Pakistan's context, referring to different theories of investment in human capital. Identifying factors of human capital formation that include health, education, science and technology, vocational training, and migration, he conceptualises and defines manpower planning, and documents its techniques, important steps, and procedures with reference to Pakistan.

Chapter 3 discusses components of HRD, which encompass education, science and technological development, the development of food, health, and nutrition, sanitation and safe drinking water, professional training, development of migration and remittances, and information and technological development. The salient features of Pakistan's population—size, growth, and composition—are analysed in Chapter 4. Chapter 5 compares the efforts made by Pakistani governments in the field of HRD—institutional frameworks, and quantitative and qualitative scenarios of HRD—with those made by other countries in the region. It also highlights the issue of child labour and the importance of women in development with reference to Pakistan.

Demographic estimates and projections play an important role in socioeconomic and developing planning. Targets for future national and regional growth are often fixed on the basis of a population's anticipated size, its distribution, and age structure. Population projections are not only necessary to estimate the growing demand for food, housing, education, and health facilities, but also to indicate the future size of the labour force. Accordingly, Chapter 6 explains the relationship between HRD, economic development, and labour force projections, and provides an empirical model of the imbalance between supply of and demand for manpower in Pakistan.

Chapter 7 explores the relationship between human capital formation and economic development, using a time series econometric technique. The analysis concludes that infant mortality adversely affects economic development while literacy rates, expenditure on education and health, life expectancy, primary school participation rate, and gross fixed capital formation have a positive impact on economic development. Finally, Chapter 8 makes recommendations on how human capital formation could be improved, with the view that a large population can be considered capital instead of a hindrance in economic development.

The book is a valuable resource for students, researchers, and policymakers. Its relevance to Pakistan's national needs is self-evident, given that it covers various phases of its national history and presents a comprehensive picture of HRD in the country.

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## ***Shorter Notices***

**Masahiro Kawai and Eswar Prasad (eds.).** *Financial Market Regulation and Reforms in Emerging Markets.* Asian Development Bank Institute. Washington D.C.: Tokyo and Brookings Institution Press. 2011. xiii+423 pages. \$34.95.

The global financial crisis of 2008 and the resulting economic meltdown has renewed interest in understanding how financial markets work across the globe, and identifying their weaknesses—*Financial Market Regulation and Reforms in Emerging Markets* is an opportune contribution. Edited by Masahiro Kawai and Eswar Prasad, it is a collection of essays that critically analyse the reasons for the financial crisis of 2007-09 and advocates restructuring the financial sector to strengthen the financial systems of developed economies and emerging markets. The authors argue that financial systems in emerging markets are still in their infancy. Emerging economies (India, Indonesia, and the People's Republic of China) need to assess and understand the reasons for financial crises in order to make their own financial systems more efficient and more flexible—a condition necessary given that these economies pursue policies of high and sustainable economic growth. Reforms should be carried out in a way as to make their financial systems more resilient to domestic and external shocks. The book is divided into six parts, which cover new perspectives in financial regulation, regulatory frameworks for emerging markets, financial market development and stability, improving financial access in emerging markets, and cross-border regulation. (*Adnan Akram*)

**Mark B. Weldon.** *Fundamentals of Practical Environmentalism.* Taylor and Francis Group, Boca Raton: CRC Press. 2011. xii+201 pages. £49.99 (Hardback).

*Fundamentals of Practical Environmentalism* focuses on decisions and choices at an individual level that affect the environment. The word “practical” implies that environmental decisions and choices should be sustainable. This book provides a guiding framework to help individuals make logical, meaningful choices and decisions related to the environment. The author proposes four pillars to help individuals analyse whether or not their environmental decision or proposed action is sustainable and (environmentally beneficial). The four pillars (environmental degradation, resource conservation, economic progress, and personal benefit) are all equally important, and the author shows how they can be combined to yield indications that will help individuals make rational, beneficial environmental choices and decisions. The book consists of three main sections: the first provides a theoretical background (the fundamentals) of environmentalism. The second section describes the four pillars in detail and shows how they can be combined into a guiding framework. The last section shows how practical environmentalism can help individuals make better environmental decisions that lead to true environmental progress, and illustrates a variety of case studies ranging from small personal environmental choices to the bigger and more complex problems of today. (*Adnan Akram*)