

ADB Economics Working Paper Series



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No. 194 | February 2010



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Asian Development Bank

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1550 Metro Manila, Philippines
www.adb.org/economics

©2010 by Asian Development Bank
February 2010
ISSN 1655-5252
Publication Stock No. WPS09_____

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Abstract

This paper examines the impact of remittances on economy and household welfare in Pakistan by using a general equilibrium framework and microeconomic analysis. The first approach is to highlight the macroeconomic and sectoral effects of a reduction in remittances, while the second is to show how remittances decrease the probability of being poor and affect the household consumption expenditure and hence poverty. The findings suggest that reduction in remittances will reduce gross domestic product, investment, and household consumption, which in turn will increase poverty. On the other hand, the probability of households becoming poor decreases by 12.7% if they receive remittances. The poverty headcount ratio and Gini coefficient decline by 7.8% and 4.8%, respectively, for household-receiving remittances. Given the important role of remittance, the key challenge for the government is to provide incentives to attract more remittances sent through formal channels and ensure their productive use.

I. Introduction

Globalization and other factors such as greater connectivity and more open policies have caused greater mobility of factors of production. This is reflected in the increasing number of workers moving out of their countries to search for better opportunities abroad.¹ The number of migrants grew from around 70 million in 1960 to more than 190 million in 2005, following the growth of the total population.² As of 2005, 76 million migrants reside in developing countries and about 114 million of them live in high-income countries. From 180 countries that have reliable data on migration, 82 countries are net recipients and 98 countries are net senders. The countries with the largest numbers of migrants during 2000–2005 are exhibited in Table 1.

Table 1: Countries with Highest Number of Migrants, 2000–2005

Country	Number (thousands)
Net in-migration	
United States	6,493
Spain	2,846
Italy	1,125
Canada	1,041
Germany	1,000
Net out-migration	
Mexico	3,983
PRC	1,900
India	1,350
Iran	1,250
Pakistan	1,239

Source: World Bank (2009).

Overall, migration can have positive and/or negative impacts both in the short and long term. On one hand, migration can lead to higher standards of living and improve educational and health standards. On the other hand, when groups of educated people move out from developing countries, there is a substantial loss of human capital. This

¹ The basic motivations for migration can be classified under economic or political reason. The two factors that constitute the migration process are: (i) push factors, i.e., voluntary or forced migration depending upon quality of life and employment opportunities, and (ii) pull factors, i.e., need for trained workers in host countries or need to maintain demographic balance.

² Despite the increasing trend in migration, the ratio of migrants to total world population remains stable at around 3%. However, not all migrants are workers since about 7.5% of them are refugees, totaling around 14.3 million people.

is known as “brain drain”, as can be seen in some developing countries that have long experience of having their doctors, engineers, and other highly skilled workers moving out of their countries. In retrospect, this may seem a lost opportunity given that the resource-scarce developing countries have limited spending on education and training.

However, as a result of outflows of migration, developing countries receive significant amounts of remittances. In general, remittances to developing countries rose from 1.2% of gross domestic product (GDP) in 1990 to 1.8% in 2007, while remittances to high-income countries remain constant at about 0.2% of GDP. At the start of the 1990s, more than 50% of the global remittances went to high-income countries but in 2007 nearly 65% of the flows were received by middle-income countries and about 10% went to low-income countries. The high-income countries, however, remain the main source of remittance outflows, highlighting the important role of remittance flows from developed to developing countries. The United States (US), for instance, has the highest outflows (\$44 billion), followed by Russian Federation (\$18 billion), Saudi Arabia (\$16 billion), Switzerland (\$15 billion), and Spain (\$15 billion).

The importance of remittances has been increasing not just at the macroeconomic level but also among recipient households. At the macro level, the share of remittances now is about 90% of foreign direct investment (FDI), surpassing official capital flows and other private flows (Acosta et al. 2006), while the number of recipient households keeps increasing. At the household level, remittances have helped smooth consumption expenditure and in some cases have also reduced poverty.

Given the role and magnitude of remittances, the question on how far they have impacted poverty and inequality levels particularly in developing countries has become very important. This research question has been the subject of a significant number of studies (e.g., Adams and Page 2005, Lopez Cordova 2005, Page and Plaza 2005, Taylor et al. 2005, Maimbo and Ratha 2005, Adams 2006, Acosta et al. 2006, Yang and Martinez 2006, Ozden and Schiff 2006). The overall finding from previous studies suggests a mixed picture with no single uniform standpoint. For instance, Adams (1991 and 1998), who examines Egypt and Pakistan, finds that overseas migration increases household income inequalities. In contrast, Taylor and Wyatt (1996) who focus on rural Mexico find that remittances reduce inequalities. Several studies indicate that remittances reduce poverty incidence, including Tingsabath (1989) for Thailand, Gustafsson and Makonnen (1993) for Lesotho, Lachaud (1999) for Burkina Faso, and Adams and Page (2005) for Guatemala. Acosta et al. (2006) explain that the impact of remittances on poverty and inequality are sensitive to the underlying methodology and show that remittances in Latin American countries do not carry a significant inequality reducing effect, even though they reduce poverty headcount ratio. They show that for a 1 percentage point increase in remittance to GDP ratio, the proportion of the poor is reduced by 0.4%. Kozelt and Alderman (1990) find a significant negative impact of remittances on labor force participation of males in Pakistan.

Jongwanich (2007) shows for a selected sample of Asian and Pacific countries that remittances have a positive but marginal impact on economic growth and a significant direct impact on poverty reduction by increasing income, smoothing consumption, and easing capital constraints of the poor. On the other hand, Brajas et al. (2009) argue that decades of remittances transfers have contributed little to economic growth in remittance-receiving economies. For a more detailed review of previous studies see Vargas-Silva et al. (2009).

Asia is at the centre of global migration and remittances as most of the top recipients of remittances are in this region (Table 2). The highest recipient of remittances is India with \$27 billion, followed by People's Republic of China (\$25.7 billion) and Mexico (\$25.1 billion). Bangladesh, Indonesia, and Pakistan are all in the top 10, receiving around \$6 billion per year each.³

Table 2: Top Recipients of Remittances, 2007

Country	\$ Billion
India	27.0
PRC	25.7
Mexico	25.1
Philippines	16.9
Poland	10.7
Romania	8.5
Bangladesh	6.6
Indonesia	6.1
Pakistan	6.0
Egypt, Arab Rep.	5.9

Source: World Bank (2009).

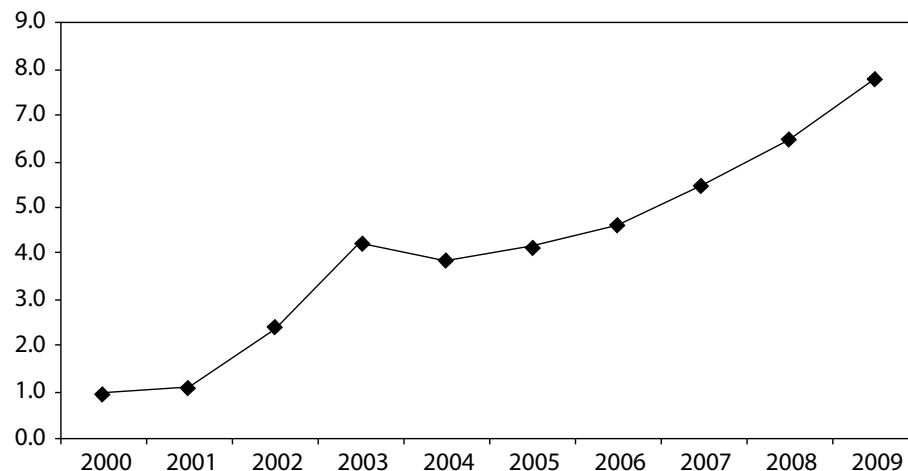
Pakistan has gained enormously from remittances both in the past and recent years. In 2007–2008 remittances were 56% of net current transfers. Due to the current global crisis, 2008–2009 saw migrant workers returning home and bringing along their accumulated savings. This pushed the share of remittances in the net current transfers to around 70%, compared to the previous 5-year average of 52%.

The inflows of remittance during 2000–2009 are given in Figure 1. As can be seen from the figure, growth started from around \$1 billion in 2000 and had reached more than \$8 billion by 2009. The number of Pakistani emigrants in 2005 stood at 3.4 million people or about 2.2% of the total population. The leading destinations were US, Saudi Arabia, United Arab Emirates (UAE), United Kingdom (UK), Canada, and countries from continental Europe (World Bank 2009). The numbers for Pakistan's skilled emigration rate stood at 9.2% in 2000 since as much as 5% of the physicians trained in the country (or 4,359) have emigrated abroad (Docquier and Marfouk 2004 and Docquier and Bhargava

³ As a share of GDP, however, countries such as Seychelles (675%), Liberia (94%), and Moldova (34%) had the highest receipts of remittances in 2007.

2006). Appendix 1 Tables and 2 show the details of migration outflows from Pakistan by destination countries and skill level.

Figure 1: Inflows of Remittances to Pakistan, 2000–2009 (US\$ billion)



Source: State Bank of Pakistan.

This paper examines the impact of remittances at macro, sectoral, and micro or household levels in Pakistan using a computable general equilibrium (CGE) model and microeconomic techniques. The first model is used to see how remittances impact the economy, sector outcomes, poverty, and inequality among the representative households. The model was developed using the SAM 2002 for Pakistan. On the other hand, the microeconomic analysis is based on household income and expenditure survey data for 2005–2006 to examine the impact of remittances on income, consumption, and poverty levels in Pakistan.

The rest of the paper is organized as follows. The next section gives a retrospective overview on the economic growth, remittances and welfare condition in general. Section III then provides quantitative results on the impact analysis of remittances in the Pakistan economy context at the macro, sectoral, and household levels. Finally Section IV highlights the key findings and their policy implications.

II. Economic Development, Remittances, and Migration in Pakistan

A. Economic Growth

During the 1960s, Pakistan grew annually at an average of 6.8%, with the manufacturing sector expanding at 9.9%. The achievement in terms of improvement in social welfare, however, was very little. The main focus of development in this decade seemed to be on a large public works program to support the infrastructural foundation for agriculture and industry.

The 1970s witnessed a phase of nationalization. The GDP growth rate declined to an average of 4.8% mainly because of public sector inefficiencies. However, given the expansions in public sector jobs, the unemployment rate declined to 2.2%, which is the lowest in Pakistan's history. This led to a reduction in the poverty headcount ratio from 42.4% in the 1960s to 38.6% in the 1970s.

The 1980s was characterized by substantial flows of bilateral aid to Pakistan following its alliance with the US in the wake of the Soviet Union's invasion of Afghanistan. This decade also saw the booming of the Middle East, which attracted a significant number of skilled and unskilled workers from abroad, including Pakistan. This period marked the starting role of remittances in helping to revive the economy and increase in household income. GDP growth in this decade increased to around 6.5%, contributed by manufacturing (8.2%) and agriculture (5.4%). The poverty headcount ratio was further reduced to 20.9%, but it was not followed by an improvement in income inequality since the Gini coefficient hovered at around 0.37.

The decade of the 1990s is usually referred as the "lost decade" for Pakistan as it was characterized by the lowest growth in its history when welfare indicators such as poverty and inequality deteriorated and unemployment increased. The main reason for this is the macroeconomic instability and lack of consistency in public policies due to rapid changes in the government. GDP growth in the 1990s came down to an average of 4.6%, as with investment to GDP ratio to 18.3%. On the other hand, the fiscal deficit to GDP ratio increased to 6.9%. Headcount ratio and Gini coefficient both increased to 27.3% and 0.39, respectively (Table 3).

The post 9/11 era (of 2001) saw a revival of the Pakistan economy as GDP growth increased to an average 5.1% during 2000–2009. The main highlights of this period were a sustained growth in the manufacturing sector at 7.1%; a reduction in the ratio of fiscal deficit to GDP from 6.9% to 4.4%; and a marginal improvement in poverty and inequality. The unemployment level however, increased to 7.1%, which is the highest since the 1970s, due to, among others, the underlying structural changes in the economy, i.e., from

obsolete practices in the industrial sector toward increased capital intensity and greater product sophistication.

Table 3: Indicators of Growth and Welfare in Pakistan

Indicators	1960	1970	1980	1990	2000-2009
Real Growth Rate (percent)					
GDP	6.8	4.8	6.5	4.6	5.1
Agriculture	5.1	2.4	5.4	4.4	3.3
Manufacturing	9.9	5.5	8.2	4.8	7.1
Services Sector	6.7	6.3	6.7	4.6	5.8
As Percent of GDP					
Total Investment	-	17.1	18.7	18.3	19.0
National Savings	-	11.2	14.8	13.8	17.1
Foreign Savings	-	5.8	3.9	4.5	1.9
Government Revenue	13.1	16.8	17.3	17.1	14.2
Government Expenditure	11.6	21.5	24.9	24.1	18.5
Development Expenditure	-	-	7.3	4.7	3.4
Overall Deficit	2.1	5.3	7.1	6.9	4.4
Exports	-	-	9.8	13.0	12.2
Imports	-	-	18.7	17.4	16.0
Trade Deficit	-	-	8.9	4.4	3.9
Annual Average					
Gini Coefficient ^a	0.39	0.38	0.37	0.39	0.34
Poverty Headcount ^b	42.4	38.6	20.9	27.3	26.9
Unemployed (percent) ^c	-	2.2	3.5	5.6	7.1

Note: ^aAnwar (2005) for 2005 and 2005–2007 estimates from economic surveys.

^bUntil 1999 from Haq and Bhatti (2001) and Economic Survey for 2007–2008.

^cLabor Force Survey (various issues).

Sources: Finance Ministry of Pakistan's Economic Survey of Pakistan (2007–2008); Ahmed and O' Donoghue (2008).

B. Remittances

The flow of remittances has increased from \$136 million in 1973 to \$6.45 billion in 2008 (Table 4). In the early part of 1970s, the largest contributor to remittance inflows to Pakistan was the UK with a 54% share. Gradually and in particular after the oil price shocks in the 1970s, the demand for workers from the Gulf countries increased, so that by the end of the 1970s, UAE and Saudi Arabia were both contributing above 20% of the total remittances. This trend continued well into the 1980s. In 1981 for instance, Saudi Arabia contributed about half of the total remittances of \$2.12 billion (compared to \$578 million in 1977). After the 1990s, the share of remittances from the US relatively increased and in 2005 its share was already 30%. Appendix 1 provides the numbers of Pakistanis working abroad since 1971 by country, while Appendix 2 gives the data based on their skills from the Bureau of Emigration and Overseas, Pakistan.

Table 4: Inflows of Remittances to Pakistan (US\$ million)

Country of Origin	1973	1977	1981	1986	1991	1996	2002	2005	2008
United Arab Emirates	0	118	265	311	172	162	469	713	1090
Saudi Arabia	8	159	984	1163	682	503	376	627	1251
United Kingdom	73	49	185	223	180	110	152	372	459
United States	10	29	71	194	190	142	779	1249	1762
Other	45	223	610	703	624	544	612	1208	1889
Total	136	578	2116	2595	1848	1461	2389	4169	6451
Percentage Share									
United Arab Emirates	0	20	13	12	9	11	20	17	17
Saudi Arabia	6	27	47	45	37	34	16	15	19
United Kingdom	54	9	9	9	10	8	6	9	7
United States	7	5	3	7	10	10	33	30	27
Other	33	39	29	27	34	37	26	29	29
Total	100	100	100	100	100	100	100	100	100

Source: Finance Ministry of Pakistan's Economic Survey of Pakistan.

Previous studies on remittances in Pakistan include estimating the determinants of remittances and linking them with their potential in reducing poverty. Nishat and Bilgrami (1993) show that remittances in Pakistan are significantly influenced by family size, income, education, skill, and living with or without family. The authors also show that migrant's income level is the most important factor for remitting, such that if income increases by 10%, remittances will increase by 3.6%.⁴ An earlier study by Pasha and Altaf (1987) showed that migrants' plan to return home may prompt them to remit more as part of their future planning. They may invest the remittance money in land and related assets. Moreover, Suleri and Savage (2006) show that migrant households in Pakistan are less vulnerable to economic shocks because they have better investment opportunities and assets such as a house. The flows of remittances to Pakistan have also shown an altruism reason. This can be seen from their increasing inflows by 10% in the wake of the earthquake in 2005, which helped to facilitate the recovery process. For an analysis of remittances from the Middle East and their impact on Pakistan's economy, see Burney (1987); and for analysis on impact of remittances on household consumption, see Malik and Sarwar (1993).

There has been an increase in the amount of remittances sent through formal channels because of better service by financial institutions and more stringent money laundering regulations (see Gazdar 2002). Table 5 summarizes the pros and cons of the various modes for transferring remittances that may also impact the socio-economy.

⁴ The data used in this study come from a survey of the workers registered with the Overseas Pakistani Foundation. From 35,000 registered workers returning from the Gulf region in 1990–1991, a sample of 7,061 was randomly selected for the study.

Table 5: Modes of Transferring Remittances

Modes of Transfer	Advantages	Disadvantages
Informal via <i>hundi</i> (through money changer)	Speedy, low transaction cost, easy for receiver with difficulties in reading and writing	Less reliable, may take longer time due to new increased regulations
Informal by hand	Speedy, no transactions cost	Risky, limited amount due to country-specific regulations
Formal through financial institutions	Reliable, safe, documented, traceable	High transaction cost, time-consuming, formal process, generally available only in well established towns/cities

Source: Updated from Suleri and Savage (2006).

The government has been strongly encouraging migrant workers to send their remittances through formal channels. As part of the liberalization of the foreign exchange regime, migrant workers are allowed to maintain foreign currency accounts with free inflows and outflows of foreign currency. The floating exchange rate policy adopted also reduced the gap between official and market exchange rates (see Azam 2005). Additionally, the government provides exemptions to migrant workers on custom duties for sending remittances through formal channels. It also introduced foreign exchange bearer certificates and foreign exchange currency certificates for migrants to provide attractive returns on long-run investments. In line with this, Amjad (1989) points out that the relevant financial institutions should improve their convenience, flexibility, safety, and profitability. This can be done through an expansion of the banking network inside the country and setting up branches in host countries with a substantial population of Pakistanis. This is important because the cost of remitting from abroad is also an important consideration in deciding which channels to be used. The costs are often very high from countries with fewer Pakistanis and less developed financial linkages. Table 6 exhibits the costs of remitting \$200 to Pakistan from selected countries in 2009.

Table 6: Cost of Sending \$200 Remittances to Pakistan from Selected Countries, 2009

Country of Origin	Average Fee (\$)
United States	18.9
United Kingdom	10.8
Saudi Arabia	9.1
United Arab Emirates	8.3
Singapore	23.5

Note: Represents average cost of banking and related financial institutions and also includes exchange rate margin.
Source: World Bank (2009). Available: remittanceprices.worldbank.org/, downloaded November 2009.

The use of remittances in Pakistan has also been widely debated. A majority of these are believed to be devoted to consumption expenditures, followed by debt repayment, construction/renovation of house, expenses related to weddings/dowries for children, purchase of real estate, starting a business, and performing the Islamic religious act of the *Hajj* that involves financing returned travel to Mecca in Saudi Arabia.

C. Migration

The objectives of government policy for migration include maximizing export of manpower, providing safeguard and protection for workers abroad, simplifying procedures, developing welfare programs for emigrants, coordinating with missions abroad on the medium-term economic projections of countries interested in Pakistani manpower, holding fairs to attract foreign employers, sending delegations to tap potential employment markets for Pakistanis, and opening up Labor Attaché Offices in countries with significant potential employment.

Table 7 summarizes three different methods of emigration used by Pakistani workers, namely through agents, relatives in the destination country, and tourist visas. Each has its associated costs and the poor may need to borrow money at a high interest rate to meet the costs.

Table 7: Estimated Costs of Emigration from Pakistan

Method of Migration	Cost ('000 Rs)	Prevalence	Advantage	Disadvantage
Through agents.	250–350	81%	Less time, less likely to be refused	High cost
Through relatives in the destination country	100–130	17%	Safe	Invitees must provide a guarantee
Use a tourist visa	80–110	2%	Less expensive	Takes more time, more likely to be refused

Source: Updated from Suleri and Savage (2006).

During the 1950s and 1960s, employment of most Pakistanis in countries such as the UK and the Gulf region was undocumented. The oil boom in the 1970s gave rise to large-scale construction activity in the Gulf countries, creating jobs for Asian migrant workers such as plumbers, masons, tile fixers, electricians, and carpenters.⁵ From 1971, the manpower “exports” from Pakistan were started on a planned basis (see Mughal 2004). To help this, the Bureau of Emigration and Overseas Employment was set up on 1 October 1971 by combining three federal government departments (2009), namely (i) National Manpower Council, (ii) Protectorate of Emigrants, and (iii) Directorate of Seamen’s Welfare. The Bureau started to function under the Emigration Act of 1922 and Rules 1959, which were subsequently replaced by the Emigration Ordinance 1979. The Bureau regulates, facilitates, and monitors the emigration process conducted by about 1,120 overseas employment promoters. This is in addition to direct employment, where an individual gets employment in another country through his/her own efforts. The Bureau also monitors the commission charges of recruitment agents, fees for skills tests, medical charges, and other related documents required by foreign employers. This is not an easy

⁵ However as infrastructure development matured, the structure of manpower requirements began to change, increasing the demand for engineers and other skilled workers.

task as was indicated by Azam (1998 and 2005). It is estimated that the recruiting agents charge migrants at least 8–10 times more than the officially prescribed fees although this estimate has come down in recent years.

While skilled migration out of Pakistan kept growing until the beginning of the 1990s, it was only after 1995 that their number started to decline and was replaced by a lower quality of workers. This was primarily due to the neglect of vocational and high training institutes. Employers in Gulf countries have complained over the lack of basic qualifications and work experience of Pakistani workers, which prompt them to look for workers from other countries such as Bangladesh and India. The government needs to address this issue and also to tap markets in other countries such as France, Germany, Greece, Italy, and Japan (see Mughal 2004). The immediate period after 9/11 incident also gave problems for aspirant workers from Pakistan as several countries such as Bahrain, Kuwait, Qatar, and UAE imposed a ban on employment visas. Several western countries such as the EU and the US also introduced policies restricting worker flows from developing countries.

The government's migration policy can have two broad objectives of lowering migration costs (i.e., recruiting and settling down costs); and enhancing migration benefits (i.e., enforcing minimum standards, social security coverage, protection of migrants' welfare, and making use of return migrants). The migration policy in Pakistan has mostly been independent of poverty reduction or related developmental objectives (see Azam 2005 for details).

A contribution to the "welfare fund" from all registered migrants can insure them against unforeseen events such as accident or death. The Community Welfare Attaches in the embassies of Pakistan can also help migrants resolve disputes with their employers. This is important especially for less educated migrants who are not aware of their legal rights.

The Overseas Pakistanis Foundation (OPF) set up in 1979 and financed through the migrants' own contributions, provides guidelines to migrants' dependents on coping strategies in the event of a migrant's death or disability. According to 2005 data, OPF has helped around 3,000 migrant families to obtain death compensation amounting to almost Rs. 1 billion from the migrants' foreign employers. Currently, the role of OPF has been expanded to also provide services such as providing investment advice to returning workers, helping potential investors, providing loans to the dependents of deceased workers, and developing housing facilities for migrants. Box 1 further summarizes some specific steps taken at the federal government level to assist overseas Pakistanis.

Box 1: Welfare Programs of the Overseas Pakistanis Foundation

Financial Assistance: Enhancement of financial assistance from Rs. 50,000 to Rs. 100,000 to destitute families. This is targeted to unskilled Pakistanis workers abroad facing work-related difficulties, disability or death.

Residential and Commercial Facilities: The government has catered to the housing needs of overseas Pakistanis by providing them with residential facilities. As a result, OPF has planned and established a number of housing schemes in different cities with the creation of about 10,000 residential units for overseas Pakistanis.

Welfare Services: The government has taken steps to advance the social welfare of the Overseas Pakistanis through the establishment of a complaint cell, services, and welfare section and most importantly the recently established emergency relief section. In addition, the existing Foreign Exchange Remittance Card scheme, which was launched by the Ministry of Finance through OPF to encourage the use of official channels for sending remittances, has now been expanded by providing the holders of this card with preferential facilities related to logistics on return.

Investment Support: To encourage investment by overseas Pakistanis, the government has taken some important steps to increase the investment opportunities for them. The Investment Advisory section has been established to provide key information on the procedure to start a business, investment policies, and feasibility studies, as well as on contact information of related business and provision of small loans.

Education: The government has embarked on a new initiative to uplift the education of overseas Pakistanis. OPF has established educational institutions in all provinces, and it has its own schools and colleges. The OPF schools are affiliated with the Federal/Provincial Boards of Education and University of London, providing extra curriculum activities and scholarships to the deserving children of overseas Pakistanis from class 1 to postgraduate level.

Pakistan Remittance Initiative: To reduce the transactions costs of remitting, the central bank has initiated the Pakistan Remittance Initiative, whereby the marketing expenses of overseas financial entities that mobilize large amounts of remittances will be reimbursed. This will reduce the overall costs of remitting borne by workers abroad.

While providing recommendations for optimizing migration, Mughal (2004) also explains the need to provide (i) basic understanding of language, culture, legal, social, and political setup of destination countries; (ii) reduce costs of migration; (iii) undertake global market analysis and train workers in skills with rising demands; (iv) carry out publicity efforts in foreign countries to ensure a stable market for Pakistani manpower; and (v) highlight investment venues for returning migrants⁶ and those wishing to do joint ventures.

⁶ There is an urgent need to conduct a survey of returning migrants in order to ascertain their skills, identify business opportunities, make proper use of their expertise, and improve the overall welfare of their household.

The recent global financial crisis adversely impacted Pakistan's prospects of increasing manpower exports particularly to the Gulf region. Almost 52% of Pakistan's remittances come from this region and most workers there come from poor rural backgrounds, with some having invested most of their savings to finance the migration cost. The full impact might be clearer over the long term, since remittance data until now still show an increase, which may be due to the rise in reverse migration of returning migrants bringing home their remittances.

III. Impacts of Remittances

A. Macro and Distributional Effects Based on CGE Modeling

1. Main Feature of the Model

The CGE model used in this paper is derived from the framework first developed by Cororaton and Orden (2007). Detailed mathematical specifications of the model are presented in Appendix Table 3.

The production function in the model combines the intermediate inputs and value-added to give the final output, which is then either exported or domestically sold. This export transformation is specified using a constant elasticity of transformation (CET) function. Imported inputs are combined with domestic goods to provide composite goods using a constant elasticity of substitution (CES) function. The value-added is a CES function of four different factors: skilled labor, unskilled labor, capital, and land. Furthermore, with Pakistan a developing country having a substantial share of the agriculture sector in overall GDP, unskilled labor is further subdivided into farm labor and unskilled workers using a CES function. Therefore the top nest of the production function in the agriculture sector becomes land, capital, and unskilled labor, which form the agriculture sector's value-added using a CES function.

On the demand side, the model specifies consumption as a linear expenditure system (LES), which is widely used in CGE modeling. Household consumption is the difference between household disposable income and savings. There is a fairly detailed specification on the investment side where demand for sectoral capital is determined by the ratio of return to capital and cost of capital. The total demand for capital gives the overall real investment, which is then multiplied by the price of investment to obtain the overall nominal investment. Finally, the investment demand by sector/origin is calculated by multiplying the ratio of nominal total investment to composite price of commodity with the investment shares given in the base data.

Output price is a weighted average of export and local prices, which are domestic price minus indirect taxes. These indirect taxes are also added to world price of import (multiplied by exchange rate) and tariff rate to give the domestic price of imported products. The export price is determined by world price of exports (multiplied by exchange rate) and export subsidies, which can be zero as in the case of this model.

On the closure rules to balance the model, total capital and land in the agriculture sector are fixed, whereas in the nonagriculture sector, only capital is fixed. Unskilled labor is allowed to move across sectors, while skilled labor can only move between nonagriculture sectors. The supplies of skilled labor, farmer, and other workers are fixed, as well as the supply of land. Total supply of goods and services in the market is equal to sum of intermediate demand and final demand for household and government consumption. Total investment is equal to total saving, which comprises savings of households, firms, foreign savings and government. Real government consumption is fixed, allowing government income and savings to vary. Savings of firms are also fixed so that a rise in a firm's income will imply increased dividends to households but not an increase in retained earnings of the firms. Most of these closure rules are similar to Cororaton and Orden (2007) with some extensions to reflect the characteristics of Pakistan's economy.⁷

The weighted average of value-added price is considered as the numeraire. The nominal exchange rate is flexible to clear the external account. This implies that foreign saving measured in the domestic currency is flexible but it is fixed in terms of foreign currency.

2. Simulation Results

To examine the effects of remittance on the economy of Pakistan, a 50% reduction of remittance flows to the Pakistan economy is simulated in the model. Table 8 summarizes the results by concentrating on some selected macroeconomic and household welfare indicators. The overall results indicate the important role of remittances in the Pakistan economy. If the remittance flows are reduced by 50%, domestic demand is significantly reduced. Total real investment is reduced by 7.7% and total imports decline by 6.4%. The latter is also due to reduced foreign exchange availability in the domestic economy. Exports increase by 10% to partly compensate for the reduction in domestic demand for domestic goods. As a result, overall GDP decreases by 0.7%.

The impacts across different households show a significant decline in the household's overall consumption, with the largest reduction seen for rural nonfarm poor households (3.5%). The least affected is the urban nonpoor households whose consumption declines only by 1.1%. In terms of poverty effect, the urban population seems to be less affected, while farmers, especially the landless ones, are badly hit by the remittance drop. This

⁷ Cororaton and Orden (2007) conduct some simulations to examine the impact of increase in foreign savings, increase in world prices of cotton lint, improvement in total factor productivity, and production subsidy. The elasticity estimates used in their model are also adopted in this model.

shows the strong link between migrants and farmers, which is unique for Pakistan. This further highlights the fact that many migrants are still nonskilled workers coming from agriculture backgrounds.

Looking at the impacts on poverty indicators, the 50% reduction in remittance flows will bring a significant adverse effect to the poor. The headcount ratio will increase by 6.4%, while the poverty gap and severity of poverty index will increase by around 6%, respectively (Table 9). The higher impacts on the headcount ratio rather than on the poverty gap and poverty severity index mean that some households have become poor because of the drop in remittances. Moreover, comparing the poverty impact between urban and rural households, there is a stark difference for the rural households as their poverty impact indicators are nearly double than those of the urban households. The headcount ratio of rural households increases by 6.9%, while that of urban households increases by 3.5%. The increases in the poverty gap and severity index of rural households are 6.9% and 6.8%, respectively; for urban households the increases are 4.1% and 4.3%. Therefore, the increase in the poverty severity index of urban households is higher than headcount ratio and poverty gap, which is still higher than the headcount ratio. This implies that the poverty impact of a remittance drop among urban households not only adds more poor households but also makes the poor households relatively poorer.

Table 8: The Impacts of Reducing Remittance Inflows by 50% (percentage change from the base)

Indicators	Percent Change
Selected Macroeconomic Indicators	
Real Investment	-7.7
Exports	10.0
Imports	-6.4
Real GDP	-0.74
Household Consumption	
Large Farmers_Sindh	-2.3
Large Farmers_Punjab	-2.6
Large Farmers_other Pakistan	-3.1
Medium Farmers_Sindh	-2.6
Medium Farmers_Punjab	-2.8
Medium Farmers_other Pakistan	-2.4
Small Farmers_Sindh	-3.1
Small Farmers_Punjab	-2.9
Small Farmers_other Pakistan	-3.2
Small Farm Renters_landless_Sindh	-2.9
Small Farm Renters_landless_Punjab	-3.0
Small Farm Renters_landless_other Pakistan	-2.8
Rural agricultural workers_landless_Sindh	-3.0
Rural agricultural workers_landless_Punjab	-3.2
Rural agricultural workers_landless_other Pakistan	-3.3
Rural nonfarm nonpoor	-3.3
Rural nonfarm poor	-3.5
Urban nonpoor	-1.1
Urban poor	-2.9

Source: Authors' estimates from simulation results.

Table 9: Poverty Impact of Reducing Remittance Inflows by 50% (percentage change from the base)

Poverty Indicators	Urban	Rural	Total
Headcount Ratio	3.48	6.90	6.35
Poverty Gap	4.13	6.89	6.05
Poverty Severity	4.25	6.83	6.11

Source: Authors' estimates from simulation results.

B. Impacts at the Household Level based on Microeconomic Analysis

1. Data and Methodology of Analysis

The microeconomic analysis is based on the data from the Household Integrated Economic Survey (HIES) of Pakistan 2005–2006. The survey covers 15,453 households, but after data cleaning for the analysis the sample is reduced to around 14,000 households. According to the Federal Bureau of Statistics the sample of households has been drawn from 1,109 primary sampling units, of which 531 are urban and 578 are rural. The coverage unit of the survey is household, which can be a single person or a multiperson household. The first implies that the individual makes his own provision for food and others, while the second involves household members who live together in one place. The household members need not be necessarily blood-related but they stay together in one place. The absent household members because of migration abroad are not considered as part of the household members. Therefore, the income generated by this migrant group is not a part of overall household income and thus the remittances are recorded under the category “money received from abroad”. Results from HIES 2005/06 show the average household size at the national level is about 6.8. The number of income earners in rural areas is higher than in urban areas, i.e., 2.16 compared with 1.91 in 2005/06.

The income ratio between urban and rural areas is also similar with the consumption expenditure ratio. The share of wages and salaries in the urban household monthly income was 48.81% in 2005–2006. The highest income contributor in rural areas remained to be agriculture, particularly the crop sector, contributing 34.08% in 2005–2006. Looking across income quintiles in 2005–2006, the share of incomes from wages and salaries actually decreases as the households move to higher quintiles. In the first quintile, the share of wages and salaries incomes is about 44.4% while for the fifth quintile the share is about 34.0%. Meanwhile, the share of income from remittance increases as the households move to higher quintile groups. Remittance income contributes less than 1% for the first quintile households while the share increases to 6.5% for the fifth quintile household. This trend applies to both in urban and rural areas, which might be a reflection of the relatively costly migration fee, such that the relatively richer can participate more. This is in addition to other characteristics of households

such as education and skill levels of household members, which would be better as the households move to higher income groups (Table 10).

Table 10: Share of Household Income by Sources, Quintile, and Regions, 2005–2006

Sources of Income	Total	Quintiles				
		1	2	3	4	5
Total						
Average Monthly Income (Rs)	12326	6725	8393	9788	11493	20811
Share in Monthly Income (%)						
Wages and Salaries	35.33	44.41	38.29	35.03	32.98	33.96
Crop Production	21.63	21.97	23.39	25.39	23.74	18.85
Foreign Remittances	4.42	0.97	1.57	2.77	4.35	6.45
Urban						
Average Monthly Income (Rs)	14968	6497	8571	10108	10747	21954
Share in Monthly Income (%)						
Wages and Salaries	48.81	66.4	57.4	53.53	52.71	45.32
Crop Production	4.45	3.26	2.74	2.36	2.87	5.42
Foreign Remittances	3.51	0.2	0.84	1.8	2.97	4.36
Rural						
Average Monthly Income (Rs)	10929	6768	8339	9670	11924	19277
Share in Monthly Income (%)						
Wages and Salaries	25.57	40.47	32.35	27.88	22.7	16.2
Crop Production	34.08	25.33	29.8	34.28	34.6	39.36
Foreign Remittances	5.08	1.11	1.79	3.14	5.06	9.64

Source: Pakistan Social and Living Standards Measurement Survey 2005–2006.

On the expenditure side, the share of food expenditure remained highest in the total budget but its share has declined during the two periods, showing an improvement in the welfare status of the households. The share in 2001–2002 was still 48.3% but in 2005–2006 it declined to 43.05%. The decreases happened both in urban and rural areas. The share in urban areas declined from 38.9% to 35.2%, and from 54.4% to 49.6% in rural areas.

Comparing the contribution of remittance across provinces, Table 11 shows that the share of remittances is highest in the North West Frontier Province (9.42%) followed by Punjab (5.13%), and Baluchistan (1.56%).

Table 11: Share of Household Income by Sources and Province 2005–2006

	Punjab	Sindh	NWFP	Baluchistan
Average Monthly Income (Rs)	12312	13031	12279	8849
Share in Monthly Income (%)				
Wages and Salaries	29.53	49.08	30.35	51.59
Crop Production	26.33	16.62	9.16	23.62
Foreign Remittances	5.13	0.72	9.42	1.56

Source: Pakistan Social and Living Standards Measurement Survey 2005–2006.

2. Methodology of Analysis

The methodology of analysis in this paper is based on the knowledge from literature that human capital variables impact migration decisions (Todaro 1976, Schultz 1982), and that migration is also influenced by various household characteristics (Lipton 1980, Adams 1993). It then follows that the regional and wealth characteristics should also play a role in the migration decision. Following Adams (2006), this paper starts by specifying the probability of a household to migrate and receive remittances.

$$Prob (Y = \text{migration}) = f [HK, H_{ch}, R_{ch}, W_{ch}] \quad (1)$$

where *HK*: human capital; *H_{ch}*: household characteristics; *R_{ch}*: regional characteristics; *W_{ch}*: wealth characteristics.

The *human capital* variables considered include the number of household members with primary, lower secondary, upper secondary, and university education, while the *household characteristics* include age of household head, number of males in the household above 15 years of age, and household size. The *regional characteristics* included in the estimation are two dummy variables to represent urban and rural areas, and developed provinces of Punjab and Sindh and the rest of Pakistan. The three *wealth characteristics* used in the regression are the squared value of property, accumulated savings, and squared value of accumulated savings.

The selection of variables is based on evidence that human capital variables impact migration as people with better educational attainment have better employment opportunities abroad (Todaro 1976, Schultz 1982). If migration is seen in the lifecycle perspective, the age of household head and the number of older household members (i.e., above 15 years of age) should play a role in determining the decision to migrate (Lipton 1980, Adams 1993). The incorporation of wealth variables such as accumulated savings from the past become necessary in order to represent the initial costs associated with migration (Barham and Boucher 1998, Lanzona 1998), while the regional characteristics represent the different levels of development, available information, networking facilities, and other such factors.

The next model estimates the income function of migrant and nonmigrant households to assess the role of remittances. The estimates are obtained for three different sets of households: (i) migrant in household but exclude remittance income to see the ex-remittance income function; (ii) migrant in household and remittances included in household income; and (iii) households with no migrants. The dependent variable is per capita household income and the standard ordinary least squares (OLS) methodology is used for estimation. After the estimation of the three income functions, the three predicted mean incomes from the estimations are then compared to observe the contribution of remittances to the household income or welfare. The predicted mean incomes are also compared with the observed means reported in the data.

$$[H. \text{ Income} / H. \text{ Size}] = g [\text{HK}, H_{\text{ch}}, R_{\text{ch}}] \quad (2)$$

Explanations of the variables used in the model are as in equation (1), but two independent variables related to human capital are dropped, namely, number of households with primary and lower secondary education. To complete the analysis, three different *expenditure functions* are also estimated by replacing income with expenditure. The main purpose is to also see the impacts of remittances on expenditure.

$$[H. \text{ Exp} / H. \text{ Size}] = g [\text{HK}, H_{\text{ch}}, R_{\text{ch}}, W_{\text{ch}}] \quad (3)$$

Finally, the household expenditure functions for various commodity groups with and without remittance variables are also estimated. The idea is to see the role of remittances in influencing the share of key expenditures on food that can also reflect the welfare status of the household (i.e., higher welfare status is reflected in the lower share of food expenditure). The food budget share function is specified as follows:

$$\text{Food Exp.} / H. \text{ Exp} = h [\text{HK}_{\text{pcexp}}, H_{\text{ch}}] \quad (4)$$

where pcexp = per capita expenditure.

3. Estimation Results: Remittances and Poverty

Chimhowu et al. (2003) argue that the poverty reducing impact of remittances can be summarized at four different levels. First is the household level impact, where remittances help in consumption smoothing, improve the affordability of health services, and enable better nutrition, lowering the incidence of child labor and therefore promoting education. In addition, the increased savings and asset accumulation can provide collateral for a number of purposes. Second is the community level impact, where improved local physical infrastructure leads to growth of local commodity markets, development of new services like banking, retail, trade, travel, and construction. The generation of local employment may lead in turn to a reduction in poverty and inequality. Third, the national level impact, where improved foreign exchange inflows can help in improving macroeconomic stability since the country can now afford more imports that can be used for productive use. Finally the global impacts in developing countries where remittances can help reduce poverty and global inequalities in terms of income, consumption, education, and health.

Kalim and Shahbaz (2009) study the remittance–poverty nexus in Pakistan during 1973–2006 and find that poverty has a negative relationship with remittances, GDP per capita, and urbanization. On the other hand, Ahmad et al. (2008) show that migration from Pakistan is positively related with the levels of inflation and unemployment rate in the country. For the returning migrants, the study by Arif and Irfan (1997) on the occupational choices of returning migrants shows their preference toward pursuing ventures related to own-business or farm activity.

To examine how far remittances contribute to poverty reduction in Pakistan, Table 12 summarizes the Probit estimation of the model discussed above to measure the probability of households becoming poor because of not receiving remittances. To do this, the dependent variable is set at equal to 1 if the household is below the poverty line and 0 otherwise. The results show that variables with a negative and significant coefficient are education level of household head; employment in urban region; and households with member abroad, i.e., receiving remittances. The results suggest that any increase in these variables leads to a decline in the probability of being poor. The probability of a household becoming poor declines by 12.7% if the household receives remittances.

Table 12: Probit Estimation Results of the Impact of Remittances on Poverty

Variables	Coefficient	z-values
Reciprocal of total per capita expenditure	14490	6.29
Household size	0.049	7.65
Education level of household head	-0.038	-7.79
Age of household head	0.015	11.24
Number of males over 15 years of age	0.130	7.54
Households with member abroad	-1.290	-6.94
Urban dummy	-0.148	-3.85
Constant	-2.188	-20.39
Marginal Effects		
Reciprocal of total per capita expenditure	2971	
Household size	0.010	
Education level of household head	-0.008	
Age of household head	0.003	
Number of males 15 years of age	0.027	
Households with member abroad	-0.127	
Urban dummy	-0.030	

Note: Dependent variable: poor = 1, nonpoor = 0.

Source: Authors' estimates from Probit model.

Moreover, to explain the probability of migration, the logit model as specified in equation (1) is estimated and the results are given in Table 13. As explained earlier, the estimation considers four different categories of independent variables, namely: human capital and household, regional, and wealth characteristics. The dependent variable is migrant dummy, which is equal to 1 if the household receives remittances and 0 otherwise. The results indicate a negative coefficient for the number of households having university education, implying that as the education level of household members increases the probability of migration among them decreases.⁸ It seems that those with graduate and postgraduate qualifications eventually find jobs in the domestic labor markets, reducing their need to migrate.

⁸ The negative coefficient for "number of household members with primary education" needs to be investigated further in light of family structures, minimum level of skill set requirements abroad, and the theoretical notion that high-growth economies have a higher preference for skilled migrants (after a certain stage in their development) given their higher productivity in comparison to the unskilled migrants. High-skilled workers are also regarded as relatively more internationally mobile and unskilled workers concentrate in fewer countries abroad. See Giodani and Ruta (2008) for a detailed exposition.

Another variable exhibiting a negative coefficient is the number of males aged over 15 in the households. This implies that as the potential earning of a household increases, the probability for the household members to migrate decreases.

Table 13: Logit Regression Estimation for Migrant Household

Variables	Coefficient	SE	z-values
Human Capital			
Number of members over age 15 with primary education	-0.322	0.087	-3.710
Number of members over age 15 with lower secondary education	0.147	0.078	1.890
Number of members over age 15 with upper secondary education	0.176	0.067	2.620
Number of members over age 15 with university education	-0.082	0.011	-7.280
Household Characteristics			
Age of household head	0.001	0.001	0.510
Number of males over age 15	-0.180	0.018	-10.020
Household size	0.076	0.006	12.540
Regional Characteristics			
Living in urban region	-0.270	0.052	-5.240
Living in developed provinces	-0.828	0.050	-16.670
Constant	-2.815	0.073	-38.620
Log likelihood	-8644		
LR χ^2	1924.1		
Prob > χ^2	0.0000		
Number of households	15062		

Note: Dependent variable: migrant equal to 1 if household receives international remittances. The model also considers three wealth characteristics, namely value of property (squared), savings from past, and savings from past (squared). The coefficients of these variables are very small but statistically significant.

Source: Authors' estimates from Logit model.

The coefficients for independent variables representing regional characteristics such as those living in urban or in relatively developed provinces such as Punjab and Sindh⁹ exhibit a negative sign and are strongly significant. This shows that geographical location also explains the probability of household members moving abroad. Most variables considered in the model are significant, except for age of the household head.

To examine the impact of remittances on the mean household incomes, Table 14 compares the mean per capita incomes of migrant and nonmigrant households, i.e., household with no migrants, households with migrants but excluding remittances, and households with migrants including remittances. As can be seen from the table, the mean income of households receiving remittances is 17.3% higher than households with no migrants or remittances. The mean income of migrant households including remittances is 10.2% higher than if remittance income is excluded from the total income. Migrant household's income excluding remittances is 6.4% higher than nonmigrant households.

⁹ Reflecting the relatively developed markets for both labor and products.

This reflects both the benefits and costs of migration, since remittances add to the total income but migration also requires initial investment to pay the costs of migrating.

Table 14: Comparison of Observed Mean Per Capita Incomes of Different Households

Type of Households	Monthly Mean (Rs)
A. Households with no migrant	10,591
B. Households with migrant (excluding remittance income)	11,274
C. Households with migrant (including remittance income)	12,420
<i>Percentage Change</i>	
D. Percentage Change (C over B)	10.2
E. Percentage Change (C over A)	17.3
F. Percentage Change (B over A)	6.4

Source: Authors' estimates.

To examine the determinants of household income, this paper estimates household income for three different household groups: (i) household with migrant but excluding remittances from the total income; (ii) household with migrant and remittances are included in the total income; and (iii) household with no migrants. The dependent variable is per capita household income either excluding or including remittances, while most independent variables are the same as in Table 13 except that the variables representing the number of household members with primary and lower secondary education have been excluded. Table 15 summarizes the results of this estimation, showing that while the signs of most independent variables remain the same in the logit model, the positive sign for the dummy variable representing households living in urban or developed provinces for the group excluding remittances has changed to negative. This again seems to suggest that the migration probability of households living in developed areas with a relatively good labor market is lower compared to rural or poor parts of the country. Moreover, the coefficients for urban residence and having upper secondary education are positive, significant, and substantially higher for household-receiving remittances. This suggests that urban migrants with relatively better education (or skills) will have higher incomes.

Table 15: Regression Analysis of Household Income

Variables	Excluding Remittance ^a	Including Remittance ^b	No Migrant ^c
Human Capital			
Number of members over age 15 with upper secondary education	1481 (3.57)	2837 (5.23)	1322.9 (10.58)
Number of members over age 15 with university education	280 (4.81)	220 (2.89)	393 (30.45)
Household Characteristics			
Age of household head	71 (11.05)	66 (7.83)	151 (68.13)
Number of males over age 15	-912 (-9.95)	-1080 (-9.01)	-36 (-1.54)
Household size	-613 (-16.03)	-711 (-14.23)	-298 (-42.17)
Regional Characteristics			
Living in urban region	8372 (30.49)	8408 (23.41)	2583 (40.01)
Living in developed provinces	439 (1.46)	-174 (-0.44)	552 (8.28)
Constant	12345 (26.62)	15491 (25.53)	3303 (33.78)

Note: Numbers in parenthesis represent t-statistics.

^aDependent variable is per capita household income excluding remittances.

^bDependent variable is per capita household income including remittances.

^cDependent variable is per capita household income for the nonmigrant households.

Source: Authors' estimates.

How does the existence of remittances change mean expenditure shares at the household level? To answer this question, Table 16 indicates the mean expenditure shares for food, durables, education, health, housing, clothing, transport, household operations, recreation, tobacco, and others from observed data. It is interesting to note that the mean expenditure shares of migrant households for food, clothing, transport, household operations, and tobacco are lower than for nonmigrant households. But the expenditure shares for durable goods, education, health, and housing are higher. This finding indicates an improvement in a household's medium- to long-run standard of living or welfare status. The expenditure on "other" category also increases with remittances. These expenditures include wages paid to housekeepers, house telephone and internet charges, pocket money for children, storage and safe keeping fees in banks, expenses on pets, local level taxes and fines, birth/death/marriage expenses in a household, personal legal expenses, and insurance fees paid during the year. Although the change in share of food group is negative, its marginal propensity to consume is higher than durables and education categories (Table 17).

Table 16: Mean Expenditure Shares from Observed Data

Components of Expenditure	With Remittances (A)	Without Remittances (B)	Percent Change (A/B)
Food	30.8	33.9	-9.1
Durable	4.5	2.8	63.8
Education	4.0	3.8	2.9
Health	5.8	4.0	44.4
Housing	2.5	2.1	19.3
Clothing	5.2	5.6	-6.7
Transport	5.9	6.3	-6.6
Household Operations	9.1	9.4	-2.7
Recreation	0.5	0.6	-11.6
Tobacco	0.6	1.2	-47.7
Other	31.0	30.3	2.3
Total	100.0	100.0	

^aHousehold Integrated Economic Survey 2005–2006.

Source: Authors' estimates.

Table 17: Household Marginal Propensity to Consume by Expenditure Group

Components of Expenditure	Total	Migrant Households	Nonmigrant Households
Basic Food	0.135	0.179	0.129
Durable	0.056	0.048	0.063
Education	0.046	0.020	0.043
Health	0.023	0.054	0.022
Housing	0.022	0.035	0.019
Other	0.247	0.198	0.235
Total	0.528	0.535	0.511

Source: Authors' estimates using ordinary least squares.

To examine the determinants of household expenditure, a regression analysis is carried out and the results are presented in Table 18. The dependent variable is per capita household expenditure and the independent variables also include number of females above age 15 in the households (given the role of women in the migration and remittances), children (household members age below 10), and the three provincial dummies. The results suggest that there is a positive and significant relationship with the change in per capita expenditures. Other variables with positive impact include age of household head, number of males above 15 years of age in the household, living in urban areas, past savings, number of persons with upper secondary education in the household, and developed provincial dummies. The variable having the most significant negative impact is household size.

The OLS estimates of budget share equations are given in Table 19 and Table 20 for without and with remittance variable. As can be seen from Table 20, the coefficient for remittance dummy variable appears to be positive for expenditures on food, education, clothing, and recreation. This implies that remittances increase these expenditures by providing additional income to finance the additional spending. The coefficient of housing expenditure is also positive but it is statistically insignificant.

Table 18: Regression Analysis for Estimating Household Expenditure

Variables	Coefficients (t-stat)
Receives remittance from abroad	6416 (24.31)
Number of members over age 15 with primary education	-1017 (-7.56)
Number of members over age 15 with lower secondary education	-1039 (-5.58)
Number of members over age 15 with upper secondary education	1512 (8.2)
Number of members over age 15 with university education	-89 (-3.46)
Age of household head	4.2 (1.6)
Household size	-561 (-33.94)
Number of males over age 15	378 (9.5)
Number of females over age 15	84 (1.12)
Living in urban region	7166 (64.01)
Accumulated past savings	0.01 (50.5)
Number of children under age 10	-268 (-0.32)
P_Punjab	2064 (11.71)
P_Sindh	1774 (9.5)
P_NWFP	1459 (7.31)
Constant	12348 (56.39)

Note: Dependent variable is per capita household expenditure.

Source: Authors' estimates using ordinary least squares.

Table 19: Estimates of Budget Share Equations without Remittance Variable

	Food	Durable	Education	Medical	Housing	Clothing	Transport	Household operations	Recreation	Tobacco	Other
Reciprocal of total per capita expenditure	-228.6428	-126.1049	-1490.1290	76.3260	-700.8776	-607.0891	-123.9829	-226.0894	-165.3152	78.4702	-1007.0730
log per capital expenditure	-0.62	-0.48	-12.26**	0.54	-5.55**	-7.56**	-0.89	-1.82	-6.9**	1.21	-3.89**
Hhs size	0.0097	0.0252	0.0427	0.0016	0.0312	-0.0061	0.0405	0.0081	0.0080	-0.0049	0.0436
Hhs size / total expenditure	2.77*	10.18**	37.28**	1.22	26.26**	-8.05**	30.86**	6.92**	35.53**	-8.01**	17.83**
Age_head	0.0068	0.0012	0.0019	0.0003	-0.0005	0.0004	0.0014	0.0000	0.0000	-0.0003	0.0001
Age_head/total expenditure	11.88**	2.87*	10.01**	1.52	-2.8*	3.01**	6.52**	0.16	-1.31	-2.95**	0.19
no. of hhs members over age 15 with primary education (edu1)	564.7359	38.2540	213.6020	-3.9389	99.9222	156.6880	87.6370	26.3150	24.3500	-1.9547	137.1631
no. of hhs members over age 15 with lower secondary education (edu2)	10.89**	1.04	12.52**	-0.2	5.64**	13.9**	4.49**	1.51	7.24**	-0.22	3.77**
no. of hhs members over age 15 with upper secondary education (edu3)	0.0025	-0.0002	-0.0003	0.0001	-0.0003	0.0002	0.0003	0.0000	0.0000	0.0001	0.0001
Constant	19.21**	-2.51*	-8.04**	1.53	-6.93**	8.44**	6.38**	0.3	-1.56	4.96**	0.59
	-219.2239	5.5619	19.6715	-3.7536	10.3149	-13.3843	-22.6611	5.4639	2.3654	-5.2599	23.5534
	-41.06**	1.47	11.2**	-1.83	5.66**	-11.53**	-11.27**	3.04**	6.83**	-5.62**	6.29**
	-0.1055	0.0035	-0.0068	0.0013	-0.0015	-0.0058	-0.0152	-0.0062	-0.0003	-0.0006	0.0039
	-17.17**	0.81	-3.37**	0.57	-0.72	-4.33**	-6.55**	-3.0**	-0.63	-0.52	0.9
	-0.1004	-0.0006	-0.0070	-0.0036	0.0010	-0.0100	-0.0143	-0.0066	-0.0009	-0.0012	-0.0046
	-12.1**	-0.1	-2.56*	-1.14	0.34	-5.56**	-4.59**	-2.35*	-1.71	-0.81	-0.79
	-0.1333	-0.0064	-0.0071	-0.0117	-0.0039	-0.0129	-0.0122	-0.0124	-0.0047	-0.0020	0.0096
	-17.3**	-1.17	-2.8	-3.95**	-1.49	-7.7**	-4.21**	-4.77**	-9.42**	-1.47	1.78
	-0.0755	-0.0001	-0.0008	-0.0017	0.0007	-0.0059	-0.0086	-0.0059	-0.0001	-0.0015	0.0012
	-101.6**	-0.14	-3.36**	-5.83**	2.87*	-36.3**	-30.62**	-23.39**	-1.71	-11.16**	2.22*
edu1 / total expenditure	9946.2160	-209.9874	54.8050	36.0048	-62.4731	592.6766	1494.1460	589.3952	-6.9725	421.2028	-25.1974
edu2 / total expenditure	23.95**	-0.71	0.4	0.23	-0.44	6.56**	9.56**	4.21**	-0.26	5.79**	-0.09
edu3 / total expenditure	9676.9080	218.8503	125.0049	121.2497	-1.6357	1018.1380	1250.1560	914.9109	83.0300	315.4635	700.6795
edu4 / total expenditure	15.77**	0.5	0.62	0.51	-0.01	7.63**	5.41**	4.43**	2.09*	2.94*	1.63
Constant	12600.1100	414.5282	1015.4770	561.2921	546.2231	1517.7180	2124.4040	1421.2990	737.4856	9.5125	-8.9574
	17.32**	0.8	4.24**	2.01*	2.2*	9.6**	7.76**	5.8**	15.63**	0.07	-0.02
	6076.4200	-29.1782	-96.3030	191.9008	-47.7748	474.2205	717.4420	274.5563	-11.8664	214.3807	-94.0132
	263.5**	-1.78	-12.7**	21.67**	-6.07**	94.58**	82.64**	35.33**	-7.93**	53.08**	-5.81**
	0.2666	-0.2102	-0.3716	0.0306	-0.2558	0.1172	-0.3267	0.0510	-0.0692	0.0606	-0.0390
	8.33**	-9.25**	-35.28**	2.49*	-23.39**	16.83**	-27.1**	4.72**	-33.29**	10.81**	-1.73

* Significant at the 0.05 level; ** Significant at the 0.01 level.

Note: Figures in italics represent t-values.

Source: Authors' estimates using ordinary least squares.

Table 20: Estimates of Budget Share Equations with Remittance Variable

	Food	Durable	Education	Medical	Housing	Clothing	Transport	Hhs operations	Recreation	Tobacco	Other
Reciprocal of total percapita exp.	-294.938	-88.011	-1504.732	83.462	-701.056	-619.796	-118.076	-223.901	-165.101	85.134	-1000.827
Receives remittance from abroad (migrant=1)	-0.8	-0.34	-12.38**	0.59	-5.55**	-7.71**	-0.85	-1.8	-6.88**	1.32	-3.86**
	0.619	-0.355	0.129	-0.107	0.015	0.090	-0.013	-0.009	0.003	-0.036	-0.065
Migrant*log per capita expenditure	5.28**	-4.26**	3.34**	-2.38*	0.38	3.53**	-0.29	-0.22	0.4	-1.74	-0.78
	-0.068	0.039	-0.014	0.013	-0.002	-0.009	0.000	0.001	-0.001	0.003	0.007
	-5.57**	4.49**	-3.46**	2.8*	-0.5	-3.37**	0.01	0.15	-0.63	1.43	0.85
Ipexp	0.014	0.023	0.044	0.000	0.032	-0.006	0.041	0.008	0.008	-0.005	0.043
	3.93**	9.07**	37.41**	0.29	26.09**	-7.6**	30.74**	6.88**	35.37**	-7.75**	17.35**
Hhs size	0.007	0.001	0.002	0.000	-0.001	0.000	0.001	0.000	0.000	0.000	0.000
	12.01**	2.74*	10.0**	1.09	-2.65*	2.67*	6.86**	0.26	-1.03	-2.49*	0.14
Hhs size / total expenditure	573.708	33.094	215.605	-4.758	99.898	158.511	86.685	25.977	24.303	-2.952	136.340
	11.07**	0.9	12.64**	-0.24	5.64**	14.06**	4.44**	1.49	7.22**	-0.33	3.75**
Age_head	0.002	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000
	19.06**	-2.37*	-8.14**	1.65	-6.95**	8.37**	6.35**	0.29	-1.6	4.97**	0.62
age_head / total expenditure	-217.824	4.761	19.955	-4.038	10.363	-13.210	-22.647	5.456	2.378	-5.313	23.401
	-40.82**	1.26	11.36**	-1.97	5.68**	-11.37**	-11.26**	3.03*	6.86**	-5.68**	6.24**
no. of hhs members over age 15 with primary education (edu1)	-0.106	0.004	-0.007	0.002	-0.002	-0.006	-0.015	-0.006	0.000	-0.001	0.004
	-17.28**	0.87	-3.41**	0.65	-0.75	-4.32**	-6.61**	-3.01*	-0.68	-0.56	0.91
no. of hhs members over age 15 with lower secondary education (edu2)	-0.099	-0.001	-0.007	-0.004	0.001	-0.010	-0.014	-0.006	-0.001	-0.001	-0.005
	-11.94**	-0.24	-2.47*	-1.33	0.39	-5.58**	-4.48**	-2.32*	-1.62	-0.71	-0.82
no. of hhs members over age 15 with upper secondary education (edu3)	-0.132	-0.007	-0.007	-0.012	-0.004	-0.013	-0.012	-0.012	-0.005	-0.002	0.009
	-17.16**	-1.31	-2.7	-4.1**	-1.46	-7.68**	-4.14**	-4.75**	-9.36**	-1.43	1.75
no. of hhs members over age 15 with university education (edu4)	-0.076	0.000	-0.001	-0.002	0.001	-0.006	-0.009	-0.006	0.000	-0.001	0.001
	-101.72**	-0.15	-3.34**	-5.77**	2.84*	-36.21**	-30.71**	-23.4**	-1.76	-11.27**	2.22*
edu1 / total expenditure	9967.461	-222.100	58.926	30.669	-61.403	594.598	1495.420	589.561	-6.662	421.061	-27.664
	24.04**	-0.75	0.43	0.19	-0.43	6.59**	9.57**	4.21**	-0.25	5.79**	-0.09
edu2 / total expenditure	9580.660	273.333	108.648	158.072	-10.681	1018.357	1231.251	910.565	80.050	307.840	713.785
	15.63**	0.63	0.54	0.67	-0.05	7.64**	5.33**	4.4**	2.01*	2.87*	1.66
edu3 / total expenditure	12498.230	472.426	996.835	593.017	539.056	1512.834	2111.924	1418.760	735.233	6.184	3.809
	17.21**	0.92	4.17**	2.13*	2.17*	9.57**	7.72**	5.79**	15.58**	0.05	0.01
edu4 / total expenditure	6071.092	-26.124	-97.432	192.721	-47.871	473.373	717.661	274.662	-11.880	214.755	-93.474
	263.4**	-1.6	-12.84**	21.78**	-6.07**	94.36**	82.62**	35.31**	-7.93**	53.15**	-5.77**
Constant	0.228	-0.188	-0.379	0.042	-0.258	0.115	-0.331	0.050	-0.070	0.060	-0.034
	7.03**	-8.17**	-35.45**	3.37**	-23.28**	16.28**	-27.06**	4.58**	-33.18**	10.5**	-1.5

* Significant at the 0.05 level; ** Significant at the 0.01 level.

Note: Figures in italics represent t-values;

Source: Authors' estimates using ordinary least squares.

Table 21: Poverty and Inequality Indicators for Migrant and Nonmigrant Households

	Without Remittances (A)	With Remittances (B)	Percentage Change (B/A)
Headcount Ratio	0.2499	0.2305	-7.8
Poverty Gap	0.1266	0.1121	-11.5
Poverty Severity	0.0855	0.0728	-14.9
Gini Coefficient	0.4470	0.4256	-4.8

Source: Authors' estimates using ordinary least squares.

To examine the impact of remittances on poverty and inequality, Table 21 shows the poverty estimates for both migrant and nonmigrant households. The results suggest that poverty declines by 7.8% if the households receive remittances from abroad. This substantial reduction in poverty level signifies the importance of remittances received by households in Pakistan. Similarly the poverty gap and poverty severity also decline even by higher rates, i.e., 11.5% and 14.9%, respectively. This implies that some of the remittance recipients are actually the poor households so that remittances reduce the poverty gap and poverty severity. Moreover, the income distribution of migrant households is actually better than nonmigrant households. The Gini coefficient of migrant household is 4.8% lower than nonmigrant households.

IV. Key Findings and Policy Implications

With around two million Pakistani migrants in the Gulf region and almost the same number spread in North America, UK, and other countries, remittances from abroad have contributed significantly to the economy. The current contribution of foreign remittances is more than 4% of GDP, and in some periods, they have become the major source of foreign exchange reserves. This paper examines the impact of remittances on the macro economy and household welfare in Pakistan using a CGE model and microeconomic analysis. The first approach is to highlight the macroeconomic and distributional effects of a reduction in remittances, while the second method is to show how remittances decrease the probability of being poor and affect the household consumption expenditure and hence poverty. The key findings are as follows:

- (i) Descriptive analysis from survey data indicates that the mean income of a migrant household is 17.3% higher than a nonmigrant household. The share of remittances in the total income increases as the household moves to a higher income group. Remittances also contribute more to rural household incomes than to urban household incomes. The share of remittances in rural households increased from 3% to 5% during 2002–2006, while in urban areas it remained stable at around 4%. Regional characteristics also affect significantly the pattern of migration and therefore the flows of remittances in Pakistan.

- (ii) The CGE simulation analysis shows that a 50% reduction in remittances adversely impacts real GDP growth by -0.74 , real investment by -7.7% , and total household consumption by -2.8% . As a result, poverty headcount increases by 6.35%. The reductions in consumption levels of rural nonfarm and landless agricultural households show the largest cut because of the remittance drop.¹⁰ The poverty impact is much stronger in rural than urban areas, showing the stronger link between migration/remittance and poverty in rural compared to urban areas. This further highlights that many migrants from Pakistan are still low-skilled workers coming from agricultural backgrounds.
- (iii) Results from the logit model show that the probability of becoming poor declines by 12.7% if the household receives remittances from abroad.¹¹ An increase in the household size and number of persons with secondary education leads to an increase in the probability of household member migrating. On the other hand, increasing the number of males over 15 years of age, living in urban areas, and having more household members with university education lead to a decrease in the probability of the household member going abroad. This in line with earlier studies showing that the middle class tends not to migrate (see Adams 1991 and 1998).
- (iv) The shares of household expenditures on food, education, clothing, and recreation increase with the availability of remittances. The predicted mean expenditure of migrant households is 41% higher than nonmigrant households. The highest increase is in the expenditure share on durables, i.e., 74%. The budget share for education increases only by 2.9% for migrant households.
- (v) The poverty headcount ratio and Gini coefficient decline by 7.8% and 4.8%, respectively, for households receiving remittances.

Due to the global financial crisis, developing countries such as Pakistan have witnessed a brief reverse migration following the laying off of workers abroad due to business closures and a general lack of demand. Pakistani overseas workers have returned home with their accumulated savings that increased remittance flows. The increase during 2008–2009 will soon diminish as the rate of returning migrants declines.

¹⁰ To further highlight this result we may add here that there are studies for Pakistan suggesting that workers moving abroad in particular to the Persian Gulf usually are from poor and financially weak background and areas that lack irrigation facilities such as the North West Frontier Province. See Azam (1991), Addleton (1992) and Katseli et al. (2006).

¹¹ For Pakistan's case Siddiqui and Kemal (2006) also show how a decline in remittances can have adverse impacts on poverty. Furthermore the decline in remittances can also reduce the economic gains from trade liberalization. See also Nishat and Bilgrami (1991), Kazi (1989), Arif (1999), Burki (1991), Nadeem (1988), Amjad (1986), Iqbal and Sattar (2005), Gilani et al. (1981), Alderman (1996), Ahmed (1986), Sohail and Sarwar (1993), Sofranko and Idris (1999).

The challenge for Pakistan is to channel the remittance flows toward long-term investments that can contribute toward sustained growth in the real sector, while at the same time leveraging the economy away from consumption-led growth.¹² In this regard, several key measures that have been seen across the developing world have also been considered for Pakistan.

First, it is suggested that fiscal incentives may be provided to the returning migrants who wish to set up small- and/or medium-scale businesses. These may take the form of tax breaks or other related initial concessions. Second, to ensure future remittance cash flows, a special exchange rate may be offered on remittances arriving in special savings accounts in domestic financial institutions. Third, the banking sector should be more proactive to increase the speed and certainty of remittance transactions to encourage more migrants to send their money through official banking channels. This will help the development of the financial sector in the economy and contribute to the stability of macroeconomic fundamentals, in particular the balance of payments.

It is also a challenge for the government to make remittances more redistributive by making the tax system more progressive to help low-income households. It is important to note however that the tax structure related to remittances should provide incentives for migrants to send more through the formal channels. This may require amendments to the current Income Tax Ordinance.¹³

¹² See Azam (2005) for the desired public policies for supporting international migration in Pakistan. See also ILO/ARTEP (1984, 1986, 1987).

¹³ For a detailed analysis on the redistribution aspect of Pakistan's income taxation system, see Ahmed and O'Donoghue (2009b).

Appendix

Appendix Table 1: Number of Pakistanis Working Abroad by Destination, 1971–2004

Destination	1971– 2000	2001	2002	2003	2004	Total
1 United Arab Emirates ¹	626705	18421	34113	61329	65786	806354
2 Algeria	708	8	5	0	4	725
3 Angola	66	2	2	0	0	70
4 Bahrain	65987	1173	1022	809	855	69846
5 Brunei Darussalam	192	174	41	78	107	592
6 Gabon	287	2	0	2	0	291
7 Gen-Island	195	0	0	0	0	195
8 Greece	428	0	2	8	6	444
9 Guinea	60	1	0	17	30	108
10 Hong Kong, China	97	10	7	13	6	133
11 Iran	12544	2	1	5	12	12564
12 Iraq	68132	1	0	0	0	68133
13 Jordan	4367	189	39	61	140	4796
14 Kenya	33	0	0	2	7	42
15 Kuwait	106307	440	3204	12087	18498	140536
16 Libya	63701	713	781	1374	375	66944
17 Lebanon	359	1	0	1	0	361
18 Malaysia	1993	64	59	114	65	2295
19 Nigeria	2019	16	21	66	14	2136
20 Oman	212131	3802	95	6911	8982	231921
21 Qatar	50481	1633	480	367	2383	55344
22 Saudi Arabia	1648279	97262	104783	126397	70896	2047617
23 Siera Leone	124	0	0	0	0	124
24 Sudan	668	37	128	27	93	953
25 Singapore	113	9	14	5	3	144
26 Somalia	59	1	3	0	2	65
27 Spain	159	362	389	202	254	1366
28 Tanzania	342	8	3	45	53	451
29 Tunisia	25	0	0	0	0	25
30 Uganda	303	0	0	0	1	304
31 United Kingdom	1059	800	703	858	1419	4839
32 United States	802	788	310	140	130	2170
33 Yemen	3796	25	73	85	157	4136
34 West Africa	307	0	0	0	0	307
35 South Africa	24	3	8	59	7	101
36 Zambia	834	5	2	1	0	842
37 Japan	91	24	10	12	12	149
38 Korea	3634	271	564	2144	2474	9087
39 Croatia	44	0	0	0	0	44
40 Turkmenistan	493	216	4	214	16	943
41 Cyprus	140	17	31	22	40	250
42 Turkey	149	3	3	1	0	156
43 People's Republic of China	137	4	8	1	3	153
44 Cameroon	41	1	2	0	0	44
45 Morocco	38	0	0	0	0	38
46 Italy	405	824	48	128	581	1986
47 Sweden	46	2	0	0	8	56
48 Switzerland	18	8	3	5	4	38

Continued.

Appendix Table 1 *continued.*

Destination		1971– 2000	2001	2002	2003	2004	Total
49	Syria	217	20	2	6	5	250
50	Germany	77	23	5	42	8	155
51	Azerbaijan	3	1	0	5	7	16
52	Other	2798	563	454	396	381	4592
Total		2882017	127929	147422	214039	173824	3545231

¹See Stahl and Farooq-i-Azam (1990) on challenges in getting a reliable count of Pakistanis in Middle East.

Source: Bureau of Emigration and Overseas Employment.

Appendix Table 2: Number of Pakistanis Working Abroad by Skill, 1971–2004

Year	Highly Qualified	Highly Skilled	Skilled	Semi-Skilled	Unskilled	Total
1971	163	892	1499	973	7	3534
1972	782	904	1860	670	314	4530
1973	916	954	3408	26	6996	12300
1974	954	582	3992	275	10525	16328
1975	985	569	8848	460	12215	23077
1976	835	1529	15087	792	23447	41690
1977	2570	4413	51845	4666	76951	140445
1978	2155	5903	53805	3830	63840	129533
1979	1527	5245	49756	3103	58628	118259
1980	1729	4041	47569	2191	62867	118397
1981	2467	6984	60503	2707	80420	153081
1982	2190	7449	60748	3065	64083	137535
1983	2123	6473	58042	3648	49745	120031
1984	1427	4527	42005	2695	42886	93540
1985	968	4259	37244	2736	37126	82333
1986	717	3787	25225	1802	26471	58002
1987	796	3558	27294	1985	32553	66186
1988	743	4739	36276	2542	37245	81545
1989	925	6095	44483	2979	41381	95863
1990	1115	6834	52895	3602	49335	113781
1991	1308	7752	67215	4662	61881	142818
1992	2293	11653	93795	5113	78652	191506
1993	1908	10105	77820	4070	60626	154529
1994	1328	6916	58197	2921	41574	110936
1995	1292	7681	61177	3317	43581	117048
1996	1794	10168	59816	5385	42466	119629
1997	1669	9292	76599	3616	57853	149029
1998	2024	8230	50122	1925	38405	100706
1999	2699	13860	31678	1118	28738	78093
2000	2999	10292	54110	2125	38207	107733
2001	3155	10846	64098	2768	47062	127929
2002	2618	14778	74968	3236	51822	147422
2003	2719	22152	101713	4601	82854	214039
2004	3291	15557	77033	3840	74103	173824
Total	57184	239019	1630725	93444	1524859	3545231

Source: Bureau of Emigration and Overseas Employment.

Appendix Table 3: Variables and Equations in the Computable General Equilibrium Model

Endogenous Variables	
X	Output
VA	Value-added
USL	Unskilled labor
WK	Unskilled workers
FR	Unskilled farmers
SL	Skilled labor
K	Capital
LW	Land
CI	Intermediate input
Mat	Interindustry matrix
D	Domestic demand
E	Exports
Q	Composite demand
M	Imports
CT	Total consumption of households
CH	Commodity consumption of households
INV	Investment demand by origin
IND	Demand for capital by destination
INTD	Intermediate demand
GC	Sectoral real government consumption
GT	Nominal total government consumption
TINV	Nominal total investment
TINV_R	Real total investment
YSL	Income from skilled labor
YLWK	Income from unskilled workers
YLFR	Income from farmers
YLW	Land income
YK	Capital income
YH	Household income
DYH	Disposable income
YF	Firm income
YG	Government revenue
TMREV	Tariff revenue
DTXREV	Direct tax revenue
ITXREV	Indirect tax revenue
SAVH	Household savings
SAVF	Firm savings
SAVG	Government savings
Er	Nominal exchange rate
PI	Local prices
wsk	Wage for skilled labor
wusk	Average wage for unskilled labor
wfr	Wage for farm labor
wwk	Wage for workers
rlwag	Return to land
Pm	Import price
Pe	Export price
Pq	Composite price of commodity
Px	Output price
Pd	Domestic price
Pva	Value-added price
R	Return to capital
Pinv	Price of investment
u	User cost of capital

Continued.

Appendix Table 3 *continued.*

Exogenous Variables	
Pindex	Weighted value-added price
Pwm	World import prices
Pwe	World export prices
ir	Real interest rate
dep	Depreciation rate
DIV_H	Total dividend income of households
TRGOVH	Government transfers to households
YFOR	Foreign income of households
GRANT_FOR	Foreign grant to government
PAYGV_FOR	Debt service payment of government
DIV_FOR	Dividends paid to foreigners
CAB	Foreign savings
dtxrh	Income tax rate for households
dtxrf	Income tax rate for firms
itxr	Indirect tax rates
tm	Tariff rate
SLS	Supply of skilled labor
WKS	Supply of workers
FRS	Supply of farm labor

Main Equations

$$1. X_j = \min \left[\frac{Cj_j}{io_j}, \frac{VA_j}{v_j} \right]$$

$$2. VA_{ag} = \kappa \cdot \left(\omega_{usk} \cdot USL^{-\rho_{va}} + \omega_k \cdot K^{-\rho_{va}} + \omega_{lw} \cdot LW^{-\rho_{va}} \right)^{\frac{-1}{\rho_{va}}}$$

$$3. VA_{nag} = \kappa \cdot \left(\omega_{sk} \cdot SL^{-\rho_{va}} + \omega_{usk} \cdot USL^{-\rho_{va}} + \omega_k \cdot K^{-\rho_{va}} \right)^{\frac{-1}{\rho_{va}}}$$

$$4. SL = VA_{nag} \cdot \left(\frac{Pva \cdot \omega_{sk}}{w_{sk} \cdot k^{\rho_{va}}} \right)^{\frac{1}{1+\rho_{va}}}$$

$$5. USL = VA_{ag} \cdot \left(\frac{Pva \cdot \omega_{usk}}{w_{usk} \cdot k^{\rho_{va}}} \right)^{\frac{1}{1+\rho_{va}}}$$

$$6. USL = \kappa_{ust} \cdot \left(\omega_{wk} \cdot WK^{-\rho_{ust}} + \omega_{fr} \cdot FR^{-\rho_{ust}} \right)^{\frac{-1}{\rho_{ust}}}$$

$$7. FR = USL \cdot \left(\frac{w_{usk} \cdot \omega_{fr}}{w_{fr} \cdot k^{\rho_{ust}}} \right)^{\frac{1}{1+\rho_{ust}}}$$

$$8. LW = VA_{ag} \cdot \left(\frac{pva \cdot \omega_{lw}}{rlw_{ag} \cdot k^{\rho_{va}}} \right)^{\frac{1}{1+\rho_{va}}}$$

$$9. Cl_j = io_{ij} \cdot X_j$$

$$10. mat_{ij} = aij_{ij} \cdot Cl_j$$

$$11. Ct_h = Dyh_h - Savh_h$$

$$12. C_h = C_{\min,h} + \frac{\alpha}{Pq} (Ct_h - \sum pq \cdot C_{\min,h})$$

$$13. INTD = \sum mat_{ij}$$

$$14. INV = \tau \cdot \frac{TINV}{Pq}$$

$$15. TINV = TINVR * Pinv$$

$$16. TINVR = \sum IND$$

$$17. \frac{IND}{K} = \lambda \left(\frac{r}{u} \right)^2$$

$$18. GC = v \cdot \frac{GT.Pindex}{Pq}$$

$$19. YSL = \sum w_{sk} \cdot SL$$

$$20. YLFR = \sum w_{fr} \cdot FR$$

$$21. YLWK = \sum w_{wk} \cdot WK$$

$$22. YK = \sum r \cdot K$$

$$23. YLW = \sum rlw \cdot LW$$

$$YH = YSL \cdot Sh_SL + YLFR \cdot Sh_FR + YLWK \cdot Sh_WK + YK \cdot Sh_K + YLW \cdot Sh_LW + DIV_H \cdot Sh_DINV \cdot Pindex + TRGOVH \cdot Pindex +$$

$$24. YFOR \cdot Sh_YFOR \cdot er$$

$$25. DYH = YH (1 - dtxrh)$$

$$26. YF = YK \cdot (shf_K) \cdot (1 - dtxrf)$$

$$27. TMREV = \sum tm \cdot M \cdot er \cdot Pwm$$

$$28. DTXREV = \sum dtxrh \cdot YH + \sum YK \cdot (Shf_K) \cdot (dtxrf)$$

$$29. ITXREV = \sum itxr.D.PI + \sum itxr.M.er.Pwm.(1+tm)$$

$$30. YG = TMREV + DTXREV + ITXREV + YLW.Shg_LW$$

$$31. SAVH = aps.DYH$$

$$32. SAVF = YF - DIV_H.Pindex - er.DIV_FOR$$

$$33. SAVG = YG - GT.Pindex - \sum TRGOVH.Pindex - er.PAYGV_FOR$$

$$34. X = \mu.(\theta.E^{\rho_e} + (1-\theta).D^{\rho_e})^{\frac{1}{\rho_e}}$$

$$35. E = D. \left[\frac{Pe}{PI} \cdot \frac{1-\theta}{\theta} \right]^{\sigma_e}$$

$$36. Q = \xi.(\delta.M^{-\rho_m} + (1-\delta).D^{-\rho_m})^{\frac{-1}{\rho_m}}$$

$$37. M = D. \left[\frac{Pd}{Pm} \cdot \frac{1-\delta}{\delta} \right]^{\sigma_m}$$

$$38. CAB = \sum Pwm.M + DIV_FOR + PAYGV_FOR - \sum Pwe.E - \sum YFOR - GRANT_FOR$$

$$39. Pm = Pwm.er.(1+tm).(1+itxr)$$

$$40. Pe = Pwe.er$$

$$41. Pq.Q = Pd.D + Pm.M$$

$$42. Px.X = PI.D + Pe.E$$

$$43. Pd = PI.(1+itxr)$$

$$44. Pva = \frac{Px.X - \sum mat_{ij}.pq}{VA}$$

$$45. Pinv = \prod \left(\frac{Pq}{\tau} \right)^{\tau}$$

$$46. Pindex = \sum w_va.Pva$$

$$47. r_{ag}.K = Pva.VA_{ag} - W_{uskl}.USL - rlw_{ag}.LN$$

$$48. r_{nag}.K = pva.VA_{nag} - w_{sk}.SL - w_{uskl}.USL$$

$$49. w_{usk} \cdot USL = w_{fr} \cdot FR + w_{wk} \cdot WK$$

$$50. u = Pinv \cdot (ir + dep)$$

$$51. Q = INTD + \sum C_h + GC$$

$$52. TINV = \sum SAVH + SAVF + SAVG + CAB.er$$

$$53. SLS = \sum SL$$

$$54. FRS = \sum FR$$

$$55. WKS = \sum WK$$

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About the Paper

Vaqar Ahmed, Guntur Sugiyarto, and Shikha Jha examine the impact of remittances on economy and household welfare in Pakistan using a general equilibrium framework and microeconomic analysis to, respectively, show the macroeconomic and sectoral effects of a reduction in remittances; and how remittances decrease the probability of being poor and affect household consumption, hence poverty status. The findings suggest that a reduction in remittances will reduce gross domestic product, investment, and household consumption, which in turn will increase poverty. On the other hand, the probability of households becoming poor decreases by 12.7%; and the poverty headcount ratio and Gini coefficient decline by 7.8% and 4.8%, respectively, if the households receive remittances. This important role of remittance calls for the government to provide incentives to attract more remittances and increase their productive use.

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