

# *The Pakistan Development Review*

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## ABSTRACTS

1. **M. Idrees Khawaja and Musleh-ud Din.** Instrument of Managing Exchange Market Pressure: Money Supply or Interest Rate. 381–394.

The magnitude of exchange market pressure has ramifications for the overall economy. Countries use instruments ranging from quantitative controls on movement of foreign currency to variation in the level of money supply or interest rate to keep the exchange market pressure within a certain desired band. Each instrument has different implications for the economy. Using the sum of exchange rate depreciation and foreign reserves outflow as a measure of exchange market pressure, the study seeks to investigate whether the authorities in Pakistan use interest rate or domestic credit for managing the level of exchange market pressure. Evidence from the Granger causality test suggests that during active life of foreign currency deposits (FCDs), interest rate has been used to manage exchange market pressure. However, the instrument changed to domestic credit with the freeze on FCDs in May 1998. Use of domestic credit to manage the exchange market pressure continued in the post 9/11 period. By and large, evidence shows that money supply is mainly used manage exchange market pressure.

*JEL classification:* E51, E52, F31

*Keywords:* Exchange Market Pressure, Monetary Policy

2. **Ahsan ul Haq Satti, Wasim Shahid Malik, and Ghulam Saghir.** New Keynesian Phillips Curve for Pakistan. 395–404.

Following Gali and Gertler (1999), we have estimated the New Keynesian Phillips Curve (NKPC) for Pakistan over the period 1976–2006. The results indicate significance of the forward-looking component in determining inflation along with the fact that real marginal cost, and not output gap, is the driving force of inflation. Results of Hybrid NKPC show that inflation does not possess backward inertia; rather it is dominated by forward-looking behaviour. Along with these results, the degree of price stickiness in Pakistan is found to be very high, while the fraction of firms using the backward-looking rule in price setting is quite low.

*JEL classification:* E12, E31

*Keywords:* Forward-looking, Real Marginal Cost, Hybrid New Keynesian Phillips Curve

3. **Zohra Jabeen and Mohammad Tariq Javed.** Sukuk-Structures: An Analysis of Risk-reward Sharing and Wealth Circulation. 405–419.

As Islamic business and finance flourishes, considerable progress is made in developing powerful and effective products that are practical as well as Sharia-compliant. *Sukuk* appears to be one of such products. Its issuance is a relatively new trend since it dawned on the global scene in 2002. The development of hybrid products is widespread in finance. The derivative securities' phenomenon and the process of disintermediation in the conventional (capitalist) financial system have a bearing on product development, worldwide. *Sukuk* too appears to be one such hybrid product. This paper attempts to discuss the *sukuk* dynamics, as a product of Islamic finance by examining its features and underlying structure, with the baseline of Sharia permissibility. By examining who the investors in *sukuk* should be, it attempts to re-align the *sukuk* structures with their purpose specified according to the AAOIFI Sharia standards. A sample from the current *sukuk* structures is tested by a basic two-question criteria; first, the risk- and reward-sharing, and second, wealth concentration or circulation. The analysis also includes the vital impact of risk-return sharing pattern on economic growth.

*Keywords:* Sukuk, Islamic Finance, Securitisation, Risk and Reward Sharing, Wealth Circulation

**4. Muhammad Faisal Rizwan and Safi-ullah Khan.** Long-run Performance of Public vs. Private Sector Initial Public Offerings in Pakistan. 421–433.

This paper examines the long- and the short-run share price performance of industrial initial public offerings (IPOs) for Pakistan's market for the period from 2000 to 2006. In particular, it compares the stock price behaviour of privatisation IPOs and private sector IPOs in Pakistan. By analysing a sample of 35 industrial IPOs, it can be concluded that IPOs tend to outperform the market with a positive initial market-adjusted return of 36.48 percent. This initial under-pricing is consistent with the previous empirical studies on IPOs, which consistently find the IPO's excess returns in the short-run. The 2-year long-run aftermarket performance of all issues is negative (–23.68 percent), while it is not only positive (12.69 percent) but also very large for privatisation IPOs when compared to the private sector IPOs (–33.11 percent), even as both the values are not statistically significant. The long-run performance of the public sector IPOs has been remarkably better than the private sector IPOs in Pakistan's market.

*JEL classification:* G18, G24, G38, K22, O16

*Keywords:* Long-run Performance, IPOs, Stock Price Behaviour, Stock Returns, Underpricing, Privatisation Policy, Public Sector Enterprises

**5. Mahmood Khalid, Wasim Shahid Malik, and Abdul Sattar.** The Fiscal Reaction Function and the Transmission Mechanism for Pakistan. 435–447.

In developing economies such as Pakistan the fiscal transmission mechanism needs to be identified, as active fiscal policy is practised and large seigniorage revenues exist. In this context, the present study aims at estimating the fiscal policy reaction function and identifying the fiscal policy transmission mechanism. More specifically, the Vector Autoregression (VAR) model, containing three variables (output gap and inflation as policy objectives and fiscal deficit as a percentage of GDP), has been estimated as a fiscal instrument. We find evidence of fiscal policy in Pakistan being endogenous over the period 1965 to 2006. Although the response to both the variables is significant, we find only pro-cyclical response of fiscal policy to the business cycle fluctuations specifically in the periods of boom. The effect of fiscal policy changes on output and inflation is not significant. We also find the evidence of contemporaneous response of policy to the state of the economy, but the policy is not forward-looking at all.

*JEL classification:* H11, H30

*Keywords:* Fiscal Reaction Function, Fiscal Transmission Mechanism, VAR

**6. Attiya Y. Javid and Robina Iqbal.** External Financial Resource Management by Listed Pakistani Firms. 449–464.

The purpose of this study is to assess the ability of firms to raise external finance through equity, when the firms have different characteristics, have adopted different levels of corporate governance, and are doing business in a weak legal environment. Our empirical analyses also identify the determinants of corporate governance practice and corporate valuation. To investigate these issues, we use firm-level data of 50 corporations listed on Karachi Stock Exchange for the period 2002 to 2007. The results reveal that the firms that need more equity financing practise good governance. The firm-specific factors (size, investment opportunities) matter more in influencing the need of external financing when the legal environment is less investor-friendly. Good investment opportunities and large size provide greater incentive to improve governance practices among firms in Pakistan. The positive association of the corporate governance index and disclosure scores with firm performance suggests that even the firms with poor legal environment can enjoy high valuation if they adopt good governance and disclosure practices. Ownership concentration appeared to be a more important tool to resolve agency conflict between controlling and minority shareholders in the case of Pakistan, where investor protection is weak. These findings suggest that pro-growth policies generate more profitable investment opportunities and stimulate the external financing needs of the corporations.

*JEL classification:* E50, G21, G24, G32

*Keywords:* External Finance, Corporate Governance, Disclosure and Transparency, Ownership Concentration, Tobin Q, Firm Size, Leverage, Rule of Law, Investment Opportunities

7. **S. M. Amir Shah.** Corporate Debt Policy—Pre- and Post-financial Market Reforms: The Case of the Textile Industry of Pakistan. 465–478.

This study investigates the effect of the pre- and post-financial market reforms on corporate debt policy and explores the evidences for the static trade-off theory and the pecking order theory in financing decisions of the textile sector of Pakistan. The analysis shows that reforms have a statistically significant effect on debt policy of the textile industry. However, during the total period under analysis, the industry remained under the same average debt burden of 82 percent of its assets. High operating expenses and cost of goods are associated reasons of financial distress. To capture the firm-specific effect, the fixed-effect model has been used. The evidences of firm-specific effects on the use of debt exist. Analysis gives no support to the trade-off theory for the textile sector of Pakistan. However, there is some support for the pecking order theory.

*JEL classification:* L53

8. **Muhammad Arshad Khan and Abdul Qayyum.** Dynamic Modelling of Energy and Growth in South Asia. 481–498.

This study empirically examines the link between real GDP, energy consumption, capital, and labour for four South Asian countries including Bangladesh, India, Pakistan, and Sri Lanka over the period 1972–2004. Applying the bound testing approach to cointegration, we find a strong cointegration between real GDP, energy consumption, capital, and labour for each country. The study mainly focuses on the role played by energy in enhancing productivity in the South Asian region. Based on unrestricted error-correction modelling procedure, we find supportive evidence of long-run as well as short-run causality running from energy consumption to real GDP for each country. These findings suggest that the economies of South Asia are energy-dependent economies. Hence, policies of energy conservation may be formulated in such a way that these policies would not produce adverse effects on economic growth in the region.

*JEL classification:* Q43, C52, R19

*Keywords:* Energy Consumption, Economic Growth, Bound Test, South Asia

9. **Adeel Ghayur.** Decube Framework: An Introduction to a New Energy Modelling and Planning Process for Sustainable Utilisation of Pakistan's Energy Resources. 499–515.

Sustainable utilisation of energy resources is a profound challenge confronting policy-makers in the twenty-first century. Policy development does not relate to the provision of affordable energy alone; equally important and challenging is the need to address the issue of climate change. Meeting this twin challenge timely and effectively is crucial to keeping a country on track for sustainable development and progress. To undertake such a challenging task, the decision-makers have started utilising different tools and methods. Termed as Energy Models, these are usually mathematical models used for scenario development and energy forecasting. However, the energy modelling and planning process also encompasses other aspects such as energy resource planning and policy planning. In this paper, we propose a new energy modelling process, namely the Decube Framework. This framework encompasses the entire process from initial energy scenario modelling to the development of an energy action plan. The other attraction of the framework lies in the fact that it is specifically designed for a developing country like Pakistan.

10. **Toseef Azid, Mumtaz Anwar, and Muhammad Junaid Khawaja.** Management of Energy Resources, Marginal Input-Output Coefficients, and Layers of Techniques: A Case Study of US Chemical Industry. 517–536.

This study examines the behaviour of different layers of techniques which are working simultaneously with the different productive efficiencies based on the model which was developed by Professor P. N. Mathur. Considering this phenomenon as input-output table was constructed based on the marginal input-output coefficients instead of an average one, which is available in different publications of the government. Each marginal coefficient represents the behaviour of a separate layer of techniques. Some forecasting is developed

on the basis of these coefficients. With the help of these coefficients, it is easy to know how many resources are required for the new techniques and how many resources are becoming unemployed.

*JEL classification:* C67, O32, Q43

*Keywords:* Marginal Input-Output Coefficients, Technological Change, Energy, Layers of Techniques

**11. Zahid Asghar and Ayesha Nazuk.** Iran-Pakistan-India Gas Pipeline—An Economic Analysis in a Game Theoretic Framework. 537–550.

In this paper we analyse the so-called Iran-Pakistan-India (IPI) gas pipeline in a game theoretic framework. The paper develops models for cooperative and non-cooperative strategies of Iran, Pakistan, and India. It also analyses the expected profits and the prices for the three players. The importance of IPI gas pipeline has also been highlighted for the economic development of the each country involved in this project. The IPI gas pipeline is called peace pipeline in the jargon of political language. We have discussed this mainly in the economic perspective and not as a geo-political scenario; implicit players like the USA are not included in our model.

*JEL classification:* C70, C71, C72, C78, O13

*Keywords:* IPI Gas pipeline, Game Theory, Cooperative Strategy, Non-cooperative Strategy

**12. Afia Malik.** How Pakistan Is Coping with the Challenge of High Oil Prices. 551–575.

The paper is a review of possible consequences and challenges presented by high oil prices in Pakistan. Pakistan is heavily dependent on imported fuels, and this dependence is expected to increase even further in future, given the depleting gas resources. The rising oil price in the international market has had affected the balance of payment position negatively, contributed to inflationary pressures, and weakened the budgetary position of the country. The government should chalk out strategies for ensuring efficiency in the use, development, adequacy, and reliability of supply. Unless appropriate steps are taken, this trend of rising oil prices will further aggravate the negative impacts on the economy.

*JEL classification:* E31, E52, E62, L43, L71

*Keywords:* Oil, Prices, Deregulation, Pakistan, Macroeconomy

**13. Seeme Mallick.** Sustainable Income, Employment, and Income Distribution in Indonesia. 579–596.

In this paper sustainable income of Indonesia is estimated by incorporating environmental capital depreciation allowance. The natural resources of Indonesia are valued as capital asset, and a depreciation allowance for its maintenance is estimated and incorporated into a Keynesian model of income determination for estimating sustainable income. The aim is to analyse the possibilities of achieving both sustainability and full employment in the economy. To explore the linkages between environmental depreciation, income distribution, and employment, Gini Coefficient and Lorenz Curve are applied to this analysis. Policy options based on income distributional impact of environmental capital depreciation allowance are discussed in detail.

*JEL classification:* Q, Q5, Q56

*Keywords:* Asia, Indonesia, Sustainable Development, Income Distribution, Environmental Capital Depreciation Allowance, Gini Coefficient, Energy Consumption

**14. Safdar Ullah Khan and Omar Farooq Saqib.** An Analysis of Pakistan's Vulnerability to Economic Crisis. 597–610.

The objective of this study is to analyse the vulnerability of Pakistan's economy to crisis by evaluating the sustainability of its external and fiscal positions in the recent past. Following the emergence of current account deficits and fiscal imbalances in the last two fiscal years, scepticism about the sustainability of these fundamentals has grown. Therefore, this study uses Masson's (1999) model of contagion to find the degree of susceptibility of Pakistan's economy to crisis through assessing its external position, and Bohn's (1998) fiscal sustainability regressions to evaluate its fiscal position. Our findings are that the Pakistani fundamentals do not

present an adverse scenario as its external balances signal low probability of crisis and its fiscal balances have remained sustainable both in the long run and in the recent past.

*JEL classification:* F31, F41, H60

*Keywords:* Currency Crisis, Vulnerability, External Balances, Fiscal Balances

**15. Waqqas Qayyum.** Causes of Youth Unemployment in Pakistan. 611–621.

Youth unemployment is increasing in less developed as well as developed nations. The disruption caused as a result has some serious repercussion for the less developed countries, which seriously lack initiatives to invest in human capital. This paper focuses on causes of increasing youth unemployment in Pakistan. Data collected from Labour Force Survey 2003-2004, for the age group 15–29, has been made. Various trends are extracted regarding youth unemployment on account of categorical assessment (demographic, educational, and personal). The results are in stark contrast to the general perception for the educated youth, particularly the intensity of unemployment among educated youth in Pakistan and the severity of unemployment in its urban areas, while the provincial governments are apathetic about combating unemployment.

*JEL classification:* C25, E24, J64

*Keywords:* Youth Unemployment, Pakistan, Educational Levels, Structural Mismatch of Skills, Discrimination

**16. Raza Ali Khan.** Understanding Poverty through the Eyes of Low-salaried Government Employees: A Case Study of the NED University of Engineering and Technology. 623–641.

Poverty is a huge, complex and confusing term. We explore this problem from the realities, experiences, and perspective of low-salaried government employees. The main purpose of this study is to provide a detailed account of the living conditions of low-salaried government employees (BPS 1–5) working in the NED University of Engineering and Technology Karachi *vis-à-vis* the increasing cost of living and deteriorating real incomes. The study also examines the major causes of poverty among low-salaried government employees and also determines their perception of poverty. The study finds that poverty is a multi-dimensional phenomenon; the perception of poverty and its causes vary from person-to-person and group-to-group.

*Keywords:* Understanding, Poverty, Scale (BPS 1–5)

**17. Usman Azhar, Samina Khalil, and Mohsin Hasnain Ahmed.** Environmental Effects of Trade Liberalisation: A Case Study of Pakistan. 645–655.

This paper examines the empirical investigation of the impact of trade openness on air and water pollution in Pakistan. The Johansen cointegration method and error-correction model technique have been used in order to examine the long-run and the short-run dynamics of system respectively. The findings indicate that long-run coefficients of trade intensity and scale effect are significantly related to air and water pollution. Thus, the scale effects of trade liberalisation are detrimental to the environment. While the composition and technique effect negatively related to pollution. Overall, the findings suggest that to maximise the gains from liberalisation, and to achieve a sustainable and high-quality growth path, Pakistan must minimise the environmental costs associated with its industrial development. It is important to recognise that even if the composition effect is held constant, the scale effect induced by growth implies an increase in output and an increase in total industrial pollution. To keep the scale effect in check, the pollution intensity of industrial activity must be decreased. This is possible through the transfer of cleaner technology if sectoral pollution is a function of the vintage of technology, and through the enforcement of environmental regulation where pollution depends on end-of-pipe treatment, as in the paper, leather and textiles industries.

*JEL classification:* F13, Q17, Q53, C22

*Keywords:* Trade Openness, Johansen Cointegration, Air and Water Population, Environmental Degradation

- 18. Muhammad Shahbaz, Naveed Aamir, and Muhammad Sabihuddin Butt.** Rural-Urban Income Inequality under Financial Development and Trade Openness in Pakistan: The Econometric Evidence. 657–672.

Pakistan is a developing economy, which has adopted a Structural Adjustment Programme (SAP) in the form of economic reforms initiated in early 1990s. The objective of such reforms was to improve the welfare of society but these reforms did not lead to improvement in all sections of the economy. The present paper explores the understanding between financial deepening, trade-openness, and rural-urban income inequality in Pakistan. We utilised DF-GLS and Ng-Perron to examine the order integration and modified ARDL co-integration along with the Johanson Technique for robustness of long-run association between the said actors. Our empirical analysis suggests that improvements in financial performance decline the rural-urban income inequality in the case of Pakistan. In contrast, economic growth widens the rural-urban income gap in the long span of time. Openness in foreign capital and trade worsen rural-urban earnings situation in Pakistan. Finally, low inflation is associated with a high rural-urban income gap in the country.

*JEL classification:* F43, D30, C4

*Keywords:* Finance, Inequality, ARDL Co-integration

- 19. Faiz-Ur-Rehman, Amanat Ali, and Mohammad Nasir.** Corruption, Trade Openness, and Environmental Quality: A Panel Data Analysis of Selected South Asian Countries. 673–688.

Globalisation has increased the importance of trade manifold, and the idea of sustainable development has gained greater momentum. However, these developments also depend on the quality of institutions in the economy. Thus, sustainable development can not be achieved unless a country has sound and independent institutions. This paper discusses the idea of environmental sustainability to demonstrate the impact of trade, corruption, and income level on environmental policy formation. Applying the fixed effects model, the study concludes that trade affects the environmental quality positively, but the level of corruption in the economy can distort this relationship. The demand for environmental quality increases as the output level starts rising, but it is also offset by the corruption level. Therefore, policy-makers must consider the importance of institutions in the economy before formulating a welfare-directed policy in such a dynamic and complicated system.

*JEL classification:* F18, Q56

*Keywords:* Environment, Trade Openness, Corruption, Sustainable Development

- 20. Muhammad Irfan.** Poverty and Natural Resource Management in Pakistan. 691–708.

- 21. Pervez Zamurrad Janjua and Ghulam Samad.** Intellectual Property Rights and Economic Growth: The Case of Middle Income Developing Countries. 711–722.

Neoclassical growth theory emphasises the role of intellectual property rights (IPRs) in the economic growth process through different channels like international trade, foreign direct investment (FDI), licencing, and research and development (R&D). We estimated the impact of IPRs protection on economic growth for a panel of ten middle-income developing countries, using pooled least square estimation techniques by applying both fixed and random effect models, and both unbalanced data from 1960–2005 and balanced data from 1970–2005. Both fixed and random effect models do not support the positive link between IPRs and economic growth. This suggests that although IPRs protection stimulates economic growth, yet these developing countries are at the transitional stage of their economic development and the cost of innovation is higher than the cost of imitation. This means that these middle-income developing economies are not well-prepared to accept this challenge at the present stage of economic and infrastructural development.

*JEL classification:* O34, F23, O40, R59, C23

*Keywords:* Intellectual Property Rights, FDI, Economic Growth Income Countries, Panel Data Estimation

**22. Mohammad Afzal.** The Impact of Globalisation on Economic Growth of Pakistan. 723–734.

The impact of globalisation varies from country to country, depending on the level of social, economic, and political developments. The LDCs have gained as well as suffered from globalisation. As no country can afford living in isolation, the LDCs can counter the adverse impact of globalisation if they unite and adopt policies that serve their genuine cause. This paper examines the impact of globalisation on the economic growth of Pakistan's economy for the period 1960–2006. Pakistan's economy remained heavily regulated and protected during three decades (1950s, 1960s, and 1970s). Pakistan started liberalising the economy in late 1980s. She used trade openness and financial integration measures to account for the impact of globalisation on economic growth. Cointegration results indicate a robust long-run relationship between economic growth, trade openness, and financial integration. Pakistan's economy will certainly benefit from globalisation, provided the country pursues sound policies.

*JEL classification:* F01, F4, C22

*Keywords:* Globalisation, Economic Growth, Cointegration, Causality, Pakistan

**23. Muhammad Tariq Majeed and Eatzaz Ahmad.** FDI and Exports in Developing Countries: Theory and Evidence. 735–750.

This study analyses the relationship between FDI and Exports, as well their common determinants in developing countries, using a panel of 49 countries over the period 1970–2004. The analysis shows that both exports and FDI positively affect each other, though the effect of exports on FDI is not very significant. Thus, there is no evidence of a substitution relationship between FDI and exports. The analysis shows that GDP, economic growth, domestic absorption, and exports positively affect FDI, a result consistent with market-seeking behaviour of multinational corporations. On the other hand, external debt and BOP deficit have negative effects on FDI. The effect of domestic investment in explaining FDI flow is negative. The study also shows that the lack of fiscal incentives is a hurdle for FDI. It is also found that depreciation of real exchange and industrialisation and development of communication facilities significantly promote exports.

*JEL classification:* F21

*Keywords:* Investment, Foreign Investment, Exports and FDI

**24. Ghulam Shabbir and Mumtaz Anwar.** Determinants of Corruption in Developing Countries. 751–764.

Corruption has two dimensions; public sector corruption and private sector corruption. This paper focuses on public sector corruption using cross-sectional data. For this purpose, 41 developing countries are analysed to explore the determinants of corruption. These determinants have been divided into economic and non-economic determinants. The economic determinants include economic freedom, distribution of income, level of development, and globalisation. The non-economic determinants consist of religion, democracy, and press freedom. The empirical findings of the study indicate that all economic determinants are negatively related to the perceived level of corruption, except distribution of income. The non-economic determinants do not significantly explain the variations in the level of corruption fully. This shows that the socio-political and religious norms are too weak to affect the corruption level among these countries. This implies that religion has a limited role in shaping the behaviour of people in general. Therefore, the perceived level of corruption is not affected by the religion. The upshot of the study is that the government should mainly focus on the economic factors to curtail the level of corruption.

*JEL classification:* D01, H41

*Keywords:* Corruption, Globalisation, Democracy

**25. Abdul Sattar and Eatzaz Ahmad.** Willingness to Pay for the Quality of Drinking Water. 767–777.

This paper presents households behaviour in terms of willingness to pay for safe drinking water in Hyderabad city, Sindh, Pakistan. The multinomial logit model is estimated for averting water contamination behaviour. Measures of awareness and households' wealth are incorporated into the model to account for joint

production of utility. The study finds that measures of awareness such as different levels of formal education of decision-makers and their informal exposure to mass media have statistically significant effects on the willingness to pay for drinking-water purification devices that can be adopted at home.

*JEL classification:* D12, D13, D31, Q21, Q25, Q51, R21

*Keywords:* Willingness to Pay, Quality of Drinking Water, Multinomial Logit Model

**26. Rizwana Siddiqui.** Quantifying the Impact of Development of the Transport Sector in Pakistan. 779–802.

The paper quantifies the impact of tax-financed public investment in infrastructure and services by mode of transportation, land, air, and water, using the dynamic computable general equilibrium model. The model includes resource cost, taxes, and cost of externalities such as congestion, pollution, and accident, where congestion and accident are incorporated for land transport only. The model measures benefits of an investment programme by a change in prices not only in the transport sector, but also in taking account of the advantages to other sectors of the economy. The results show that tax-financed investment in transport has reduced its share and cost of non-factor services in the total value of commodities (first objective of NTC). It reduces transport cost of movement of passengers. Improving safety and reliability of transport operations can be concluded from a reduction in the environmental and accident cost (2nd objective of NTC). Overall, the transport sector development has a positive impact on macro aggregates too.

*JEL classification:* L9, R53, R41, O11, D62, C68

*Keywords:* Public Investment, Transport, Growth, Trade, Externalities, CGE

**27. Muhammad Irfan.** The Impact of Open Sewerage Smell on House Rent in Rawalpindi. 803–815

The purpose of this study is to estimate the location dis-amenity (bad smell) due to open sewerage systems in Rawalpindi city. The existing sewerage system comprises 30 percent ground and 70 percent open sewerage system. Households use the side rain-drain and Nala Lai for sewerage exit purpose because of no significant development in public infrastructure. The study used the hedonic property value approach to examine the impact of the open sewerage system on house rent. The study is conducted in both open and ground sewerage systems with different locations. The study estimates that the house rent decreases by Rs 672 per month if the open sewerage *nali* is in front of the house. If the open sewerage system is semi-closed, the willingness to pay for the house rent increases to Rs 388 per month.

*JEL classification:* Q51, Q53

*Keywords:* Dis-amenity, Open Sewerage, Nala Lai, House Rent, Willingness to Pay, Rawalpindi

**28. Muhammad Sarwar Zahid, Abdul Qayyum, and Wasim Shahid Malik.** Dynamics of Wheat Market Integration in Northern Punjab, Pakistan. 817–830.

This paper presents some empirical evidence of wheat market integration in Northern Punjab by applying the cointegration technique. It is found that there exists long-run market integration between Lahore as a central market with all the feeder markets of Faisalabad, Sargodha, Gujranwala, Gujrat, and Sialkot. Those market pairs with good road/rail connections and good flow of information have better market integration with each other than the other market pairs, which have partial integration due to weak infrastructure and flow of information. The conclusion suggests that the government needs to improve infrastructure and information system, including construction of new transportation facilities.

*JEL classification:* Q1, Q11, Q13

*Keywords:* Wheat Market, Market Integration, Efficiency, Uncertainty, Pakistan

**29. Shabbar Jaffry, Yaseen Ghulam, and Vyoma Shah.** Returns to Education in Pakistan. 833–852.

This paper investigates whether the education inequality in Pakistan varies across the wage distribution of individuals. We adopt a quantile regression framework, which then uses different quantile spreads to analyse

the conditional inequality using the data drawn from the Labour Force Surveys over the 1990 to 2003 time-period. The analysis also shows how the return to education varies when different sets of variables or combinations are used. Education coefficient decreases when post-education decisions are introduced. This paper uses pooled data as well as pseudo panel approaches, as the LFS are not continuous in cross-section surveys and findings suggest that results obtained from the pseudo panel approaches are more robust than the pooled sample data. The estimates also show that the evidence of conditional education inequality in Pakistan, and also that inequality has increased over the years. The conditional inequality has been increased from 1.13 to about 1.26 in the 1990 to 2003 sample period. Estimates have also been produced for different levels of education and categories like provinces, gender, area of living, and industries. The highest increase in conditional education inequality is found for the person who has completed the Matriculation or Intermediate qualification as compared to all other educational levels.

*JEL classification:* J31

*Keywords:* Return to Education, Education Inequality, Quantile Regression, Pakistan

### **30. Aneel Salman. Ecofeminist Movements—from the North to the South. 853–864.**

Ecofeminism is a combination of environmental, feminist, and women's spirituality concerns. Ecofeminist theory is a theory built on community-based knowing and valuing, and strength of this knowledge is dependent on the inclusivity, flexibility, and reflexivity of the community in which it is generated. The domination and oppression of women is directly related to the environmental abuse of the Earth. It is ironic that though women are better ecological managers than men, and more involved in environmental activities, and the most affected by degradation and pollution, they are kept out of environmental policies at the local, national, and global levels. This paper looks briefly at the concept of Ecofeminism and its movement and discusses the role of women and their interconnectedness to the environment, including the struggles of women to conserve their habitats. Case studies in this section focus on three South Asian countries, i.e., India, Bangladesh, and Pakistan, as well as one case study from the United States and one from Kenya, to see if and how Ecofeminism has evolved in these countries.

*JEL classification:* B54, J16

*Keywords:* Ecofeminism, Ecology, Movement, Environment, Women

### **31. Muhammad Sabir and Zehra Aftab. Dynamism in the Gender Wage Gap: Evidence from Pakistan. 865–882.**

One of the main caveats of Pakistan's economic development history is the persistence of gender inequality with respect to almost all socioeconomic indicators. For instance, Pakistan ranks 66, out of 75 countries, with respect to Gender Empowerment Measure [Human Development Report (2006)] with a GEM value of 0.377, largely a manifestation of very low estimated female to male earned income ratio, which is a depressing 0.29. GEM and other labour force statistics confirm the gender gap in labour force participation. One of the possible explanations of this gender gap is gender discrimination in the labour market, particularly in wages. This study aims to analyse how the gender wage gap has evolved over the last nine years for the wage-employed, by using data drawn from the Labour Force Survey at two distinct points in time: from LFS 1996-97, and then, after almost a decade, in 2005-06. The analysis is disaggregated by occupation, and by province.

The results confirm significant gender differentials in relative wages, even after controlling for a range of human capital and job characteristics in the pooled sample as well as in the pseudo panel data analysis. Moreover, estimation results from the two respective cross-sections (1996-97 and 2005-06) show a significant increase in the wage differential over the last nine years. This dispersion of wages among male and female workers, even after controlling for observed human capital and job characteristics, is much higher in Pakistan when compared to other countries.

*JEL classification:* J31, J71

*Keywords:* Gender Wage Differentials, Quantile Regression, Wage Dispersion, Pakistan

### **32. Saima Akhtar Qureshi, Muhammad Khan, and Muhammad Iftikhar ul Husnain. Gender, Environment, and Sustainable Economic Growth. 883–994.**

Standard growth models such as those of Nelson and Phelps, Lucas, Rebelo, and others assume that production can be sustained with an insignificant amount of natural resources and environmental

services if labour and capital can be improved adequately. The notion that the economy can grow sustainably for ever depends in large part on the assumption that technological improvements can trim down the number of units of natural capital necessary to produce a unit of economic output. Also, many studies, such as those by Davidson and Myers, Dankelman and Davidson have indicated that women are responsible for the environment care and play a predominant role in the management and use of natural resources. These studies emphasise that women must be involved in decision-making at all levels to foster sustainable economic development and growth. The paper develops a simultaneous equation model to highlight the notion that increase in human capital of women substitutes natural capital and hence leads to sustainable economic growth in Pakistan. Regression results show that growth in female-male enrolment (used as proxy for human capital) has positive and significant impact on economic growth. Our estimates show that the improvement in human capital substantially reduce the extraction and consumption of natural resources. We find that growth in female-male enrolments ratio is positively related with growth in forest area cover at different levels of education, confirming the notion that increase in human capital can successfully substitute natural resources at certain levels in the process of economic growth. The study confirms the arguments that women are efficient environmental managers within the development process of the economy. However, the study also finds a strong interrelationship between environment and human capital accumulation. The depletion of natural resources and environmental pollution inversely affect the human capital accumulation. The study stresses that government should ensure universal primary education, provision of safe drinking-water, electricity, and gas to protect natural resources and to empower sustainable economic growth.

*Keywords:* Gender, Human Capital, Sustainable, Hartwick Rule

### **33. Shujaat Farooq and Usman Ahmed.** Underemployment, Education, and Job Satisfaction. 895–907.

Education is an effective vehicle to produce the skills required to maintain economic growth. The benefits of education range from the human aspects to economic, social, and cultural advancement. In Pakistan, there is significant rise in the average level of education, but over time, more and more workers are incapable of using their educational background on the job. Supply of labour may have outstripped the demand of labour in some professions, with highly qualified people taking up jobs in low positions. Such underemployment has not been fully explored in Pakistan. The mismatch between education and job often results in underemployment and over-education, representing an inefficient use of human resources and lost output for society. Our research is based on a case study of clerical workers of Sui Northern Gas Pipe Lines (Ltd). Investigation of clerical work is especially suitable because underemployment is high in the clerical sector. Using the self-assessment criteria, we compare the employees' personal characteristics and educational backgrounds with the nature of their jobs, attitudes, and behaviour. The findings show that individuals who underutilise their education and skills are dissatisfied because the employees' earn almost no return on surplus education. Since they get no reward on surplus education, they have less job involvement and high quit intention rate as compared to the better-matched workers.

*JEL classification:* I2, J6, J28, J31

*Keywords:* Under-employment, Education, Satisfaction

### **34. Shahid Ahmad.** Land and Water Resources of Pakistan—A Chitral Assessment. 911–937.

The paper gives an assessment of the land and water resources of Pakistan for present and future use. The shortage of water to meet crop consumptive requirement is around 0.9 billion m<sup>3</sup>, considering rainfall of 16.5 billion m<sup>3</sup> per annum. The shortage increases during dry years when rainfall is insignificant. There is still potential for saving of water by improving secondary canal system, watercourse improvement, and high efficiency irrigation systems. However, beyond 2015, major investments would be required to line the canal and watercourse conveyance system, and for large-scale introduction of high-efficiency irrigation systems. Whether the country can afford such investments or not is a serious concern, which demands that priority must be assigned to canal commands where such investments are cost-effective. The future rise in population would increase domestic and industrial water

requirements and enhanced awareness of the civil society at large would also demand water for nature to meet the environmental requirement. The increased water demand for these sectors may come largely from saving of existing losses in the agriculture sector, which is the largest user of water.

*Keywords:* Land, Water, Critical Assessment of Resources, Rive Flows, Canal Diversion, Groundwater Abstractions

**35. Mohammad Asif Khan.** Valuation and Pricing of Surface Water Supplies in Pakistan. 939–955.

Out of the total annual flow of 151.58 MAF water, 103.81 MAF is being diverted to irrigate 45 million acres of farm land in the country. Only 55 percent of diverted flows become available at farm gate, 42 percent infiltrate to groundwater, and 3 percent are lost as evaporation. Per acre availability of water is decreasing day by day owing to urban/industrial demand, global warming, environmental change, and increased area demand. Groundwater owing its existence to operational canal system supplies over 40 percent of crop water requirements.

The value of water on the basis of incremental applications can not be determined as the measurement of crop yield is a function of incremental water applied in an uncontrolled and unpredictable environment. Water rate is a small proportion of crop production cost. Increasing its rate would, therefore, not lead to its economical use; rather will add to the financial burden of small farmers, who normally have higher cropping intensity. The rates are, however, much less when seen in the historical context or in the light of prevailing O&M costs and cost of water saving by remodelling/rehabilitation of irrigation channels or groundwater extraction. Present water rates meet only 45 percent of system O&M needs in Punjab, and much less in other provinces. For proper upkeep of the system, there is a dire need to increase it to the level of at least O&M cost recovery.

*JEL classification:* Q1, Q25

*Keywords:* Agriculture, Water

**36. Muhammad Nawaz Bhutta.** Land Tenure and Management: An Analytical Appraisal. 957–968.

Cropping intensity is affected by the size of irrigated farms, and agricultural production is affected by fragmentation of farms. Agrarian reforms were introduced twice to provide opportunities of land ownership and for social security to farm workers. Yet, a small fraction of big landowners are benefiting from the major portion of the government subsidy for tubewell installation and on-farm water management. Policies and planning have to be better focused for equitable distribution of subsidy to small farmers of the country.

*Keywords:* Landholding, Subsidy, Equity, Sustainability, Land Tenure, Agriculture

**37. Muhammad Rafiq and Shafiqullah.** Demand Analysis of Recreation Visits to Chitral Valley: A Natural Resource Management Perspective. 971–984.

The study is about the valuation of tourism's benefits in Chitral Valley, which offers composite tourism attractions ranging from nature based to religion and cultural products. Accessibility to such natural exotic locations is often free which results in environmental hazards and divests the indigent government from revenue that such sites offers. Natural resource management strategy, hence, necessitates valuing the benefits associated with a natural resource for weighing the cost and benefits of different policy options. For analysing the problem, Chitral was selected as a case study. The analytical technique employed for this study is Zonal Travel Cost Method (ZTCM) which is a widely used technique and has been extensively used by researchers. The double log functional form was selected for estimating the value of the recreational visits because of the fact that it accounts for extreme value [Ward and Beal (2000)]. The recreational value for the current year has been estimated as Rs 5225190. These estimates can be used for the cost benefit analysis of any preservation project undertaken by the government and non-government agencies. The results obtained can help the local government for imposition of an optimal entry fee. Additionally, the results of the study will aid the government for efficient resource allocation and to observe changes in the value of natural resources over time. The study will facilitate researchers for future studies on the subject matter.

*JEL classification:* C31, C21, D60, Q21, Q26, Q51

*Keywords:* Environment Valuation, Chitral Valley, Zonal Travel Cost, Recreational Value

**38. Samina Khalil, Mehmood Khan Kakar, and Waliullah.** Role of Tourism in Economic Growth: Empirical Evidence from Pakistan Economy. 985–995.

Tourism activities are multi-pronged and mostly have a positive impact on any economy. This paper examines the role of tourism in the short-run economic development in Pakistan. We use the error-correction model, and also the causal relationship between tourism receipts and economic expansion (GDP). The results show that there is a strong relationship among tourism, receipts, and economic expansion; and economic expansion is necessary for tourism development in Pakistan.

*JEL classification:* L83, O10

*Keywords:* Tourism Receipts, Co-integration, ECM, GDP

**39. Ayaz Ahmed, Henna Iftikhar, and G. M. Chaudhry.** Water Resources and Conservation Strategy of Pakistan. 997–1009.

Water is an essential element for survival of all living things. It is a vital factor for economic development—for augmenting growth of agriculture and industry. The paper analyses the water resources and conservation strategy of Pakistan. Since independence, this country has constructed only two big dams, i.e., the Tarbela and the Mangla Dams. The sedimentation condition in these dams has resulted in the decline of their storage capacity. The study indicates that due to stagnant water resources, the per capita water availability is decreasing at an alarming rate. The study highlights the proposed and ongoing water projects. The paper also articulates a water conservation strategy for Pakistan in order to fulfil future requirements.

*Keywords:* Water Resources, Water Conservation, Pakistan

**40. Rashida Haq.** Land Inequality by Mode of Irrigation in Pakistan, 1990–2000. 1011–1022.

The aim of this study is to estimate the magnitude of inequality in land distribution by mode of irrigation in two agriculture census periods, 1990 and 2000. It also analyses relative equity performance in cultivated irrigated area as compare to the total cultivated area. Theil's indices of inequality illustrate that there exist considerable levels of inequality in the distribution of all land variables in all areas evidently increasing over the two agriculture census periods. There is a significant level of increase in inequality in the cultivated area irrigated by canal except in the NWFP, whereas inequality in the irrigated area by tubewell has increased in all provinces in 2000. The equity index for irrigated area by canal has gone up, indicating that the distribution inequity is increasing in Pakistan. In Sindh, the picture is not encouraging for irrigated area by tubewell, as the distribution inequity has increased in the two periods. Relative equity performance for the irrigated area by canal and tubewell has worsened in Balochistan. The present highly skewed land distribution provides to large farms disproportionately large shares of incremental benefits from irrigation development.

*JEL classification:* D63, Q24, O13, R14

*Keywords:* Land Inequality, Irrigation, Equity Performance, Theil's Index

**41. Umar Farooq, Munir Ahmad, and Abdul Wahid Jasra.** Natural Resource Conservation, Poverty Alleviation, and Farmer Partnership. 1023–1049.

Crop and livestock sectors are now almost equal partners in agricultural GDP. Natural resources like land, water and rangelands are important for both crop and livestock farming, which are now becoming more limiting factors of production. Agricultural production in Pakistan mainly relies on irrigation. The future expansion in agricultural production could only be achieved by utilising more efficient production techniques with least deterioration of natural resources. The available evidence on utilisation of land, water and rangelands resources in Pakistan shows that they were unwisely and inefficiently used in the past. Continuation of such practices may result in irreversible losses. Unfortunately, the farming community (the real affectee) is not realising the nature, importance, and consequences including low input-low output associated poverty trap. Conserving natural resources through community mobilisation with empowerment. The primary requirement is that local communities should own the interventions by becoming partners in the development activities of their areas. This will not only make easy access to various institutions working for finding solutions to their

problems, it will also make the tasks of various public and private development institutions and NGOs relatively easy. This paper highlights the mechanisms of partnership in conserving natural resources. It also attempts to sensitise policy-makers and development planners towards creating awareness and practising partnership with empowerment in planning and implementation of natural resource conservation and rehabilitation projects.

*Keywords:* Poverty, Resource Conservation, Empowerment, Community Mobilisation

**42. Fateh M. Mari and Heman D. Lohano.** Measuring Production Function and Technical Efficiency of Onion, Tomato, and Chillies Farms in Sindh, Pakistan. 1053–1064.

This paper estimates technical efficiency for onion, tomato, and chillies using primary data collected from three districts of Sindh, namely, Hyderabad, Thatta, and Mirpurkhas. The paper also analyses the returns to scale in producing these crops. The functional form of the production function was specified as Cobb-Douglas function with three inputs: land, labour, and capital. The sum of the coefficients on these inputs measures the degree of homogeneity, which determines whether the production function is constant, increasing or decreasing returns to scale. The ordinary least squares method was used for estimating the production function. The *t*-test was applied for testing the null hypothesis that the degree of homogeneity equals 1. Null hypothesis was maintained at 5 percent significance level for each of the onion, tomato, and chillies crops. These results indicated that the production function has constant returns to scale for these crops. The technical efficiency rating indicates that the onion, tomato, and chillies producers are not technically efficient in producing the selected crops. The average technical efficiency rating is 0.59, 0.74, and 0.83 for onion, tomato, and chillies respectively.

*JEL classification:* Q12

*Keywords:* Technical Efficiency, Returns to Scale, Production Function, Onion, Tomato, Chillies

**43. Khalid Mushtaq, Faisal Abbas, Abedullah, and Abdul Ghafoor.** Energy Use for Economic Growth: Cointegration and Causality Analysis from the Agriculture Sector of Pakistan. 1065–1073.

Economic growth is energy-intensive. Nonetheless, in developing countries like Pakistan, the present energy use in agriculture is not strictly commensurate with energy consumption trends in developed countries. Sharp increases in energy prices have serious implications for the agrarian economy of Pakistan. This study implies the Johansen's co-integration approach and Granger causality to check the degree of integration and the direction of causality among different economic time series for the period 1972–2005. It is found that all the series are first-differenced stationary and there exists a long-run equilibrium relationship among concerned variables. The Granger causality test result suggests that unidirectional causality is running from GDP to oil consumption; electricity to GDP; while neutrality exists for gas and GDP. The implications of this study are that any future growth in the agriculture sector will increase the demand for oil, and if government improves the infrastructure and subsidises rural and agricultural electricity, it would significantly enhance agricultural share of GDP.

*JEL classification:* O13, Q43

*Keywords:* Energy Consumption, Agricultural growth, Cointegration, Causality, Pakistan

**44. Tahir Mukhtar and Muhammad Tariq Javed.** Price Integration in Wholesale Maize Markets in Pakistan. 1075–1084.

Market integration is perceived as a precondition for effective market reforms in developing countries. The high degree of market integration means the markets are quite competitive and provide little justification for extensive and costly government intervention designed to improve competitiveness so as to enhance market efficiency. This study tests long-run spatial market integration between price pairs of maize in four regional markets of Pakistan using cointegration and error-correction model (ECM) approaches. Hypotheses tests of market integration and causality are conducted using monthly wholesale maize prices in logarithmic form over the period January 1995 to December 2005. The results show that

the regional markets of maize have strong price linkages, and thus are spatially integrated. Lahore market dominates with price formation in the other three regional markets. Thus, maize markets across Pakistan are efficient and are functioning well. Furthermore, the findings of the study suggest that by stabilising maize price in Lahore market, the government can rely on arbitrage to produce similar outcomes in the regional markets. Thus the cost of stabilisation may be reduced considerably.

*JEL classification:* C22, Q13

*Keywords:* Market Integration, Maize, Cointegration, Granger Causality

**45. Usman Mustafa.** Environmental Fiscal Reforms through Decentralisation for Sustainable Development and Poverty Eradication. 1087–1103.

Environment degradation and augmentation of poverty are causing a serious peril not only for the present but also for future generations. The situation is aggravated day by day. This is mainly due to the distortion in the market systems. Environmental Fiscal Reform (EFR), through decentralisation measures, can rationalise tax arrangement and distribute resources effectively and efficiently. The devolution of power is a step forward, but it requires corresponding fiscal decentralisation, institutional development, and political will. The lower tiers of government have meagre resources and poor skills, infrastructure, and institutions, which need improvement. EFR can generate benefits in terms of fiscal revenue, environmental outcomes, and poverty reduction in local districts. It can also produce greater opportunities for empowering and serving the poorest people, and, as a result, also support sustainable development.

*JEL classification:* Q20, Q28, Q52, Q6

*Keyword:* Environment, Fiscal Reforms, Decentralisation, Sustainable Development, Poverty

**46. Syed Arshad Hussain Shah, Syed Akhter Hussain Shah, and Mahmood Khalid.** Incompatibility of Laws and Natural Resources: A Case Study of Land Revenue Laws and Their Implications in the Federal Areas of Pakistan. 1105–1117.

Direct and indirect implications of incompatible land laws are studied for Islamabad district. It is observed that incompatible revenue laws directly affect civil litigation, crime rate, and transaction cost in the society. Inconsistent laws increase workload for the governance institutions. Workload of civil and criminal courts also increases due to incompatible laws. The quality of service delivery and dispensation of justice are adversely affected by incompatible laws. Risk-averse investors normally avoid making investment in such an ambiguous property rights regime. With ambiguous laws, the transaction cost to individuals and the society increases.

*JEL classification:* K00, K11, Q15

*Keywords:* Law and Economics, National Resource Laws, Land Laws

**47. Muhammad Azeem Khan, M. Iqbal, and Iftikhar Ahmad.** Environment-Friendly Cotton Production through Implementing Integrated Pest Management Approach. 1119–1135.

The study measures the impacts on biodiversity and bio-safety indicators in the context of total pesticide use, toxicity of pesticide use, environmental quotients, health hazards, attitude towards environment, and pest-predator dynamics at IPM- and farmer-managed plots in Khairpur district of Sindh. Results show that total doses of pesticide chemicals were largely reduced (41 percent) on IPM-trained farms. Highly toxic class of pesticide use reduction was much higher (54 percent), which resulted in lowering the Environmental Impact Quotient (EIQ), more than 49.5 percent as compared to a quantum jump at controlled farms. The change in the IPM-trained farmers' attitude and beliefs helped them to change pesticide use behaviour for better environment and health improvements. IPM-trained farmers' attendance score and their age and education status are significantly associated with the pesticide applications, observed biodiversity, and field EIQ. The ratio of predators and pests indicates that less chemical use gives a free hand to predators to flourish, fluctuate, and counter the pest pressure, whereas on farmer practice plots, the pesticide aid reduces natural pest control processes, which enhance pesticide use dependencies. More involvement of plant protection experts during both IPM-trainings and post-training follow-ups is suggested for improved understanding among farmers, extension agents, and researchers.

**48. Mirajul Haq, Usman Mustafa, and Iftikhar Ahmad.** Household's Willingness to Pay for Safe Drinking Water: A Case Study of Abbottabad. 1137–1153.

The study describes the Contingent Valuation Method (CVM) and Averting Behaviour Approach (ABA) to analyse drinking-water services and quality in Abbottabad district. In an attempt to measure how many households are willing to pay for improved water services, we use CVM and apply multinomial logistic regression. In ABA, we have again used the same technique to estimate the water purification behaviour of households. Education, awareness, available water sources, and the quality of drinking-water determine WTP of HH in the sample district.

*JEL classification:* Q53, Q56

*Keywords:* Averting Behaviour, Contingent Valuation Method, Drinking Water, Willingness to Pay

**49. M. Rafiq Khan.** Techno-Economic Evaluation of Chromium Recovery Pilot Plant Installed at Kasur Tanneries Complex, Pakistan. 1155–1166.

A techno-economic evaluation of the Chromium Recovery Pilot Plant installed by KTWMA at Kasur Tanneries Complex was carried out. The data were collected from KTWMA by paying visits to the office of the General Manager, Tanneries Water Pre-treatment Plant at Kasur to obtain general information and to have a view of the work-in-progress. The General Manager and the Plant Supervisor were interviewed. Detailed information was also supplied by the Plant Supervisor through a questionnaire provided to him. Subsequently, the data were analysed to determine the B/C Ratio, NPV, and Payback Period of the Project. The analysis led to the B/C Ratio of 0.5, negative NPV of Rs 14,650,011, and payback period 36. These indicators are far below the decision criteria. Thus, the installation is not viable financially or economically. The study, of course, recommends that the installation, being a social and legal obligation, is socio-economically justified even if the tanner has to invest the capital required from his own resources.

*JEL classification:* Q56

*Keywords:* Chromium, Recovery, Kasur, Pakistan

**50. Krishna Prasad Pant.** Valuing Interventions to Reduce Indoor Air Pollution—Fuelwood, Deforestation, and Health in Rural Nepal. 1169–1187.

Poor people in developing countries use dirty fuels like fuelwood, because they find it easier to collect and cheaper to buy than modern fuels. The environmental consequences of the fuelwood harvesting from common property resources are much discussed in the literature. But limited studies are available on the health costs of the biomass fuel use and indoor air pollution. In addition, the health conditions of the household members may also affect fuel choice, in turn creating a condition of endogeneity bias on the estimates. The study attempts to estimate the health effects and resulting costs of indoor air pollution from biomass fuel after adjusting for the problem of endogeneity by employing a survey of 600 rural households. The survey has generated household information about energy use and respiratory health status of 2,739 adults and 301 children. Based on the data, the paper investigates the effects of interventions like biogas and improved cooking stoves on health benefits. The respiratory diseases affected by the intervention are chronic bronchitis and asthma among adults and acute respiratory infections among the children. Instrumental variable probit regression is used for the health effects, and the cost of illness approach for health costs. The study concludes that if the health costs are counted, the biomass fuels are much more expensive than the modern fuels; and the traditional chula is more expensive than the improved chula. Making the poor understand the private health costs from biomass fuel can help to protect the forest by reducing fuelwood harvesting.

*JEL classification:* Q23, Q42, Q53, I12

*Keywords:* Indoor Air Pollution, Biogas, Improved Cook Stove, Chronic Bronchitis, Asthma, Acute Respiratory Infections, Instrumental Variable

**51. Lubna Hasan.** An Anatomy of State Failures in Forest Management in Pakistan. 1189–1203.

Deforestation remains one of the most intractable environmental problems. Pakistan also faces a serious problem of depletion of its forest reserves. The general perception among planners is that overpopulation is the

primary culprit behind forest degradation. Moreover, people living close to forestlands, and using it for their needs, show imprudent behaviour towards these forests and use them in an unsustainable manner. So there is a tendency among policy-makers to find ways of keeping people away from this resource, and to strengthen government's hold over it. This is a rather simplistic conception of the issue since most of the forests in Pakistan are state-owned/managed, and the responsibility for the protection/conservation of these forests rests with the state. Therefore, any inquiry into the causes of forest degradation in Pakistan must analyse the state's role in it. Putting the entire burden of deforestation on 'other factors' shifts attention away from the more important causes (such as the failure of the government to manage forests) and leads to wrong policy conclusions. This study intends to focus attention on this important factor behind deforestation—the role of the state in forest degradation in Pakistan.

*JEL classification:* Q23, Q58

*Keywords:* State Failures, Deforestation