

## **REDISTRIBUTIVE EFFECT OF PERSONAL INCOME TAXATION IN PAKISTAN**

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**Abstract.** This paper studies the redistribution effect of personal income tax in Pakistan. We decompose the overall tax system in order to evaluate the contribution of rate, allowances, deductions, exemptions and credits. The structure given in Income Tax Ordinance, 2001, is applied to gross household incomes in 2002 (low growth year) and 2005 (high growth year). Our findings reveal that the reforms laid down in this Ordinance resulted in a greater redistribution of incomes. The redistributive effect increases as we move from 2002 to 2005 tax assessment. Deductions for salaried tax payers contribute the most towards progressivity. This is different from countries with advanced taxation systems relying mainly on allowances followed by tax rate and exemptions.

### **I. INTRODUCTION**

Personal income taxation is amongst the oldest and one of the commonly used instruments of fiscal policy. Besides partly fulfilling the government expenditure needs, income tax is also aimed at reducing the inequality gap in the society. They are transformed in to progressive structures so that principles of fairness are fully accomplished. Setting a just tax base is of

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critical importance in order to observe the ability-to-pay principle. The extent of redistribution in a tax system is not necessarily a static concept. Time period over which we measure income and wealth are likely to influence the measures of redistribution and progressivity (Creedy 1999).

The declining role of personal income taxes in developing countries is certainly not a new phenomenon. Most developing economies have inelastic tax structures with a narrow tax base, and high collection/administrative costs. Hence in many cases these taxes are easy to evade (Avi-Yonah *et al.*, 2006; Bird *et al.*, 2005). However the overall role of personal income taxation cannot be completely discarded. This is because apart from the distributional impact of these taxes, there are incentive effects as well, which can for example impact the tax payer's decision and manner of participating in the labour market (Blundell *et al.*, 2000).

In this paper we try to evaluate the progressivity in Pakistan's income tax structure using data from Household Income and Expenditure Survey 2001-02. We see the impact of Income Tax Ordinance for two separate years; 2002 (low growth year), and 2005 (high growth year). There is some previous research on the evaluation of tax progressivity in Pakistan. For example, *see* Ilyas (2004), Alauddin *et al.* (1981), Ahmed *et al.* (1986), Azfar (1972), Jeetun (1978), Malik *et al.* (1985, 1989). However, to our knowledge there is no decomposition analysis of personal income tax system. In the developing countries, this area of research has in the past received less importance, given that income tax constitutes relatively smaller portion of the overall revenue collections. *See* Sicat *et al.* (1988), Bird and Zolt (2005, 2008), Bird (2008) and Bernardi *et al.* (2006).

The next section briefly describes the personal income tax reform in Pakistan. Section III focuses on data and methodological issues and section IV then describes the components contributing to the progressivity of the tax system.

## II. PERSONAL INCOME TAX STRUCTURE IN PAKISTAN

In 1947, immediately after independence, Pakistan adopted the Income Tax Act 1922 of the pre-partition sub-continent. This Act was in fact introduced by the British in this region, who had a version called the general income tax introduced through Income Tax Act 1860. The Act of 1922 was based on the recommendations of All India Income Tax Committee which had been given the task of studying the income tax collections since the introduction of first general income tax in India. This general tax was only imposed for a period of 5 years in order to compensate for the mutiny of 1875. However, after the

great famine of 1876, this tax was revived the next year. The Act II of 1886 then gave a scheme for income tax levy that continued in later reforms.

As the new forms of incomes emerged, Pakistan had to adopt a new set of recommendations given by the then Central Board of Revenue<sup>1</sup> in the form of Income Tax Ordinance, 1979. The promulgation of this Ordinance widened the tax net and expanded the tax base. For details *see* Khan (1984). Similar need for revision was felt 21 years later when Income Tax Ordinance, 2001 was introduced which is still in operation subject to annual amendments through Finance Bill.

Under the present structure of income taxation, incomes are classified into: (a) salary, (b) income from property, (c) income from business, (d) capital gains, and (e) income from other sources. The salary category encompasses: (a) wages and remuneration, including any fringe benefits in money terms such as leave pay, commission, and gratuity/work condition supplements. Deduction is allowed if salary constitutes more than 50 percent of a person's overall earnings. Zakat is deducted from the tax base. Zakat is a mandatory tax on all Muslim citizens if they had any earnings during the year. It is charged at 2.5 percent on income (and specified asset holdings). *See* Zakat and Ushr Ordinance, 1980. Agricultural incomes have been exempt from taxation. This exemption is also applicable to any rent from agricultural land. However, more recently this type of exemption has become a controversial issue and has been debated on various occasions in the lower and upper houses of parliament.

Apart from the income tax there are four other types of direct taxes namely: wealth tax, capital value tax, worker's welfare fund, and corporate assets tax. The main income tax parameters have been derived from the Income Tax Ordinance, 2001. There are three different income categories general income, salaried income and agriculture income, each having five different bands where incomes are being taxed according to the prescribed schedule.

The income to be taxed is computed as below:<sup>2</sup>

$$TY = Y - Z - WPF - WWF$$

Where  $TY$  is the taxable income,  $Y$  is total income from all heads of income,  $Z$  is the Zakat payment by an individual,  $WPF$  is the amount paid towards

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<sup>1</sup>Now called: Federal Board of Revenue (FBR).

<sup>2</sup>This definition is in line with the one given in Income Tax Ordinance, 2001-02, Central Board of Revenue, Islamabad.

workers participation fund under Companies Profit (Workers' Participation) Act, 1968. *WWF* is the amount paid to Workers' Welfare Fund under the Workers' Welfare Fund Ordinance, 1971.

In this paper, we will mainly analyze the personal income taxation as the other forms of direct taxation are harder to simulate and at times lead to excessive use of assumptions. Furthermore the other four types of direct taxes yielded Rs. 7,123 million in the year 2000-01, which was 5.7 per cent of the total collection from direct taxes (CBR Yearbook 2000-01).<sup>3</sup> In the 2002 tax system, allowance is kept at Rs. 80,000 with progressive rates applied until Rs. 700,000 after which the highest (slab) rate of 35 per cent is applied.

As explained earlier agricultural incomes in Pakistan are exempt from taxes. However if a person's agriculture income exceeds Rs. 80,000 and the person also has non-agriculture income then the tax rate will only apply to non-agricultural income of a taxpayer.

A special tax credit of 50 per cent of the tax payable is allowed to an individual if: (a) his age is 65 years or more on the first day of the relevant tax year, and (b) his taxable income is up to Rs. 300,000.<sup>4</sup> Other miscellaneous tax credits allowed by the government in the Ordinance include; foreign tax credit, tax credit for donations, tax credit for investment in shares, tax credit for payments towards retirement annuity scheme, and tax credit for mark-up on loans for house.

A low tax base, failure to curb evasion and delay in bringing new forms of incomes in the tax net, has resulted in an inelastic tax structure. These issues although were part of the overall objectives of Income Tax Ordinance, however, revenue collections have not been able to keep pace with the growth milieu. Figure 1 shows how income tax collections have performed vis-à-vis real GDP growth.

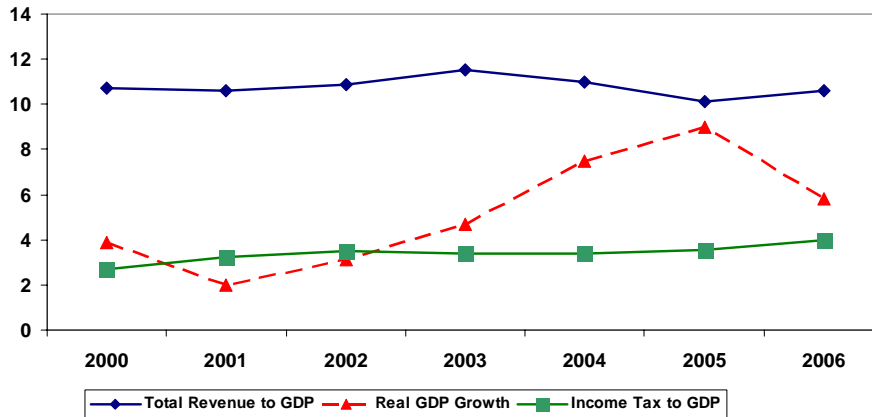
The income tax to GDP ratio remained stagnant between the years 2000 to 2006. However, during this time Pakistan witnessed one of the highest GDP growth rates in its history (reaching up to 9% percent in 2005). Between 2001 and 2005 the economic growth rate averaged 5.1 percent, however the income tax to GDP ratio remained under 3.5 percent. The share of income tax in total direct taxes and overall federal tax receipts also declined from 95.8 to 93.2 percent and 33.8 to 29.4 percent respectively.

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<sup>3</sup><http://www.cbr.gov.pk/YearBook/2000-01/default.htm>.

<sup>4</sup>Clause [1A] of Part-III of Second Schedule in the Income Tax Ordinance.

FIGURE 1  
GDP Growth and Income Tax



### III. METHODOLOGY AND DATA ISSUES

The starting point is the identification of tax related components that are used while going from gross incomes ( $I$ ) to net incomes ( $NI$ ).<sup>5</sup> We calculate the tax free income ( $F$ ), which in equation 1 is the sum of exemptions ( $E$ ), allowances ( $A$ ) and deductions ( $D$ ). Then taxable income ( $TI$ ) is calculated in equation 2 by subtracting tax free income from gross income.

$$F = A + D + E \quad 1$$

$$TI = I - F \quad 2$$

The residual income ( $R$ ) is calculated in equation 3 by subtracting the tax liability ( $T$ ) from taxable income and final residual income ( $R_f$ ) is obtained in equation 4 by adding residual income with tax credits ( $C$ ).

$$R = TI - T \quad 3$$

$$R_f = R + C \quad 4$$

If credits are subtracted from tax liability (in equation 5) we get final tax liability ( $T_f$ ), which if subtracted from gross income will give us the net income (equation 6).

<sup>5</sup>For ease of reference notations are the same as used in Pfähler (1990).

$$T_f = T - C \quad 5$$

$$NI = I - T_f \quad 6$$

The progressivity of tax liability can be expressed as the sum of four items namely rate effect, allowance effect, deductions effect, and tax credits effect. This is formalised below:<sup>6</sup>

$$\pi_N^K = \frac{t}{t-c} \left[ \pi_R^K + \frac{\alpha}{1-\alpha-\delta} \rho_A^K - \frac{\delta}{1-\alpha-\delta} \pi_D^K \right] + \frac{c}{t-c} \rho_C^K \quad 7$$

Where  $\pi_N^K$  is Kakwani index of progressivity,  $t$  is average (gross) tax rate,  $c$  is average credit rate,  $\rho_C^K$  measures regressivity of credits,  $\pi_R^K$  gives the progressivity of rate,  $\rho_A^K$  measures regressiveness of allowances,  $\pi_D^K$  gives progressivity of deductions,  $\alpha$  and  $\delta$  indicate average allowance rate and average deduction rate respectively. This decomposition method developed in Pfähler (1990) is used in Decoster *et al.* (2002) and Wagstaff *et al.* (2001).

Our main data source is Pakistan's Household Income and Expenditure Survey (HIES) 2001-02. The survey description shows that a total of 16400 households were interviewed. The sample of household was drawn from 1150 primary sampling units out of which 500 are urban and 650 are rural. The data in survey only provided details on net incomes. This posed a challenge for our analysis as we required gross incomes which can be subjected to tax rules. Hence to obtain the net incomes we used the net-to-gross algorithm in XLsim microsimulation model for Pakistan (O' Donoghue and Ahmed 2004). This algorithm is explained at length in Immervoll and O' Donoghue (2001).

XLsim is a generic program designed to analyse tax-benefit policies and reforms. Due to the recent enormous growth in this field, tax-benefit microsimulation models are being developed in various languages such as C, Visual Basic, Gauss and SAS. However our inclination towards using XLsim is due to its user friendly excel-VB environment. The idea behind the actual design of XLsim came about as a need to demystify the large scale and heavily coded microsimulation systems. To construct a model using Gauss, for example would require considerable skill in programming and debugging. However for the case of XLsim, one requires intermediate level proficiency in MS-Excel to construct and run the model. The Xlsim model

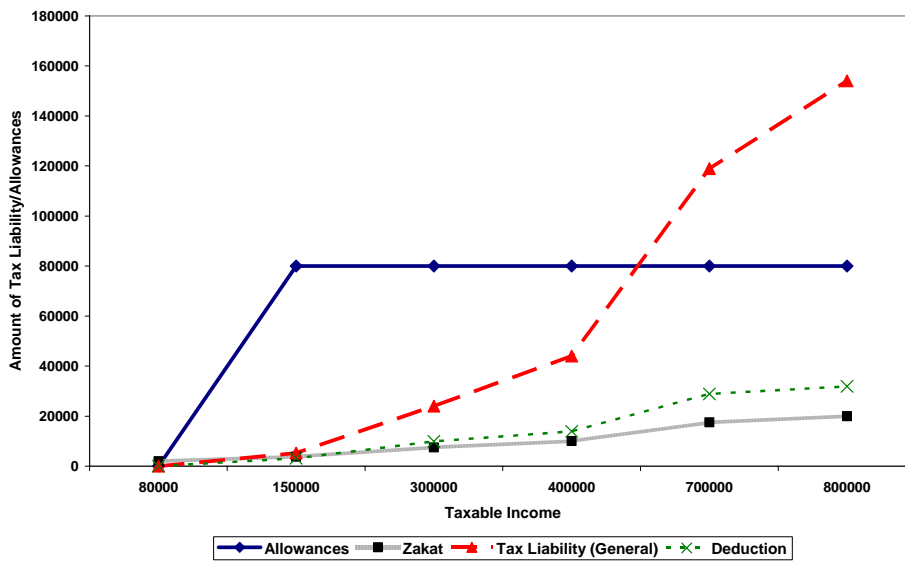
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<sup>6</sup>For ease of reference the notations are the same as used in Wagstaff *et al.* (2001).

uses the household data and applies the taxation rules to individual gross incomes. The calculations are produced both at the family and household level, and the difference in the disposable income between the two runs is the net effect of the reform. For a review of microsimulation models *see* Klevmarken (1997) and O'Donoghue (2001). For country-specific applications *see* Lloyds (2003) and Wagenhals (2004).

A brief explanation is required here to highlight the tax-related definitions as used in our analysis and exhibited in Figure 2. We have treated allowance as that limit of income which is not taxed. Deduction is in fact reduction in tax liability allowed for salary earners. Exemptions include incomes from agricultural activities and credit includes the special provisions stated in Ordinance/tax rules (explained in section 2), Zakat, and Sadaqat.<sup>7</sup> Data on effective payment of Zakat at the household level does not match the amount assessed in FBR records. Hence, for accounting purpose we have treated Zakat as a component that directly reduces the amount of income tax paid. The assumption over here is that a tax payer essentially reduces his payable amount by showing the Zakat accrued to him, however we are not certain from the FBR data if the Zakat payment was in fact made.

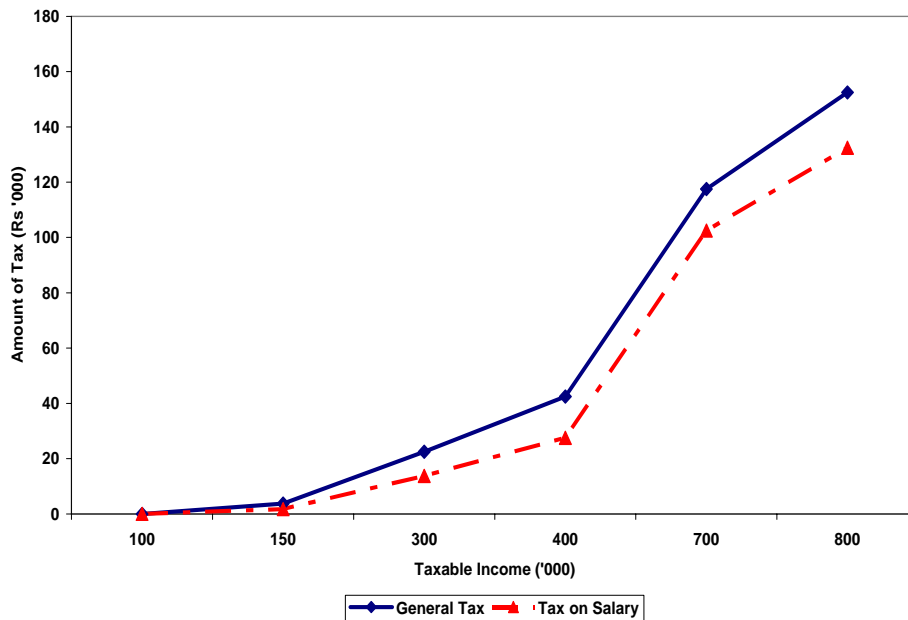
FIGURE 2  
Tax System for the Year 2002



<sup>7</sup>Charity money.

The tax system in 2002 and 2005 remained almost the same except for the change in allowance.<sup>8</sup> In Figure 3 we can see that the tax liability starts from Rs. 100,000 instead of Rs. 80,000 (in 2002). We can also observe the deduction component in the tax system where the liability of those tax payers, whose salary constitutes more than 50 percent of total income earned, is lesser than the general tax payers.

FIGURE 3  
General Vs. Salary Tax Burden 2005



While going from 2002 to 2005 tax system we also uprate the income-related characteristics in the 2001-02 household survey. Adjustments to various income components are made in order to accurately project the changes in incomes between 2002 and 2005. Separate uprating factors can be applied for various income sources such as; wage income, self-employment income, rental income, and pensions. This method has been explained in Stirling and Lazutka (2006). The obvious advantage of this method is that changes in incomes are applied at disaggregate income levels. This to some extent preserves the heterogeneity of the survey observations.

<sup>8</sup>There is also minor change in the manner of allowing deduction for salaried class.



#### IV. RESULTS – DISTRIBUTIONAL IMPACT OF THE TAX SYSTEM

The overall personal income tax structure in Table 1 seems progressive for 2002 system (shown by a positive Kakwani) and redistributive (shown by a negative Reynolds-Smolensky). Applying the 2005 rates to the household incomes for the year 2002, we see an increase in progressivity, and if 2005 rates are applied to uprated incomes, then the results indicate a reduction in progressivity of about 1 percent (from 0.547 to 0.542). However, uprated 2005 system seems more redistributive as shown by the decline in R-S. The percentage change of Gini coefficient for net income over gross incomes shows a 3.7 percent decline compared to 3.2 in 2002 system (Table 2). This is also an indicator of over time redistribution of the Income Tax Ordinance, which is revised every year (through a Finance Bill) keeping in view the changes in incomes.

The low values of Reynolds-Smolensky (R-S) seem plausible as there is inequal redistribution shown by tax base and rate structure (Table 1). Only allowances and deductions have been responsible for contributing towards redistribution in overall personal income tax system. The role played by allowances and deductions also seems to be slightly declining overtime. Progressivity in both tax rate and base is declining over time.<sup>9</sup> This is seen in the overtime reduction in value of Kakwani for all sub-components namely; allowances, deduction, exemptions and credits. The highest change is in Kakwani measure for allowance falling by 2 percent (from 0.501 to 0.491). A closer look reveals that the progressivity pattern of tax base and allowance remained identical.

If one is to focus on only the role played by income tax reforms in reducing income inequality then we can observe in Table 2, first column, where the Gini coefficient of post-tax income declines by 3.2 percent as compared to pre-tax income. We can see the dominance of 2005 system over 2002 in terms of change in (greater) redistribution. The former shows a greater decline in all inequality indicators.

Generalised Entropy (*GE*) indicators are used in order to assess sensitivity towards inequality across the income distribution. *GE* measures satisfy five axioms which are desirable for a measure of inequality namely;

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<sup>9</sup>However, if the incomes are not uprated and 2005 system is applied to 2002 incomes then there is increase in progressivity.

TABLE 1  
Decomposing Personal Income Tax System

Tax Components	Kakwani	Reynolds-Smolensky
Overall Income Tax		
2002	0.547	-0.012
2005	0.564	-0.011
2005_u*	0.542	-0.015
Tax Rate Structure		
2002	0.602	0.018
2005	0.621	0.015
2005_u	0.595	0.021
Tax Base Structure		
2002	0.502	0.140
2005	0.532	0.115
2005_u	0.492	0.132
Allowance		
2002	0.501	-0.121
2005	0.531	-0.105
2005_u	0.491	-0.117
Deduction		
2002	0.621	-0.005
2005	0.640	-0.002
2005_u	0.613	-0.003
Tax Credits		
2002	0.588	0.005
2005	0.617	0.004
2005_u	0.586	0.006
Exemptions		
2002	0.590	0.026
2005	0.591	0.025
2005_u	0.577	0.028

\*2005\_u: 2005 tax system with incomes uprated from 2002 household data.

the transfer principle, scale independence, population independence anonymity and decomposability.  $GE$  ranges from zero (complete inequality) to infinity (see Cowell, 1995). An increase in  $GE$  parameter implies less sensitivity towards inequality at the lower end of the distribution.  $GE(0)$  is the mean log deviation, giving higher weight to income differences at the lower end of distribution.  $GE(1)$  is Theil index of inequality that gives equal weight to the entire income distribution.  $GE(2)$  is one half the squared coefficient of variations and gives more weight at the upper end. We can observe in Table 2 that the highest change (while comparing pre and post tax incomes) is in the case of  $GE(2)$ . This is because the upper tail of income distribution is most affected by the imposition of a progressive personal income tax and income earners falling in this upper tail end up paying a higher marginal rate.

TABLE 2  
Percentage Change in Net Income Over Gross Income

	2002_n/g	2005_u_n/g
Gini	-3.2	-3.7
GE(1)	-7.9	-9.6
GE(0)	-5.4	-6.4
GE(2)	-12.1	-15.0

\*n/g: Percentage change in net income over gross income.

2005\_u: 2005 tax system with incomes uprated from 2002 data.

Table 3 exhibits the percentage contribution of various tax components (towards progressivity) under each of the three systems. The clearly stagnant contributions are observable between the 4 years (2002 to 2005). The percentage contribution of rate effect, allowances and deductions remains constant. The contribution of exemptions slightly decreases, while that of credits increase. The later's increase is plausible given that the increase in Zakat payable is directly related to increase in pre-tax incomes. Recall from previous section that for the purpose of tax accounting in household data we have treated Zakat payment as a tax credit.

TABLE 3  
Percentage Contribution Towards Progressivity

Tax Components	2002	2005	2005_u
Rate effect	20.8	20.7	20.8
Allowance	17.3	17.7	17.2
Deductions	21.4	21.3	21.4
Exemptions	20.3	19.7	20.2
Credits	20.3	20.6	20.5
Total	100	100	100

\*2005\_u: 2005 tax system with incomes uprated from 2002 data.

How do the component-wise contributions in Pakistan compare with other countries? We try to see from Verbist (2004) and Urban (2006) the percentage contribution towards progressivity in other developed and transition economies. Selected countries are grouped in Table 4. In this cross-country comparison we can observe that in pursuit of progressivity, countries with advanced taxation systems rely on allowances followed by rate and exemptions. Pakistan being a low-income country having a much narrower tax base relies on deductions followed by rate and exemptions. Recall that deduction here represents reduction in tax liability allowed for salary earners.

TABLE 4  
Cross-Country Comparison: Percentage Contribution Towards Progressivity

Countries	Exemptions	Deductions	Allowances	Rate	Credits	Overall	R-S
Austria	16.8	0.5	0.1	47.3	35.3	100	0.061
Ireland	34.5	-2.5	31.2	38.7	-1.9	100	0.055
Netherlands	8.1	-4.5	25.1	71.3	-	100	0.046
UK	55	-2.4	30.7	14.4	2.3	100	0.046
Croatia	-	-	85.8	14.3	-0.2	100	0.031
Pakistan	20.3	21.4	17.3	20.8	20.3	100	0.012

Source: For first four countries; Verbist (2004). For Croatia; Ivica Urban (2006). For Pakistan: Author's own calculation.

Table 5 gives a comparison of post tax incomes for 2002 and 2005. The Gini coefficient for 2005 post tax uprated incomes increased by 1.4 percent compared to 2002. Even if the incomes are not uprated for 2005, still there is an increase of 0.18 percent in inequality. This implies that overtime changes in the tax system (resulting in higher redistribution from 2002 to 2005) are unable to reduce the already unequal pre-tax income gap. The rise in incomes around 2005 has favoured the higher income groups resulting in an increase in Gini coefficient.

TABLE 5  
Percentage Change in Inequality Measures for 2005 over 2002

	2005/2002	2005_u/2002
Gini	0.18	1.4
GE(1)	0.28	3.2
GE(0)	0.28	3.4
GE(2)	0.23	4.3

\*2005\_u: 2005 tax system with incomes uprated from 2002 data.

## V. CONCLUSION

Pakistan like other developing economies has a narrow tax base with high enforcement costs, making personal income taxation an unlikely cornerstone of a comprehensive inequality reduction agenda. However its role cannot be completely written-off given the potential contribution towards efficiency and equity objectives at the national level.

Our main findings are:

- Income Tax Ordinance resulted in greater redistribution. The redistributive effect increases as we move from 2002 to 2005 tax assessment.
- Deductions for salaried tax payers contribute the most towards progressivity. This is different from countries with advanced taxation systems relying mainly on allowances followed by tax rate and exemptions.
- Given the increasing pre-tax income gap, reforms in taxation cannot be entirely relied upon for a reduction in inequality in the society.<sup>10</sup>

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<sup>10</sup>The need for social protection policies and social safety nets remains.

- Progressivity pattern of tax base and allowance is identical.

There is a need to reform the present structure of exemptions. Income from agriculture (almost a quarter of GDP) is exempt from taxation. Agriculture taxation in Pakistan has been a matter of both parliamentary controversy and bureaucratic contention. For a very long time the presence of a dominant feudal class in the parliament implied that no headway could be made in this direction. However, on the insistence and continuous pressure from the multilateral donors and agencies a plan was chalked out to levy the tax on agriculture incomes subject to a consensus on a suitable tax base. However the actual imposition of such a tax is still not clearly defined to serve the macroeconomic purpose of broad basing the tax base and the microeconomic purpose of decreasing income inequalities (*see* World Bank, 1999; Chaudhry, 2001). The tax office has been unclear as to what will be a better instrument for agriculture taxation, *i.e.* should the tax be levied on agricultural produce, land value, value of agriculture inputs, value of output sold etc. In order to increase the tax to GDP ratio, indirect tax will remain the primary instrument in the medium term. There is a need to further study the distributional impact of bringing new services in to the tax net. The existing structure of sales tax also has the potential of being made a progressive tax. These issues require further research.

## REFERENCES

- Ahmed, E. and N. Stern (1986), Tax reform for Pakistan: Overview and effective taxes for 1975-76. *The Pakistan Development Review*, Volume 25(1), pp. 43-72.
- Alauddin, Talat and Biquees Raza (1981), *Tax Progressivity in Pakistan*. Pakistan Institute of Development Economics, Research Report Series No. 133.
- Avi-Yonah, R. and Y. Margalioth (2006), Taxation in developing countries: Some recent support and challenges to the conventional view. *Virginia Tax Review*, Summer 2007.
- Azfar, Jawaid (1972), The income distribution in Pakistan, before and after taxes 1966-67. Unpublished doctoral thesis.
- Bernardi, Luigi, Luca Gandullia and Laura Fumagalli (2006), Tax Systems and Tax Reforms in South and East Asia: Overview of Tax Systems and main policy issues. In Bernardi, L., A. Frascini and P. Shome (eds.), *Tax Systems and Tax Reforms in South and East Asia*. London: Routledge, pp. 3-35.
- Bird, R. M. (2008), Tax challenges facing developing countries. National Institute of Public Finance and Policy Working Paper 2008.
- Bird, R. M. and Eric M. Zolt (2005), The limited role of personal income tax in developing countries. *Journal of Asian Economics*, Volume 16, pp. 928-946.
- Bird, R. M. and Eric M. Zolt (2008), Tax policy in emerging countries. *Environment and Planning C: Government and Policy*, Volume 26, Issue 1, pp. 73-86.
- Blundell, R., A. Duncan, J. McCrae and C. Meghir (2000), Labour Market Impact of Working Families' Tax Credit. *Fiscal Studies*, Volume 21, No. 1, pp. 75-104.
- Chaudhry, M. G. (2001), Theory of Optimal Taxation and Current Tax Policy in Pakistan's Agriculture. *The Pakistan Development Review*, Volume 40(4), Part II, pp. 489-502.
- Cowell, F. A. (1995), *Measuring Inequality*, Second edition. Harvester Wheatsheaf, Hemel Hempstead.

- Creedy, John (1999), Taxation, Redistribution and Progressivity: An Introduction. *The Australian Economic Review*, Volume 32, No. 4, pp. 410-422.
- Decoster, André, Isabelle Standaert, Christian Valenduc and Guy Van Camp (2002), What Makes Personal Income Taxes Progressive? The Case of Belgium. *Brussels Economic Review/Cahiers Economiques de Bruxelles*, Editions du DULBEA, Université libre de Bruxelles, Department of Applied Economics (DULBEA), Volume 45(3), pp. 91-112.
- Ilyas, M. (2004), Distributive effects of government expenditures and taxes: A case study of Pakistan. Doctoral dissertation, International Islamic University, Islamabad.
- Immervoll, H. and C. O'Donoghue (2001), Imputation of Gross Amounts from Net Incomes in Household Surveys: An Application using EUROMOD. EUROMOD Working Papers em1/01, EUROMOD at the Institute for Social and Economic Research.
- Jeetun, Azad (1978), The incidence of taxes in Pakistan. Distributional paper, Applied Economics Research Centre, University of Karachi.
- Khan, R. A. (1984), *Introduction to the Taxation System of Pakistan*. Book Traders, Lahore (Pakistan).
- Klevmarcken, N. A. (1997), Behavioral Modeling in Micro Simulation Models. A Survey. Uppsala University, Department of Economics, Working Paper Series 1997:31.
- Lloyd, R. (2003), Use of Static Microsimulation Models in the Policy Process in Australia. Paper presented to *Modelling our Future: International Microsimulation Conference on Population Aging and Health*.
- Malik, M. H. and N. Saqib (1985), Who bears the federal taxes in Pakistan. *The Pakistan Development Review*, Volume 24, No. 3&4 (Autumn-Winter).
- Malik, M. H. and N. Saqib (1989), Tax incidence of income class in Pakistan. *The Pakistan Development Review*, Volume 28, No. 1 (Spring), pp. 13-26.
- O'Donoghue, C. (2001), Dynamic Microsimulation: A Methodological Survey. *Brazilian Electronic Journal of Economics*, Volume 4(2).



- O'Donoghue, C. and V. Ahmed (2008), Xlsim: Tax-Benefit Microsimulation Model. *Working Paper*, National University of Ireland, Galway 2004.
- Pfähler, Wilhelm (1990), Redistributive effect of income taxation: decomposing tax base and tax rates effects. *Bulletin of Economic Research*, Volume 42(2), pp. 121-129.
- Sicat, Gerardo P. and Arvind Virmani (1988), Personal Income Taxes in Developing Countries. *World Bank Economic Review*, Volume 2, Issue 1, pp. 123-38.
- Stirling, T. and R. Lazutka (2006), I-CUE Feasibility Study: Lithuania 2005 Tax-Benefit System. EUROMOD Study, Institute of Social and Economic Research, 2006. [http://www.euro.centre.org/data/1163686277\\_6287.pdf](http://www.euro.centre.org/data/1163686277_6287.pdf).
- Urban, Ivica (2006), What makes the personal income tax in Croatia progressive? Occasional publication of the Institute of Public Finance, Croatia.
- Verbist, G. (2004), Redistributive effect and progressivity of taxes: An international comparison across the EU using EUROMOD. EUROMOD Working Paper EM5/04, October 2004.
- Wagenhals, G. (2004), Tax-Benefit Microsimulation Models for Germany: A Survey. Discussion Paper No. 235/2004, Institut für Volkswirtschaftslehre, University of Hohenheim.
- Wagstaff, A. and E. Van Doorslaer (2001), What makes the personal income tax progressive? A comparative analysis of fifteen OECD countries. *International Tax and Public Finance*, Volume 8, pp. 299-315.
- World Bank (1999), *Agricultural Taxation in Pakistan*. Washington, D. C.: World Bank Report No. 18935-Pak 1999.