

Determinants of Tax Revenue and Role of Informal Sector in Pakistan



A Research Dissertation submitted to the Pakistan Institute of Development Economics (PIDE), Islamabad, in partial fulfillment of the requirements for the award of the degree of Masters of Philosophy in Economics and Finance.

Submitted By

Samreen Ramzan

Supervised By:

Dr. Iftikhar Ahmad

Co-Supervisor:

Muhammad Ali Kemal



PAKISTAN INSTITUTE OF DEVELOPMENT ECONOMICS, ISLAMABAD

CERTIFICATE

This is to certify that this thesis entitled “**Determinants of Tax Revenue and Role of Informal Sector in Pakistan**” submitted by **Samreen Ramzan** is accepted in its present form by the Department of Economics and Finance, Pakistan Institute of Development Economics (PIDE) Islamabad as satisfying the requirements for partial fulfillment of the Degree of Master of Philosophy in Economics and Finance.

Supervisor:

Dr. Iftikhar Ahmad
Assistant Professor
PIDE
Islamabad.

Co-Supervisor:

Mr. Muhammad Ali Kemal
Research Economist
PIDE
Islamabad.

External Examiner:

Dr. Iftikhar Husain Adil
Assistant Professor
National University of Sciences and Technology
Islamabad.

Internal Examiner:

Dr. Attiya Yasmin Javid
Professor/Head
Department of Economics
PIDE
Islamabad.

Head, Department of Economics and Finance:

Dr. Hasan Muhammad Mohsin
PIDE
Islamabad.

Dedication

I dedicate my dissertation to my beloved parents, teachers and all those who prayed for my success and a special thanks to my brothers Moin Lodhi, Muhammad Imran and my friend Zeba nawaz.

(May ALLAH bless them)

ACKNOWLEDGEMENT

First and far most, all the praises and Glories to Almighty ALLAH (SWT) who bestowed on me the determination, potential and capability to complete this dissertation. I present my sincerest and profound thanks to Prophet Muhammad (SAW) who is source of guidance and blessing for humanity.

After that I am thankful to MR. Muhammad Ali Kemal and Dr. Iftikhar Ahmad. In fact, this work would neither have started nor ended without Mr. Muhammad Ali Kemal professional guidance, direction, enthusiasm and encouragements therefore, I express my heartiest obligation and appreciation to my worthy supervisor and co supervisor for their invaluable guidance, valuable suggestions, sincere and sympathetic attitude, I have learnt a lot from our discussions. May Almighty ALLAH (SWT) bless him and his family. (Ameen)

I owe an immeasurable debt of gratitude to my family and friends for their moral support throughout my study.

Samreen Ramzan

26/M.phil-EAF/PIDE/2013

TABLE OF CONTENTS

Chapter 1: Introduction.....	2
1.1 Defining the Informal Sector.....	5
1.2 Objectives of the Study	6
1.3 Significance of the Study	6
1.4 Organisation of the study	7
Chapter 2: Literature Review.....	8
2.1. Theoretical Literature.....	8
2.2. Empirical Literature	10
Chapter 3: Overview of taxation structure and causes in Pakistan.....	26
3.1 Causes of Low Tax to GDP Ratio.....	31
Demography.....	31
Literacy.....	31
Socio Economic Factors and low tax to GDP ratio in Pakistan.....	31
Narrow Tax Base.....	32
Tax Policy	32
Undocumented Economy of Pakistan	32
Weak Audit and Enforcement.....	33
Corruption	33
Tax exemptions	33
Sectoral discrepancy in tax collection.....	34
Chapter 4: Methodology and Model Specification	35
4.1. Model	35
4.1.1. Definition and expected signs of variables.....	36

4.1.2. Characteristics of Informal Sector:.....	38
4.2. Econometrics Methodology	38
4.3 Data Sources.....	41
Chapter 5: Time Series Properties and Empirical Findings.....	42
5.1. Unit root tests	42
5.2. Auto Regressive Distributive Lags (ARDL) Estimation.....	43
Cointegration Test:	43
Normalized cointegrating equation	44
Normalized equation of Tax revenue	45
Normalized equation of Direct taxes	47
Normalized equation of Indirect taxes.....	50
Stationarity of Error correction.....	51
Short Run Error Correction Results.....	52
Diagnostic tests for ARDL	58
Chapter 6: Summary and Conclusions	59
References	62

LIST OF TABLES

Table 1: Overview.....	28
Table 2: Results of cointegration in Tax revenue	43
Table 3: Results of cointegration in direct taxes.....	44
Table 4: Results of cointegration in indirect taxes.....	44
Table 5: Normalized Cointegrating Vectors (<i>Total Tax Revenues</i>).....	45
Table 6: Normalized Cointegrating Vectors (<i>Direct Tax Revenues</i>).....	48
Table 7: Normalized Cointegrating Vectors (<i>Indirect Tax Revenues</i>).....	50
Table 8: ADF Test Results (Error Terms)	51
Table 9: Tax revenue	52
Table 10: Direct taxes	54
Table 11: Indirect taxes.....	56
Table 12: Results for diagnostic tests for ARDL.....	58

List of Figures

Figure 1: Tax to GDP ratio	29
Figure 2: Direct and Indirect taxes.....	30
Figure 3: Share of manufacturing and share of services in GDP.....	30

Abstract

The aim of the study is to evaluate the determinants of tax revenue and role of informal sector in Pakistan over the period of 1972-2014 by applying the time series econometric technique. We applied bound testing of cointegration to check the long run relationship and Error Correction Model (ECM) to check the short relationship between tax revenue and its determinants. Results indicate that normalized cointegrating equation that budget deficit, total public debt, per capita income, informal industry, formal services, informal services have negative association with tax revenue while formal industry and trade openness have positive impact on tax revenue in long run. According to ECM results, there is a negative value of error correction coefficient, i.e., -0.56. It indicates that whenever there is a deviation from long run equilibrium path, variable adjusts toward the equilibrium. Results suggest public debt, per capita income, openness, formal services and informal services have positive impact on tax revenue while budget deficit and formal industry have negative impact on tax revenue.

Chapter 1:

INTRODUCTION

“The importance of public revenue to the underdeveloped countries can hardly be exaggerated if they are to achieve their hopes of accelerated economic Progress. (Nicholas Kaldor, January 1963¹)”

The main function of a taxation policy is to collect maximum revenues to finance essential public expenditures on public provision goods and services. According to (Kaldor, 1963) developing country may require 10-15 percent tax revenues to develop. A country's revenue generation primarily depends upon size of the economy and administrative capacity of the nation to regulate tax structure efficiently. (Ajaz and Ahmad, 2010)

Economic performance of Pakistan has not been remained stable since its inception. Especially after the breakaway of East Pakistan (now Bangladesh), the government budget has mostly been in deficit (Chaudhary and Munir, 2010) Larger the budget deficit leads to, flattered the growth rate with higher inflation and most importantly, a widening current account deficit that leads to balance of payment crisis. (Qasim et al. 2015) also supported the idea of fiscal consolidation that boosts growth but not at the cost of reducing capital/development expenditures. The tax efficiency in Pakistani tax system remained focal point for the last 25 years. Despite many efforts, tax to GDP ratio could not be altered upward. During last few decades Pakistan's political stability hurt tax reforms. Subsequent governments failed to address the issue of low tax to GDP ratio. As a result, over whelming dependence on foreign aid and internal loans to finance government projects has increased.

¹ Available at <https://www.foreignaffairs.com/articles/asia/1963-01-01/will-underdeveloped-countries-learn-tax>

Pakistan's tax-to-GDP ratio stands today at just below 10 percent and it has remained more or less stagnant.

There are many causes for the low tax-to-GDP ratio. The first is the loss of growth momentum of the economy, particularly declining exports, which constitute the primary tax bases in the economy. Secondly, loss in revenues may be associated with the tax reforms in the decade of the 90's, i.e., process of trade liberalization that replaced the custom duties with sales tax. (Chaudhary and Munir, 2010). Third, Gordon and Li (2005) indicates that problem of enforcement is the main reason for low tax revenues in developing countries. On the other hand, Bilquees (2004; Page 73) argued that the majority is not paying tax because of low average income. Thus large majority remain out of tax net because of overall low average incomes.

Finally, there has been a strong perception that poor tax regulations, inconsistent tax policies and political instability altogether serve as widening informal sector. Currently, there is huge growth in the informal sector of the economy which relies on public expenditures for service provision but contributes a little to the national tax revenues. Today there is renewed interest in the informal economy worldwide. This is because a large share of the global workforce and economy is informal and because the informal economy is growing in many contexts and appearing in new places and guises (Martha, 2012). Apart from the other macroeconomic determinants of tax revenue in Pakistan such as income level, exchange rate and inflation rate, informal sector is considered to be an important factor in this direction.

Nonetheless, taxing informal sector is a very complex process. It is believed that informal sector has limited revenue potential, high costs of collection and potentially perverse impacts on small firms. Although enforcement costs are high in the developing countries but the registration of informal sector helps in stimulating higher economic growth Woodruff (2013). But there are

some problems associating with taxing the informal sector such as investors may focus just only avoiding the taxes and forget about the growth opportunities. Moreover, taxation is considered distortion in the economy which effect efficiency. However, apart from creating distortions our problems lack of the capacity and under-enforcement which leads to the problem of over-burden of taxation.

Firms operating in the informal sector are in general less regulated and faced lower taxes as compared to the firms in the formal sector. Therefore, it is expected that informal sector activities are more efficient in the absence of distortion. Schneider and Enste (2002) call it positive force for development. Furthermore, informality distorts the “natural” competitive process which is the main fundamental of market economy because informal firms enjoy an “unfair” cost advantage through tax avoidance, which is not possible in a regulated economy [Lewis, 2004]. Informal firms reduce their scale of operation in order to remain undetected by the government, which makes them less efficient [Farrel, 2004]. and Levy (2008) states that informality is a drag on the development process because it subsidizes employment in low-productive activities. The wages in the informal sector are also increasing sharply as compared to stagnant formal sector. The more interesting fact about the informal sector is that it continues to grow even during the course of recession in the formal economy.

However it depends on the nature of informal economy. In few countries like Pakistan many formal activities are conducted in those areas which are out of the tax net. These activities such as restaurants contribute significant to the economy, nonetheless remain out of the tax net and become part of informal economy.

1.1 Defining the Informal Sector

When estimating informal economy, there are theoretical and realistic challenges. There is no single definition of informal economy therefore the conceptual issues arises to define. There are many words used to refer to it: black economy, shadow economy, hidden sector, parallel sector, underground economy, subterranean sector and second sector. Nevertheless, each definition has its own meaning which excludes and includes several activities. Therefore it is very difficult to gather data from workers of informal sector because they do not disclose their true incomes and do not disclose actual production or sales. An accurate definition is impossible because the informal sector amends to sanctions from tax authorities, general moral attitudes, and to changes in tax (Schneider and Enste 2000). Definition of any study of the informal sector will rely on its focus. Some definitions in the literature are following: Smith (1994) defines it as “market based production of goods and services, legal and illegal that escapes detection in the official estimates of GDP”. Hartzenberg and Leimann (1992) prefer a broader definition: “all economic activities pursued without the sanction of the authorities; i.e. those not recorded in the national accounts.” Feige (1994) defines it as “all economic activities that contribute to the officially calculated / observed GDP but are currently unregistered”. In this study the definition of informal sector would be: “all those economic activities that are outside the established government’s structures control”.

Estimated documented GDP also has formal and informal component in it. However, still many activities are undocumented due to lack of information as well estimation of GDP using old base of GDP. Therefore, the estimated hidden or shadow or underground economy is not the only informal economy but it is an undocumented informal economy.

1.2 Objectives of the Study

The main objective of this study is to identify the key determinants of tax revenue in Pakistan over the period of 1972-2014. The specific objectives are;

- To examine the relationship among tax revenue and its determining factors specified in the study.
- To examine the relationship among direct taxes, indirect taxes and their determinants
- To find out the relationship between informal sector and tax revenue in Pakistan.

1.3 Significance of the Study

Pakistan is trapped into chronic vicious cycle of low tax revenue which is seriously affecting the nation's capacity to deliver quality public services to its dwellers. As a result of continuous failure of each successive government to revert the low tax to GDP ratio the tax payers are losing their confidence in the system and many businesses are supposed be camouflaging them in the informal sector. The widening of informal sector reflects lack of control from the governments over the system. Although growth in informal sector leads to provide potential jobs and help out to be the lifeline for majority of the population who stand unemployed while looking towards the formal sector. Yet the growth in informal sector must not go unchecked otherwise crowding out in public services for those who pay and who do not pay will deteriorate the very social and economic fabric of the country. Therefore, it is very important to understand the relationship between the growth of informal sector and relative growth in tax revenue. This dynamics will open up new ways for tax revenue improvement. The inclusion of informal sector has not been critically stressed in the past for the improvement in the tax revenue of the country. The current study will therefore divert the attention of researchers and government officials to this very important subject by generating some quality evidences.

1.4 Organisation of the study

After the Chapter 1 of introduction, Chapter 2 contains Literature review in which theoretical links as well as empirical studies are discussed. Chapter 3 contains Overview of tax revenues in the historical context. Chapter 4 contains theoretical framework, model and methodology. Chapter 5 contains findings and explanation of results. Conclusions are drawn in Chapter 6.

Chapter 2:

LITERATURE REVIEW

This chapter reviews literature available on tax revenues and its determinants specified in the study. Section 2.1 reviews the theoretical literature. Empirical literature review is given in section 2.2.

2.1. Theoretical Literature

Taxes are important sources of public revenue. There are lots of studies done by researchers on tax revenue determinants. Several studies have included per capita income (PCI), public debt, openness, and manufacturing share in GDP, services share in GDP, institutions and informal sector as major factors of tax revenue. Per capita income is used as a proxy for the overall development of the economy and is expected to be positively associated with tax. Furthermore, according to Wagner's law, government expenditures are expected to increase with the increase in income of the people because they will then use more recreational activities such as public parks, use public roads etc. Therefore, the demand for government services is income elastic.

Using cross country data Agbeyegbe et al. (2004) concludes that better tax administration in higher income countries is associated with higher degree of monetisation. Developing countries have higher degree of perks which are untaxed thus lower tax revenues. Higher income countries often tax more progressively as compared to lower income countries. Therefore, it is expected that there is a positive relationship between the tax performance and GDP per capita.

Openness is one of the core indicators that determines the tax efforts Lotz and Morss (1970) and Wibbels and Moisés (2003). Some studies finding a strong association between the

degree of openness and tax revenue include Ebrill et al. (1999), Agbeyegbe et al. (2004), Aizenman and JinJarak(2009)and Senhadji (1998). Given that tax revenues of low income countries, especially from a trade tax perspective, tend to have high dependency on the international trade sector, an increase in the degree of trade openness is expected to bring higher tax revenue. Thus, a positive relationship is expected between higher levels openness and tax performance. Ghura (1998) and Gupta (2007) also found the positive effect.

Manufacturing share in GDP is defined as the growth in manufacturing sector divided by growth of GDP. Increase in growth of manufacturing sector cause increase the revenue through sales tax, excise duty and corporate income tax etc. the expected sign of this variable is positive. (Ahmad and Mohammad, 2010). Same relationship can be seen in the case of share of services in GDP. In case of many of the developing countries the service sector comprises of informal sector. It is expected it will increase tax revenue but due to informal service sector degree of tax evasion is also high so growth in service sector impact not much on tax collection. The expected sign of this variable is ambiguous.

Revenue collection of a country also influence to the government's efficiency of that country. Better institutions and governance brings a fine tax system; tax system and governance are positively related to each other. An enhanced tax to GDP ratio can be accomplishes by utilizing a mixture of improved tax administration, best macroeconomic policies, good governance and other optional tax methods. One grim issue for governance of a country is the connections between legitimacy and the tax policy of governments and their policies they follow. Benno (2003) recommends that courts and legal system, local autonomy direct democratic rights, and trust in government have a positive and significant impact on tax morale. Bird *et al.* (2008)

point out that tax framework is highly approachable to governance framework of a country; developed or high income countries can perk up their tax effort through improving their framework of governance.

Total government debt has also been measured key component of tax revenue. This is computed in terms of debt per capita. An elevated level of public expenditure often leads to huge fiscal deficits. The budget deficit in most cases is covered by funds and loans which lead to an increase in the total public debt. There is a negative relation between tax performance and public debt has been distinguished by Tanzi and Blejer(1988) who discover that a huge public expenditure often go to an increase in total public debt. Government debt often brings to the country at non-concessional and concessional interest rates. As a result it is considered that there is negative relation between total government debt and total tax revenue.

There is inverse relation between informal sector and tax revenue. When the size of informal sector increases, degree to tax invasion also increases. In case of many of the developing countries typically have a large informal sector, very high self-employment rates and low levels of tax collection (Woodruff, 2013).

2.2. Empirical Literature

There are so many empirical studies those evaluated the tax effort across different countries and measured the informal economy. Most of the studies using tax to GDP ratio and tax to GNP ratio as dependent variable. According to the literature following are the main determinants of tax revenue: share of agriculture in GDP, share of manufacturing and mining in GDP, share of service sector in GDP, inflation, PCI, openness, political stability, total debt, external debt, tax rate, M2, FDI, literacy rate and urban population.

Karagoz (2013) examine the Turkey's determinants of tax revenue and where sectorial composition affects revenue or not. He used time series regression analysis. The results of the regression disclose that industrial and agricultural sector share in GDP, foreign debt stock economy's monetization rate, and rate of urbanization have significant effect on tax revenues in Turkey. While as per expectations there is a negative sign for share of the agricultural in GDP. According to the results there is no significant impact of openness to foreign trade on tax revenues in Turkey.

Bahl (2003) described the variables affecting tax revenue of less developed countries and OECD by using a panel data set. He used the determinants as openness, non-agricultural to GDP ratio and growth rate of population; all these demonstrated statistically significant and positive results. There is a correlation between tax effort and the size of black economy represented the negative and statistically significant result.

Bird (1976); Ahmad and Stern (1991) illustrated that if an economy has a large GDP share of agriculture, value added will expect to produce low tax revenues. It is generally hard to directly tax Pakistan's agriculture sector due to political influence, however it is often taxed very heavily in many understood means, e.g., tariffs, through import quotas, overvalued exchange rates and controlled prices for output.

A study has been done by Teera (2002), in which he assessed, how effecting factors of tax revenue effect tax system and tax structure. He estimated a model by using the time series data of Uganda over the period of 1970 to 2000. His results indicated that all type of taxes affected by population density, agriculture ratio and tax evasion. Per capita income (PCI) indicated the unexpected negative sign. However openness (as computed by import ratio) and tax evasion

represented the negative but significant impact. Aid variable shows positive sign because aid in Uganda always holds up imports particularly raw material so not surprisingly.

Alm et al. (2004) took the determinants of total tax to GDP ratio those are per capita income in terms of GNP, agricultural/GNP, taxes on international trade/GNP, mining/GNP and shadow economy/GNP. He used the data of developing countries and developed countries. He found the insignificant and negative relation with international trade/GNP and agricultural/GNP, statistically significant and positive relation with mining/GNP and negative sign but statistically significant relation with shadow economy/GDP and GDP per capita.

Chaudhary and Munir (2010) conducted a study on factors of low tax revenue in case of Pakistan. They applied econometric technique on time series data since 1973 to 2009. Findings suggested that openness, foreign aid, external debt, broad money, and political stability are the key determinants of tax revenue in case of Pakistan economy. The results also point out that in Pakistan, more dependence on low level of literacy rate, foreign aid, agriculture sector and narrow tax base are the main factors those become the cause of lower tax revenue. Finally they concluded that high tax to GDP ratio in Pakistan economy can produce by improving the literacy level, openness, widening the tax base, political stability through organizing income inequality, tax evasion and tax exemptions.

Gupta (2007) compute the basic elements of tax revenue performance in developing countries. He used a wide dataset and also checks for some econometric problems that were overlooked previously. According to the findings, fundamental factors such as per capita income, trade openness, agriculture share in gross domestic product and foreign aid have significant impact on tax revenue performance of an economy. While additional factors include corruption, share of direct and indirect taxes and political stability, corruption and share of indirect taxes and

political stability etc. He also uses revenue performance index and computes that some Latin American economies fall short of their tax revenue potential while, several Sub Saharan African economies are performing fine above their prospective

Several studies done by Toyé and Moore (1998), Fjeldstad and Taungodden (2003), Li (1997), Tanzi (2000), and Galtung (1995) argue that tax revenue collection sector is one of the major areas that stimulate corruption. Taxation system will be more efficient if there will be good governance and law and order condition in a country. There are key dynamic effecting factors, good law and order situation in the state, proficient tax administration and preparedness of taxpayers to pay tax.

Phillips and Sandall (2008) did a work on tax reforms and governance. They found that good governance and proper investment system employed positive impact on taxation system. The study argues that there is positive and significant impact of governance on taxation system. While, sound taxation system encourages governance. In conclusion there is bidirectional relation between governance and taxation system.

Iqbal et al. (2015) carried out a study to examine the impact of various forms of taxes like sales tax, excise duties, custom duties, worker welfare tax and income tax on gross domestic product (GDP) in case of Pakistan over the period of 1979-2010. Statistical results showed positive and significant impact of taxes excluding worker welfare tax (WWT) on GDP of Pakistan. It argues that WWT is negatively affecting labor productivity and so economic growth of Pakistan.

Ghani (2011) Analyze the tax performance across the different countries with a special focus on Pakistan. He examined the tax performance of 104 countries by using some econometric techniques on panel dataset, over the time period from 1996 to 2005. In general, he

identified that these are the majorelements of tax-to-GDP ratio across these countries are per capita GDP, openness, urban population, control of corruption and rule of law. The tax attempt indices illustrate an overall decline obtained for Pakistan. He suggested that Pakistan needs good policy measures to implement in the country such as the tax base, implementation of modified VAT and broaden and improvement of institutional quality.

Mahdavi (2008) did a work on tax revenue and its components by using unbalanced panel data of developing countries over the period of 1973 to 2002. The study was conducted for 43 DCs including Pakistan. Findings suggest that some variables affect level of the tax revenue and tax revenue structure. Additionally, results argued that some variables effect is statistically insignificant and opposite directions on its components. The study concludes that dynamics level of tax revenue and structure of tax revenue has important role for tax reforms in DCs.

Castro and Camarillo (2014) analyze the impact of structural, economic, social and institutional factors on tax to GDP ratio by using dynamic and static panel data methods, across 34 countries over the period 2001 to 2011. The results indicate that the industrial sector, civil liberties and GDP (gross domestic product) per capita have positive impact on tax revenue, while the share of FDI (foreign direct investment) in gross fixed capital formation and agricultural sector have negative impact on dependent variable. There is a positive impact of lagged value of the dependent variable. They also come across the tax gap and tax effort and compute that they are diverse across countries and stable over time apart from the development level of the economies.

Ajaz and Ahmed (2010) explained in their study that in revenue generation process, there are many institutional problems in developing countries. Corruption in tax administration is one of the key problems. Low quality of governance is second major problem of low tax revenue

generation in the country. This paper examines the influence of structural and institutional variables (governance and corruption) on tax revenues during the period of 1990-2005 by using the panel data for 25 developing countries. They used the GMM regression model for estimation. After the analysis they found that following institutional variables significantly influence to all the taxes. Further, they found that corruption has unfavorable effect on collection of taxes, whereas good governance leads to better tax collection.

Patoli et al. analyze the impact of inflation on tax revenue in Pakistan. Furthermore they estimated the elasticity in stochastic variable of taxes (direct, indirect and total taxes) and inflation in Pakistan and other factors remaining constant. They measured the empirical relationship and took the secondary data from the period 2000 to 2010 by using of some statistical instruments for example correlation among variables of direct taxes, indirect taxes, total taxes and inflation using ordinary least square method (OLS). According to their finding taxes and inflation are positively correlated.

Aizenman and Yothin (2005) examined how fundamental operational and political economic factors affect proficiency of value added tax (VAT) collection system. They analyzed that good economic structure promotes the effectiveness of VAT collection. They also argued that low trend of urbanization, less share of trade openness and higher agriculture share discourages the VAT collection productivity.

In a paper Tabasam (2014) efforts to analyze the impact of foreign aid, FDI (foreign direct investment), trade openness and remittances (Foreign cash inflows) on tax revenue in Pakistan for the time period from 1975 to 2012, by using different time series techniques like Co integration, unit root test of Augmented dickey fuller, and Error correction mechanism. According to his results a positive sign exists between Trade openness, Remittances and tax

revenue and there is negative sign holds between foreign direct investment and total tax revenue in Pakistan throughout the study period.

Mahmood and Chaudhary (2013) carried out a study on tax revenue and FDI (foreign direct investment). They estimated the impact of GDP per person employed and foreign direct investment on tax revenue in Pakistan. They choose the time period 2000 for break period and puts 0 from 1972 to 2000 and 1 afterwards in tax to GDP ratio. They used the time series techniques as Phillips-Perron, Augmented Dickey Fuller, Zivot-Andrews, and Ng-Perron unit root tests to locate the integration level in the time series. The study finds the long run and short run relationship in the model and they applied Error correction model and auto-Regressive Distributive Lag. According to the results gross domestic product and foreign direct investment have positive and significant impact on the tax revenue. Hence study concluded that foreign direct investment affect tax revenue significantly.

Chelliah et al. (1975) did a work on the data of 47 countries over the period of 1969 to 1971. The took agriculture share, export share, and mining share as dependent variables and tax share in GNP as independent variable. Their results shows negative but significant effect for agriculture share, while for export and mining share the effect was positive and significant. Same results had been found in the study done by Tait et al. (1979), however they took the period of 1972-1976.

Lutfunnahar (2007) recognized the factors affecting the revenue performance and tax share for Bangladesh and 10 other developing countries through a panel data evaluation for 15 years. The results showed broad money, international trade, population growth and external debt are majordetermining factor of tax efforts. Findings of the study concluded that Bangladesh and

other developing countries are not consuming their occupied capability of tax revenue and have low tax effort.

Eltony (2002) evaluated in his panel data study the determinants of tax revenue share in GDP and developed tax effort's index of 16 Arab countries. According to the results share of mining in GDP, PCI (per capita income) and the share of agriculture in GDP are the key determinants of the tax revenue share in the GDP for the following Arab countries. These dependent and explanatory variables are statistically significant and acquired their expected signs. There are some other variables that are very important determinants those are the share of imports and exports but it's applicable in only the non-oil Arab countries. There is positive and significant relationship found between outstanding foreign debt and tax share.

Leuhold (1991) measured the determinants of tax share for African countries. He took per capita income, mining share and share of agriculture in income and ratio of export and import as determinants of tax share. According to results of the study share of mining has positive; share of agricultural has negative whereas the share of foreign loans and grants and foreign trade share have also statistically significant and positive relation.

Stotsky and Mariam (1997) also worked for tax efforts. They constructed a measure of tax effort and calculated the determinants of the tax share in GDP by using a panel data of 43 sub-Saharan African countries during the period of 1990-95. The examination suggests that both the share of mining in GDP and the share of agriculture in GDP have negative and significant impact on tax share and the relation of share of imports and exports in GDP and tax share are significantly positive, while per capita income is not significant. Moreover, there is no strong relation found between tax shares and international monetary fund (IMF) platforms.

Ahsan and Wu (2005) evaluated the determinants of tax share in GDP for period 1979-2002 for developing and developed countries and they found the statistically significant and negative relation of growth in population to the tax ratio, GDP per capita and agriculture share while corruption has insignificant and negative relation but share of trade in GDP has significantly positive relation.

Lotz and Morss (1967) find the ratio of tax revenue to GNP by using the data of developing and developed countries. He exercised openness, per capita GNP for this. He found both per capita GNP and openness showed the positive and statistically significant effect. Tanzi (1987) measured positive and significant effect only for per capita income by taking the data of developing countries.

Fenochietto and Pessino (2013) present a model to determine the tax effort and tax capacity of 113 countries and the main variables on which they depend. The results and the model shows a clear determination of which countries are near their tax capacity and which are some way from it, and therefore, could increase their tax revenue. This research also determines the central factors on which tax capacity depends. They argued that the tax volume depends on the level of development, trade, education, inflation, income distribution, corruption, and the ease of tax collection.

Mascani et al (2014) carried out a study on tax revenue recruitment in which they discussed the problems and challenges of tax revenue in developing countries. They argued that in recent years, domestic revenue mobilization in developing countries gained increasing importance in the policy debate. In developing countries governments and policy makers face many challenges in mobilizing tax revenues, which result in a gap between what they could

collect and what they actually collect. However the substantial sources of tax gaps are tax exemption, tax evasion, inequitable rent-sharing in the extractive sector and tax avoidance.

Pasha (2010) explains reasons of low-tax-to-GDP trap in Pakistan and how to get rid this trap to attain the revenue targets. Analyzing the pattern features that are influencing the trend in individual and total tax revenue over a period of twenty years, he suggests that inappropriate and partially successful tax reforms have put in this trap. He presents a strategy in which his aim is not only improving tax revenues but also building the tax structure balanced, broad based and more progressive.

Aamiret al. (2011) comparing in this studies these two types of taxes (direct and indirect) in two neighbor countries Pakistan and India. They acquired a sample of tax revenue collected under the heads of indirect and direct taxes from period 1999-2000 and 2008-2009. The results of the study shows that India generating more tax revenue from direct taxes whereas Pakistan getting more tax revenue from indirect taxes. They concluded from the results that there are different effects of these two fiscal policies. If there are more Indirect taxes in the country, poverty gap will increase.

Ordóñez† (2010) explained that the informal sector of many developing countries is a major characteristic. According to the Literature determinants of informality are very important to study. There is less understanding in the relationship of both development of economy and informal sector. As per the literature, a tax enforcement quality of a country is the most significant determinants of economic informality. In this paper, author quantitatively analyzes the significance of the consequences of incomplete tax enforcement on productivity and aggregate outcome. He uses a (DGEF) dynamic general equilibrium framework to asses these effects that are not briefly explained in the literature. He uses the dataset for Mexico by

standardizing the model. Mexico is a country where 31% of the workers job in informal organizations. After that he investigates the consequences of improving enforcement. Under complete enforcement, result shows that output and labor productivity of Mexico would be 17% higher.

Ordenez (2014) analyze the quantitative impact of incomplete tax enforcement on productivity and aggregate output. He took the dataset for Mexico and used dynamic general equilibrium model for theoretical support. Under perfect competition, output and labor productivity would be higher with the ratio of 19% and under monopolistic competition output and labor productivity would be 34% higher, under complete enforcement.

Ihrig and Moe (2004) examine the relationship between tax enforcement policies, tax rate and size of informal sector as well as how these factors influence the informal sector. They also show how the sector naturally gets smaller as the economy of the country evolutions towards steady state. They suggested a policy that reduction in tax rate will automatically decrease the size of informal sector and this policy is best to increase the living standard and decrease the informal employment. According to the results policymakers desire to view the informal sector as essential part of country's economy.

Mukarrum, (2001) estimate the elasticity and buoyancy of major taxes in Pakistan by using the technique chain indexing over the period 1981-2001. According to the results of the study that for direct taxes that followed by sales tax, elasticity and buoyancy are higher. On the other hand excise duties and customs are relatively lower because overall elasticity of tax is also low. Consequently, it is expected that the sales tax and direct taxes will be the support of the future strategy of resource mobilization of Pakistan. Furthermore the estimates of buoyancy are

elevated than their related elasticities for all types of taxes. He concluded that broadened tax bases and enhanced tax rates helped to achieve the growth in revenues instead of auto growth.

Bilquees (2004) also Estimate the flexibility and elasticity of the tax system for the time period 1974-75—2003-04. The elasticity of both total tax revenue with respect to the non-agriculture Gross domestic product base and total tax revenue with respect to the total Gross domestic product is less than unity.

Ahmad and Mohammad (2010)evaluated the tax buoyancy's determinants by using the cross sectional data of 25 developing countries for period 1998 to 2008 and used pooled least square technique for result evaluation. Their results showed significant and positive effect for services sector while many studies gave insignificant results.Further it represented insignificant influence for agriculture sector. Budget deficit and monetization showed positive sign while negative impact on tax buoyancy of growth in grants.

Woodruff (2013) says typically there is a large informal sector, low level of tax collection and very high self-employment rates in lower middle income and low income countries. In a current proposal inSri Lanka small firms registered in the informal sector. Thisinclusion of small firms in informal sector helpedto these firms a quick growth. In this study he gave some policy implications to government in developing countries.

Ehrhart (2009) argues that democracy has substantial influence on domestic tax revenue. He used the panel of 66 developing countries since 1990 to 2005. Study showed the solid proof that the political government in a country controls the extent to which domestic tax reforms are exercised and domestically higher revenues achieved.

Phiri and Kabaso (2012), attempt to find whether there is significant scope for taxation of informal sector in Zambia. They evaluate the techniques for computing informality and match up

to the results these techniques have attained in different frameworks. Applying the Currency Demand Approach to Zambia for the period 1973–2010, they find that the tax potential of informal sector averaged 42% of overall tax revenues per annum and that the informal GDP averaged 47.7% of official GDP per annum.

In developing countries casual payments are an often ignored source of local government finance. Olken and Singhal (2012) take ten countries' micro data to found stylized facts on the distributional implications, form, and magnitude of the "informal taxation". Informal sector widening especially in rural areas and considerable in-kind labor compensations. The rich pay more than a poor, but he pay less in proportion terms, and formal taxes are less regressive than informal taxes. Failing to comprise informal taxation underrates revenue decentralization and household tax burdens in developing countries.

Freeman et al. (2006) explained in their study that the researchers got challenges to discover more authentic and exact techniques to quantify the urban informal economy which got bigger in the last thirty years. Particularly this study inspects modern works on the informal economy of urban areas and examines the different methods for measuring urban informal economy and its definitions. There are some direct and indirect estimation methods. Direct estimation methods such as household surveys and labor force and indirect estimation measures, such as labor force statistical profiles, currency demand and electricity consumption.

Vuletin (2008) analyzes the size of the informal economy and the factors contributing to determine the informal economy for 32 mainly Latin American and Caribbean countries in the early 2000s. They used a structural equation modeling approach. By using this approach they find that rigid labor markets, burdensome tax system, dominance of the agriculture sector and higher inflation are the key factors in determining the informal economy. According to the

results that higher informality in the country reduces enrollment rates in education the number of contributors to social security schemes, and labor unionization.

Dube (2014) analyze the challenges of an attempt to collect tax revenue from informal sector facing by Zimbabwe and other developing countries. Sometimes informal sector is a growing component of the economy and generate sufficient revenue at least to fund the expenditures of administrative authorities. Over the last 8 years, Zimbabwe tries to collect the taxes from informal sector. According to the evaluation there has been apparent increase in taxes but the rate of increase should be greater than the revenue collected. It requires looking at problems such as the quantity collected as a ratio of total revenues, the ratio of the informal sector of those who pay these taxes, the tax administration's capability to support quasi-voluntary compliance and the costs acquire in generating these taxes. This study shows that the levels of tax evasion (verified by the informal sector associations), corruption and selective application of tax policies are alarmingly high.

Torglerand Schneider (2007) evaluate in their paper that how countries' quality of institutions and tax morale influence the informal economy by a multivariate analysis and many potential aspects. They highlight the quantitative significance of the following features to recognize the intensity and transformation of informal economy and available new data sources are very useful to understand this topic. According to their results that there is a negative relationship between institutional quality, tax morale and shadow economy that an increase in institutional quality and tax morale lead to a smaller shadow economy.

Kemal(2007) explained the link between the formal sector of the economy and underground economy. He found that informal economy is influencing the formal economy but formal economy is not influencing the informal economy. The study recommended to

strengthening the institutions, to raise the number of legal documentation, better governance, diminish the number of regulations and control smuggling through tariff validation to decrease the tax evasion.

Loayza(1997) gave the point that governments impose excessive taxes with increase informal economy. He evaluated the factors and effects of the informal sector by using an endogenous growth model. He used data of early 1990s of Latin American countries; Loayza evaluates some of the model's propositions and determines the size of the informal sector in several countries - recognizing the size of the informal sector.

Joshi et al. (2014) conducted a study, in which they reviewed on debates of informal economies. In this paper they tried draw attention to new thinking about whether and how to strengthen informal sector taxation, and highlight recent innovations and efforts from a state-oriented perception. In Conventional debates they found that to tax has frequently focused on the limited revenue potential, high cost of collection, and potentially adverse impact on small firms. While recent arguments have increasingly highlighted the more indirect benefits of informal taxation in relation to economic growth, broader tax compliance, and governance. More research is needed, they argued, into the relevant costs and benefits for all, including quasi-voluntary compliance, political and administrative incentives for reform, and citizen-state bargaining over taxation.

Burki and Afaqi (1996) also surveyed the growing literature on informal sector of Pakistan through empirical studies. They explained in their study that informal sector is devastating topic in recent years because of its size, employment, skill generation, growth and earning potential for the firms. Particularly they focus on employment and skill generation under *ustad-shagird* organization and they gave their opinion for growth of firms inspecting sub-

contracting arrangements, technology adaptation, and macro policy environment, access to capital, firm's location and markets. They also illustrated the production relationship of working women.

Chapter 3:

OVERVIEW OF TAXATION STRUCTURE AND CAUSES IN PAKISTAN

Tax to GDP ratio is the total tax revenue collection of government that is divided by the GDP of that country. Most important sources of tax revenue in Pakistan are general sales tax or value added tax, corporate and personal tax, custom duties and federal excise duty. Countries that have highest tax to GDP ratio in the world are, 49.3 percent of Zimbabwe, 49.7 percent of Sweden and higher 50 percent of Denmark. Pakistan's tax to GDP ratio is worse than its neighbor countries. For example tax to GDP ratio of Sri Lanka is 15.3 percent, 17.7 percent India's tax to GDP ratio, Maldives' 20.5 percent. Pakistan barely managed 8.9 percent Tax-to-GDP ratio in fiscal year 2009-10. This worse and declining tax to GDP ratio indicates that taxation is not able to keep pace with economic growth.

Performance of tax system in Pakistan is inadequate but the question is how inadequate is the performance of tax system? That adequacy can be measure through following approaches. First approach is government budget deficit that represent that Pakistan's tax effort is too low to fulfill the public expenditures. First in 2004 Pakistan's budget deficit decreased to 2.3 percent of GDP but later increased to 7.6 percent of GDP in 2008 and 5.9 percent of GDP in 2011. This decrease in budget deficit was due to the effort on expenditure side. Second approach is international comparison. There is no a proper way to establish that how high or low taxes should be in a country, international comparison tells us how far is Pakistan from the international norms. According to Kaldor (1963) Third approach is regression analysis approach. Taxable capacity is dependent variable in this approach which is measured by tax collection to

GDP ratio. Regress the taxable capacity with different proxies that taken as independent variables. From this estimation we can get a predicted value of tax collection to GDP ratio.

In 2002-03 direct taxes comprised of corporate and personal taxes are 31 percent of total tax revenue and increased by around 39 percent in 2011. General sales tax presented in 1990 become the major source of Pakistan's tax revenue by 2000. According to Federal Board of Revenue in 2003-04 GST accounted for 42 percent of total tax revenue of Pakistan 4 percent share in GDP but decreased in 2010-11 to 3.5 percent. In 1990 excise tax revenues were 16 percent of total revenue but according to FBR, excise tax revenues are currently around 9 percent of total revenue. There are so many causes of this decrease in excise tax revenues e.g. abolition of some excise taxes and lack of elasticity of revenue. After trade liberalization, Pakistan' tax structure has remained less reliant on custom duties. In 1993-94 custom duties were 1.6 percent of GDP that is down to 1.1 percent of GDP in 2001-02 and 1.02 percent of GDP in 2010-11.

We can improve tax to GDP ratio if all the sectors proportionately contribute to revenue, but in Pakistan all the sectors' contribution does not match in overall economy and tax to GDP ratio e.g. Transport, retail and whole sale sector, construction, restaurants, hotels and commission agents. Federal Board of Revenue declares that sectors' contribution of telecommunication, insurance and banking sector is also under potential.

Table 1: Overview

unit ??

FY	CBR taxes	Direct tax	Indirect Taxes			
			Sales tax	Customs	Excise	Total
1999-00	9.2	3.0	3.1	1.6	1.5	6.2
2000-01	9.4	3.0	3.7	1.6	1.2	6.4
2001-02	9.2	3.2	3.8	1.1	1.1	5.9
2002-03	9.6	3.1	4.0	1.4	0.9	6.4
2003-04	9.4	3.0	4.0	1.6	0.8	6.4
2004-05	9.0	2.8	3.7	1.8	0.8	6.2
2005-06	9.4	3.0	3.9	1.8	0.7	6.4
2006-07	9.6	3.8	3.6	1.5	0.8	5.9
2007-08	9.9	3.8	3.7	1.5	0.9	6.1
2008-09	9.1	3.5	3.6	1.2	0.9	5.6
2009-10	9.9	3.5	3.5	1.1	0.8	5.4
2010-11	9.3	3.3	3.5	1.0	0.8	5.3

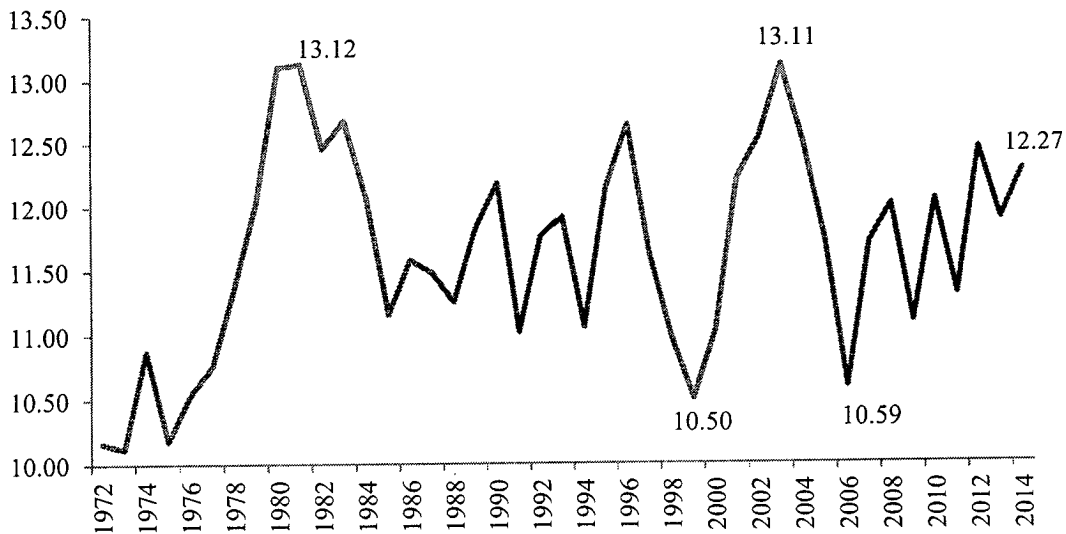
Sources: World Development Indicators

We plot the data in terms of graphs to recognize the descriptive properties. The graph below somewhat shows different values than the above mentioned tables. It was done deliberately to show that if we keep the base of GDP constant overtime then there will be lesser difference in tax-GDP ratio than we observed otherwise while comparing it with the values of tax-GDP ratio 20 years ago. In the pattern of tax to GDP ratio there is a quantum jump during the period of 1970s, 13.2 percent was highest because of boosting four percentage points of GDP in customs duties as well as terminating of tax holidays. Since the early 1990s, tax to GDP ratio has

remained stagnant to 11 to 12 percent and share of customs duties has declined with the increase in performance of sales tax and income.

Further, 1960s is considered the decade of excise duties, 1970s and 1980s is considered as the decade of customs duties, and 1990s of income and sale taxes. During the 1990s the average value of tax to GDP ratio was 11.5 per cent and at 13 per cent during the period 2000–07. Adjusting for the effect of re-basing of GDP in 2000-01 after a long interval of 20 years, it is evident that tax to GDP ratio has remained broadly unchanged.

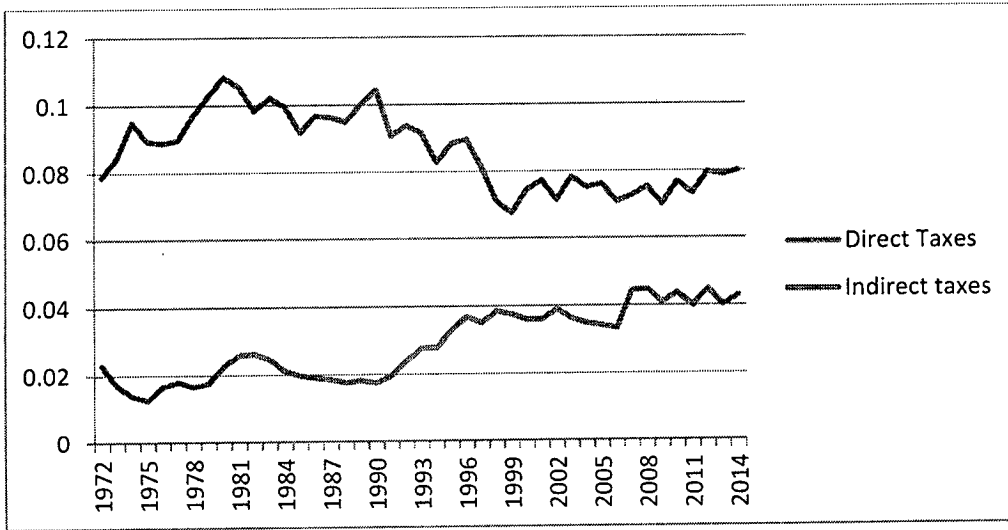
Figure 1: Tax to GDP ratio



Note: The calculation of Tax-GDP ratio is done by keeping GDP base constant over time

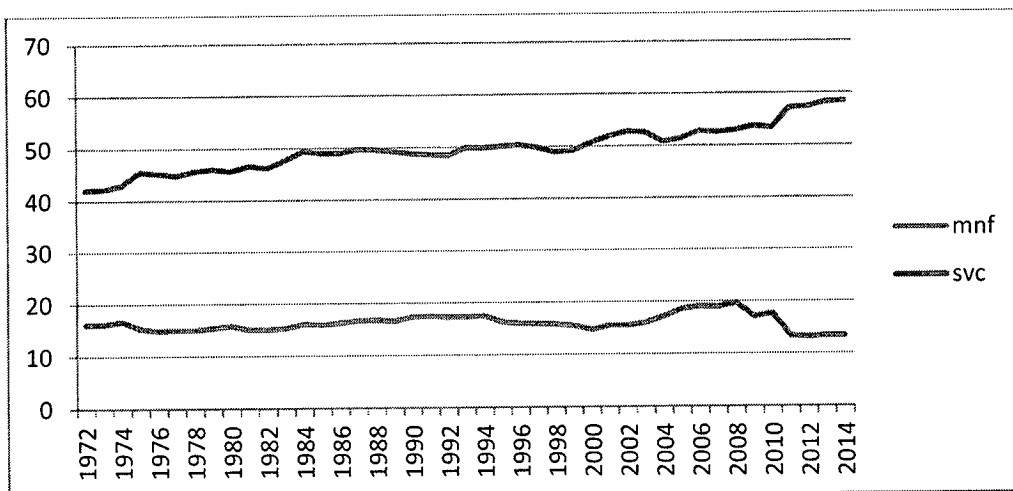
The trend of direct and indirect taxes show that Pakistan’s indirect tax system is aggressive and bias against the poor, putting greater burden on the low-income households than the upper ones. We must reduce the burden through decreasing indirect taxes while higher rates of income taxes, capital transfer taxes and wealth taxes on elite are some means adopted for achieving equity in society.

Figure 2: Direct and Indirect taxes



The manufacturing is the most important sub-sector of the industrial sector comprising 65.4 percent share in the overall industrial sector. Growth of manufacturing is registered at 3.17 percent compared to the growth of 4.46 percent last year. The share of the services sector has reached to 58.8 percent in 2014-15. The Services sector has witnessed a growth rate of 4.95 percent as compared to 4.37 percent last year. The growth performance in services sector is broad based, all components contributed positively in growth,

Figure 3: Share of manufacturing and share of services in GDP



3.1 Causes of Low Tax to GDP Ratio

Demography

The demographic trends are very significant for any country's tax to GDP ratio. The GDP ratio will be higher for the country that has more professional and employed people as they are involved in economic activities. But Pakistan's demographic trends are not encouraging for tax revenue collection.

Literacy

Tax to GDP ratio is significantly low for the countries where population is based on illiterate and less technical and professional people because economic and social development can hardly be accomplished. Pakistan has not performed well overall in the field of education and particularly professional studies.

Socio Economic Factors and low tax to GDP ratio in Pakistan

Pakistan is facing a lot of socio economic problems. The revenue collection of the country is declining because of poverty, unemployment, terrorism and law and order situation. Because of these the economic has been slowed down and foreign investors are reluctant to invest in our country. The high rate of inflation is prevailing in Pakistan because of increase in oil prices and unfavorable internal business condition. Consumer Price Index and Wholesale Price Index is very high, while the purchasing power of people is very low. In this situation it is difficult to increase the tax to GDP ratio, unless these threats are not addressed rightly.

Narrow Tax Base

Measurement of narrow tax base is imperative because the mobilization of tax revenue has a direct connection with the number of taxpayers contributing enthusiastically in the system set up to levy and collect taxes. The utmost threat to revenue collection in our country is our narrow tax base which has a direct relationship with low tax-to GDP ratio.

Tax Policy

The tax policy is approach of government to implement taxation, policy. Progressive taxes policy has been used by the countries that have high tax to GDP ratio as it rectifies income inequality and prevents persistent differences in society. But in Pakistan whole emphasis is on indirect taxes which is known to be a regressive taxation, although Refaat(2005) concluded that GST, especially is not at all regressive, though not progressive at the same time. Direct taxes are also being collected in form of indirect taxes, i.e., withholding taxes, which people have asked to payback when the file tax returns. Nonetheless, the filers are very few in numbers than those who actually pays withholding taxes on different goods and services they use.

Undocumented Economy of Pakistan

The undeclared income earned through some economic activity over a period of time is known as undocumented economy. The case of non-declaration of income due to fear from harsh attitude of tax collector, low literacy rate and ignorance increases the size of undocumented economy. The undocumented economy of Pakistan is three times bigger than the size of regular economy. Comparing with large developing and developed countries the share of taxpayers to population is low in our country.

The undocumented economy has been the main reason of low tax to GDP ratio. FBR has been trying to include the informal economy into registration albeit significant part of informal

economy is still remains out of the tax net. For example when VAT was introduced to collect tax at each stage of supply chain/production in order to register every transaction, people had started using fake invoices. Through the use of fake and flying invoices they get the benefit of VAT mode taxation but the real purpose of getting the economy documented is not being fulfilled.

Weak Audit and Enforcement

The lack of documentation is the main problem prevailing in Pakistan, in case of individuals as well as to the firms and small corporations. It indicates that an incomplete and inaccurate data is provided by the taxpayer with poor record keeping.

Corruption

In Pakistan the social and economic problems are caused by the corruption. The year 2010, indicated that corruption had increased from Rs. 195 billion in 2009 to Rs. 223 billion. According to 2010 report taxation department is at no 8 in term of corruption. And out of different taxes, income tax is the most corrupt field. The areas where corruption has been pointed out are: reducing fictitious assessment, under assessment, reduction in tax, getting tax certificate, releasing goods, and refund of extra paid tax.

Tax exemptions

Federal Government to exempt any income or classes of income, or person from tax under the section 53 of the Income Tax Ordinance 2001, section 13 of sales tax act 1990 and section 16 of Federal Excise Act 2005 etc.

Tax exemptions are allowed under restrictive set of conditions. In certain cases these are granted to promote investment, exports and growth, in other cases privileged personalities are entitled to such exemption, or they are allowed to vulnerable groups to preserve equity in the tax system

(essentially tax expenditure). Some of these exemptions are time-bound, i.e. they lapse after the due date unless renewed further or they have no expiry date and their termination (or continuation) depends on the design of tax policy being pursued.

Sectoral discrepancy in tax collection

According to sectoral analysis service sector is the major tax non-compliant sector creates the gap between taxes to GDP ratio. The sub sectors like wholesale and retail sector, transport, construction, hotels/restaurants and commission agents whose tax contribution does not match with their contribution to GDP.

Chapter 4:

METHODOLOGY AND MODEL SPECIFICATION

The reliability of a research outcome inextricably depends upon the accuracy of research design. The basic purpose of methodology is to describe the research design which will be followed throughout the course of this research. The appropriate description of methodology helps to replicate the study to ensure the results are consistent and reliable. In this regard, this study will be quantitative in nature and depends upon time series data to investigate the role of informal sector in tax revenue collection.

4.1. Model

The study will analyse empirically the determinants of low tax revenue in Pakistan by employing time-series econometric techniques over the period 1973-2014. Tax revenue is taken as dependent variable while budget deficit, openness, per capita income, public debt, formal services, formal industry, informal services, informal industry taken as explanatory variables. Following Chaudhary and Munir (2007), we specify empirical model in the following way:

$$Y_t = \alpha + \beta_1 B + \beta_2 open + \beta_3 PCI + \beta_4 debt + \beta_5 foser + \beta_6 find + \beta_7 infoser + \beta_8 infind + \mu_t \dots \dots \dots (1)$$

[95 it cross section data]

Where Y is tax revenue, B is budget, $open$ is trade openness, PCI is per capita income, $foser$ shows formal services, $find$ is formal industry, $infoser$ is informal services and $infind$ is informal industry and μ shows the error term.

4.1.1. Definition and expected signs of variables

Budget deficit: Budget deficit is a status of financial health in which expenditures exceed revenue. Expected sign of budget deficit is positive which means tax revenue increases with the increase in budget deficit. However, the long run association may be negative due to presence of higher budget deficit caused by lower tax revenues.

Openness: Openness is measured as the ratio of imports and exports of goods and services to GDP. Openness has largely been considered a fundamental determinant of taxable capacity by different studies. Among the studies that have presented the importance of openness are studies by Lotz and Morss (1970) and Wibbels and Moisés (2003). It is expected that international trade taxes impact negative on the overall revenues due to tariff liberalisation, however, increase in sales tax may have impacted positively to the overall revenues.

Per Capita Income: Per Capita Income is measured at constant factor cost in million rupees. Higher incomes countries reflect a higher level of development, which is usually associated with a higher ability for tax payers to pay taxes as well as a greater capacity of the government to collect taxes; while low income countries reflect a lower level of development, which is usually associated with a lower ability of tax payers to pay taxes as well as governments 'ability to collect taxes. The effect of per capita income is expected to be positive on overall tax revenues, however, negative association may imply the distribution of GDP is getting better or higher share of GDP is associated with those sectors which are exempted from taxation.

Public Debt: Public debt is that money or loan owed any government agency. Public debt is expected to have positive impact on tax revenue because higher revenues are needed to retire debt in future.

Formal services: Formal services involve those services sector activities, which are not out of the tax net, as well as they employ formal labor and transactions are done in the formal economy. It is calculated by subtracting total service sector from informal part of the service sector i.e. $\text{Formal service} = \text{total service sector} - \text{informal service}$.

Formal industry: Formal industry defined as the total industrial sector minus informal industrial sector i.e. $\text{Formal industry} = \text{total industry} - \text{informal industry}$

Informal services: Informal services activities are that part of service sector which is not registered, out of the tax net, employs lesser very few employees (in general self-employed) and use unskilled labor. Sectors given in the National accounts are partially or totally operator informally. Therefore after discussions with the Pakistan Bureau of Statistics we have come up with certain numbers which gives us percentage share of informal economy in the documented economy reported in the economic survey.

Informal industry: Informal industries activities are that part of industry sector which is not registered, out of the tax net, employs lesser very few employees (in general self-employed) and use unskilled labor. Sectors given in the National accounts are partially or totally operator informally. Therefore after discussions with the Pakistan Bureau of Statistics we have come up

with certain numbers which gives us percentage share of informal economy in the documented economy reported in the economic survey.

4.1.2. Characteristics of Informal Sector:

The study will measure the informal sector by a general method of differentiating the formal sector and informal sector through the following characteristics of informal sector.

- Private un-incorporated enterprises.
- No complete accounts permitting a financial separation of production activities of the enterprise.
- At least some part of the goods or services for sale or barter??
- Employment size below a certain threshold And/or not registered under specific form national legislation. (International Labor Office)

4.2. Econometrics Methodology

Most of the time series data are not stationary [Engle and Granger, (1987)] thus ordinary Least Square can produce spurious results. It is absolutely necessary to check the stationarity of time series by applying unit root tests. We have used Augmented Dickey Fuller (ADF) test which examines the stationarity of the data

Specifications of the ADF tests are;

$$\log(y_t) = \rho \log(y_{t-1}) + \gamma \sum_{i=1}^n \Delta \log(y_{t-i})$$

$$\log(y_t) = \alpha + \rho \log(y_{t-1}) + \gamma \sum_{i=1}^n \Delta \log(y_{t-i})$$

$$\log(y_t) = \alpha + \beta t + \rho \log(y_{t-1}) + \gamma \sum_{i=1}^n \Delta \log(y_{t-i})$$

Where y is any variable, t is the trend variable, ρ is autocorrelation coefficient, α and β are parameters, ε is the error term, subscript t shows the time periods.

$$\begin{aligned} H_o &= \rho \geq 1 & \text{or} & & \delta \geq 0 \\ H_A &= \rho < 1 & \text{or} & & \delta < 0 \end{aligned}$$

If H_o is rejected, the series has no unit root and it is therefore stationary. On the other hand, if H_o is not rejected, we conclude that there is a unit root in the series and it is non-stationary. The test is first applied on the levels, and if the level is non-stationary, then the test is applied on first difference. If the first difference is also non-stationary, the test is then applied on the second difference and so on.

After testing the unit root test we applied cointegration test to find the long run relationship among tax revenue and its determinants. The study used Auto-Regressive Distributive Lag (ARDL) bound testing technique which has been developed by Pesaran et al. (2005). This technique is superior to other techniques when there is mix order of integrations such as $I(0)$ and $I(1)$. The model takes Optimum lag length in this approach for each variable individually in the model which helps in the general to a specific model. The study uses the Schwarz Bayesian Criterion (SBC) and Akaike Information Criteria (AIC) to develop the optimum lag length for the ARDL model. We estimate the long-run equation and use the F-statistic to check the significance of the variables in lagged level. If the F-statistic is significant, we can assume that there is a long-run relationship between the variables. Then we applied Error Correction Model (ECM) to check the deviation of the current state from its long-run relationship will be fed into its short-run dynamics. We estimate the short run equation and use the F-statistic value to check the significance.

ARDL model to find the cointegration among tax revenue and its determinants are as follows:

$$\begin{aligned} \Delta lr_t = & \theta_0 + \theta_1 lr_{t-1} + \theta_2 open_{t-1} + \theta_3 pci_{t-1} + \theta_4 b_{t-1} + \theta_5 debt_{t-1} + \theta_6 find_{t-1} + \\ & \theta_7 foser_{t-1} + \theta_8 infind_{t-1} + \theta_9 infoser_{t-1} + \sum_{i=1}^k \phi_{1i} \Delta lr_{t-i} + \sum_{i=1}^k \phi_{2i} \Delta open_{t-1} + \\ & \sum_{i=1}^k \phi_{3i} \Delta pci_{t-1} + \sum_{i=1}^k \phi_{4i} \Delta b_{t-1} + \sum_{i=1}^k \phi_{5i} \Delta debt_{t-1} + \sum_{i=1}^k \phi_{6i} \Delta find_{t-1} + \\ & \sum_{i=1}^k \phi_{7i} \Delta foser_{t-1} + \sum_{i=1}^k \phi_{8i} \Delta infind_{t-1} + \sum_{i=1}^k \phi_{9i} \Delta infoser_{t-1} + \mu_t \dots \dots \dots (2) \end{aligned}$$

ARDL equation for Direct taxes and its determinants is as follows:

$$\begin{aligned} \Delta Direct_t = & \theta_0 + \theta_1 Direct_{t-1} + \theta_2 open_{t-1} + \theta_3 pci_{t-1} + \theta_4 b_{t-1} + \theta_5 debt_{t-1} + \\ & \theta_6 find_{t-1} + \theta_7 foser_{t-1} + \theta_8 infind_{t-1} + \theta_9 infoser_{t-1} + \sum_{i=1}^k \phi_{1i} \Delta lr_{t-i} + \\ & \sum_{i=1}^k \phi_{2i} \Delta open_{t-1} + \sum_{i=1}^k \phi_{3i} \Delta pci_{t-1} + \sum_{i=1}^k \phi_{4i} \Delta b_{t-1} + \sum_{i=1}^k \phi_{5i} \Delta debt_{t-1} + \\ & \sum_{i=1}^k \phi_{6i} \Delta find_{t-1} + \sum_{i=1}^k \phi_{7i} \Delta foser_{t-1} + \sum_{i=1}^k \phi_{8i} \Delta infind_{t-1} + \\ & \sum_{i=1}^k \phi_{9i} \Delta infoser_{t-1} + \mu_t \dots \dots \dots (3) \end{aligned}$$

ARDL econometric equation of Indirect taxes is as follows:

$$\begin{aligned} \Delta Indirect_t = & \theta_0 + \theta_1 Indirect_{t-1} + \theta_2 open_{t-1} + \theta_3 pci_{t-1} + \theta_4 b_{t-1} + \theta_5 debt_{t-1} + \\ & \theta_6 find_{t-1} + \theta_7 foser_{t-1} + \theta_8 infind_{t-1} + \theta_9 infoser_{t-1} + \sum_{i=1}^k \phi_{1i} \Delta lr_{t-i} + \\ & \sum_{i=1}^k \phi_{2i} \Delta open_{t-1} + \sum_{i=1}^k \phi_{3i} \Delta pci_{t-1} + \sum_{i=1}^k \phi_{4i} \Delta b_{t-1} + \sum_{i=1}^k \phi_{5i} \Delta debt_{t-1} + \\ & \sum_{i=1}^k \phi_{6i} \Delta find_{t-1} + \sum_{i=1}^k \phi_{7i} \Delta foser_{t-1} + \sum_{i=1}^k \phi_{8i} \Delta infind_{t-1} + \\ & \sum_{i=1}^k \phi_{9i} \Delta infoser_{t-1} + \mu_t \dots \dots \dots (4) \end{aligned}$$

4.3 Data Sources

The data of tax revenue, per capita income, share of manufacturing, share of services, openness, total public debt, budget deficit, inflation and informal sector ^{collected} will be taken from, Pakistan economic survey, The Hand Book of Statistics (SBP) and ministry of finance, and data on government effectiveness from Worldwide Governance Indicators (WGI). — ^{Published}

by whom ? say world Bank ??

Chapter 5

TIME SERIES PROPERTIES AND EMPIRICAL FINDINGS

5.1. Unit root tests

The ADF test results indicates that tax revenue (LR), direct taxes (LDIRECT), indirect taxes (LINDIRECT), formal services (LFOSER) are stationary at level and first difference. While budget (LB), per capita income (LCPI), trade openness (LOPEN), informal industry (LINFIND), informal services (LINFOSER), formal industry (LFIND), and institutions (DINST) are non-stationary at level and when we take 1st difference of these variables they became stationary.

Table.5.2. Unit Root Test

Variables	ADF		
	Level	1 st difference	Lagged difference
LR	-3.33*	-4.84***	1
LB	-3.06	-7.60***	1
LDIRECT	-3.21*	-4.36***	1
LINDIRECT	-3.39*	-4.77***	1
LPCI	-2.52	-4.58***	1
LDEBT	-1.69	-1.44	1
LOPEN	-3.02	-5.71***	1
LINFIND	-1.58	-4.61***	1
LINFOSER	-2.97	-4.55***	1
LFIND	-2.02	-3.42*	2
LFOSER	-3.24*	-6.28***	1
DINST	-2.57	-5.28***	1

Note: Null hypothesis is "series is non-stationary or having unit root. In this study we are using the critical values of Schwarz Info Criterion (..) to reject the null hypothesis. At level constant linear trend, critical values -4.192, -3.52,-3.19 are significant at 1%, 5% and 10% correspondingly. *, **, *** represents significant at 10%, 5% and 1% respectively.

5.2. Auto Regressive Distributive Lags (ARDL) Estimation

We have estimated ARDL model in the form of unrestricted error correction model to examine the long run relationship among tax revenue and openness, per capita income, total debt, budget, formal industry, informal industry, formal services, informal services. We also have examined the long run relationship among direct taxes and explanatory variables and indirect taxes with independent variables.

Cointegration Test:

To investigate the cointegrating relationship among the variables, we apply zero restriction on the lagged level variables. The computed F-stat value is 5.03 which is greater than the upper bound value I(1) critical value (i.e 3.52 by Pesaran et al. (2001)) at 1 percent significance level. Therefore, the null hypothesis of no cointegration is rejected. Hence, we concluded that there exists a long run relationship among the variables.

Table 2: Results of cointegration in Tax revenue

Test	Value	Df	Prob
F-stat	5.034049	(9, 17)	0.0021
Chi-square	45.30644	9	0.0000

Note: *F-upper bound 3.52 by Pesaran et al. (2001)*

The computed F-stat value is 6.87 which is greater than the upper bound value I(1) critical value (i.e 3.52 by Pesaran et al. (2001)) at 1 percent significance level. Therefore, the null hypothesis of no cointegration is rejected. Thus, we conclude that there exists a long run relationship among the variables.

Table 3: Results of cointegration in direct taxes

Test	Value	Df	Prob
F-Stat	6.87	(8, 17)	0.0004
Chi-Square	54.9	8	0.0000

Note: *F*-upper bound 3.52 by Pesaran et al. (2001)

The computed F-stat value is 3.77 which is greater than the upper bound value I(1) critical value (i.e 3.52 by Pesaran et al. (2001)) at 5 percent significance level. Therefore, the null hypothesis of no cointegration is rejected. Thus, we conclude that there exists a long run relationship among the variables.

Table 4: Results of cointegration in indirect taxes

Test	Value	Df	Prob
F-Stat	3.77	(8, 16)	0.001
Chi-Square	30.2	8	0.0002

Note: *F*-upper bound 3.52 by Pesaran et al. (2001)

Normalized cointegrating equation

To calculate the long run coefficients, we normalized the estimated coefficient of the lagged level variables by dividing the estimated coefficient of lagged tax revenue and hence long run coefficients are obtained. The normalized equation for long run growth model is specified by equation.

Normalized equation of Tax revenue

Table 5: Normalized Cointegrating Vectors (*Total Tax Revenues*)

Variable	Coefficient	t-Statistic
C	-8.29	-1.24
LR(-1)	1.00	
LB(-1)	0.07	0.59
LDEBT(-1)	0.19	1.37
LPCI(-1)	1.52	1.71
LOPEN(-1)	-1.18*	-3.51 ✓
LFIND(-1)	-0.31	-0.51
LINFIND(-1)	0.14	0.60
LFOSER(-1)	-1.86*	-2.76 ✓
LINFOSER(-1)	0.62	1.46

Note: * indicates values are significant

$$LR = 8.29 - 0.068LB - 0.19LDEBT - 1.52LPCI + 1.18LOPEN + 0.31LFIND - 0.14LINFIND + 1.86LFOSER - 0.62LINFOSER \dots \dots \dots (5)$$

The results of normalized equation in eq (5) represent that there is a negative association between budget deficit and tax revenues, which implies that higher the budget deficit lower will be the tax revenues. The coefficient is not very high, i.e., 0.06, which implies that one percent increase in budget deficit 0.06 percent decline in revenues. Nevertheless, the t-value shows that it is insignificant thus statistically the impact of budget deficit at five percent level of significance is zero, i.e., we cannot count it as one of the main explanatory variable. One of the reasons for its

insignificant association is due to ad hoc policy of tax administration which sets tax targets by looking at the budget deficit. However, due to increase in budget deficit than target and lesser revenue collection than target lead to lower and insignificant association between the two variables.

The estimated value of public debt is -0.19 which implies that higher the debt lower the tax revenues. Although the result is very vague because increase in debt should increase the tax revenues but in Pakistan we have seen opposite trend for the last two decades, i.e., debt is increasing and revenues are not increasing by the same amount. Nonetheless, the t-value is less than the critical t-value, thus we can easily say that coefficient is not significantly different from zero. Therefore, debt is not among the strong determinants of revenues in the long run.

Similar to debt, coefficient of per capital income is negative, which is the most surprising results of our estimation. The t-value shows that it is significant at ten percent level of significance. The result implies that although over time per capita income has been increasing but due to lack of documentation, tax evasion/avoidance, and unable to increase tax base the association between the two variables is negative in the long run.

Estimated value of trade openness is 1.18 which indicates that there is positive association between the openness and tax revenues. Although the reduction in custom duties had significant mark on the international trade tax calculations which may have impacted overall revenues negative due to increase in openness. Nonetheless, custom duties regime is replaced by the imposition of sales tax on imports which may have impacted positively the overall revenues. The coefficient shows that elasticity is greater than one and it is also statistically significant. Thus it implies more openness is better for increase in revenue

The normalized value of formal industry is 0.31 which is positive and according to the hypothesis formulated. This implies that formal sector of industry contributes positive in revenue collection, however, the insignificant t-value implies that the association is not behavioral. On the other hand, the estimated value of informal industry is -0.14 which is negative and according to the hypothesis formulated. The value of t-statistic shows that it is insignificant though. This implies that association between informal industrial sector and tax revenues is not significant but it contributes negatively to the tax revenues.

Services sector of Pakistan is mostly out of the tax net whether it is in formal sector or in informal sector. Coefficient of formal services sector is negative, which shows the negative contribution of services sector in tax collection. The value of coefficient is -1.86 which implies more than unitary elastic. We can infer from this that we need reforms in the services sector especially, and make tax authorities capable to collect the revenues effectively. On the other hand estimated value of the coefficient of informal services is 0.62 which shows the positive and opposite to our hypothesis formulated. However, it is statistically insignificant; therefore we can say that it has nothing to do with the tax revenues.

Normalized equation of Direct taxes

The results of normalized equation in eq. (5) represent that there is a negative association between budget deficit and direct taxes, which implies that higher the budget deficit lower will be the direct taxes. The coefficient is very high, i.e., 21.82, which implies that one percent increase in budget deficit 21.82 percent decline in direct tax revenues. Nevertheless, the t-value shows that it is insignificant thus statistically the impact of budget deficit at five percent level of significance is zero, i.e., we cannot count it as one of the main explanatory variable. One of the reasons for its insignificant association is due to ad hoc policy of tax administration which sets

tax targets by looking at the budget deficit. However, due to increase in budget deficit than target and lesser revenue collection than target lead to lower and insignificant association between the two variables.

Table 6: Normalized Cointegrating Vectors (*Direct Tax Revenues*)

Variables	Coefficient	t stat
C	-443.19	0.52
LDIRECT(-1)	1.00	
LB(-1)	-21.82	1.47
LDEBT(-1)	-9.86	0.44
LPCI(-1)	86.50	-0.75
LOPEN(-1)	-62.29	1.56
LFIND(-1)	-51.22	1.17
LINFIND(-1)	9.16	-0.28
LFOSER(-1)	-87.13	0.95
LINFOSER(-1)	137.66	-2.58

$$\text{Direct taxes} = 443.19 + 21.82LB + 9.86LDEBT - 86.49LPCI + 62.29LOPEN + 51.22LFIND - 9.16LINFIND + 87.13LFOSER - 137.66LINFOSER$$

The estimated value of public debt is -9.86 which implies that higher the debt lower the tax revenues. Although the result is very vague because increase in debt should increase the tax revenues but in Pakistan we have seen opposite trend for the last two decades, i.e., debt is increasing and revenues are not increasing by the same amount. Nonetheless, the t-value is less

than the critical t-value, thus we can easily say that coefficient is not significantly different from zero. Therefore, debt is not among the strong determinants of revenues in the long run.

Similar to debt, coefficient of per capital income is negative, which are the most surprising results of our estimation. The result implies that although over time per capita income has been increasing but due to lack of documentation, tax evasion/avoidance, and unable to increase tax base the association between the two variables is negative in the long run.

Estimated value of trade openness is -62.89 which indicates that there is negative association between the openness and tax revenues. Although the reduction in custom duties had significant mark on the international trade tax calculations which may have impacted overall revenues negative due to increase in openness. Nonetheless, custom duties regime is replaced by the imposition of sales tax on imports which may have impacted positively the overall revenues. The coefficient shows that elasticity is greater than one and it is also statistically significant. Thus it implies more openness is better for increase in revenue

The normalized value of formal industry is -51.22 which is negative and according to the hypothesis formulated. This implies that formal sector of industry contributes positive in revenue collection, however, the insignificant t-value implies that the association is not behavioral. On the other hand, the estimated value of informal industry is 9.16 which is positive and according to the hypothesis formulated. The value of t-statistic shows that it is insignificant though. This implies that association between informal industrial sector and tax revenues is not significant but it contributes negatively to the tax revenues.

Services sector of Pakistan is mostly out of the tax net whether it is in formal sector or in informal sector. Coefficient of formal services sector is negative, which shows the negative

contribution of services sector in tax collection. The value of coefficient is -87.13 which implies more than unitary elastic. We can infer from this that we need reforms in the services sector especially, and make tax authorities capable to collect the revenues effectively. On the other hand estimated value of the coefficient of informal services is 137.66 which shows the positive and opposite to our hypothesis formulated. However, it is statistically insignificant; therefore we can say that it has nothing to do with the tax revenues.

Normalized equation of Indirect taxes

The results presented in normalized equation (5) represent that there is a negative and insignificant impact of budget deficit on indirect taxes in long run, which indicate that one percent change in budget deficit leads to an increase in tax revenue by 0.03 percent. The estimated value of public debt is 0.42 which is also positive and insignificant in long run. The value of per capita income in normalize equation is 0.06 which positive and insignificant. It indicates that there is a positive impact of per capita income on indirect taxes.

Table 7: Normalized Cointegrating Vectors (*Indirect Tax Revenues*)

Variables	Coefficients	t-values
C	4.61	-0.56
LINDIECT(-1)	1.00	
LB(-1)	0.03	-0.22
LDEBT(-1)	0.42	-1.72
LPCI(-1)	0.06	-0.05
LOPEN(-1)	-1.16	2.13
LFIND(-1)	1.62	-1.28
LINFIND(-1)	-0.49	1.15
LFOSER(-1)	-2.24	1.37
LINFOSER(-1)	-0.23	0.47

$$\text{Indirect taxes} = 4.61 - 0.03\text{LB} + 0.42\text{LDEBT} + 0.062\text{LPCI} - 1.165\text{LOPEN} + 1.62\text{LFIND} - 0.49\text{LINFIND} - 2.24\text{LFOSER} - 0.23\text{LINFOSER}$$

Estimated value of trade openness is -1.16 which indicate that there is negative insignificant impact of trade openness on indirect taxes. The normalized value of formal industry is 1.62 which is positive and insignificant. It shows that there positive relation between indirect taxes and formal industry. The estimated value of informal industry is 0.49 which is positive and insignificant. It indicates that a one percent change in informal industry leads to increase the indirect taxes by 0.49 percent. The value of formal services in normalizes equation is -2.24 which shows the negative and insignificant impact of formal services on indirect taxes. Estimated value of informal services is -0.23 which shows the negative and insignificant results on tax revenue.

Stationarity of Error Correction

The results of ADF indicate that ER, ED and EIND are stationary at level.

Table 8: ADF Test Results (Error Terms)

Variables	Level	Lagged diff
ER	-5.16*	7
ED	-7.40	1
EIND	-5.82*	1

Note: Null hypothesis is "series is non stationary or having unit root. In this study we are using the critical values of Schwarz Info Criterion (..) to reject the null hypothesis. At level constant linear trend, critical values - 4.192, -3.52,-3.19 are significant at 1%, 5% and 10% correspondingly. *, **, *** represents significant at 10%, 5% and 1% respectively.

Short Run Error Correction Results

In error correction model (ECM) differenced variables are showing short run relationships, while lag value of error term (U1) shows error correction. Following general to specific methodology, we eliminated all insignificant differenced variables. The results of error correction are reported in the Table above.

There is a negative value of error correction coefficient, i.e., -0.56. It indicates that whenever there is a deviation from long run equilibrium path, variable adjusts toward the equilibrium. The value of coefficient implies that in one year variable restores the 56% shock in it. The t-value shows that it is significant at 5% level of significance.

Table 9: Tax revenue

Variable	Coefficient	Std. Dev	T-Stat	Prob
U1(-1)	-0.566301	0.064522	-8.776855	0.0000
D(LB)	-0.088577	0.019773	-4.479697	0.0001
D(LDEBT)	0.264972	0.068627	3.861033	0.0007
D(LPCI)	1.359024	0.246272	5.518388	0.0000
D(LOPEN)	0.406113	0.079226	5.125984	0.0000
D(LFOSER)	0.788766	0.103248	7.639543	0.0000
D(LDEBT(-1))	0.302107	0.077137	3.916492	0.0006
D(LPCI(-1))	1.249558	0.266174	4.694513	0.0001
D(LFIND(-1))	-0.267611	0.105021	-2.548169	0.0171
D(LINFOSER(-1))	0.434504	0.092961	4.674030	0.0001
D(LDEBT(-2))	0.224004	0.074065	3.024407	0.0055
D(LOPEN(-2))	0.289491	0.073758	3.924887	0.0006
D(LFIND(-2))	-0.171239	0.088526	-1.934347	0.0640
D(LFOSER(-2))	0.232838	0.074795	3.113014	0.0045
R-squared	0.866730	Akaike info criterion		-4.087703
S.E. of regression	0.027395	Schwarz criterion		-3.496596
Durbin-Watson stat	2.016238	Hannan-Quinn criter.		-3.873977

Estimated coefficient value of budget deficit is -0.08 which exerts negative and significant effect on tax revenue and indicate that a 1 percent increase in budget deficit leads to a decrease in tax revenue by 0.08 percent. Similarly, estimated coefficient of debt is 0.26, which is positive and significant. It indicates that a 1 percent change in total public debt leads to increase in tax revenue by 0.26 percent. Estimated value of per capita income is 1.35, which is positive and significant. It shows that a one percent change in per capita income leads to an increase in tax revenue by 1.24 percent. Estimated coefficient of trade openness is 0.4, which is positive and significant. It represents that a one percent change in trade openness increases the tax revenue by 0.4 percent. It is quite difficult to assess the direct impact of openness on tax revenue; openness may influence taxation indirectly by affecting many economic variables which in turn affect tax revenue. Ghura (1998) and Gupta (2007) also found the positive effect. Estimated value of formal industry is -0.26, which is negative and significant. It indicates that a 1 percent change in formal industry leads to a decrease in tax revenue by 0.26 percent. Estimated coefficient value of informal industry is -0.08 which is negative and insignificant in short run that represents a one percent change in informal industry decreases the tax revenue by 0.08 percent. Estimated value of formal services is 0.78 which is positive and significant and it indicates a one percent change in formal services leads to an increase in tax revenue by 78 percent. The variable is capturing the effect of growth in service sector on tax revenue. Therefore increase service sector leads to increase in tax revenue tax revenue. Elasticity of informal services is 0.43 which is positive and significant in short run that means a one percent change in informal services leads to increase the tax revenue by 0.43.

Estimated R-square is 0.86 which suggest that 86 percent of the variation in dependent variable is explained by the independent variable. P value of F-Statistics is significant at 1

percent which indicates that variables are jointly significant. Durbin-Watson stat is 2.01 which shows that there is no serial correlation.

Table 10: Direct taxes

Variable	Coefficient	Std.Dev	T-Stat	Prob.
UD(-1)	-0.006842	0.000778	-8.790348	0.0000
D(LB)	0.054891	0.033577	1.634773	0.1137
D(LPCI)	3.484340	0.513278	6.788402	0.0000
D(LINFIND)	0.150201	0.131141	1.145334	0.2621
D(LDEBT(-1))	-0.251866	0.125424	-2.008117	0.0547
D(LPCI(-1))	1.743342	0.495221	3.520334	0.0016
D(LOPEN(-1))	0.684754	0.137504	4.979886	0.0000
D(LFOSER(-1))	0.574693	0.234332	2.452473	0.0209
D(LINFOSER(-1))	0.805590	0.212575	3.789673	0.0008
D(LOPEN(-2))	0.604937	0.129564	4.669014	0.0001
D(LFIND(-2))	-0.352034	0.172192	-2.044423	0.0508
D(LINFIND(-2))	0.350552	0.126589	2.769214	0.0100
D(LFOSER(-2))	0.854702	0.172390	4.957966	0.0000
R-squared	0.868792	Akaike info criterion		-2.847524
S.E. of regression	0.051243	Schwarz criterion		-2.298639
Durbin-Watson stat	1.883201	Hannan-Quinn criter.		-2.649065

The value of error correction coefficient is -0.006 which is negative and significant. The negative value indicates that whenever there is a deviation from long run equilibrium path, variable adjusts toward the equilibrium. The value of error term -0.006 implies that in one year variable restores the 0.006 percent shock in it. P-value shows that it is significant at 1% level of significance. The significant error correction exists in the long run total revenue equilibrium.

Estimated coefficient value of budget deficit is 0.05 which exerts positive and insignificant effect on direct taxes and indicate that a 1 percent increase in budget deficit leads to an increase in tax revenue by 0.05 percent. Similarly, estimated elasticity of total debt is -0.25, which is negative and significant. It indicates that a 1 percent change in total public debt leads to a decrease in direct taxes by 0.25 percent. Estimated value of per capita income is 3.48, which is positive and significant. It shows that a one percent change in per capita income leads to an increase in direct taxes by 1.24 percent. Estimated coefficient of trade openness is 0.68, which is positive and significant. It represents that a one percent change in trade openness increases the direct taxes by 0.68 percent. Estimated value of formal industry is -0.35, which is negative and significant. It indicates that a 1 percent change in formal industry leads to a decrease in direct taxes by 0.35 percent. Estimated coefficient value of informal industry is 0.15 which is positive and insignificant that represents a one percent change in informal industry decreases the direct taxes by 0.15 percent. Estimated value of formal services is 0.57 which is positive and significant and it indicates a one percent change in formal services leads to an increase in tax revenue by 57 percent. The variable is capturing the effect of growth in service sector on tax revenue. Therefore increase service sector leads to increase in direct taxes. Elasticity of informal services is 0.80 which is positive and significant that means a one percent change in informal services leads to increase the tax revenue by 80 percent.

Estimated R-square is 0.86 which suggest that 86 percent of the variation in dependent variable is explained by the independent variable. Durbin-Watson stat is 1.88 which shows that there is serial correlation.

Table 11: Indirect taxes

Variable	Coefficient	Std. Dev	T-Stat	Prob
UIN(-1)	-0.650226	0.106028	-6.132598	0.0000
D(LB)	-0.094284	0.025846	-3.647868	0.0016
D(LDEBT)	0.101786	0.075899	1.341065	0.1949
D(LPCI)	0.768132	0.289500	2.653310	0.0153
D(LOPEN)	0.525849	0.092808	5.665966	0.0000
D(LFIND)	-0.101303	0.122613	-0.826202	0.4184
D(LINFIND)	0.254940	0.090951	2.803048	0.0110
D(LFOSER)	1.471475	0.234862	6.265268	0.0000
D(LINFOSER)	-0.232216	0.177919	-1.305177	0.2066
D(LDEBT(-1))	0.157032	0.092492	1.697784	0.1051
D(LPCI(-1))	0.254088	0.303929	0.836012	0.4130
D(LFIND(-1))	0.561868	0.193038	2.910658	0.0086
D(LINFIND(-1))	-0.115196	0.079261	-1.453371	0.1616
D(LFOSER(-1))	0.175085	0.134540	1.301355	0.2079
D(LDEBT(-2))	0.160851	0.080516	1.997753	0.0595
D(LPCI(-2))	-0.942928	0.318346	-2.961956	0.0077
D(LOPEN(-2))	0.224768	0.088542	2.538536	0.0196
D(LFIND(-2))	0.149850	0.116427	1.287068	0.2128
D(LINFIND(-2))	-0.208105	0.084383	-2.466212	0.0228
D(LFOSER(-2))	0.156956	0.095628	1.641319	0.1164
S.E. of regression	0.029988	Akaike info criterion -3.869173		
R-squared	0.893588	Schwarz criterion -3.024733		
Durbin-Watson	2.049631	Hannan-Quinn criter. -3.563850		

The value of error correction coefficient is -0.65 which is negative and significant. The negative value indicates that whenever there is a deviation from long run equilibrium path, variable adjusts toward the equilibrium. The value of error term -0.65 implies that in one year variable restores the 65 percent shock in it. P-value shows that it is significant at 1% level of significance. The significant error correction exists in the long run total revenue equilibrium.

Estimated coefficient value of budget deficit is -0.09 which exerts negative and significant effect on direct taxes and indicate that a 1 percent increase in budget deficit leads to an increase in indirect taxes by 0.05 percent. Similarly, estimated elasticity of total debt is 0.10, which is positive and significant. It indicates that a 1 percent change in total public debt leads to an increase in indirect taxes by 10 percent. Estimated value of per capita income is 0.76, which is positive and significant. It shows that a one percent change in per capita income leads to an increase in indirect taxes by 68 percent. Estimated coefficient of trade openness is 0.52, which is positive and significant. It represents that a one percent change in trade openness increases the direct taxes by 52 percent. Estimated value of formal industry is -0.10, which is negative and significant. It indicates that a 1 percent change in formal industry leads to a decrease in indirect taxes by 10 percent. Estimated coefficient value of informal industry is 0.25 which is positive and significant that represents a one percent change in informal industry decreases the indirect taxes by 25 percent. Estimated value of formal services is 1.47 which is positive and significant and it indicates a one percent change in formal services leads to an increase in indirect taxes by 1.47 percent. Elasticity of informal services is -0.23 which is negative and significant that means a one percent change in informal services leads to increase the indirect services by 23 percent.

Estimated R-square is 0.89 which suggest that 89 percent of the variation in dependent variable is explained by the independent variable. Durbin-Watson stat is 2.04 which shows that there is serial correlation.

Diagnostic tests for ARDL

The estimated model is tested by applying a series of diagnostics tests and the results are reported in table. The Lagrange Multiplier (LM) is 3.12 with p value 0.08 which indicate which indicate no problem of serial correlation. To check the heteroskedasticity, we applied Auto Regressive Conditional Heteroskedasticity (ARCH) test, which indicate no problem of heteroskedasticity, as the F stat is 2.07 with p value is 0.14, which indicate that it is insignificant, hence indicates the presence of ARCH effect in the model. The JB test specifies that the residuals are normally distributed under its f-stats value 0.89 with p-value 0.64. We employed RAMSEY RESET test to see whether the modr terms of the explanatory variables or not and the test results given int het able below shows that there the coefficients of nonlinear terms are insignificant thus our model is correctly specified and it does not need to include nonlineaer terms.

Table 12: Results for diagnostic tests for ARDL

Diagnostic test	F-Statistics	P-value
Serial correlation (LM Test)	3.11	0.08
Heteroskedasticity (ARCH Test)	2.07	0.14
Normality Test (JB)	0.89	0.64
Model Specification (Ramsey RESET)	3.32	0.06

Chapter 6:

SUMMARY AND CONCLUSIONS

Main functions of tax structure are to collect revenue from taxes and finance the public expenditures. This study analyses the determinants of tax revenue and role of informal sector in Pakistan. Many studies examine the determinants of tax revenue but informal sector has not been critically stressed in the past for the improvement in the tax revenue of the country. Following the study of Chaudhary and Munir (2010) we modify the model by using the time series econometric technique for period 1972-2014.

We applied cointegration test to find the long run relationship among tax revenue and its determinants. The study used Auto-Regressive Distributive Lag (ARDL) bound testing technique. Then we applied Error Correction Model (ECM) to check the deviation of the current state from its long-run relationship will be fed into its short-run dynamics. As per the cointegration results we have found the long run relationship among variables. We applied the same tests for direct tax revenue and indirect tax revenue and found the same results.

Per capita income is associated negatively to the tax revenues which implies that although over time per capita income has been increasing but due to lack of documentation, tax evasion/avoidance, and unable to increase tax base the association between the two variables is negative in the long run.

Openness is positively associated with overall tax revenues as well indirect tax revenues, while a direct taxes revenue effort is not significantly associated. Although the reduction in custom duties had significant mark on the international trade tax calculations which may have impacted overall revenues negative due to increase in openness. Nonetheless, custom duties

regime is replaced by the imposition of sales tax on imports which may have impacted positively the overall revenues. The coefficient shows that elasticity is greater than one and it is also statistically significant. Thus it implies more openness is better for increase in revenue

Formal activities of the services sectors are negatively associated with the tax efforts, which is along the lines of our formulated hypothesis. This implies that we need reforms in the services sector especially, and make tax authorities capable to collect the revenues effectively

Although the budget deficit along with the piling debt are among the main variables which shapes the taxation structure of any country, nonetheless, insignificant association could be due to ad hoc policy of tax administration which sets tax targets by looking at the budget deficit. However, due to increase in budget deficit than target and lesser revenue collection than target lead to lower and insignificant association between the two variables. On the other hand debt is significantly affecting indirect taxes but not the direct taxes as well as the overall revenues. Possible reason behind this issue is the higher revenue collection through indirect taxes than direct taxes.

Contrary to our hypothesis, the informal sector is insignificantly associated with the overall revenue collection efforts. However, it is negatively associated with the efforts of direct tax revenues. Despite that direct taxes are collected in indirect way mostly, which is difficult to evade, however, informal sector due to lower regulation contributes negatively to direct tax efforts.

Apart from the long run association. The error correction exists in the all the regression. Thus it is concluded that whenever the equilibrium is unstable, the dependent variable adjusts to restore the equilibrium.

Interesting conclusions are drawn from the short run analysis, which has more power to explain the revenue collection efforts. This also implies that the fundamentals we have taken for the analysis are strongly associated with the dependent variable in the short run compared to the long run. Overall revenue efforts are negatively associated with the budget deficit which implies that higher budget deficit means lower tax collection. On the other hand higher debt leads to higher tax collection. Moreover apart from formal industrial activity the other formal and informal activities are positively associated with the revenue efforts.

Direct taxes, in the short run, not affected by the budget deficit nor with the debt. The effect of per capita income is higher for direct taxes than indirect taxes. Moreover, the insignificant impact of informal sector is more on indirect taxes than direct taxes, which is our major source of revenue. Thus it is easier to evade indirect taxes in informal sector due to lesser regulations.

It is essential that Pakistan's tax system should be seen as fair, adequate, simple transparent, and administratively easy to comply with. People's perception regarding tax collecting authorities and the government that provide them with the services are also important. Tax avoidance must be made costly and compliance cheap. If tax leakages are removed, an extra 6-8 percent of GDP will be realised. But Pakistan has a long way to go to improve its tax system and until it is accomplished one cannot expect much improvement in poverty and welfare at grassroots level.

Taxing the informal sector requires a strategy that clearly outlines the objectives of taxing the informal sector such a strategy would hopefully spell out the ultimate goal of the taxes. An informal sector tax strategy would go beyond merely setting tax rates and then trying to implement them. It requires an understanding of how the informal sector operates and an honest assessment of the resources that are available to the tax authority.

REFERENCES

- Chelliah, R.J., Baas, H.J., and Kelly, M.R.(1975). Tax Ratios and Tax Effort in Developing Countries, 1969-71.*IMF Staff Papers*, 22(1), 187-205
- Leuthold, J.H. (1991). Tax Shares in Developing Economies: A Panel Study, *Journal of Development Economics*, 35,173-185
- Lotz, J.R. and Morss, E.R. (1967).Measuring 'Tax Effort' in Developing Countries. *International Monetary Staff Papers*, 14, 479-497
- Bahl, R.W. (2003). Reaching the Hardest to Tax: Consequences and Possibilities, paper presented at the "Hard to Tax: An International Perspective" conference, *Andrew Young School of Policy Studies, Georgia State University*, May 15-16
- Bird, R.M.(1976), Assessing Tax Performance in Developing Countries: A Critical Review of the Literature. *Finanzarchiv*, 34, 244-65
- Teera, J.M. (2002). Determinants of Tax Revenue Share in Uganda(unpublished).
- Ahmed, Q.M. (2010). Determinants of Tax Buoyancy: Empirical Evidence from Developing Countries. *European Journal of Social Sciences*. 13(3), 408-414
- Lutfunnahar, B. (2007). A Panel Study on Tax Effort and Tax Buoyancy with Special Reference to Bangladesh. Working Paper 715: *Policy Analysis Unit (PAU)Research Department Bangladesh Bank*
- Ehrhart, H. (2009). Assessing the relationship between Democracy and Domestic taxes in developing countries.*CERDI, Etudes et Documents*, E.30
- Ahsan, S.M. and Wu, S. (2005). Tax Structure and Reform in China, 1979-2002. Mimeo Department of Economics, Concordia University, Canada.

Kaldor,N.(1963) . “Will Underdeveloped Countries learn to Tax?” Foreign Affairs.

41:410-19

Loayza, N., 1997, “The Economics of the Informal Sector: a Simple Model and Some Empirical Evidence from Latin America”, World Bank Policy Research Working Paper, WPS 1727 (World Bank: Washington DC).

Kaufmann, D. and A. Kaliberda, 1996, “Integrating the Unofficial Economy into the Dynamics of Post-Socialist Economies: A Framework of Analysis and Evidence”, in B. Kaminski (ed.) *Economic Transition in Russia and the New States of Eurasia*. Armonk, NY: M. E. Sharpe, Inc.

DE SOTO, H. (1989): *The Other Path: The Invisible Revolution in the Third World*, I B Tauris & Co Ltd.

Chen, M. a. (2012, august). The informal economy: definitions, theories and policies. *WIEGO*

Farrell, D. (2004): “The hidden dangers of the informal economy,” *McKinsey Quarterly*, 26–37.

Schneider, F. and D. Enste (2002): *The shadow economy*, Springer.

Kaldor,N.(1963) . “Will Underdeveloped Countries learn to Tax?” Foreign Affairs.

41:410-19

Gupta, S.A (2007), “Determinants of Tax Revenue Efforts in Developing Countries” IMF Working Paper No.07/184 Washington, DC: The International Monetary Fund

Levy, S. (2008): *Good Intentions, Bad Outcomes: Social Policy, Informality, and Economic Growth in Mexico*, Brookings Institution Press.

Lewis, W. W. (2004): *The Power of Productivity: Wealth, Poverty, and the Threat to Global Stability*, University Of Chicago Press.

- Feige, E., 1979, "How Big is the Irregular Economy?" *Challenge*, Vol. 22, pp. 5–13.
- Leuthold, J.H. (1991). Tax Shares in Developing Economies: A Panel Study, *Journal of Development Economics*, 35,173-185
- Stotsky, J.G. and Wolde Mariam, A. (1997).Tax Effort in Sub-Saharan Africa. Working Paper 107: *International Monetary Fund*, Washington, DC
- Ghura, D. (1998). Tax Revenue in Sub-Saharan Africa: Effects of Economic Policies and Corruption. *IMF Working paper*.
- Kemal, M. A. "Fresh Assessment of the Underground Economy and Tax Evasion in Pakistan: Causes, Consequences, and Linkages with the Formal Economy". *PIDE working paper No.2007:13*. (2007).
- Kemal, M. A. Underground Economy and Tax Evasion in Pakistan: A Critical Evaluation. Pakistan Institute of Development Economics:.. (Research Report No. 184.) (2003)"
- A., R. C., & Mehmood, H. (2013). Impact of FDI on Tax Revenue in Pakistan. *Pakistan Journal of Commerce and Social Sciences*, 7, 59-69.
- Aamir, M., Qayyum, A., Nasir, A., Hussain, S., Khan, K. I., & Butt, S. (2011). Determinants of Tax Revenue: A Comparative Study of Direct taxes and Indirect taxes of Pakistan and India. *International Journal of Business and Social Science*, 2.
- Bilquees, F. (2004). Elasticity and Buoyancy of the Tax System in Pakistan. *The Pakistan Development Review* , 73–93.
- Chaudhry, I. S., & Munir, F. (2010). Determinants of Low Tax Revenue in Pakistan. *Pakistan Journal of Social Sciences (PJSS)*, 30 (2), 439-452.
- Dube, G. (2014, january). INFORMAL SECTOR TAX ADMINISTRATION IN ZIMBABWE. *public administration and development* , 48–62.

- Ghani, Z. (2011). *A Cross Country Analysis of Tax Performance with Special Focus on Pakistan's Tax Effort*. Master's Degree Project, Swedish Business School At Örebro University, Economics and Econometrics.
- Ihrig, J., & Moe, K. S. (2004). Lurking in the Shadows: The informal sector and government policy. *Journal of Development Economics* , 541-557.
- Karagöz, K. (2013). Determinants of Tax Revenue: Does Sectorial Composition Matter? *Journal of Finance, Accounting and Management*, 4, 50-63.
- Khan, A. (n.d.). Analysis of Key Determinants of Tax Policy and administration. *Lahore Journal of Economics* , 1: 116.
- Mukarrum, F. (2001). Elasticity and buoyancy of major taxes in Pakistan. *Pakistan Economic and Social Review* , 75-86.
- Ordonez, J. C. (2014). Tax Collection, The Informal Sector, and Productivity. *Review of Economic Dynamics*, 17, 262-286.
- Pasha, A. G. (2010, september). Can Pakistan Get Out of the Low Tax-to-GDP Trap? *The Lahore Journal of Economics* , 171-185.
- patoli, A. Q., Zarif, T., & Syed, N. A. (2012). Impact of Inflation on Taxes in Pakistan: An empirical study of 2000-2010 period. *Journal of Management and Social Sciences*, 8, 31-41.
- Tabasam, F. (2014). Impact of Foreign Capital Inflows on Tax Collection: A Case Study of Pakistan. *Issues*, 2.