INTERNATIONAL STUDIES PROGRAM

International Studies Program
Working Paper 08-11
December 2008

Pakistan's Tax Gap: Estimates by Tax Calculation and Methodology

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ACKNOWLEDGEMENTS

These working papers are the reports that were a joint product of a team from the Federal Board of Revenue (FBR), Government of Pakistan, the Andrew Young School of Public Policy (AYSPS) at the Georgia State University, and the World Bank. The views, expressed in the reports, are of the authors and not of the Government of Pakistan.

The FBR team was headed by Mr. Ahmad Waqar, Secretary Revenue Division and Chairman FBR, and Mr. M. Abdullah Yusuf, former Chairman FBR, and included Mr. Mumtaz Haider Rizvi, Member Fiscal Research and Statistics, Dr. Ather Maqsood Ahmed, former Member Fiscal Research and Statistics, Mrs. Robina Ather Ahmed, Chief Fiscal Research and Statistics, Mr. Umar Wahid, Secretary Fiscal Research and Statistics, Mr. Mir Ahmed Khan, Second Secretary Fiscal Research and Statistics, and Mr. Naeem Ahmed, Second Secretary Fiscal Research and Statistics.

The final report was prepared by Kaspar Richter (World Bank), and Jorge Martinez-Vazquez (AYSPS). The background studies (listed below), were drafted by Robina Ather Ahmed, James Alm, Roy Bahl, Musharraf Cyan, Mir Ahmad Khan, Jorge Martinez-Vazquez, Geerten Michelse, Mark Rider, Wayne Thirsk, Umar Wahid and Sally Wallace. The tax revenue simulation results in the report are based on micro-simulation models developed by Mark Rider and Sally Wallace with Harini Kannan. The GST chapter draws extensively on a review of Pakistan's sales tax by Rebecca Millar and Christophe Waerzeggers from June 2008. The final report also benefited from the Pakistan tax administration review by Carlos Silvani, Edmund Biber, William Crandall, Wyatt Grant, Orlando Reos and Geoff Seymour from September 2008. Peer reviewer comments from Kai-Alexander Kaiser, Senior Economist, World Bank; Michael Keen, Advisor, International Monetary Fund; Dr. Ahmad Khan, former Member FBR; Russell Krelove, Senior Economist, International Monetary Fund, and Eduardo Ley, Lead Economist, World Bank greatly enhanced the quality of the report. Dr. Ahmad Khan and Dr. A. R. Kemal reviewed the background studies, and Ehtisham Ahmad commented on the concept paper. Anjum Ahmad, Shamsuddin Admad, Mihaly Kopanyi, Hanid Mukhtar, and Saadia Refaqat from the World Bank provided useful feedback. Mirafe Marcos helped greatly by providing the draft chapter of the provincial background study. The team would like to thank Satu Kahkonen, Lead Economist, Miria Pigato, Sector Manager, Ijaz Nabi, former Sector Manager, Yusupha Crookes, Country Director, and Ernesto May, Sector Director, for continued support and guidance throughout all stages of this report. Muhammad Shafiq, Nimanthi Attapattu, and Irum Touqeer handled with great ease all arrangements for the missions and for the processing of the report.

The team benefited enormously from the close collaboration of the Government of Pakistan ever since this work was launched in January 2007. The team is very grateful to Mr. M. Abdullah Yusuf, who conceived the idea for this report, and to Dr. Ather Maqsood Ahmed, who developed the framework and coordinated the inputs of the FBR team. The team is greatly indebted for the outstanding support and assistance of FBR's Fiscal Research and Statistics Wing. Its contribution is immense: it co-authored three background studies; provided comments, feedback, and guidance to the team throughout the analysis and report preparation; and facilitated the interaction with other departments, including the Budget Wing, Debt Office, and the Economic Affairs Division of the Ministry of Finance.

Background Papers for the Pakistan Tax Policy Report

08-07 Bahl, Roy, Wallace, Sally and Cyan, Musharraf. *Pakistan: Provincial Government Taxation*.

08-08 Thirsk, Wayne. *Tax Policy in Pakistan: An Assessment of Major Taxes and Options for Reform.*

08-09 Michelse, Geerten. *Pakistan – a Globalized Tax World – An Analysis of its International Tax Practice.*

08-10 Alm, James and Khan, Mir Ahmad. *Assessing Enterprise Taxation and the Investment Climate in Pakistan.*

8-11 Ahmed, Robina Ather and Rider, Mark. *Pakistan's Tax Gap: Estimates by Tax Calculation and Methodology*.

08-12 Sally Wallace and Harini Khan. Pakistan: Comprehensive Individual Tax Reform: Round 2

08-13 Wahid, Umar and Wallace, Sally. *Incidence of Taxes in Pakistan: Primer and Estimates*

Pakistan's Tax Gap: Estimates by Tax Calculation and Methodology

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We would like to thank Sezer Alcan, Safia Shabbir, and especially Violeta, Vulovic for outstanding research assistance. We also benefited from helpful discussions with Mir Ahmed, Naeem Ahmed, Jorge Martinez, Wayne Thirsk, Umar Wahid, and Sally Wallace.

PAKISTAN'S TAX GAP: ESTIMATES AND METHODOLOGY

Introduction

This report provides estimates of Pakistan's tax gap by type of tax and describes the methodologies and data used to produce these estimates. A country's tax gap is the amount of tax that goes uncollected due to non-compliance with the tax law. For estimation purposes, the operational definition of the tax gap is the difference between potential and actual federal tax revenue, where potential revenue is the amount of tax that the government would collect if everyone fully complied with the tax law. It is a simple matter to get actual tax collections by type of tax, so the trick to estimating a country's tax gap is to obtain a reasonably accurate measure of potential tax revenue. Our basic strategy is to use micro-simulation models to estimate the potential revenues from Pakistan's federal taxes of which there are only a hand full. Such modeling requires micro-economic data with information about the relevant tax bases and a tax calculator to simulate tax liabilities by type of tax. The advantage of this approach is the detailed information that it provides on the rate of compliance by type of tax which should be helpful in targeting scarce tax enforcement resources and in evaluating tax policy reforms.

Table 1 summarizes our tax gap estimates by type of tax for the vast majority of Pakistan's federal taxes.[1] For fiscal year (FY) 2004-05, we estimate Pakistan's federal tax gap to be about Rs. 409.5 billion, or approximately 69 percent of actual tax receipts of

[1] We do not provide tax gap estimates for the workers welfare fund (WWF), workers profit participation fund (WPPF), the capital value tax (CVT), or the wealth tax. As these taxes represent only about 1.6 percent of total federal tax receipts, we do not think that neglecting to estimate these tax gaps is likely to be a serious source of error. We also limit our analysis to Pakistan's federal taxes; consequently we do not estimate tax gaps for provincial taxes.

Rs. 590.4 billion. For reasons that are discussed below, we believe that this is a conservative estimate of Pakistan's federal tax gap. We estimate the direct tax gap to be about Rs. 262.8 billion, or around 143 percent of actual direct tax revenues of Rs. 183.1 billion and the indirect tax gap to be approximately Rs. 146.7 billion, or about 36 percent of actual indirect tax revenues of Rs. 407 billion. Given the difficulties that many developing countries have with collecting indirect taxes, it is not surprising that the tax gap for direct taxes is larger in percentage terms than the tax gap for indirect taxes.[2]

Before plunging into the details of our analysis it may be useful to take a moment to reflect upon the relationship between the extent of tax evasion and the size of a country's tax gap as well as the effect of tax evasion on the performance of a country's tax system. But first we should clarify some of the terms used in this report. It is important to distinguish between tax avoidance which refers to the use of the tax law to minimize tax liabilities, and non-compliance with the tax law which refers to the non-payment of lawful tax liabilities. A country's tax gap is the result of non-compliance with the tax law. Rather than using the expression 'non-compliance with the tax law', we use the more concise expression 'tax evasion'. People often think of tax evasion as being motivated by greed or avarice, but other motives play a role as well. For example, people may fail to comply with tax laws for any number of reasons, including poor health,

[2] Nicholas Kaldor (1963) provides an outstanding description of the difficulties developing countries face in collecting direct taxes. The article is all the more remarkable because many of the issues hindering revenue mobilization 50 years ago remain problems, such as the inability of developing countries to collect direct taxes which are the mainstay of the tax systems of most developed countries then and now.

ignorance, and sloth. Even though we use the term tax evasion, we have in mind all forms of non-compliance with the tax law, whatever its underlying motivation.[3]

If everyone fully complied with the tax law, there would be no tax gap. As tax evasion increases, the country's tax gap increases. Thus the size of a country's tax gap is proportional to the extent of tax evasion in the country. Tax evasion, in turn, adversely affects the performance of a country's tax system. We proceed below by examining the likely effects of tax evasion on the performance of a country's tax system in terms of its revenue yield, economic efficiency, and interpersonal equity.

As previously noted tax evasion reduces the revenue yield of a tax system below its potential yield. While this may be the most obvious consequence of tax evasion, it may not be the most significant effect. After all, a government can often meet its revenue target, even in the face of pervasive tax evasion, by increasing tax rates. This fact leads us directly to the second and arguably the most harmful consequence of tax evasion: its effect on the tax system's economic efficiency. Understanding this issue requires some familiarity with the economics of taxation. Briefly, the total cost of taxation can be decomposed into a revenue burden and an excess burden. The revenue burden of taxation is the effect of taxes on the purchasing power of households. For example, paying income taxes reduces the resources available to households for consumption and investment. Likewise a sales tax reduces household purchasing power by increasing the prices of

[3] For purposes of designing tax policies and tax enforcement strategies to address tax evasion, it important to keep in mind that tax evasion may have any number of motivations. Strategies that may be appropriate when tax evasion is motivated by greed may not be effective and, indeed, may even be counterproductive if tax evasion is the consequence of, for example, complex tax laws.

goods and services.[4] The reduction in purchasing power due to the revenue effect of a tax is fittingly called the revenue burden of taxation. Since one of the primary purposes of taxation is to reduce household purchasing power in order to provide for a non-inflationary means of financing government activity, the revenue burden of taxation is unavoidable.

Taxes also impose costs or burdens in excess of their revenue burden. Taxes distort market decisions by changing relative prices, and these distortions impose costs on society. More specifically, people and firms may change their behavior in response to taxes. For example, income taxes change after-tax returns to work, saving, and investment and as a result people may work less, save less, and invest less than they would in the absence of an income tax. Such responses to taxation lead to reductions in economic output and thus further reduce the purchasing power of households. This loss of purchasing power is in addition to the revenue burden of taxation and is therefore called the excess burden of taxation. At the risk of oversimplifying matters, excess burdens induced by changes in relative prices are proportional to the square of the tax rate.[5] In other words, doubling the tax rate leads to a quadrupling of the excess burden of

[4] For purposes of this discussion, we are assuming that consumers bear the full burden of sales taxes. Although this is not an unreasonable assumption, it is at least theoretically possible for sales taxes to be shifted backward onto the producers of taxable outputs or onto the suppliers of inputs. If sales taxes are shifted backward onto producers and suppliers of inputs, then these taxes reduce their purchasing power. This is the important point: whatever their incidence, taxes reduce the purchasing power of households. For a more complete discussion of the economic incidence of various taxes, we refer the reader to Sally Wallace and Umar Wahid's (2008) distributional analysis of Pakistan's current tax system and the references to the literature on tax incidence provided there.

[5] The economics literature on the excess burden of taxation is rather technical. We refer the interested reader to Anthony B. Atkinson and Joseph E. Stiglitz (1980) and the references to the literature provided there. Basic references are Peter A. Diamond and James A. Mirrlees (1971) and A.K. Dixit (1975).

taxation, tripling the tax rate results in a nine fold increase, and so on. This relationship between the tax rate and the excess burden of taxation is often referred to as the law of the square of the tax rate.

Now, we are in a position to explain why tax evasion increases the excess burden of raising a given level of revenue. In the presence of tax evasion, government must use higher tax rates to achieve a given revenue target, and higher tax rates increase the excess burden of taxation because of the law of the square tax rate. Another source of excess tax burden is the cost to government of administering a tax system. Tax evasion increases the administrative costs of taxation thus further increasing the excess burden of taxation.

Finally we turn to the effect of tax evasion on the horizontal and vertical equity of a tax system. According to the principle of horizontal equity, a tax system should impose similar tax burdens on similarly situated individuals. The horizontal equity of a tax system is compromised when some taxpayers comply with the tax system and other similarly situated individuals do not. In addition, tax evasion may compromise the vertical equity of a tax system. According to the principle of vertical equity, tax burdens should be proportional to an individual's ability to pay tax. This principle is invoked to justify a progressive income tax. The idea being that the ability to pay tax increases with income. High-income individuals are often less tax compliant because they have greater scope to evade taxation and avoid detection than low and middle income individuals. If this is indeed the case, tax evasion compromises not only the intended horizontal equity of a tax system but its intended vertical equity as well.

In the case of Pakistan, however, the consequences of tax evasion for the vertical equity of the tax system may not be as clear cut as the above line of reasoning suggests.

The correlation between income and the opportunity to escape detection of the non-payment of tax differs greatly among countries of the world, especially between developing and developed countries. In many developed countries with relatively small informal sectors, it is nearly impossible to escape detection of the non-payment of tax due to an extensive system of third-party reporting of income and withholding of tax at source. As one would expect, a nearly 100 percent detection rate of under reporting of wage and salary income in the United States leads to very high voluntary compliance rates with taxes on wage and salary income. In fact, the Internal Revenue Service estimates that the voluntary compliance rate with the income tax on wages and salary is nearly 98 percent. Since low and middle income individuals in developed countries receive a large share of their income from employment in the formal sector of the economy, the portrayal in the previous paragraph of the effect of tax evasion on the intended vertical equity of a tax system is more likely to be accurate.[6]

In developing countries with large informal sectors, like Pakistan, low income individuals and often many middle income professionals operating in the private sector, such as medical doctors, attorneys, and so on, have much greater scope for escaping detection of the non-payment of tax than their counterparts in developed countries. So, the effect of tax evasion on the vertical equity of a tax system in developing countries may not be as clear cut as in the case of developed countries with extensive systems of third-party reporting and withholding of tax at source.

[6] There are automobile mechanics, plumbers, electricians, gardeners, and handy-men working in the informal sector of the economy in many developed economies who can escape detection of the non-payment because they are not subject to third-party reporting and withholding of their income. However, this is the exception that proves the rule.

The main point of this brief discussion is that a country's tax gap provides a useful measure of the extent of tax evasion in a country, and a large tax gap suggests that a tax system may be underperforming in terms of revenue yield, economic efficiency, and interpersonal equity. To properly interpret the effect of a large tax gap on the performance of a tax system requires a theory of the determinants of tax evasion. It is beyond the scope of this report to offer a comprehensive review of this literature. Suffice it to say that there is substantial empirical evidence in support of the theory that tax evasion depends on a country's tax policy choices (tax rates) and enforcement strategies (audit and penalty rates).[7]

A puzzling result in this literature is that people appear to be much more tax compliant than economic theory predicts, particularly given the low detection rates in many countries. There is a growing literature that attempts to resolve this puzzle, at least in part, by examining the effect of tax morale on voluntary tax compliance. According to Bruno S. Frey (1997), tax morale is the intrinsic motivation of citizens to pay taxes which, he contends, depends on their attitudes toward the state. If the general population feels that the tax system treats them fairly and that they are getting good value from the government for the taxes paid, their willingness to voluntarily pay tax increases. Conversely, if the general population believes that the tax system is unfair and that

[7] In the interests of accuracy, we should point out that under plausible assumptions, economic theory predicts that tax compliance is positively related to the tax rate, and there is at least one prominent empirical paper that finds support for this prediction. The seminal theoretical papers on tax compliance are M. G. Allingham and A. Sandmo (1972) and Shlomo Yitzhaki (1974). The empirical paper that I refer to in the previous sentence is Jonathan Feinstein (1991). Nevertheless, we believe that there is a consensus in the empirical literature that tax compliance varies inversely with the tax rate. See, for example, James Andreoni, Brian Erard, and Jonathan Feinstein (1998), James Alm (1998), and Jorge Martinez and Mark Rider (2005) for excellent reviews of this literature.

government corruption is rampant, their willingness to voluntarily pay tax decreases. In this view, increasing tax morale, all other things held constant, should increase voluntary tax compliance. Low tax morale confronts governments with the twin horns of a dilemma. Improving government services often requires greater revenue mobilization. But, to increase government revenue, government should increase tax morale, and to improve tax morale, government should provide better services. In other words, we cannot improve services without increasing revenue first, and we cannot increase revenue without improving services first.

Often governments attempt to increase revenue mobilization by increasing tax rates and enforcement effort, but such actions may further erode tax morale and thus fail to deliver the sought after increase in revenue mobilization.[8] This dilemma bedevils many governments around the world, particularly in countries with weak institutions, large informal sectors, and low tax morale. There are no easy solutions to these issues, but we believe that tax gap analysis can be helpful in revealing issues with a country's tax administration and tax policies, and such information should be helpful in devising reform strategies to address these issues.

In summary, tax evasion compromises the revenue yield, efficiency, and equity of a tax system. The size of a country's tax gap provides direct evidence regarding the extent of tax evasion in a country and indirect evidence about the likely performance of the tax system. Our estimate of Pakistan's tax gap of about 46 percent suggests that tax evasion is widespread, particularly in the case of direct taxes, and indicates that the federal tax system is underperforming in terms of the system's revenue yield, economic

[8] See, for example, Richard M. Bird, Jorge Martinez-Vazquez, and Benno Torgler (2006) for an interesting cross-country analysis of tax morale.

efficiency, and interpersonal equity. Although it is beyond the scope of this study to offer solutions, the size of Pakistan's tax gap suggests that increasing the country's tax effort, particularly in an equitable and efficient manner may require simultaneous and complementary reforms of both tax policy and tax administration. The size of Pakistan's tax gap also may be symptomatic of low tax morale which may require a different set of interventions to achieve the desired result of increased revenue mobilization.

The remainder of this report is organized as follows. The subsequent section provides a brief overview of the literature on methodologies employed to estimate a country's tax gap. In section 3, we provide a brief overview of Pakistan's tax system. The methodologies, data, and tax gap estimates are discussed in section 4, and section 5 concludes this report.

Literature Review

There are two general approaches to estimating a country's tax gap. The top down approach uses highly aggregated data to estimate the size of a country's underground economy, the tax gap is the product of the country's effective tax rate and the estimate of the size of its underground economy. For illustrative purposes consider a hypothetical country with an effective tax rate equal to 10 percent of official gross domestic product (GDP), and suppose the estimated size of the underground economy is 50 percent of official GDP. In this example, our hypothetical country's tax gap is equal to 5 percent of GDP (0.10×0.50) or 50 percent of actual tax collections ($0.05 \div 0.10$). In contrast to the top down approach, the bottom up approach uses data from tax service operations, from enforcement audits, from household income and expenditure surveys and micro-

simulation models to estimate potential tax revenues. With an estimate of potential tax revenues, a country's tax gap can be computed by subtracting actual tax revenues from potential revenues. We proceed below by describing each of these two general approaches in greater detail. Based on our review of the economics literature on this topic, the bottom up approach appears to be the preferred methodology for estimating a country's tax gap. When the bottom up approach is well done, it provides more accurate and detailed estimates of a country's tax gap by type of tax; whereas, the top down approach is an indirect method and often provides inaccurate estimates.

The Top Down Approach

In the top down approach to estimating a country's tax gap, aggregate variables serve as proxies for the size of the underground economy.[9] Assuming that the estimated size of the underground economy is an accurate measure of the tax base being concealed from the tax authorities, then the effective tax rate of the formal sector can be applied to this figure in order to compute the amount of potential tax revenue that is not being collected by the tax authorities.[10]

[9] There are several alternative terms used to refer the "underground" economy. Examples are shadow, informal, hidden, invisible, unobserved, unrecorded, black, second, illegal, etc. In this section we use the term "underground" and recognize that all the alternatives can be considered as equivalent. However, the variety of terms also reflects the numerous ways in which the underground economy can be defined and measured, thus in order to correctly interpret a measure of the underground economy it is important to precisely identify what is included in its definition.

[10] There are several possible definitions of the underground economy. To obtain an accurate measure of a country's tax gap from an estimate of its underground economy, the underground economy must be defined in a manner consistent with the task at hand. Friedrich Schneider (2005) proposes the following useful definition. The underground economy is the value of all market-based legal production of goods and services that are deliberately concealed from public authorities to avoid payment of taxes and social

The economics literature describes five methods for estimating the size of the underground economy.[11] We begin by describing the national accounts method. According to this method, the size of the underground economy is the difference between two conceptually equivalent measures of GDP, specifically national income and national expenditures. As a matter of accounting equivalence, the aggregate value of national expenditures for a given period of time should be identical to the aggregate value of national income net of international transactions. Therefore, if we obtain independent and reliable measures of national expenditures and national income, the difference between the two can be interpreted as a measure of the size of the underground economy. This is because their difference should account for unregistered transactions in the economy and therefore provide an indirect estimate of the share of the economy escaping the reach of the tax collection agency. Unfortunately, estimates of national expenditures normally contain errors and omissions and therefore the estimated size of the underground economy based on this method is likely to be inaccurate.

The second method depends on the discrepancy between the official estimate of the size of the labor force and the actual size of the labor force. If the labor force participation rate is stable over time, a reduction in the official estimate of the size of the labor force suggests that workers are leaving the formal economy and joining the underground economy. Of course the problem with this assumption is that the labor force

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security contributions as well as to avoid meeting legal standards and complying with certain administrative procedures.

[11] Friedrich Schneider and Dominik H. Enste (2002) provide a comprehensive survey of the methodologies for estimating the size of the underground economy. Other references include James Alm, Jorge Martinez-Vazquez, and Friedrich Schneider (2004) and Friedrich Schneider (2005). Our discussion closely follows their work. A more recent review of the literature on the underground economy is provided by Rodrigo Garcia-Verdu (2007).

participation rate in the formal sector may in fact vary for reasons completely independent from changes in the participation rate in the underground economy. As a result, this method may be unreliable way to estimate a country's tax gap.

In addition to the two methods described above, there are two monetary methods of estimating the size of the underground economy and the associated tax gap: the transactions approach and the currency demand approach. These two methods are based on the assumption that the underground economy relies on cash payments.[12] More specifically, the transactions approach is based on the quantity theory of money. According to this theory, the amount of money circulating in the economy is equal to the nominal value of GDP.[13] By assuming a value for the rate at which cash changes hands or the velocity of money, the size of the underground economy is equal to the difference between the value of all transactions and official estimates of GDP, as reported in a country's national accounts.[14]

In contrast, the currency demand approach is based on estimating an econometric model of the demand for cash. This approach accounts for both the determinants of the

[12] Barter of legal goods and services should also be considered as part of the underground economy, but by definition it does not rely on cash payments. See, for instance, Rolf Mirus and Roger Smith (1997) for more on this topic.

[13] The quantity theory of money can be represented by Fisher's quantity equation, which states that the product of the money supply (M) and the average number of times money is used and reused during a certain period of time or the velocity of money (V) must be equal to the product of the value of all transactions in the economy, which is given by the average price (P) and the number of transactions (T), or $M \times V = P \times T$. Velocity is inversely related to the demand for money.

[14] In this approach, total GDP (GDP_T) is equal to official GDP (GDP_O) plus the underground economy (GDP_U), or $GDP_T = GDP_O + GDP_U$. According to the Fisher quantity equation, $GDP_T = P \times T$, and therefore, $M \times V = GDP_O + GDP_U$. Data on M and GDP_O are generally available from the national income and product accounts and statistics of the central bank, respectively. With an assumption about the value of velocity (V), it is easy to calculate the size of the underground economy from the following equation $GDP_U = M \times V - GDP_O$.

demand for cash and the factors influencing the decision to join the underground economy. The effects of the variables accounting for the decision to join the underground economy are used to compute the size of the underground economy through their effect on the demand for cash. The currency demand approach is a commonly used method of estimating the size of the underground economy and thus estimates based on this method are available for a number of economies.

Friedrich Schneider (2005) uses the currency demand approach to estimate the size of underground economy for five regions of the world. According to these estimates, which are reported in table 2, the underground economy is larger on average for African and Central and South American countries than for OECD countries.[15] The average size of the underground economy for Asian countries is somewhere in the middle of the distribution. The fact that the average size of Asia's underground economy is smaller than that for other developing regions may be explained in part by the fact that there are high income OECD countries in Asia. These high income countries have smaller underground economies, and this decreases the overall average for Asian countries. In addition, Benno Torgler (2004) reports that there is a high level of tax morale among

[15] Although Schneider (2005) does not provide estimates of the size of Pakistan's underground economy, M. Ali Kemal (2007) estimates the size of Pakistan's underground economy to be about 54 percent of GDP, using the same currency demand approach as Schneider. Kausik Chaudhuri, Friedrich Schneider, and Sumana Chattopadhyay (2006) use a multiple indicator multiple cause (MIMIC) model to estimate the size of the underground economies for 15 Asian countries during the period 1994-95. According to their estimates, Pakistan has the fifth largest underground economy among the 15 Asian countries, ranked between Nepal (fourth) and Bangladesh (sixth). It is worth noting that their estimates differ greatly in magnitude from those of Schneider (2005). For example, Chaudhuri et al. (2006) estimate Pakistan's underground economy to be 31.4 percent of GDP, which is substantially less than Kemal's estimate of 54 percent of GDP.

Asian countries which may help explain the relatively small average size of the underground economy for Asian countries.

A fifth method for estimating the size of the underground economy is the electricity consumption method. The empirical literature shows that the overall level of economic activity in the formal and informal sectors is highly correlated with electricity consumption. Daniel Kaufmann and Aleksander Kaliberda (1996) use electricity consumption to estimate the total level of economic activity and the size of the underground economy as the difference between the growth of electricity consumption and growth of official estimates of gross national product (GNP).

Although conceptually appealing, the top-down approaches described above have two major drawbacks. Estimating the size of the underground economy is challenging, and the various methods result in conflicting estimates of its size. Table 3 documents this for two approaches applied to eight Asian economies. The first column of table 3 shows the estimates as a percentage of GNP based on the electricity consumption approach, and the second column shows the estimates as a percentage of GDP based on the currency demand approach. The estimates based on the electricity consumption approach are consistently higher than those based on the currency demand approach. However, there is no obvious pattern suggesting what is really driving these differences.[16]

[16] A possible source of divergence in the two sets of estimates may be due to the fact that GNP is used to gauge the size of the underground economy for one set of estimates; while GDP is used for the other set. However, the ratios of GNP and GDP, which are reported in column 4 of table 3, make it clear that the differences in the estimates of the size of the underground economy cannot be explained by the differences in GNP and GDP.

The variation in estimates of the size of a country's underground economy obtained with these different methods is a source of concern.[17] Edgar L. Feige and Ivica Urban (forthcoming) compare different estimates of the underground economy for 25 transition countries and find considerable variation in the estimates based on the different approaches. They compare estimates based on the national accounts method, the electricity consumption method, and currency-deposit-ratio method.[18] Based on this evidence, they conclude that the differences among these estimates cast doubt on the reliability of the top down approach to estimating the size of the underground economy.

Furthermore, estimating a country's tax gap based on estimates of the size of the underground economy implicitly assumes that this is a good measure of the tax base being concealed from tax authorities. This assumption is problematic because a country's tax gap may not be proportional to the size of the country's underground economy as the top down approach implicitly assumes. Since taxpayers can evade taxes even when transactions are properly recorded by the statistical agency responsible for producing the national accounts, the amount of unpaid tax and the size of the underground economy are not necessarily closely related. In short, using estimates of the size of the underground economy to estimate a country's tax gap is a very indirect and potentially inaccurate method of estimating a country's tax gap, and thus results obtained using this strategy should be interpreted with caution.[19]

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[17] For an early critical analysis of the macro approach methods, see Phillippe Barthelemy (1988).

[18] The currency-deposit ratio model is a variation of the currency demand method, in which that variable is taken as a proxy for the change in unobserved income in each country.

[19] See Philippe Barthelemy (1988) and Friedrich Schneider and Dominik H. Enste (2002) for a detailed analysis of the weaknesses and limitations of top-down approaches.

The Bottom Up Approach

As previously noted, the bottom approach uses micro-economic data to estimate the size of the relevant tax bases and micro-simulation models to calculate potential tax liabilities. Thus, this approach provides detailed estimates of the tax gap by type of tax. We organize the discussion of the bottom up approach by type of tax and more generally by direct and indirect taxes. We begin with the bottom up approach to estimating the tax gap for direct taxes.

In United States, the most recent estimates of the individual income tax underreporting gap is the tax year (TY) 2001 study of the reporting compliance of individual taxpayers. For TY 2001, the Internal Revenue Service (IRS) audited 46,000 randomly selected individual income tax returns which were subject to intensive line-by-line audits under the new National Research Program (NRP).[20] The analysis of these data took place from October 2002 to September 2004, and the estimates were officially released in February 2006. The lag in releasing the tax gap estimates is mainly due to the time needed to review and clean the enormous mass of raw data and address any anomalies uncovered in the sample. Additional time was also required to adjust the underreporting gap for the income that auditors did not detect. This adjustment is based on the work of Jonathan Feinstein (1999) on detection-controlled estimation which takes into account persistent differences in detection rates among individual auditors and

[20] Starting with the TY 2006, the NRP compliance studies are undertaken annually but use a smaller sample of returns than the TY 2001 study. For example, the TY 2006 study is based no 13,000 individual income tax returns.

implicitly applies the income detection rate of a composite best examiner to the entire audit sample.[21]

The underlying model includes two expressions: one for the probability of violation by potential offenders and the other for the probability of detection, conditional on a violation having occurred. The two expressions are jointly estimated and the resulting parameter estimates are used to construct estimates of the proportion of violations that remain undetected on various combinations of taxpayer-examiner characteristics.[22] According to the TY 2001 study, the underreporting gap was estimated to be approximately18 percent of potential income tax, which combined with the non-filing and underpayment gaps results in a total individual income tax gap of approximately 20.9 percent.[23]

The most recent estimates of thee corporate income tax underreporting gap for the United State was derived from studies of taxpayer compliance covering periods prior to 1988. Those earlier estimates are projected forward under the assumption that reporting compliance rates have not changed. The underreporting gap was estimated separately for small, mid-size, and large corporations. For corporations under $10 million in assets the

[21] According to the previous study for TY 1976, the multiplier for adjusting for non-detection was derived from comparing the income reported on third-party documents to the unreported income detected by examiners who did not make use of those documents. While varying substantially across line items, the average value of these multipliers was around two.

[22] Interestingly, when applied to the 1982 and 1985 Taxpayer Compliance Measurement Program (TCMP) data, the adjustment multipliers produced by the detection-controlled estimation procedures are almost identical to the multipliers derived from using third party documents. See Feinstein (1999) for further discussion of this issue.

[23] For a less developed country, Jorge Martinez-Vazquez, Mark Rider, and Sally Wallace (2008) estimate the individual income tax gap for the Russian Federation in 1996 to be approximately 45 percent of potential tax liabilities, using household income expenditure survey data from the Russian Longitudinal Monitoring Survey (RLMS).

estimation is based on representative audits under the (now discontinued) Taxpayer Compliance Measurement Program (TCMP), covering both households and small businesses. For corporations ranging from $10 to $100 million the estimation was done by scaling up the underreported amount uncovered in regular operational audits to the population of returns. For large corporations (over $100 million in assets), the corporate income tax underreporting gap was estimated as the actual uncovered underreporting given the almost complete audit coverage of large corporations in the 1980s. The total underreporting and underpayment gap for corporations was estimated to be about 18.5 percent of potential corporate income tax receipts.

In Russia, the Ministry of Finance conducted an analysis of aggregate tax return data for the enterprise profit tax by industry 1998. Comparing these data side-by-side with GDP estimates by sector, the study concludes that the overall compliance rate for enterprise profit tax was approximately 64 percent, or equivalently that the evasion rate for the enterprise profit tax was approximately 36 percent. However, the actual evasion rate was probably higher because official estimates of GDP by sector are likely underestimated due to the underground economy in Russia.

Turning to bottom up approaches to estimating the tax gap for indirect taxes, the United Kingdom (UK) uses operational data to estimate the magnitude of the tax gap for a number of categories of the value added tax (VAT).[24] The bottom up estimates of the four major evasion types roughly sum up to the top down estimate of 15 percent for the VAT gap, specifically 2.5-3.9 percent for missing trader fraud, 3.6-4.3 percent for artificial tax avoidance, 0.6-0.7 percent for non-registration for VAT, and 3.6-5.7 percent

[24] See Michael Keen and Stephen C. Smith (2007) for more on this topic.

for general non-compliance by VAT-registered firms. The methodology is not fully disclosed due to confidentiality of enforcement operation strategies. It was disclosed that the upper bound for the missing trader fraud is based on discrepancies between sales to the UK reported in the European Union countries and purchases from other member states declared in the UK.

Carlos A. Aguirre and Parthasarathi Shome (1988) estimate the potential VAT revenue before and after a change in the VAT rate structure in Mexico. When a VAT was introduced on both goods and services in 1980, it had a single general rate of 10 percent with few exemptions (mainly for agriculture), a zero rate applied almost exclusively to exports, and a special tax regime for small businesses. In 1983, the need to increase revenues prompted the government to raise the standard rate to 15 percent, while introducing a special rate of 6 percent for agricultural products and medicines and a special rate of 20 percent for luxury items (caviar, cable TV, and the like). At the same time agricultural produce became zero-rated rather than exempt. The estimate of the potential revenue for 1980 and 1983 starts with production data adjusted for exports, imports, capital transactions, changes in stocks, exemptions, and all intermediate uses, with the help of an input-output (I-O) table. The computation is performed separately for different sectors of the economy to which different VAT rates apply. The resulting potential VAT revenue suggests a tax gap of 45.1 percent in 1980 and 48.3 percent in 1983. At that time, the VAT yield was 2.7 percent of GDP in 1980 and 3.0 percent of GDP in 1983.

Tuan Minh Le (2007) estimates Romania's VAT base using 2002 I-O matrices consisting of 34 economic sectors. Romania introduced a VAT in 1993. It is a

consumption-based VAT and administered according to the invoice-credit method under the destination principle. The standard rate is 19 percent while a reduced rate of 9 percent applies to selected goods and services related to tourism, cultural activities, mass media, medicines, and educational aids. A zero rate is applied to exports and selected goods imported under special customs regimes (i.e., inward processing operations, free trade zone, suspense customs regimes, and so on). VAT revenues are equal to approximately 7 percent of Romania's GDP in 2004. To estimate the taxable base, the final consumption in each sector is reduced by the amount of exemptions and zero-ratings, increased by the volume of inputs in sectors producing exempted commodities, and adjusted for the sales net of inputs purchased by small businesses with gross receipts are less than the registration threshold. The total tax base computed for all sectors is multiplied by the weighted average VAT rate to arrive at potential VAT revenue. Comparing the estimate of potential VAT revenues to actual VAT collections in 2002 indicates a tax gap of 45.6 percent of potential revenues.

For the Russia Federation, Jorge Martinez-Vazquez, Mark Rider, and Sally Wallace (2008) cite a study of VAT evasion developed by USGTA using data from a regional I-O model. This model produced an estimate of the VAT compliance rate by comparing the simulated tax liability based on production information in the economy and flow-through to output for 25 sectors of the economy with actual payments made in those sectors. Based on this approach, the average weighted value added tax compliance rate of all sectors was approximately 55 percent. Similar procedures using a computable general equilibrium (CGE) model of the Russian economy produced weighted compliance estimates of 38 percent.

Glenn P. Jenkins and Chun-Yan Kuo (2002) estimate the tax gap for Nepal's sales tax, which has been in place before the introduction of VAT in fiscal year (FY) 1998-99. The sales tax was imposed on the manufacturer's sale price of goods produced for domestic consumption and the duty paid value of imported goods. In FY 1993-94, there were two sales tax rates, 10 percent and 20 percent. Due to the paucity of data, the estimates rely on Household Budget Survey data on household consumption, national accounts for capital inputs apportioned according to import information, and dated I-O tables from a study by the United Nations Development Programme (UNDP) on intermediate inputs. The tax gap was estimated to be six percent for alcoholic beverages, 10 percent for tobacco products, and 48 percent for the remaining taxable commodities.

In summary, there are two general approaches to estimating a country's tax gap. The top down approach is an indirect method which uses aggregate data to estimate the size of the underground economy. The tax gap is obtained by taking the product of the effective tax rate and the estimate of the size of the underground economy. Two of the major drawbacks of the top down approach to estimating a tax gap is that there may not be a good correspondence between the size of a country's underground economy and the underreporting of the tax base. Furthermore, estimates of the size of the underground economy vary greatly, according to the methodology employed to make the estimates. The bottom up approach uses micro-economic data and micro-simulation models to estimate the size of the tax gap by type of tax. This approach is the preferred methodology because the estimates are likely to be more accurate and provides greater detail than the top down approach on the tax gap by type of tax. We turn now to a brief description of the structure of Pakistan's federal tax system.

A Brief Overview of Pakistan's Tax System

As reported in table 4, in FY 2004-05, Pakistan collected approximately Rs. 590.1 billion in total, net of refunds, federal tax receipts, or about 9.7 percent of GDP of Rs. 6,129.7 billion. For a country with Pakistan's level of development, the tax to GDP ratio is rather low. Direct taxes account for 31.0 percent (Rs. 183.1 billion) of total federal taxes, and the remaining 69 percent (Rs. 407.0 billion) comes from indirect taxes.[25] The proportion of federal tax revenues from indirect taxes is rather high by international standards. For the reader's convenience, we provide a brief overview of the main features of Pakistan's current federal tax system.[26] This overview begins with a description of Pakistan's system of direct taxes and then turns to a brief description of the indirect tax system.

The Direct Tax System

Pakistan's direct tax system consists of a classical income tax, which subjects dividends to double taxation, and some other minor taxes on income, namely a profits tax which is dedicated to the workers welfare fund (WWF) and the workers profit participation fund (WPPF), a capital value tax (CVT), and a wealth tax. Approximately 94 percent of direct tax revenues in FY 2004-05, or Rs. 172.5 billion, come from the federal income tax. The income tax on salaried individuals accounts for 7percent (Rs. 13.3 billion) of total federal income tax receipts. The income tax on non-salaried

[25] For purposes of our tax gap analysis, we use a number of data bases on household income and expenditures, detailed customs records, and detailed information on gross domestic product to estimate the various tax bases making up Pakistan's federal tax system. The most recent year for which these detailed data are available is FY 2004-05. This is the reason that we choose to estimate the tax gap for FY 2004-05.

[26] For those interested in a more detailed description and evaluation of Pakistan's tax system, we refer the reader to Wayne Thirsk (2008).

individuals accounts for 26 percent (Rs. 47.8 billion), and the remaining 61 percent (Rs. 111.4 billion) comes from the income tax on corporations.[27]

Taxable income under the individual income tax consists of income derived from wages and salaries, property (rental) income, business income, capital gains, except for stock market capital gains, and other sources of income. There is a progressive tax rate schedule that beyond the zero rate increases gradually from 0.5 percent to 25 percent. As discussed in greater detail in Wayne Thirsk (2008), there is an extensive and sometimes peculiar list of exemptions and credits, and a few deductions and preferential tax rates.

The base of the corporate income tax is conventionally defined as active income earned from the sales of goods and services, and any passive income received in the form of rents, interest, management fees or royalties. The usual list of business expenses are deductible from chargeable income, specifically costs associated with employees, research and development, employee training, bad debts, cost of sales, depreciation allowances for tangible fixed assets, compulsory contributions to the workers welfare fund (WWF) and workers profit participation fund (WPPF), and interest expenses. Pakistan, with one exception, applies a uniform corporate tax rate of 35 percent. Net operating losses may be carried forward for a period of six years. Corporations operating in some sectors are subject to presumptive taxation.

As discussed in greater detail in Thirsk (2008), there is an extensive network of 'withholding' measures that include many forms of presumptive taxation, such as the treatment of compressed natural gas (CNG) and construction contracts. The designated

[27] The share in total income tax revenues from the corporate income tax is rather high by international standards. The trend is to reduce the taxation of capital income due to globalization and competition for foreign direct investment.

withholding agents include the federal government, a company other than a 'small' company, association of persons (AOP), a foreign contractor or consultant, a consortium or joint venture, and an exporter or export house.

We believe that Pakistan's withholding tax regime can be usefully divided into three separate regimes. First, there is a set of familiar withholding taxes that withhold income tax at source. There is a second set of 'withholding' taxes that are essentially presumptive taxes. Finally, there is a third set of 'withholding' taxes that are essentially excise taxes that are creditable against individual income tax liabilities and are therefore regarded as advanced payments. We discussed each set of withholding taxes in turn.

One set of withholding tax devises are the more or less familiar ones that involve withholding income tax at source. Withholding tax at source has proven successful in increasing compliance with the individual income tax in many countries, including most if not all developed countries. In Pakistan, examples of these would include the following: withholding on wages and salaries (at variable rates), bank interest (10 percent), dividends (10 percent), gross rents (5 percent), purchases and sales of listed shares (0.01 percent), royalties and management fees paid abroad (15 percent), and prizes and winnings (10 percent).[28] Notably, withholding on interest, dividends, and rents are final taxes. This gives Pakistan's global income tax some elements of a scheduler income tax.[29]

The remaining 'withholding taxes' are more in the nature of excise taxes. Examples of these include withholding taxes on construction contracts (at a 6 percent

[28] The withholding rate is provided in parentheses.
[29] Scheduler taxes are common in many North European countries, particularly the Nordic countries.

rate), imports (5 percent), exports (1 percent), telephone and electricity bills (both at variable rates), bank deposit withdrawals (0.2 percent of daily withdrawals in excess of Rs. 25,000), automobile purchases (5 percent), and commissions on income of petrol station operators (10 percent).[30] In addition to these, any purchase of goods and services by designated withholding agents is subject to withholding at the following rates: 1.5 percent for the sale of rice, cotton seed, or edible oils, 3.5 percent for other goods, and 6 percent on services including professional services. These may also fall into the excise type, withholding regime. The 'excise tax withholding regime', for lack of a better term, can be further divided into two camps. There are withholding taxes that are considered to be final, and others that are considered to be advanced or adjustable taxes. The former are really presumptive taxes, and the latter may be regarded as withholding taxes, at least in principle. Many countries, among them many advanced economies, use presumptive taxation. Presumptive taxation is a proven way to efficiently and equitably increase compliance with the income tax among the 'hard-to-tax', such as the self-employed, professionals, small businesses, and the like. As previously noted, examples of presumptive taxation in the excise tax mode include the tax treatment of CNG and construction contracts, among others.

Now, we turn to the category of withholding taxes that may be referred to as advanced income tax payments in the excise tax mode. Advanced taxes as enumerated in the law consist of withholding against cash withdrawals from commercial banks, car purchases, brokerage fees, stock market transactions, transportation services, and electricity and telephone bills. Since they are adjustable, what are essentially indirect or

[30] The withholding rates are provided in parentheses.

excise taxes, may, at least in principle, be fairly referred to as advanced payments or, if you prefer, withholding taxes. It is far from clear that non-salaried individuals claim the credits against income tax liabilities in sufficient numbers to justify calling them advanced payments. Here we are trying to draw a distinction between actual practice and the principle of the matter. In principle, they are withholding taxes. In practice, people may not be the claiming credit against their individual income tax liabilities for adjustable withholding taxes that they may have paid throughout the year. This would seem to be particularly true of salaried individuals who pay withholding taxes on their telephone and electricity bills.

Having drawn the distinction, we leave it up to the reader to decide which view should prevail. But, resolving this distinction is not merely an academic exercise. If, upon reflection, you decide that it is actual practice that matters, then what we may have is a set of indirect taxes. That being the case, perhaps they should be treated as such, and the principle that they are adjustable should be dropped. Alternatively, if, upon reflection, the principle prevails, then perhaps the FBR should engage in a public relations campaign to educate non-salaried individuals about the possibility of claiming credits for adjustable withholding taxes paid throughout the year. For reasons that will become evident below, we believe that the practice of attributing 'withholding taxes' in FBR reports and financial statements to the different income taxes in a non-transparent manner interferes with clear thinking about the performance of the different direct taxes and may be masking serious issues with non-compliance with the different income taxes.

Table 5 reports collections by withholding tax head for FY 2004-05. Given the extensive array of withholding devices, it is not surprising that this method of tax

collection contributes nearly 64 percent of total, net of refunds, income tax revenue raised in FY 2004-05. Table 5 also shows that withholding tax on construction contracts accounts for about 31 percent of all withholding tax collections reported by the FBR in FY 2004-05. Thus, withholding tax on contracts accounts for 20 percent of total federal income tax receipts ($0.31 \times 0.64 = 0.20$). In other words, a sector that accounts for 2.3 percent of value added in GDP, according to Federal Bureau of Statistics (FSB), pays 20 percent of federal income taxes. This fact is suggestive of serious issues with non-compliance with the federal income tax. We return to this issue below.

In the context of our tax gap analysis, it is important to have a clear understanding of how the FBR attributes withholding tax collections to the different income taxes, namely the income tax on salaried individuals, on non-salaried individuals, and on corporations. Based on discussions with FBR staff at several district offices, withholding tax on wages and salaries is attributed to the income tax on salaried individuals in the FBR's reports and financial statements. However, it is far from clear how collections from other withholding tax heads are attributed in the FBR's reports to the different income taxes despite discussions with staff members of several district offices.[31]

It is our understanding that collections from the withholding taxes, except those on wages and salaries, are attributed by the FBR to the income tax on non-salaried

[31] The methodology employed by the FBR to attribute withholding taxes to income tax by source has been difficult to figure out. We believe that the attribution of withholding taxes is made at the individual direct tax offices scattered about the country. Robina Ather Ahmed visited a few direct tax offices in this regard to see how this attribution is done. She was led to believe that it is a manual exercise and withholding collection under all the heads; imports, exports, dividends, and so on, with the exception of salaries, is attributed to non-salaried individuals. Since the sum of all withholding taxes, except that on wages and salaries, is nearly double the total amount of revenue from the income tax on non-salaried individuals, or Rs. 98.1 versus Rs. 51.1 billion, respectively, this explanation is not entirely satisfactory.

individuals. As the sum of collections from the remaining withholding taxes is greater than the income tax on non-salaried individuals, our understanding of the attribution of withholding tax collections appears to be incomplete. Perhaps a reasonable hypothesis is that withholding taxes on telephone and electricity bills (Rs. 9.9 billion), bank interest (Rs. 4.6 billion), dividends (Rs. 2.7 billion), and other sources (Rs. 13.3 billion) is attributed by the FBR to the income tax on non-salaried individuals. If this is indeed the case, the withholding tax regime accounts for approximately 60 percent of income tax collections from non-salaried individuals. As discussed in greater detail below, this last point is crucial to the interpretation of our tax gap estimate for the income tax on non-salaried individuals. Finally, assuming the remaining withholding taxes (i.e., construction contracts, imports, and exports) are attributed to the income tax on corporations, then collections from withholding taxes account for 61.7 percent of total corporate income tax revenues.

The Indirect Tax System

The indirect tax system consists of a sales tax, which is a conventional credit-invoice, destination-based, value added tax, a system of federal excise taxes, and import duties. As reported in table 4, indirect taxes account for approximately 69 percent (Rs. 407.0 billion) of total federal tax receipts in FY 2004-05. sales tax revenues account for 59 percent (Rs. 238.5 billion) of total indirect tax collections; federal excise taxes account for 13 percent (Rs. 53.1 billion); and customs duties account for the remaining 28 percent (Rs. 115.4 billion).

Sales tax is imposed on all traders, other than those involved in providing services, having a turnover above the registration threshold of Rs. 5 million ($83,373). A zero rate applies to exports and to a number of other sectors and activities. Currently, the sales tax rate is 15 percent. The federal excise tax base consists of 48 excisable goods. These can be conveniently grouped into six categories, vegetable oils, carbonated beverages, tobacco products, cement, and seventeen different types of oils and fuels, and certain luxury items (toiletries and cosmetics).

Finally, duties are applied to the value of imports. The tariff schedule generally provides for duty rates, ranging from 0 to 25 percent in 5 percentage point increments, i.e., 0 percent, 5 percent, 10 percent, and so on. There are exceptions to this general rule, including the rates applied to imports of automobiles, automobile parts, beverage alcohol, and tobacco products, which are subject to duty rates upward of 100 percent. Free trade agreements were recently concluded with China and Sri Lanka, and talks on a preferential trade regime with Malaysia are currently underway.

Pakistan's Tax Gap

We are finally in a position to discuss our tax gap estimates and the methodologies and data used to produce them. We calculate the tax gap for the following federal taxes: income tax on salaried and non-salaried individuals (separately) as well as corporations, sales tax, federal excise tax, and import duties. We do not estimate the tax gap for some minor taxes, namely the taxes dedicated to the WWF and WPPF, the capital value tax (CVT), and the wealth tax. Since these taxes account for only 1.8 percent of total federal tax receipts in FY 2004-05, we effectively cover 98 percent of federal tax

revenues. As explained below, data availability dictates that we use FY 2004-05 as our baseline or benchmark. Our tax gap estimates by type of tax are reported in table 1.

Operationally, the definition we use to estimate Pakistan's federal tax gap is the difference between potential and actual tax revenues. It is a simple matter to obtain actual tax receipts by type of tax. The challenge is to estimate potential tax revenues, which is the amount of tax that the Government of Pakistan should expect to collect if there was full compliance with the tax system in place in FY 2004-05.[32] We use micro-simulation models to estimate the potential tax for each federal tax, except for some minor taxes. A micro-simulation model essentially consists of detailed data on the tax base in question and a tax calculator. A tax calculator, as its name suggests, is simply a computer program that performs the arithmetic calculations required to compute tax liability as prescribed by the tax law for a given tax.[33] With an estimate of potential tax revenues in hand, the tax gap is easily calculated by simply taking the difference between our estimate of potential tax revenues and actual tax receipts in FY 2004-05, as reported in FBR financial statements and as reproduced in table 1 of this report.

We proceed below by describing the methodologies used to estimate the tax gap for each federal tax. We also discuss our tax gap estimates below. We begin with the individual income tax.

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[32] As discussed in greater detail below, we choose to use FY 2004-05 federal tax receipts as the our benchmark for this exercise because of the availability of micro-economic data for 2004-05.

[33] Tax calculators can be programmed in Fortran, C++, SAS, Stata, SPSS, and even MS-Excel spreadsheets. The choice of software depends on the volume of data, the complexity of the tax law, and the skill of the analyst.

Direct Tax Gap

As reported in table 1, our estimate of the direct tax gap is Rs. 262.8 billion, or about 143 percent of actual direct tax revenues of Rs. 183.1 billion. We estimate the tax gap for the income tax on salaried individuals to be about Rs. 13 billion, or 97 percent of actual receipts of Rs. 13.3 billion, and, for the income tax on non-salaried individuals, we estimate the tax gap to be approximately Rs. 7.3 billion, or 15 percent of actual revenues of Rs. 47.8 billion. Finally, we estimate the corporate tax gap to be approximately Rs. 242.5 billion, or about 217 percent of actual corporate tax receipts of Rs. 111.4 billion. We proceed below by describing the methodologies used to make our direct tax gap estimates.

Income tax on salaried individuals

To estimate the revenue potential of the individual income tax under current law, we need an objective measure of the tax base, or at least a measure that is not subject to intentional reporting errors for tax purposes. It is important to have individual level data in order to account for the tax threshold and graduated rate structure. The Federal Bureau of Statistics (FBS) periodically conducts two household surveys that are useful for this purpose, namely the Household Integrated Expenditure Survey (HIES) and the Labour Force Survey (LFS). The sample size of the HIES is 14,776 households. The sample is drawn from 1,045 primary sampling units of which 486 are urban and 449 are rural. According to the FBS (2006a), the sample size is considered sufficient to produce estimates of key variables, including household income by source, at the national levels with a 5 to 7 percent margin of error.

In the HIES, we have individual reported income by type in the "E" data file. Individuals report their type of work (paid, self-employed, agriculture, non-paid) and their earnings for the previous month. They also report how many months they worked in the previous year. We estimate annual wage income by taking the product of these two amounts.[34] Using the individual level estimates of taxable wage income for each observation in the sample, a tax calculator is used to estimate income tax liabilities based on FY 2004-05 tax law for each observation (with positive taxable income) in the sample. The tax calculator is programmed using SAS. Unfortunately, we cannot control for specific exemptions since we simply do not have the necessary information to do so.[35]

Once the calculation is made, we aggregate over households and apply the household weight to obtain an estimate of the population tax liability on wages. The result is reported in Table 6 as "model 1", 39.6 billion rupees. Since actual income tax revenue from salaried individuals is Rs. 13.3, the tax gap based on this estimate of potential income tax is Rs. 25.6 billion, or 182.9 percent of actual collections.

There are other data in the HIES that are useful for this analysis, too. The HIES household income file ("section H" file and "section N" file) contains summary information on total household income by type. These data are the basis for the statistics

[34] The survey also asks how much was earned in the previous year. However, the response rate on that variable is quite low so we do not use that variable in the simulation analysis. The Federal Bureau of Statistics reports that the HIES data are net of taxes, so we gross up wages appropriately. The same is true of the Labour Force Survey data.

[35] The calculations for the individual income are produced by Umar Wahid and Sally Wallace as part of their work on the tax distribution study. For the sake of consistency, we are piggy-backing on their work. We also refer the interested to their study [Umar Wahid and Sally Wallace (2008]. We would like to acknowledge our appreciation to them for their help in producing the estimates of potential individual income tax receipts.

reported in official government publications.[36] Using household data we are not able to be as accurate in estimating income tax liabilities because of the impact of the tax threshold. Our estimate of income tax liability using the household income data is Rs. 36.6 billion (labeled model 3 in table 6). The resulting estimate of the tax gap based on this estimate of potential revenue is therefore Rs. 22.6 billion, or 161.4 percent of actual tax revenues of 13.3 billion.

Finally, we use the Labour Force Survey (LFS) to analyze the same compliance issues. The data in the LFS are individual-level and more detailed information is available regarding employment type and history. The sample size is 18,912 households spread over four quarters of the year in order to account for seasonal variations in income. The LFS data are thought to provide more accurate measures of wage income. Simulating income tax liability using the LFS, we estimate potential income tax from salaried individuals to be Rs. 27.4 billion (model 6).

These estimates of potential wage-based income tax revenues are upper bound estimates, as they do not account for all the exemptions and credits in the current system. However, it is possible to estimate the value of some of the exemptions. For example, there is a concessionary rate for teachers and senior citizens (among others). The concessionary rate for senior citizens is unlikely to have an impact on the calculation of the income tax on wages; however concessionary rates on teachers may have an impact on our estimate of the individual income tax gap. Mark Bray (2002) reports that teachers' salaries in Pakistan are 4 times per capita GDP, suggesting that most teachers' salaries

[36] The income reported by individual members of the household does not add to that reported in the household file. This may be due to reporting errors.

are below the threshold for the individual income tax and therefore should not affect our tax gap estimate for salaried individuals.

Umar Wahid (2008) reports that income tax exemptions in FY 2006-07 amount to Rs. 121.9 billion. Most of these exemptions arise from the non-tax status of various allowances, capital gains, pensions, and provident and superannuation funds. Some credits are also allowed. For example, for the wage simulation, the charitable contribution credit is the only one likely to have an substantial impact on our estimates of potential tax revenues. The estimate of the tax expenditure for charitable contributions credit in 2006-07 is Rs. 1.7 billion. Deflating this estimate cost to 2004-05 levels yields an estimate of approximately Rs. 1.5 billion.

Utilizing the LFS potential tax estimate and subtracting the estimated cost of charitable contributions, the estimated potential income tax liability for wage income is Rs. 26.3 billion. This is a gap of Rs. 13 billion, or about 97 percent of actual collections from the wage portion of the income tax. This is our preferred estimate of non-compliance with the individual income tax for salaried individuals for FY 2004-05.[37] This is a very large tax gap by any reasonable standard, and undoubtedly reflects, at least in part, the fact that small corporations are not required to withhold tax on the wages and salaries of their employees.[38]

[37] The LFS survey is believed to provide more accurate estimates of wages by sector due to the focus of the survey. Wahid and Wallace (2008) use the HIES to analyze the distribution of income (in total and by type) due to the comprehensiveness of the HIES in estimating total income and expenditures. They report that the distribution of wage income is similar between the two surveys. For our purpose, we believe that the estimate based on the LFS provides the most accurate estimate.

[38] We refer the interested reader to the discussion of this issue in Thirsk (2008).

Income tax on non-salaried individuals

This category of individual income tax includes the self-employed, small businesses (unincorporated), rental income, capital gains, and other sources, including the withholding tax on dividends and other items. In FY 2004-05, the total revenue from these sources is Rs 47.8 billion. Using data from the HIES, it is possible to estimate the potential income tax from some of these sources, using a method similar to that for the wage portion of the individual income tax.[39] In some respects, the disaggregation of tax for this component is cleaner than that for wages since, for many households, only one member reports these forms of income. In addition, receipts for some of these income items (dividends, interest) come largely from bank withholding [Thirsk (2008) and FBR quarterly reports].[40]

The largest portion of this item is for associations of persons (AOP), other self-employed persons, and non-corporate businesses. In the HIES, these individuals are classified as self-employed or employers. Using these data and applying the appropriate tax calculator, we estimate potential self-employment income tax of Rs. 41.2 billion. The FBR reports income tax revenue for this group of Rs 38.2 billion. This implies a tax gap of Rs. 4.0 billion, or 7.8 percent of actual revenues for this group. Given the reported sampling error of 5 to 7 percent, this estimate is statistically indistinguishable from zero. Since we lack information on other sources of self-employment income in the HIES, we assume the same rate of non-compliance (7.8 percent of actual tax revenues from self-

[39] The LFS does not provide detailed income information for non-salaried individuals.
[40] As noted in Thirsk (2008), withholding on capital income constitutes final tax. The withholding rate on dividends and bank interest is 10 percent. A complication here is that the amount of bank withholding covers the corporate and non-corporate sector. To date there is no disaggregation between corporate/non-corporate sectors.

employment income). Applying this rate to actual income tax revenues from non-salaried individuals of Rs. 47.8 billion, we estimate potential revenues of Rs. 55.1 billion, and the resulting tax gap estimate is Rs. 7.3 billion, or 15 percent of actual tax revenues from this source.

This analysis suggests an astonishingly small amount of non-compliance among the self-employed. For example, the tax gap for the self-employed in the United States is estimated to be about 40 percent of potential tax liability. The self-employed are notoriously difficult to capture in the tax net, particularly in developing countries with large informal sectors, like Pakistan.[41] It may be the case that the self-employed are not accurately reporting their employment status or their earnings in the HIES. The Pakistan Economic Census 2005 reports a large "small and medium enterprise" sector consisting of 3.2 million enterprises; so there is evidence that there is 'money out there', although some of these would be classified as corporations. Using the HIES, Wahid and Wallace (2008) estimate that there are 4.6 million households reporting self-employment income greater than Rs 40,000. Using the LFS, they also report 7.8 million individuals identified as self-employed, but this survey does not report earnings from self-employment and therefore cannot be used to provide an alternative estimate of this tax gap.[42]

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[41] See, for example, David Joulfaian and Mark Rider (1998) and Richard M. Bird and Sally Wallace (2004) for evidence regarding the taxation of the self-employed.

[42] As discussed in greater detail in Wahid and Wallace (2008), an alternative strategy for identifying potential non-compliance among the self-employed is to analyze the pattern of expenditures relative to reported income. If individuals reporting self-employed income also report total expenditures greater than total income, the difference between reported expenditures and income could be a proxy for underreported income. Surprisingly there is no statistical difference in the ratio of expenditures to income between the self-employed and wage earners. This may be a function of the integrity of the income data in the 2004-05 HIES. In any event, we have no basis for adjusting the level of self-employment income based on these results.

A possible explanation for this highly suspect result is the extensive withholding tax regime. As previously noted, we estimate that 60.8 percent of actual income tax revenues from non-salaried individuals are a direct result of the withholding tax regime.[43] The data in table 5 clearly establishes that the withholding tax regime is a significant revenue spinner. Furthermore, the withholding taxes on telephone bills, electricity bills, and bank withdrawals undoubtedly collect significant revenue from the self-employed and employees, alike. Therefore, attributing all of the revenue from these collection heads exclusively to non-salaried individuals may be masking a larger tax gap for the self-employed and leading us to mistakenly overstate the tax gap for salaried individuals. Pakistan's extensive withholding tax regime is an understandable response to the notoriously difficult task of collecting income tax from the self-employed and other small businesses in a country with a large informal economy. Based on our tax gap estimates for this group, the withholding tax regime appears to be achieving its intended result, at least insofar as revenue mobilization is concerned. The effect of the withholding tax regime on other performance measures of the individual income tax, such as its efficiency and equity, is unlikely to be as salutary. There is no doubt need for more work in this area.

[43] This estimate is indeed an estimate because guesswork is involved in the way we attribute withholding tax revenue to non-salaried individuals. Despite considerable effort, including visits to several district offices, we simply do not have a clear understanding of the conventions employed by the district offices of the FBR to attribute withholding tax revenue among the sources of income tax.

Income tax on corporations

We use a detailed I-O model of Pakistan's economy for FY 2004-05 to estimate the potential revenue from corporate income tax.[44] Not only does the model provide information on total use or gross sales for each of the 81 sectors in the I-O model, but it also provides crucial information on business expenses that are deductible from corporate taxable income, specifically the costs of inputs, compensation of employees, and indirect taxes. Although the I-O model also reports consumption of fixed capital, the depreciation schedule used for national income accounting purposes is less generous than that used for purposes of calculating corporate taxable income. We estimate the tax depreciation allowances by obtaining information on expenditures on fixed capital and applying statutory depreciation rules to these data.

Some of the 81 sectors in the model are not subject to the corporate income tax because either the sector is exempt from corporate income tax, such as electricity, or the sector is are not dominated by small businesses. Examples of such sectors include handicrafts, textiles, and light manufacturing. To err on the side of caution, we exclude estimated profits from all of these sectors. We also exclude the 'profit' from the government sectors, namely the central monetary authority, public administration and defense, and education and healthcare. We should point out that income from agriculture is not subject to the federal income tax, so the profits of this sector are excluded, too. After eliminating these sectors, we are left with 24 sectors that are likely to be subject to the corporate income tax.

[44] We also use Pakistan's I-O model to estimate the sales tax gap. This model is described in greater detail in the section of the report describing the methodology used to estimate the sales tax gap.

Although we estimate the tax gap using the disaggregated data, for the reader's convenience, we aggregate these data into 8 major economic sectors, specifically mining, chemicals, cement, metal products, equipment manufacturers, construction, transportation and communications, and financial services. We report our estimates of gross receipts, the major deductions (e.g., cost of inputs, compensation of employees, indirect taxes, and depreciation allowances) for each of these 8 economic sectors in table 7. We assume that all activity is subject to the large corporation rate of 35 percent. Finally, we apply the 6 percent presumptive tax rate to our estimate of the gross receipts from the construction sector. Based on these assumptions, we estimate potential corporate tax revenues to be about Rs. 353.9 billion, compared to actual revenues of Rs. 111.4 billion. The resulting estimate of the tax gap is Rs. 242.5 billion, or 217 percent of actual corporate tax receipts in FY 2004-05. Interestingly, the tax gap for the construction sector is Rs. 1.9 billion or only 5.5 percent of actual withholding tax on construction contracts of Rs. 34.7 billion.

We believe that our estimate of the corporate tax gap is a conservative one because we eliminate sectors that may include some corporatized firms, such as the textile sector, and the estimate of depreciation allowances appears to be rather high as a percentage of gross receipts. Although a tax gap of 217 percent is substantial, we believe this finding is justified by the data. There are also other signs of low compliance with the corporate income tax. Nearly 30 percent of actual corporate income tax receipts come from withholding on construction contracts, and withholding tax on imports and exports accounts for an additional 60 percent of actual corporate tax receipts. As with the individual income on non-salaried individuals, it appears that the withholding tax regime is masking serious problems with non-compliance in the corporate sector.

Indirect Tax Gap

As reported in table 1, our estimate of the indirect tax gap is Rs. 146.7 billion, or about 36 percent of actual indirect tax revenues of Rs. 407.0 billion. We estimate the tax gap for the sales tax to be approximately Rs. 73.6 billion, or about 30 percent of actual sales tax revenues of Rs. 238.5 billion. Our estimate of the federal excise tax gap is about Rs. 48.8 billion, or 91 percent of actual revenues of Rs. 53.1 billion, and the import duty gap is about Rs. 24.3 billion, or about 21 percent of actual duties collected of Rs. 115.4 billion. The methodologies used to produce these estimates are described in detail below.

Sales tax

We use a detailed I-O model of Pakistan's economy to estimate the potential revenue of the sales tax from domestic sales. Not only does the model provide information on total use or gross sales for each of the 81 sectors in the I-O model, but it also provides crucial information on the value of primary and intermediate use, the value of imports and exports, and the value of investment expenditures. In other words, the I-O model provides the necessary information to model Pakistan's potential sales tax base, including taxable supplies, input credits, and refunds on exports. The most recent I-O model of Pakistan's economy is for 1989-90.[45] We re-benchmark this model to reflect the level of economic activity by sector values for 2004-05, using ratios and relationships from the 1989-90 model and 2004-05 national accounts data. Undoubtedly, the accuracy of our sales tax gap estimates suffer significantly because the I-O model does not fully

[45] We obtained the FY 1989-90 I-O model from the FSB. They currently are working on an updated I-O model for FY 1999-00.

capture the current structure of Pakistan's economy, such as the input-use coefficients of each sector.

To understand the methodology used to estimate the sales tax gap, it is necessary to review some GDP accounting identities. We apologize to the reader for this digression into mathematical manipulations, but we believe that this is the most efficient way to convey these ideas. There are three approaches to estimating GDP, the income approach, expenditure approach, and production or value added approach. An I-O table uses both the expenditure approach (horizontally along the rows of the model) and the value added approach (vertically along the columns of the model) to GDP accounting.

The following GDP identities are equivalent:

$$GDP = C + I + G + (X - M) = \sum \text{value added}_i = \sum(\text{total use} - \text{intermediate use})_i \quad (1)$$

where: C = final consumption expenditures;

I = gross investment expenditures;

G = government purchases of goods and services;

X = the value of exports; and

M = the value of imports.

The subscript i stands for the sector.

We can obtain an expression for the sales tax base by solving the left-hand-side of (1) for final consumption (C), which yields the following expression:

$$\text{Sales tax base} = C = GDP + M - I - G - X \quad (2)$$

Substituting (2) into the right-hand-side (1), we obtain an equivalent expression for the sales tax base:

$$\text{Sales tax base} = \sum(\text{value added}_i + M_i - I_i - X_i) - G \quad (3)$$

Multiplying (3) by the sales tax rate (τ_i) and re-arranging the resulting expression, we obtain the following definitions:

$$\text{Gross sales tax} = \sum \tau_i \times (\text{Total use}_i + M_i - I_i - X_i - G_i) \quad (4a)$$

$$\text{Input tax} = \sum \tau_i \times \text{intermediate use}_i \quad (4b)$$

$$\text{Net sales tax revenue} = \text{Gross sales tax} - \text{Input tax} \quad (4c)$$

Expressions (4a-c) provide operational definitions that are useful for estimating potential sales tax revenue, using information readily available in an I-O model. To operationalize (4a), we have to adjust gross sales (or total use in the language of an I-O model) in each sector to account for the proportion of sales in a sector that are subject to the 15 percent sales tax rate as well as the proportion of sales above the registration threshold. We also have to make similar adjustments to (4b) to estimate potential input credits while also accounting for zero rated and exempt sectors. The assumptions regarding the proportions subject to the 15 percent rate and above the registration threshold are based on a study conducted a number of years ago by international consultants to the FBR. The details of these calculations and assumptions are provided for all 81 economic sectors in table 1-A of the statistical appendix to this report.

For the reader's convenience, we summarize our results in 15 major economic sectors. It is important to note that our methodology measures the potential tax revenue from the sales tax from domestic sales only. As reported in table 8, we estimate the potential sales tax revenue *from domestic sales* to be approximately Rs.191.3 billion, the resulting sales tax gap estimate (from domestic sales) is about Rs. 45.1 billion, or about 30 percent of actual domestic sales tax revenues of Rs. 146.2 billion.

To obtain an estimate of the total sales tax gap, we assume that imports are subject to the same rate of non-compliance as that for domestic sales. As reported in table 1, we estimate the total sales tax gap to be approximately Rs. 73.6 billion or about 30 percent of actual sales tax revenues of Rs. 238.5 billion in FY 2004-05. Our methodology provides highly disaggregated estimates of potential sales tax revenue (from domestic sales) and consequently sales tax gaps for a number of economic sectors. However, the implementation suffers from the lack of a current I-O model for the Pakistan economy. Although we put considerable effort into re-benchmarking the 1989-90 I-O model to hit targets in 2004-05 national income accounts, our efforts do not capture all the structural changes to the economy that have undoubtedly occurred over the intervening years. The model would also benefit from a careful effort to estimate the proportions of sales in a sector subject to the 15 percent sales tax rate and the proportion of sales in a sector that are above the registration threshold. Finally, with more time, it should be possible to use the I-O model to estimate potential sales tax from imports and refunds on exports. In any event, the methodology described here has considerable potential as a tool for identifying non-compliant sectors and allocating enforcement resources to the sectors that are likely to have the highest revenue yield.

Federal excise tax[46]

We also use the 2004-05 HIES to estimate potential federal excise tax revenue. The HIES is a household-based survey, and therefore does not contain information on the consumption or production of intermediate goods. Many of the excisable goods subject to

[46] We would like to acknowledge our gratitude for the assistance that we received from Professor Sally Wallace in producing this estimate.

in rem rates and a smaller number subject to ad valorem rates are intermediate goods; examples of such include jet fuels, lubricating oils, mineral greases, and so on. We have no quantity data for intermediate use of excisable goods, and therefore, we have no direct way to estimate the tax gap associated with such goods.

From the HIES, we obtain estimates of the value of total consumption for 4 out of 10 broad categories of excisable goods, specifically aerated water and beverages, tobacco products, edible oils, and cosmetics and perfumes. Since the HIES values are final retail sales, and the FET is collected at the manufacturing stage, we take 80 percent of the HIES values to account for wholesale and retail sales markup. The value of these commodities, adjusted for the retail and wholesale markup, account for approximately 52 percent of total federal excise tax revenues in FY 2004-05. We multiply the adjusted HIES reported value of consumption by the statutory excise tax rate to estimate potential revenues. We apply the household weight to the sum of the sample values to obtain estimates of the corresponding population values.[47] Finally, we compare actual revenues to our estimate of potential revenues for FY 2004-05 to estimate the tax gap for the excisable commodities for which we have information. For those commodities for which there is no HIES category, we assume that their tax gap is equal to the average tax gap for the excisable goods for which we have data.

Table 9 summarizes the estimated potential tax revenues, actual tax revenues, and tax gap by commodity. Based on the 4 items that we are able to analyze based on available data, the federal excise tax gap is approximately Rs. 19.2 billion, or 69.3

[47] The HIES expenditure data do not tally to total consumption or GDP as reported in the national income accounts. As detailed in Wahid and Wallace (2008), a reweighting adjustment is made to the HIES expenditures so that they are in line with the national income accounts.

percent of actual federal excise tax revenues of Rs. 27.4 billion. We assume an average tax gap of 91 percent. Based on this assumption, we obtain a total federal excise tax gap of Rs. 48.8 billion, or 91 percent of actual excise revenues of Rs. 53.1 billion.

If this estimate strikes some as unrealistically large, we would observe that, according to the FRB's data, all the federal excise revenue from edible oils comes from imports. In other words, to take just one potentially egregious example, the FBR does not report any excise tax collections from domestic sales of edible oils. To be fair, there are valid arguments on both sides of the issue, as to whether our methodology under- or overstates the 'true' federal excise tax gap. On the one hand, many excisable goods are used exclusively for intermediate use. If producers of such goods are more likely to be monitored by the FBR, such firms may be more tax compliant than producers of the 4 excisable commodities for which we have data. On the other hand, producers have a lot to gain by not paying their full excise tax liabilities because doing so increases their costs which may threaten their competiveness in the marketplace, particularly if their competitors are not pay their tax liabilities, in full or in part. In general, our estimates may understate the 'true' federal excise tax gap because some of the excisable goods analyzed here represent intermediate use, such as cooking oils and aerated water and beverages, meaning that such use is not captured in the HIES.

Import duties

We estimate the import duty gap, using detailed information on trade between Pakistan and leading trade partners, specifically China, Germany, India, Japan, Malaysia, and the United States. These six countries collectively account for approximately 50

percent of Pakistan's imports by value in FY 2004-05. To estimate potential dutiable value of imports, we use the reported values of exports destined for Pakistan and from the countries in our sample. Clearly, firms have an incentive to underreport the dutiable value of imports to avoid paying duties. However, firms do not face the same incentives to misreport export values as they do import values, but, as we will see below, they may be subject to a different set of incentives that may influence our tax gap estimates.

We use detailed information on the reported value of imports and exports for these six countries, at the six digit commodity level. We obtain these data from the United Nations Comtrade database. Using 8-digit commodity level data on imports from each country, which was provided by the FBR, we calculate effective duty rates at the 6-digit commodity level for each country. We estimate potential and 'actual' tax revenues by multiplying reported export and import values in our sample by the corresponding effective duty rates. These data are summarized by country and two digit tariff chapter in tables 2-A and 3-A in the statistical appendix to this report.

We also report our main findings in table 10. It is evident from examining the data in this table that we have a wide variety of conflicting results. For example, the estimated import duty gap for China is Rs. 12.0 billion, or 82.9 percent of actual customs revenue of Rs. 14.5 billion from trade with China. In contrast, the estimated duty gap for the United States is Rs. -0.5 billion, meaning that, for the United States, our estimate of potential import duties is less than the estimate of actual import duties. In addition to the United States, we estimate 'negative' duty gaps for India, Japan, and Malaysia. We tried a number of strategies to solve this puzzle. For example, we trying lagging the export data to account for the time that it takes for goods to be transported from the country of

origin to Pakistan, but this does not resolve the problem.[48] Still another explanation is that firms operating in countries with high corporate tax rates, like the United States and Japan, may have an incentive to overstate the value of exports in order to shift income abroad for tax purposes. Similarly, firms operating in countries with a value added tax, like Malaysia, may have an incentive to overstate the value of exports to exaggerate value added export refunds.[49] Finally, these puzzling results may reflect simple reporting errors in the data. It is noteworthy that the four countries with 'negative' gaps report relatively small gaps in percentage terms.

Without a convincing explanation for the negative import duty gaps observed in our sample, it is not clear how to proceed. It is tempting to simply discard the countries with negative duty gaps and base our estimate of the import duty gap exclusively on the two countries in our sample with positive duty gaps. In our sample, China and Germany are the two countries with positive duty gaps, and they have estimated import duty gaps equal to about 82 percent and 13 percent, respectively. However, this approach risks overstating the import duty gap should the negative duty gaps result from errors in the data, and there are similar errors but of the opposite sign in the case of those countries with positive duty gaps. We choose to err on the side of caution and avoid the expedient of simply discarding country data with negative duty gaps. Instead, we take two approaches to estimating the import duty gap. First, we aggregate the negative and positive gaps for the six countries in our sample. Using this method we get an estimated

[48] A possible explanation for this puzzling finding is changes in exchange rates over time and across countries. However, international trade is generally conducted in U.S. dollars, and the data in the U.N. Comtrade database are in U.S. dollars. So, this explanation is not entirely convincing.

[49] Interestingly, China does not allow full crediting of value added tax on exports.

import duty gap equal to about Rs. 8.4 billion for our sample of countries, or 14.7 percent of actual import duties for our sample of Rs. 57.2 billion.

However, our preferred approach is to weight each estimated duty gap reported in table 7 by the corresponding country's share in total trade with Pakistan. These trade shares are reported in Table 10 and based on the value of imports for calendar year 2005. Using this approach, we estimate the duty gap to be about 21.1 percent of actual duty revenues. Applying this ratio to actual import duties of Rs. 115.4 billion, we estimate the total import duty gap to be about Rs. 24.4 billion. This estimate is likely to be a rather conservative estimate of the 'true' import duty gap, as it does not account for smuggled goods or misclassification of goods. This approach to estimating the import duty gap provides highly detailed information that may be useful for allocating enforcement resources. Analyzing these data also helps identify incentives to misclassify imports created by the tariff schedule. Specifically, within a 6-digit commodity group, there may be a broad range of duty rates at the 8-digit level, ranging from 0 to 25 percent. Given the fine distinctions between commodities at the 8-digit level, duty rate differentials of this magnitude create incentives for firms to misclassify imports to avoid paying duty.

Conclusions

We estimate Pakistan's tax gap to be about 45 percent. This is probably in the mid-range of countries like Pakistan. Although it is hard to say anything definitive because there are not many reliable tax gap studies for low income countries with which to make such comparisons. We estimate the direct tax gap to be approximately 65 percent and the indirect tax gap to be approximately 35 percent. We believe that the finding that

there are more serious issues with non-compliance with direct taxes than indirect taxes is reasonable. Income taxes are difficult to administer, and many countries are shifting to greater reliance on indirect taxes as a result, particularly the value added tax.

We believe that Pakistan's large tax gap reflects, in part, tax policy issues. Although we estimate a small or even no tax gap for the income tax on non-salaried individuals, we believe that the 'excise withholding tax' regime is masking serious problems with non-compliance in this sector. Undoubtedly, many salaried individuals are paying withholding tax on electricity and telephone bills and bank withdrawals and not claiming the adjustment for the payment of these withholding taxes on the income tax return. Effectively, they are paying income tax twice. Once when they pay 'withholding' tax on electricity and telephone bills, and, again, when they pay withholding tax on wages and salary. While it is beyond the scope of the present study to offer solutions to such issues, we believe that the detailed information on Pakistan's tax gap provided here should be useful in developing tax reform strategies.

Table 1: Tax Gap Estimates by Type of Tax, Fiscal Year 2004-05

Tax by type	Potential Tax (Rs. billions)	Actual Tax (Rs. billions)	Tax Gap (Rs. billions)	Share of actual tax in potential tax (percent)
A. Direct tax (1 + 2)	445.9	183.1	262.8	143
1. Income tax (a + b + c)	435.3	172.5	262.8	152
a. On salaried individuals	26.3	13.3	13.0	97
b. On non-salaried individuals	55.1	47.8	7.3	15
c. On corporations	353.9	111.4	242.5	217
2. Other direct tax[1]	10.6	10.6	-	-
B. Indirect tax (1 + 2 + 3)	553.7	407.0	146.7	36
1. Sales tax	312.1	238.5	73.6	30
2. Federal excise tax	101.9	53.1	48.8	91
3. Duty on imports	139.7	115.4	24.3	21
C. Total net federal tax receipts (A + B)	998.6	590.4	409.5	69

Note:
[1]Other direct taxes include revenues from the capital value tax (Rs. 1.9 billion), the workers welfare fund and the workers profit participation fund (Rs. 7.6 billion), and the wealth tax (Rs. 0.03 billion). We do not provide tax gap estimates for these taxes. Since they represent such a small share of total federal tax receipts (1.6 percent), this should not be a major source of error in our estimates.

Table 2. Size of the Underground Economy by Region[a]

Country groups	Average size of he underground economy as a percent of official GDP[b]
Africa	41.2 (24)
Asia	26.3 (25)
Central and South America	41.5 (17)
Transition countries	37.9 (23)
OECD Countries	16.8 (21)

Source: Friedrich Schneider (2005, page 618)

Notes:
[a] The estimates correspond to the average value added as a percent of official GDP for the period 1999 to 2002, using DYMIMIC (latent estimation) and the currency demand approach.
[b] The number of countries in each sample of countries is provided in parentheses.

Table 3: Average Size of the Underground Economy for 8 Asian Countries (1989-90)

Country	Methodology		Difference between estimates	Ratio GNP/GDP[c]
	Electricity Consumption[a] (percent of GNP)	Currency Demand[b] (percent of GDP)		
Hong Kong	13	11.9	1.1	1.00
Israel	29	16.3	12.7	0.98
Malaysia	39	25.1	13.9	0.96
Philippines	50	37.2	12.8	0.99
Singapore	13	9.8	3.2	1.03
South Korea	38	22.3	15.7	1.00
Sri Lanka	40	36.2	3.8	0.98
Thailand	71	43.2	27.8	0.99
Sample average	37	25.3	11.7	0.99

Notes:
[a] Source: Friedrich Schneider and Dominik H. Enste (2002, page 31).
[b] Source: Friedrich Schneider (2005, page 608).
[c] Source: Alan Heston, Robert Summers, and Bettina Aten (2002).

Table 4: Net Total Federal Tax Receipts, Fiscal Year 2004-05

Tax by type	Actual receipts by type of tax (Rs. billions)	Share of revenue by type of tax in total federal tax receipts (percent)
A. Direct tax (1 + 2)	183.1	31.0
1. Income tax (a + b + c)	172.5	29.2
a. On salaried individuals	13.3	2.3
b. On non-salaried individuals	47.8	8.1
c. On corporations	111.4	18.9
2. Other direct tax[1]	10.6	1.8
B. Indirect tax (1 + 2 + 3)	407.0	69.0
1. Sales tax	238.5	40.4
2. Federal excise tax	53.1	9.0
3. Duty on imports	115.4	19.6
C. Total federal tax receipts (A + B)	590.1	100.0

Source: CBR Year Book, 2004-2005. <http://www.fbr.gov.pk/YearBook/2004-2005/default.asp>

Notes:
[1]Other direct taxes include revenues from the capital value tax (Rs. 1.9 billion), the workers welfare fund and the workers profit participation fund (Rs. 7.6 billion), and the wealth tax (Rs. 0.03 billion).

Table 5: Withholding Tax (WHT) by Collection Head, Fiscal Year 2004-05

Collection head	Collections (Rs. billion)	Share of WHT revenue in total revenue (percent)	WHT Rate (percent)
Construction contracts	34.7	31.1	6
Imports	24.5	22.0	5
Wages and salaries	13.4	12.0	variable
Exports	7.9	7.1	1
Telephone bills	5.0	4.5	variable
Bank interest	4.6	4.1	10
Electricity bills	4.8	4.3	variable
Dividends	2.7	2.4	10
Other	14.0	12.5	variable
Total withholding tax	111.5	100.0	-

Source: Withholding tax revenue by collection head is from the FBR, and the withholding rates in column 4 are from Thirsk (2008).

Table 6: Potential Individual Income Tax in Wages (Salaried and Non-salaried Individuals)

Data Source	Model number. Variable/description	Weighted value of simulated income tax liability	Notes
Household Integrated Economic Survey	1. Estimated individual household member annual wages.	39.6 billion rupees	Does not exclude exempt categories (teachers, pensions) nor does it account for deductions (charity, etc.)
	2. Estimated individual household member self-employed income.	35.3 billion rupees	
	3. Estimated household total annual wages.	36.6 billion rupees	
	4. Estimated household total self-employed income.	32.2 billion rupees	
	5. Estimated household non-wage, non-agriculture taxable income.	66.8 billion rupees (43.2 billion without "other" category)	
Labour Force Survey	6. Estimated individual wage income.	27.4 billion rupees	

Source: This is table 6 in Umar Wahid and Sally Wallace (2008).

Notes: FBR reported income tax receipts from salaried individuals (2004-05) of Rs. 14.0 billion and from non-salaried individuals of Rs. 51.1 billion, including self-employed, income tax on capital withheld by banks, rental income, and other. The weights used are those made available in the data files.

Table 7: Corporate Income Tax Gap, Fiscal Year 2004-05
(Rs. billions; except where otherwise indicated)

Economic sector	Gross receipts	Cost of inputs	Compensation of employees	Indirect taxes	Capital allowances	Taxable profit	Potential tax revenue	tax rate (%)
Mining	182.9	61.7	10.9	59.2	26.3	24.9	8.7	35
Chemicals	973.2	772.3	56.3	26.0	64.8	53.8	18.8	35
Cement	132.0	59.5	19.4	4.2	9.9	38.9	13.6	35
Metal products	129.2	96.4	16.2	2.2	22.2	-	-	-
Equipment manufacturers	736.9	571.5	57.6	10.6	36.6	60.5	21.2	35
Construction [a]	610.4						36.6	-
Transportation	1,416.0	545.7	182.9	7.1	230.0	450.3	157.6	35
Financial services	496.5	124.9	66.8	1.9	24.9	278.0	97.3	35
Total	4,677.1	2,232.0	410.1	111.3	414.7	906.4	353.9	-

Note: [a] Potential tax receipts from construction assumes the 6 percent withholding rate of gross receipts.

Table 8: Sales Tax Gap by Sector (15×15 version), Fiscal Year 2004-05
(Rs. billions; except where otherwise indicated)

Sector	Gross value added[1]	Adjusted gross sales[2]	Taxable portion[3]	Sales tax rate[4]	Gross sales tax[5]	Input credits[6]	Potential tax[7]	Actual tax[8]	Tax gap[9]
1. Major crops	496.1	762.5	0.0	0	0.0	0.0	0.0	0.0	0.0
2. Minor crops	145.4	513.5	0.0	0	0.0	0.0	0.0	0.2	-0.2
3. Livestock	628.3	937.4	0.0	0	0.0	0.0	0.0	1.4	-1.4
4. Forestry	35.4	98.5	0.0	0	0.0	0.0	0.0	0.0	0.0
5. Fishing	17.5	131.5	0.0	0	0.0	0.0	0.0	0.0	0.0
6. Mining	121.8	959.1	0.0	0	0.0	0.0	0.0	38.5	-38.5
7. Manufacturing	1,118.4	4,113.5	41.5	15	256.3	147.4	108.9	65.3	43.6
8. Utilities	156.3	197.8	81.2	15	24.1	9.2	14.9	16.1	-1.2
9. Construction	143.9	117.5	0.0	0	0.0	0.0	0.0	0.0	0.0
10. Trade	1,107.3	1,081.0	36.2	15	58.7	4.9	53.9	1.5	52.3
11. Transportation	902.2	1,088.3	8.7	15	14.1	0.5	13.6	22.6	-9.0
12. Finance	210.7	257.3	0.0	15	0.0	0.0	0.0	0.0	0.0
13. Housing	165.5	685.9	0.0	0	0.0	0.0	0.0	0.6	-0.6
14. Public administration	337.6	699.9	0.0	0	0.0	0.0	0.0	0.0	0.0
15. Services	543.3	165.5	0.0	0	0.0	0.0	0.0	0.0	0.0
Column sum	6,129.7	11,809.1	-	-	353.2		191.3	146.2	45.1
Gross Domestic Product[10] (factor prices)	6,129.7								

Notes:
[1] Gross value added at factor prices is from the *Economic Survey, 2006-07* (Table 1.5).
[2] Adjusted gross sales = gross sales + imports – exports.
[3] Taxable portion is the product of the share of taxable value in a sector and the share of taxable sales above the registration threshold.
[4] Sales tax rates are the statutory tax rates obtained from FRB.
[5] Gross sales tax = (adjusted gross sales) × (taxable portion) × (sales tax rate)
[6] Calculating the input credits by sector involves an elaborate set of calculations, using the 81× 81I-O model and accounting for zero rated and exempt sales, the proportion of taxable sales, and portion of sales above the registration threshold.
[7] Potential tax = net sales tax = gross sales tax – input credits.
[8] Actual tax is from the FRB.
[9] Tax gap = potential tax revnue – actual tax revenue.
[10] The sum of gross value added at factor prices is equal to GDP (at factor prices).

Table 9: Federal Excise Tax Gap Estimates, Fiscal Year 2004-05
(Rs. billions; except where otherwise indicated)

Commodity	Value of consumption, adjusted for manufacturing stage of collection	Ad valorem rate (percent)	Potential revenue	Actual revenue	Tax gap	Share of tax gap in actual revenue (percent)
Aerated water and beverages	24,587	12	2,950	2,835	115	4.1
Tobacco	49,628	63	31,266	21,952	9,314	42.4
Perfumes	21,616	10	2,162	968	1,194	123.4
Cooking oils	69,873	15	10,481	1,920	8,561	445.9
Total	165,704	-	46,859	27,674	19,184	69.3

Source: HIES expenditure data are used to estimate the value of consumption, and the FRB is the source for actual revenues. Tax rates are from the Federal Excise Tax Act.

Table 10: Import Duty Gap, Fiscal Year 2004-05
(Rs. billions; except where otherwise indicated)

Trade partner	Potential import duties	Actual Import duties	Import duty tax gap	Tax gap as a share of actual import duties	Trade partner's share in total imports	Trade weighted tax gap as a share of actual import duties	Calendar year of import and export data
China	26.6	14.5	12.0	82.9	15.6	25.8	2006
Germany	6.2	5.5	13.7	13.7	7.6	2.08	2005
India	1.5	1.5	-4.0	-4.0	1.1	-0.08	2005
Japan	20.0	22.8	-12.3	-12.3	10.8	-2.67	2006
Malaysia	8.2	9.2	-10.2	-10.2	4.8	-0.99	2005
United States	3.2	3.7	-14.8	-14.8	10.2	-3.00	2006
Total	65.7	57.2	14.7	14.7	50.1	21.1	

Notes: Import duty tax gap = potential import duties – actual import duties.

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STATISTICAL APPENDIX

Table A-1: Sales Tax Gap by Sector, Fiscal Year 2005-05. (Rs. millions; except where otherwise indicated)

Number	Sector	Adjusted total use	Taxable portion	Percent above threshold	Sales tax rates	Gross sales tax	Admissible input tax	Potential tax revenue*	Actual tax revenue	Tax gap**
1	rice	89,300	0.00	0.00	0.00	0	0	0	1	-1
2	wheat	311,369	0.00	0.00	0.00	0	0	0	0	0
3	cotton	132,063	0.00	0.00	0.00	0	0	0	0	0
4	sugar cane	71,181	0.00	0.00	0.00	0	0	0	0	0
5	tobacco	15,015	0.00	0.00	0.00	0	0	0	0	0
6	other	32,691	0.00	0.00	0.00	0	0	0	0	0
7	pulses	76,526	0.00	0.00	0.00	0	0	0	0	0
8	potatoes	34,309	0.00	0.00	0.00	0	0	0	0	0
9	vegetables	176,511	0.00	0.00	0.00	0	0	0	189	-189
10	fruits	251,164	0.00	0.00	0.00	0	0	0	1	-1
11	oil seeds	6	0.00	0.00	0.00	0	0	0	8	-8
12	other	85,795	0.00	0.00	0.00	0	0	0	25	-25
13	livestock	937,419	0.00	0.00	0.00	0	0	0	1,362	-1,362
14	forestry	98,545	0.00	0.00	0.00	0	0	0	0	0
15	fisheries	131,493	0.00	0.00	0.00	0	0	0	0	0
16	coal	53,704	0.00	0.00	0.00	0	0	0	4,068	-4,068
17	crude oil and gas	584,029	0.00	0.00	0.00	0	0	0	34,353	-34,353
18	other	321,327	0.00	0.00	0.00	0	0	0	113	-113
19	vegetable oils etc	203,290	0.50	0.70	0.15	10,673	10,047	626	126	500
20	milled grains	476,906	0.00	0.00	0.00	0	0	0	393	-393
21	bakery products	47,290	0.50	0.50	0.15	1,773	1,356	417	617	-200
22	sugar	289,786	0.00	0.00	0.00	0	0	0	0	0
23	other food	302,023	0.50	0.70	0.15	15,856	5,318	10,538	12,755	-2,217
24	beverages	16,242	1.00	1.00	0.15	2,436	1,459	977	1,876	-899
25	tobacco products	234,746	1.00	1.00	0.15	35,212	10,583	24,629	6,113	18,516

*Potential tax = (adjusted total use)×(taxable portion)×(percent great than threshold)×(sales tax rate) – admissible input tax; **Tax gap = potential tax – actual tax.

Table A-1: Sales Tax Gap by Sector, Fiscal Year 2005-05. (Rs. millions; except where otherwise indicated) (continued)

Number	Sector	Adjusted total use	Taxable portion	Percent above threshold	Sales tax rates	Gross sales tax	Admissible input tax	Potential tax revenue*	Actual tax revenue	Tax gap**
26	ginned cotton	136,147	1.00	0.50	0.15	10,211	2,543	7,668	1,152	6,516
27	cotton yarn	163,334	1.00	0.50	0.15	12,250	12,172	79	9,126	-9,047
28	cotton cloth	179,597	1.00	0.50	0.15	13,470	12,989	481	635	-153
29	art silk	174,887	1.00	0.50	0.15	13,117	9,952	3,165	1	3,164
30	made-up textile	25,365	1.00	0.50	0.15	1,902	2,452	-550	86	-636
31	knitwear	9,428	1.00	0.50	0.15	707	3,024	-2,317	0	-2,317
32	carpets	6,025	1.00	0.50	0.15	452	2,052	-1,600	180	-1,780
33	garments	45,584	1.00	0.50	0.15	3,419	7,356	-3,937	550	-4,488
34	other textiles	5,217	1.00	0.50	0.15	391	1,416	-1,025	2,638	-3,663
35	leather products	16,410	1.00	0.50	0.15	1,231	1,190	41	137	-96
36	footwear	56,586	1.00	0.50	0.15	4,244	2,308	1,936	196	1,740
37	wood products	57,630	1.00	0.50	0.15	4,322	2,366	1,956	195	1,762
38	paper and printing	139,793	1.00	0.50	0.15	10,484	4,756	5,728	1,503	4,225
39	pharmaceuticals	115,024	0.00	0.00	0.00	0	0	0	137	-137
40	fertilizers	161,435	0.00	0.00	0.00	0	0	0	2,863	-2,863
41	chemical products	103,837	1.00	1.00	0.15	15,575	10,037	5,539	853	4,686
42	refined petroleum	367,812	1.00	1.00	0.15	55,172	11,016	44,156	0	44,156
43	plastic products	63,640	1.00	0.70	0.15	6,682	6,479	203	1,054	-851
44	other chemicals	144,561	1.00	0.70	0.15	15,179	1,969	13,210	3,417	9,793
45	bricks	75,356	0.00	0.00	0.00	0	0	0	576	-576
46	cement	122,553	0.00	0.00	0.00	0	0	0	3,879	-3,879
47	other mineral products	41,987	1.00	0.70	0.15	4,409	1,177	3,232	0	3,232
48	basic metal products	66,321	1.00	0.70	0.15	6,964	1,193	5,771	571	5,200
49	metal products	37,555	0.50	0.70	0.15	1,972	1,913	58	4,548	-4,490
50	machinery	334,981	1.00	0.70	0.00	0	1,919	-1,919	207	-2,126

*Potential tax = (adjusted total use)×(taxable portion)×(percent great than threshold)×(sales tax rate) – admissible input tax; **Tax gap = potential tax – actual tax.

Table A-1: Sales Tax Gap by Sector, Fiscal Year 2005-05. (Rs. millions; except where otherwise indicated) (continued)

Number	Sector	Adjusted total use	Taxable portion	Percent greater than threshold	Sales tax rates	Gross sales tax	Admissible input tax	Potential tax revenue*	Actual tax revenue	Tax gap**
51	electrical equipment	(175,466)	0.00	0.00	0.00	0	0	0	2,897	-2,897
52	transport equipment	42,946	0.50	0.70	0.15	2,255	12,101	-9,846	5,383	-15,229
53	surgical instruments	(870)	0.00	0.00	0.00	0	0	0	69	-69
54	handicrafts	199	1.00	0.20	0.15	6	15	-9	0	-9
55	sports goods	1,656	1.00	0.00	0.15	0	0	0	0	0
56	jewelry	(33,037)	0.00	0.00	0.00	0	0	0	15	-15
57	other manufacturing	56,720	1.00	0.70	0.15	5,956	6,224	-269	546	-815
58	utilities	124,059	1.00	0.70	0.15	13,026	8,699	4,327	16,074	-11,746
59	gas supply	73,775	1.00	1.00	0.15	11,066	486	10,580	0	10,580
60	construction	117,535	0.00	0.00	0.00	0	0	0	0	0
61	wholesale	175,442	1.00	0.30	0.15	7,895	621	7,274	0	7,274
62	retail	737,924	1.00	0.30	0.15	33,207	1,507	31,699	0	31,699
63	hotels	167,660	1.00	0.70	0.15	17,604	2,724	14,880	1,508	13,373
64	transport by railway	68,285	0.00	0.00	0.00	0	0	0	0	0
65	transport by road	859,565	0.00	0.00	0.00	0	0	0	1	-1
66	transport by water	1,925	0.00	0.00	0.00	0	0	0	642	-642
67	transport by air	53,512	0.00	0.00	0.00	0	0	0	584	-584
68	storage	10,829	0.00	0.00	0.00	0	0	0	0	0
69	communication	94,144	1.00	1.00	0.15	14,122	535	13,586	21,378	-7,792
70	monetary authority	18,391	0.00	0.00	0.15	0	0	0	0	0
71	banks	167,990	0.00	0.00	0.00	0	0	0	0	0
72	other credit institutions	34,508	0.00	0.00	0.00	0	0	0	0	0
73	insurance	36,363	0.00	0.00	0.00	0	0	0	0	0
74	real estate	175,141	0.00	0.00	0.00	0	0	0	0	0
75	ownership of dwellings	457,500	0.00	0.00	0.00	0	0	0	0	0

*Potential tax = (adjusted total use)×(taxable portion)×(percent great than threshold)×(sales tax rate) – admissible input tax; **Tax gap = potential tax – actual tax.

Table A-1: Sales Tax Gap by Sector, Fiscal Year 2005-05. (Rs. millions; except where otherwise indicated) (continued)

Number	Sector	Adjusted total use	Taxable portion	Adjustment for threshold	Sales tax rates	Gross sales tax	Admissible input tax	Potential tax revenue	Actual revenue tax	Tax gap*
76	business services	53,236	0.00	0.00	0.00	0	0	0	562	-562
77	public administration	447,972	0.00	0.00	0.00	0	0	0	0	0
78	education	97,625	0.00	0.00	0.00	0	0	0	0	0
79	health care	58,446	0.00	0.00	0.00	0	0	0	0	0
80	cultural services	95,810	0.00	0.00	0.00	0	0	0	0	0
81	household services	165,521	0.00	0.00	0.00	0	0	0	0	0
	Total	11,809,099				353,239	161,955	191,285	146,165	45,119

*Potential tax = (adjusted total use)×(taxable portion)×(percent great than threshold)×(sales tax rate) – admissible input tax; **Tax gap = potential tax – actual tax.

Table A-2: Customs Duty Tax Gap – United States, China, and Japan, 2006.

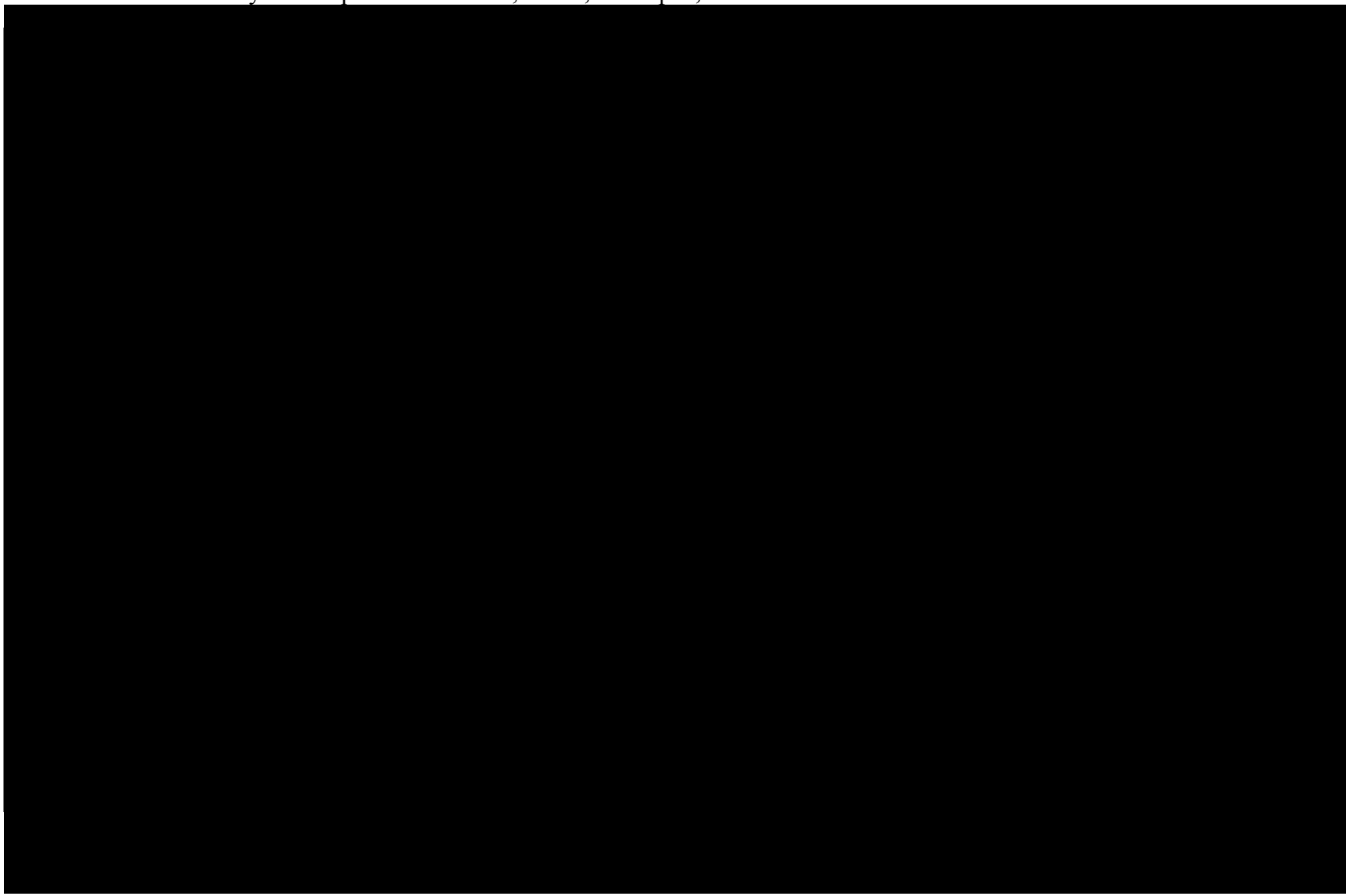

Table A-2: Customs duty tax gap – United States, China, and Japan, 2006 (continued)

Chapter	United States				China				Japan			
	Reported	Potential	Gap *	% **	Reported	Potential	Gap *	% **	Reported	Potential	Gap *	% **
33 Essential oils	469,599	916,122	-446,523	51.3	611,904	402,801	209,103	151.9	99,583	203,145	-103,562	49.0
34 Washing preparations	648,310	816,552	-168,242	79.4	1,162,302	1,376,682	-214,380	84.4	227,843	595,253	-367,410	38.3
35 Albuminoidal substances	113,728	85,403	28,326	133.2	169,432	154,295	15,137	109.8	162,601	315,837	-153,236	51.5
36 Explosives	21,131	303,220	-282,089	7.0	68,556	159,774	-91,218	42.9			0	
37 Photogr. or cinematogr. goods	145,290	49,564	95,726	293.1	356,195	597,273	-241,078	59.6	503,741	490,543	13,198	102.7
38 Miscell. chemical products	1,975,096	1,124,864	850,232	175.6	4,346,928	4,761,345	-414,418	91.3	517,770	526,771	-9,002	98.3
39 Plastics	3,342,068	2,440,598	901,469	136.9	11,630,686	13,999,391	-2,368,704	83.1	2,958,447	2,208,416	750,031	134.0
40 Rubber	547,767	195,132	352,635	280.7	7,386,064	10,182,885	-2,796,822	72.5	3,614,260	4,176,323	-562,064	86.5
41 Raw hides etc.					2,290	0	2,290					
42 Articles of leather	37,451	32,589	4,863	114.9	1,365,686	5,645,318	-4,279,632	24.2	6,482	0	6,482	
43 Artficial fur	1,077	0	1,077		7,240	1,598	5,642	453.0				
44 Wood etc.	10,246	8,879	1,368	115.4	1,142,189	1,576,158	-433,969	72.5	8	0	8	
45 Cork etc.	2,157	0	2,157		7,145	19,020	-11,874	37.6	385	1,134	-749	34.0
46 Manufactures of straw					19,577	71,515	-51,938	27.4				
47 Pulp	973,163	226,440	746,723	429.8	8,355	0	8,355		6,786	0	6,786	
48 Paper and paperboard	1,971,212	1,450,879	520,333	135.9	6,133,973	5,974,007	159,966	102.7	3,063,851	3,172,039	-108,189	96.6
49 Printing industry products	11,548	64,104	-52,555	18.0	491,824	1,129,160	-637,336	43.6	61,064	55,444	5,620	110.1
50 Silk					478,060	8,258,415	-7,780,355	5.8	13	0	13	
51 Wool	1,629	0	1,629		51,136	129,587	-78,451	39.5	25	0	25	
52 Cotton	37,509	42,185	-4,676	88.9	361,889	408,720	-46,831	88.5	14,431	33,481	-19,051	43.1
53 Other vegetable textile fibres	1,505	0	1,505		53,242	602,816	-549,574	8.8				
54 Man-made filaments	122,746	107,550	15,196	114.1	12,813,381	45,927,778	-33,114,396	27.9	436,545	253,844	182,701	172.0
55 Man-made staple fibres	424,596	212,734	211,862	199.6	1,711,658	1,912,664	-201,005	89.5	1,029,930	948,801	81,129	108.6
56 Wadding etc.	22,913	19,168	3,745	119.5	1,012,337	1,637,042	-624,706	61.8	107,104	696,453	-589,349	15.4
57 Textile floor coverings	46,176	11,702	34,474	394.6	393,231	1,194,012	-800,781	32.9	63,883	20,462	43,421	312.2
58 Special woven fabrics	129,129	65,382	63,747	197.5	1,094,871	6,991,312	-5,896,441	15.7	3,681	0	3,681	
59 Impregnated textile fabrics	244,855	300,178	-55,323	81.6	2,836,068	5,675,876	-2,839,807	50.0	205,028	99,125	105,903	206.8
60 Knitted or crocheted fabrics	32,077	1,313	30,764	2,443.0	575,211	3,516,173	-2,940,962	16.4	28,958	28,311	647	102.3
61 Knitted clothing accessories	40,028	34,233	5,794	116.9	1,893,668	29,955,826	-28,062,158	6.3	26,778	3,354	23,424	798.4
62 Not-knitted clothing accessories	53,000	52,304	697	101.3	1,307,112	5,892,296	-4,585,184	22.2	726	0	726	
63 Other textile articles	1,055,792	1,038,285	17,507	101.7	1,349,374	5,941,870	-4,592,496	22.7	148,169	162,719	-14,550	91.1
64 Footwear	10,546	2,140	8,406	492.8	4,402,103	23,564,763	-19,162,660	18.7	3,633	9,663	-6,030	37.6

* Gap = Reported Collection - Potential Collection

** % = (Reported Collection/Potential Collection) * 100

Note: amounts in US$

Table A-2: Customs duty tax gap – United States, China, and Japan, 2006 (continued)

Chapter	United States				China				Japan			
	Reported	Potential	Gap *	% **	Reported	Potential	Gap *	% **	Reported	Potential	Gap *	% **
65 Headgear	10,658	18,556	-7,898	57.4	92,851	581,734	-488,883	16.0	10	0	10	
66 Umbrellas	2	0	2		76,117	401,973	-325,856	18.9	5	0	5	
67 Prepared feathers					156,527	384,216	-227,689	40.7				
68 Articles of stone	42,687	120,383	-77,696	35.5	1,041,771	1,620,312	-578,541	64.3	57,370	714,025	-656,655	8.0
69 Ceramic products	43,141	75,249	-32,107	57.3	16,359,722	15,733,683	626,038	104.0	53,278	16,749	36,529	318.1
70 Glass and glassware	115,689	107,858	7,832	107.3	6,796,319	7,786,010	-989,690	87.3	582,812	549,482	33,329	106.1
71 Natural or cultured pearls	15,203	3,179	12,024	478.3	234,536	207,500	27,036	113.0				
72 Iron and steel	4,265,163	1,902,786	2,362,377	224.2	8,639,697	9,855,021	-1,215,324	87.7	9,352,937	8,727,140	625,797	107.2
73 Iron and steel products	1,829,152	822,511	1,006,641	222.4	10,796,545	17,817,875	-7,021,330	60.6	3,692,275	6,053,975	-2,361,700	61.0
74 Copper etc.	46,160	54,885	-8,725	84.1	507,978	636,421	-128,443	79.8	15,894	11,253	4,641	141.2
75 Nickel etc.	3,685	0	3,685		337,856	6,398	331,458	5,281.0	1,716	1,635	80	104.9
76 Aluminium etc.	159,346	142,562	16,784	111.8	1,739,096	2,436,029	-696,933	71.4	267,313	149,937	117,376	178.3
78 Lead etc.	50	0	50		1,187	540	647	219.7				
79 Zinc etc.	6,562	0	6,562		96,921	61,437	35,484	157.8	43,221	984	42,237	4,392.0
80 Tin etc.					40	1,730	-1,690	2.3	38	0	38	
81 Other base metals	2,010	10,119	-8,109	19.9	65,694	58,531	7,163	112.2				
82 Tools of base metal	493,804	113,950	379,854	433.4	642,759	2,399,890	-1,757,130	26.8	126,291	387,765	-261,474	32.6
83 Miscell. articles of basemetal	100,040	229,754	-129,715	43.5	2,744,186	8,233,596	-5,489,410	33.3	104,008	660,803	-556,795	15.7
84 Nuclear reactor	16,150,933	11,631,943	4,518,990	138.8	47,506,531	75,146,482	-27,639,951	63.2	22,082,507	57,313,501	-35,230,994	38.5
85 Electrical machinery	13,286,440	16,061,808	-2,775,368	82.7	44,724,207	83,393,914	-38,669,707	53.6	9,358,376	18,277,262	-8,918,886	51.2
86 Locomotives	48,959	111,378	-62,419	44.0	1,476,845	1,057,763	419,081	139.6	1,905	1,086	819	175.4
87 Other vehicles	6,073,615	1,649,123	4,424,492	368.3	24,045,890	43,515,195	-19,469,305	55.3	372,719,723	270,466,074	102,253,649	137.8
88 Aircraft, spacecraft	28,164	224,944	-196,780	12.5	76	989	-912	7.7				
89 Ships, boats	17,024	30,136	-13,112	56.5	13,877	10,996	2,881	126.2	3,768	32,005	-28,237	11.8
90 Medical instruments	2,781,321	3,008,405	-227,084	92.5	2,833,561	5,144,074	-2,310,513	55.1	2,008,633	2,385,287	-376,654	84.2
91 Clocks and watches	12,057	959	11,099	1,257.6	295,582	506,965	-211,383	58.3	47,122	32,100	15,022	146.8
92 Musical instruments	488	0	488		6,868	17,858	-10,990	38.5	163	181	-18	90.2
93 Arms and ammunitions	13,241	6,166,150	-6,152,909	0.2	345,604	3,943	341,661	8,765.5				
94 Furniture	271,002	328,343	-57,341	82.5	4,845,626	6,200,402	-1,354,777	78.2	83,625	1,569,957	-1,486,332	5.3
95 Toys, games	153,553	314,081	-160,528	48.9	4,745,389	1,199,987	3,545,402	395.5	28,595	5,831	22,764	490.4
96 Miscell. manufactured articles	294,340	63,858	230,482	460.9	3,621,629	6,435,041	-2,813,412	56.3	173,064	715,958	-542,895	24.2
97 Works of arts	8,571	1,432	7,138	598.4	352	536	-185	65.5				

* Gap = Reported Collection - Potential Collection

** % = (Reported Collection/Potential Collection) * 100

Note: amounts in US$

Table A-3: Customs Duty Tax gap – Germany, India, and Malaysia, 2005.

Chapter	Germany				India				Malaysia			
	Reported	Potential	Gap *	% **	Reported	Potential	Gap *	% **	Reported	Potential	Gap *	% **
TOTAL	105,615,258	120,104,000	-14,488,742	87.9	29,675,080	28,456,480	1,218,600	104.3	175,993,377	157,459,357	18,534,019	111.8
01 Live animals	436	15,100	-14,664	2.9	1,341	509	832	263.4				
02 Meat					6,590	15,669	-9,079	42.1				
03 Fish									20	0	20	
04 Dairy produce	593,601	609,750	-16,149	97.4	530,999	1,046,101	-515,102	50.8	2,198	5,368	-3,171	40.9
05 Miscell. animal products	328	2,000	-1,672	16.4	29,255	626	28,629	4675.6				
06 Plants					138	231	-93	59.9	5,209	0	5,209	
07 Edible vegetables					715,994	651,220	64,774	109.9	3,728	18,875	-15,147	19.8
08 Fruit and nuts					37,749	45,876	-8,127	82.3	58,123	51,076	7,047	113.8
09 Coffee, etc.	793	0	793		1,706,406	1,159,049	547,357	147.2	15,854	5,687	10,167	278.8
10 Cereals	5,819	0	5,819		348,017	125,773	222,244	276.7				
11 Milling industry products	215,264	231,530	-16,266	93.0					9,409	0	9,409	
12 Oil seeds	5,993	2,170	3,823	276.2	347,431	509,939	-162,508	68.1	1,974	0	1,974	
13 Vegetable saps	72,655	11,120	61,535	653.4	281,702	361,499	-79,797	77.9				
14 Miscell. vegetable products					984,340	763,693	220,647	128.9	11,280	0	11,280	
15 Fats and oils	78,743	31,240	47,503	252.1	35,693	88,390	-52,697	40.4	147,449,562	124,328,082	23,121,481	118.6
16 Meat or fish preparation									11,041	2,123	8,918	520.0
17 Sugars	163,107	101,210	61,897	161.2					20,576	26,366	-5,791	78.0
18 Cocoa and preparations	3,348	0	3,348						247,615	212,928	34,687	116.3
19 Preparation of cereals	110,931	89,700	21,231	123.7	18,402	28,382	-9,981	64.8	155,963	174,331	-18,368	89.5
20 Parts of plants preparations	3,573	2,400	1,173	148.9	0	0	0		32,901	53,902	-21,001	61.0
21 Miscell. edible preparations	68,098	52,070	16,028	130.8	44,390	1,337	43,053	3321.2	288,396	173,326	115,069	166.4
22 Beverages etc.	10,150	60,500	-50,351	16.8			0		1,217	0	1,217	
23 Food industries waste	106,146	32,450	73,696	327.1	5,243,621	4,980,251	263,370	105.3	15,594	5,561	10,033	280.4
24 Tobacco etc.	4,770	0	4,770									
25 Salt etc	57,269	38,280	18,989	149.6	6,993	3,298	3,694	212.0	37,646	12,797	24,849	294.2
26 Orses, slag and ash					830	0	830					
27 Mineral fuels and oils	199,008	282,280	-83,272	70.5	2,453	0	2,453		196,702	12,814	183,888	1535.0
28 Inorganic chemicals	963,293	647,960	315,333	148.7	173,916	102,538	71,378	169.6	55,652	23,157	32,496	240.3
29 Organic chemicals	3,650,078	2,518,960	1,131,118	144.9	4,724,958	3,680,481	1,044,477	128.4	2,331,053	6,330,532	-3,999,479	36.8
30 Pharmaceutical products	2,524,280	2,160,640	363,640	116.8	160,054	554,099	-394,046	28.9	98,610	15,957	82,653	618.0
31 Fertilisers	138,218	0	138,218		0	311	-311	0.0	1,877	0	1,877	
32 Tanning or dyeing extracts	2,367,085	1,506,550	860,535	157.1	2,660,484	2,279,133	381,351	116.7	229,057	266,369	-37,312	86.0

* Gap = Reported Collection - Potential Collection

** % = (Reported Collection/Potential Collection) * 100

Note: amounts in US$

Table A-3: Customs Duty Tax gap – Germany, India, and Malaysia, 2005. (continued)

Chapter	Germany				India				Malaysia			
	Reported	Potential	Gap *	% **	Reported	Potential	Gap *	% **	Reported	Potential	Gap *	% **
33 Essential oils	591,391	1,265,470	-674,079	46.7	94,995	178,105	-83,110	53.3	48,303	88,062	-39,760	54.9
34 Washing preparations	2,268,036	2,551,300	-283,264	88.9	108,156	145,275	-37,119	74.4	974,272	1,000,140	-25,869	97.4
35 Albuminoidal substances	350,477	420,500	-70,023	83.3	113,885	30,127	83,758	378.0	165,436	341,665	-176,229	48.4
36 Explosives												
37 Photogr. or cinematogr. goods	221,759	188,960	32,799	117.4	14,086	13,263	823	106.2	17,576	33,934	-16,359	51.8
38 Miscell. chemical products	4,111,123	3,069,440	1,041,683	133.9	541,483	347,910	193,574	155.6	3,418,545	2,622,863	795,682	130.3
39 Plastics	3,727,840	3,657,480	70,360	101.9	3,922,668	3,195,295	727,373	122.8	3,525,912	3,567,590	-41,678	98.8
40 Rubber	585,560	681,090	-95,530	86.0	4,319,221	4,954,642	-635,421	87.2	894,316	760,589	133,727	117.6
41 Raw hides etc.	269	400	-131	67.2	3	79	-76	4.1				
42 Articles of leather	93,315	89,400	3,915	104.4	92	0	92		947	13,615	-12,668	7.0
43 Artficial fur	389	3,100	-2,711	12.6								
44 Wood etc.	210,235	123,870	86,365	169.7	1,952	377	1,575	518.0	3,097,403	2,969,481	127,922	104.3
45 Cork etc.	516	0	516		3,246	0	3,246					
46 Manufactures of straw												
47 Pulp	110,561	87,450	23,111	126.4	0	0	0					
48 Paper and paperboard	2,081,594	1,429,450	652,144	145.6	4,706	3,026	1,679	155.5	328,037	330,860	-2,822	99.1
49 Printing industry products	61,977	117,700	-55,723	52.7	1,178	476,882	-475,704	0.2	2,266	38,180	-35,914	5.9
50 Silk												
51 Wool	613	11,850	-11,237	5.2					5	0	5	
52 Cotton	12,837	2,010	10,827	638.7	57,011	339,111	-282,100	16.8				
53 Other vegetable textile fibres					3,040	1,010	2,030	300.9				
54 Man-made filaments	242,266	69,300	172,966	349.6	16,069	0	16,069		1,988,715	1,997,946	-9,231	99.5
55 Man-made staple fibres	352,348	4,000	348,348	8808.7	213,257	271,526	-58,269	78.5	132,416	121,562	10,854	108.9
56 Wadding etc.	20,238	20,260	-22	99.9					34,800	29,723	5,077	117.1
57 Textile floor coverings	24,856	4,000	20,856	621.4								
58 Special woven fabrics	9,454	1,560	7,894	606.1	24	0	24		15,968	0	15,968	
59 Impregnated textile fabrics	344,248	237,660	106,588	144.8	22,902	41,182	-18,280	55.6	15,469	4,329	11,141	357.4
60 Knitted or crocheted fabrics	43,509	260	43,249	16734.1					4,712	0	4,712	
61 Knitted clothing accessories	47,280	13,540	33,740	349.2	45	0	45		5,771	4,485	1,286	128.7
62 Not-knitted clothing accessories	9,741	53,490	-43,749	18.2					9,904	10,786	-882	91.8
63 Other textile articles	358,146	257,530	100,616	139.1	278	37,789	-37,511	0.7	11,892	43,591	-31,699	27.3
64 Footwear	9,403	2,850	6,553	329.9	0	6,387	-6,387	0.0	36,062	5,886	30,175	612.6

* Gap = Reported Collection - Potential Collection

** % = (Reported Collection/Potential Collection) * 100

Note: amounts in US$

Table A-3: Customs Duty Tax gap – Germany, India, and Malaysia, 2005. (continued)

Chapter	Germany				India				Malaysia			
	Reported	Potential	Gap *	% **	Reported	Potential	Gap *	% **	Reported	Potential	Gap *	% **
65 Headgear	4,823	3,600	1,223	134.0								
66 Umbrellas					1,405	6,907	-5,502	20.3				
67 Prepared feathers												
68 Articles of stone	351,069	387,250	-36,181	90.7	252,681	305,345	-52,664	82.8	71,455	199,482	-128,026	35.8
69 Ceramic products	506,608	513,430	-6,822	98.7	46,820	26,208	20,611	178.6	102,351	79,833	22,518	128.2
70 Glass and glassware	380,904	563,470	-182,566	67.6	37,622	43,644	-6,022	86.2	163,579	141,802	21,777	115.4
71 Natural or cultured pearls	14,722	1,000	13,722	1472.2	2,052	113	1,939	1815.4				
72 Iron and steel	9,281,449	5,070,670	4,210,779	183.0	894,096	788,189	105,907	113.4	510,647	176,803	333,843	288.8
73 Iron and steel products	2,705,983	4,603,000	-1,897,017	58.8	48,637	41,669	6,968	116.7	406,911	1,007,200	-600,288	40.4
74 Copper etc.	152,854	210,140	-57,286	72.7	45,497	75,595	-30,098	60.2	63,056	54,116	8,940	116.5
75 Nickel etc.	24,567	16,740	7,827	146.8	2,804	1,911	893	146.7				
76 Aluminium etc.	2,340,034	2,443,970	-103,936	95.7	434,753	253,571	181,182	171.5	427,793	275,607	152,186	155.2
78 Lead etc.												
79 Zinc etc.	1,326	1,620	-294	81.9	2,461	0	2,461					
80 Tin etc.	8,046	1,500	6,546	536.4					34,275	29,566	4,709	115.9
81 Other base metals	2,171	2,000	171	108.6								
82 Tools of base metal	242,734	282,780	-40,046	85.8	193	11,588	-11,395	1.7	3,390	2,198	1,192	154.2
83 Miscell. articles of basemetal	134,670	254,990	-120,320	52.8	32,735	6,394	26,342	512.0	32,674	106,559	-73,885	30.7
84 Nuclear reactor	23,957,333	27,504,240	-3,546,907	87.1	211,832	268,236	-56,404	79.0	3,065,187	4,770,522	-1,705,334	64.3
85 Electrical machinery	17,425,329	26,562,830	-9,137,501	65.6	62,397	42,684	19,713	146.2	2,573,028	2,591,993	-18,965	99.3
86 Locomotives	312,250	235,500	76,750	132.6					875	3,025	-2,150	28.9
87 Other vehicles	17,689,469	24,688,930	-6,999,461	71.6					1,987,619	1,635,755	351,864	121.5
88 Aircraft, spacecraft	67,324	20,210	47,114	333.1								
89 Ships, boats												
90 Medical instruments	2,006,115	2,245,690	-239,575	89.3	97,064	114,844	-17,780	84.5	183,415	320,937	-137,522	57.1
91 Clocks and watches	11,709	1,500	10,209	780.6	11	0	11		1,834	0	1,834	
92 Musical instruments	0	0	0		39	61	-22	64.0				
93 Arms and ammunitions	12,585	55,500	-42,915	22.7								
94 Furniture	222,952	1,354,400	-1,131,448	16.5					321,737	333,525	-11,788	96.5
95 Toys, games	18,138	15,420	2,718	117.6	10	4	5	219.8	5,112	0	5,112	
96 Miscell. manufactured articles	506,938	303,790	203,148	166.9	1,920	29,127	-27,207	6.6	28,459	25,896	2,562	109.9
97 Works of arts	187	0	187									

* Gap = Reported Collection - Potential Collection

** % = (Reported Collection/Potential Collection) * 100

Note: amounts in US$