# THE KOREAN APPROACH TO SOLVING TAX EVASION

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**Abstract**--In 2005 the Korean government instituted a mandatory cash receipts system to curb tax evasion by cash-based companies in the retail sector. We estimate that the system significantly decreased business tax evasion, and was cost-effective. Because it was a significant intervention, the system also had unintended consequences, including increased prices in the retail industry, firms exiting the market, and asymmetric wealth transfers across classes of individual taxpayers. The results have important policy implications for countries and/or subnational governments which consider adopting similar systems.

### Index Terms—Taxation, public policy; economics

### I. INTRODUCTION

A significant policy problem for governments is the "tax gap", or difference between what countries collect in taxes and what should be collected if everyone (individuals and businesses) paid what they should. The tax gap is estimated to be in excess of 20% of tax revenues, depending on country. Such studies have indicated that about one-third of such gap is due to businesses (primarily middle- and smaller-size) underreporting revenues. Such smaller business tax evasion is most easily achieved when sales are made in cash, since cash revenues can be hidden from government authorities more easily than credit card sales. Countries' attempts to curb such "cash -based" evasion by increased auditing and penalties have had only limited success. A recent mechanism used to curb evasion has been on the consumer side using positive incentives. Taiwan instituted a lottery system whereby consumers who requested and received receipts from merchants could receive cash prizes. Since behavioral economics indicates that people over-weigh the probability of winning lotteries, this on its face would be appealing. Indeed, this system was found to increase compliance in China [19], and other developing countries such as Armenia, Bolivia, North Cyprus, and the Philippines have used a receipt/lottery-type system to increase compliance [18].

Starting in 2000, Korea implemented unique tax reforms to try to curb businesses' cash -based evasion by the use of positive incentives which went well beyond the lottery method. Although the Korean law changes included traditional "punishment" rules such as requiring (under fear of penalty) certain sectors of the retail business to record and provide receipts for cash sales by a number of electronic methods, authorities still feared this would not be enough. Historically, a very large part of retail sales in Korea are cash basis, and retailers were known to give lower prices to customers who paid in cash instead of credit cards. Accordingly, the Korean government incentivized purchasers to force retailers to report cash transactions. In the first phase of incentives (starting in 2000), one such incentive was the lottery system used in other countries, whereby receipts submitted by customers were selected to win weekly prizes based on random drawings. The second incentive in this phase was to give consumers an income tax deduction if they used credit cards (instead of cash). Since the government collected credit card information, such sales could not be hidden for tax purposes by vendors. In the second phase (starting in 2005), consumers were given income tax deductions for cash -based purchases (such deductions for credit card purchases continued as well). To make sure that such cash purchases were also reported for tax purposes, the Korean government established an on-line system which recorded each person's receipts on an ongoing basis, provided they registered with the government to get a tax purchasing identification card. The use of this electronic-based system was feasible in Korea (unlike other countries) due to the extensive IT structure in that country. Another incentive in the 2005 laws was a "bounty" paid to customers who reported non-compliant retailers.

The first purpose of this paper is to provide an independent shakedown of the above changes to see if the system "worked". We underpin this analysis with models of taxpayer behavior to derive predictions. For the first phase, the answer was not obvious, since firms could encourage customers not to use credit cards by offering reduced prices for cash-based purchases, and tax evasion would continue. For the second phase, while evasion by firms was less likely, it could be that the costs of the system outweighed the benefits. Indeed, we find that the system increased income exposed and VAT paid, in both phases. The system was also cost-effective, a result which might not obviously obtain due to costs of the system.

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The second purpose of this paper is to examine whether there were significant unwanted collateral effects, since there was a large economic intervention. We find that such "side effects" included increasedprices in the retail sector, and that a number of firms apparently could not shift the tax burden sufficiently and exited the market (voluntarily, or by businessfailure). These results are consistent with the textbook version of corporate tax incidence, an increased tax is ultimately borne by capital, although some tax can be passed forward to consumers, or back to suppliers of goods and services, as well as to labor, depending on elasticities of markets (see [12] for a survey of the related tax incidence literature). Finally, we also document a wealth transfer that was uneven across classes of consumer/taxpayers, i.e., vertical inequity.

Since the Korean system is the first to significantly curb cash-based evasion, the findings have important policy implications for countries and/or subnational governments that wish to achieve the same objective.

# **II. SYSTEM EFFECTIVENESS**

Most small Korean businesses are run in forms other than corporate, in which case taxable information is reported in individual tax return data. Such smaller businesses were the target of the CRS. Unfortunately, the NTS individual return data does not have sufficient detail to perform our tests. We can, however, report what the Korean NTS estimates as the impacts of the cash receipts system, and analyze this data further.

We examined such "additional income exposed" from the cash receipts system. The data were provided by NTS. NTS obtained data on total private consumption from the Bank of Korea and the Credit Finance Association of Korea (the first column in the table), then compared it to credit card and cash transaction reported to NTS under the new system (other columns), to determine "income exposed" after the new law. We validated the NTS data on private consumption with household expenditures on GDP data on from the Korean Statistical Information Service (KOSIS), a national statistical database operated by Statistics Korea. We validated growth in credit card transactions with data from the Bank of Korea.We then use this data to perform the following calculations/comparisons. Note that the total income exposed will be composed of both income which would already have been reported by businesses (previously complying taxpayers), plus newly exposed income (previously non-compliant taxpayers). However, to the extent that the change in cash transactions exceed the growth rate in private consumption, we can infer that the difference is due to the CRS. Indeed, while private consumption growth

averaged 5.5% over the 2006-12 period, cash consumption growth reported to the NTS averaged 29.76%, and overall (cash, debit card, and credit card) income reported to NTS increased an average of 15.8% per year. It is worth noting that much of this growth occurred in the first two years of implementation; growth here exceeded 60%. It is also worth noting that there was an average 24.8% annual growth rate in credit card usage from 2000-2004 when private consumption on grew by 8.6% on average, indicating that tax incentives for credit card usage were effective in encouraging usage of cards versus cash consumption.

As corroboration of the above, we ploted credit card usage growth rates over time in as well as GDP growth over time. There is a clear surge in credit card usage in 2000 (the law change year). Card usage continues to grow after 2000, although the rate of growth declines. We also observed that such growth rates are not obviously related to GDP growth over time.

Although we do not have taxable income data for individual proprietors, we can examine VAT data to see if the VAT tax base increased after the law changes. Our data shows the VAT tax base before credit card data was collected by NTS (1997-2000), and is broken into retail plus restaurants (industries which would be later subject to the credit card data collection and the CRS), and all other industries. Our data also shows the same industry breakdown for the period in which credit card data was collected, but before the CRS was installed. The data shows that VAT collections grew by 69 per cent for retail +restaurants, and by 41 per cent for all other industries. Thus, the law seemed to increase tax compliance due to consumers switching from cash-based to credit card-based consumption. We also examine the VAT tax base for the periods in which the CRS was in effect (post 2004). Here, we see that the tax base increased by 126 per cent for retail + restaurants, and 74 per cent for other industries.

What was the effect to individuals from the tax deductions? Here, we used NTS data on individual tax returns reports, by income class, from 2005-2012. Data was not available for tax benefits under pre-2005 rules. This data contained wages reported, deductions taken for cash sales reported, taxable income, gross tax, and other variables. Also reported are number of taxpayers in each of these categories. Average annual tax benefits across all taxpayers from the cash receipts deduction (from 2007-2012) were about 818 million won. This data was summarized and averaged over 2007-12. Here, the average percent of taxpayers claiming cash receipts deductions were about 80% for most of the gross income deciles. However, for the lowest decile (incomes averaging under \$8354) the participation rate

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was only 35%. This result is consistent with the expectations in the previous section; taxpayers' marginal tax rates were low so there was less incentive to demand cash receipts. Similarly for the highest three deciles, participation ranged from 43% to a low of 6.5% for the wealthiest taxpayers. Annual tax benefits per taxpayer from the deduction were modest, from a low of \$8/taxpayer for the lowest income decile, to \$384 for incomes between 83k and 167k. The deductions as percent of wages ranged from 0.02% for the wealthiest decile to 3.9% for incomes in the \$16k-\$33k range. Our analysis also shows that there was an aggregate wealth transfer between groups which was uneven. The lowest decile received very little (20,397 million won) and two moderate income groups (incomes between \$17k and \$50k) received over 50% of aggregate tax benefits (over 500m won/year). The wide variation in wealth transfer across taxpayer groups suggests a lack of vertical equity in the system.

Was the system "cost effective?" To determine this, we first estimate extra tax revenue resulting. The businesses targeted by the CRS system were mainly smaller ones (who were more prone to report sales off the books), and such businesses were typically unincorporated (often sole proprietorships). Income from such businesses is reported on individual tax returns. Unfortunately, NTS data publicly-available on individual tax returns does not give business income so we must take another tack. First we must estimate additional tax revenue collected. Due to lack of costs data pre-2005 (see below discussion), we examine post 2004 tax revenue gains. Assume that this was the difference in growth rates between total consumption and cash receipts reported (29.75%-5.5%) times the average cash receipts reported (59.95 trillion won) or 14.53 trillion won per year. Since there will be expenses business taxpayers can deduct, assume that there is a 10% profit margin on average, which then yields an average increase in taxable income of 1.45 trillion won per year. Since this income is attributable to some blend of the corporate sector and individuals operating in the private sector, we estimate an average tax rate of 20.4%, which then yield an annual average increase in income tax revenues of 295.8 billion won. Next, we estimate estimated gain in VAT revenues, and using post-2004 data. The Korean VAT rate is 10%. If we assume that the cash receipts exposed is all VATtaxable, then we have 1.453 trillion won per year in VAT at the consumer level. However, retail vendors would then take VAT credit for VAT taxes charged to them by vendors. Assuming all such vendor charges were subject to VAT already, one assumption is that the additional net VAT resulting is based on the assumed retail profit margin of 10%, and accordingly, additional VAT per year from the CRS is 10%\*1.453 trillion, or

145.3 billion. Combined with the net income tax gain above, the extra tax revenue from CRS is 441.1 billion won, or \$379 million U.S..While NTS does not provide official numbers on such revenue gains, correspondence with them indicated that they estimated a \$526 million revenue gain for 2005.

There are two costs to NTS of the system. One is the tax deductions given to consumers. Using detailed NTS data, the average deduction per year was about 13.1 billion won. At an average tax rate of 18%, the average annual tax cost is 2.358 billion won (about \$2 million). Thus the average net tax revenue gain for the system is 339.9 billion -2.4 billion=337.5 billion won per year (\$280 million).NTS correspondence with the authors indicated that the average annual cost of the CRS (implementation and operation) was \$42.2 million, broken down as follows: equipment purchases of \$15.26 million (likely largest in the implementation phase); program development of \$3.68 million; lottery prizes of \$3.79 million ; promotion expense of \$1.05 million; call center labor of \$14.7 million; and tax credits of \$1.695 million. NTS' correspondence with the authors indicated that such costs were minimized the system "piggy backed" exist credit card systems already in place for many vendors.

Overall, it seems the CRS system is a success in terms of net tax revenue, after costs. The next section considers whether the "side effects" of this system were negative and significant.

# **III. SECONDARY EFFECTS**

The Korean system had a significant economic impact and a number of effects which, acting through markets, may have resulted in a shifting of resources and prices and have tax incidence effects different from the statutory incidence. Empirical studies have found a wide variety of results of such tax shifting; see [12] for a literature review.

As noted above, the NTS tax return dataset is incomplete before 2005. Additionally, many smaller Korean businesses are run in forms other than corporate, in which case taxable information is reported in individual tax return data. The NTS individual return data does not have sufficient detail to perform our tests. Because we cannot use tax return data, we use establishment-level data from Korean Statistical Information Service (KOSIS), the national statistical database, operated by Statistics Korea. The sample that we use in this study includes statistical database for wholesale and retail trade/service industry for fiscal years from 1997 to 2013. Available data is categorized by subindustries and province, and offers items such as

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sales, expenses, number of workers, and number of establishments.

Regressions were run using a differences-in-differences (DID) models for the 1997-2004 period. The dependent variables are (the logs of) number of establishments, number of workers, annual sales, cost of sales, selling and administrative expenses, and average wages, and the intervention is the tax deductibility of credit card receipts starting in 2000. None of the firm-related coefficients are significant; apparently, whatever tax burden which resulted to some firms was offset by sales-induced expansion by previously tax-complying firms. On the other hand, prices actually dropped by approximately .04 per cent (significant ant .01), suggestion that merchants dropped prices to induce cash-based purchases.

Additional regressions for 2000-2013 were run with intervention being installation of the CRS in 2005. There was a statistically significant increase in prices (approximately 6 per cent), and reported retail sales increased by approximately 17.3% (significant at .01). Since cost of goods sold increased by approximately the same percent as sales (significant at .001), this suggest an increase in inventory purchased, but not prices paid for the inventory.

There was neither a significant increase in the number of retail workers or wages. Selling and administrative expenses did not change; combined with the above cost of goods sold findings, suggests that retail firms were unable to push part of the increased tax burden back to suppliers. Indeed, the number of retail establishments dropped by approximately 21.2%, significant at .01, suggesting firms exiting the market due to inability to either shift or pay taxes due to the tax burden falling primarily on capital owners.

## CONCLUSIONS

The Korean tax reforms are unique and appear to be an unqualified success in curbing tax evasion by cashbased companies in the retail sector. To the extent other countries have sufficient telecom/technology infrastructures, they may want to seriously consider implementing a similar system. Like any other significant tax change, this system does not come without some collateral effects--increasing prices in the retail industry, causing some firms to exit the market, and resultant wealth transfers to lower-middle and middle-class taxpayers. Countries or subnational governments considering adopting similar systems may wish to design mechanisms to mitigate such "side effects".

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