Original Article

Designing pension programs to strengthen formal labor markets in developing countries: The case of Indonesia

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ABSTRACT Pension systems in developed countries, where labor is concentrated in formal production sectors, are likely to differ from those in developing countries, where labor is more concentrated in informal sectors. Governments have few tools for implementing fiscal policies (taxes and subsidies) in respect of firms and labor in informal sectors. This research develops a comprehensive, multi-dimensional approach to setting up pension systems in developing countries in general and Indonesia in particular. The pension system suggested comprises a short-run consumption tax policy to finance a defined-benefit plan to meet the minimum physical needs of the older population; a medium-run labor income tax policy to finance a defined contribution, fully funded savings plan for individuals and a long-run skilled labor-creation plan through university education to allow more individuals to finance their own pension savings, under the fully funded savings plan. The defined-benefit plan serves as a redistribution tool and the defined-contribution plan as a savings tool. The skilled labor-creation plan is a supporting tool to make the pension program sustainable in the long run. An overlapping generation computable general equilibrium model is calibrated for the Indonesian economy, with heterogeneity in households introduced through the inclusion of skilled and unskilled labor. The model is used to analyze the impact of consumption taxes and pension taxes on labor supply, and to calculate the equivalent variation of the distribution of the consumption tax burden across generations and labor groups. For comparison, a consumption tax to finance defined-benefit pension cash transfers of US\$1, \$2 and \$3 per person per day is found to impose a lower burden on skilled than on unskilled labor. Introducing a consumption tax to finance a \$1 cash transfer creates an incentive for the highest amount of labor (both skilled and unskilled) to work in the formal sector, and to compensate for consumption tax costs through higher income. Increasing the consumption tax to support \$2 and \$3 cash transfers reduces labor supply to the formal sector, however, with skilled labor supply decreasing more than unskilled in the \$2 case and the reverse in the \$3 case. My theoretical contributions are that, given the existence of both formal and informal labor and production sectors in an economy, and the latter being dominant: (1) taxation

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of expenditures is preferred to taxation of income because the former may induce labor to work in the formal sector; and (2) there exists an optimal level of consumption tax that provides incentives for the largest supply of labor, both skilled and unskilled, to the formal sector.

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Keywords: macroeconomy; pension; taxation; overlapping generation; computable general equilibrium; informal sector

INTRODUCTION

Since the introduction of Law No. 40 in 2004, and the increasing phenomenon of the aging population, there is an urgency to support the economic life of the older population in Indonesia.¹ Included in the older population are Indonesian citizens whose age is 60 and above, regardless of whether they ever worked in their productive age.

The main purpose of this article is to construct a model predicting the impact of an integrated pension program for Indonesia on its economy. The pension reform offered in this article is a tax and transfer type. The source of funds is the consumption tax with a cash transfer program for eligible poor pensioners in the short run. One important part of the model is the consumption behavior of the Indonesian household members, among young workers (age 21–55) and old pensioners (56–65). As has been shown by Cameron and Cobb-Clark,^{2–4} the characteristic of a typical family in Indonesia is that of young workers co-residing with their elderly parents. They also show that there are cash transfers from the young workers to their elderly parents. Nevertheless, they also found that the Indonesian older population is often working at the age when they are supposed to retire. They found that co-residency is only part of the culture, which could break down in the future, whereas the amount of transfers might be too little to support the needs of the elderly. The United Nations made an estimation that by the year 2025, the aged population in Indonesia (age 60+) will increase by 100 per cent, whereas the amount of total population will decrease.

The rest of the article is organized as follows. First, the author of this article has discussed the

previous studies of the social security system in developing countries, followed by a research question. After that, the analysis of calibration follows. The final conclusion ends the article.

STUDIES OF SOCIAL SECURITY SYSTEMS IN DEVELOPING COUNTRIES

The seminal work for analyzing the issues of pension policy in developing countries is by James.⁵ She proposed that countries with dual labor markets, including formal and informal sectors, should separate the purposes of redistribution and the contribution-benefit link in running a pension program. In terms of policy matters, the government is able to raise taxes from workers and corporations in the formal sector but not from those in the informal sector. Her suggestion is that governments in developing countries should not implement a pay-as-you-go pension system, as these systems combine the distribution purpose and savings purpose.

There are several reasons behind James' suggestions. First, there is not sufficient labor income in the formal sector to be charged for pension taxes. Thus, the tax amount collected would not satisfy the minimum benefit amount distributed to all the pensioners from both formal and informal sectors. In many developing countries, the amount of labor in the formal sector is much smaller than that in the informal sector. Second, there is no government guarantee, in the future, about the benefit received by the contributors in the formal sectors that links to their contribution. The second condition is predicted to lead to the evasion of social security contributions by workers in the formal sector,

either by suspending their participation or by moving to the informal sector.

James also proposed a type of multi-pillar system for pension programs in the developing countries.⁶ The first is a universal social security system that breaks links between benefit and contribution and covers everyone, that is, all the retirees, from both formal and informal sectors, and people who never went into the labor force in their life. The first pillar is run by the government. The second pillar is a compulsory fully funded defined contribution program for employees within certain brackets of income, which is usually designed for employees who work in the formal sector, and run by the government. The third pillar is an additional voluntary fully funded defined contribution. As it is voluntary, the program will be run by private institutions, and will be followed only by certain employees in certain income brackets.

There is a great deal of literature about the experience of developing countries in running pension programs. Linciano⁷ reviews theoretical issues and empirical evidence from four different countries. Among these four countries, two are developing countries: Chile and Argentina. Having suspended its unsustainable pay-as-you-go system, Chile changed its pension system to a mixed system between fully funded and pay-as-you-go, with the fully funded system making up approximately 87 per cent of the total benefit.⁸ Chile's revised pension program is a mandatory fully funded individual retirement account. The government continues to guarantee a minimum pension to participants below the poverty line. Similarly, the pension reform in Argentina comprises a mixed system between a private fully funded system, called capitalization regime (CR), and the traditional pay-as-you-go system. The obvious advantage is the eligibility for the basic benefits for male workers. Individuals are free to choose CR or the pay-as-you-go system.

Another example of a developing country with formal and informal labor sectors is Brazil.^{9,10} The Brazilian pension system is a pay-as-you-go system with retirement contributions to the program from both employees and employers.

The Brazilian government also provides a minimum pension benefit to employees, and no contribution is required for someone to be eligible to receive benefits. Nevertheless, with the formal-informal labor market conditions, there exists movement of labor from the formal labor market to the informal one.

Other studies include those on pension reforms in China.¹¹⁻¹³ China's pension system faced short-term as well as long-term problems. The short-term problem is the large amount of pension payments required for the enormous number of Chinese civil servants. The long-term problem is China's rapidly increasing aging population. To cope with these problems, China reformed its pension system in 1997. The reform comprises three pillars. The first pillar is the traditional pay-as-you-go system in which the government charges a tax on the employers for the benefit of the employees. The second pillar is the mandatory fully funded pension, paid by both employers and employee. The third pillar is the voluntary fully funded pension. It is not clear at this point whether these reforms have addressed the short- and long-term problems.

There are not many studies on the redistribution effects in developing countries. One good case of a mixed system between a pay-as-you-go and a funded collective system is⁸ of Argentina, Chile and Mexico. Their research looked at the distribution impact of pension reforms on gender. Their findings are that in the three countries, women accumulated private annuities more than men did after the reform. However, this effect took place only because the new public pension pillar targeted the low earner population, many of whom were women. As a result, low earning married women were the biggest gainers from the pension reform.

There are also studies on the impact of social security reform on labor supply. One excellent study is by Edwards and Edwards.^{14,15} They analyzed the impact of social security reform on the labor market in Chile. Their findings are that reduction of job security, decentralization of workers' collective bargaining and the privatization of social security altogether reduced unemployment by 1 to 1.5 per cent.

All of the studies discussed above show that there are two important things to consider when applying for a pension program in developing countries. The first is the sustainability of the pension program by looking at how the program financed itself. The second is protection of the formal labor market from the movement of labor into an informal one.

THE RESEARCH QUESTION

The purpose of this article is to examine the sustainability of an integrated pension system for Indonesia, which may include a savings motive and a redistributive motive. Sustainability here is defined as a system that can run in the long term. The research question of focus is: Given the current state of the traditional economy in Indonesia, where informal production and informal labor markets vastly occupy the economy, how can a sustainable pension system that achieves an increasing formal labor market be designed and established?

THE MODEL AND DATA

Since the seminal work of Auerbach and Kotlikoff,¹⁶ economic scholars, who work on taxes and pensions, are able to apply the macroeconomic dynamic computable general equilibrium (CGE) as the main tool to predict the long-run effect of taxation. The model is also known as the Overlapping Generation (OLG) CGE model. The applicability and the beauty of the OLG model lie in its microeconomic foundation. Even though it is a dynamic macroeconomic model, it contains the behavioral models of economic agents: household, firm and government. Export and import is included in the model to catch the feature of a small open economy country.¹⁷

Initially, OLG CGE is a homogeneous model; that is, it assumes each economic agent has similar economic characteristics: the same initial wealth, the same consumption function, the same productivity, the same working hour. Later, the model develops into a heterogeneous one in order to catch the economic phenomenon of a developing country.^{9,18,19} The author of this article considered heterogeneous OLG CGE as an apt model to catch

the heterogeneity of the Indonesian economy. It comprises a formal and informal market of goods and services, a formal and informal money market and a formal and informal labor market.

Charmes²⁰ estimated that there has been a 30 per cent fall in the informal sector of the Indonesian goods and services market. For the Indonesian money market, data from Bank Indonesia²¹ show that in year 2000, approximately 55 per cent of Indonesian credit in Rupiah comes from the informal lending sector (individuals and People's Credit Bank). Meanwhile, Badan Pusat Statistik (BPS-Central Bureau of Statistics) shows that in year 2000, 65 per cent of Indonesian labor work in the informal sector, because they are unskilled. Only 4 per cent of the skilled labor work in the formal sector. The rest are unskilled labor who have access to work in the formal sector. The numbers do not change much in 2007. In 2007, laborers working in the informal sector was 70 per cent of the total labor force, whereas the amount skilled labor remained the same.

THE ANALYSIS OF THE CALIBRATION RESULTS

The calibration is based on the OLG model that is customized for the Indonesian economy.²² The purpose of calibration in this article is to observe what happens to the labor market if an additional consumption tax on cash transfers is imposed. Consumption tax is the *prima donna* for the *proposed* policy as corporate income has already been under too much burden of taxes (34% gross income). Meanwhile, due to huge informal labor sector, labor income taxes become unavailable for the central government. Besides, applying labor income taxes would induce labor to go to the informal sector. An additional consumption tax is imposed so that the government has the capacity to collect funds for paying the older population. In doing so, the author of this article assumes that workers are able to choose their optimal working hours because of changes in consumption tax. The model calibrated only skilled and unskilled labor in the formal production sector because data for production and labor are not available in the informal production sector.

Data are included for macroeconomy and labor in the benchmark Indonesian Year 2000. At the time of macroeconomy data collection, the corporate sector had already paid roughly 34 per cent of their revenue to the government, whereas the household sector (laborers) paid less than 2 per cent of their labor income. In addition to a huge informal labor sector, the inexistence of infrastructure for labor income taxes, such as single identity number, are reasons for such taxes composition. For information, the income of laborers working in the informal sector is usually below the taxable income.

THE LABOR AMOUNT AFTER TAXATION

The typical assumption in the labor amount analysis is that laborers are able to optimize their working hours after taxation. The types of laborers being analyzed here are, again, the skilled and unskilled labor in the formal production sector. The profile of unskilled labor in the informal production sector is not available. A calibration is first made, under consumption taxes for US\$1, \$2 and \$3 cash transfers, in order to compare the results here with the earlier results. I then calibrate under a fully funded savings pension program to observe which pension plan generates the maximum amount of labor in the formal production sector.

The author of this article starts the analysis by setting the amount of labor at time 0 (the time when the hypothetical policy starts) equal to 1.00 before an additional consumption tax, on both skilled and unskilled labor, is imposed. The 1.00 index represents 100 per cent of the amount of labor at the initial condition. Owing to the feature of the CGE model, the growth of skilled and unskilled labor follows the growth of population in the model, constant at 1 per cent annually or 5 per cent for every time interval. This population growth holds before and after an additional consumption tax so that the initial ratio of skilled to unskilled labor also equals 1.00 for every time interval. This CGE feature simplifies the analysis because any changes in the first data in the observed series already represent changes in the rest. Notice that the initial consumption tax

rate is 7.5 per cent and the labor income tax rate is 1.8 per cent.

\$1 cash transfer

After an additional consumption tax, for the \$1 cash transfer, the consumption tax rate becomes 14.6 per cent. Assuming that the consumption expenditure is financed by labor income, an additional consumption tax rate at 7.1 per cent is equivalent to an additional labor income tax rate of 10.4 per cent. The new labor income tax rate is 12.2 per cent. At time 0, the index of skilled labor increases to 1.14, an increase of 14 per cent from the base index, and the index of unskilled labor also increases to 1.15, an increase of 15 per cent from the base index. This means that a consumption tax of \$1 provides an incentive for labor, both skilled and unskilled, to enter the formal production sector. An additional consumption tax increases the purchasing price of the goods produced in the formal sector; and, in order to maintain utility, skilled and unskilled labor need higher wages that are available only in the formal production sector. Notice that, after taxation, the index of unskilled labor increases slightly more than that of the skilled labor. An additional consumption tax for the \$1 cash transfer slightly decreases the ratio of skilled to unskilled labor.

\$2 cash transfer

An additional consumption tax for the \$2 cash transfer generates a different impact on the amount of labor in the formal production sector. The consumption tax rate becomes 22.7 per cent, and its equivalent labor income tax rate becomes 24.9 per cent. After an additional consumption tax, at time 0, the index of skilled labor continues to decrease to 0.82, 18 per cent less than the initial index, and the index of unskilled labor also decreases to 0.85, a 15 per cent decrease from the initial index. Notice that, after taxation, it is the skilled labor that leaves the formal production sector the most.

\$3 cash transfer

An additional consumption tax for \$3 cash transfer also provides incentives for labor to leave

the formal production sector. A consumption tax rate reaches 35.2 per cent and its equivalent labor income tax rate reaches 40.8 per cent. At time 0, the index of skilled labor amount goes down to 0.78, and that of unskilled labor amount goes down as well into 0.75. Compared to the decreasing rate of the consumption tax for the \$2 cash transfer, the decreasing rate of skilled labor is 22 per cent, but for unskilled labor increases to 25 per cent. Clearly, a consumption tax rate that is too high prompts unskilled labor to leave the formal sector. As a result, the ratio of skilled labor to unskilled index increases.

Summary

Which policy is optimal? If the goal of this policy is to provide incentives for labor to enter the formal production sector, then the calibration result predicts that a consumption tax that finances the \$1 cash transfer provides the highest incentives for labor to work in the formal sector. Its amount of skilled labor and unskilled labor is the highest among the three policies, and also higher than the initial labor amount. An additional consumption tax for the \$2 cash transfer provides incentives for both types of labor to leave the formal production sector, therefore it is not a good policy choice. The consumption tax for the \$3 cash transfer is also not a good choice as it provides incentives for both skilled and unskilled labor to leave the formal production sector, with unskilled laborers leaving the most.

THE MANDATORY FULLY FUNDED PENSION POLICY

Even though it is a mandatory pension program, a fully funded pension is a type of savings program, different from a pay-as-you-go pension system. It changes the relative price of consumption today and consumption after the retirement. However, because it is a 'forced' savings plan and, here, involves taxation of labor income, the setup is assumed to be based on the principle of the highest amount of labor in the formal production sector, for both skilled and unskilled labors type.

This mandatory fully funded pension setup comes after the consumption tax is determined

because only the labor that has a relatively high income (for example, a minimum average Rp. 60 million annually, using the standard of average skilled labor in Indonesia) can participate in the fully funded pension fund. At the beginning of the program, not all labor is able to participate in the fully funded pension program. Most of the labor that is able to participate at the beginning is skilled labor, whose labor income is relatively high. Later, as the program develops, it is expected that other labor will be included in each group. The fully funded pension program will gradually replace the cash transfer pension. Sometime in the future, as each labor has sufficient individual pension savings, the cash transfer program is expected to be terminated. Therefore, the setup of the fully funded pension savings follows the best setup of the consumption tax system that provides the highest incentives for labor to work in the formal production sector.

The analysis of the fully funded pension setup is also based on an assumption that laborers are able to adjust their working hours. It is also assumed that the central government has already chosen and run the consumption tax for the \$1 cash transfer. As the fully funded pension plan links the contribution and the benefit, I analyze the pension setup under 100 per cent labor income finance (fully paid by the labor) and 50-50 finance (50 per cent paid by the labor-50 per cent paid by the firm). The tax rate is 10 per cent of skilled labor income, or Rp. 20.6 billion.

The initial labor income tax rate, after the consumption tax for the \$1 cash transfer, is 12.2 per cent, whereas the corporate capital income tax rate is 34.0 per cent. An additional fully funded savings tax of Rp. 20.6 billion increases the labor income tax rate to 16.3 per cent, whereas an additional Rp. 10.3 billion increases the labor income tax rate to 14.2 per cent. Finally, an additional Rp. 10.3 billion fully funded savings tax increases the capital income tax rate to 36.6 per cent.

The result for an additional fully funded pension savings simulation is shown in Appendix B. After the government charges 10 per cent taxes on fully funded savings, the labor income tax rate becomes 16.3 per cent, and the index of

skilled labor decreases to 1.02 from 1.14, a decrease of 0.12 index points or a 10.5 per cent decrease of skilled labor. Meanwhile, the index of unskilled labor decreases, as well, from 1.15 to 1.01, a decrease of 0.14 index points or 12.2 per cent of unskilled labor. As the tax is taken fully from the labor income, the reduction of the labor amount is purely the effect of labor movement between the sectors of production.

Nevertheless, from Appendix B, the additional 50–50 funding of fully funded pension savings taxes shows that the additional taxes reduces the index of skilled labor from 1.14 into 0.69, a reduction of 0.45 index points or 39.5 per cent of skilled labor amount. The taxation also reduces the index of unskilled labor from 1.15 to 0.73, a reduction of 0.42 index points or 36.5 per cent of unskilled labor amount. At this time, the labor income tax rate is 14.2 per cent, and the capital income tax rate is 36.6 per cent. As the taxes reduce both capital and labor income, the effect of labor reduction in this case is because of the movement of firms from the formal sector to the informal sector, as well as the movement of labor themselves. The capital income tax rate is already quite high in the initial equilibrium, therefore the firms could not bear any additional expense for labor pension anymore.

CONCLUSIONS

As the absolute and relative amount of the retired population increases in Indonesia, there emerges a need for Indonesia to have an integrated pension program. Support from family members for the elderly would be discontinued eventually because the number of children in one family is getting smaller, the elderly live longer, and the family is becoming more and more fragmented, as children no longer live with their parents after marriage.²³ The pension program must fit the characteristics of Indonesia as a developing country, where output markets and labor markets are massive in the informal sector. As the central government has little ability to collect taxes in the informal sector, any social security taxation in the formal sector could make firms and labor move from a formal sector to an informal sector. Therefore, an investigation of the type of pension reform and

its financing is necessary. This is the broad purpose of this article.

Experiences from developing countries, such as Argentina, Brazil, Chile, Mexico and China, have shown that a combination of defined benefits in one program and defined contributions in another program can fit the pension system for a country with a massive informal sector, both in the output and labor markets. The two programs together serve the redistribution purpose, on the one hand, and the savings purpose, on the other hand. The separation of the purposes is meant to prevent the application of a pension system causing labor and firms to move to the informal sector, as well as to maintain the sustainability of the program by insulating the program from the aging problem.

Using an OLG model, the analysis of sources of financing for the Indonesian redistribution program shows that consumption tax financing fits the main criteria as the source of redistribution financing. One implication of the additional taxation on consumption is the additional burdens on generations. As generations distribute the tax burden among them, the analysis of equivalent variation in the tax burden distribution shows that skilled labor generations bear fewer burdens than that of unskilled labor under a consumption tax that finances a \$1 cash transfer (a 14.6 per cent consumption tax rate), under a consumption tax for a \$2 cash transfer (a 24.9 per cent consumption tax rate), and under a consumption tax for a \$3 cash transfer (a 35.3 per cent consumption tax rate).

The analysis of the impact of a consumption tax on the amount of skilled and unskilled labor shows that the consumption tax for a \$1 cash transfer provides the highest incentives for the skilled and unskilled labor to work in the formal sector, an increase by 14 per cent in skilled labor and 15 per cent in unskilled labor. The consumption tax rate is 14.6 per cent, and its equivalent labor income tax rate is 12.2 per cent. The consumption tax for a \$2 cash transfer would decrease skilled labor by 18 per cent and unskilled labor by 15 per cent in the formal sector, whereas the consumption tax for a \$3 cash transfer would decrease skilled labor by 22 per cent

and unskilled labor by 25 per cent. In addition, the setup of a fully funded pension system after the consumption tax for the \$1 cash transfer shows 100 per cent labor income financing is the one that provides the highest incentives for skilled and unskilled labor to work in the formal sector. In contrast, an alternative financing split of 50 per cent labor income tax and 50 per cent capital income financing would stimulate the firms and both skilled and unskilled labor to leave the formal sector. The initial tax rate of capital income has already been too high; therefore any additional tax rate for pensions would move the firms to the informal sector.

Finally, there are two propositions that the author of this article can contribute to the theory of public finance. First, in an economy with a large informal production and labor sector, consumption taxes are preferable to income taxes because my results indicate that consumption taxes are more likely to induce the movement of labor to the formal sector. In addition, the consumption tax must be paid in some way by every household, regardless of whether they produce in the formal sector or informal sector. Second, given formal and informal labor markets in an economy, where the informal labor market is dominant, there exists an optimal consumption tax rate that provides an incentive to the highest amount of labor to work in the formal sector. It is time and the application of taxation that will prove the accuracy of these two propositions.

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APPENDIX A

See Table A1.

Table A1: Examples of country with formal–informal labor economy running defined benefit and defined contribution pension system

Countries	Funding	Contribution Percent of employees earning	Benefits
Argentina	Multi-pillar system Pillar 1: Flat Benefit Pillar 2: Funded Individual Accounts Many private funds	6–16 per cent paid by employee 11 per cent paid by employee	Flat – 30 per cent of male average wage Annuity Minimum benefit \$140 after 10 years of service
Brazil	Two main regimes: Private Sector Workers (RGPS) Pay-as-you-go basis Civil Servant (RPPS)	8 per cent paid by the employer Some amount by employees up to A ceiling, min. 30 years contribution 11 per cent paid by the employees	Minimum wage or average of last 3 years wage
Chile	Multi-pillar system Pillar 1: Minimum Pension Guarantee (MPG) Pillar 2: Funded Individual Accounts Many private funds	Financed from Government general revenues 13 per cent paid by employee	MPG (27 per cent of male average wage) Annuity
China	Multi-pillar system Pillar 1: Minimum Pension Guarantee (MPG)	Financed from employer's account by 17 per cent of employee's wage, Min. 15 years of working time	20 per cent of average wage
Mexico	Pillar 2: Funded Individual Accounts Multi-pillar system Pillar 1: Social Quota (SQ) + Minimum Pension Guarantee (MPG) Pillar 2: Funded Individual Accounts Many private funds	Employer contribution: 3 per cent of wage Employee contribution: 8 per cent of wage 5.5% of minimum wage paid by Government 6.5% paid by employee	Annuity Annuity 1 minimum wage after 25 years' contribution

Source: Dunaway and Arora¹², Filho⁹, James E, Edwards AC, Wong R.⁸

APPENDIX B

See Table B1.

Table B1: The amount of labor (per cent) after additional consumption tax and fully funded pension tax

Year	Before consumption tax		After consumption tax						Fully funded pension savings after \$1 consumption tax			
			\$1 per day person transfer		\$2 per day person transfer		\$3 per day person transfer		10 per cent labor income		5 per cent labor income and 5 per cent capital income	
	LS(T)	LU(T)	LS(T)	LU(T)	LS(T)	LU(T)	LS(T)	LU(T)	LS(T)	LU(T)	LS(T)	LU(T)
0	1.00	1.00	1.14	1.15	0.82	0.85	0.78	0.75	1.02	1.01	0.69	0.73
5	1.05	1.05	1.20	1.21	0.86	0.89	0.82	0.78	1.07	1.07	0.73	0.77
10	1.10	1.10	1.26	1.27	0.91	0.94	0.87	0.82	1.12	1.12	0.77	0.81
15	1.16	1.16	1.32	1.33	0.95	0.98	0.91	0.87	1.18	1.18	0.81	0.85
20	1.22	1.22	1.39	1.40	1.00	1.03	0.96	0.91	1.24	1.24	0.85	0.89
25	1.28	1.28	1.46	1.47	1.05	1.09	1.00	0.96	1.31	1.30	0.89	0.94
30	1.35	1.35	1.54	1.55	1.11	1.14	1.06	1.01	1.37	1.37	0.93	0.99
35	1.42	1.42	1.62	1.63	1.16	1.20	1.11	1.06	1.44	1.44	0.98	1.04
40	1.49	1.49	1.70	1.71	1.22	1.26	1.17	1.11	1.52	1.51	1.03	1.09

Source: Widjaja, calibration result.

Note: LS(T)=formal sector skilled labor amount; LU(T)=formal sector unskilled labor amount.

APPENDIX C

See Figure C1.

Figure C1: Theoretical findings relationship between formal sector labor amount and consumption tax rate.