Australian National University

Working Papers in Trade and Development

Anti-globalisation, Poverty and Inequality in Indonesia

Arief Anshory Yusuf

and

Peter Warr

April 2018
Working Paper No. 2018/03

Arndt-Corden Department of Economics
Crawford School of Public Policy
ANU College of Asia and the Pacific

Anti-globalisation, Poverty and Inequality in Indonesia*

Arief Anshory Yusuf

Universitas Padjadjaran

and

Peter Warr

Australian National University

Abstract

Since the 1997-99 Asian Financial Crisis (AFC), the rate of poverty reduction in Indonesia has slowed and economic inequality has increased. At the same time, protectionism also increased, both at the global level and within Indonesia. The objective of this paper is to find the extent, if any, that protectionism, both at the global level and within Indonesia, explains the observed slowing down in poverty reduction and rising We do this using a general equilibrium model of the Indonesian economy which enables detailed calculation of the poverty and inequality impacts of policy changes and external shocks. We conclude that increased protection had harmful effects on both poverty reduction and inequality, but that its impact was relatively small. It was not the major cause of either the slowdown in poverty reduction or increased inequality.

Key words: Inequality; poverty; Indonesia; general equilibrium

JEL codes: F63; I32;O53

* In fond memory of our colleague, Professor Rina Oktaviani.

1. Introduction

The 1997–98 Asian financial crisis was a turning point for Indonesia, as it was for many other East Asian countries. In addition to the economic consequences, Indonesia experienced dramatic political change, including a transition to electoral democracy and far-reaching government decentralisation. In the post-crisis period, the average growth rate of real GDP per capita has been only marginally lower than during the two decades preceding the crisis, but the rate of poverty reduction has slowed significantly. Something seems to have happened to make growth substantially less effective in reducing poverty. Simultaneously, Indonesia has experienced a huge increase in measured economic inequality. The slowdown in the rate of poverty reduction per unit of growth and the increase in inequality can be viewed as quantitative aspects of the same distributional phenomenon, in which different segments of the population recovered from the crisis at widely divergent rates. What caused this to happen?

The present study marks the initial step in a research program in which the authors aim to explore competing hypotheses that might explain the change in the poverty–inequality nexus since the crisis. The hypothesis examined in this article relates to what we will call ‘anti-globalisation’: resistance to the increasing reliance on international trade that has been a characteristic of globalisation, with that resistance taking the form of tightened restrictions on international trade. At the same time as inequality has increased in Indonesia, protectionism has also risen, both internationally and within Indonesia. We hypothesise that anti-globalisation has caused at least some of the slowdown in poverty reduction and increase in inequality. We will examine the extent to which the increase in protectionism in the global economy, and within Indonesia itself, can explain the changes in economic outcomes experienced by different segments of the Indonesian population.

First, we discuss in more depth the slowdown in poverty reduction and increase in inequality experienced in Indonesia since the financial crisis. We then provide more detail on the rise of protectionism, both in the international economy and within Indonesia. Next, we describe the economic model used to analyse the effects of protectionism on poverty and inequality. Finally, we summarise the results.

2. Slowdown in poverty-reduction slowdown, rise in inequality

Over the four and a half decades for which data are available, the incidence of absolute poverty has declined dramatically in Indonesia (Figure 1). Over the two decades immediately preceding the Asian financial crisis, 1976–96, poverty incidence at the national level declined on average by 1.44 per cent per annum (Table 1). This meant that each year, on average, 1.44 per cent of the Indonesian population moved from levels of real expenditure per person below the poverty line to levels above the line, holding the real value of the poverty line constant. The decline occurred in both rural and urban areas and in all parts of the country, though not at the same rate. The damaging effects of the 1997–98 financial crisis included a temporary increase in poverty incidence. The period of economic recovery that began roughly in 2000 brought a resumption of poverty reduction, but at much lower rates than previously. In the post-crisis period (2000–16), national poverty incidence declined on average by 0.53 per cent per annum. Thus, the post-crisis rate was lower than the pre-crisis rate by 1.44 – 0.53 = 0.91 percentage points per year, representing a 63 per cent decline in the rate at which poverty fell each year.

Figure 1 about here

Table 1 about here

To some extent, a lower rate of poverty reduction after the crisis was to be expected given the fall in economic growth: the average annual rate of real GDP growth per person dropped from 4.44 per cent in the pre-crisis period (1976–96) to 3.93 per cent in the post-crisis period (2000–16). But this 11 per cent reduction in real GDP growth per person was much smaller than the 63 per cent decline in the rate of poverty reduction.

The slowdown in the rate of poverty reduction per unit of economic growth coincided with an increase in economic inequality. Figure 2 tracks inequality in Indonesia, as measured by the Gini coefficient, based on expenditure per household member, over the period 1976–2016 (see also Table 1). The Gini coefficient can in theory vary between 0 and 1, where higher values indicate greater inequality. The figure shows that the Gini coefficient barely changed during the two decades before the Asian financial crisis. It fell during the crisis itself, from 0.365 in 1996 to 0.303 in 2000, because, although the entire population suffered, better-off Indonesians were more seriously affected than poorer Indonesians. The Gini coefficient then increased over the next

decade and a half to reach 0.397 in 2016. This post-crisis rise in measured inequality was one of the largest increases ever recorded for any country.[1]

Figure 2 about here

3. Rising Protectionism

As Figure 3 shows, world trade grew at about double the rate of world GDP over the decade and a half prior to the 2007–08 global financial crisis. As a consequence, the ratio of global trade to GDP increased significantly during this period (Figure 4). The growth in world trade slowed during the crisis and has still not recovered. World GDP growth was briefly negative but has since recovered, while not quite regaining its pre-crisis level. Since the crisis, the growth rates of world trade and world GDP have been about the same. As a result, the global trade-to-GDP ratio has stagnated in the post-crisis period (Figure 4).

In the case of Indonesia, the trade-to-GDP ratio has fallen steadily since the 1997–98 Asian financial crisis. In 2016 it was only about two-thirds its level prior to the crisis (Figure 4).

Figures 3 and 4 about here

The 18th Global Trade Alert Report (Evenett and Fritz 2015) draws attention to a retreat from globalisation in many countries. This has taken the form of increased protectionism, especially in response to the global financial crisis (Figure 5). The report shows that the commodity categories in which trade declined were the same as the categories in which protection increased. It therefore attributes the slowdown in the growth of global trade relative to global GDP to rising protectionism, particularly in the G20 countries.

Figure 5 about here

Indonesia is one of the G20 countries in which protectionism has increased since the global financial crisis. In an important recent paper, Marks (2017) has estimated the effective rates of protection (ERPs) across 140 tradable-goods sectors in the Indonesian economy in early 2015, using value-added shares as weights. His estimates take into account the effects of most-favoured-

[1] The largest recorded rate of increase in the Gini coefficient is thought to have occurred in the former Soviet Union, immediately following its break-up in 1991. Indonesia's post-crisis rate of increase seems to be the second highest.

nation and preferential-import tariff schedules, anti-dumping and safeguard duties, export levies, duty drawbacks and exemptions, domestic subsidies and excise taxes. He finds that both the magnitude and the dispersion of ERPs were higher in early 2015 than in early 2008, and that much of the variability was related to the expanded use of quantitative trade restrictions. In particular, the regulations examined raised a measure of the cost of living by 7.6 per cent in 2015, compared with 2.0 per cent in 2008. Table 2, drawn from Marks (2017), indicates that between 2008 and 2015 nominal rates of protection in Indonesia changed most significantly in four product categories, three of them food sectors and the other one a mining sector. In the three food categories, food crops, livestock and their products, and manufactured food (food, beverages and tobacco), nominal rates of protection against imports increased by 15.2 per cent, 7.9 per cent and 7.6 per cent respectively. In the mining category—'other mining', which includes tin, nickel, bauxite and copper—*dis*-protection, reflecting export taxation, increased by 9 per cent in absolute value.

Table 2 about here

4. Application of the INDONESIA E3 General Equilibrium Model

Changes in rates of protection in countries other than Indonesia alter the prices for commodities and traded inputs faced by Indonesia on world markets. This in turn affects the domestic prices faced by both producers and consumers within Indonesia, but the transmission of international price changes to domestic price changes is conditioned by Indonesia's trade policies. Changes in Indonesia's own protection policies alter the relationship between domestic prices and international prices. These policies affect the welfare of Indonesian households, by changing both their incomes and the prices they face for consumer goods. In this study, we analyse these complex relationships using INDONESIA-E3, a multi-household, multi-sector computable general equilibrium (CGE) model of the Indonesian economy. The essence of the analysis is a comparison of the welfare of households in the observed circumstance, in which the above anti-globalisation policies are in place, and their welfare under a hypothetical alternative set of policies—the counterfactual—in which those policies are absent.

The distinctive feature of the INDONESIA-E3 model, and one that is very important for this study, is the disaggregation of households by expenditure class. The multi-household feature is applied not only to the expenditure or demand side of the model, but also to the income side. This allows precise estimation of the effect that shocks have on different types of households,

facilitating measurement of their impact on inequality and poverty incidence. In the literature on poverty impact analysis using CGE models, this class of model is called an integrated CGE model (Bourguignon, Robilliard and Robinson 2003). In an integrated CGE model, each household is linked to its sources of income (through the market for factors of production) and to its areas of expenditure (through the market for commodities). In the widely used top-down method of integrating data on households into modelling, the CGE model is separate from the poverty module and there is only a one-directional relationship between them. But in an integrated CGE model, such as INDONESIA-E3, there is no separation between the model and the poverty module—both are contained within the one fully integrated model.

INDONESIA-E3 has been used in the past to analyse the effect of fuel pricing reform on the expenditure, income and consumption patterns of Indonesian households (Yusuf and Resosudarmo 2008), the impact of a carbon tax on poverty incidence and other measures of household welfare (Yusuf and Resosudarmo 2015) and the effect of subsidy interventions on land use and carbon emissions (Warr and Yusuf 2011).[2]

The INDONESIA-E3 model uses a social accounting matrix (SAM) for its database. The SAM was constructed to allow the integration of highly disaggregated households, sufficient for accurate distributional analysis. It covers up to 175 industries, 175 commodities and 200 household groupings (100 in urban areas and 100 in rural areas, grouped in each case by percentile of real expenditure per capita). The data used to construct the SAM are taken from an Indonesian input–output table, the official SAM published in 2008 by the central statistical agency (BPS) and, most importantly, household-level data from the National Socio-Economic Survey (Susenas) for 2008 conducted by BPS.[3]

5. Model structure

The CGE model used in this study combines Indonesian data, as summarised above and elaborated below, with a theoretical structure based on the ORANI-G model, an applied general equilibrium model of the Australian economy.[4] This theoretical structure is conventional for static general equilibrium models in that it contains equations describing:

[2] A more detailed exposition of the model can be found in Yusuf (2008).
[3] The statistical method used to construct the SAM is explained in more detail in Yusuf (2006).
[4] See Horridge (2000) for an in-depth discussion of the ORANI-G model.

- industry demand for intermediate inputs and primary factors;
- producers' supplies of commodities;
- demand for inputs to capital formation;
- household demand;
- export demand;
- government demand;
- basic values of goods and services relative to production costs and purchaser prices;
- market-clearing conditions for commodities and primary factors; and
- numerous macroeconomic variables and price indices (Horridge 2000: 2).

The demand and supply equations for private sector agents (producers and consumers) are based on the usual assumptions that producers are motivated by the desire to minimise costs and consumers by the desire to maximise utility. These agents are assumed to be price takers, with producers operating in competitive markets with zero-profit conditions.[5]

We modified the standard ORANI-G model in several ways. In particular, we constructed a SAM representing the Indonesian economy in the year 2008 to serve as the core database for our CGE model. The official Indonesian SAM published by BPS does not distinguish households by level of income or expenditure, so does not allow an accurate assessment of the effect of policy changes or external shocks on the welfare of different types of households. The SAM used in our study contains comprehensive data on 200 household groupings: 100 in urban areas and 100 in rural areas, grouped in each case by percentile of real expenditure per capita. Constructing a SAM specifically designed to have a distributional emphasis required not only large-scale household survey data but also the reconciliation of various data sources.

In addition to providing detailed, disaggregated data on households, the Indonesian SAM for 2008 acknowledges the typical characteristics of labour markets in developing countries such as Indonesia by distinguishing four types of skills (agricultural, non-agricultural unskilled, clerical and services, and professional), each divided into urban and rural workers, and also into formal and informal (unpaid) workers, making a total of 16 categories of labour. In the model, we aggregate these 16 categories of labour into five labour categories: agricultural labour, unskilled formal-

[5] The equations used in our model are described in detail in Yusuf (2008).

sector labour, unskilled informal-sector labour, skilled formal-sector labour and skilled informal-sector labour.[6]

In our study, the headcount measure of poverty incidence and the Gini coefficient of inequality are calculated using the methods set out in Appendix A1. These calculations are based on the distributions of real expenditure per capita ex ante (before the policy change) and ex post (after the policy change). The simulation results are estimates of the percentage changes in the endogenous variables of interest that result from the exogenous policy changes being studied. In this study, these policy changes are increases in rates of protection, first at the global level and second within Indonesia itself, occurring between 2008 and 2015.

For all the simulations, we assume full employment for all types of labour. Real wages for each category of labour are the equilibrating variables. Capital and land are assumed to be sector-specific. Another assumption in the macroeconomic closure is that government spending and real investment demand for each good are fixed exogenously.

We use the model to simulate two scenarios: one in which there is a world globalisation reversal, and one in which there is an Indonesian globalisation reversal. In the first case, we use the World Bank's estimated levels of global protection to simulate the effect on Indonesian households of a 20 per cent increase in all rates of protection in all countries except Indonesia. In the second case, we simulate the effect on Indonesian households of the observed increase in Indonesia's own trade protection between 2008 and 2015, based on Marks (2017), as discussed above.

In the second of these cases—increased protection within Indonesia—we focus on two contrasting sectors in which significant changes in protection occurred between 2008 and 2015: food (consisting of food crops, livestock and manufactured food), in which Indonesia is a net importer; and minerals, in which Indonesia is a net exporter. The simulations are divided into three parts, covering, in turn, food, minerals, and food and minerals combined. Marks' (2017) estimates of changes in nominal rates of protection distinguish between those that are attributable to changes in tariffs and those that are attributable to changes in quantitative trade restrictions. The distinction is important for modelling the distributional effects of the changes in protection because the revenue from tariffs accrues to the government, while the rents accruing from quantitative restrictions are collected privately. In our simulations, the rents from quantitative restrictions within Indonesia are assumed to accrue to the richest 5 per cent of Indonesian households in urban areas.

[6] For detailed information on how the SAM used in this paper was constructed, see Yusuf (2006).

6. Results

Impact of a world globalisation reversal

Protection arising outside Indonesia is represented by the tariff-equivalent of protection facing Indonesia's exports in the world market. We use a 20 per cent increase in this tariff-equivalent to simulate the effect on Indonesian households of an increase in global protection.

The simulated effect that an increase in protection in all countries except Indonesia has on the welfare of the Indonesian population is summarised in Figure 6. The left-hand side of the chart shows how an increase in global protectionism affects the real expenditure on all commodities of households living in urban areas, while the right-hand side shows how it affects the real expenditure of households living in rural areas. In each case, the households are divided into 100 per capita expenditure centiles, arranged from the poorest 1 per cent to the richest 1 per cent.

Figure 6 about here

As Figure 6 shows, almost all population groups within Indonesia experience a decline in real expenditure, meaning that they all lose from a globalisation reversal. The households living in rural areas experience larger declines in real expenditure, on average, than urban households. In rural areas, the adverse effects of a globalisation reversal are felt most strongly by households in the 30th to 50th percentiles of expenditure per capita.

Clearly global protectionism has diverse effects on different Indonesian households, through its divergent effects on household incomes and household expenditures. The effects on household incomes are related to changes in the returns to the factors of production that individual households own; and the effects on household expenditures are related to changes in the prices of the consumer goods that individual households purchase.

In terms of the income effect, Figure 7 shows that, with the exception of skilled labour, the real returns to all factors of production (unskilled labour, capital and land) are reduced by a globalisation reversal (where 'real' means nominal factor returns deflated by the Indonesian consumer price index, as estimated by the model). Agricultural workers are the worst affected, followed by landowners. These results are consistent with the finding that rural households experience stronger negative impacts than urban households.

Figure 7 about here

The tendency for the negative impact of global protectionism to be largest for rural/agricultural households reflects the fact that increased global protection lowers the international prices for agricultural commodities relative to manufactured commodities. The effects on the production of different sectors of the Indonesian economy also reflect this fact. As Table 3 shows, global protectionism negatively affects the output of many traditional Indonesian export commodities that have a strong rural basis, including sugar cane, tobacco, cloves, tea, coconut and maize. Global protectionism mainly benefits service sectors with a strong urban basis, such as transportation, and hotels and restaurants.

Table 3 about here

Given its effect on the real expenditure of households, as shown in Figure 6, one would expect global protectionism to increase poverty incidence, especially in rural areas. Our calculations indicate that this is indeed the case, but that the effect is small: in rural areas poverty incidence increases by 0.18 percentage points, in urban areas by 0.06 percentage points and nationwide by 0.12 percentage points. The estimated impact on inequality within Indonesia, as reflected in the Gini coefficient, is negligible.

To summarise, these estimates indicate the possible effects of increased global protectionism between 2008 and 2015. Starting with 2008 levels of global protection, for example, a 20 per cent increase in all rates of global protection by 2015 would raise Indonesia's nationwide level of poverty incidence in 2015 by 0.12 percentage points, compared with the level it would *otherwise* have been if global protection had not increased.

Impact of Indonesia's globalisation reversal

We now consider how Indonesia's protection of the food sector (in which Indonesia is a net importer) and dis-protection of the mineral sector (in which Indonesia is a net exporter) affects the welfare of individual Indonesian households. The answer is complex. It depends on changes in the returns to factors of production, individual households' patterns of ownership of these factors of production, changes in the prices of the consumer goods purchased by households, and individual households' patterns of consumption of these consumer goods. The overall impact of these differing effects at the household level can be decomposed into:

Total Effect (*real expenditure effect*) = *Income Effect – Price Effect*

Income Effect measures, for each household, how a shock affects the income derived from a household's ownership of factors of production (labour, capital and land). *Price Effect* measures

the impact on the household's cost of living. The latter is household-specific because, even though everyone faces identical changes in the prices of individual commodities, each household purchases a different bundle of commodities. For example, if the prices of food items increase proportionately more than the prices of non-food items, the cost of living (*Price Effect*) of poor households will increase proportionately more than that of rich households, because the share of food in the total consumption of poor households is generally higher than that of rich households. *Total Effect* (in percentage change) is simply *Income Effect* minus *Price Effect*.[7]

Figure 8 about here

This decomposition is implemented in Figure 8 for the case of Indonesia's protectionism in the food sector. The income effect is positive for both the rural and urban populations and is proportionately larger, on average, for the rural population. Since the rural population is on average poorer than the urban population, the income effect reduces inequality *between* the rural and urban populations. In addition, the income effect is proportionately larger for the poorer population groups within rural areas. This is also the case within urban areas, with one important exception. Because the richest 5 per cent of urban households receive all the rents from quantitative trade restrictions, their incomes increase, on average, by around 1 per cent, whereas the remaining urban households receive an average increase of less than 0.4 per cent. For this reason, while inequality falls within rural areas, the overall effect on inequality within urban areas is difficult to infer from the diagram alone.

The first column of Table 4 helps to clarify these results. It shows that the effect of Indonesia's protection of the food sector is to raise the nominal return to agricultural labour relative to the returns to all non-agricultural forms of labour and the returns to capital and land. Agricultural labour is of course the principal income source for the poorest segments of the rural population.

Table 4 about here

Turning to the price effect, it is apparent from Figure 8 that the effect of Indonesia's protection of the food sector on consumer prices is greater than its effect on income, in both rural and urban areas. The price effect is also regressive, meaning that the increase in the cost of living is felt more strongly by poorer households. The total effect, that is, the overall change in household real expenditure, is negative for all except the richest 5 per cent of urban households, the recipients of

[7] A fuller development of this analytical framework is provided in Warr and Yusuf (2014).

the rents from quantitative import restrictions. The fact that the top 5 per cent of urban households experience a positive total effect tends to increase overall inequality.

It is important to note that the fact that our simulation results indicate that all rural *centile groups* lose from increased protection of the food sector does not mean that all rural *households* lose. Within the richer, land-owning centile groups in particular, there will be both households that gain and households that lose. What the results mean is that within each rural centile group the losers outweigh the gainers. The same is true for the urban centile groups, except the richest 5%.

As one would expect from the fall in real expenditure for almost all population groups, an increase in protection in the food sector increases poverty incidence. Table 5 indicates that poverty incidence rises by 0.079 per cent in urban areas and 0.062 per cent in rural areas. The nationwide increase in poverty incidence is 0.070 per cent. Thus, protection of the food sector increases poverty, but the size of the effect is small.

Table 5 about here

Table 6 shows that an increase in protection in the food sector leads to a rise in inequality, but the effect is very small. The estimated Gini coefficient for rural areas does not change, while the coefficient for urban areas increases by only 0.001 points. Using an alternative measure of inequality, the Palma ratio (Palma 2014), we find that the ratio of the expenditure share of the richest 10 per cent to the share of the poorest 40 per cent of urban households increases from 1.276 to 1.288, or by 0.012 points.

Table 6 about here

In the case of dis-protection of the mineral sector, the effect of Indonesia's own globalisation reversal on the returns to factors of production is felt most strongly by land and capital owners (Table 4). This occurs because limiting the exports of extractive sectors hurts the factors of production used most intensively in these sectors. As Figure 9 shows, the effect on income is strongly progressive (downward sloping), especially for the sections of the urban population whose incomes depend most intensively on capital and land. The effect on prices is relatively neutral across centile groups, shown by the rather flat price effect curves. The overall impact on real expenditure is progressive, particularly in urban areas. As shown in Table 5, Indonesia's protectionism in the extractive mineral industries through export limitation tends to reduce poverty in urban areas, increase it in rural areas and increase it nationwide. However, the effect is again very small. The impact on inequality as measured by the Gini index is neutral (Table 6).

Figure 9 about here

Figure 10 shows the combined effect of protection in the food and mineral sectors on real household expenditure per capita. The effects are dominated by protection of the food sector, discussed above. First, the income effect tends to be progressive (downward sloping) in both urban and rural areas, but the rural population experiences a greater proportional increase in income than the urban population. Within the rural population, the positive income effect is larger for the poorer parts of the population. In urban areas, the richest 5 per cent of households receive the greatest benefit from the economic rent derived from quantitative trade restrictions.

Second, the price effect is regressive (downward sloping) in both urban and rural areas, because the increase in commodity prices is biased against the basket of commodities consumed more intensively by poorer households and this effect is larger in rural than in urban areas.

Figure 10 about here

Third, as the price effect is larger than the income effect for all except the richest 5 per cent of urban households, all population groups, except the latter, lose from Indonesia's own globalisation reversal. As a result, poverty incidence increases by 0.072 percentage points in urban areas, 0.074 percentage points in rural areas and 0.073 percentage points nationwide (Table 5). In other words, Indonesia's protectionism (represented by the increase in the nominal rate of protection occurring between 2008 and 2015) results in an increase in poverty, but the impact is small. The estimated effect on inequality, meanwhile, is negligible (Table 6).

7. Conclusions

Since the 1997–98 Asian financial crisis, the rate of poverty reduction in Indonesia has slowed. From a reduction of 1.44 per cent of the total population per annum between 1976 and 1996, the rate slowed to 0.53 per cent per annum between 2000 and 2016. Thus, the post-crisis rate of poverty reduction was only 37 per cent of the pre-crisis rate, whereas the post-crisis rate of GDP growth per person was 89 per cent of the pre-crisis rate. Following the crisis, economic inequality increased dramatically. The Gini index of inequality increased from 0.303 in 2000 to 0.397 in 2016, one of the largest increases ever recorded for any country. Protectionism also increased, both globally and within Indonesia.

The objective of this paper has been to estimate the extent to which protectionism, both at the global level and within Indonesia, explains the observed slowdown in poverty reduction and rise in inequality. We did this using the INDONESIA-E3 model, a general equilibrium model of the Indonesian economy that enables detailed calculation of the poverty and inequality effects of policy changes and external shocks. Using this modelling approach, we were able to compare the welfare of households under the existing policies, which included the observed increases in protection, with their welfare under a hypothetical alternative set of policies—the counterfactual—in which these increases in protection did not occur.

The difference between the annual rates of poverty reduction before and after the 1997–98 Asian financial crisis is 1.44 – 0.53 = 0.91 percentage points per year. We find that increased protectionism at the global level between 2008 and 2015 may have reduced the annual rate of poverty reduction in Indonesia during that period by just under 0.02 percentage points (0.12 percentage points over the seven-year interval), and that increased protectionism within Indonesia during the same period may have reduced the annual rate of poverty reduction by an estimated 0.01 percentage points (0.07 percentage points over the seven-year interval). We therefore conclude that protectionism increased poverty incidence, but that the effect was small, and not nearly enough to explain the slowdown in the rate of poverty reduction. We also find that the increase in protectionism from 2008 to 2015 increased inequality, but the effect was smaller still.

We conclude that anti-globalisation has been harmful for both poverty reduction and inequality, but that it was not the major cause of either the slowdown in poverty reduction or the rise in inequality that Indonesia has experienced since the Asian financial crisis in 1997–98.

References

Bourguignon, F., A.-S. Robilliard and S. Robinson (2003) 'Representative versus real households in the macro-economic modelling of inequality', Document de Travail DT/2003-10, Développement et Insertion International (DIAL), Paris, September.

Evenett, S., and J. Fritz (2015) 'The tide turns? Trade, protectionism, and slowing global growth', 18th Global Trade Alert Report, Centre for Economic Policy Research (CEPR), London.

Horridge, M. (2000) 'ORANI-G: a general equilibrium model of the Australian economy', Preliminary Working Paper No. OP-93, Centre of Policy Studies and Impact Project, Monash University, Clayton, October.

Marks, S.V. (2017) 'Non-tariff trade regulations in Indonesia: nominal and effective rates of protection', *Bulletin of Indonesian Economic Studies* 53(3): 333–57.

Palma, J.G. (2014) 'Has the income share of the middle and upper-middle been stable around the "50/50 rule", or has it converged towards that level? The "Palma ratio" revisited', *Development and Change* 45(6): 1,416–48.

Warr, P., and A.A. Yusuf (2011) 'Reducing Indonesia's deforestation-based greenhouse gas emissions', *Australian Journal of Agricultural and Resource Economics* 55(3): 297–321.

Warr, P., and A.A. Yusuf (2014) 'Fertilizer subsidies and food self-sufficiency in Indonesia', *Agricultural Economics* 45(5): 571–88.

World Trade Organization (2016) 'WTO report on G-20 trade measures (mid-October 2015 to mid-May 2016)', WTO Secretariat, 21 June.
https://www.wto.org/english/news_e/news16_e/g20_wto_report_june16_e.pdf

Yusuf, A.A. (2006) 'Constructing Indonesian social accounting matrix for distributional analysis in the CGE modelling framework', Working Paper in Economics and Development Studies No. 200604, Department of Economics, Padjadjaran University, Bandung, November. http://ceds.feb.unpad.ac.id/wopeds/200604.pdf

Yusuf, A.A. (2008) 'INDONESIA-E3: an Indonesian applied general equilibrium model for analyzing the economy, equity, and the environment', Working Paper in Economics and Development Studies No. 200804, Department of Economics, Padjadjaran University, Bandung, September. http://ceds.feb.unpad.ac.id/wopeds/200804.pdf

Yusuf, A.A., and B.P. Resosudarmo (2008) ‘Mitigating distributional impact of fuel pricing reform: the Indonesian experience’, *ASEAN Economic Bulletin* 25(1): 32–47.

Yusuf, A.A., and B.P. Resosudarmo (2015) ‘On the distributional impact of a carbon tax in developing countries: the case of Indonesia’, *Environmental Economics and Policy Studies* 17: 1–26.

Appendix: Measurement of poverty incidence and inequality

Headcount measure of poverty incidence

Let y_c represent real expenditure per capita of a household in the *c*-th centile, where *c* = 1, … , *n*. Let the poverty line be y_P, which lies between two levels of real expenditure per capita within *c*, that is, between the largest real expenditure per capita that is still lower than the poverty line, or $max\left\{y_c \mid y_c < y_p\right\}$, and the smallest real expenditure per capita that is above the poverty line, or $min\left\{y_c | y_c > y_p\right\}$. Thus, poverty incidence is calculated as

$$P(y_c, y_p) = max\{c|y_c < y_p\} + \nabla c \quad (1)$$

where: $\nabla c = \frac{y_p - max\{y_c|y_c < y_p\}}{min\{y_c|y_c > y_p\} - max\{y_c|y_c < y_p\}} \cdot (min\{c|y_c > y_p\} - max\{c|y_c < y_p\}).$

The first term in equation 1 is simply the highest centile, where real expenditure per capita is lower than the poverty line, that is, the number of households with real expenditure per capita less than or equal to $max\left\{y_c \mid y_c < y_p\right\}$. The second term is the linear approximation of the number of households with real expenditure per capita above $max\left\{y_c \mid y_c < y_p\right\}$ but still lower than the poverty line.

The change in poverty incidence after a policy shock (simulation) is calculated as

$\Delta P = P(y_c', y_P) - P(y_c, y_P)$, where $y_c' = \left(1 + \frac{\hat{y}_c}{100}\right) \cdot y_c$ and $\hat{y}_c$ is the percentage change in real per capita expenditure of a household of the centile *c* produced from the simulation of the CGE model.

Gini coefficient of inequality

The Gini coefficient is calculated from :

$$G(y_c) = \frac{1}{n}\left(n + 1 - 2\frac{\sum_{c=1}^{n}(n+1-c)y_c}{\sum_{c=1}^{n} y_c}\right).$$

Table 1. Change in poverty incidence and inequality, 1976–96, 2000–08 and 2008–16

Year	Poverty incidence (%)	Inequality (Gini)
1976	**40.1**	**0.346**
1996	11.3	0.365
Annual change, 1976–96	**–1.4**	**0.001**
2000	19.1	0.303
2008	15.4	0.367
Annual change, 2000–08	**–0.5**	**0.008**
2008	15.4	0.367
2016	10.9	0.397
Annual change, 2008–16	**–0.6**	**0.004**

Source: BPS.

Table 2. Nominal rates of protection by sector, 2008 and 2015 (%)

Sector	2008	2015	Change, 2008–15
Food crops	12.5	27.7	15.2
Estate & other crops	–0.3	2.0	2.3
Livestock & their products	0.9	8.8	7.9
Forestry	–4.0	–4.2	–0.2
Fisheries	0.2	0.3	0.1
Oil & gas extraction	0.6	0.1	–0.5
Other mining	–13.1	–22.1	–9.0
Food, beverages & tobacco	3.0	10.6	7.6
Textiles, apparel & leather	0.7	3.7	3.0
Wood products	–0.1	0.6	0.7
Paper products	0.7	1.4	0.7
Chemicals	1.7	3.2	1.5
Oil refining & LNG	0.2	0.4	0.2
Non-metal products	2.0	4.7	2.7
Metals & metal products	3.3	6.7	3.4
Machinery & transport equipment	4.7	7.7	3.0
Other manufacturing	2.1	4.3	2.2

Source: Marks (2017: Table 4).

Table 3. Impact of global protectionism on output by sector (% change)

Sector	%	Sector	%	Sector	%
Water transport	2.32	Root crops	0.17	Rail transport	–0.05
Transport services	1.37	Rice milling	0.15	Other services	–0.06
Other manufacturing	1.10	Paddy	0.15	Finance	–0.10
Hotels & restaurants	0.65	Slaughtering	0.13	Electricity, gas & water	–0.14
Soybeans & other beans	0.60	Rubber plantations	0.12	Basic non-ferrous metals	–0.14
Other estate crops	0.58	Poultry	0.09	Livestock	–0.16
Coffee	0.52	Banking	0.09	Maize	–0.20
Basic ferrous metals	0.50	Other forest products	0.09	Coconut	–0.21
Chemicals	0.47	Coal, metal & other mining	0.07	Beverages	–0.47
Air transport	0.47	Wood	0.07	Tea	–0.58
Machinery	0.44	Metals	0.06	Cloves	–0.78
Transport equipment	0.41	Cement	0.06	Flours	–0.86
Fabricated metal products	0.34	Other agricultural products	0.05	Tobacco	–0.87
Fertilisers & pesticides	0.30	Fuels	0.04	Cigarettes	–1.12
Paper products	0.30	Other mining	0.04	Sugar cane	–1.13
Non-metallic mineral products	0.29	Oil	0.01	Sugar	–1.17
Fuel subsidies	0.29	General government services	0.01	Other food products	–1.22
Wood products	0.27	Natural gas & geothermal	0.01	Textiles, clothing & footwear	–1.45
Rubber & plastics	0.26	Construction	0.00	Oil palm	–1.49
Communications	0.23	Other services	–0.02	Fibre crops	–1.61
Vegetables & fruits	0.23	Social & community services	–0.04	Yarn spinning	–1.61
Other food crops	0.21	Trade	–0.04	Oils & fats	–1.84
Road transport	0.20	Fisheries	–0.05	Food processing	–3.99

Source: Authors' calculations from INDONESIA-E3 model.

Table 4. Impact of Indonesia's protectionism on nominal return to factors of production (% change)

	Food	Minerals	Food+minerals
Agricultural labour	0.885	–0.161	0.722
Unskilled formal labour	0.121	0.188	0.305
Unskilled informal labour	0.229	0.179	0.352
Skilled formal labour	0.273	–0.066	0.205
Skilled informal labour	0.196	–0.066	0.128
Capital	0.179	–0.309	–0.131
Land	0.538	–0.533	–0.005
Memo item:			
Consumer price index	0.551	–0.053	0.496

Table 5. Impact of Indonesia's protectionism on poverty incidence (percentage points)

Sector	Urban	Rural	All
Before policy change	**11.650**	**18.930**	**15.412**
Food	11.729	18.992	15.482
Change	**0.079**	**0.062**	**0.070**
Minerals	11.643	18.942	15.415
Change	**–0.007**	**0.012**	**0.003**
Food+minerals	11.722	19.004	15.485
Change	**0.072**	**0.074**	**0.073**

Source: Authors' calculations from INDONESIA-E3 model.

Source: Authors' calculations from INDONESIA-E3 model.

Table 6. Impact of Indonesia's protectionism on inequality

Sector	Gini coefficient			Top 10%/ bottom 10% (decile dispersion)		Top 10%/ bottom 40% (Palma ratio)	
	Urban	Rural	All	Urban	Rural	Urban	Rural
Before policy change	**0.369**	**0.277**	**0.371**	**7.620**	**3.893**	**1.276**	**0.803**
Food	0.370	0.277	0.372	7.681	3.892	1.288	0.803
Change	**0.001**	**0.000**	**0.001**	**0.062**	**–0.001**	**0.012**	**0.000**
Minerals	0.368	0.277	0.371	7.602	3.889	1.275	0.802
Change	**0.000**	**0.000**	**0.000**	**–0.018**	**–0.004**	**–0.002**	**–0.001**
Food+minerals	0.370	0.277	0.371	7.663	3.888	1.285	0.802
Change	**0.001**	**0.000**	**0.001**	**0.044**	**–0.005**	**0.009**	**–0.001**

Source: Authors' calculations from INDONESIA-E3 model.

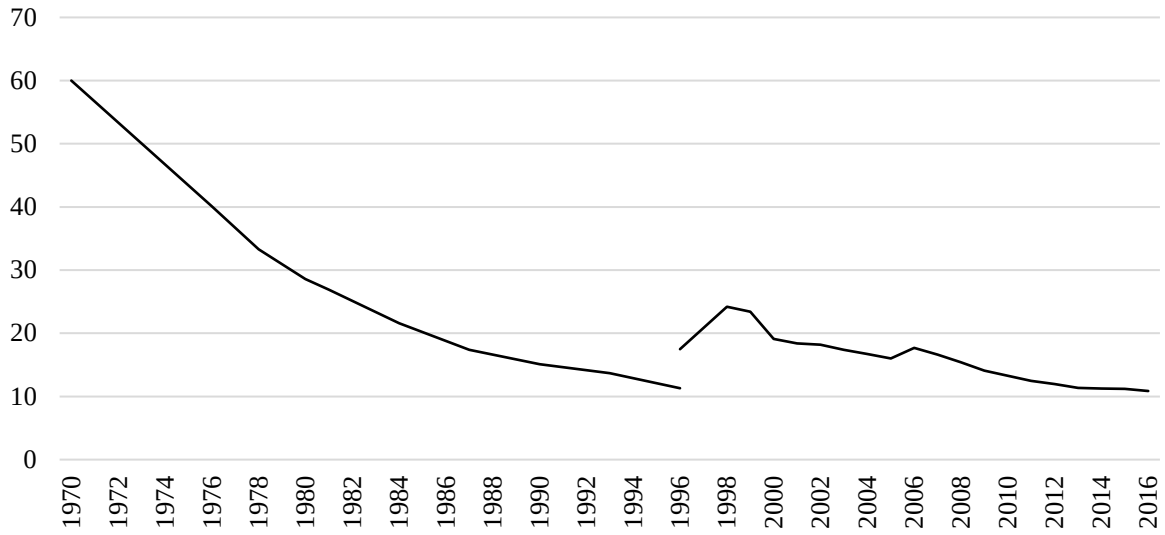

Figure 1. Poverty incidence (% population)

Source: Central Bureau of Statistics, Jakarta.

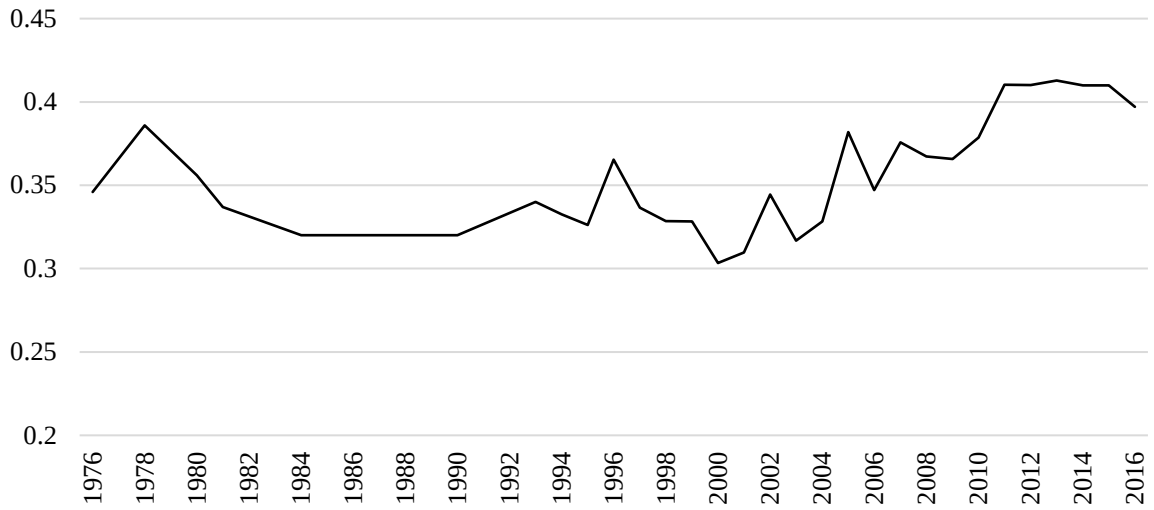

Figure 2. Gini coefficient of inequality

Source: Central Bureau of Statistics, Jakarta.

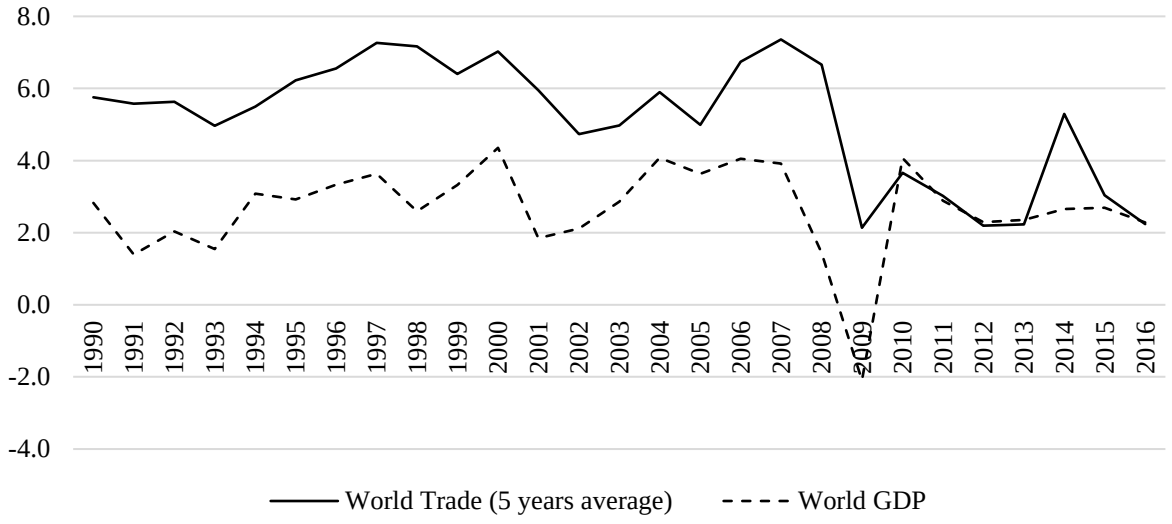

Figure 3. World Trade and GDP Growth (% per year)

Source: World Bank, *World Development Indicators*, various issues.

Figure 4. Trade-to-GDP ratio (%)

Source: World Bank, *World Development Indicators*, various issues.

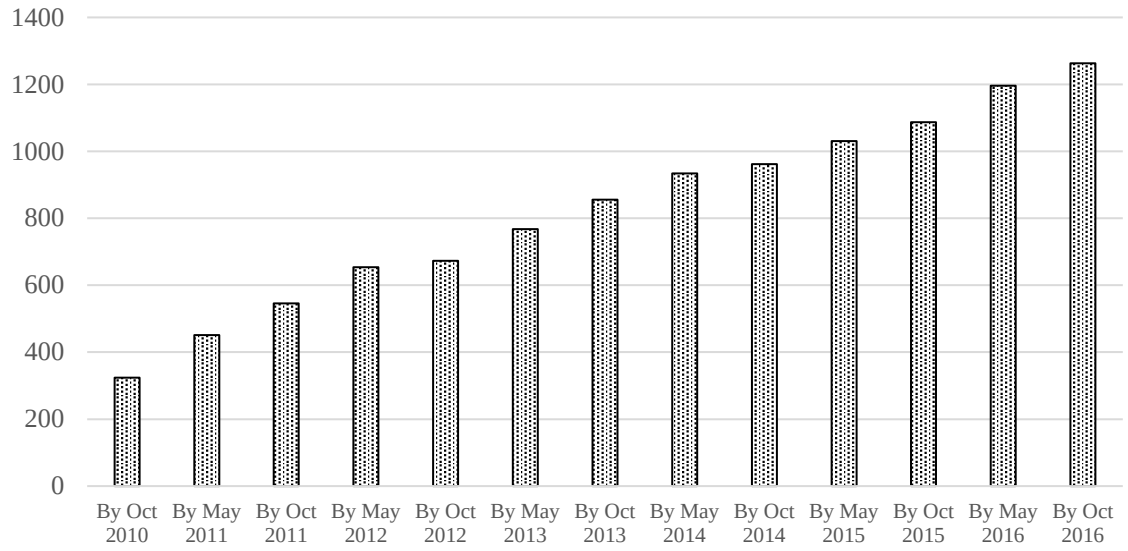

Figure 5. Trade restriction in G20 countries since October 2008

Source: World Trade Organisation (2016)

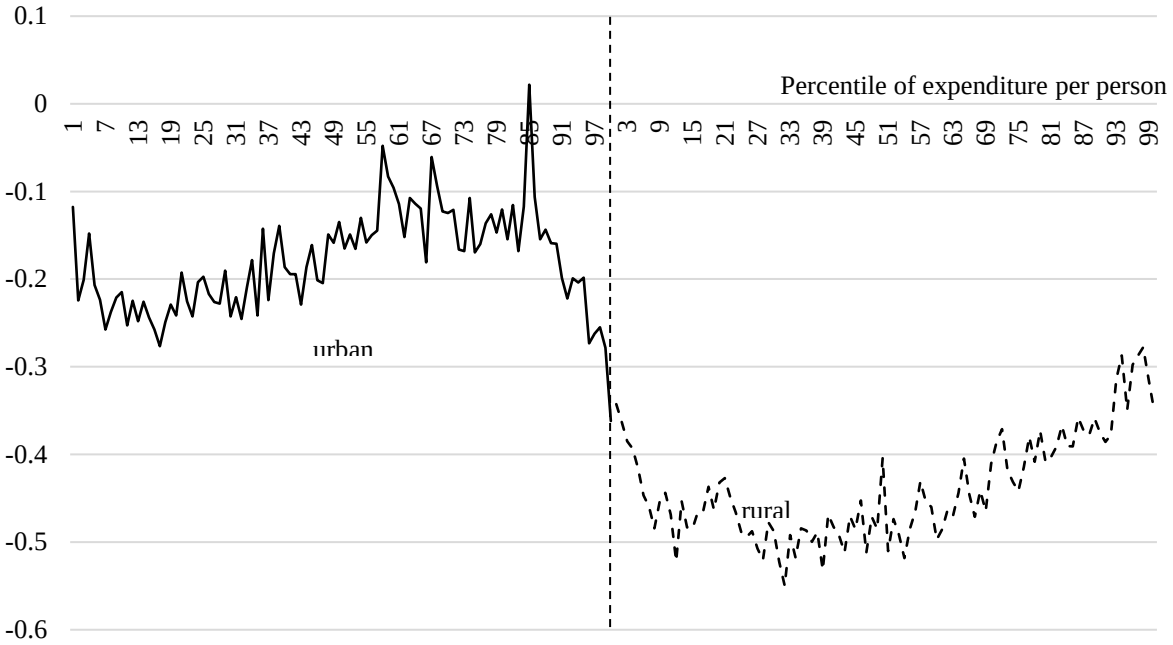

Figure 6. The impact of global protectionism on real expenditure per person (% change)

Source: Authors' calculations from INDONESIA-E3 model.

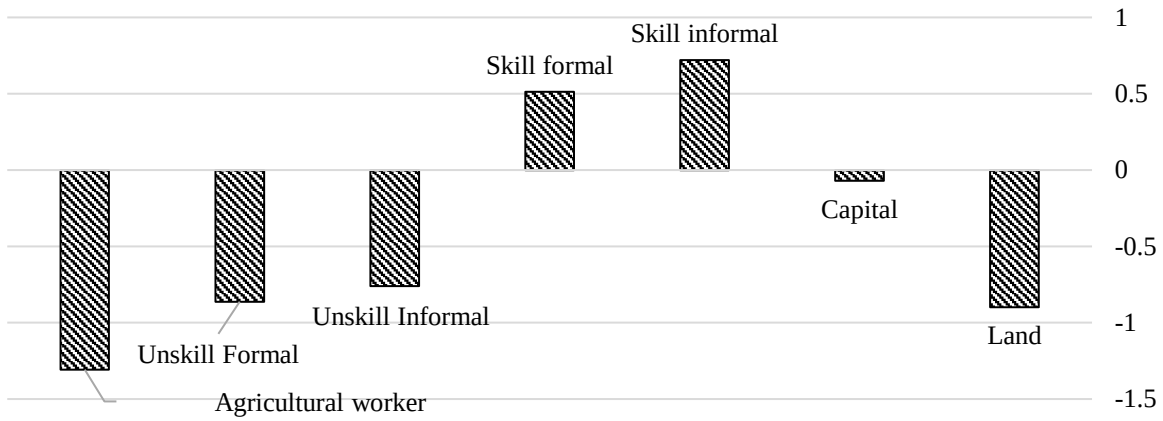

Figure 7. The impact of global protectionism on real return to factors of production (% change)

Source: Authors' calculations from INDONESIA-E3 model.

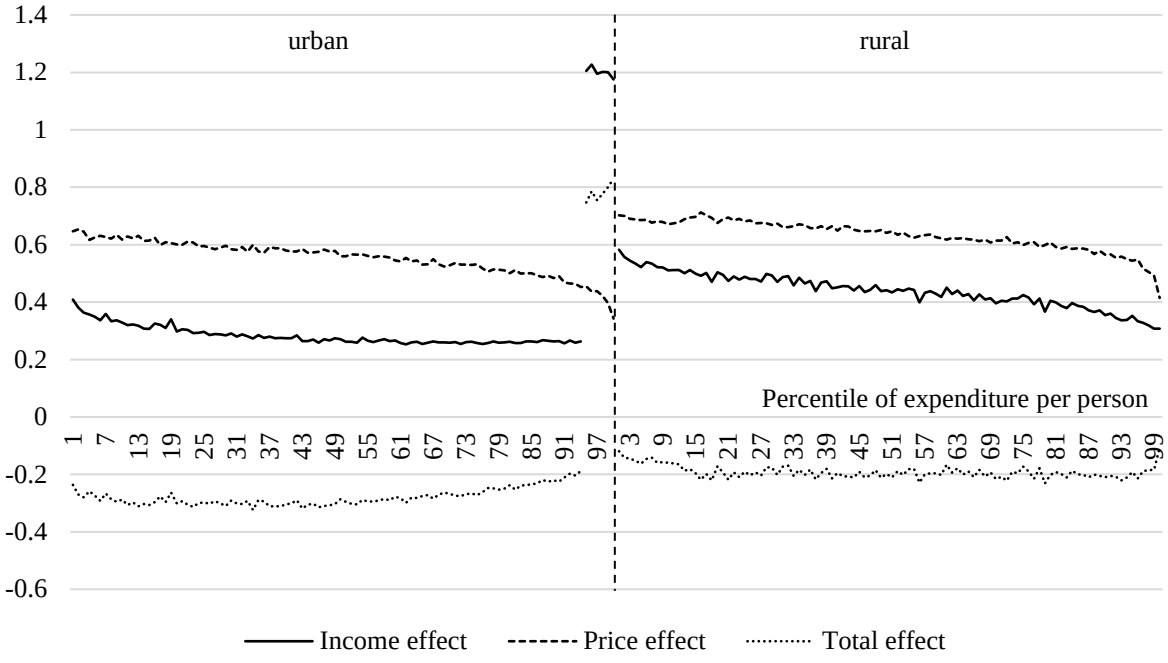

Figure 8. The impact of Indonesia's globalisation-reversal in the food sectors on real expenditure per person (% change)

Source: Authors' calculations from INDONESIA-E3 model.

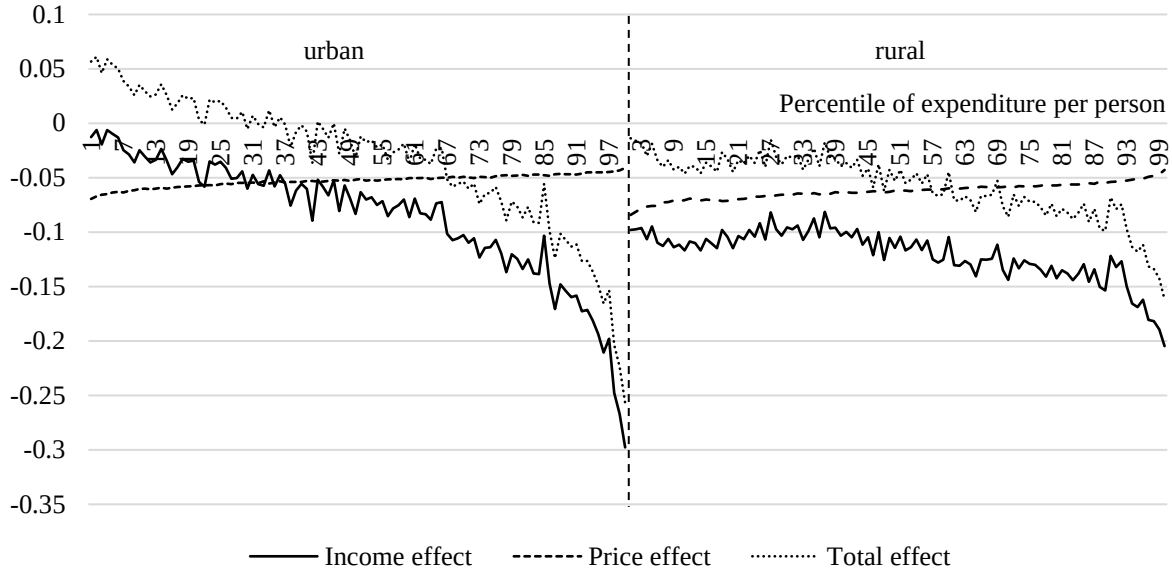

Figure 9. The impact of Indonesia's globalisation-reversal in the mineral sectors on real expenditure per person (% change)

Source: Authors' calculations from INDONESIA-E3 model.

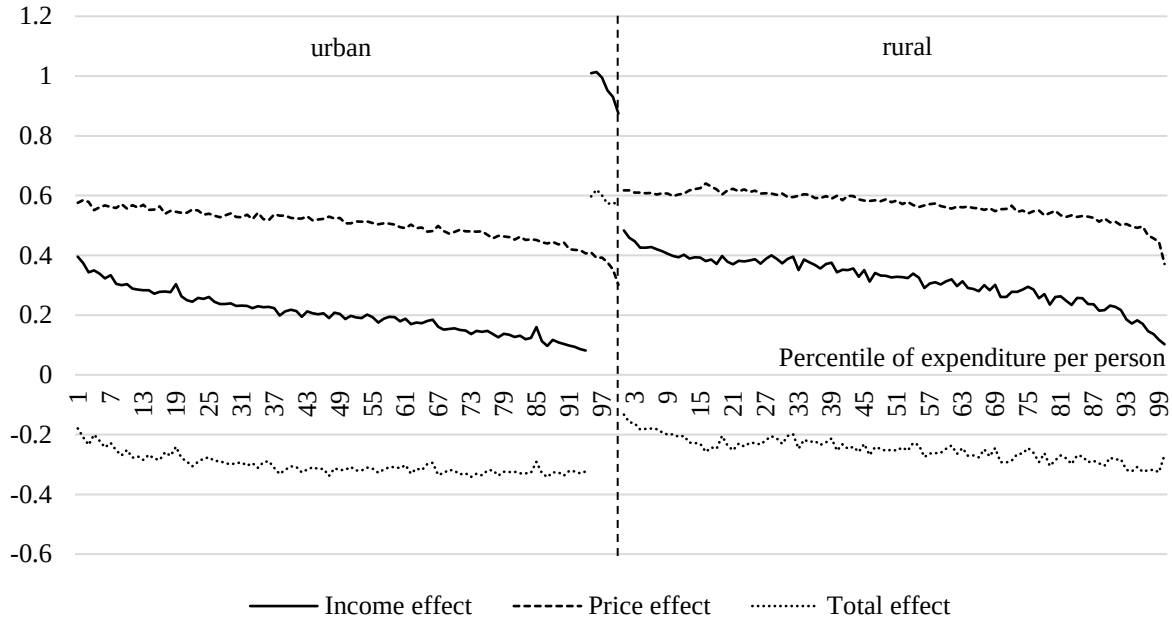

Figure 10. The impact of Indonesia's globalisation-reversal in the food and mineral sectors on real expenditure per person (% change)

Source: Authors' calculations from INDONESIA-E3 model.