Transformation and diversification of the rural economy in Asia

by
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Philippine Institute for Development Studies

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About the author

Roehlano Briones is a Research Fellow at the Philippine Institute for Development Studies. He has authored numerous published research papers and co-edited four books on the economics of agriculture and natural resources, rural development, food security, international trade and the macroeconomy. As a consultant for various donor agencies, he has assisted the governments of Indonesia, Thailand, Viet Nam and other Asian countries, together with regional organizations such as the ASEAN Secretariat. He was lead expert for the preparation of *Rules and Procedures of Release and Replenishment of Rice Reserves* for the ASEAN Plus Three Emergency Rice Reserves (APTERR). Previously, he was an assistant professor at Ateneo de Manila University and the University of the Philippines Los Baños. He obtained his PhD from the University of the Philippines School of Economics in 2000, and carried out postdoctoral research at the WorldFish Center in Penang, Malaysia.

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Abstract

This paper seeks to analyse the transformation and diversification of the rural economy in Asia, focusing on the implications for income and employment opportunities for rural communities. Rural non-farm employment is a sizeable component of rural employment, tends to concentrate in services, and over time has grown more quickly than agricultural employment. Non-farm income accounts for a significant share of rural household incomes.

The indirect contribution of agriculture to GDP is sizeable in relation to its direct contribution; in a growing economy, the ratio of indirect to direct contribution rises over time. Rurally based agroprocessing (typically export-oriented) will be a prominent feature of the non-farm economy in some areas and agricultural value chains. Overall the impact of agricultural growth on non-agricultural sectors is mixed; it is likely, though, that such impact is conditional on other factors, such as location. Spatial development involves the formation of an urban hierarchy with a metropolitan centre linked to intermediate cities, rural towns and villages. For rural areas, proximity to towns and cities boosts non-agricultural activity as well as farming of products that specifically cater to urban demand. In exceptional cases, expansion of the rural non-farm sector will be pioneered by manufacturing, thereby following the pattern of rural industrial clusters in East Asia. On the whole, though, the main pathway for rural non-farm growth in developing Asia is still expansion in non-tradeables (i.e. services).

Strategic directions for rural non-farm development include: (i) widening the outreach of formal rural finance entails integration of some of the features of informal finance; (ii) investment evaluation of agricultural development projects should consider second-order interactions between farm and non-farm activities in both rural and urban areas; and (iii) strengthening urban-rural connectivity involves a comprehensive attempt to influence the location and technology choice over time of both urban and rural enterprises.

This paper suggests a role for a cluster-based industrial policy to further support the rapid expansion of rural non-farm employment. In some areas, this will be composed of rural industries; services will nonetheless continue to comprise the bulk of the rural non-farm economy, drawing its impetus primarily from interaction with existing or emerging urban centres.

Introduction

Aims and scope

Rural areas are typically associated with agricultural activities, while non-agricultural activities seem to congregate naturally in urban centres. Previously neglected in the development literature, the non-agricultural economy in rural areas has been increasingly studied since the 1960s. It is now a mainstream topic in the field, although its role and prospects for sustained growth and poverty reduction are still keenly debated.

Throughout this paper, "rural" describes areas surrounding urban concentrations, covering low-density village settlements as well as smaller towns of intermediate density (Haggblade et al., 2010). This paper seeks to analyse the transformation and diversification of the rural economy in Asia, focusing on its implications for income and employment opportunities of rural communities, based on an extensive literature review.[1] The analysis will assess the role and importance of rural non-farm output and employment in rural transformation and related diversification of employment and income opportunities, with an effort to quantify the importance of the linkages across sectors (agriculture and others) and across regions (urban and rural). Lastly, it will indicate broad strategic thrusts to be pursued to leverage these diversification opportunities for rural economies to reduce rural poverty and inequality.

The analysis is expected to allow a better understanding of the challenges that developing countries in the region face today in terms of the diversification of their rural economy as compared with the 1980s and 1990s, when most of the relevant literature on farm and non-farm linkages, migration and urbanization was developed. Hence this analysis examines how changes in underlying starting conditions such as connectivity, human capital development and demography; institutional arrangements such as decentralization; financial and trade integration; and access to land are affecting developing Asia's prospects for rural transformation and economic diversification.

An approach to the rural non-farm economy and its linkages

In the 1950s and 1960s, an anti-agriculture bias became widespread in development thinking: in this view, agriculture functioned in relative isolation, serving mostly as a sink for surplus labour. Subsequent empirical work, however, found that many workers residing in rural areas were occupied outside the farm, and that agriculture is well integrated with other sectors, in particular with the local non-farm economy. The policy thrust has also moved away from neglect of agriculture to emphasizing agricultural productivity, rural enterprises

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1. The Pacific Island region has already received substantial attention from other IFAD research activities (e.g. the recently completed Pacific Island Strategy) and development partners. The IFAD listing of countries in Asia is as follows: East Asia – China, Democratic People's Republic of Korea, Mongolia, Republic of Korea; Southeast Asia – Cambodia, Indonesia, Lao People's Democratic Republic, Malaysia, Myanmar, Papua New Guinea, Philippines, Thailand, Timor-Leste, Viet Nam; West Asia – Afghanistan, Iran, Pakistan; South Asia – Bangladesh, Bhutan, India, Nepal, Sri Lanka.

and rationalized urban and regional planning. Attention to the rural non-farm economy has arisen from an emerging recognition of the importance of agriculture and rural development (Haggblade, 2007).

The bias against agriculture and the rural economy nevertheless persists in current development thinking and policy (Jones and Corbridge, 2010), although the food price crisis of 2007-2008 has at least partially refocused the spotlight on agriculture (Dethier and Effenberger, 2012). In exaggerated form, this bias suggests the following hypotheses:

- As an economy develops, the contribution of agriculture to output and employment declines, and in the most developed economies its contribution is miniscule.
- Rural non-farm production and employment is an unproductive option for rural households, offering equivalent earnings to traditional agriculture.
- Rural non-farm economic activities face limited prospects for expansion as the market is almost entirely limited to the local economy.

Based on these hypotheses, economic development policy appears justified in paying little attention to agriculture and the rural economy, focusing rather on facilitating urbanization and transition of employment to industry (or services). If, on the other hand, the evidence is inconsistent with these hypotheses, then additional evidence may be adduced to clarify the design of development policies in light of the growth potential of the agricultural and rural economy.

The rest of this paper is organized as follows: the next section provides a general characterization of structural change and of the rural non-farm economy in terms of its income and employment composition; and the third section examines the linkages between agriculture and the rest of the economy in greater depth. The interaction between rural and urban economies is addressed in the fourth section; and the final section discusses policy implications based on evidence reviewed in the previous sections, as well as additional studies on rural development strategies, and draws conclusions.

The rural non-farm economy and employment

The challenge of rural employment

Developing Asian economies have undergone structural transformation, although reduction in the employment share of agriculture continues to lag behind that of its output share.

A stylized fact of structural change is that the share of agriculture in output and employment declines with growth in per capita incomes. Since 1990, per capita incomes have grown at sustained rates on average, led by China, India and Viet Nam, hence employment and output shares of agriculture have been declining throughout Asia (Table 1). The pace of decline, and even directions of change over some intervals, may vary widely. In Pakistan, agriculture share was stagnant despite 1.9 per cent growth since 1990; Cambodia, Nepal and the Philippines underwent rapid contraction in share in the 1990s but the decline slowed down in the 2000s. The output share of agriculture even rose in the 2000s for Malaysia and Thailand – agriculture in the latter had benefited from a massive support programme in the late 2000s and early 2010s. Nonetheless, the overall trend over structural change is unmistakable. The decline in the output share of agriculture has been attributed to non-homothetic preferences that favour non-food spending as income rises (i.e. the Engel effect) (Kongsamut et al., 2001). Capital deepening and Rybcynzki-type effects (Martin and Warr, 1993), as well as differential rates of productivity growth (Ngai and Pissarides, 2007), also drive structural change.

The decline in employment share tends to lag behind that of output share. Figure 1 presents agriculture's output share (as of 2010) and employment share (most recent available year); countries are arranged in descending order of per capita income. Output shares range from 10 to 35 per cent, whereas employment shares are still in the 30 to 70 per cent range. Hence output per agricultural worker is below that of the average worker in every country of Asia. The lag in structural transformation of the employment shares may be due to differences in sector-specific human capital, or sector-specific distortions in the labour market (Buera and Kaboski, 2009).

Moreover, as per capita income declines, output share also tends to rise (reading left to right). Deviations are few – for example, unusually low output shares of agriculture for Indonesia and the Philippines, and especially Bangladesh. However, the relationship of employment shares to per capita income is much more erratic – for instance, China, India and Thailand seem to have agricultural employment shares exceeding what is expected given their relatively high per capita incomes.

Table 1: Per capita gross national income (GNI) and share of agriculture in gross domestic product (GDP) for selected Asian countries, 1990-2014

	Per capita GNI (2011 US$)		Share of agriculture in GDP (per cent)			
	1990	2014	1990	2000	2010	2014
Bangladesh	1 319	3 180	30.2	25.5	17.8	16.1
Bhutan	–	7 181	34.9	27.4	17.5	–
Cambodia	–	2 964	56.5	37.9	36.1	30.5
China	1 520	11 747	27.1	15.1	9.9	9.5
India	1 751	5 379	29.3	23.0	18.2	17.0
Indonesia	4 270	9 725	19.4	15.6	14.3	13.7
Japan	29 775	36 906	2.4	1.6	1.2	–
Lao People's Democratic Republic	–	4 823	61.2	48.5	30.6	24.8
Malaysia	9 772	22 980	15.0	8.3	10.2	9.0
Mongolia	–	10 624	15.2	30.9	13.1	15.6
Nepal	–	2 307	48.4	37.8	35.4	–
Pakistan	3 194	4 869	26.0	25.9	24.3	25.0
Philippines	3 962	7 992	21.9	14.0	12.3	11.3
Republic of Korea	12 064	33 890	8.7	4.4	2.5	2.3
Sri Lanka	3 316	9 177	24.2	17.6	12.8	9.9
Thailand	6 263	13 224	10.0	8.5	10.5	10.5
Viet Nam	1 410	5 092	38.7	24.5	18.9	18.1

Source: WDI.

Figure 1: Share of agriculture in output (2010) and employment (most recent year) (per cent)
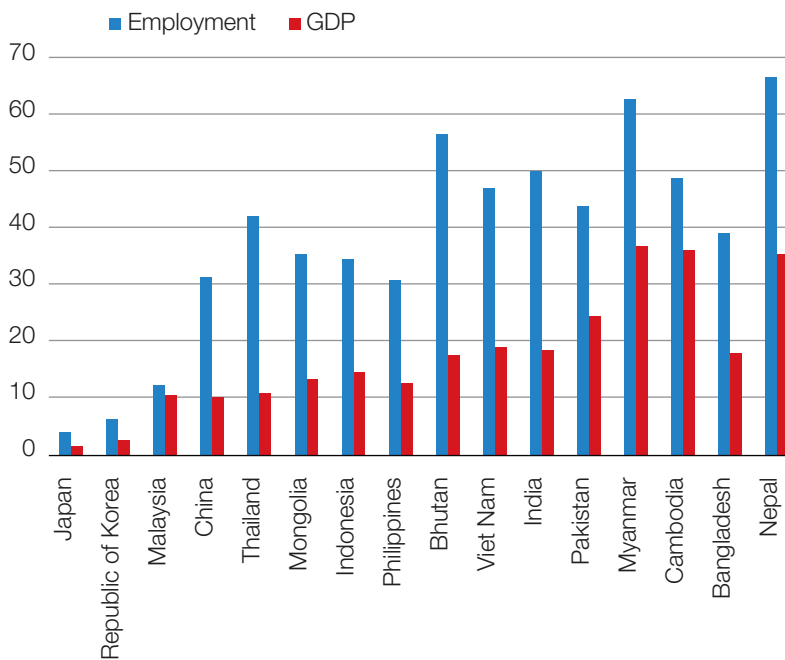
Source: World Bank (2015) for GDP share; FAO (2015) for employment share.

Rural wages have been increasing throughout most of developing Asia, with rural-urban migration as well as growth of manufacturing being the main drivers.

Although labour productivity in agriculture is relatively low, rural wages have recently been increasing in developing Asia (Wiggins and Keats, 2014). In China, daily wages in rural areas have risen by almost 140 per cent since the early 2000s (e.g. from US$3 to US$7.20 for male workers, and from US$2.30 to US$5.50 for female workers). Similar trends are observed for South and Southeast Asia (figure 2), although the changes are less pronounced than in China. The sharpest changes are observed for India and Viet Nam. Meanwhile, the exceptions are Pakistan (real wage decline) and the Philippines (real wage stagnation). Econometric analysis finds the following: the number of rural workers has a negative and most pronounced effect on rural wages, followed by growth of manufacturing output (with a positive effect); agricultural labour productivity has no statistically significant effect on rural wages.

The question is whether rural wages in Pakistan and the Philippines will ultimately turn upward consistent with the experience of the rest of developing Asia; and whether the increase in rural wages will be sustained for the latter countries. As Asia's cities test the limits of their capacity to absorb the millions remaining in the countryside, the rural non-farm economy emerges as the final frontier for rural employment growth.

Figure 2: Rural wages in selected Asian countries, $ per day at constant 2010 prices PPP

(a) SOUTH ASIA

US$

Legend: India, Male • India, Female ■ Nepal ▲ Pakistan ✕ Sri Lanka ✳

(a) SOUTHEAST ASIA

US$

Legend: Indonesia • Myanmar ■ Philippines ▲ Thailand ✕ Viet Nam ✳
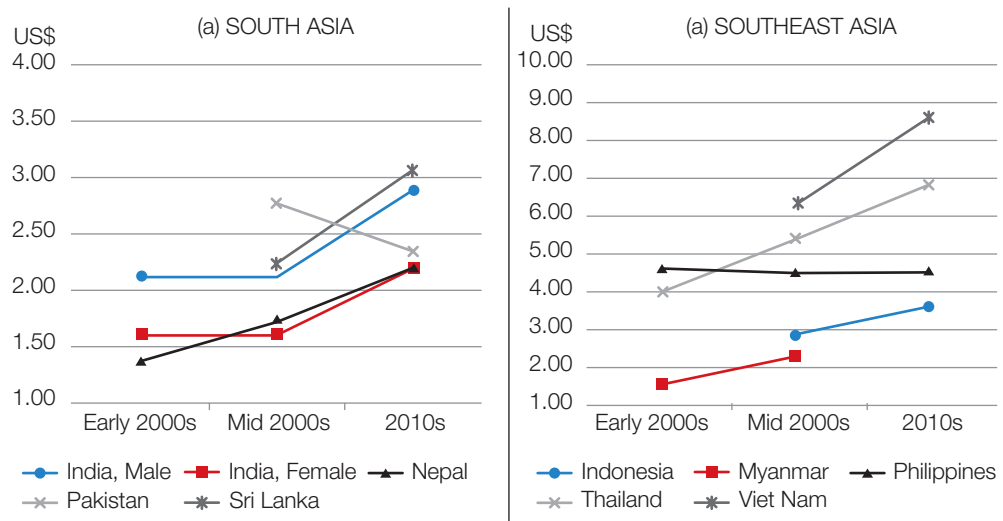
Source: Wiggins and Keats (2014).

Size and composition of non-farm employment and income

Rural non-farm employment is a sizeable component of rural employment, tends to concentrate in services, and over time has grown more quickly than agricultural employment.

The share of non-farm employment in rural employment is roughly about 30 per cent in developing countries (Haggblade et al., 2007).[2] By sector of employment, the biggest share by far is in services, accounting for 56 per cent; commerce and transport alone account for about a quarter of employment (figure 3). Manufacturing is just 22 per cent of rural non-farm employment. Data on employment composition over time are scarce; Hazell et al. (2007) have compiled data for several Asian countries over extended periods, the most recent being for 2001 (table 2). Whereas non-farm employment has been growing consistently relative to agricultural employment, growth of manufacturing employment has not kept pace with overall growth of non-farm employment (although it has grown more quickly than agricultural employment).

The Philippines (together with Bangladesh) has suffered declining rural manufacturing employment as shown in table 2; an update by Balisacan et al. (2012) finds these trends persisting in the 2000s. While the share of non-farm employment has grown consistently over time, manufacturing continues to have a minor (though mostly stable) share of rural non-farm employment.

2. Data pertain to Bangladesh (2003); India (1996); Indonesia (1998); Nepal (1986); Pakistan (2001); Philippines (1986); Republic of Korea (1986); Sri Lanka (1986); Thailand (1996).

Figure 3: Share in rural non-farm employment, selected Asian countries (per cent)

21% Construction, utilities, mining

22% Manufacturing

32% Personal, financial, community services

24% Commerce and transport
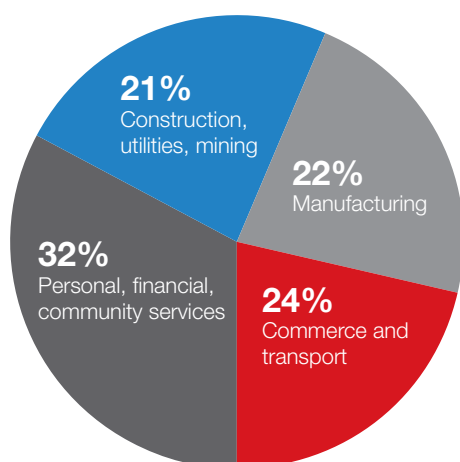
Source: Haggblade, Hazell and Reardon (2007).

Table 2: Annual growth in rural employment, selected Asian countries

Country	Annual growth in rural employment (per cent)			
	Total	Agriculture	Non-farm	Manufacturing
Bangladesh (1991-2001)	0.2	0.1	0.7	-0.2
India (1971-1991)	0.9	0.8	1.3	1.0
Indonesia (1971-1995)	0.7	0.4	1.5	1.1
Pakistan (1981-1998)	-0.2	-0.8	0.9	0.7
Philippines (1970-1990)	0.2	0.4	-0.1	-2.0
Republic of Korea (1970-1980)	-0.1	-0.3	-0.4	1.1
Average (unweighted)	0.3	0.1	0.7	0.3

Source: Hazell et al. (2007).

Non-farm income accounts for a significant share of rural household incomes.

Rural households generate sizeable portions of their income from non-farm activities according to the most recently available data from the Rural Income Generating Activities (RIGA) project (table 3). The share of non-agricultural income ranges from 38 to 65 per cent; the average of the countries listed is 55 per cent, higher than the average for developing countries at 48 per cent.[3]

Within Asia, in three sample countries (Bangladesh, Indonesia and Pakistan) out of the five, the majority share of income is from non-farm sources; for Nepal, half of income is derived from non-farm sources. Among the non-agricultural sources, wage employment accounts for a similar share of income as transfers and others (20 per cent), whereas self-employment is a smaller contributor. The composition varies widely even within the limited sample of countries – Viet Nam has a large share of self-employment income relative to the rest, whereas Pakistan relies mostly on non-agricultural wage employment.

Meanwhile, transfers and others loom large in Bangladesh and Indonesia. The impact of remittances may also be hypothesized as significant in the other countries (except Viet Nam). However, the relationship between remittances and agricultural activity is ambiguous. For instance, more remittances may raise rural wages and make agriculture less competitive; on the other hand, remittances may relieve cash and financing constraints of farm households, thereby supporting farm production.

Higher-expenditure quintiles have higher participation rates in rural non-farm employment, but lower participation rates in agricultural wage employment.

Distributional patterns also show the remuneration potential of the sector. Table 4 shows the participation rates of rural households in the various types of employment, based on RIGA. Among the types of employment, participation is highest for farm self-employment and, among the non-farm categories, for transfers and others. For these categories, there is no clear pattern of change across the expenditure quintiles. However, in the case of agricultural wage labour, it is clear that poorer households will tend to have higher participation rates. In contrast to agricultural wage employment, non-farm employment does not appear to function as an occupation of last resort.

Table 3: Shares in rural household income, selected Asian countries

Source	Share in rural household income (per cent)				
	Bangladesh 2000	Nepal 2003	Viet Nam 1998	Pakistan 2001	Indonesia 2000
Agricultural	36.9	50.6	62.2	41.4	35.5
Non-agricultural	63.1	49.4	37.8	58.6	64.5
Wage	19.9	21.1	9.2	28.8	20.3
Self-employment	16.4	9.2	21.2	10.7	17.6
Transfers and others	26.8	19.2	7.3	19.1	26.5

Source: Davis et al. 2009.

3. Other countries in the sample were: Albania, Bulgaria, Ecuador, Ghana, Guatemala, Madagascar, Malawi, Nicaragua, Nigeria, Panama, Tajikistan.

Table 4: Employment participation rate, rural households, selected Asian countries

Country/quintile	Employment participation rate (per cent)				
	Farm	Wage, agricultural	Wage, non-agricultural	Non-farm enterprise	Transfers and others
Bangladesh 2000					
First	76.7	58.0	29.3	18.2	68.2
Second	80.6	44.6	31.5	23.3	70.2
Third	85.8	35.6	31.0	27.2	73.4
Fourth	82.1	24.3	33.3	27.6	76.4
Fifth	84.8	13.8	34.4	32.0	84.5
All households	**82.0**	**35.3**	**31.9**	**25.7**	**74.5**
Indonesia 1993					
First	63.2	26.6	20.2	22.9	64.6
Second	65.0	24.4	22.1	28.7	70.4
Third	61.4	19.3	27.5	27.5	73.5
Fourth	56.3	16.9	31.4	32.7	79.8
Fifth	61.1	11.8	29.9	40.1	80.8
Total	**61.4**	**19.8**	**26.2**	**30.4**	**73.8**
Indonesia 2000					
First	58.0	28.8	29.6	23.9	85.6
Second	62.3	23.0	31.1	31.4	88.8
Third	56.0	20.2	31.8	32.1	89.0
Fourth	50.9	15.1	32.4	36.8	87.9
Fifth	44.7	9.5	34.0	39.3	83.8
Total	**54.4**	**19.3**	**31.8**	**32.7**	**87.0**
Nepal 1996					
First	89.2	57.4	19.9	15.9	24.4
Second	93.7	51.3	19.9	19.9	26.5
Third	93.9	46.1	18.2	19.8	30.5
Fourth	94.0	33.8	21.6	22.0	33.1
Fifth	92.8	18.9	26.5	23.0	41.0
Total	**92.7**	**41.5**	**21.2**	**20.1**	**31.1**
Viet Nam 1992					
First	96.1	11.6	10.7	27.7	40.2
Second	97.3	16.5	17.0	34.3	36.9
Third	96.9	16.3	22.8	38.3	36.9
Fourth	97.1	17.8	28.4	50.0	38.1
Fifth	93.3	13.8	30.4	54.3	38.6
Total	**96.1**	**15.2**	**21.9**	**40.9**	**38.1**
Viet Nam 1998					
First	98.6	24.9	28.0	29.5	42.8
Second	99.4	24.1	31.2	32.0	47.0
Third	98.5	21.1	33.0	40.5	48.3
Fourth	98.7	17.1	35.3	40.2	50.3
Fifth	97.2	13.0	30.9	45.7	52.4
Total	**98.5**	**20.0**	**31.7**	**37.6**	**48.2**

Source: Carletto et al. (2007).

Likewise, a clear pattern emerges for rural non-farm employment, though in the reverse direction: higher-expenditure quintiles have higher participation rates in either non-farm wage or non-farm enterprise employment. Patterns over time, however, are unclear: for example, non-farm employment participation is rising in the case of Indonesia, but not for Viet Nam. Little can be concluded given the few countries and short time intervals in the sample.

As size of owned land decreases, dependence on non-farm income and agricultural wage income increases.

Table 5 provides another disaggregation from the RIGA database, this time of rural household income by land ownership quintile. Dependence on farm income is lower for lower-quintile households; surprisingly, increased farmland ownership is not associated with greater reliance on the more asset-based sources of income, such as income from enterprises. The exception is Bangladesh for transfers and remittances. Clearly, households with greater wealth as measured by land ownership will tend to specialize increasingly in farming.

Rural non-farm activities span a wide range of activities, with varying linkages to local and agricultural demand.

Early theorizing by Hymer and Resnick (1969) posited non-farm production – referred to as "Z-goods" – as limited to purely local demand, for home or village consumption. Poor livelihood prospects in agriculture leads to a "distress push" to rural non-farm activities. As the village economy develops, households increasingly specialize (i.e. in farming), while replacing Z-goods with purchases of market goods produced outside the village.

In fact, subsequent empirical work on the rural non-farm economy has failed to confirm the Hymer-Resnick prediction. Kijima and Lanjouw (2005), using data for India (years 1987, 1993 and 1999), are able to disaggregate non-farm employment into regular, casual and self-employed. Casual employment – the stereotypical form of non-farm employment – has a similar share to regular non-farm employment; the biggest category of non-farm employment turns out to be self-employment.

Significant forms of rural non-farm activity are neither limited by local markets nor a last resort in response to distress (Ranis and Stewart 1993). There are significant instances in which local manufacturing catering to external demand has increased rural wages. For instance, the rattan industry in Cirebon district in the island of Java, Indonesia grew rapidly in the 1990s, driven by the export market (93 per cent of output is now for export). Due to high local employment (in 2000 over 50,000 workers were in rattan production), agricultural wages grew to 20,000 Rp per day, compared with just 12,000 Rp per day just a few years previously; many farmers in the area were compelled to mechanize as a result of rising wages (SMERU Research Institute, 2003).

Even non-local services can be a source of rural non-farm income. For instance, the recent drive to replace fossil fuels has created a non-traditional market for rural-based energy sources such as solar energy (IFAD, 2011). Households can receive income from urban-based services through remittances or rural-urban commuting (Haggblade, Hazell, and Reardon, 2010). The rural-urban interaction is discussed further in the fourth section, "Towards a strategy for the development of the rural non-farm economy."

Table 5: Share in rural household income by source and land ownership quintile

Country/category	Share in household income (per cent)				
	On-farm, total	Wage labour		Non-farm enterprise	Transfers and others
		Agriculture	Non-agriculture		
Bangladesh 2000					
Landless	4.2	27.6	25.1	18.7	24.4
First quintile	14.5	24.4	18.3	17.0	25.8
Second quintile	26.3	18.1	15.1	13.7	26.8
Third quintile	33.4	10.6	14.8	13.3	27.8
Fourth quintile	40.6	4.9	10.7	13.5	30.3
Fifth quintile	42.8	2.3	11.6	12.1	31.2
All households	**17.6**	**20.0**	**19.7**	**16.3**	**26.3**
Indonesia 2000					
Landless quintile	8.4	12.7	26.6	20.8	31.3
First quintile	41.5	6.4	14.2	14.5	23.3
Second quintile	43.6	6.2	15.1	13.8	21.4
Third quintile	50.4	6.4	10.4	14.0	18.9
Fourth quintile	54.5	5.2	10.6	10.7	19.1
Fifth quintile	51.4	4.3	10.5	14.7	19.1
All households	**25.8**	**9.7**	**20.3**	**17.6**	**26.5**
Nepal 1996					
Landless	19.6	42.3	10.6	16.1	11.4
First quintile	42.8	25.0	11.1	8.3	12.8
Second quintile	45.9	18.3	11.2	10.7	13.9
Third quintile	55	14.2	14.4	6.9	9.5
Fourth quintile	66.8	8.9	9.4	7.0	7.9
Fifth quintile	73.4	5.3	9.1	5.7	6.5
All households	**49.5**	**19.9**	**10.9**	**9.4**	**10.3**
Pakistan 2001					
Landless	20.4	11.0	35.5	13.2	20.0
First quintile	52.2	5.2	15.3	6.1	21.3
Second quintile	61.2	2.5	14.2	5.7	16.5
Third quintile	67.6	3.0	10.5	5.2	13.7
Fourth quintile	76	2.3	8.2	3.1	10.3
Fifth quintile	74.3	1.0	6.7	2.5	14.8
All households	**35.4**	**8.3**	**27.5**	**10.3**	**18.5**
Viet Nam 1998					
Landless	17.3	16.2	15.8	36.5	14.3
First quintile	58.9	2.4	9.4	21.4	7.8
Second quintile	62.3	2.9	8.1	19.4	7.2
Third quintile	62.9	5.2	7.3	18.0	6.7
Fourth quintile	62.2	6.6	7.9	18.7	4.6
Fifth quintile	69.2	6.0	5.3	15.2	4.2
All households	**58.3**	**5.6**	**8.5**	**20.5**	**7.1**

Source: Carletto et al. (2007).

Women's participation rates in rural non-farm work are lower than men's and tend to concentrate in manufacturing, trade and other services.

Rosegrant and Hazell (2000) summarize figures from the 1980s and 1990s by sex and sector of employment. For rural areas in Asia, they find the following:

- Men exhibit higher employment shares for construction and transport.
- Women tend to be found in trade, services and finance. Female participation in manufacturing and trade exceeds that of males in all cases.
- For both sexes, the share of trade is highest; the share of women in trade tends to be higher than for men, except for Bangladesh and India.

More recent data with gender breakdown are more difficult to find. In 2009, 48.2 per cent of female workers were in agriculture, compared with only 38.9 per cent of male workers (ILO and ADB 2011). In a special case of garment villages in Bangladesh, Heath and Mobarak (2015) estimate the share of garment workers who are female at 54.1 per cent; in non-garment villages, only 14.4 per cent of workers are female.

Shares over time are available for rural areas of Maharashtra State in India (Misra, 2014). The share of female workers in non-farm employment is declining slightly over time (table 6); that of men, however, is rising, together with overall share for both sexes.

Table 6: Shares in non-agricultural employment of rural workers, by sector

Sector	Rural workers' share of employment (per cent)			
	1993-1994	1999-2000	2004-2005	2009-2010
All workers	**17.4**	**17.4**	**20.1**	**20.6**
Male workers	**24.8**	**26.2**	**28.6**	**29.1**
Shares of total male workers in:				
Mining and quarrying	2.0	0.8	1.4	1.7
Manufacturing	26.6	26.7	26.6	21.6
Electricity, gas and water	1.2	1.5	0.7	1.0
Construction	13.7	13.0	14.7	19.2
Trade, hotels and restaurants	18.1	21.8	23.1	23.7
Transport and communication	7.7	12.2	14.0	13.1
Finance	2.8	2.3	2.8	3.1
Public administration, community services, etc.	27.8	21.8	16.8	16.5
Female workers	**8.8**	**6.1**	**9.4**	**7.8**
Shares of total female workers in:				
Mining and quarrying	2.3	1.6	1.1	1.3
Manufacturing	34.1	36.1	33.0	26.9
Electricity, gas and water	-	0.0	0.0	0.0
Construction	13.6	14.8	13.8	15.4
Trade, hotels and restaurants	20.5	21.3	24.5	26.9
Transport and communication	1.1	0.0	1.1	0.0
Finance	1.1	0.0	1.1	0.0
Public administration, community services, etc.	27.3	26.2	25.5	29.5

Source: Misra (2014).

Female workers show much lower participation rates in non-farm employment. They concentrate in manufacturing, trade and other services; employment shares of females for these sectors are rising over time, except for manufacturing. Male workers, in contrast, exhibit higher shares than female workers for transport and communication.

Households with better-educated workers have higher participation in rural non-farm employment.

The statistical association between non-farm employment and higher levels of education is positive and strong – Lanjouw (2007) characterizes it as a "robust stylized fact." In rural India, as of 2004-2005, participation in non-farm employment is rising with level of schooling, from primary to secondary, and from secondary to higher (Kaur et al., 2011). Similarly, in a Himalayan region in the States of Sikkim and West Bengal, which is largely agrarian, household survey data for 2004 reveal a very high share of non-farm income (60 per cent). A key determinant of participation in the more remunerative non-farm activities is education; nonetheless, even small increments in education are enough to improve employment prospects in the non-farm sector (Micevska and Rahut, 2008). The effect appears to go beyond simple correlation: probit regression on data from rural Viet Nam (as of 2006) and India (as of 2004-2005) shows that the probability of participating in non-farm employment is greater for workers with secondary schooling or higher, compared with those who had received only primary schooling (Imai et al., 2015).

Membership in a socially disadvantaged group and rural non-farm employment

Participation in rural non-farm employment tends to be lower for socially disadvantaged groups.

In India, scheduled castes/scheduled tribes (SC/ST) pertain to socially disadvantaged groups in society. These groups have exhibited greater participation in agricultural employment and casual non-farm employment compared with non-SC/ST members. The participation rates of SC/ST members in regular non-farm employment is conversely lower (Lanjouw and Murgai, 2008). Another study for India and Viet Nam also examines the impact of membership in SC/ST and ethnic majorities, respectively, using econometric regression (Imai et al., 2015). In India, membership in socially disadvantaged groups tends to reduce participation in non-farm employment, whereas in Viet Nam, membership in an ethnic majority group favours participation in non-farm employment. Hence, in rural areas, non-farm employment offers relatively high-income opportunities; however, access to these opportunities for disadvantaged groups is problematic. The net effect of participation on poverty and equity is unclear a priori, hence evidence on the direction of impact is reviewed in the following.

Poverty and equity impact of rural non-farm employment

Rural non-farm employment has tended to reduce poverty and income inequality.

Despite more limited access to non-farm employment for disadvantaged groups, the net effect of such employment for poverty and equity is positive. In rural Pakistan, a decomposition analysis of farm and non-farm income sources shows the size distribution of the latter as being inequality-decreasing (Adams, 1994). For a province of China in 1996, an econometric model is estimated to enable counterfactual simulation of rural household incomes, and thereby poverty and inequality, in the absence of access to non-farm sources of income. Given such absence, poverty and income inequality is estimated to be much higher and deeper (de Janvry et al., 2005).

In the case of India, several rounds of National Sample Surveys (the latest in 2004-2005) have been subjected to econometric estimation to verify the poverty and equity impacts of rural non-farm employment (Lanjouw and Murgai, 2008). Estimates reveal that expansion of the non-farm sector lead to a decline in poverty. Impact is transmitted through both a direct channel (employment expansion being pro-poor at the margin) and an indirect channel (from non-farm employment growth to agricultural wages). This favourable finding for India is reinforced by Himanshu et al. (2013), in a study that homes in on a specific village in Uttar Pradesh. As of 2008-2009, continued expansion of the non-farm sector is directly and strongly engaging the poor.

Rural non-farm employment and shocks

Rural non-farm employment serves as a safety net for rural households facing adverse shocks. Migrant remittances, followed by rural-urban migration, are important coping mechanisms.

An important property of agriculture and farm households is proneness to adverse shocks; non-farm employment may serve as a safety net in the face of such shocks. Gröger and Zylberberg (2016) examine coping strategies in rural Viet Nam following the onslaught of typhoon Ketsana. Households suffered a 10 per cent drop in average annual income per capita due to the typhoon. Migrant income was the main coping mechanism of disaster-stricken households; most of the cushioning effect was contributed by migrants already in place before the disaster. Only 17 per cent of non-migrant households were able to send members to urban areas after the typhoon.

The more remote source of remittance is overseas (rather than nearby rural towns); a study in the Philippines found that, for a given fall in household income, roughly 60 per cent was replaced by increased remittance inflows from abroad. The insurance effect of foreign remittances was so large that consumption of households remained basically unchanged despite shocks to farm income due to rainfall variability (Yang and Choi 2007).

More generally, participation in non-farm employment significantly reduces household vulnerability (as measured by a vulnerability index). The effect is obtained from data for rural Viet Nam and India, analysed under a treatment-effects model that controls for selection bias (Imai et al., 2015). Access to more skilled employment tends to have larger vulnerability-reducing effects, i.e. employment in "sales", as "professionals/clerks", and in "production"; on the other hand, "unskilled/manual" employment increased vulnerability in Viet Nam (in 2004 and 2006), but reduced vulnerability in India.

Characteristics of rural non-farm enterprises

Thus far, discussion has revolved around rural households and workers. Enterprise-level data for rural areas are relatively scarce, although there is a considerable literature on micro, small and medium-size enterprises (MSMEs) in Asia. Many of the traits of MSMEs in general are also characteristics of rural MSMEs.

A sizeable share of workers are employed on their own account in microenterprises.

As of 2009, more than 30 per cent of all non-agricultural workers are self-employed in Bangladesh, India, Indonesia, Pakistan, the Philippines and Thailand; of these, more than 90 per cent are "own-account" workers (as opposed to "employers"); that is, working in owned or family-owned microenterprises (ADB, 2009).

Rural non-farm enterprises are mostly microenterprises engaged in services and trade.

Across very diverse economic contexts (Indonesia, Pakistan and Sri Lanka), some patterns emerge among rural enterprise indicators (table 7). One is average firm size (between two and three workers): the overwhelming majority are microenterprises (80 per cent having two or fewer workers), and the majority are engaged in services and trade (60 to 90 per cent).

Most rural enterprises remain diminutive, unregistered and focused on the local market; a small minority are able to expand.

Again for rural Indonesia, only 2.1 per cent of enterprises are registered; given that the bulk are in trade and services, it is easy to see why close to 80 per cent are supplied within the same subdistrict (Kecamatan). Even for enterprises involved in production, 75 per cent are consumed in the same district (Kabupaten).

Few small enterprises in developing countries experience growth (Mead and Liedholm 1998). Data specific to Asia are scarce; for Mexico, it was found that only 12 per cent of owner-only firms are able to expand to hire more workers. Nonetheless, the share of firms that go out of business declines with firm size (from 35 per cent for owner-only to 22 per cent for the largest firm size category). Conditional on survival, growth in number of workers is positively related to net enterprise income, owner's education, age bracket (up to 36-50 years old), and being married (Fajnzylber, Maloney and Rojas 2006).

Table 7: Indicators for rural non-farm enterprises

Indicator	Sri Lanka 2004	Pakistan 2005	Indonesia 2006
Average number of workers	2.40	2.03	2.06
Share with two or fewer workers (per cent)	81	80	–
Proportion engaged in services and trade (per cent)	59	89	80

Sources: World Bank (2006); Deininger (2007); Sur, Zhang and Chen (2014).

The rural non-farm economy and the agrifood sector

Trends in agro-industrial output

Agriculture and agribusiness combine for a prominent share of output in developing economies; agribusiness can maintain a significant share of GDP for developed economies.

Previously we have shown that agriculture's share in GDP has been declining for most of developing Asia, and is now below 20 per cent (with a few exceptions including Cambodia, Lao People's Democratic Republic, Myanmar and Pakistan). However, with the inclusion of "agribusiness" (i.e. the sectors that provide agricultural inputs, and handle, process, transport, market and distribute food and other agro-based products), the shares in GDP are much larger (figure 4). In Asian countries for which data are available, agribusinesses share in GDP is larger than that of agriculture – as much as quadruple in the case of Thailand. The combined agriculture and agribusiness share in GDP ranges from 27 to 54 per cent; the lower end is similar to the 30 per cent combined agriculture and agro-industry shares in Latin American countries in 1997 (de Ferranti et al. 2005). The large share of agribusiness persists in higher-income countries such as Brazil and the United States (of America); on the other hand, for low-income countries where agriculture is still a major contributor in GDP, such as those in sub-Saharan Africa, the share of agribusiness may still be smaller than that of agriculture.

Figure 4: Shares in GDP, selected countries (per cent)
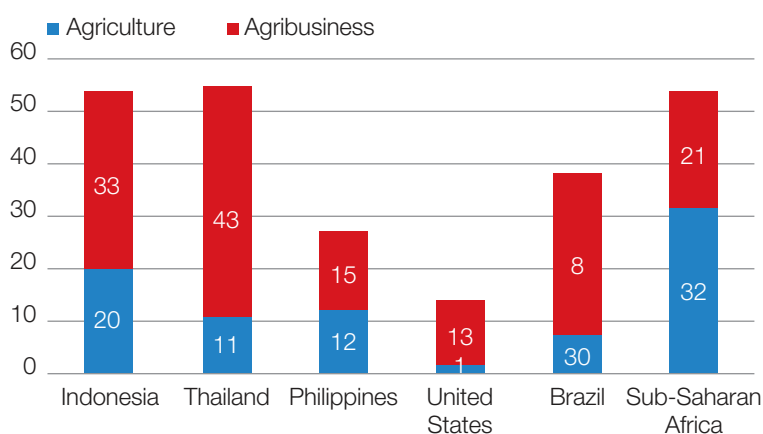
Note: Data for Brazil, Indonesia, Thailand, the United States (of America) and sub-Saharan Africa are for the late 1990s; data for the Philippines are for 2012.
Sources: Philippines, Balisacan et al. (2012); other countries, Jaffee et al. (2003).

The importance of the agroprocessing sector tends to rise with per capita income.

Based on two-digit level of industry classification, industry (for which manufacturing is the largest component) has been gaining as a share in GDP for selected Asian countries (table 8). Food and beverages – the subsector more obviously linked to agriculture – has tended to increase its share in manufacturing output over time. In India, despite the declining share of food and beverages in manufacturing, its share in output probably increased due to the rising overall share of industry in GDP. Note that the rest of the agriculture-based sector exhibits no universal tendency towards expansion over time; unfortunately, any relationship will be confounded by the heterogeneity of agricultural linkages of these apparently related sectors (tobacco products; textiles; wearing apparel and fur; leather, leather products and footwear; and wood products).

Table 8: Output shares of agri-based and industry sectors over time, in per cent

Region/country	Output shares of agri-based and industry sectors (per cent)		
	Food and beverages, share in manufacturing	Other agri-based sectors, share in manufacturing	Industry, share in GDP
East and Southeast Asia			
China (2000)	9.3	14.7	45.9
China (2011)	9.6	9.8	46.4
Indonesia (2000)	14.0	28.1	45.9
Indonesia (2011)	25.2	16.4	44.8
Malaysia (2000)	10.8	6.4	46.8
Malaysia (2011)	18.8	3.6	40.2
Philippines (2001)	20.4	8.3	34.5
Philippines (2010)	22.9	4.1	31.7
Thailand (2000)	9.3	14.7	36.8
Thailand (2011)	18.5	7.5	38.1
Average (2000)	**12.8**	**14.4**	**42.0**
Average (2011)	**19.0**	**8.3**	**40.2**
South Asia			
India (2000)	16.4	14.6	26.0
India (2011)	13.5	8.3	33.1
Nepal (2001)	36.0	23.6	17.3
Nepal (2011)	36.0	12.2	14.9
Pakistan (2001)	17.8	40.5	23.3
Pakistan (2006)	21.4	33.5	21.2
Sri Lanka (2000)	25.9	34.4	29.9
Sri Lanka (2011)	30.9	31.2	29.9
Average (2000)	**24.0**	**23.3**	**24.1**
Average (2011)	**25.5**	**21.3**	**24.8**

Note: "Industry" denotes manufacturing; mining and quarrying; electricity, gas, steam and air conditioning supply; water supply, sewerage, waste management and remediation activities; and construction.

Sources: Basic data on manufacturing output from UNIDO; shares in GDP from ADB (2015a).

Direct and indirect contribution of agriculture

The indirect contribution of agriculture to GDP is sizeable in relation to its direct contribution; in a growing economy, the ratio of indirect to direct contribution rises over time.

Input-output analysis is one way to quantify linkages with agriculture more accurately. The indirect contribution of agriculture takes the form of backward and forward production linkages to non-agricultural activities. The former refers to the output of other sectors that are allocated to agriculture, that is, non-agricultural contribution to agriculture expressed in value added. The latter refers to agricultural output that is allocated to other sectors, that is, agriculture's contribution to non-agricultural sectors expressed in value added. Indirect contribution is computed as in the formulas of Anriquez and Stamoulis (2007) and de Ferranti et al. (2005) (see Annex).

The World Input-Output Database allows for this type of analysis for three Asian countries – China, India and Indonesia – from 1995 to 2011. Results are shown in table 9. Agriculture starts out with a sizeable share in GDP for India and even China in 1995, although its share was already down to 15 per cent in Indonesia. The share in GDP of "expanded agriculture" (i.e. including indirect contributions) is larger by 3.7 percentage points in Indonesia, and up to 7.4 percentage points in China, compared with primary agriculture.

Over time, the share of primary agriculture falls, with the steepest decline in China (almost 10 percentage points). In the case of Indonesia the share of expanded agriculture increases its share in GDP; however, in both China and India the share of expanded agriculture falls steeply. Nonetheless, the size of the indirect contribution relative to the direct contribution is increasing across all three countries; this suggests that the character of agriculture's contribution to the economy is evolving from mostly direct to mostly indirect. The fastest increase in this ratio is in Indonesia, while the slowest is in India.

Table 9: Share of agriculture in GDP 1995-2011

Country/contribution	Share of agriculture in GDP (per cent)			
	1995	2000	2005	2011
China				
Agriculture	20.0	15.1	12.1	10.1
Expanded agriculture	27.4	21.6	18.5	15.7
Indirect/direct contribution	0.37	0.44	0.53	0.55
India				
Agriculture	25.7	22.7	18.6	16.6
Expanded agriculture	29.4	25.9	21.7	19.1
Indirect/direct contribution	0.14	0.14	0.17	0.16
Indonesia				
Agriculture	15.4	16.3	13.1	14.7
Expanded agriculture	22.6	25.1	22.3	25.9
Indirect/direct contribution	0.47	0.54	0.70	0.76

Source of basic data: WIOD (2015); also see Timmer et al. (2015).

Farm-driven linkages and the development of agrifood supply chains

Consumption patterns are a key driver in structural change and agrifood expansion.

Changing consumption patterns are fundamentally altering the structure of the agrifood sector (Reardon et al., 2009). According to Bennet's law, as income increases, per capita consumption of starchy food staples tends to fall; in general as purchasing power rises and the population urbanizes, consumption moves away from staples and other basic food items towards fruit and vegetables and higher-quality food. Together with technological change in packaging and logistics, these shifts favour the expansion and increasing sophistication of food and beverages, and agricultural inputs and services such as transportation, storage and marketing.

Production linkages spearheaded by agroprocessing – critical phase in agriculture-led rural industrialization in East Asia.

East Asia is again regarded as a model for industrialization through the early formation of agrifood supply chains. In the case of Taiwan and South Korea, in the early stage of economic development, agriculture-led rural industrialization was observed in the development of food processing (Otsuka, 2007). Similarly, Japan has been cited as a case of agri-based industrialization. Johnston (1951) was among the first to point out the numerous innovations and transformations in Japanese agriculture that preceded the rapid industrialization of the country. The development of agriculture contributed directly to capital accumulation by providing savings; it also contributed indirectly by freeing up labour for industries and supplying food at low cost for manufacturing workers.

Transformation of traditional agricultural value chains has been observed for China and, beyond East Asia, in India and Bangladesh (Reardon et al., 2012). In rice milling, enterprises have evolved from small to medium and large mills using more modern equipment. While chains have lengthened geographically, as larger mills require more sources of supply to meet throughput, they have shortened "transactionally": the traditional role of the village trader (engaging in tied output-credit purchases) has been declining as rice mills and wholesalers increasingly source paddy rice directly from farmers. The staple has shown improved quality and better packaging, now available in branded and labelled bags. Farmers in Bangladesh are shifting from coarse-grade to medium-grade rice. At the farm level, there is evidence of a more active land and input market, and greater access to finance, owing in part to increased participation in non-farm employment.

One advantage favouring agrifood supply chains is reliance on availability of flexible work arrangements, including deployment of women and young workers.

Returning to the Japanese example, a driver of early industrialization was the establishment of the putting-out/homework system. This system actively employed women, and allowed industrialization to advance without massive rural-urban migration (Francks, 2002). The flexibility of rurally based industry has also been shown in the example of Cirebon district in Indonesia (SMERU Research Institute 2003) mentioned above. In the case of Buyut village, the rattan industry employs about 600 workers and hosts 15 subcontractors. Workshops are located near the owners' homes; subcontractors and their workers are paid by piece. Orders tend to fluctuate and continuity of work is not guaranteed; rattan workers earn from as little as 12,000 Rp per week (the farm wage prevailing before the rattan cluster grew was 12,000 Rp per day); however the pay can be as high as 200,000 Rp per week depending on the order and pace of work. Workers are able to manage their own hours; many housewives and students are employed in the putting-out business.

Agricultural multipliers

Estimates of explicit or implicit agricultural growth multipliers fall over a wide range – including negative values – with varying implications for the underlying scarcity of labour in rural areas.

Here, the application of input-output analysis to quantify the indirect contribution of agriculture[4] has been more systematically applied towards estimation of macro- and meso-level multipliers derived from social accounting matrices. Assuming linear inter-industry and final demand relations with no price adjustment, the key indicator that emerges is the multiplier. This is the value of additional output generated by stimulating production in a particular sector or group of sectors. For agriculture, indicative magnitudes of growth multipliers range from 1.9 to 2.8; the bulk of the additional rounds of spending is due to stimulation of consumption linkages (Haggblade et al., 2007).

The problem is that for linear model multipliers to be taken literally, resources must be assumed to be in perfectly elastic supply – a rather extreme assumption. Empirical studies tend to find an inelastic supply response; for instance, a study for selected Asian countries (Bangladesh, Cambodia, China, India, Indonesia, Nepal, Pakistan, Philippines, Sri Lanka and Thailand), own-price supply elasticity can go as low as 0.18 (vegetables) to 0.61 for fruit, while that for rice is only 0.44 and for maize 0.28; the exception is wheat, which exhibits an elastic own-price response (Imai et al., 2012).

In a static sense, the idea of a perfectly elastic supply may be inaccurate. However, the idea of a "slack" in the rural economy may make perfect sense from a more dynamic perspective. Surplus labour in rural areas need not literally be unemployed, but may be disguised in the form of redundant, low-productivity employment in agriculture and some types of community and personal services. Development in agriculture accelerates the shift of surplus labour to non-agricultural employment and to urban areas, which accounts for the dynamic complementarity between growth in agricultural and non-agricultural sectors.

It will be difficult to try to model such dynamic interactions using structural form (e.g. computable general equilibrium) models. Alternatively, one may econometrically estimate reduced-form equations to capture the interaction between agricultural and non-agricultural sectors. Tiffin and Irz (2006) affirm the positive growth elasticity of agriculture on non-agriculture in both developing and developed countries based on Granger causality analysis. However, Valdés and Foster (2010) report estimates that are in the range 0.12 to 0.148 from agricultural to non-agricultural GDP for developing countries, but negative in developed countries. Christiansen, Demery and Kuhl (2011) find that substantial growth linkages from agricultural to non-agricultural sectors are found only in low-income countries, for example in sub-Saharan Africa.

The latter opens up the possibility that substitution rather than complementarity may characterize the interaction between agriculture and non-agriculture, at least for certain types of economy. Exploring the nature of this interaction at the subnational level was the motivation for the oft-cited study by Foster and Rosenzweig (2004), which found (*contra* the multiplier literature) that the rapid growth of rural industry in India occurred in areas with the lowest rates of improvement in crop yields, consistent with a model in which industrial capital is mobile and seeks low-wage areas. In other words, within the country rural industrialization and agricultural development are substitutes. In the following section, the issue of complementarity and substitutability is qualified in relation to location characteristics.

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4. See the above subsection on "Direct and indirect contribution of agriculture".

Linkages with the urban economy

Spatial distribution of non-farm employment and rural businesses

Rural areas in the urban periphery tend to specialize in non-farm activities; agriculture tends to be more important in the hinterland and in agronomically favourable areas.

Fafchamps and Shilpi (2002, 2005) apply economic geography to explain the spatial distribution of farm and non-farm activity. Cities and towns are formed by agglomeration economies; around the city, the von Thünen model predicts the formation of concentric circles – the peri-urban circles specialize in goods subject to perishability and high transport costs, while grains and pulses may be produced in the outer circles; at the outermost regions households revert to subsistence production of both agricultural and non-agricultural goods. They then test this prediction with data from Nepal for the mid-1990s. Only 14 per cent of the population live in cities and towns with populations above 10,000 people. About 62 per cent of households reside within three hours' travel to the nearest town or city; only 13 per cent of households reside in areas within 10 hours or more of the nearest town or city. Using regression analysis, Fafchamps and Shilpi find that non-farm employment is heavily concentrated in and around towns and markets. Meanwhile, food for urban consumption is produced mainly in an intermediate zone 30 minutes to two hours away from the nearest market and three to seven hours away from a town. Farm households in and near towns and cities purchase rice and other agricultural products they consume; they tend to specialize in a marketed product rather than produce for subsistence. Lastly, beyond the intermediate zone production is largely for subsistence.

Deichmann et al. (2009) also examine the spatial division of non-farm employment, but examine the interaction with agriculture in greater detail. In particular, they test the hypothesis that an increase in agricultural productivity promotes non-agricultural employment via production and consumption linkages. Using 2000 data for Bangladesh, they find the following:
- About 28 per cent of non-farm wage employment pays below the median agricultural wage.
- Proximity to towns and cities increases the probability of having high-return wage employment, as well as of self-employment; low-return wage employment is uncorrelated with distance.
- Only large towns and cities matter; access to small towns (with a population up to 5,000) has no effect on non-farm employment.
- Workers in favourable agricultural areas (based on crop suitability index) that are close to urban centres have a greater probability of having high-return wage employment and self-employment.
- However, in remote favourable areas workers tend to specialize in agricultural employment. That is, agricultural productivity promotes non-farm employment only in the presence of nearby urban centres. This is consistent with the presence of market failures endemic to lagging regions, which may nullify the gains from productivity growth in agriculture (de Janvry et al., 1991).

A third case study was conducted for the Philippines by Balisacan et al. (2012). In their study, the geographical units are by province and municipality; geographical units are characterized by infrastructure indicators. At the provincial level, provinces are further distinguished by share of urban population and proportion of municipalities with favourable areas for agriculture (proxied by terrain with slope below 18°). Balisacan et al. find the following:

- Growth of the non-farm sector – especially in services – has been consistent over time but not equally spread out; rather, it has concentrated in metropolitan areas and their surrounding provinces.
- Agricultural growth exerts a positive effect on rural service sector growth; the elasticity of service sector growth to agricultural growth is in the range 0.20 to 0.25.
- The elasticity of growth linkage of agriculture is larger for areas favourable to agriculture, but not for areas with high urbanization.

The fourth and fifth points from the Bangladesh study, and the third point from the Philippines study, introduce a necessary qualifier on understanding the interaction between farm and non-farm economies. As observed above in the third section (subsection on "Agricultural multipliers"), agricultural growth can either complement or substitute growth in non-agricultural sectors, and that complementation will be more characteristic of areas less favourable for agriculture and more remote from cities.

Urban-driven industrial linkages: the role of non-food supply chains

The rapid growth of rural industry in East Asia has been held up as a model of structural transformation for developing economies.

Despite the low share of manufacturing in rural non-farm employment, rural industry as a sector has commanded much attention owing to its role in structural transformation, especially in East Asia. China is a prominent example: back in 1952, industry's share in GDP was only 18 per cent; by 1978 its share had risen to 44 per cent under its catch-up strategy, although at that time concentrated in heavy industry. The 1978 reforms accepted the parallel importance of light industry: together with other market-oriented policies, economic growth accelerated dramatically, and light industry grew to account for 40 per cent of GDP (Chen et al., 2011). A more broadly based industrialization strategy was accompanied by rapid rural transformation (Long et al., 2011); parallel to massive rural-urban migration was the formation of new centres of industry in the countryside.

Rural industries tend to congregate in clusters, thereby benefiting from external economies of scale and reduced transaction cost.

Unlike agriculture, which by its nature occurs over a dispersed physical area, industries in rural areas tend towards a cluster formation. For example, the early era of European industrialization in Italy, and industrialization in East Asian countries, follows the "Marshallian industrial district" model, where numerous SMEs form agglomerations characterized by vertical division of labour. Clustering of rural industry is likewise prominent in China. The number of firms in clusters grows more quickly than in non-clustered areas, hence industries have become more spatially concentrated. Furthermore, even as industries have become increasingly specialized, firms have become more interconnected (Long and Zhang, 2012).

A classic case is that of Wenzhou, which used to be a mostly rural region, one of the poorest in eastern China. However, over the past several decades it has been one of the fastest-growing regions in China. Footwear manufacture was a traditional industry in the region, with shoe-making technology widely diffused; however, its market share was negligible. After the 1978 reforms, the expansion of footwear manufacturing was very rapid. Clustering deepened the division of labour, enabling small entrepreneurial firms to enter a narrowly specialized stage of production. The formation of the cluster may have also been strengthened by the regional social culture promoting risk-taking, hard work and the value of friendships, in turn supporting contract enforcement and informal finance (Huang et al., 2008).

Clustering is fairly common in rural industries; a study of more than 4,000 clusters in rural Indonesia (Weijland, 1999) also pinpoints the critical role of agglomeration, at least in the early stages of development. Transaction cost reduction (i.e. search and reach advantages in marketing) is mainly responsible for clustering. Social capital facilitates the reduction in transaction cost. Marshallian external economies from specialization and indivisibilities may occasionally be found, but only in niche subsectors.

At the beginning stages of a cluster, kinship ties (the epitome of social capital) may be critical for diffusion of new technology. A paper-manufacturing village in Viet Nam is an appropriate case study: knowledge of new technology (mechanized methods of papermaking) was initially acquired by workers employed in relatives' factories. Soon they spun off into their own factories, also acquiring information from machinery sales representatives as well as learning by doing. These start-ups were typically unable to access formal bank loans, and kinship networks provided initial financing for capital investments. The case is now famous for showing the evolution of a traditional handicrafts village into a modern industrial cluster (Kimura, 2011).

Dynamic rural industry clusters exhibit inter-firm linkages based on subcontracting.

The integrated value chains are based on inter-firm linkages, which previous research demonstrates rely on subcontracting relations. The latter is a catch-all term referring to supply transactions with qualities transcending spot purchases of standardized products. For instance, purchase orders may cover customized specifications governing quality, design, quantity and timing; the buyer may extend additional assistance in the context of repeated transactions (i.e. technical support) and even advances of materials and cash.

For instance, the putting-out system in the United Kingdom prior to its industrialization involved a merchant who would subcontract market orders to nearby skilled home workers. The putting-out system was also widely observed in Japan, as noted above, and the modern variant of the putting-out system, subcontracting, remains widespread in modern Japan and Taiwan (Long and Zhang, 2012).

In both Taiwan and South Korea, rural industries are oriented towards subcontracting arrangements between urban large-scale firms and rural SMEs, mainly in metalwork and textiles. The large firms are endowed with superior information on marketing and modern technology, and better access to financial markets. The SMEs offer benefits from division of labour or specialization, an advantage common to outsourcing arrangements (Otsuka, 2007). In South Korea, 1997 data show that up to 38 per cent of SMEs are engaged in subcontracting;

moreover, subcontracting tends to rise (and not decline) with firm size. For companies with 200-299 workers, 46.1 per cent are subcontracting; this proportion falls to 30.3 per cent for companies with five to nine workers (Nugent and Yhee, 2002).

Subcontracting is not limited to East Asian clusters; it has also been encountered for metalcraft manufacturers in the Philippines (Hayami et al., 1998) and garment manufacturing in Bangladesh (Ahmed, 2013). In Indonesia, Hayashi (2002) investigated whether subcontracting linkages are an important support mechanism for SMEs. In his study, "subcontracting" refers to supply for purchase orders with specification on quality, function, shape and design, issued by the buyers. These SMEs are in metalworking manufacture, supplying parts to manufacturers of automobiles, motorcycles, agricultural machinery and bicycles. These SMEs are not all rural, being mainly located in cities and surrounding areas of Jakarta and Surabaya. Hayashi finds that the bulk of all supply orders are characterized by subcontracting; the share of subcontracting in total sales rises with firm size, and firms of 20 workers or more increased their reliance on subcontract orders over the period 1993-1998. SMEs that have a higher ratio of subcontracting orders tend to have higher labour and total factor productivity.

Initial products of competitive industrial clusters tend to be labour-intensive; more capital-intensive products were initiated by the introduction of foreign technologies.

A synthesis study of 19 industrial clusters in Asia and sub-Saharan Africa found that, consistent with the Heckscher-Ohlin theorem, initial products of these clusters tended to be labour-intensive items. These items included woodwork, metalwork, silk, agricultural implements, garments, knitwear and leather shoes. The clusters were later to specialize in working clothes, motorcycles, machine tools, electrical fittings, rolled steel bars, printed circuit boards, and more sophisticated versions of garments, knitwear and metalwork. Upgrading was associated with foreign direct investments, investments by state-owned enterprises, migration by foreign artisans, and training of managers provided by foreign firms and international organizations (Otsuka and Sonobe, 2011).

In some clusters a preference for employing female rural workers has had favourable effects on human development outcomes.

The feminization of employment in labour-intensive, export-oriented manufacturing has been observed since the 1990s. Women account for 70 to 90 per cent of workers in some export processing zones; female informal workers account for about three quarters of the globally linked value chains for textiles, apparel and clothing, leather and footwear, and electronics (ILO and ADB, 2011).

The Bangladesh garment sector is a well-known example. In 2013, the sector supplied 79 per cent of exports and 14 per cent of total GDP. Since 1983, out of 60 villages in a peri-urban area outside Dhaka, 44 were classified as within commuting distance of a garment factory. A household survey of these villages found the following: employment in the ready-made garment industry had a sizeable positive effect on propensity to keep younger girls in school, older girls engaging in waged work, and postponement of marriage and childbirth. In turn these led to declining fertility rates (2.3 births per woman in 2009 versus 5.9 per woman in 1983) and higher girls' enrolment, possibly by as much as 14.8 percentage points (Heath and Mobarak, 2015).

The role of rural towns and small urban centres

At the initial stages of development, geographical concentration dominates the economic landscape; over time, an urban hierarchy emerges with a metropolitan centre linked to intermediate cities, rural towns and villages.

Trends in urbanization (summarized by World Bank 2009) contextualize the formation of rural-urban linkages. The first trend is rising concentration: in about a quarter of all countries in the study, more than half of national income is generated on less than 5 per cent of land area. Increasing concentration towards a metropolis is commonly observed throughout developing Asia. In Thailand, for example, Bangkok's concentration ratio (contribution of metropolitan area to GDP divided by its share in land area) rose from 1.8 in 1975 to 3.1 in 2004, while its per capita GDP quadrupled.

Second is the emergence of an urban hierarchical structure, which becomes evident at an intermediate level of urbanization (about 50 per cent), when the relative economic importance of agriculture has declined. At the advanced stage (75 per cent urbanization) a services-based metropolis emerges, surrounded by industrial towns and cities.

For rural areas, proximity to towns and cities boosts non-agricultural activity as well as farming that caters to urban demand.

The three country cases in the above subsection on "Spatial distribution of non-farm employment and rural businesses" highlight the implications of economic concentration and urbanization for the rural economy. Rural areas that are closer to emerging urban markets realize gains from trade and specialization that are denied to the more remote rural areas. Urban markets also shape the pattern of agricultural activities: generally, peri-urban areas specialize in perishable food products for urban consumers. This pattern is consistent with what is observed elsewhere, for example, in the peripheries of Jakarta, where the outermost ring will still contain rice farming, plantation and forestry; the next inner ring contains fisheries and livestock; and city outskirts contain only horticulture (Pribadi and Pauleit, 2015).

Prospects for industrialization of rural Asia

In exceptional cases, expansion of the rural non-farm sector will be pioneered by urban-linked manufacturing; rural-based agroprocessing will nonetheless remain a prominent feature of the non-farm economy.

The experience of the dynamic East Asian economies has fundamentally shaped the narrative of rapid industrialization and rural development. There is no denying the recent economic history of the lead economies – Japan, South Korea, Taiwan and now China. For the rest of developing Asia, there may be similar instances of rural-based yet urban-linked industrialization, although these will be highly country- and sector-specific. Where dynamic rural industrialization is replicated, features such as clustering and subcontracting will probably also follow. These features have already been noted above for paper-manufacturing clusters in Viet Nam, as well as machinery manufacture in Indonesia. Likewise, garment manufacturing in Bangladesh tends to cluster around major cities (Dhaka and Chittagong), and subcontracting is also prevalent, accounting for an estimated 67 per cent of employed workers (Ahmed, 2013). As these industrial clusters tend towards production of tradeables, they may potentially exhibit explosive growth from selling to the international market.

Common forms of agro-based manufacturing require proximity to farms (to reduce transport and logistics costs) and can afford to disperse into rural areas (in the absence of strong agglomeration economies), for example in making banana chips, raw sugar, crude coconut and palm oil, crumb rubber, and the like. An interesting question therefore is whether agroprocessing can be a nucleus for rural industrial clusters. The potential for rurally based agroprocessing cannot be denied, but whether rurally based clusters will be common is a different matter. Agroprocessing clusters tend to locate in urban areas in order to benefit from proximity to ports and marketing outlets. For instance, in the Philippines, the central city of Cebu hosts large processing factories for seaweed and dried mango; other processors (e.g. banana chips, meat processing) are also found in cities. In the case of Thailand, by 1990 the share of industry in GDP reached 27 per cent, of which food processing accounted for about a quarter, and textiles and wearing apparel over one fifth (ADB 2015b). Nonetheless, about 78 per cent of manufacturing is located in the Bangkok metropolitan area, and only a sprinkling of raw materials processing was found in outer provinces (Siamwalla, 1995).

On the whole, the main pathway for rural non-farm growth in developing Asia is expansion in non-tradeables (services).

However, the rise of rural industrial clusters appears to be an exceptional case; non-tradeables, mainly services and trade, will continue to be the mainstay of the rural non-farm economy. As rurally based services are tied to demand both locally and in nearby urban centres (if any), expansion of these activities may be more gradual than the competitive industrial clusters. Nonetheless, such growth is likely to be sustained in pace with urbanization.

Recapitulation

The Introduction to this paper posited three hypotheses following the anti-agriculture and rural development bias. The review of available evidence generally finds a qualified refutation of these hypotheses, as follows.

- Contribution of agriculture – consistent with the first hypothesis, the direct contribution of agriculture to output and employment declines uniformly over the course of development. However, combining direct and indirect contributions of agriculture (including backward and, especially, forward linkages), the broad contribution of agriculture may increase in some cases. An increase in agricultural productivity and output will boost rural household demand for non-farm goods and services, and lead to second-round effects on rural non-farm activity through production linkages.
- Characteristics of non-farm employment – within the universe of rural non-farm activities, only casual employment and production of traditional Z-goods match the low productivity and economic returns of traditional agriculture. Also, within that universe are regular employment and activities linked to external demand, which offer dynamic potential. In addition, expansion of the rural non-farm sector will also benefit agricultural producers and workers via the aforementioned production linkages, as well as by factor markets (the positive effect of non-farm employment on agricultural wages).
- Demand for rural non-farm goods and services – as a corollary to the previous finding, rural non-farm production and employment are closely linked to agriculture and the urban economy, hence the supposition that the non-farm sector faces poor market prospects is unfounded.

Towards a strategy for development of the rural non-farm economy

Role of rural infrastructure

In villages with better transport infrastructure, households derive greater employment and income from non-farm activities.

The association of rural transport infrastructure (mostly roads, but also including bridges, railways, ports, etc.) with improved rural non-farm outcomes is well documented; given the importance of linkages with the urban economy, this association is to be expected. Nonetheless, the causal linkages deserve further elaboration and qualification. For instance, some traditional rural industries declined after investments were made in rural roads, apparently due to intensified competition from modern goods such as village basket- and pottery-making (Ahmed et al., 2007). Such products fit into the category of Hymer-Resnick Z-goods.

Improved rural roads reduce the unit cost of freight, which is certainly beneficial to rural non-farm enterprises. However, perhaps even more important is that improved road quality reduces damage to cargo, and creates a more predictable flow of transportation, for example, allowing Indian automotive producers to realize supply chain efficiencies and external economies of scale from clustering. These efficiencies reach out to rural areas: the largest car assembler spent 71 per cent of sales on raw materials and components, of which 62 per cent was domestically sourced; of this proportion, 70 per cent came from within 80 km radius of the factory (Gulyani, 2001).

Balisacan et al. (2012) find that, for the Philippines, expansion of the local road network has a positive and significant effect on non-farm sector growth; however, it has a negative and significant effect on agricultural growth. Apparently, local roads benefit non-tradeable services but encourage the shift away from local tradeables (i.e. agriculture). However, expansion of national highways was positively and significantly associated with agricultural sector growth, presumably as it promotes cross-country movement of tradable agricultural products.

Likewise, Gibson and Olivia (2010) find that, in Indonesia, lack of access to and poor quality of infrastructure constrain the non-farm enterprises of rural households. Households are less likely to have a non-farm enterprise, and also have a lower income share from non-farm employment, if they live in a location that is more remote and has lower-quality roads. Upgrading the local road increases the likelihood of a household being engaged in a non-farm enterprise by just over 4 percentage points.

Aside from road transport, other rural infrastructure has also been found to benefit rural non-farm employment.

For rural Bangladesh, connection to the grid was found to boost both farm and non-farm income of rural households, leading to higher expenditure (Khandker et al., 2012). For Viet Nam, an impact study on rural electrification found that non-farm income rose significantly on connection to the grid (however, this finding is not robust to econometric specification). Non-farm productivity for shops and home businesses is likely to increase with the use of electrical tools and machines, and the ability to stay open at night (Khandker et al., 2013). Conversely, with low electrification, rural households lack access to electricity and suffer from frequent electricity blackouts, which has been found to discourage non-farm enterprises in rural Indonesia. Connecting a village to the electricity network raises the likelihood of non-farm enterprise participation by 13 percentage points (Gibson and Olivia, 2010).

In the rural Philippines, Balisacan et al. (2012) found that, aside from road density, household access to sanitation and electricity, level of schooling and road density were all positively and significantly associated with non-farm sector growth. At the municipal level, improvement in infrastructure facilities, proxied by changes in the percentage of barangays with telephones and access to national highways, also positively and significantly affected the expansion of non-agricultural employment.

Lastly, for rural non-farm enterprises in Sri Lanka, electricity is seen as the most important obstacle in the investment climate (table 10). This holds across basic sectors (manufacturing, services and trade), although manufacturing enterprises post the highest share (31 per cent), and trade the lowest (19 per cent). Road access and quality were mentioned by 5 to 10 per cent of enterprises; water supply constraints were reported by an average of 7 per cent.

More systematic regression analysis finds that eliminating the following constraints will boost total factor productivity by the following percentages:
- electricity: 5.2
- market demand and information: 5.2
- financial infrastructure: 3.8
- road access: 3.1

Relaxing all these constraints together boosts productivity by about 22 percentage points (Deininger et al. 2007).

Table 10: Proportion of enterprises reporting a given constraint as the most important obstacle in the investment climate

Constraint	Enterprise type (per cent)			Total
	Manufacturing	Service	Trade	
Electricity	31	27	19	25
Distance to bank	8	15	14	12
Market demand	6	11	16	11
Market information	8	3	5	6
Road access	9	5	10	8
Road quality	6	3	5	5
Water supply	8	10	5	7

Source: Deininger et al. (2007).

Role of financial intermediation

By the 1990s, formal finance had made considerable progress in supplying the financial needs of rural areas, yet significant gaps remain.

Credit must typically originate from household and other savings, and is then relayed to entrepreneurs via financial intermediaries, mainly banks. In a rural context, capital flows into rural non-farm enterprises can arise from various sources: urban-based financial institutions, migration remittances, and external investment in "transplant" industries taking advantage of lower rural wages (Renkow, 2007).

Data on specifically rural outreach in large Asian countries were compiled by Meyer and Nagarajan (1999) for the late 1990s. Outreach was high in Thailand, with the government agricultural bank directly or indirectly reaching nine tenths of all farmers. For Indonesia, access to formal loans was also widespread, as several organizations successfully provided individual loans without requiring collateral. For China, outreach was moderately extensive at the time, with the main source of formal loans being rural credit cooperatives.

Outreach was somewhat poorer for rural India, where the ratio of population to rural bank branches ranged from 17,000 to 21,000. Likewise, for Bangladesh, by the 1990s the formal sector actors (national commercial banks, development finance institutions and agricultural cooperatives) saw their share in rural finance falling, mostly limited to crop lending for farmers. Wider requirements for rural finance were being met by microfinance institutions (MFIs) including the pioneering Grameen Bank.

Ayyagari and Beck (2015) report data for 2011 on the reach of the formal financial system in Asia, although rural finance is not separately categorized. Account penetration (percentage of all adults who singly or jointly have at least one account with a formal financial institution) averages 26.7 per cent in Asia, compared with a global average of 45.7 per cent. There is huge variation within Asia: in Republic of Korea and Singapore, account penetration approaches 100 per cent, whereas the figure is under 5 per cent for Cambodia. The proportion of enterprises with a loan or credit line from a financial institution ranges from a high of 36 per cent for East and Southeast Asia to a low of 30 per cent for Central Asia; this is much greater than the share in sub-Saharan Africa (19 per cent), but pales in comparison with the share in Latin America and the Caribbean (figure 5).

Figure 5: Share of enterprises with credit from a financial institution, 2006-2014 (per cent)
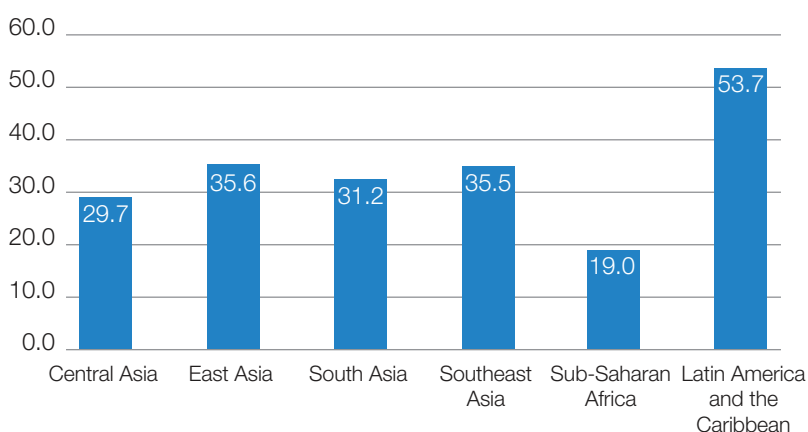
Source: Ayyagari and Beck (2015).

In the above-mentioned study by Deininger et al. (2007), financial infrastructure was observed to be a key constraint for rural non-farm enterprise. Credit constraint is often cited for formal finance, but less so for informal finance; however, the latter is subject to high (if not exorbitant) interest rates, hence the common complaint of SMEs about the inaccessibility of affordable credit from formal lenders. Formal lenders face information constraints in finding reliable borrowers. Given weak or costly legal systems in the developing world, they also confront enforcement problems in dealing with default; and they impose high transaction cost on their borrowers. Based on data from rural Thailand, Giné (2011) found that enforcement problems rather than transaction costs were the main constraint to gaining access to formal credit.

Human capital investment

The third section of this paper, "The rural non-farm economy and the agrifood sector", discussed the importance of human capital in gaining access to regular non-farm employment. Here "human capital" is broadly construed to cover not only formal schooling, but also informal and technical/vocational education. However, education policy sometimes fails to recognize the role of the rural economy. National training systems generally focus on core industrial and service occupations; the agri-based educational system is weak to non-existent in many developing countries. Transformation of rural labour markets entails investment in rural skills development. Addressing the skills gap in rural areas requires widening the scope of training policies and programmes beyond agriculture, as well as exploring alternative training service delivery, for example, through NGOs and the private sector (Atchoarena et al., 2003).

Governance reforms towards non-farm rural economic development

Decentralized approaches may offer greater benefits than centralized governments in terms of rural development outcomes, although the former are not free of institutional constraints to equity and efficiency.

Other sets of policy interventions for rural development adopt the themes of participation, local governance and decentralization. Decentralization may be rationalized under subsidiarity – the principle affirming that decisions should be taken at the lowest possible level at which they will take effect. This is a response to the perceived failures of centralized approaches to governance. Such a response is not without basis; for the Plurinational State of Bolivia, Faguet (2004) found that public investment in human capital and social services changed significantly after decentralization. These changes were driven by the spending patterns of the smallest and poorest municipalities.

The two largest countries in Asia (and the world) have embraced decentralization. In China, it has been the institutional framework for industrialization since the late 1970s; and at the time of its economic restructuring in the early 1990s, India adopted constitutional reforms towards decentralization (Bardhan, 2002). In Southeast Asia, Malaysia is constituted as a federal government, and Indonesia enacted a law in 2000 that radically devolves political power to local governments.

Taken to their logical conclusion, participatory approaches lead to community-driven development, in which decision-making for community-level interventions is undertaken by communities themselves, including project selection, design, procurement and implementation. Community-driven development is becoming widespread, especially with strong donor support for the strategy. Evidence points to the positive contribution of community-driven development to service delivery outcomes, which do accrue to majority of members of the community. Improvements have been observed for access to health, education and potable water (Babajanian 2015). Similarly, a long-running nationwide community-driven development project in the Philippines, Kapit-Bisig Laban sa Kahirapan [Linking Arms Against Poverty] Comprehensive and Integrated Delivery of Social Services (KALAHI-CIDSS), has been subjected to rigorous impact evaluation (Edillon et al. 2011). Evaluation found that KALAHI-CIDSS increased household consumption by 5 per cent; the impacts were stronger for households classified as poor in the baseline survey. The KALAHI-CIDSS project improved basic service delivery, as measured by visits to a health facility when sick; increased number of households accessible year-round (by 6 per cent); and a small positive impact on access to safe water.

Community-driven development approaches should not be seen as cure-all, or even as an instrument to address the concerns of the poorest. Decentralization may be prone to elite capture at the local level, which can frustrate goals of delivering social services, infrastructure facilities and conditions conducive to local business development to the general population (Bardhan 2002). Such fears initially greeted the institutionalization of the community-driven development approach in Indonesia; in fact, the participatory planning process promoted under community-driven development has been widely adopted by beneficiary communities in Indonesia and has been integrated into local development planning systems and procedures (ADB 2016).

Implications

The above assessment of the rural non-farm economy suggests a set of strategic directions for rural development.

The patterns identified in this section can be transformed in a straightforward fashion into a set of strategic directions for development of the rural non-farm economy:
- adopting participatory approaches in governance
- widening the outreach of formal rural finance
- increasing investment in rural infrastructure
- strengthening connectivity between urban and rural economies
- promoting agricultural value chains.

More controversial implications relate to the design of the resulting programmes and the amount of resources to be invested in them. Both issues are largely outside the scope of this paper; we do, however, have further comments on the design of credit and connectivity programmes and on the evaluation of rural investments.

Widening the outreach of formal rural finance involves a service delivery system that adopts some of the features of informal finance.

A direct approach to widening the outreach of formal finance is to establish more bank branches in rural areas. Such state-led rural branch expansion, in which bank branches are set up in unbanked locations, was found to have reduced poverty in India (Burgess and Pande, 2005). However, this strategy entails high cost in the form of public subsidies; it is unclear whether bank branch expansion represents a cost-effective method for poverty reduction.

While formal finance struggles to expand its outreach in rural areas, informal finance has served a vast range of clientele in this area. A key advantage of the latter is access to local-level information combined with low transaction costs. There may nonetheless be a viable model combining advantages of both formal and informal finance. For instance, India's National Bank for Agriculture and Rural Development has established a microfinance model that combines self-help groups with formal finance (Zhang et al., 2010).

Likewise, the Philippines has adopted a set of policy and institutional reforms towards financial inclusion: private microfinance providers have responded to the new regulatory framework by expanding the range of products on offer and improving their delivery mechanisms. A key reform was adoption of risk-based supervision by the financial regulator; meanwhile, microfinance providers self-organized into a council to reinforce commitment and transparency in the sector, anchored on adherence to and reporting of benchmark financial performance ratios (Llanto, 2015).

Investment evaluation of agricultural development projects should consider second-order interactions between farm and non-farm activities in both rural and urban areas.

Investment in agricultural value chains aims to exploit the power of farm-non-farm linkages. The primary node of the chain – farm production – should continue to command policy attention, given the nature of farm and non-farm linkages discussed in this paper. Investments in farm productivity should be reinvigorated, including in agricultural research and development, together with extension, for both its direct impact on agricultural production and its upstream and downstream effects along the value chain.

Closer integration of the chain can be supported by expanding farm supply to urban-based processors, for example through contract farming. Alternatively, integration may take the route of localization of the value chain – promotion of rurally based enterprises for agroprocessing and input supply, initially for basic raw materials but with increasing sophistication over time.

Cost-benefit analysis may be applied to gauge the amount of resources to be invested into agricultural development programmes, and the literature on the rural non-farm economy may have methodological implications for the evaluation of such programmes. In conventional cost-benefit analysis, the farm wage proxies the opportunity cost of labour. However, this disregards the issue of underemployment in rural economies. One way to extend conventional cost-benefit analysis is to estimate impacts of a project in terms of second-order reduction in unemployment with an expansion in demand. Benefits from stimulating output (and demand) can simply incorporate the additional employment generated, multiplied by the difference of labour price and reservation wage (Bartik, 2012).[5]

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5. If there is likewise excess capacity in the capital goods sector, then additional deployment of capital may be treated similarly, though the presumptive opportunity cost of capital in this case is zero.

More generally, consideration of agricultural linkages widens the relevant indirect effects to dynamic externalities from an array of agricultural development projects (clustered in a region). A strategy for this has been sketched by Simas and Valdés (2003), for evaluation of public irrigation investments in north-east Brazil. Their study identified farm and enterprise models in the relevant processing and marketing chain (including the packing and selection process) to represent the actual situation of production systems with public investments in irrigation projects, and compare this with the production situation in similar areas with no public investments in irrigation. These farm and non-farm enterprise models are the basis for analysing upstream and downstream linkages under with-and-without scenarios to estimate the broader impacts of public investments.

Strengthening of urban-rural connectivity involves a comprehensive attempt to influence the location and technology choices over time of both urban and rural enterprises.

Strengthening connectivity certainly requires transport infrastructure (subsumed under the third strategic direction, increasing investment in rural infrastructure); however, such investment is not sufficient, as the strategy requires a broader attempt to influence enterprises' choice of location. Essentially, this is a call for a form of industrial policy towards encouraging large production hubs to situate themselves in small towns, as well as supporting rurally based enterprises to serve as suppliers to these hubs. Precedents for such industrial policy exist: for example, Penang Development Corporation, a state-owned company, spearheaded a successful SME subcontracting industry for machine tools in Penang State. Development of subcontractors was facilitated by government-business cooperation, with Penang Development Corporation matching microelectronics multinationals with SMEs in the state (Rasiah, 2002).

A cluster-based approach suggests that rural industrialization policy should avoid blanket dispersal of investments and interventions over a homogeneous rural space. Instead, selectivity should be exercised in prioritizing strategic areas, involving competition-oriented policy; investment in managerial human capital; and demand-led expansion of industrial zones and extension of credit (Otsuka and Sonobe, 2011).

Conclusion

Given the constraints in growth of agriculture and rural-urban migration, the rural non-farm economy is now seen as a source of rural employment growth and poverty reduction. Policy interest has focused on leveraging diversification opportunities for rural economies to reduce poverty and inequality. These opportunities are, in turn, linked to two potential drivers of growth: agriculture and urban centres.

Agriculture typically wanes as an economy progresses; nonetheless, the indirect contribution of agriculture to an economy tends to rise over time in the form of agro-industrial activities. Despite this, evidence on the impact of the growth of agriculture (or agricultural productivity) on non-agricultural sectors is mixed; it is likely that this impact is conditional on other factors, such as location.

Agriculture is by no means the sole driver of the non-farm economy; urban centres are also a key element of rural non-farm growth. This paper suggests a role for a cluster-based industrial policy, which will further support the rapid expansion of rural non-farm employment. In some areas, this will be composed of rural industries (i.e. manufacturing), but on the whole services will still constitute the bulk of the rural non-farm economy, which will draw its impetus primarily from interactions with existing or emerging urban centres.

Annex. Formulas for indirect contributions

Anriquez and Stamoulis (2007) translate these concepts into the following formulas, which are equivalent to the formulas in de Ferranti et al. (2005). The indirect contributions are:

$$\text{backward linkages} = \sum_{i \neq k} \frac{X_{ik}}{\sum_j X_{ij}} VA_i$$

$$\text{forward linkages} = \sum_{j \neq k} \frac{X_{kj}}{\sum_i X_{ij}} VA_j$$

where k is the sector of interest (agriculture, hunting, forestry, fishing); X_{ij} is the intermediate demand of sector i for output of sector j; and VA_i is the value added of sector i.

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