

The Participation of North Korean Households in the Informal Economy: Size, Determinants, and Effect

Byung-Yeon Kim and Dongho Song*

This paper uses a survey of North Korean refugees to look at the size and the determinants of informal economic activities. In addition, we estimate the effect of informal economic participation on labor supply in the formal economy. We find that the informal economy is very large in North Korea with the share of income from informal economic activities at 78% of the total income of North Korean households. However, there is little evidence that supports a deepening informalization from 1996 to 2003. It is estimated that such activities are primarily driven by survival motives in North Korea. We also find that workers who have secondary jobs reduce working hours in the formal economy. These results suggest that increases in informal economic activities can shrink the formal economy, but preventing such activities is difficult.

Keywords: Informal economy, Labor supply, North Korea

JEL Classification: J22, J24, O17, P20

* Associate Professor, Department of Economics, Seoul National University, Shillim-Dong, Gwanak-Gu, Seoul, South Korea, (E-mail) kimby@snu.ac.kr; Postgraduate Student, Department of Economics, Seoul National University, Shillim-Dong, Gwanak-Gu, Seoul, South Korea, (E-mail) dh519@snu.ac.kr respectively. We are very grateful to Jihong Kim and Taejong Kim who participated in designing the questionnaire and conducting the survey. We would like to thank Insook Lee for her steadfast efforts on the survey project. Without their expertise and commitment, the completion of this survey would not have been possible. We thank two referees for their valuable comments. B-Y Kim gratefully acknowledges the financial support from the Advanced Strategy Program (ASP) of the Institute of Economic Research, Seoul National University.

[**Seoul Journal of Economics** 2008, Vol. 21, No. 2]

I. Introduction

North Korea is currently one of the poorest countries in the world in terms of per capita income. Kim *et al.* (2007) estimates that the North Korean GDP per capita in 1989 in PPP terms is 2,258 US dollars. If one applies estimated growth rates, suggested by the Bank of Korea from 1990 to 2006 to the above estimate, North Korea's GDP per capita in 2006 is 1,657 US dollars. This estimate is not too different from those of Bangladesh, Kyrgyz Republic and Nepal in 2004, which are 1,839, 1,707 and 1,427 US dollars, respectively. Reflecting exchange rate discounts of low-income countries, GDP per capita official exchange rates in the same year are much lower than those in PPP terms: they are 400, 340 and 230 US dollars, respectively. This implies that North Korea's current GDP per capita in the official exchange rates ranges between 300 and 400 US dollars.¹

Severe poverty in North Korea in the late 1990s led international organizations to launch food aid programs.² In addition, countries like South Korea, China and the United States have been providing economic aids to North Korea. This external help has prevented starvation in North Korean during recent years. However, starvation still remains a possibility barring a dramatic transformation of the highly inefficient North Korean economy.

This economic crisis in North Korea has encouraged households to adopt survival mechanisms, one of which is informal economic activity (IEA). IEA, widespread in North Korea, generally consists of private plot activities, stockbreeding, and street vending. For example, a survey by Park (2002) and Lee (2007) suggests that income from IEA is much larger than official income — the share of informal income is not less than 90% of total income.

This paper uses the Survey of North Korean Refugees (SNKR) living in South Korea, and is based on data collected from 700 respondents. This represents the largest survey of North Korean refugees conducted in South Korea. Using SNKR, this paper estimates the size and the

¹This is in line with Kim and Lee (2007), which estimates North Korean GDP per capita in 2006 ranges between 350 and 400 US dollars.

²Lee (2004) estimates that the number of people who starved to death in North Korea from 1994 to 2000 ranged between 0.58 and 1.12 million. This is about 2.5~4.9% of total North Korean population.

determinants of the informal economy in North Korea from the late 1990s to the early 2000s. It also evaluates the effect of labor supply in the informal economy on labor inputs in the formal economy. This investigation is related to whether the formal economy, based on central planning, is negatively affected by IEA. If the IEA reduces incentives to work in the formal economy, the central planning system could be negatively impacted as a natural process as labor supply to the formal economy might decrease as households prefer to work in the informal economy.

We find that the informal economy generates 78% of the total income of North Korean households, but likewise discover that there is insufficient evidence of increasing IEA when it is measured as the share of informal income of households of total income. It is estimated that such activities are driven mainly by survival motives in North Korea. We also find that workers who have secondary jobs tend to reduce working hours in the formal economy. This result suggests that further increases in the IEA, which may be triggered by economic crises or policy measures, can shrink the formal economy.

II. The Informal Economy in Centrally Planned Economies

Grossman (1977) defines the informal or the second economy as 'all production and exchange activity that fulfills at least one of the following two tests: a) being directly for private gain, b) being in some significant respect in contravention of existing law'.³ O'Hearn (1980) adds another aspect of the second economy: it operates outside the planning structure. Following the above discussion, IEA is defined as activities that fulfill at least one of the above three tests.

Households' IEA in North Korea include both legal and illegal activities. Prime examples of legal, informal economic activities include the consumption of self-produced food, the sale of agricultural products raised on private plots and stockbreeding. Other examples include trading of home-made foods or manufactured goods on streets or in designated places like the Jonghap market and Soomae

³ Because the term 'second' economy is established among Sovietologists, we use informal and second economy interchangeably.

markets.⁴ In contrast, wage labor for other individuals is not allowed. Private trading based on buying cheaply and selling at higher prices, is another example of households' illegal activities. Unlicensed private production and sales also belong to the category of illegal activities.

Some suggest that an increasing informal economy may destabilize the central planning system and eventually cause its collapse. This discussion is related to the debate on the causes of the collapse of the Soviet system. Several economic causes, such as policy mistakes under Gorbachev's leadership, rising costs of monitoring producers, increasing inefficiencies of state enterprises and growing repressed inflation have been suggested (Ellman and Kontorovich, 1992; Dallin, 1992; Treml and Ellman, 1993; Schroeder, 1995; Kim, 1999, 2002; Harrison 2002). Of course, the suggested causes were not mutually exclusive and economic problems triggered by one factor or another might have been aggravated by others.

An influential view relating to the informal economy is that the Soviet system collapsed because of 'informalization' of the economy. The spread of informal economic activities, including households' private economic activities, misappropriation, corruption, and organized crime, all contributed to the deterioration of the Soviet system. (Treml and Alexeev, 1994; Grossman, 1998; Solnick, 1998; Wintrobe, 1998). Moreover, it has long been recognized that socialist economies had an informal or so-called 'second' economy (Kim, 2003; Davis, 1988; Grossman, 1977).⁵ Treml and Alexeev (1994) argue that the informal economy in the USSR was not only large, but also increasing at an alarming speed. According to them, the Soviet informal economy reached its 'dysfunctional' stage by the 1980s, when the negative effects of the informal economy, such as loss of productivity, dominated its possible lubricating effects. Reflecting an

⁴ North Korean authorities allowed an increase in market transactions of consumer goods by changing the name of 'farmers' markets to 'markets' in 2003. These markets are called Jonghap (universal) markets where not only agricultural products but also manufactured goods are permitted for trade. It is known that the authorities regulate prices using price ceilings but such ceilings are changed frequently, reflecting supply and demand of the goods. In addition, existing state shops that buy and sell second-hand goods or goods made from secondary activities (called Soomae shops) are allowed to develop themselves as shops trading imported goods at market prices.

⁵ Davis (1988) provides a comprehensive survey of informal economy activities in socialist countries in the context of the shortage and disequilibrium models.

increasing emphasis on the role of informalization in the collapse of the Soviet economy, Grossman (1998) states his hypothesis more forcefully that 'the USSR's shadow economy and the rest of its underground in the end contributed to the system's collapse.'

Studies on centrally planned economies suggest that there are several reasons why a household's informal economic activities could undermine the efficiency of the economy.⁶ First, the growth of an economy slows down as the informal economy becomes large. This is primarily because the IEA is associated with low capital intensity and high transaction costs (Wellisz and Findlay, 1986; Treml and Alexeev, 1994). Second, the informal economy distorts feedback to the central planners in a way that they would not be able to correct their previous mistakes in allocating resources (O'Hearn, 1980; Treml and Alexeev, 1994). This means that as long as the informal economy serves as a corrective mechanism for a CPE, central planners continue to allocate resources inefficiently. Third, IEA, rent-seeking activities in particular, affect formal institutions, social norms and discipline negatively. They significantly reshape the character of society, leading to substantial stratification, a highly corrupt officialdom, opportunism and organized crime (Grossman, 1977, 1998; O'Hearn, 1980; Solnick, 1998). Such problems and deficiencies in the society are most likely to reduce economic growth.

The above analysis suggests that given the same quantity and quality of inputs as before, an increasing informal economy leads to negative economic growth not only in the formal sector, but also in the overall economy, consisting of the formal and informal sectors. In other words, productivity in the economy will decline as informal activities take up more resources from formal activities. This results in a spiral of a shrinking economy, ultimately resulting in a collapse. Murphy suggests a more destructive effect on economic growth (1993). Informal economic activities are not limited to production and can often include rent-seeking, referring to the redistribution activity that uses resources. The impact of a rise in rent-seeking on economic growth is, therefore, larger than that of informal production activities because rent-seeking does not produce any goods and services, unlike informal production, but just takes up

⁶ Ericson (1983) convincingly argues that illegal transactions of enterprises could increase efficiency. Yet, his model concerns enterprises' behavior in input markets whereas our discussion refers to households' behavior.

resources. In this way, they show that an economy in a 'good' equilibrium of high output and low rent-seeking may be shifted to a 'bad' equilibrium by rent seekers, leading to the collapse of output.

There are possible benefits from IEA. The informal economy can increase the welfare of consumers by attracting part of the work force into the unplanned production of consumer goods (Grossman, 1977; Wellisz and Findlay, 1986). There is also some evidence that informal production is more efficient than formal production because of higher material incentives associated with informal production (Grossman, 1977). Moreover, some activities in the informal economy that are conducted without stealing time or resources from the formal economy are supplementary to the economy. For example, total labor supply of teachers and doctors can increase because of their work in the informal economy during their spare time. Hence, a key question on the effect of the informal economy on growth is whether the informal economy is supplementary to the formal economy or depletive.⁷

Three critical questions arise in the evaluation of the informalization hypothesis in North Korea: Is the informal economy large? Did it grow over time? Are inputs in the formal economy reduced because of IEA? A related question is what motives drive households to participate in the informal economy. If it is motivated mainly by survival, IEA is deeply rooted in the inefficiency of the system and does not disappear unless the economy improves substantially. This paper attempts to provide some answers to these questions.

III. Surveys of North Korean Refugees

Over the last few years, the survey data on North Korean refugees has attracted a growing amount of attention from researchers. Most eminent studies are those of Park (2002) and Lee (2007). In his study, Park (2002) surveys 84 refugees to estimate the IEA of North Korean households. He finds that the share of income from the informal economy in total income is significantly larger than that of formal income. Income from the formal sector is only 2% of the total

⁷ Some economists suggest "the supply multiplier effect": shortages reduce the utility of money and thus decrease households' labor supply (Barro and Grossman, 1974; Howard, 1976). One can use the term of a modified supply multiplier which refers to the negative effect of labor supply in the informal economy on the formal sector.

income while 98% of the total income is earned in the informal sector.

Lee (2007) attempts to understand the impact of “The July 1st 2002 Economic Management Improvement Measures” on household income and expenditures⁸ by using the survey data from 335 North Korean refugees. According to this work, the rate of unemployment increased from 23.4% before the introduction of the measures, to 34.8% after it. He attributes this increase to rapidly rising quits, especially among female workers. Lee (2007) argues that such measures encouraged North Koreans to work privately in order to make more money instead of working in the formal sector. He estimates that the share of informal income as a percentage of total income amounts to 90%.

According to Lee (2007), after the introduction of July 1st measures, an increasing number of respondents replied that they purchased raw materials through private, wholesale dealers. Expenditures of retail goods in the informal economy are more conspicuous. The share of respondents who used state shops to purchase consumer goods has further decreased. A total of 2% of North Korean refugees reported to have used state shops to buy consumer goods from 1997 to 1999, but the share decreased further to 0.8% from 2004 to 2006.

There are some studies using data from qualitative surveys of North Korean refugees. Yang (2005) conducts an in-depth survey of 24 refugees to understand the extent to which market activities are prevalent in North Korea. His findings are in line with those of the above studies in that an increasing number of individuals earn their income from secondary jobs in stores, rather than from regular wages. He reports a case in which the respondent made clothes privately and sold them in the market. In this case, after some time, the respondent began concentrating on activities such as the purchase of raw materials and the creation of sample products. He left the rest of the work to others, encouraging specialization among

⁸ North Korea announced reform measures on 1st July 2002, which include the abolition of retail price subsidies, concomitant increases of prices of consumer goods and wages, the permission of sales of goods produced by firms at market prices, and the permission of firms to use net profits at their disposal. These measures include reform elements similar to those in the 1965 Economic Reform in Soviet Union and the New Economic Mechanism in Hungary from the 1960s (Kim, 2005).

workers to improve efficiency and solidify his position in the market. North Korean authorities have a tendency to look the other way regarding such market activities harshly in order to boost tax revenue by collecting fees from vendors in open markets or by collecting real estate taxes from individuals. Moreover, Yang (2005) argues that such informalization spurs production activities and causes tougher competition, noting that increased home manufacturing activities and developments in the private service sectors are good examples. He also suggests that as North Korea fails to meet the demand for consumer goods, Chinese goods overwhelmingly account for the consumer goods sold in North Korea's markets. Consumer goods produced domestically are confined mainly to clothes, shoes, soaps, pencils and tooth pastes.

The above studies both show that North Korean retail markets are highly informalized and elements of a market economy are slowly making their way into North Korean life. In the retail sales market, an absolute majority of consumers no longer buy goods through state channels, but rather utilize informal channels like the Jonghap markets (similar to covered markets in the Western world). These became legal in the early 2000s along with black markets, and collective stores.

Although existing work reveals the characteristics of North Korean retail markets, there are several limitations stemming partially from small sample sizes. Furthermore, most studies are confined to describing what is happening in retail markets without much empirical analysis. We attempt to improve the existing work on the informalization of North Korean retail markets in two ways. First, we use a survey that has a larger sample size to obtain more reliable results. Second, we formally test the informalization hypothesis based on appropriate empirical analysis.

IV. Data Description

This study uses the survey data collected from 700 North Korean refugees. This survey was carried out by J. Kim, T. Kim, B. Kim, and I. Lee from 2004 to 2005.⁹ The survey is divided into two parts. The first

⁹The total number of North Korean refugees who have settled in South Korea from the early 1990s to the end of 2007 is about 13,000. The number of refugees in a year began to increase to a double-digit number in the

part is related to the refugees' economic life while living in North Korea and the second part is related to their adjustment to life in South Korea. In this paper, we use the first part of the data set because the purpose of this study is to analyze IEA of North Korean households.

The survey represents the largest sample size among the surveys of North Korean refugees and their economic life as conducted in South Korea. Yet this data set is not perfect. First of all, the sample is not representative of the total population of North Korea, as the survey is based on refugees from North Korea. The fact that many refugees left North Korea to escape starvation suggests that they were relatively poorer in North Korea. Second, the part of the survey on economic life in North Korea is based on memory. That is, respondents had to rely on their recollection of their lives in North Korea. Moreover, a large number of refugees came to South Korea via China or Southeast Asian countries. More than 53% of the respondents stayed in the third countries more than five years before they arrived in South Korea. Nevertheless, an absence of official data on North Korean households forces the use of the survey of North Korean refugees. We also believe that this data will still be able to reveal meaningful behaviour patterns of North Korean households.

Table 1 presents the means of the variables over the pooled sample for respondents who participate in the informal economy, the formal one, and as a whole.¹⁰ It is noteworthy that females participate in the informal economy more actively than males, whereas participants in the formal economy are dominantly male. The table suggests that, between participants in the formal economy and those in the informal one, there is little difference in the number of family members, age, and regions. However, it is noticeable that on average, formal economy participants appear to be better educated compared to those who participate in the informal economy.

Table 2 shows that the absolute majority of individuals participated in IEA. A total of 78% of the survey respondents reported to have worked in informal sectors while they were living in North Korea. In addition, 74% of jobholders in the formal economy have also engaged

mid-1990s and exceeded 1,000 from 2002. Most of the refugees escaped out of North Korea by crossing the border between North Korea and China, and spent some years outside North Korea to come to South Korea eventually.

¹⁰ We exclude some extreme observations in terms of income earned and observations relating to those who reported to have departed North Korea before 1997. Hence, our sample reduces to 675 observations.

TABLE 1
MEANS OF VARIABLES

	Total Survey Respondents	Informal Economy Participants	Formal Economy Participants
Demographic Characteristics			
Male	41%	37%	53%
Number of family members	3.68	3.68	3.74
Age	39.3	40.3	39.4
Regions (total = 100%)			
From Hamkyung Province	83%	81.5%	82.1%
Yanggang, Jagang Province	2.5%	3%	1.9%
Pyungahn Province	10%	10.8%	11.1%
Hwanghae, Kangwon Province	4.3%	4.5%	4.4%
Russia or Other	0.2%	0.2%	0.5%
Departure Year (total = 100%)			
1997-1998	44.2%	43.5%	47.8%
1999-2001	27.1%	27.2%	26.1%
2002-2004	28.7%	29.3%	26.1%
Education (total = 100%)			
Up to Middle School	21.5%	22%	16.7%
High School	50.5%	51.1%	51.4%
University	28%	26.9%	31.9%
Sample Size	675	525	360

TABLE 2
INFORMAL ECONOMY PARTICIPATION BY FORMAL ECONOMY PARTICIPATION

		Participation in the formal economy			
		No	Yes	Total	Share
Participation in the informal economy	No	53	95	148	22%
	Yes	260	265	525	78%
	Total	313	360	673	100%
	Share	46.5%	53.5%	100%	

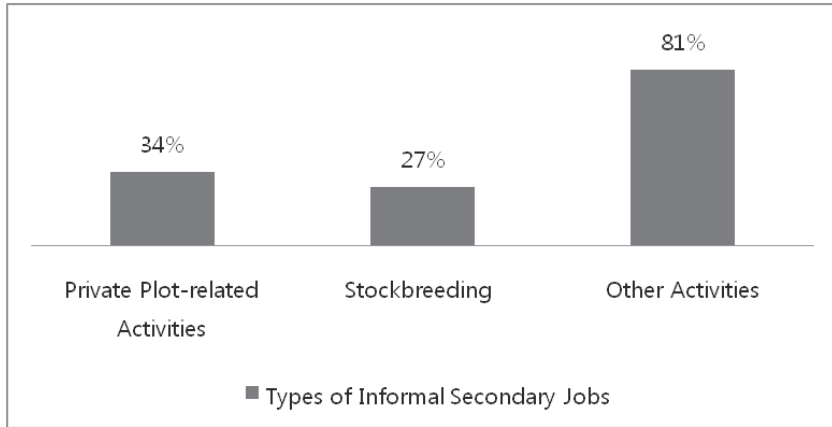


FIGURE 1
SHARE OF RESPONDENTS PARTICIPATED INFORMAL ECONOMY ACTIVITIES

in IEA, while 83% of respondents who did not officially work involved in IEA.

Figure 1 shows the classifications of informal work in North Korea. We characterized them into three types: private plot-related activities, stockbreeding and other activities including trading on streets. The 34% and 27% of participants in IEA engage in private plot-related activities and stockbreeding, respectively. The most dominant activities in the informal economy are the type classified as others; the 81% of IEA participants fall into this category.¹¹

Figure 2 details other types of IEA. We categorized these into five activities. The most popular other types of IEA, namely those excluding private plot activities and stockbreeding, are street vending. A total of 53% of the participants in other types of IEA worked as street vendors of food, fish or groceries. The second most popular job, with 25%, is the production of consumer goods for sale, particularly food-processing. More than 10% of workers in other types of IEA are involved in the smuggling of goods from China or other regions. In general, most IEA in North Korea are distribution-oriented, and not value addition-oriented. The sum of the respondents involved in street vending

¹¹The three types of IEA are not mutually exclusive. Hence, the sum of these numbers exceeds 100%. In many cases, respondents who replied to involve in stockbreeding also work on private plots.

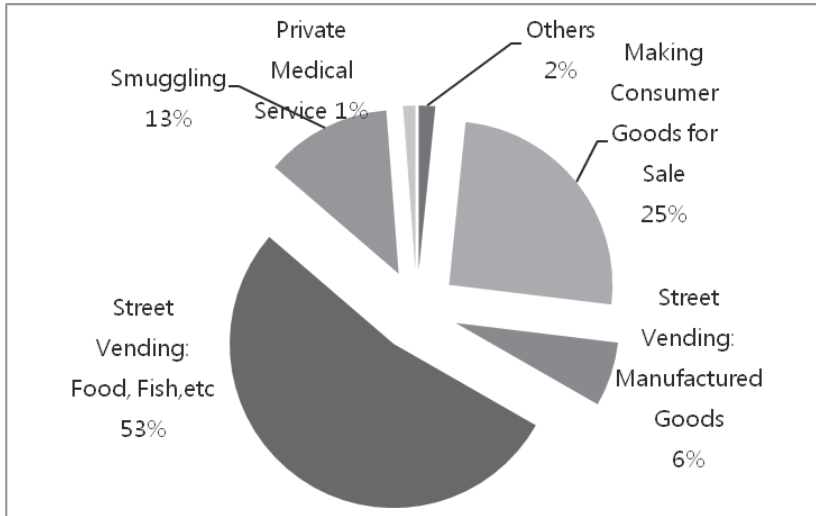


FIGURE 2

DISTRIBUTION OF OTHER TYPES OF INFORMAL ECONOMY ACTIVITIES

and smuggling is more than 70% of the total of other jobs. In contrast, 28% of respondents holding other jobs participated in value-added activities such as producing consumer goods and the provision of private service. However, the nature of producing consumer goods for sale suggests added low value as most of goods dealt were food, cigarettes and ice cream. Although some activities such as making clothes, shoes, or bicycles are reported, the numbers are negligible.

Figure 3 presents the refugees that participated in IEA each year as a share of total respondents, regardless of whether or not they worked in the informal economy. We asked respondents to answer the questions based on their experience one year before departing North Korea. As the sample size in a year is less than 100 after 1998, the trend of these shares should be taken with caution. The statistical tests suggest that there is no significant change in the shares of both private plot-related and stockbreeding activities (henceforth PS activities) and other activities between 1996-2001 and 2002-2003.¹²

¹² Because of multiple participation in both PS activities and others, the figures suggested by the sum of the share of these activities do not match

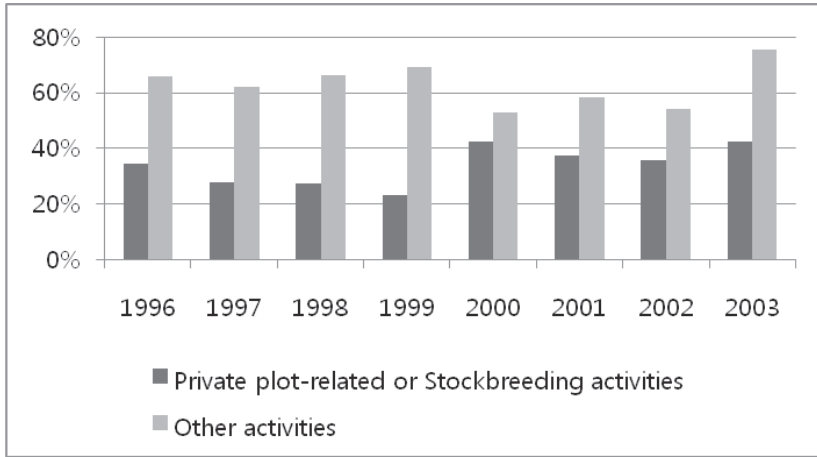


FIGURE 3
TREND OF INFORMAL ECONOMY ACTIVITIES

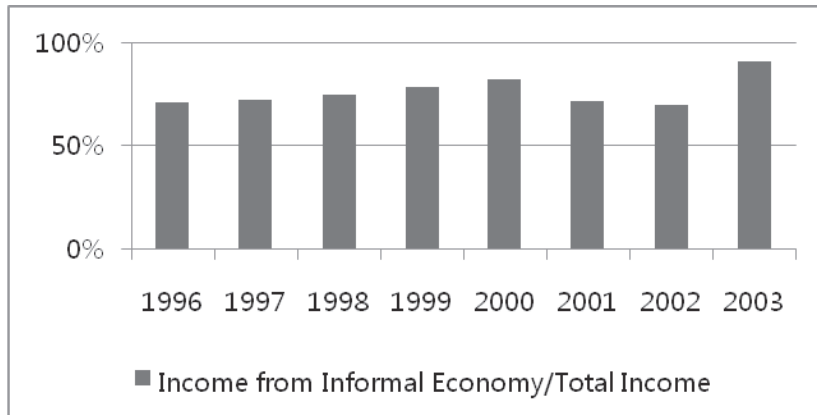


FIGURE 4
THE SHARE OF INFORMAL INCOME OUT OF TOTAL INCOME

Figure 4 shows the share of income from the informal economy from 1996 to 2003. We define total income as the sum of income from both formal and informal sectors. According to the figure, the share of informal income from total income is 78% since 1998. This figure is

that 78% of total respondents participated in IEA shown as in Table 2.

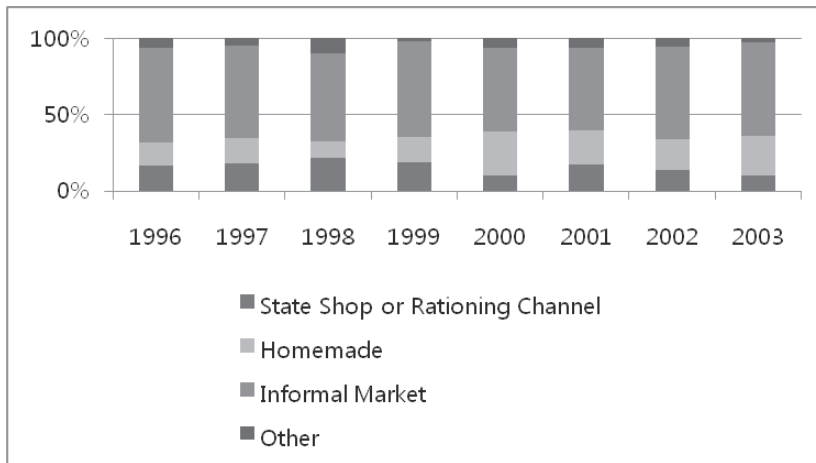


FIGURE 5

DISTRIBUTION CHANNELS OF BASIC FOOD AND AGRICULTURAL PRODUCTS

surprisingly high, even if compared to former socialist economies. For instance, Kim (2003) shows that the share of informal income of Soviet household as a percentage of the sum of formal and informal income was around 16.3% during 1964-1990. Yet again there is no significant difference in the share between 1996-2001 and 2002-2003.

We also present the share of expenditures spent on the informal economy. Figures 5 and 6 show the places where basic food and consumer goods were purchased, respectively. The state shop and the rationing channel are the official distribution networks in North Korea, while self-consumption and purchasing food or goods on the street or in markets are classified as informal channels. As the figures suggest, both in the cases of consumer goods as well as basic food and agricultural products, the share of consumption through the official distribution channels out of total consumption does not exceed 20%. This is in stark contrast to the period before the 1990s, during which the dominant distribution channels were rationing and state shops. The shares of food expenditure and consumer goods through the official channels in 2003 are only 10.3 and 8.4%, respectively. The share of consumption through the informal distribution channels in North Korea is much higher than that in the Soviet Union: According to Kim (2003), Soviet households' expenditure through informal channels was only 22.9% of total expenditure from 1969 to 1990. In sharp

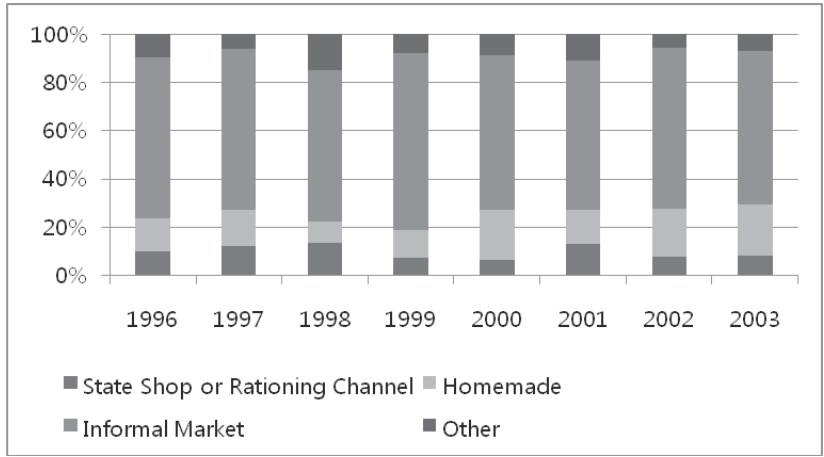


FIGURE 6
DISTRIBUTION CHANNELS OF CONSUMER GOODS CONSUMPTION

contrast to Soviet households, informal expenditures in North Korea exceed 90% of total expenditure.

V. Econometric Analysis

A. Determinants of Informal Economy participation

We estimate the determinants of informal economic participation by using a probit model. IEA are broadly categorized into two types, PS activities, and other activities.¹³ As documented in Figure 2, other types of IEA include street vending, production of consumer goods for sale, private medical service and smuggling. We aim to examine underlying motivations for each IEA, more specifically whether or not IEA are driven by survival motives. In order to test this hypothesis, we use two variables. One is real wages from the formal sector, and the other is the rank of income perceived by respondents. The former is related to objective poverty in terms of formal wages, while the latter pertains to subjective poverty.¹⁴ Other explanatory variables

¹³ Private plot-related and stockbreeding activities are highly correlated and thus considered as similar activities. The correlation coefficient is 0.498

¹⁴ There may be a possibility of endogeneity of the variable of wages from the formal sector. However, in North Korea, most formal jobs are allocated to individuals based on the status of the family and the extent of loyalty to the

include demographic related variables such as gender, age, age squared, the number of family members, educational background, the year of departure from North Korea, variables related to main jobs, regional variables and employment status of other family members. The results of these regressions are presented in Table 3.

Models 1 and 2 in Table 3 present the estimation results of the determinants of PS activities and the types of IEA, respectively. The results show that the significance of demographic variables in Models 1 and 2 differs. According to Model 2, males are less likely to work in other IEA, whereas Model 1 shows no significant effect of gender on PS activities. In addition, Models 1 and 2 present contrasting effects of age, the number of families, and education on informal economy participation. Regarding age, PS activities increase once a person passes the age of 31. In contrast, other types of activities are conducted most actively at the age of 37. Regarding the significance of the number of family members, PS activities may need the cooperation of family members, as indicated by the positive coefficient on the number of family members in Model 1. Concerning education, the coefficient on middle school is positive and negative in Models 1 and 2, respectively. This finding indicates that other types of IEA may require the higher levels of education compared to PS activities.

As for the affect of one's main job on IEA, those who work as clerks are most active in PS activities. Managerial positions and professionals significantly decrease the possibility of other types of IEA. One interesting result is that the association of a family member with the informal economy encourages other members to participate in the informal economy as a vendor, making consumer goods and smuggling them. This neutralizes the positive coefficient on family member working in the informal sector in Model 2. Having a family member participating in other types of IEA would increase the marginal probability to participate in such IEA by around 14%.

Most importantly, the result suggests that a survival strategy is important in explaining participation in the IEA. We use two variables as a proxy for low income or income in need. The first one is real wages from the formal sector.¹⁵ If the purpose of working in

regime. Admission to tertiary education is also heavily affected by such factors.

¹⁵We use the growth rates of nominal exchange rates of the North Korean currency against US dollars to estimate a price deflator in North Korea. That is, based on the purchasing power parity (PPP) theory, we equate the growth

TABLE 3
PARTICIPATION IN INFORMAL ECONOMY ACTIVITIES

Explanatory Variables	Whether the individual holds a informal job or not			
	in "private plot-related or stockbreeding activities"		in "other activities"	
	(1)	t-ratio	(2)	t-ratio
Demographic Characteristics				
Male	-.0201	-0.38	-.3742**	-2.69
Age	.0795**	3.47	-.0736**	-2.36
ln(age squared)	-1.243**	-3.14	1.359**	2.07
number of family	.1200**	5.62	-.0334	-0.82
Education				
Up to middle school	.4506**	4.94	-.4965**	-2.68
High school	.0463	0.70	.0315	0.20
University		Omitted Variable		
Departure Year				
1997-1998		Omitted Variable		
1999-2001	.0987	0.99	-.1305	-0.86
2002-2004	.3056**	2.36	.0017	0.01
Main Job				
Unskilled occupations	.1207	0.98	-.2220	-1.43
Skilled blue-collar workers	-.1634	-0.60	-.3910	-1.41
Service and market workers		Omitted Variable		
Clerk	.4006*	1.89	-.0138	-0.04
Management and senior administration	-.3495	-1.55	-.4743*	-1.93
Professionals	.2663	1.37	-.8552**	-2.81
Regions				
Hamkyung Province		Omitted Variable		
Yanggang or Jagang Province	.1653	0.55	.6650	1.18
Pyungahn Province	-.1025**	-3.42	.4368**	2.09
Hwanghae or Gangwon Province	.0411	0.25	.4141	1.27
Family member working				
In formal sector	.1940	1.40	-.2769**	-2.02
In Informal sector	.0660	0.98	.3704**	2.54

(Table 3 Continued)

Explanatory Variables	Whether the individual holds a informal job or not			
	in "private plot-related or stockbreeding activities"		in "other activities"	
	(1)	t-ratio	(2)	t-ratio
Income				
Real wage from formal sector	-.0000*	-1.67	-.0002**	-3.57
Rank#	-.0785**	-2.11	-.0937	-1.55
Number of Observations	519		519	
Pseudo R square	0.075		0.139	

Notes: Estimation was conducted using a probit model. In all columns, absolute t-ratio on the basis of robust standard errors is provided in parentheses. Constant term is not reported. Levels of statistical significance indicated by asterisks: *90%; **95%.

#: Rank is classified into five categories based on subjective quality of life and standard of living; top 20%, 20-40%, 40-60%, 60-80%, 80-100%.

the informal economy is to compensate for the low wage earned from the formal sectors, one would expect the coefficient on this variable to be negative. The second one is a subjective standard of living measured by rank, indicating 1 to be in the top 20% and 5 to be in the bottom 20%. If one subjectively considers himself to be relatively affluent, he would not participate in the IEA either. Hence, the coefficient on this variable is expected to be positive. In line with our expectation, the coefficient on real wages, from the formal sector, is precisely determined with a negative sign, implying the IEA participation is driven by the survival motive. However, in the case of rank, the result is somewhat different from our expectation. The variable is negatively correlated with PS activities, suggesting that those who perceive themselves as relatively rich are more likely to participate in PS activities.¹⁶ The survival motive, as a main driving force of IEA in

rate of nominal exchange rates of North Korean currency against US dollars in a given year with the price deflator in the same year. SNKR includes questions about market exchange rates (Jangmadang exchange rates) and we use the average of such rates. In order to check the reliability of the reported exchange rates, we compared them with the data from the CIA. We found that they are quite similar.

¹⁶This result may be plagued by endogeneity of the variable of rank. The income of an individual would increase if he or she works in the informal sector, which causes the negative correlation between rank and informal economy participation. One interpretation made by a referee is that motives

North Korea, suggests that IEA is deeply rooted in the inefficiency of the system. Hence, one can argue that IEA would not disappear without a dramatic increase in the welfare of the population.

B. Labour Supply in the Formal Economy

In this section, we test the hypothesis that participation in IEA reduces labor supply in the formal sector. Labor supply and participation in the IEA are likely to be interconnected. Hence, estimating labor supply without taking endogeneity of participation in IEA would result in biased estimates. We aim to correct such bias using an instrumental variable approach. In other words, the parameters of the model are estimated using a two-step procedure. In the first stage, an equation for participation in the IEA was estimated using a probit model as above. We independently predict the value participation in PS activities and other IEA, as in Models 1 and 2, and use the predicted variables as regressors in the equation for labor supply in the formal sector. Since our proxies for IEA participation are previously estimated variables, conventional standard errors would be biased. We therefore report bootstrapped standard errors in Models 3 and 5.¹⁷ The first column refers to estimation results from the OLS, as a reference. Models 4 and 5 include the interactive term between IEA participation and time to understand how IEA affects the official labor supply in a non-linear way.

The results in all models show that participation in PS activities has no significant effect on official labor supply. On the contrary, engaging in other forms of IEA tends to significantly reduce labor supply in the formal sector. In this regard, PS activities can be categorized as system supplementing activities while other forms of IEA as system substituting ones.¹⁸ The magnitude of the coefficient

for IEA have been changing from mere survival to exploiting opportunities over time, and the negative coefficient on real ages refers to the old motive while the positive one on subjective rank reflects the new motive. Another possibility is that respondents over-reported their subjective standard of living while they were objectively poorer in North Korea.

¹⁷Our bootstrapped standard errors are based on 1,000 replications. Regressions in columns (3) and (5) were thus conducted 1,000 times and the bootstrapped standard errors that we report for each coefficient were calculated from the distribution of each of the 1,000 estimated parameters obtained in these replications.

¹⁸We thank a referee who suggested this interpretation.

TABLE 4
EFFECT OF INFORMAL ECONOMY PARTICIPATION ON LABOR SUPPLY
IN THE FORMAL SECTOR

Explanatory Variables	Labour Supply in the Formal Economy				
	OLS (1)	IV (2)	BS (3)	IV (4)	BS (5)
Demographic Characteristics					
Male	12.177 (0.12)	-28.553 (-0.26)	-28.553 (-0.25)	-28.688 (-0.26)	-28.69 (-0.25)
Age	-28.43 (-0.77)	-47.58 (-0.85)	-47.58 (-0.83)	-46.227 (-0.82)	-46.23 (-0.80)
ln(age squared)	815.90 (1.09)	1191.1 (1.15)	1191.1 (1.14)	1105.7 (1.07)	1105.7 (1.05)
number of family	-25.09 (-0.78)	-33.265 (-0.56)	-33.265 (-0.55)	-47.417 (-0.79)	-47.42 (-0.77)
Education					
Up to middle school	Omitted Variable				
High school	112.64 (0.87)	209.34 (0.91)	209.34 (0.93)	246.24 (1.07)	246.24 (1.07)
University	-29.39 (-0.19)	94.203 (0.39)	94.203 (0.39)	108.98 (0.46)	108.98 (0.46)
Departure Year					
1997-1998	Omitted Variable				
1999-2001	-112.3 (-0.96)	-157.74 (-1.23)	-157.74 (-1.21)		
2002-2004	77.173 (0.68)	87.870 (0.55)	87.870 (0.54)		
Main Job^a					
Management	-327.9 (-1.20)	-444.15 (-1.32)	-444.15 (-1.31)	-407.26 (-1.22)	-407.3 (-1.16)
Professional	-361.4 (-1.36)	-459.95 (-1.50)	-459.95 (-1.49)	-474.15 (-1.55)	-474.2 (-1.46)
Administrative Positions	-510.1 (-1.61)	-625.5* (-1.81)	-625.5* (-1.80)	-638.5* (-1.82)	-638.5* (-1.79)
Clerk	-324.9 (-1.05)	-377.77 (-1.08)	-377.77 (-1.08)	-432.88 (-1.24)	-432.9 (-1.24)
Service Sector	Omitted Variable				
Skilled blue-collar workers	-491.4* (-1.82)	-616.2** (-2.02)	-616.2** (-2.04)	-589.7** (-1.91)	-589.7* (-1.82)
Industry, Construction, transport	-419.5 (-1.62)	-499.3* (-1.80)	-499.3* (-1.83)	-553.2** (-1.97)	-553.2* (-1.95)
Mining, Agriculture	-323.2 (-1.26)	-382.78 (-1.37)	-382.78 (-1.41)	-422.87 (-1.52)	-422.9 (-1.46)

(Table 4 Continued)

Explanatory Variables	Labour Supply in the Formal Economy				
	OLS (1)	IV (2)	BS (3)	IV (4)	BS (5)
Regions					
Hamkyung Province			Omitted Variable		
Yanggang or Jagang Province	-522.0 (-1.65)	-255.80 (-0.80)	-255.8 (-0.68)	-276.36 (-0.86)	-276.4 (-0.69)
Pyungahn Province	216.15 (1.30)	223.14 (1.37)	223.14 (1.36)	234.19 (1.44)	234.2 (1.44)
Hwanghae or Gangwon Province	80.567 (0.49)	125.14 (0.70)	125.14 (0.64)	122.46 (0.66)	122.5 (0.59)
Informal Economy Participation					
In private plot-related or stockbreeding activities	115.0 (1.00)	68.913 (0.07)	68.913 (0.06)	244.30 (0.19)	244.3 (0.19)
Time*PS activities				33.975 (0.34)	33.975 (0.32)
In other activities	-405.9** (-4.01)	-741.3** (-2.42)	-741.3** (-2.35)	-684.6* (-1.92)	-684.6* (-1.92)
Time*Other activities				-21.219 (-0.33)	-21.22 (-0.33)
Number of Observations	251	248	248	248	248
Over-identification test (P-value)		0.51		0.42	
R square	0.148	0.101	0.101	0.091	0.091

Notes: Estimation was conducted using a probit model. In all columns, absolute t-ratio on the basis of robust standard errors is provided in parentheses. Constant term is not reported. Levels of statistical significance indicated by asterisks: *90%; **95%.

a: Main job is now specified into ten categories: management is now divided into (1) management staff and (2) administrative position, simple physical labor is divided into (1) forestry, (2) industry, construction, transport, (3) mining, agriculture, and the rest stay the same. Forestry is omitted due to small sample size.

on informal economy participation in other activities suggests that about 35% of working hours decrease because of such types of IE A.¹⁹ This finding appears to support the informalization hypothesis in a way that increasing market activities subsequently shrinks labor inputs in the formal sector.

We further test whether there is evidence of deepening informalization

¹⁹The average working hours of respondents who participated in the formale conomy is 2,126 hours per year, which is 40.1 hours per week.

over time. We use an interaction term between time trend and PS, or other types of IEA. Models 4 and 5 show that these interaction terms are not significant, indicating that the unit impact of participation of other types of IEA on official labor supply is constant during the period of our estimation. In other words, a reduction in official labor supply, if any, is due to an expansion of other types of IEA, and not an increasing impact of such activities. However, we found in earlier sections that there is no significant trend of such IEA activities. This implies that one condition is not still satisfied to accept the informalization hypothesis. The informal economy is very large, relative to the formal economy. Unlike PS activities, IEA involving street vending, making consumer goods for sale and smuggling are possible in reducing official labor supply. However, such types of IEA appear not to have expanded significantly from 1996 to 2003. Furthermore, their unit impact on official labor supply has not increased in the same period.

VI. Conclusions

This paper uses the survey data of North Korean refugees who settled in South Korea to show that IEA is prevalent in North Korea. The share of income from the informal economy is 78% as a percentage of total income. In addition, 78% of North Korean households participate in IEA. Popular forms of IEA include private-plot-related activities, stock-breeding, street vending, producing consumer goods for sale and smuggling. However, there is insufficient evidence that IEA has been increasing recently, especially after 2002.

We find that the participation is driven by low income from the formal sector, as the income effect on informal economy participation is significant in North Korea not only for PS activities but also for other types of IEA like street vending and producing consumer goods for sale. In other words, the dominant motive for informal economy participation is to escape from poverty. The influence of poverty on informal economy participation suggests that IEA is used as a survival strategy by the poor in order to supplement their income. It also indicates that participation in IEA will continue unless there is a dramatic increase in the welfare of households.

It is found that labor supply in the formal sector is negatively affected by other types of IEA. Yet, there is no such effect of private-plot-related activities and stockbreeding. We find that the

impact of participation in other types of IEA on official labor supply has been stable during the period of our estimation. This indicates that the further shrinkage of the formal economy, if any, will be caused by an increase in market-trading activities, rather than its increasing unit impact.

Recently, there have been reports that North Korean authorities tried to forbid market trading conducted particularly by women under the age of 45. This policy intends to target relatively young women, who are most active in street vending or sales in markets. This can be interpreted as evidence that North Korean authorities understand the negative effect of such types of IEA on official labor supply.

The informal economy may result in a poor provision of public goods, low respect for law and order and the high corruption of bureaucrats, creating a vicious circle in the economy. Hence, further increases in IEA, particularly trading in markets, may destabilize the central planning system. The dilemma facing North Korean authorities is how to find a balance between allowing market activities to aid poverty stricken families while reducing the negative effects of such activities on the central planning system. However, this dilemma may not be resolved as the history of centrally planned economies vividly displays.

(Received 8 January 2008; Revised 18 June 2008)

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