

年齢構成と貿易開放度に関する地域別分析
The effects of age structure on trade openness by geographic region

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In this research, we investigate how age structure influences trade openness (i.e., the ratio of trade to GDP) by geographic region. Not all tradable goods are imported or exported, but an increase in the demand and supply for tradable goods will increase imports and exports. Based on previous studies, especially Braude (2000) and Fukumoto and Kinugasa (2017), we hypothesize that there exist differences in demand between tradable and non-tradable goods by age groups. Compared with working-age individuals, dependent individuals tend to consume more non-tradable goods such as education and medical services; this suggests that an increase in the share of the working-age population will increase the demand and supply for tradable goods relative to non-tradable goods and thus increase trade openness.

We empirically examine the relationship between trade openness and age structure using panel data. We conduct empirical analysis not only for the whole world but also for the following four regions of the world: Africa, Asia and Oceania, Europe, and North and South America. We deal with a sample period of 1951–2010 and 92 countries are considered to represent the whole world sample. We calculate five-year average data from 1951 to 2010 and create panel data for 12 periods: 1951–1955, 1956–1960, 1961–1965, 1966–1970, 1971–1975, 1976–1980, 1981–1985, 1986–1990, 1991–1995, 1996–2000, 2001–2005, and 2006–2010. In our empirical model, the dependent variable is trade openness. Independent variables are the variables for age structure, the government consumption share of GDP, population and period dummies. We use two kinds of age-structure variables: share of working-age population in total population and dependency ratio (the ratio of young and old dependent populations to working age population).

We estimate the following three equations by region: Africa, Asia and Oceania, Europe, and North and South America.

$$\begin{aligned} Openness_{it} = & \alpha_i + \beta_1 Age(n)_{it} + \beta_2 Gov_{it} + \beta_3 Pop_{it} + \beta_4 GDP/Pop_{it} \\ & + \beta_5 D(1956 - 1960)_{it} + \beta_6 D(1961 - 1965)_{it} + \beta_7 D(1966 - 1970)_{it} \\ & + \beta_8 D(1971 - 1975)_{it} + \beta_9 D(1976 - 1980)_{it} + \beta_{10} D(1981 - 1985)_{it} \\ & + \beta_{11} D(1986 - 1990)_{it} + \beta_{12} D(1991 - 1995)_{it} + \beta_{13} D(1996 - 2000)_{it} \\ & + \beta_{14} D(2001 - 2005)_{it} + \beta_{15} D(2006 - 2010)_{it} + \varepsilon_{it} \end{aligned}$$

for $n = 1, 2, 3$. The dependent variable $Openness_{it}$ represents trade openness of country i at period t . α_i is a country dummy variable. Let $Age(1)_{it} = Working_{it}$ be the share of working-age population, $Age(2)_{it} = Dependency_{it}$ be the dependency ratio, and $Age(3)_{it} \equiv 0$. Gov_{it} denotes the government consumption share of GDP, Pop_{it}

denotes population, and GDP/Pop_{it} is the real GDP per capita. $D(XXXX-YYYY)_{it}$ are period dummies.

We consider factors other than age structure as follows. Government consumption share of GDP is defined as the variable of government size. High government size might mean strong government intervention, and we expect that government size has a negative effect on trade openness. Population is considered as the variable of economy size. We expect that the economy size has a negative effect on trade openness because smaller countries tend to need to trade more than larger countries. Real GDP per capita is used for the variable of economic development. It is expected that increases in demand for luxury non-tradable goods due to economic development would reduce trade openness. We use period dummies as proxy variables for the trade barriers and foreign outsourcing because of data restriction. Above all, declining trade barriers and increasing foreign outsourcing could be important reasons for the upward trend of trade openness over several decades. Development of regional economic integration would influence trade openness for many countries in the same region during the same period, and so we believe that it comprises a part of the period dummy variables. Therefore, it is possible that the effects of period dummies on trade openness are different by region.

Our empirical results show that the share of working-age population has significantly positive effects and the dependency ratio has significantly negative effects on trade openness in the three regions except Africa. The absolute values of the coefficients are the largest for Asia and Oceania and second largest for Europe. Since intra-regional trade is actually vigorous in both regions, this would be consistent with our hypothesis. In Europe, the dispersions of trade openness and the share of working-age population are small, therefore, the similarity of age structure might influence similarity of trade openness. The absolute values of the coefficients for North and South America are smaller than those for Asia and Oceania and Europe. Because North and South America is quite a long region, it is possible that intra-regional trade of North and South America has not been developed. In addition, shift to trade liberalization was delayed in South American countries compared with Asian countries because trade policies based on infant industry argument were predominant. Manufacturing protection under import-substituting industrialization decreases the share of trade of tradable goods. As a result, trade openness might be less sensitive to age structure. In many African countries, goods and labor markets are not prepared enough, and non-tradable goods such as education and medical services may not be sufficiently supplied. Therefore, it is possible that age structure does not influence trade openness in Africa.

To sum up our empirical results, it is possible that demographic change has influenced trade openness. Moreover, it is suggested that the similarity of trade openness among countries in the same region may occur not only because of regional economic integration but also because of similarity of age structure.