The Impact of Logistics Costs on the Economic Development: The Case of Thailand

Liu Xianghui, International School, Associate Dean Huaqiao University, PRC

Abstract

Thai economy has been suffering from the low efficiency of its logistics systems, which is revealed by its remarkably high logistics costs in relation to its gross domestic product. Having impacts on both the industrial structure and spatial distribution of the economy, high relative logistics costs in Thailand greatly constrains the sustainable development of Thai economy. While the Thai government are taking proactive measures to reduce its logistics costs in relation to its gross domestic product, special attention should be paid to the relation between the logistics costs and economic development to develop appropriate logistics policies to accommodate the need of economic development.

1. Introduction

With exports accounting for more than two thirds of its gross domestic product (GDP), Thailand is heavily exportdependent. As a result, the importance of the logistics systems to Thai economy can never be overstated.

Although proactive measures have been taken to increase the efficiency of its logistics systems, Thailand's logistics costs relative to its GDP continue to remain high these years (see table 1 and figure 1). In 2009, the total value of logistics costs of Thailand was approximately 1.5 trillion Baht which accounted for 16.8 percent of the GDP (see figure 2 for the trend). In comparison, US's total logistics costs in 2009 were around 1095 billion US dollars, an equivalence of 7.7 percent of the GDP. As it might be argued that Thailand and the US share too few commonalities to be compared with each other, a comparison with its neighboring countries within ASEAN is more persuasive. While Thailand's logistics costs relative to its GDP are nearly 20 percent, Singapore and Malaysia's costs of logistics are about 8 percent and 13 percent of their GDPs respectively. Meanwhile, logistics costs range between 8% and 10% in most OECD countries. According to Bowersox, Rodrigues and Calantone (2005), global logistics costs in 2002 were estimated at USD 6732 billion, and corresponded to 13.8 per cent of the world's GDP in that year. It seems that Thai's logistics costs to GDP are a little bit too high.

Recently, the National Economic and Social

Table 1. Logistics Costs to GDP during 2001-2010 in percent

	2001	2002	2003	2004	2005	2006	2007	2008	2009	2010
Transport Costs to GDP	9.9	8.8	8.4	8	8.5	8.8	8.9	9.1	8.3	8.7
Inventory Holding Costs to GDP	7.9	7.7	7.7	7.7	8.1	8.5	8.2	7.8	7	7.6
Administration Costs to GDP	1.8	1.6	1.6	1.6	1.7	1.7	1.7	1.7	1.5	1.6
Total Logistics Cost to GDP	19.6	18.1	17.7	17.3	18.3	19	18.8	18.6	16.8	17.9

Source: Office of the National Economic and Social Development Board (NESDB)

Development Board (NESDB), the Thai government's planning agency, has set a fiveyear target to lower logistics costs from 19 percent of GDP to 1516 percent by the end of the 11th national economic and social development plan in 2016. In order to accomplish this ambitious goal, the Thai government has approved a plan to expand the rail network and add highspeed trains. The cost for this rail infrastructure overhaul is enormous, with the total budget projected to be 1.7 trillion baht1. This investment program includes upgrading 660 kilometers of existing track and signaling infrastructure, buying more locomotives, and constructing five doubletrack routes to the northern, northeastern and southern regions. Can this investment program be economically justified? What shall we do to reduce the logistics costs in Thailand? We'll examine these two questions by analyzing the nature and structure of logistics costs.

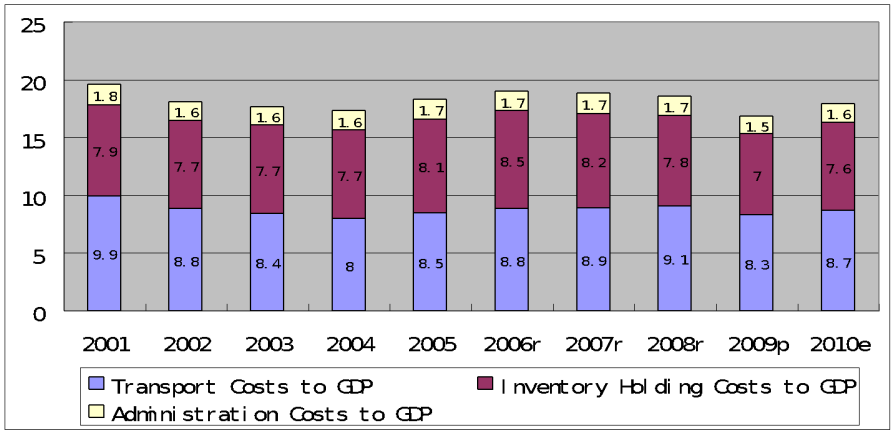

Fig. 1. Proportion of Logistics Costs to GDP at Current Prices, 2000-2010

Source: NESDB

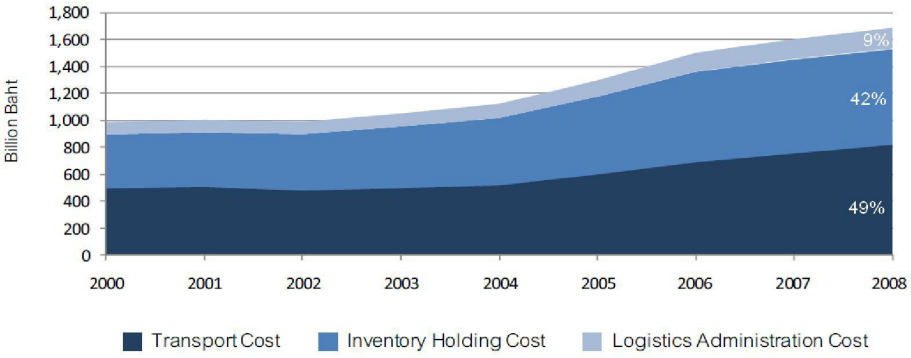

Fig. 2. Thailand's Logistics Costs from 2000 to 2008 as absolute costs

Source: Thailand Logistics Report 2008

2. The impacts of logistics costs on the economic development

2.1 Logistics industry is a huge industry in Thailand

With a favorable geographical position in Asia, Thailand has aspired to become ASEAN's logistics hub. The logistics industry is a huge industry in Thailand, and the NESDB estimated it had a potential to generate about 300 billion baht added value to the economy each year.

The market value of Thai's logistics industry in Thailand was approximately 800 billion baht (USD 26.4 billion) in 2010. While the logistics industry generates about 3.2 percent of Thai's GDP, it forms an important economic sector by itself. However, the significance of the logistics industry in the economy is far beyond this. On the one hand, as an important producer's service industry, logistics can impede or facilitate the development of the economy. On the other hand, logistics costs are framing forces of both industrial structure and regional distribution of the economy.

[1] There has been some information revision of GDP and total logistics costs in 20062008 in accordance with the National Income in 2010. In addition, the forecast of Thailand economic situation in 2011 by Kasikorn Research Center expects that the logistics cost per GDP of 2011 is still higher than 18 per GDP.

2.2 Logistics costs have large impacts on the scale of the economy

Logistics costs and trade costs are closely related. According to James Anderson (Anderson, Wincoop, 2004), trade costs include all costs incurred in getting a good to a final user other than the marginal cost of producing the good itself, such as transportation costs (both freight costs and time costs), policy barriers (tariffs and nontariff barriers), information costs, contract enforcement costs, costs associated with the use of different currencies, legal and regulatory costs, and local distribution costs (wholesale and retail). Among the many components of trade costs, transportation costs are undoubtedly logistics costs, while some other costs like local distribution costs are partially logistics costs. Therefore, there should be a positive correlation between logistics costs and trade costs. The impacts of the trade costs on the economy in general and on the volume of trade in particular are well researched. It is estimated that 10 % increase in transport costs reduces trade volume by 20 % and doubling shipping costs slows GDP growth by 0.5 % (Limao Nuno, Anthony J. Venables , 2001).

From a microeconomic perspective, the costeffectiveness of logistics can have a major bearing on a firm's decisions about which country to locate in, which suppliers to buy from, and which consumer markets to enter. From a macroeconomic perspective, high logistics costs to GDP are a barrier to trade and foreign direct investment (FDI), and thus to economic growth. Countries with higher overall logistics costs are more likely to miss the opportunities of globalization.

Higher logistics costs result in higher trade costs, which in turn penalize trade and impede the realization of gains from trade liberalization as well as the growth of the economy. While other ingredients in trade costs are mostly industry neutral, that is, they penalize trade in various industries equally, logistics costs are industry sensitive, and as a result, logistics costs can work as a framing force of industrial structure.

2.3 Logistics costs are framing forces of industrial structure

The level of logistics costs is heavily dependent on the industry, and tends to be high in logisticsintensive operations such as food, metal, chemical and paper manufacturing (Farahani, Asgari & Davarzani, 2009). In terms of trade costs, we may say that the trade costs have a similar effect as ad valorem tax. Anderson and Wincoop have estimated the tax equivalent of 'representative' trade costs for industrialized countries is 170%, with transportation costs alone contributing 21% of the tax equivalent (Anderson, Wincoop, 2004).

Thailand's economic growth has been largely fueled by international trade. Given this dependence on international trade, freight logistics have played an important role in the competitive edge of various industries of Thai's in the international market. If Thai's logistics industry is less efficient than other countries, the competitiveness of almost all industries will suffer. However, the degree to which different industries are penalized is different. It is quite obvious that those industries that produce goods with a low valuetoweight ratio will suffer more from the low efficiency of the logistics industry. On the contrary, the industries that produce relatively light products, that is, those with a high valuetoweight ratio such as hightech electronic products or pharmaceutical products, will benefit more from trade liberalization and are more likely to prosper. In this way, logistics costs provide a way to shape the structure of the economy.

2.4 Logistics costs are framing forces of regional economies

In a similar fashion, logistics costs can also work as framing forces of regional economies. If the logistics costs are substantial in relative to the costs of the goods, the industry will concentrate on places with good logistics infrastructure. On the contrary, if there is a highly developed logistics system available,

the industries will be less likely to concentrate on a few regions with favorable geographic positions. So, it is clear that low logistics efficiency will contribute to the emergence of development gaps between developed regions and less developed regions. Let's take the distribution of agriculture as an example. Since fruits are more demanding to the logistics than rice because they have to be shipped in a more timely way, fruits farming will slowly concentrate on the regions with better transportation infrastructure.

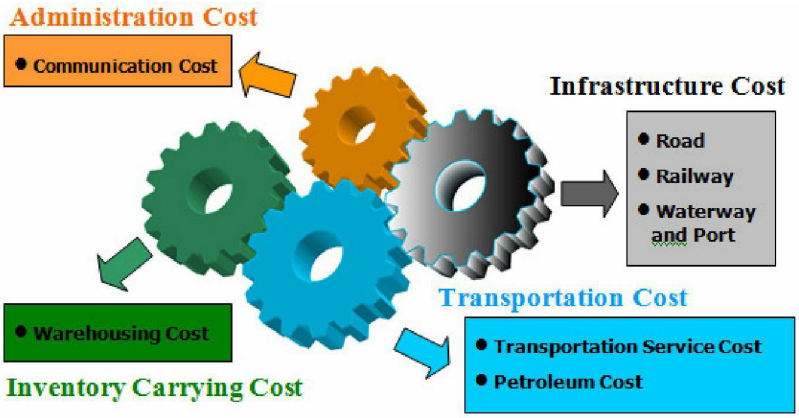

Fig. 3. Logistics Cost Components

Source: In Pursuit of Transportation Research Challenges in Thailand, Journal of Asian Transportation Research Society

3. Why is Thailand's logistics costs so high and what is the consequence

3.1 The structure of Thailand's logistics costs

In order to make a diagnosis to Thai's logistics system, we need to begin our analysis with examining the structure of Thailand's logistics costs.

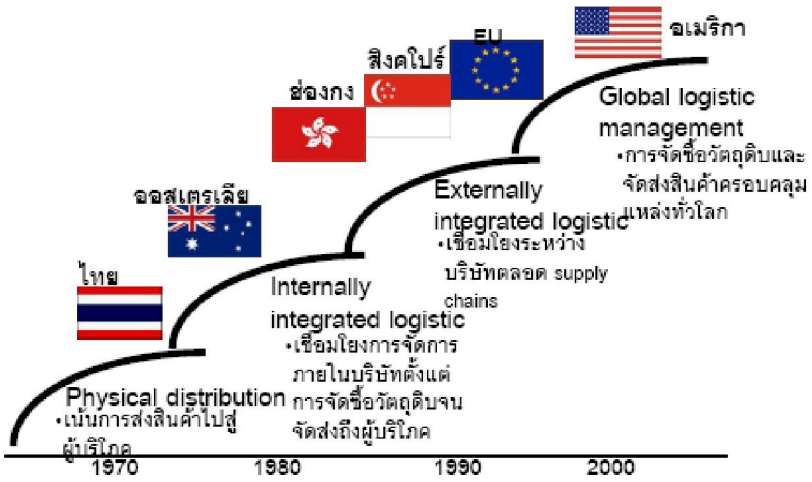

Fig. 4. The Stage of Thai Logistics Development

Source: The Current Situation of Thailand's Logistics

From a macroeconomic perspective, logistics costs can be divided into four categories: transportation costs, inventory carrying costs, administration costs, and infrastructure costs (see figure 3). Since the infrastructure costs are largely undertaken by government sectors, we usually exclude infrastructure costs from logistics costs. Comprising transportation service costs, petroleum costs, vehicle costs and maintenance costs, transportation costs usually account for over 60% of total logistics costs in developed economies.

Whereas inventory carrying costs comprise warehousing costs and financial costs, administration costs include compensation of employees in business logistics operation and communication costs. The structure of Thailand's logistics costs can be seen from figure 2. Although the absolute values of the three components of logistics costs change every year, their ratios are relatively stable. This relatively stable structure of logistics costs reflects the development status of the logistics system. In 2009, transportation costs make up to 49.4 percent of Thai's total logistics costs, followed by inventory holding costs which have made up to 41.7 percent of the total costs, while administration costs have only contributed 8.9 percent to the total cost (Thailand Logistics

Report 2010).

We note that the inventory carrying costs in Thailand constitute a larger component than those in most developed countries, which might imply that JIT approach is very likely less popular in Thailand than in developed countries. The figure 4 below shows the stage of logistics development of Thailand in comparison to other developed economies. Thailand is still in the lowest level of the development process – "the physical distribution" (Suthiwartnarueput, 2007). At this stage, the logistics activities concentrate on the traditional function of logistics – physical distribution – due to lack of advanced technologies and sophisticated logistics practices.

We can of course break down transportation costs into categories in terms of transportation modes. In 2005, highway cost was 684 billion baht, accounting for 80% of total amount of transportation cost in Thailand, while railway cost was only 4 billion baht, less than 0.5% of total amount of transportation cost (Wiroj Rujopakarn et al, 2009). Thailand relies rather heavily on road transportation, which can also be seen from the volume of domestic freight by transportation mode. By contrast, the railroad is the most important transportation mode for domestic freight in both China and the US, both transporting almost half of the volume of their domestic freight (Ming Xiong, 2010).

As trucks are more expensive than railroad for long haul transport, shifting road to rail transport as a logistics strategy is worth investigating.

3.2 The consequences of Thailand's high relative logistics costs

Thailand's high relative logistics costs have some farreaching consequences on its economic development. Some might be positive, but many others are negative.

On the one hand, firms in Thailand are forced to compete in those industries producing goods with high valuetoweight ratio in the world market. This impact of the low efficiency of logistics industry might be positive, because these prioritized industries are generally those with high knowledge input and low pollution output. However, if the domestic producers are not ready to play in these hightech industries, the national economy will lose its competitiveness in the world market.

On the other hand, the low efficiency of logistics industry will result in an unbalanced development in different regions. While some regions can develop more rapidly, other regions will be lagged far behind. The consequences of this unbalanced development are twofold. First, it will have a negative effect on the consumption side of the economy due to the distinctive savings rate between the rich and the poor. What might be worse is that this development gap between regions might lead to political unrest in some regions, which has already been observed in Thailand in recent years.

4. Some recommendations on Thailand's logistics policies

Based on our analysis, some recommendations could be made to improve the Thai's logistics system.

Firstly, Thai's continuous investment in logistics infrastructure can well be justified economically. However, the investment should not be limited to transportation infrastructure. Since there exist tradeoffs between different components of logistics costs, investment in logistics systems should take a wider perspective. Considering Thai's logistics industry is still in a less advanced stage, priorities should be given to investment in human resources development and in the foundational communication and information networks. By climbing the ladder of logistics development, not only can the cost structure of logistics be improved, but the total logistics costs relative to GDP could be reduced.

Secondly, while the investment in the rail infrastructure overhaul is in the right direction, a more radical institutional reform should be considered. It is recommendable to privatize the operation of the railway to make

it more competitive. The reason that firms prefer truck transportation than rail mode is a matter of price. Only when the transportation costs by rail are reduced because of an increase of efficiency, can rail mode be accepted more widely. Therefore, competition orientation must be introduced into the operation of rail transportation.

Thirdly, Thailand should improve its trade structure by balancing the freight volume of import and export. Because Thailand exports more stuff than it imports, more containers are sent out than shipped in. Since Thailand does not produce these containers itself, Thai exporters must pay to have about 1 to 1.5 million empty shipping containers sent back every year. At a cost of about US$ 200 to 300 per container, the transport of empty shipping containers costs Thailand US$ 450 million per annum, which is a big burden for Thai's logistics system. In order to achieve this goal, Thailand could try to export more hightech products while importing more raw materials.

Lastly, while relative logistics costs are sometimes useful in the evaluation of the logistics system, some other measures such as the Logistics Performance Index, the cost of Doing business, and the Enabling Trade Index are also important indicators if we want to evaluate the efficiency of the logistics system more accurately. Since comparing the logistics costs relative to GDP only makes sense between countries with similar GDP compositions, the logistics costs as a percentage of GDP should be compared on a year on year basis. The beauty of other measures lies in that they can provide solutions other than the mere diagnosis to the problems.

Of course, all the proposals mentioned above are just put forward tentatively, and they must undergo more stringent examination before they can be of any practical value.

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