Abstract

Traditional discussion about multinational corporations (MNC) mostly assumes that advanced economies are sources of foreign direct investment (FDI). Typical MNC locates its headquarters in a developed country, while the production takes place in other developed countries or less advanced economies. This paper has been devoted to presentation of a new model of multinational corporations originating in emerging countries. The model assumes that headquarters is located in a less developed country and production can be internationally dispersed. An important restriction in the model is that advanced products have to be produced in a highly developed country. This is consistent with empirical findings that new multinationals from emerging countries represent lower technological level and their foreign engagement is frequently motivated by accessing advanced solutions. The aim of the analysis is to define optimal strategy of foreign production with respect to different levels of input prices, productivity of firms and market sizes.

JEL Classification: F21; F23

Keywords: foreign direct investment, heterogeneous firms, emerging countries

*Wrocław University of Economics, email address: artur.klimek@ue.wroc.pl
1. Introduction

During last years great interest has been put on multinational corporations from newly industrialised countries. It was caused by an unprecedented expansion of firms from so-called BRIC countries or Eastern Europe. The notion emerging countries is highly imprecise and sometimes embraces very differentiated economies. In this paper I will refer to emerging countries as those with large potential of growth and being home to many firms rapidly expanding abroad. The foreign expansion of emerging multinational corporation (EMNC) has been motivated by the three main incentives: market access, technology acquisition and lower production costs. The last motive may seem intriguing, but in many cases Chinese or Polish corporations are looking for still lower production costs, especially when they operate in a very competitive industry.

In this paper I presume that main motive of foreign expansion is to acquire strategic assets, understood as knowledge-related crucial elements of advantage of expanding firms (Dunning, 1998). It means that emerging firms are mainly interested in further development. We can also read it as the last missing puzzle piece in the expansion of EMNC. They already posses the rest of elements like vast amount of cash or resources. What is missing is knowledge and technology. These elements are also defined as potential barriers of their further growth (Goldstein, 2009). We can say that it was easy in the early stages of development to copy behaviour of mature multinationals, but if emerging multinationals would like to outstrip competitors, they need to formulate their original strategies.

Stylized facts presented below confirm the need of knowledge of new multinationals. As an example I used cross-border merger and acquisition (M&A) deals by Chinese enterprises (table 1). Out of 323 large deals in the period 2000-2010 over 219 were directed to developed countries. I took into consideration sectors with the highest number of deals. The first twenty sectors were responsible for around 72% of all M&A deals. Two main groups of sectors are prevalent. First is natural resources extracting and processing. More important, the second group comprises technologically advanced industries, like automobile manufacturing or computer production. Such industries require large amount of
skills and their acquisition was the main reason for M&A deals. Not only in manufacturing, but also in services we can point the sectors requiring knowledge and market expertise. Thanks to such transactions foreign corporations could minimise the effect of foreignness.

Table 1. Chinese M&A deals 2000-2010 by industries

<table>
<thead>
<tr>
<th>Industry</th>
<th>Number</th>
</tr>
</thead>
<tbody>
<tr>
<td>Metal ore mining</td>
<td>25</td>
</tr>
<tr>
<td>Information services</td>
<td>21</td>
</tr>
<tr>
<td>Industrial machinery manufacturing</td>
<td>14</td>
</tr>
<tr>
<td>Commercial banking &amp; other financial services</td>
<td>12</td>
</tr>
<tr>
<td>Computer and electronic product manufacturing</td>
<td>10</td>
</tr>
<tr>
<td>Motor vehicle</td>
<td>10</td>
</tr>
<tr>
<td>Oil and gas extraction</td>
<td>8</td>
</tr>
<tr>
<td>Mining</td>
<td>8</td>
</tr>
<tr>
<td>Pharmaceutical and medicine manufacturing</td>
<td>6</td>
</tr>
<tr>
<td>Apparel manufacturing</td>
<td>5</td>
</tr>
<tr>
<td>Broadcasting (except Internet)</td>
<td>5</td>
</tr>
<tr>
<td>Paper manufacturing</td>
<td>4</td>
</tr>
<tr>
<td>Real estate</td>
<td>4</td>
</tr>
<tr>
<td>Miscellaneous manufacturing</td>
<td>4</td>
</tr>
<tr>
<td>Automobile manufacturing</td>
<td>4</td>
</tr>
<tr>
<td>Coal mining</td>
<td>3</td>
</tr>
<tr>
<td>Support activities</td>
<td>3</td>
</tr>
<tr>
<td>Scientific research and development services</td>
<td>3</td>
</tr>
<tr>
<td>Electric power generation, transmission and distribution</td>
<td>3</td>
</tr>
<tr>
<td>Miscellaneous electrical equipment and component manufacturing</td>
<td>3</td>
</tr>
</tbody>
</table>

Source: own elaboration based on DealWatch by ISI Emerging Markets

Presented data concern only the mode of acquiring foreign firm as a source of knowledge. This has been prevalent form of FDI of emerging multinationals. However, greenfield projects can be also used as a way of extracting the knowledge
from the host country. Therefore in further consideration I will not focus on any specific mode of foreign direct investment.

Classical economic models have not been entirely adequate to explaining complex phenomena of the global economy for some time. Especially when we think of power shifts between advanced and emerging economies. The same remarks apply to the theory of MNC from newly industrialised countries. There have been some attempts to put theoretical curbs on the expansion of EMNC. But to the best knowledge of the author there have been no significant elaborations of the issue. This paper has been prepared in order to shed some light on the topic.

In this paper I rather use notion internationalization, not globalization in describing the expansion of EMNC. It is due to the fact the emerging multinationals are rather in the beginning of their foreign expansion path. The name internationalization seems more proper in these conditions.

There are two influential strands of theory explaining emergence of multinational corporations. The first one is based on the optimisation of production costs and is known as vertical model of MNC (Helpman, 1984) or factor-proportion model (Brainard, 1993). The model assumes that MNCs locate production in countries with the lowest production costs. In this case FDI flows from countries abundant with capital to countries where capital is scarce. Vertical multinational separates headquarters activities from production and they are conducted in different locations.

The other model of MNC refers to a situation when production is undertaken in closeness to customers and main purpose is to decrease trade costs (Markusen, 1984). The horizontal model is also named proximity concentration model (Brainard, 1993). As a general rule the production of differentiated products takes place in both home and host countries.

As a result of merging the two previously mentioned models we also have knowledge capital model of multinational corporation (Carr, Markusen, & Maskus, 2001). The model was built on the assumption of firm-level scale economies. The prices and availability of production factors are keys to international fragmentation. Further analysis of role of differences between the North and the
South for the multinationals led to defining export-platform type of foreign direct investment (Ekholm, Forslid, & Markusen, 2007).

All of the models presented above assume that the North is a country (region) that is a source of multinational corporations and all decisions about internationalisation of firms are taken there. The North is assumed to be skill-intensive and capital-intensive and it leads firms to start foreign operations. But we have to remember that firms in every country are heterogeneous. It means that in every country there are highly productive firms that may engage in production abroad. This assumption was confirmed empirically for Poland as an example of emerging country (Klimek, 2011).

Besides considering the mode of foreign operations, a multinational corporation has to decide which activities should be internalized or can be done by independent contractors. Multinational corporations need to choose between own production and outsourcing. The latter deals are governed by imperfect contracts. In order to minimise the risk the firm should have full control over the entire production process. But the choice between this two modes of supply depends on the costs of preparing a new variety, size of industry and factor production price differences (Grossman & Helpman, 2003).

2. The model

I develop a model in which a firm form emerging country has to decide whether to produce differentiated products at home country and then export them or to become a multinational. The uniqueness of the model is putting headquarters of the firm in the South, instead of in the North as it was in conventional models. The presented model has been designed to explain activities of multinational enterprises from emerging countries in the advanced economies†. The goal of the model is to analyse various strategies of international configuration with respect to profits incurred by each option.

† I only focus on multinationals investing in countries of higher development level than the country of origin. Investment projects of emerging multinationals in other developing countries can be also explained by standard North-South models.
I assume there are two countries named “North” and “Home”, represented by the index \( j = N, H \). The North is a highly developed country and the Home is an emerging, Southern country.

The model concerns a single industry\(^4\). This industry is technology intensive. Firms originating in the Home produce one differentiated product \( X \). Consumers preferences for the \( i \) variety of product \( X \) is given by a constant elasticity of substitution (CES) utility function. The model is based on the Dixit-Stiglitz model of monopolistic competition (Dixit & Stiglitz, 1977). For any of the two countries:

\[
U = \left( \sum_{i=1}^{\infty} x_i^\alpha \right)^{1/\alpha}, \quad 0 > \alpha > 1
\]  

(1)

The demand function for a variety \( i \) of good \( X \) for each producer takes the following form:

\[
x_{ij} = I_j p_{ij}^{-\sigma}, \text{where } \sigma = \frac{1}{1-\alpha} > 0
\]  

(2)

where \( I_j \) is the total factor income in the country \( j \), \( p_{ij} \) is the price of variety \( i \) in a country \( j \), \( \sigma > 1 \) is the elasticity of substitution between any pair of goods. Optimal prices of the differentiated product in each market is per-unit variable costs \( c_{ij} \) divided by \( \alpha \), that is \( p_{ij} = \frac{c_{ij}}{\alpha} \).

Any firm wanting to enter the market has to bear fixed cost. This type of costs takes three forms. If a firm wants to start production of intermediate goods it needs to bear fixed costs \( F \). Home production of intermediates is excluded therefore the costs are only present in a case of the North, \( F_N > 0 \).

Assembly process also requires fixed costs for preparing facilities and governance of the process. If the assembly takes places in the home country there are no additional fixed costs \( G_H = 0 \), but if assembly is placed in the North \( G_N > G_E \), so the costs take positive value. Assembly requires less fixed costs than production of intermediates \( F_N > G_N \).

\(^4\) The model was organised in a way allowing for future embedding it into general equilibrium.
There is also one additional fixed cost that has to be paid by a firm from emerging country – technology $T$. It means that in order to access the source of supply a firm need to bear additional costs of establishing contact and pay the supplier additional premium for accessing the technology. This cost is lower than establishing own production site abroad $T > F_N$. The cost occurs when a firm outsources intermediates instead of producing them on its own. Outsourcing is marked as $O$ in the rest of the paper.

I assume there is one production factor – labour $w_j$. The cost of labour is higher is the North and lower in the South, $w_N > w_H$. For simplicity of notations in the model, I normalise the wage in Home to one, $w_H = 1$.

I assume there are two stages of production. A firm has to use one unit of local labour in the place of production of intermediates and one unit of labour for assembly in the place of conducting this activity. The intermediate goods have to be produced in the North due to the fact that this is an advanced product and requires vast amount of knowledge. Intermediates are produced in that country because there is technology allowing for such production. This assumption is consistent with assumptions of vertical multinationals by Markusen (2004). This restriction could be also interpreted as an example of computer industry, where chips are produced and developed in a skill-abundant location, while the assembly can be conducted in any labour-abundant location.

Firms are assumed to be heterogeneous with productivity levels $\theta$. Following Melitz (2003) and Helpman et al. (2004) each entrant into the industry takes the productivity as given. Cost function of production is given as $c(m_j, a_j)$, where $m$ and $a$ are price indexes of inputs in a country $j$.

There is also an iceberg of trade costs, which means that a firm must ship $\tau \geq 1$ units of intermediate and $t \geq 1$ of the final goods to a distant destination in order to deliver one unit of goods. Transportation costs are symmetrical. They also play role of barriers of access to foreign markets.

\[^{\S}\] I abstract from the fact that the intermediates may be produced in emerging country as a result of foreign investment from advanced economy. The intermediate good represents not only physical factors but also knowledge. Even if the production is undertaken in a low cost country the knowledge comes from highly developed country.
Having defined the basic assumptions I can assess the fixed and variable costs of serving each market using different integration strategies (table 2).

Table 2. Fixed and variable costs according to production regime

<table>
<thead>
<tr>
<th>Production</th>
<th>Assembly</th>
<th>Fixed costs</th>
<th>Variable costs for H</th>
<th>Variable costs for N</th>
</tr>
</thead>
<tbody>
<tr>
<td>O in H</td>
<td>T</td>
<td>c(τw_n, 1)</td>
<td>tc(τw_n, 1)</td>
<td></td>
</tr>
<tr>
<td>O in N</td>
<td>G_n + T</td>
<td>tc(w_n, w_n)</td>
<td>c(w_n, w_n)</td>
<td></td>
</tr>
<tr>
<td>in N in H</td>
<td>F_n</td>
<td>c(τw_n, 1)</td>
<td>tc(τw_n, 1)</td>
<td></td>
</tr>
<tr>
<td>in N in N</td>
<td>F_n + G_n</td>
<td>tc(w_n, w_n)</td>
<td>c(w_n, w_n)</td>
<td></td>
</tr>
</tbody>
</table>

Using the elements we can introduce the profit function of an emerging multinational. Following Grossman et al. (2006) the profit function is composed of a market share and productivity level of corporation.

\[
π_{ij} = (1 - α)l_jθc_{ij}^{\frac{\alpha}{1-\alpha}} - k
\]  

(3)

where \( θ = \theta^{\frac{\alpha}{(1-\alpha)}} \).

Out of possible strategies four are feasible in the market conditions. The first strategy \( OH \) (eq. 4) means producing intermediate components by an independent contractor abroad. Purchased components are then transported to \( H \) in order to assemble them. Part of the production of final goods is sold in emerging market and some of the goods are sold in foreign markets. The firm needs to bear addition cost of accessing the technology – \( T \). This is treated as fixed cost due to the fact that entry into the industry requires bearing the cost.

The strategy is optimal for firm of lower productivity due to the fact that can save some money on production since home assembly is cheaper than conducting it abroad. However, the firm has to pay for transportation of all components to the emerging country and then transporting the products to the northern destination. I assumed that the North is a region of high development.
level, what also causes that delivering products of a brand of an emerging company may face some mental barriers of customers. In this case the strategy is optimal if the volumes of sales in the North are not very high and two-way transportation is still cheaper than assembly in the North.

\[ \pi_{OH} = (1 - \alpha)Y_H \Theta c(\tau w_N, 1)^{-\alpha(1-\alpha)} + (1 - \alpha)Y_N \Theta tc(\tau w_N, 1)^{-\alpha(1-\alpha)} - T \] (4)

The next strategy (eq. 5) which can be named foreign assembly is the first step of producing in a foreign destination and preserving on transportation costs. In this strategy some components are transported to the home country and the rest is assembled in the proximity to customers. Such solution is only chosen if transportation costs are higher than assembly costs in the host country \( t > w_n \) and \( \tau > w_n \). In this situation a firm avoids the problems with accessing the host market. The strategy is optimal if the size of market is enough to compensate fixed costs of establishing assembly plant and fragmentation costs. The larger share of sales is conducted in the host destination the more gains for the investing company. In this case the costs of external sources of supply are still present.

\[ \pi_{ON} = (1 - \alpha)Y_H \Theta c(\tau w_N, 1)^{-\alpha(1-\alpha)} + (1 - \alpha)Y_N \Theta c(w_N, w_N)^{-\alpha(1-\alpha)} - G_N - T \] (5)

The third strategy (eq. 6) is designed for companies that wish to internalize the production of components. This strategy should be valid if savings and gains from building or acquiring a production facility in host country are higher than spending on purchasing the technologically intensive components from independent supplier. The fixed costs embrace both costs of production facilities, but also inventing or acquiring technology of production. This strategy is similar to the strategy \( OH \) because the assembly still takes place in home country. Similar conclusions comes from ratio between transportation and assembly costs.

\[ \pi_{NH} = (1 - \alpha)Y_H \Theta c(\tau w_N, 1)^{-\alpha(1-\alpha)} + (1 - \alpha)Y_N \Theta tc(\tau w_N, 1)^{-\alpha(1-\alpha)} - F_N \] (6)
The last viable strategy (eq. 7) comprises of producing components and assembly in the North. Some of the components are transported back to home country in order to supply the market. The firm could also move total production to the North in order to save on fragmentation, but the sunk costs have been already paid in the home country. Therefore the production will stay divided between the two countries.

$$\pi_{NN} = (1 - \alpha)Y_H \Theta c(\tau w_N, 1)^{-a(1-a)} + (1 - \alpha)Y_N \Theta c(w_N, w_N)^{-a(1-a)} - F_N - G_N$$  (7)

The strategy $NN$ is optimal for highly productive firms. The most important for them is to have control over complete process abroad. They also want to produce the goods in the proximity to customers. Thanks to the strategy the firm and its products may be perceived by clients as home ones. The example may be Lenovo, that located the principal operations in the United States, while Chinese headquarters play rather supervisory role.

Now I will move to comparison of possible attainable profits incurred by each strategy. The strategy of $OE$ means the highest unit production costs, while the productivity of the firm does not have to be of a very high level. This strategy also incurs the lowest fixed cost and the risk of investing abroad.

The second strategy $ON$ incurs higher fixed cost and also variable costs of production. The only saving in this situation is easier access to foreign market and lower transportation costs of serving the market in the North.

Third strategy $NE$ is optimal strategy for accessing technology and production facility in the North. But it also incurs very high fixed costs. Transport costs and technology access can be cheaper in the situation.

The last strategy, $NN$, is rather designed for firms with a very high productivity and those which plan to serve mostly host markets and preserve on transportation costs. This strategy is associated with a very high fixed and variable cost. It is designed only for highly productive firms.
Strategies presented above depends on the relation between wage rate, transportation costs, fixed cost and productivity. At the moment, I will move to analysing ratios determining the choice of particular strategies.

The choice between the four strategies depends on the productivity level of a firm (fig 1). Profit functions $\pi_{OH}$ and $\pi_{ON}$ meet in the point $A$, which means that any firm with productivity above the point is capable of establishing assembly plant in the host country. It is worth underlining that any firm planning to start production of technology intensive products and offer them in the North needs to be of a significant level of productivity. This is consistent with previous findings about exporters and their productivity (Bernard, et. al 2003). The distance between A and B is smaller than from O to A. We can read it as lower productivity requirements for assembly plant if a firm already produces the goods in any other

Figure 1. Profit functions of selected strategies
location. At the point B the firm decides whether to establish the intermediate production site in the North. When a firm achieves at least productivity in point C then manufacturing and assembly may be conducted in the host country.

3. Concluding remarks

This paper has been devoted to the analysis of determinants of integration strategies of multinational enterprises from emerging countries. The issue of new multinationals has been gaining importance in the global economy due to the changes in the world architecture. I developed a model, which should help in further analysis of the phenomenon. The two-country model with heterogeneous firms assumed locating headquarters in the South and main production activities in the North.

Main findings coming out of the work focus on the relation between unit variable costs and fixed costs of foreign production. A very strong assumption about technical abilities of firms from emerging countries has been made – the intermediate goods can be only produced in the country of higher development level and thus higher wages. A firm from an emerging country starts the production of an intermediate goods abroad, when gains from producing at own facilities are higher than costs of outsourcing them. However, the former option is only available for very productive firms.

Not only production of technology advanced may be located in a country of higher wages. Also the assembly can be located in the North, where prices of production inputs are higher than in the home market. This counterintuitive assumption is associated with the transportation costs. This category of costs contains also other trade costs, like cost of accessing the market and foreignness.

In this paper I assumed symmetric size of the markets. Anyway, in some elements of the analysis I indicated how the differences can influence decisions of investing firms. Further work on the issue should also embed the sizes of market into the model. The sizes of markets also play a significant role in deciding about the international configuration of production. In case of a large host market the
production of components and assembly may be conducted in that market. In such case home country assembly operations will be still running due to zero fixed cost for this market. If the fixed cost of establishing assembly plant in home would be positive only the size of the market would determine placing the production there.

Any firm entering the industry takes a given productivity level, which determines its international integration strategy. We need to remember that firms from emerging economies engaging in FDI in the North have to be of a very high productivity, not only comparing to its peers in the home market, but also globally. The highest productivity is a feature of a very small fraction of firms in the industry. Therefore the number of EMNC producing in the North will be changing according to the convergence pace between developed and developing economies. However, some of the disadvantages of emerging firms may be overcome by the support of the authorities in home country. Therefore future analysis should also point at this supportive role of external actors.

Future research should also focus on modelling the market structure in the North after entering by southern multinational enterprises. Due to this fact, the competition level may change, thus influencing factor prices and profits of firms already operating in the market.

The constructed model described one industry, but further work on this issue should put the model into general equilibrium. Thanks to this extension the pattern of multinational activities will be related to factor endowments in host and home countries. General equilibrium would also capture characteristics of many industries where number of firms is endogenous.
References


