Determinants of Nordic Competitiveness*

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Abstract

Competitiveness of the Nordic countries is investigated, using panel data running from 1996 to 2007, for 55 countries. We apply unique IMD World Competitiveness Yearbook data, using features from the Knowledge Capital Model and Gravity Model to analyze the determinants of the competitiveness of the sample with emphasis on the Nordic countries. The research highlights the role of the business environment factors. Also, various macro economic factors are included in the empirical analysis. Results indicate that the ten most competitive countries are driven by foreign direct investment, female labor participation, exports and entrepreneurship.

Keywords: Competitiveness, Foreign Direct Investment, Panel Data
JEL Classifications Codes: F21, F23

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1 Introduction

The five Nordic countries of Finland, Sweden, Norway, Denmark and Iceland are consistently in the top ranking in competitiveness indices. These ranking come from all over. For example, the Davos Report (2006) presented at the World Economic Forum (WEF, 2007) showed the continued strength of these economies, and the European Private Equity and Venture Capital Association (EVCA, 2007) in the same year ranked Iceland, the smallest and most northern economy, as the second most competitive European country. The EVCA (2007) used tax and legal environments for investments as the basis for their ranking, but there have been plenty of other measures used. Finally, this is also supported by the World Competitiveness Yearbook published by the IMD International Institute for Management Development (IMD, 2007). We will look more closely at the WCY of the IMD in this paper. We ask ourselves what causes this strong competitiveness? The so-called "Scandinavian model" of Denmark, Finland and Sweden has been said to be a role model for others to follow. It seems to generate high growth and employment as well as stability for these economies (Sinn et al., 2007). In this context it is worth mentioning Denmark's model, which has been hailed as a successful way of combining flexibility with social security. It has in particular been seen as a role model to follow. This has to be a key factor in generating high competitiveness indices in these economies. The main characteristic features of the Scandinavian model are a large government sector, generous social protection, high tax rates and emphasis on active labor market policy. The Nordic social model also manages to combine equity and efficiency at a level not observed elsewhere (Sapir, 2006). In the case of the Nordic country group, which of the factors outlined above weigh the most in contributing to high competitiveness?

There is a lot to choose from, since this group of countries rank high in several social and economic elements. For example, technology is easily accessible, the labor markets flexible, and the female labor participation is quite high. Various factors promote female labor market participation and employment in the Nordic

countries. Those include low relative taxation of second earners in a household and the extent of childcare subsidization which is the most generous in the Nordic's out of all OECD countries (Sinn et al., 2007). Also, the labor pool is skilled overall, with the majority having a secondary education that results in a strong middle class. Some theories suggest that a strong middle class generally means that the labor market and society is more dynamic, creating another advantage that increases competitiveness. In Europe in general, the trend is heading towards a more US-type model, with open borders and integrated states, yet again increasing labor market flexibility for all countries (Braunerhjelm et al., 2001). But do all these advantages compensate for some characteristics that could be thought of as disadvantages? For one thing, the population of most of these countries is quite small, with Sweden the largest at only around 10 million. This is pretty tiny relative to the rest of the world and limits the potential for economics of scale.

Also, these Nordic countries are geographically located on the extreme edge of the European continent, and in the case of Iceland, which is isolated, remoteness should make trade and communication difficult and expensive. But has technology erased the geographic distance problem sufficiently, making location no longer a problem? Was Cairncross (2001) correct when she said distance was dead? The economic success of these countries would make it seem so.

There are plenty of possible speculations but there are ways to measure this empirically. So, using 1996-2007 IMD World Competitiveness Yearbook (2007) data, we apply the Gravity Model (Bergstrand, 1985) accounting for economic size and market expansion, and choose a modified version of that model. We then include features from the Knowledge Capital model (Carr et al., 2001) to bring in other common competitiveness factors, such as proxies for human capital.

The paper is organized as follows: Section 2 sets out an overview of competitiveness factors. Section 3 explains the concept of national competitiveness. In Section 4 we look at the performance of the Nordics in this context. Section 5 is a literature overview and in Section 6 the model is specified. Regression results are presented and discussed in Section 7. Finally, Section 8 includes summary and conclusions.

2 Overview of Competitive Factors in the Nordics

There are several ways to compare how well nations are doing in increasing the standard of living and quality of life within their boundaries.

Table 1 OECD Countries GDP *per* capita.

1970		1980		1990		1998		2004	
Switzerland	175	Switzerland	153	Luxembourg	150	Luxembourg	174	Luxembourg	217
U.S.A.	139	U.S.A	136	Switzerland	144	U.S.A.	139	Norway	147
Denmark	127	Iceland	127	U.S.A	137	Switzerland	127	U.S.A	143
Luxembourg	127	Canada	123	Iceland	120	Norway	121	Ireland	131
Sweden	124	Luxembourg	121	Canada	115	Iceland	116	Switzerland	125
Canada	119	Denmark	117	Austria	114	Austria	113	Netherlands	119
Australia	118	Austria	115	Japan	112	Denmark	113	Austria	117
Netherlands	116	Sweden	115	Sweden	111	Canada	111	Iceland	117
New Zealand	114	Netherlands	112	Denmark	110	Netherlands	109	Australia	117
France	107	Belgium	111	Finland	108	Japan	108	Denmark	117
Germany	105	Australia	110	Germany	107	Australia	106	Canada	115
Austria	104	France	108	Belgium	107	Ireland	106	Belgium	113
Belgium	103	Germany	108	Norway	107	Germany	105	Sweden	112
U.K.	101	Norway	107	Netherlands	107	France	105	U.K.	111
Iceland	97	Italy	104	France	106	Belgium	105	Finland	108
Italy	97	Finland	104	Italy	104	Sweden	104	Japan	107
Finland	95	Japan	100	Australia	100	Italy	103	France	105
Japan	92	New Zealand	96	U.K.	98	Finland	103	Germany	104
Norway	89	U.K.	95	New Zealand	84	U.K.	103	Italy	99
Spain	76	Greece	81	Spain	80	Spain, N.Z.	82	Spain	94

Top 20 OECD countries by per capita GDP, index: average for OECD member countries = 100. Current prices for given year adjusted for purchasing power parity. *Source:* McKinsey analysis, McKinsey on Economics (2006) .

One very basic indicator is GDP per capita. It is important to look at since competitiveness reflects in a way the ability to sustain a high or growing GDP per capita (Bowen and Moesen, 2007). Table 1 shows GDP per capita for 20 OECD countries. The Nordic countries have constantly done well compared to the rest of the world in the last decades. We seek to find the reasons why they have had high GDP, and how it is reflected in their competitiveness measures.

Competitiveness is a comparative concept of the ability and performance of a firm, sub-sector or country to sell and supply goods and/or services in a given market.

3 National Competitiveness

The term is also used to refer in a broader sense to the economic competitiveness of countries, regions or cities. Recently, countries are increasingly looking at their competitiveness in global markets. Ireland (1997), Greece (2003), Croatia (2004), Bahrain (2005), the Philippines (2006), Guyana and the Dominican Republic are just some examples of countries that have advisory bodies or special government agencies that tackle competitiveness issues. Other nations, such as Dubai, are considering the establishment of such a body.

National competitiveness is said to be particularly important for small open economies, which rely heavily on trade, and typically foreign direct investment, to provide the scale necessary for productivity increases to drive increases in living standards. On an economic scale, Iceland is an extreme case of a small, open economy. In a recent Human Development Report (Watkins, 2007) made by the United Nations Iceland is found to have the best living standards in the world based on various criteria, such as education, GDP per capita and life expectancy. The other Nordics follow with Norway ranking second. Finland, Sweden and Denmark all rank in top 15 in the world. This fact is very interesting and relevant to this paper since high competitiveness is closely linked with high living standards. This report also shows a strong relationship between increased income equality and increased living standards.

The Irish National Competitiveness Council uses a Competitiveness Pyramid structure to simplify the factors that affect national competitiveness. It distinguishes in particular between policy inputs in relation to the business environment, the physical infrastructure, the knowledge infrastructure and the essential conditions of competitiveness that good policy inputs create, including business performance, productivity, labour supply and prices/costs of business.

International comparisons of national competitiveness are conducted by the World Economic Forum, in its Global Competitiveness Report and the Institute for Management Development (IMD), in its World Competitiveness Yearbook (2007).

3.1 Competitiveness in the Nordic Community

We feel it to be of great interest to analyze to some depth the driving forces of competitiveness and provide comparison of the Nordic countries to the rest of the world. As to seek for improvements in standard of living, it must be important to know which areas can be improved in the business environment of the countries in question.

We choose to use the World Competitiveness Yearbook (WCY, 2007) issued by IMD World Competitiveness Center as the main reference for our comparison of the Nordic Countries and the rest of the world. The WCY ranks the ability of nations to create and maintain an environment that sustains the competitiveness of enterprises. Competitiveness measures the facts and policies that shape the ability of a nation to create and maintain an environment that sustains more value creation for its enterprises and more prosperity for its people.

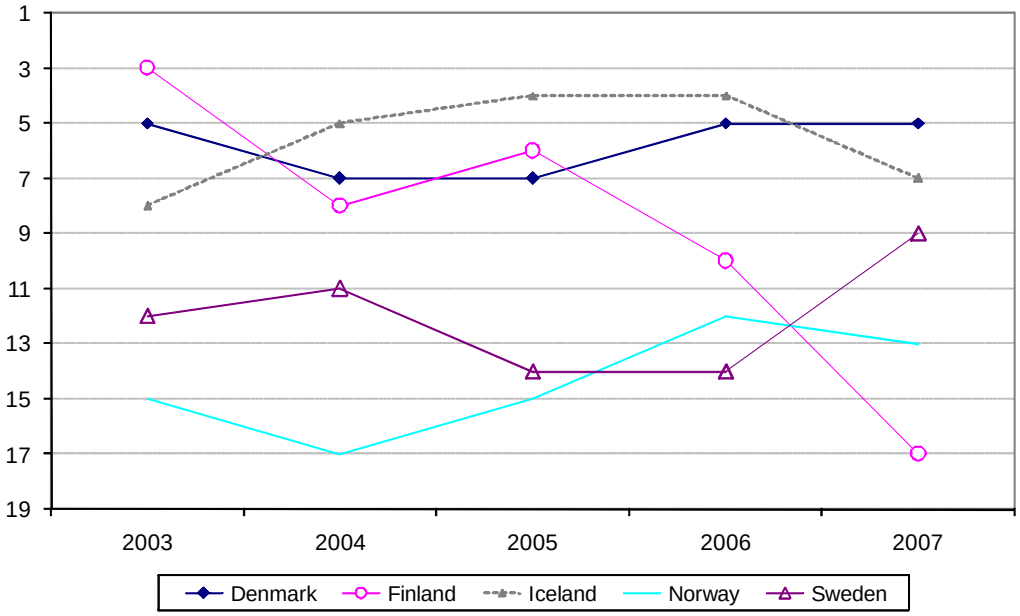
In this paper we use this rank to compare the Nordic countries with each other and seek to investigate where their strengths and weaknesses may lie. It is referred to as IMD rank. The Overall Competitiveness Rank is based on 323 criteria that are grouped into 4 main factors which are: Economic Performance, Government Efficiency, Business Efficiency and Infrastructure. The 4 main IMD factors can be further broken down into 5 sub factors which will be demonstrated later. Altogether these 20 sub factors comprise more than 300 criteria. Each sub factor has the same weight in the overall assessment. We seek to investigate the high overall competitiveness of the Nordic Countries. The Nordic countries; Denmark, Finland, Iceland, Norway and Sweden all share a high overall competitiveness and have many similarities in some areas while they are dissimilar in others. Figures are based on data derived from the IMD World Competitiveness Yearbook (WCY) and the countries are ranked among over 50 other countries of the world. Total number of countries was 51 in 2003-2005, 53 in 2006 and 55 in 2007. The data used for the ranking is 2/3 hard data from international, national and regional organizations and 1/3 soft data taken from the annual Executive Opinion Survey.

4 Performance of the Nordics

4.1 The Nordics in International Comparison

Figure 1 exhibits the Overall Competitiveness of the Nordic Countries as measured by the IMD and ranked among the 51-55 countries that are included in the IMD World Competitive Yearbook (WCY, 2007).

Figure 1. Overall Competitiveness Ranking, Nordics.



Source: IMD WORLD COMPETITIVENESS YEARBOOK (2007).

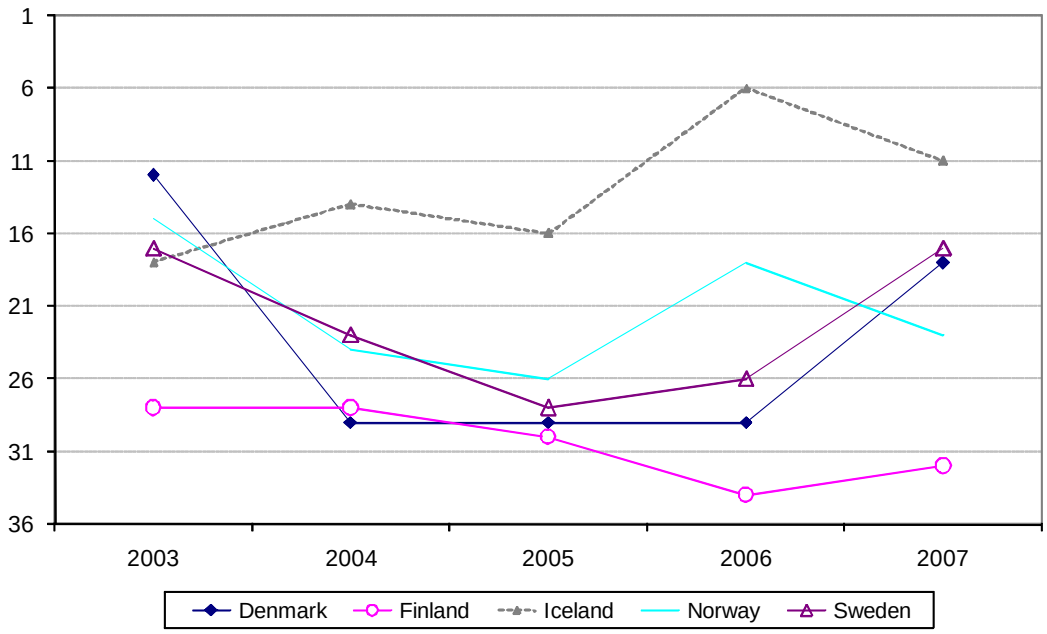
This shows clearly that the Nordic Countries are all quite competitive ranging from number 3 to 17 out of over 50 countries evaluated by IMD. High competitiveness rank is strongly related to a nation's welfare. A nation's success in creating wealth for its citizens can depend on the country's prevailing culture (Eyjolfsdottir and Smith, 1997). Nordic countries' cultures are similar in many aspects. As an implication to that the Nordics all invest considerable amounts in higher education, science and technology and as a result are leading high technology societies (Sachs, 2006). Economic growth and labor participation have been higher than in the euro

area in recent years. Government budgets have been in surplus, the labor force is skilled and the risk of poverty is low (Suyker, 2006). All this contributes to a favorable and highly competitive environment.

In recent years Iceland has most often been the most competitive of the Nordics but Norway the least with the exception of this year (2007) when Finland fell from rank 10 to 17.

This Overall Competitiveness index rank by IMD is based on four main factors: Economic Performance, Government Efficiency, Business Efficiency and Infrastructure. These factors can each be divided further into several sub factors. For comparison WEF Global Competitiveness Index focuses on three sub-indicators: Basic, Efficiency and Innovation (Bowen and Moesen, 2007).

Figure 2. Economic Performance, Nordics.



Source: IMD WORLD COMPETITIVENESS YEARBOOK (2007).

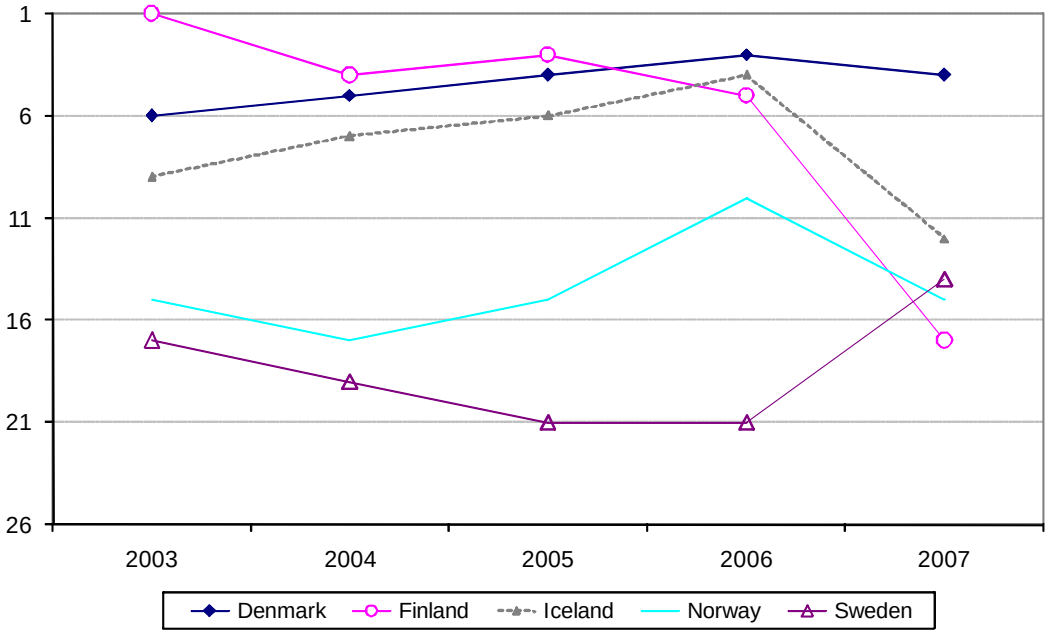
When it comes to Economic Performance Iceland ranks highest in most cases but Finland and Denmark least.

Economic Performance can be drilled down to the following 5 sub factors: Domestic Economy, International Trade, International Investment, Employment and Prices.

We will seek to explain which subfactors lead to these differences, why Finland constantly ranks below 26 and why Iceland has outperformed the other Nordic countries since 2004.

It is interesting to see that while the Nordic Countries have ranked in the top 20 in Overall Competitiveness in recent years they rank much lower in Economic Performance, suggesting that the performance of their economy is something that allows for much improvement. The Nordics have however achieved to combine social welfare with high income, economic growth and stability (Sachs, 2007). But it is in our interest to analyze what the Nordics can do to further improve their economic performance.

Figure 3. Government Efficiency, Nordics.



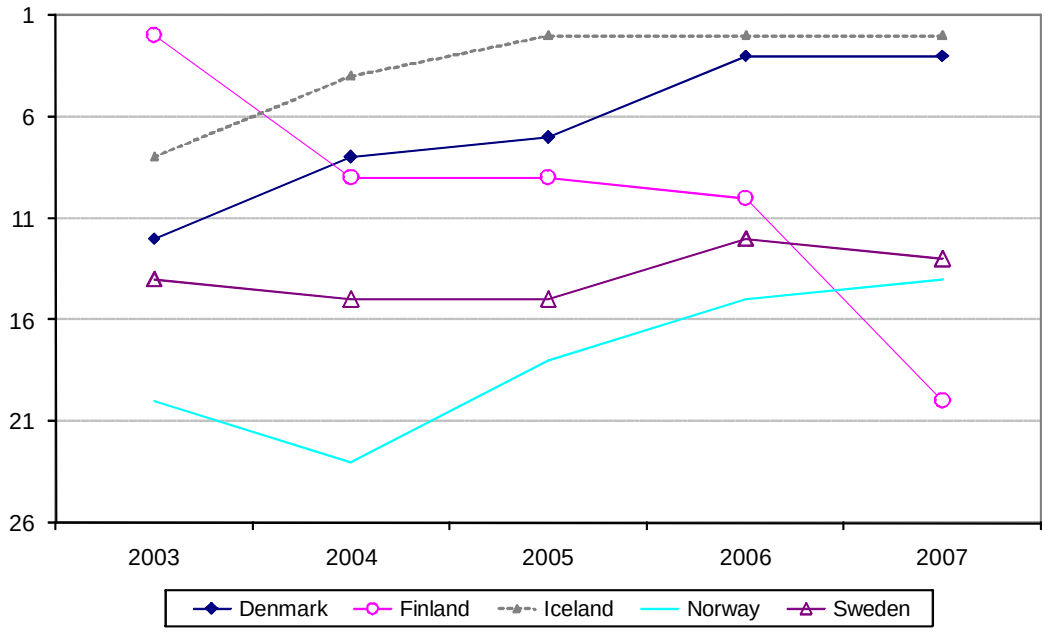
Source: IMD WORLD COMPETITIVENESS YEARBOOK (2007).

Government Efficiency measures the extent to which government policies are conducive to competitiveness. It can be divided into 5 subfactors; Public Finance, Fiscal Policy, Institutional Framework, Business Legislation and Societal Framework.

Here, Government Efficiency is best in Finland, Denmark and Iceland ranking from first to 17 in recent years. It is worst in Sweden ranking from 14 to 21 in recent years. We note that Iceland and Finland are ranking much lower this year than in previous years.

In this area Denmark, Finland and Iceland seem to be similar but quite far from Norway and Sweden. The Nordics all focus on research and development. They invest, on average, over 2,7% of GDP on research and development. Iceland, which is the smallest of them, has the largest government financed R&D expenditure. Norway has the lowest (Andersen, 2005).

Figure 4. Business Efficiency, Nordics



Source: IMD WORLD COMPETITIVENESS YEARBOOK (2007).

Business Efficiency measures the extent to which enterprises are performing in an effective manner and in an innovative and profitable environment. It consists of the following subfactors; Productivity & Efficiency, Labor Market, Finance, Management Practices and Attitudes & Values.

The Nordic countries rank high in Business Efficiency from second to 23rd in recent years. Iceland ranks best at second in 2005 and 2006 but Norway has the least

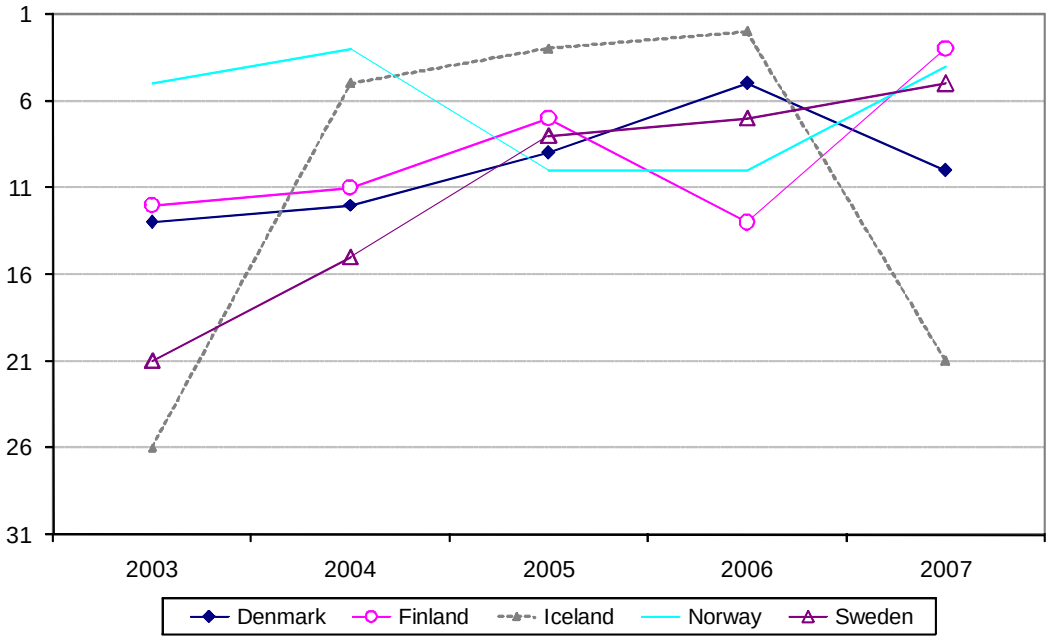
Business efficiency of the Nordic countries and has ranked close to 20 in recent years and at best 15th. Iceland's high rank in this area is most likely due to various factors and forces. Icelandic business and management culture is quite unique. Having a generally optimistic and positive state of mind makes Icelandic managers flexible, and easy to cope with in business. Lack of self-discipline enhances originality, flexibility and innovation. Icelandic society is rather informal and has created good relationships between employees and superiors as well as flat hierarchies within organizations (Eyjolfsdottir and Smith, 1997).

Also, flexibility and adaptability of people when faced with new challenges is most in Iceland and Denmark, but least in Finland and Norway. Norway has only recently risen above 6 (on the scale 1 to 10) but Iceland has reached 9.

When it comes to ranking productivity and efficiency in the past few years Norway, Finland and Denmark have consistently been among the highest 13 countries in the world whereas Iceland and Sweden have been far more inconsistent and even ranked below the best 20 in the world.

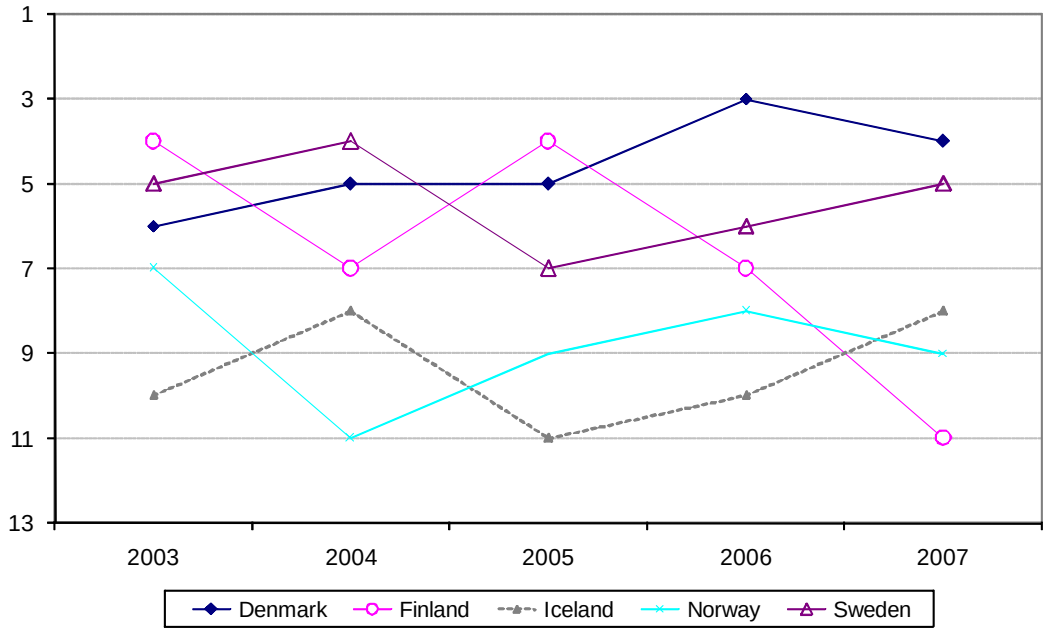
When looking at Infrastructure Denmark and Sweden have performed better on average than the other Nordic countries. Infrastructure is separated into 5 subcategories, they are Basic Infrastructure, Technological Infrastructure, Scientific Infrastructure, Health and Environment and Education. Finland was performing well from 2003, topping in 2005 but their rank has fallen since then.

Figure 5. Productivity and Efficiency, Nordics



Source: IMD WORLD COMPETITIVENESS YEARBOOK (2007).

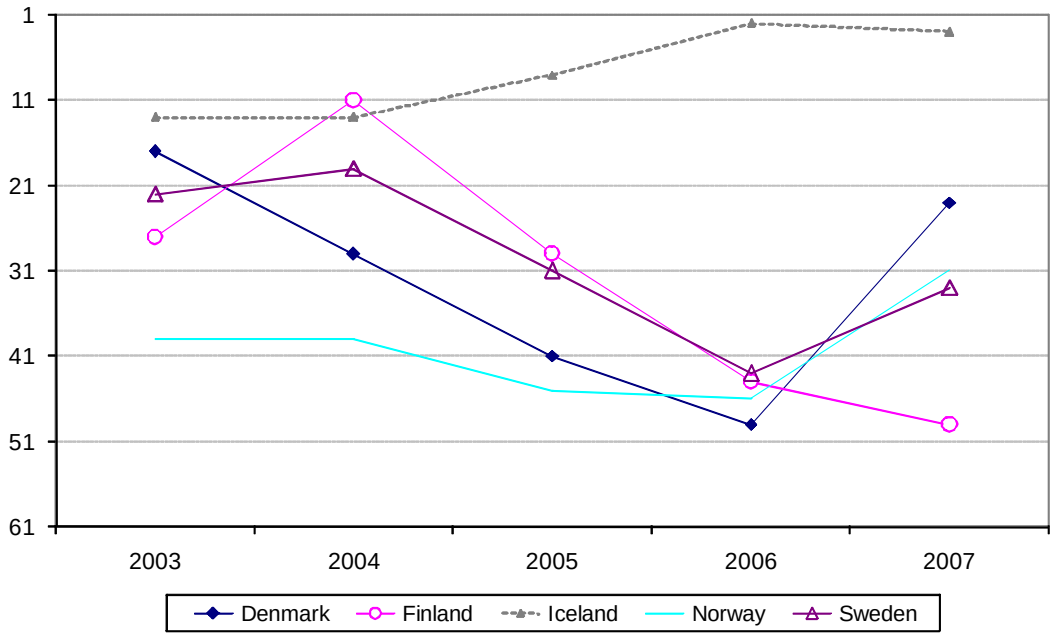
Figure 6. Infrastructure, Nordics.



Source: IMD WORLD COMPETITIVENESS YEARBOOK (2007).

When Economic Performance is further investigated, the sub factor International Investment shows significant differences among the Nordic countries. Whereas Iceland has ranked among the top 12 in recent years, even topping the list in 2006, the other Scandinavian countries have ranked below 40 at times and rarely above 20.

Figure 7. International Investment, Nordics.



Source: IMD WORLD COMPETITIVENESS YEARBOOK (2007).

International Investment is based on the following criteria: Direct investment flows abroad, Direct investment stocks abroad, Direct investment flows inward, Direct investment stocks inward, Balance of direct investment flows, Net position in direct investment stocks, Relocation threats of production and Relocation threats of R&D facilities. Furthermore it is based on Relocation threats of services, Portfolio investment assets and Portfolio investment liabilities.

4.2 What is Similar between the Nordic Countries?

If we only look at the overall Competitiveness of each of the Nordic countries we can generally say that they seem to be doing quite well. Iceland has for instance ranked in the top 8 in previous 5 years and in top 5 in 2004-2006.

Has happiness something to do with this success in competitiveness? The European Happy Planet Index is a survey published by the New Economics Foundation and Friends of the Earth. It judges the European country best able to give citizens a long and happy life. The Nordics rank highest in this survey, with Iceland being the leader, Sweden second, Norway third and Denmark sixth. The Nordic countries have many similarities, they are all relatively small, open market economies with social safety and powerful business sector. They form somewhat an integrated market area and are closely interlinked (Karppi, 2001). However, their trading pattern may be affected by the fact that Norway and Iceland still belong to EFTA, while Sweden, Finland and Denmark have been members of the EU for some time.

The Nordics cooperate in various fields. It is worth mentioning The Nordic Hydrogen Energy Foresight. It is a strategic project, involving 16 organizations from the five countries. It focuses on moving towards a hydrogen economy within the next 20-30 years. The intention is among others to contribute to the competitiveness of the Nordic business sector and creating a Nordic knowledge market.

When considering similarities and diversities between the Nordic countries, a closer look at the 4 main factors of competitiveness reveals some important differences between the Nordic countries. The following figures reveal that even though the Nordic countries excel in some areas, they tend to be lagging behind in Economic Performance. Denmark and Finland seem to be equally strong in the other three main factors of Competitiveness: Government Efficiency, Business Efficiency and Infrastructure. Infrastructure is Norway's and Sweden's strongest factor of competitiveness but weakest of the three remaining main factors in Iceland. In the case of Iceland, Business Efficiency is the main reason for Iceland's high rank in Overall Competitiveness. Denmark has enjoyed a high overall competitiveness, ranking 5th

or 7th in previous years. In the case of Denmark, Government Efficiency, Business Efficiency and Infrastructure all constantly rank very high, however Economic Performance tells a drastically different story, ranking 29th in 2004-2006 and at only 18th this year. Denmark spends the highest amount on social welfare among the Nordics (Sachs, 2006).

Finland ranked very high 5 years ago but has fallen somewhat behind in the last 2 years. Overall Competitiveness has fallen from 3rd to 17th and that trend is hand in hand with the trends in Government Efficiency, Business Efficiency and Infrastructure. Economic Performance however has been close to 30th in the last 5 years. It is obvious that it is Business Efficiency with support from Government Efficiency that is the main reason for Iceland' high competitiveness rank. Infrastructure is close to 10th in the world but Economic Performance is only in top 20 in the world. Improved Economic Performance could improve Iceland's competitiveness.

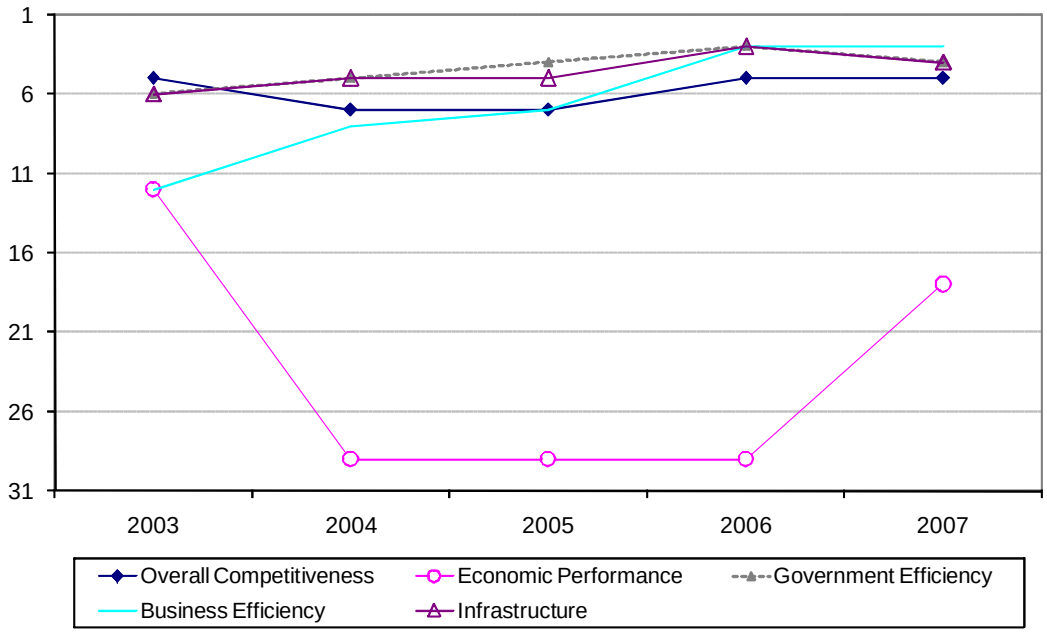
Norway's greatest strength seems to be its Infrastructure. Government Efficiency is parallel to its overall Competitiveness. Economic Performance ranks poorly and Business Efficiency also lowers Norway's Overall Competitiveness.

Sweden's strongest factor of Competitiveness is its Infrastructure and Business Efficiency, which is also fairly strong. Sweden has experienced strong productivity growth in the private sector, driven for the most part by deregulation and intensified competition (Bengtsson et al., 2006).

However Government Efficiency and Economic Performance in Sweden rank

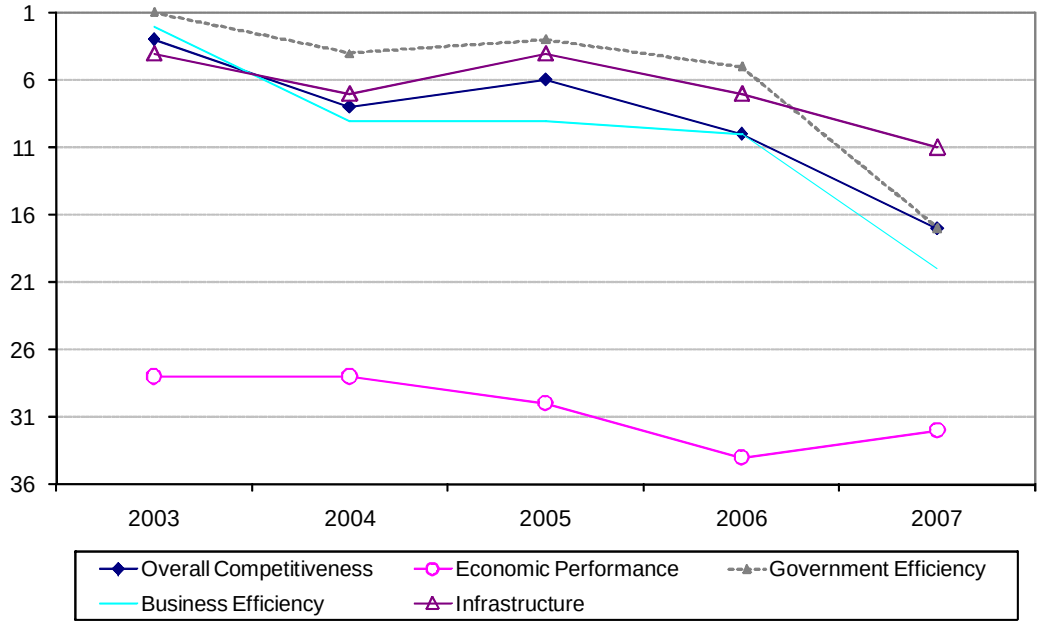
around and below top 20.

Figure 8. Denmark: Factors of Competitiveness.



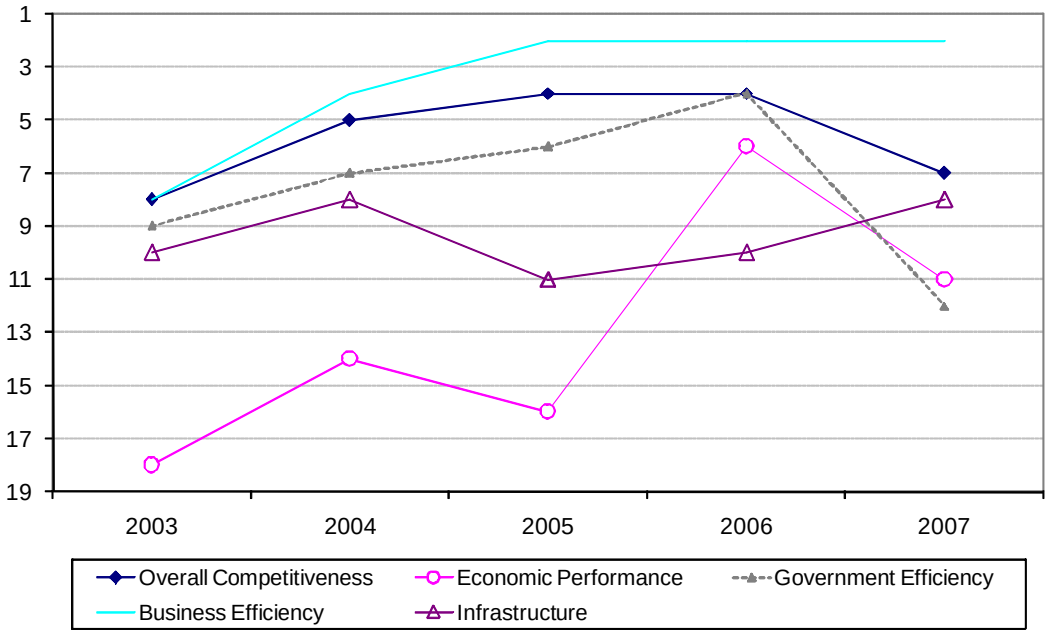
Source: IMD WORLD COMPETITIVENESS YEARBOOK (2007).

Figure 9. Finland: Factors of Competitiveness.



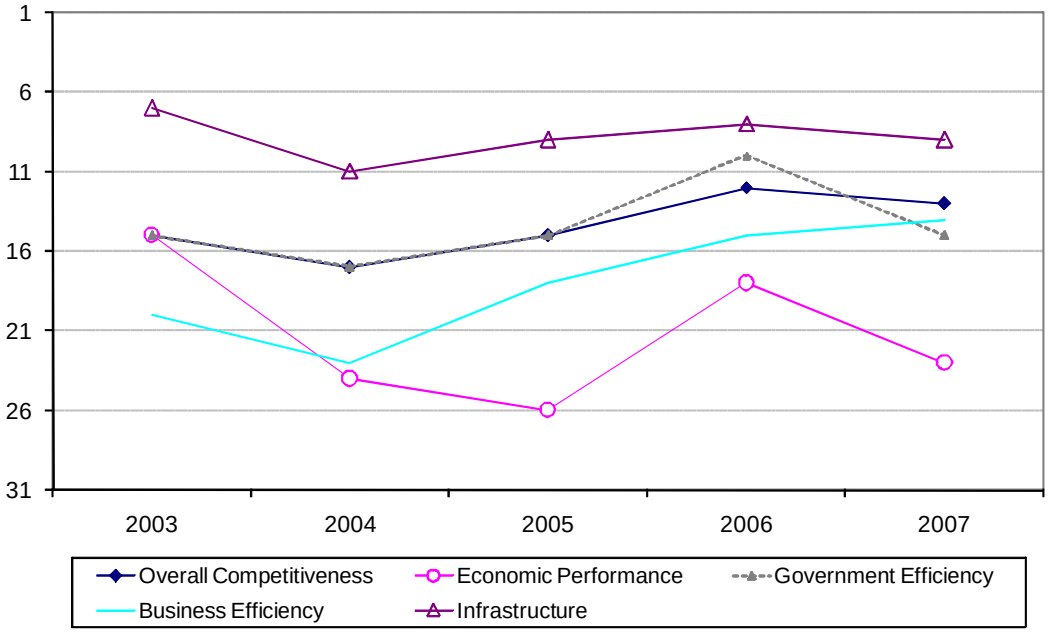
Source: IMD WORLD COMPETITIVENESS YEARBOOK (2007).

Figure 10. Iceland: Factors of Competitiveness.



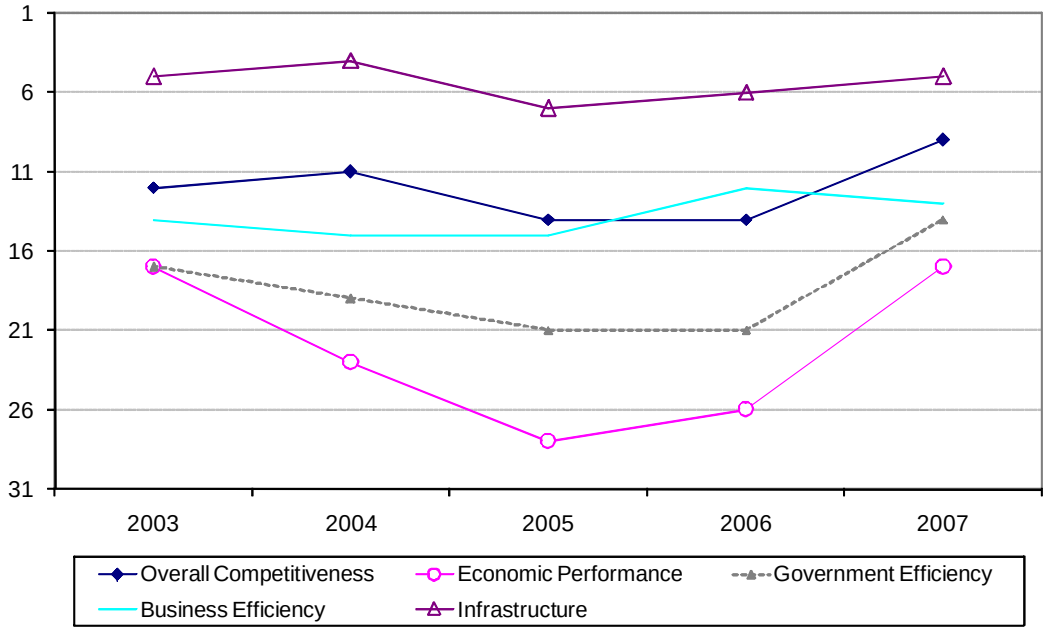
Source: IMD WORLD COMPETITIVENESS YEARBOOK (2007).

Figure 11. Norway: Factors of Competitiveness.



Source: IMD WORLD COMPETITIVENESS YEARBOOK (2007).

Figure 12. Sweden: Factors of Competitiveness.



Source: IMD WORLD COMPETITIVENESS YEARBOOK (2007).

5 Literature Overview

As previously noted, measuring competitivness involves taking into account various forces and factors. This research questions if multinational investments are important factors that affect the competitiveness of nations. Within the field of international economics it has become increasingly popular in recent years to seek for explanations of what attracts multinational investment to various countries. The general believe has been that foreign direct investment, defined as 10% or more stock ownership in a firm (World Bank, 2007), has been taking place in the southern countries by the more northern countries. That is, the believe has been that the investment flow has been from north to south, rather than from south to north. However this has not proven to be the case as discussed in Markusen (2002).

Many have undertaken research as to seek explanation for what reason a multinational enterprise, or a multinational, would choose to overcome fixed cost (Davies and Kristjánsdóttir, 2006) and undertake foreign direct investment (FDI) in a particular country. Also, Razin, Rubinstein and Sadka (2004) looked at foreign direct investment as being a twofold decision: whether to export FDI and, if so, how much. In their research the existence of fixed cost plays an important role in the determination of FDI. Some economists have focused their research on explaining whether multinationals choose between countries based on the tax imposed on them in these countries (Blonigen and Davies, 2002, 2003). The choosing of multinationals between different countries based on taxes and labor cost has become a highly relevant topic, since countries rely on foreign investment as one of the bases for continued growth. Governments therefore have a motive to attract investment by for instance creating a feasible tax environment. Often multinationals have to choose between exporting and making a direct investment in a particular country. For example, in the decades after the war Japanese car manufactures like Toyota had to decide whether to export cars to the US or undertake foreign direct investment in the US by opening production facilities in the US (Helpman, 1984). The incentive for undertaking foreign direct investment is generally classified as being

of vertical nature (Helpman, 1984) or of horizontal nature (Markusen, 1984). A model capturing the incentives for making vertical investment was put forward by Helpman (1984). Vertical investment is driven by the incentives of gaining access to cheap raw material. Moreover the model on horizontal foreign direct investment by Markusen (1984) provides an explanation for horizontal incentives for undertaking investment. Horizontal investment takes place when multinationals open up facilities in foreign countries to seek market access, rather than to gain access to raw material. The case mentioned earlier, on Toyota making investment in the US after the war, would be an example of horizontal investment rather than vertical investment.

In recent years it has been popular to develop empirical estimation models to estimate trade and investment flows, based on the international economic theory put forward by Helpman (1984), Markusen (1984, 2002) and others. A popular approach has been to apply the so-called Gravity Model for these purposes (Bergstrand, 1985) or the Knowledge-Capital Model (Carr et al., 2001). The present paper continues this line of research by developing a model based on the features of the knowledge-capital and gravity models, allowing for inclusion of issues from both models (Razin et al., 2003).

6 Model and Data

6.1 Model Specification Applied

The model specification applied for estimation is firstly based on Equation (1) which can be considered to be related to a gravity model, since it accounts for factors such as population, openness and exchange ratio. Also FDI and exports are accounted for, but either of these two last factors are normally the dependent variable in the gravity model. The knowledge capital model features in the model proxying for endowments can be considered to be female labor supply.

Variables in Equation (1) are presented either in levels, or transformed using logarithm or an Inverse Hyperbolic Sine Function. The transformation is based on the so-called kernel density estimation procedure. The relation between the logarithm function and the Inverse Hyperbolic Sine Function is the following $\sinh^{-1}(x) = \ln(x+(1+x\hat{}2)\hat{}0.5)$. The reason why the ihs function is used is because it allows for transformation of not only positive values, like the logarithm function does, but also zeros and negatives. The results from estimating Equation (1) are presented in Table 4. The two other additional equation results are presented in Table 5 and Table 6. Table 5 includes estimation results from the Heckman 2 step procedure, while Table 6 includes estimation results from the multinomial logit regression.

$$\begin{aligned} RANK_{i,t} &= \beta_0 + \beta_1 \sinh^{-1}(FDI\_rat_{i,t}) + \beta_2 \ln(POP_{i,t}) \\ &\quad +\beta_3 \ln(FEM_{i,t}) + \beta_4 \sinh^{-1}(EXP_{i,t}) \\ &\quad +\beta_5 \ln(OPEN_{i,t}) + \beta_6 \sinh^{-1}(INF_{i,t}) \\ &\quad +\beta_7 COR\_TAX_{i,t} + \beta_8 EX\_R_{i,t} \\ &\quad +\beta_9 EN\_SHIP_{i,t} + \beta_{10} FLEX\_AD_{i,t} + \epsilon_{i,t} \end{aligned} \tag{1}$$

Table 2 provides variable definition for the variables used.

Table 2. Variable Definition

Variable	
$\text{RANK}_{i,t}$	Overall IMD competitiveness rank.
$\text{FDI\_RAT}_{i,t}$	Foreign Direct Investment stock, as a ratio of GDP.
$\text{POP}_{i,t}$	Population, millions.
$\text{FEM}_{i,t}$	Female labor force participation, percentage of total labor force.
$\text{EXP}_{i,t}$	Exports of Goods, measured in USD billions.
$\text{OPEN}_{i,t}$	Trade to GDP ratio. Sum of exports and imports devided by double GDP.
$\text{INF}_{i,t}$	Average annual consumer price inflation. Measured as percentage change in prices.
$\text{COR\_TAX}_{i,t}$	Real corporate taxes. Real corporate taxes do not discourage entrepreneurial activity. IMD WCY Executive Opinion Survey based on an index from 0 to 10.
$\text{EX\_R}_{i,t}$	Exchange rates. Exchange rates support the competiviveness of enterprises. Executive opinion Survey, index 1-10.
$\text{EN\_SHIP}_{i,t}$	Entrepreneurship of managers. Rank comes from the Excecutive Opinion Survey, based on an index from 0 to 10.
$\text{FLEX\_AD}_{i,t}$	Flexibility and adaptability of people when faced with new challenges. Rank comes from the Excecutive Opinion Survey, based on an index from 0 to 10.

6.2 Data

The data used in this paper comes from the IMD World Competitiveness Yearbook, which is the leading annual report on the competitiveness of nations. It has been published since 1989 and it ranks and analysis how a nation's environment sustains the competitiveness of enterprises. IMD stands for The Institute for Management Development and is recognized as one of the world leaders in executive education.

The WCY ranks the competitiveness of 55 countries (2007), based on 323 criteria. It focuses mostly on hard data (2/3 from international, regional and national sources). It also uses survey data (1/3) from its annual WCY Executive Opinion Survey. The IMD and the World Economic Forum (WEF) both construct their own competitiveness indices. Competitiveness is the ability to sustain a high/growing GDP per capita, or "well-being" of a nation's citizens. The term is also used to refer to the economic competitiveness of countries, regions or cities. The reason we chose the WCY for our analyses is that the data is easily accessible and well

organized. We use data for the period 1997 to 2007, or 11 years.

Table 3. Summary Statistics for the Basic Sample

Variable	Obs	Mean	Std. Dev.	Min	Max
$\text{RANK}_{i,t}$	545	25.35229	14.45177	1	55
$\text{FDI\_RAT}_{i,t}$	467	.3361317	.3896269	.0013207	2.997664
$\sinh^{-1}(\text{FDI\_RAT}_{i,t})$	467	.3065266	.285783	.0013207	1.817707
$\text{POP}_{i,t}$	541	82.43756	220.2445	.27	1314.48
$\ln(\text{POP}_{i,t})$	541	2.982382	1.658335	-1.309333	7.181196
$\text{FEM}_{i,t}$	497	42.13966	5.716033	14.9	50.73
$\ln(\text{FEM}_{i,t})$	497	3.728998	.1676092	2.701361	3.926517
$\text{EXP}_{i,t}$	546	126.2061	174.679	1.802	1112.32
$\sinh^{-1}(\text{EXP}_{i,t})$	546	4.686444	1.415142	1.351412	7.707351
$\text{OPEN}_{i,t}$	521	47.59474	34.81542	8.432163	237.7796
$\ln(\text{OPEN}_{i,t})$	521	3.665987	.610935	2.132053	5.471344
$\text{INF}_{i,t}$	538	5.954788	11.94852	-4	154.8
$\sinh^{-1}(\text{INF}_{i,t})$	538	1.825828	1.10582	-2.094712	5.73529
$\text{COR\_TAX}_{i,t}$	499	5.202629	1.465297	1.40146	8.947369
$\text{EX\_R}_{i,t}$	499	5.604609	1.330504	.969697	8.142858
$\text{EN\_SHIP}_{i,t}$	499	5.949278	.8690076	3.426	9.106796
$\text{FLEX\_AD}_{i,t}$	499	6.532718	1.046477	3.54	9.023255

Sources: World Economic Forum, IMD and the World Bank.

The number of countries ranked by IMD are 51 in 2003, 51 in 2004, 51 in 2005, 53 in 2006 and 55 in 2007. This increase in the database is something we have to account for. The Overall Competitiveness of nations is categorized into four main criteria by IMD. Those are Economic Performance, the macro-economic evaluation of the domestic economy. Also Government Efficiency, which is the extent to which the government policies are conducive to competitiveness. Business Efficiency, which is the extent to which the national environment encourages enterprises to perform in an innovative, profitable and responsible manner. Last but not least it is Infrastructure, which means the extent to which basic, technological, scien-

tific and human resources meet the needs of business. These are then respectively categorized further. In our choosing of indices we focus on FDI. Foreign Direct Investment is defined as "investment made to acquire lasting interest in enterprises operating outside of the economy of the investor". Inward and outward FDI is encouraged by different incentives.

Foreign Direct Investment are foreign direct investment stock data (BoP, current US$). During the period estimated, FDI as well as some other variables used in the sample occasionally turn negative, within particular years. As for FDI, this can happen if dividend payment from the host country to the source country is higher than the investments made in a particular year. Generally FDI is believed to give an indication of the long-term incentives of an investor, and can therefore potentially be considered to give indication of the competitiveness of countries

According to Vartia and Nikinmaa (2004) "Competitiveness indices are poor at predicting growth and therefore also not at measuring growth competitiveness. They do measure something, but what? One possible interpretation is that they are an indicator of risk: a high competitiveness ranking may imply fewer business risks and vice versa. Basic Nordic strengths, such as a developed infrastructure, a stable society, lack of bureaucracy, nonexistent corruption, low crime etc, receive much weight in the indices. These indices attempt to compress different aspects of competitiveness into one key figure. This may also be a problem. The index number is the average of various components of the index: in computing the average some important determinants of growth may be underestimated. even if attempts were to be made to weigh each determinant by their average importance. the impact of some determinants of competitiveness may also vary depending on the situation"

7 Estimation Results

7.1 OLS Results

First we estimate plain OLS regression, secondly we use the Heckman two-step procedure to account for sample selection, and thirdly we estimate a multinomial logistic regression.

Table 4. OLS Empirical Findings

Regressors	***Equation (1)***
$\sinh^{-1}(\text{FDI\_RAT}_{i,t})$	.765 (0.61)
$\ln(\text{POP}_{i,t})$	6.232*** (17.40)
$\ln(\text{FEM}_{i,t})$	−8.961*** (−2.86)
$\sinh^{-1}(\text{EXP}_{i,t})$	−7.629*** (−22.02)
$\ln(\text{OPEN}_{i,t})$	7.271*** (11.31)
$\sinh^{-1}(\text{INF}_{i,t})$	.329 (1.09)
$\text{COR\_TAX}_{i,t}$	−3.629*** (−12.53)
$\text{EX\_R}_{i,t}$	−2.346*** (−9.86)
$\text{EN\_SHIP}_{i,t}$	−1.049*** (−2.60)
$\text{FLEX\_AD}_{i,t}$	−1.308*** (−3.31)
CONSTANT	96.901*** (7.41)
OBS.	358
R-SQ.	0.8759

Note: t-statistics are in parentheses below the coefficients. ***, ** and * denote significance levels of 1%, 5% and 10%, respectively.

The regression results from estimating Equation (1) with the OLS procedure are presented in Table 4. The estimates indicate that competitiveness is not signif-

icantly affected by FDI. Population size, market size, is found to positively affect competitiveness, however negatively affected by female labor participation. Competitiveness is found to be negatively affected by exports, however positively affected by openness. Competitiveness is not affected by inflation, but negatively affected by in increase in corporate tax as well as an increase in exchange rates, entrepreneurship of managers, and flexibility & adaptability of people.

7.2 Sample Selection Estimation

We next turn to the so-called Heckman selection model. This Heckman estimation procedure, provides us with two-step estimation opportunities, by being a regression model with sample selection. The first step results represented in Table 5 provide us with probit estimation of the equation in question, based on 1 or 0 values dependent on if the country is among the 10 most competitive or not, here referred to as "top 10" country.

We choose the set-up such that particular year data for "top 10" country gets the value of 1, but the year data for countries out of the 10 most competitive get values of 0. The second step proceeds by providing OLS estimates for the sample selection of the "top 10" countries. In other words, Stage 2 estimates driving factors of competition, controlling for the estimated probability of countries being ranked as the "top 10".

First Step probit estimates for Table 5 indicate that FDI and entrepreneurship of managers have significant positive effects on whether countries are ranked as the top 10 most competitive. However, the countries market size (measured as population size) and corporate tax are estimated to significantly negatively affect the probability that countries are in the "top 10" competitiveness ranking.

The second step results indicate that, when controlled for the estimated probability of countries being ranked as the "top 10" countries, FDI, female labor participation, good exports and entrepreneurship are all estimated to have significant positive effects on competitiveness.

Table 5. Heckman Two-Step Empirical Findings

Regressors	
First Step Probit Results	Full Sample
$\sinh^{-1}(\text{FDI\_RAT}_{i,t})$	2.307^{**} (2.08)
$\ln(\text{POP}_{i,t})$	$-.957^{***}$ (-3.05)
$\text{COR\_TAX}_{i,t}$	-1.675^{***} (-4.82)
$\text{EN\_SHIP}_{i,t}$	1.059^{*} (1.72)
CONSTANT	9.109 (1.55)
Second Step OLS Results	10 Most Competitive Countries
$\sinh^{-1}(\text{FDI\_RAT}_{i,t})$	1.535^{***} (3.26)
$\ln(\text{FEM}_{i,t})$	8.278^{***} (4.50)
$\sinh^{-1}(\text{EXP}_{i,t})$	$.305^{***}$ (3.73)
$\ln(\text{OPEN}_{i,t})$	$-.098$ (-0.40)
$\text{EN\_SHIP}_{i,t}$	$.834^{***}$ (5.73)
CONSTANT	-39.119^{***} (-5.20)
OBS	359
CENSORED OBS	287

Note: Heckman's consistent Z - values are in parenthesis below coefficients.
***, ** and * denote significance levels of 1%, 5% and 10% respectively.

7.3 Multinomial Logistic Regression

Table 6. Multinomial Logistic Estimates

Intervals	Rank 1-10	Rank 11-20	Rank 21-30	Rank 31-
Regressors				
$\sinh^{-1}(\text{FDI\_RAT}_{i,t})$	1.75^{e-06} (0.31)	.082 (0.72)	.681* (1.89)	−.764** (−2.13)
$\ln(\text{POP}_{i,t})$	−.00002 (−0.45)	−.379*** (−2.95)	.033 (0.22)	.346*** (4.11)
$\ln(\text{FEM}_{i,t})$	.00001 (0.38)	.189 (0.60)	−.027 (−0.08)	−.162 (−0.60)
$\sinh^{-1}(\text{EXP}_{i,t})$	.00002 (0.45)	.413*** (3.05)	.018 (0.11)	−.432*** (−4.48)
$\ln(\text{OPEN}_{i,t})$	−.00002 (−0.45)	−.387*** (−3.07)	−.126 (−0.80)	.513*** (4.55)
$\sinh^{-1}(\text{INF}_{i,t})$	-1.60^{e-06} (−0.47)	.002 (0.08)	−.093* (−1.83)	.090* (1.90)
$\text{Cor\_tax}_{i,t}$	4.11^{e-06} (0.43)	.120*** (2.72)	.119** (2.00)	−.240*** (−5.10)
$\text{Ex\_r}_{i,t}$	4.82^{e-06} (0.45)	.058*** (2.66)	.119** (2.39)	−.177*** (−3.87)
$\text{En\_ship}_{i,t}$	2.23^{e-06} (0.44)	.013 (0.32)	.128** (2.17)	−.141** (−2.46)
$\text{Flex\_ad}_{i,t}$	5.98^{e-06} (0.43)	.084* (1.80)	−.139** (−2.27)	.056 (1.18)
Number of Observations 358				

Note: t-statistics are in parentheses below the coefficients. ***, ** and * denote significance levels of 1%, 5% and 10%, respectively.

The multinomial logit estimates are presented in Table 6. Estimates indicate that an increase in FDI does not increase the probability that a country ranks in competitiveness in the top seats 1-10, or 11-20. However FDI increase positively affects the probability of a country ranking in seat 21-30 and negatively affects the probability that a country ranks in seat 31 or lower. Market size increase, measured by population increase, posititvely affects probability that countries rank in the bottom seats of 31 or below, however positively affects the probability that countries rank in seats 11-20. Female participation in the labor market is not found to affect probability of countries entering any of the ranking intervals. Export in-

crease is found to positively affect the probability that countries are ranked on the interval between 11-20, however negatively affect probability that they enter the interval of 31 and below. Openness is found to significantly decrease the probability that countries are on the 11-20 competitiveness interval, however increase the probability that they are in the lowest competitiveness interval. Inflation is estimated to negatively affect the probability that countries are in the competitiveness interval between 11-20, however positive that they enter the lowest interval. Corporate tax, exchange rates and entrepreneurship are all estimated to positively affect the probability that countries enter into the intervals of 11-20 and 21-30, however negatively affect the probability that countries enter the lowest interval of seat 31 or higher. Finally, flexibility and adaptability of people is estimated to posititvely affect the probability that countries are in the competitiveness interval of 11-20, however negatively affect the probability that they are in the interval of 31- or higher seat.

8 Summary and Conclusions

In this research we want to seek for explanation of why the Nordic countries have proven to be among the most competitive countries in the world in recent years. Using the World Competitiveness Yearbook issued by IMD we seek to sheld light on the factors that cause this high competitiveness. The Overall Competitiveness Rank is grouped into 4 main factors which are: Economic Performance, Government Efficiency, Business Efficiency and Infrastructure. Measured by the IMD rank the Nordic Countries range from number 3-17 out of over 50 countries evaluated. This is a very interesting fact, since high competitiveness is strongly related to a nation's welfare. Economic growth and labor participation has been quite high in the Nordics in recent years, government budgets have been in surplus and the labor force is skilled. All this contributes to a favorable and highly competitive environment. The economic flow between countries has a lot to say about their relative competitiveness.

To analyse this further we choose to use a specification based on features from the Gravity Model and a Knowledge-Capital Model for our analysis, since the Gravity and Knowledge-Capital models have proven to be useful when determining the macro economic flows between countries. First we estimate an OLS regression for the whole sample. Secondly, we continue by estimating a Heckman 2 step procedure allowing for sample selection of the 10 most competitive countries specifically. Thirdly, we receive Multinomial Logistic Estimates for the sample. Results indicate that foreign direct investment is found to positively impact the probability that countries are ranked among the 10 most competitive, and also when controlled for the 10 most competitive. However, although population size is found to positively affect competitiveness when estimated for the whole sample, it is not driving competitiveness of the 10 top ranking countries. Female labor participation does not impact the probability that countries are among the 10 most competitive, however once controlled for the estimated probability of being among the 10 most competitive, female labor participation is found to positively impact competitiveness. The

same holds for goods exports, and entrepreneurship. Openness is only found to positively affect the lowest ranking interval of countries. However, inflation is only found to negatively affect countries in the ranking interval between 21-30, and corporate tax those in the lowest interval. Exchange rate is found to positively affect the probability that countries are ranked in somewhere between 11-30, however negatively impact the probability that they are in the lowest ranking interval. Finally, flexible administration is found to positively affect the probability that countries rank in the interval between 11-20, however negatively impact the probability that they are ranked in the interval between 21-30.

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