

Denmark

Fin 358 International Finance Project

*The first part, I: Country Analysis, of the project will serve to provide the reader with a **clear picture** of how Denmark's Macroeconomic qualities and data shape it as an economy and country. The goal of the presented data in I: Country Analysis section of this project is to provide sufficient information in order for the reader to proceed to the second part of the project: II: Investment Analysis. In this part of the paper I will discuss investment opportunities, as well as restrictions and risks for the international investor seeking capital gains in Denmark.*

I: Country Analysis

Before getting into the different facts, analysis and eventually discussions, which will be derived from Denmark's economic data; providing the uninformed reader with a few basic, informative characteristics of Denmark, will help the reader relate, as well as understand, the issues and possibilities the economy of Denmark possesses.

- Denmark (dark-green marked country).
- Member of the Scandinavian region.
- Capital: Copenhagen (Approx. 1,900,000 inhabitants).
- Approximate population is 5,600,000 (600,000/5,600,000=10.7% not born in Denmark).
- Currency: Danish Krone (Exchange rate as of 8/5/2015 to the U.S. Dollar is DKK6.86/1USD).
- Memberships include but are not limited to: The UN, OECD, EU, NATO, Schengen, IMF and WTO.
- Monarchy.
- Government: ***The liberal party.***
- 1st place in least corrupt countries in the world 2013.
- Corporate tax rate: 24.5%; Personal income 37.48-59%.
- Very open to foreign investments (foreign and domestic investors generally treated equally under law).
- Central Bank: Danmarks Nationalbank.



I: Country Analysis (macroeconomic trends):

This part of the project will be divided into 7 different sections:

1. Balance of Payments-Current Account Surplus or Deficit (All Values in US Millions)
2. Exchange Rate (Fixed Rate with the Euro)
3. GDP Growth
4. Inflation
5. Monetary Policy
6. Fiscal Deficits/Surpluses
7. Yields on Government Bonds Compared to the US T-Bonds for the last 5-10 Years

1: Balance of Payments-Current Account Surplus of Deficit (all values in US millions):

Definition of Current Account: *“The difference between a nation’s savings and its investments. The current account is an important indicator about an economy’s health. A positive current account balance indicates that the nation is a lender to the rest of the world.”*-Investopedia

According to the data gathered from the IMF’s database, the current account has enjoyed a trade surplus from 2009 through 2014; exports have exceeded imports. Exports ranged from 91,108.11 to 111,671.35 with an increasing trend from 2009-2011 at 91,108.11-111,245.26. In 2012 the exports dropped to 105,449.55 and climbed back to its peak at 111,671.35 in 2013, where it has kept a steady level. An important detail to remember is that the balance on goods and services also has remained positive throughout the same period; at an almost entirely increasing level, with merely minor drops. One reason for this *minor* drop in exports relative to imports in 2012 can be explained by the appreciation in the DKK relative to the Euro in late 2011-early 2012, causing the Danish exports to become more expensive to surrounding nations with the Euro; notable that *it is* a minor decrease in exports considering this movement in currency appreciation/depreciation.

	2009	2010	2011	2012	2013	2014
Balance of Payments						
Current Account (Excludes Reserves and Related Items)	10,767.02	18,182.63	19,874.64	18,749.78	24,248.24	21,493.81
Goods, Credit (Exports)	91,108.11	95,029.88	111,245.26	105,449.55	111,671.35	111,449.17
Goods, Debit (Imports)	82,126.26	85,904.67	101,102.08	96,947.44	99,785.56	101,320.69
Balance on Goods	8,981.85	9,125.22	10,143.19	8,502.11	11,885.79	10,128.30
Services, Credit (Exports)	56,243.31	61,211.25	66,494.40	65,999.26	70,686.08	72,486.81
Services, Debit (Imports)	52,338.06	52,310.15	58,643.06	58,179.69	63,268.76	64,238.57
Balance on Goods and Services	12,887.09	18,026.31	17,994.52	16,321.67	19,303.10	18,376.73

The quantitative data presented in the *“Balance of Payments”* above, can be further explained using the average and standard deviation. These low standard deviations calculated represent stable exports on both goods and services; as well as stable positive balances in these accounts; I would like to stress the fact that these numbers have a low volatility, *despite* the slight increase in the value of the Danish Krone in 2012 relative to the Euro; indeed is positive for Danish exports.

Category	Average	Standard Deviation
Goods, Credit (Exports):	$\mu = \sum \frac{x}{n} = 104,325.5533$	$\sigma = \sqrt{\frac{\sum (x-\mu)^2}{n-1}} = 9,110.024182$
Balance on Goods	$\mu = \sum \frac{x}{n} = 9,794.407936$	$\sigma = \sqrt{\frac{\sum (x-\mu)^2}{n-1}} = 1,215.327826$

Services, Credit (Exports):	$\mu = \sum \frac{x}{n} = 65,520.18152$	$\sigma = \sqrt{\frac{\sum (x-\mu)^2}{n-1}} = 6,017.081574$
Balance on Goods and Services	$\mu = \sum \frac{x}{n} = 17,151.57199$	$\sigma = \sqrt{\frac{\sum (x-\mu)^2}{n-1}} = 2,301.319483$

This numeric data supports the stability and non-existing volatility of Denmark's goods and services' difference between exports and imports; the fact that Denmark is running a stable trade surplus.

The financial account has a good, but different story; it's increased dramatically from 2009-2014; from a -26,358.65 to +35,340.33 in 2014. This could be because Danes are purchasing less foreign assets (such as real estate), whereas foreigners have been acquiring more Danish assets.

Financial Account (Excludes Reserves and Related Items)	-26,358.65	-5,326.85	7,887.28	17,345.52	30,148.71	35,340.33
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This positive change would indicate an increase in the ownership of Danish real assets (such as bank deposits, loans, corporate/government bonds, equity, factories, real estate etc.) These numbers could very well indicate an increase in foreign business interest in Denmark. The average for the financial account is 9,839.391115; and with a very high standard deviation of 23,079.13275. It should be noted that this high standard deviation is positive in this case; it represent a drastic increase in the acquisitions of Danish assets made by foreigners, and possibly a decrease in the purchases of foreign assets made by Danish citizens.

However, the balance on the current, capital and financial account together has gone from a positive 33,670.67 to a negative 7,998.67 after net errors and omissions.

33,670.67	4,279.69	10,554.14	1,852.06	-647.33	-7,998.67
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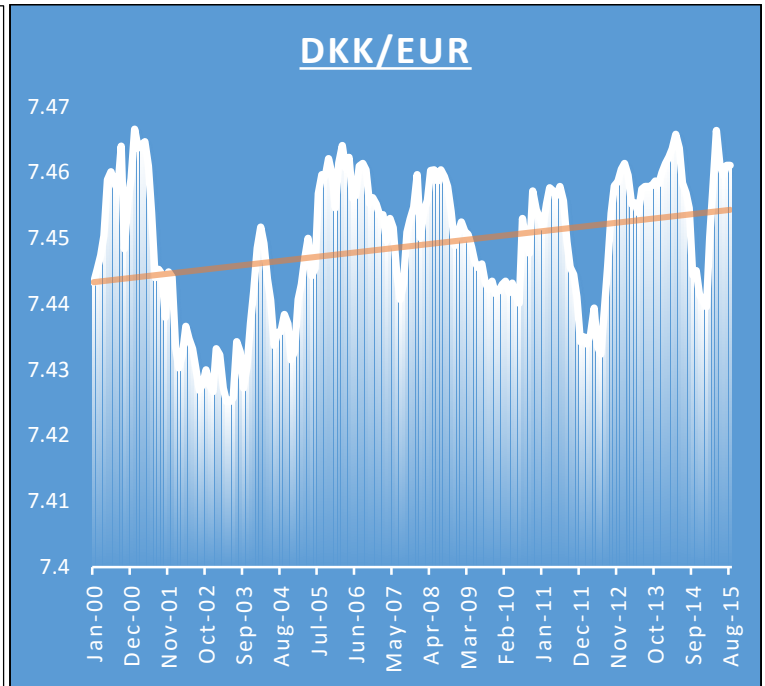
2: Exchange Rate: (Fixed Rate with the Euro):

For the most relevant analysis to be reached I'll focus on the exchange rate between the Danish Krone (DKK) and the Euro; I'm doing this since the majority of Denmark's trade is through the use of Euros, between other members of the EU (However, I'll also include the exchange rates between the U.S. Dollar and Danish Krone, since this is a class at an American university). To reach a more in depth analysis/picture of the exchange rate of the Danish Krone; including a quick note about the relationships of the Norwegian and Swedish Krona compared to the Danish Krone is only unavoidable. This is because these 3 currencies are very closely related and compete on a big scale, on a daily basis.

As shown in the [graph below](#), the Danish Krone has had a fairly stable relationship with the Euro since January of 2000; it has stayed in between 7.425-7.468; no volatile/extreme changes in value. This is positive for the investor who (who owns the Euro as his/her domestic currency) might be interested in Denmark; this graph doesn't only show the relationship between the Danish Krone and Euro for the past couple of years; this is almost 15 years worth of data (when going even further back in time, we still only see minor controlled changes in value). The trendline included in the graph shows this seemingly

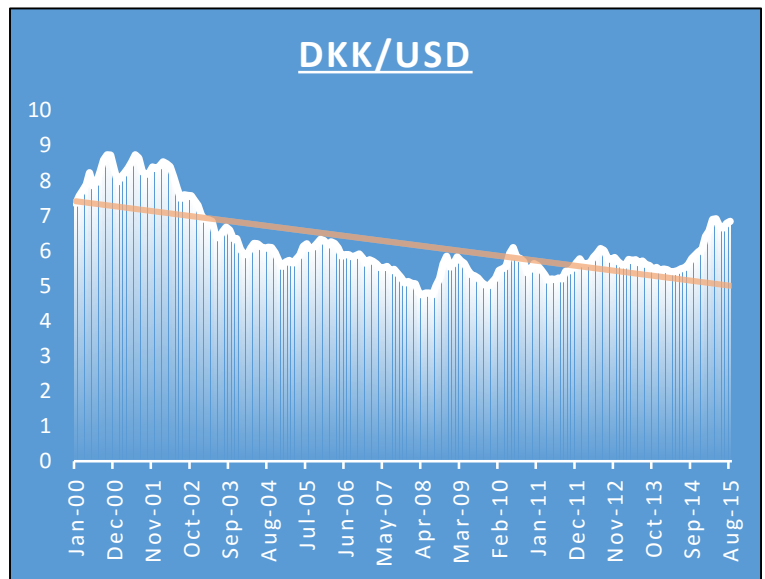
immovable relationship in value between the Danish Krone and Euro, and how it stays in the DKK7.44/1€ to DKK7.456/1€.

As mentioned above I would not deem it anything else than appropriate to also compare the performance of the Danish Krone to the Swedish and Norwegian Krona. These currencies have many similarities and are fairly close in terms of their value. The Danish Krone has been stronger than the Swedish Krona since November 1992; and stronger than the Norwegian Krone since January 1991 ([according to the Pacific Exchange Rate Service](#)). The reason why this is worth mentioning is because these currencies are very tightly related and intervene in each others' economies constantly. It is possible to pay with Danish Kroner in Sweden and Norway, and vice versa.



Based on the historical performance of the Danish Krone, it has presents itself as a very stable currency with little or no drastic change in value, when comparing it to its closest competitors; the Euro, Swedish and Norwegian Krona. It has stayed in the same close range with the Euro, and been stronger than those of Sweden and Norway for decades.

Interestingly enough; the U.S. Dollar actually dropped in value compared to the Danish Krone during the financial crisis (the drop in value started in August 2006 and went to 4.73DKK/1\$ in July 2008); after that its trend stayed in the 4.5DKK-5.9DKK/1\$ until December 2014, where it went to 6.0356DKK/1\$. The latest rate between the Danish Krone and U.S. Dollar was 6.8386DKK/1\$ in August 2015 according to the [Pacific Exchange Rate Service](#). Worth to note that the Danish Krone stayed strong against the U.S. Dollar during the financial crisis of 2008.

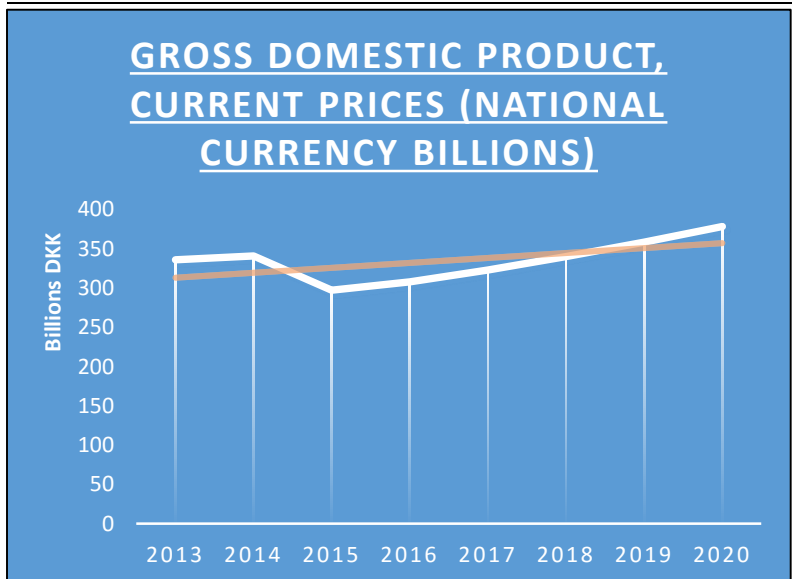
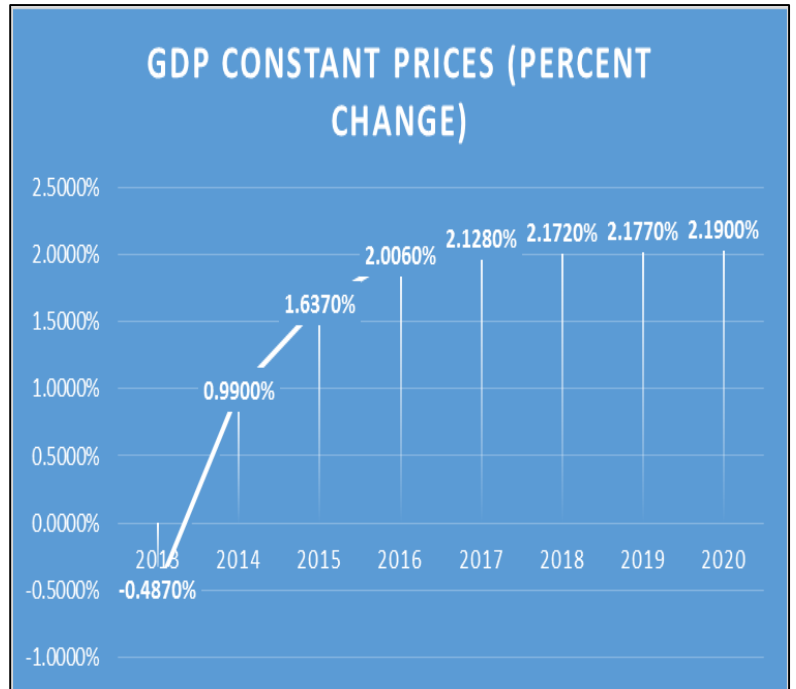


3: GDP Growth:

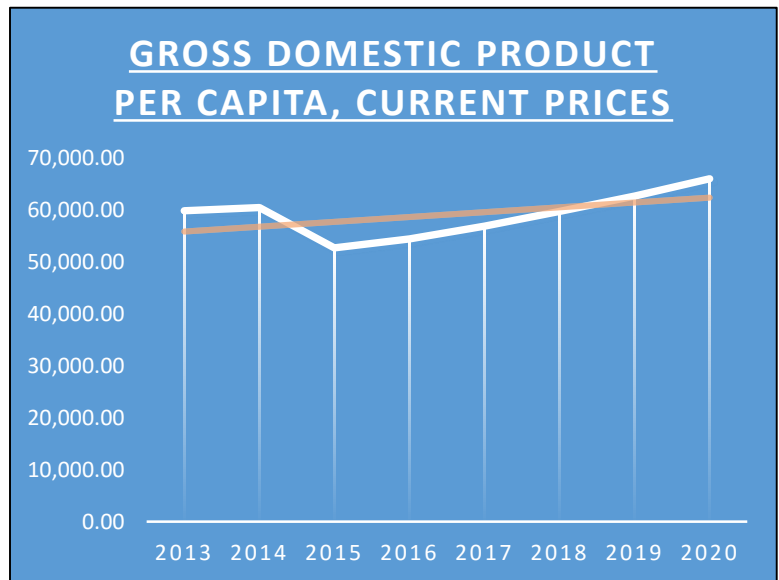
The definition of “Real Gross Domestic Product” (GDP) is an inflation-adjusted measure that reflects the value of all goods and services produced in a given year, expressed in base year prices. Often referred to as “Constant Price”, “Inflation-corrected GDP” or “Constant Dollar GDP”.

The “GDP constant Prices (Percent Change)” graph shows the percentage change in GDP constant prices from 2013 to 2015; the continuing numbers are the predictions made by specialists. The predictions show a positive increase in the GDP from 2014 through 2020. Based on the definition above we see that the value of goods and services are increasing. In 2013 the value had decreased by -0.4870%; moving along in time it had increased to almost positive 1% in 2014 where it has been projected to increase at a decreasing rate until 2020. The “Gross Domestic Product, Current Prices (National Currency Billions)” graph, shows us the decrease from year 2014-2015 from about 340-297 Billion DKK, since 2015 however, it has been increasing at a steady rate to about 378B (projected in 2020). These graphs show a healthy increase in the Gross Domestic Product of Denmark.

One important graph and “aspect” of the GDP that should not be left out; it the GDP Per Capita and its change within the same time period. One could argue that it “obviously” follows the exact same trend as the “Gross Domestic Product, Current Prices (National Currency Billions)”; since it is the same number divided by the Danish population. This measure is however helpful, because it tells us that the performance of the Danish workforce, and therefore growth in the economy and an increase in productivity.

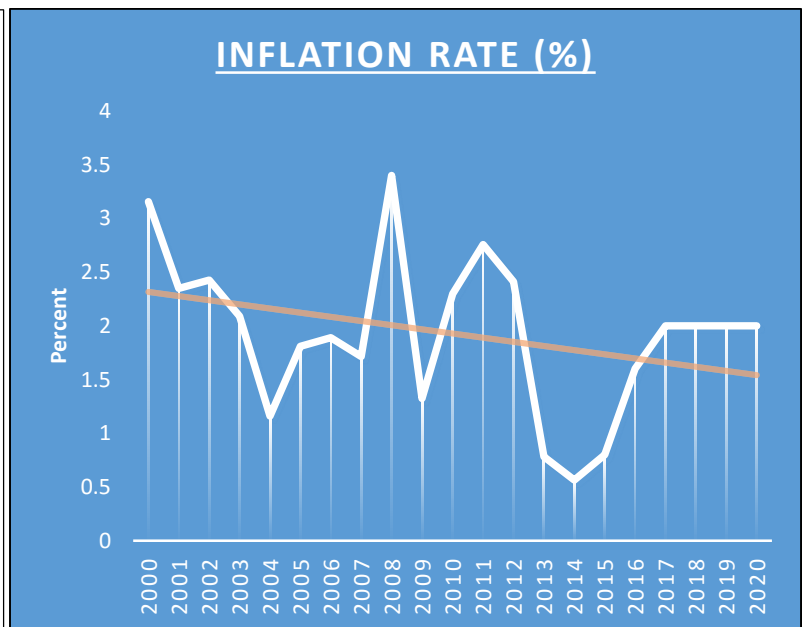


To sum up, the gross domestic product is one of the primary indicators of a country's economic performance. Per Capita Gross Domestic Product is used as an indicator of standard of living as well, with higher GDP per capita meaning a higher standard of living (one fun fact that may be interpreted as a supporting argument of the information given above; Denmark has been ranked #1,2 and 3 as the happiest nation worldwide several years in a row, ranked first in entrepreneurship and equality).



4: Inflation:

As the central bank of Denmark, *Danmarks Nationalbank* is in charge of monetary policies in Denmark. One of the main objectives of *Danmarks Nationalbank* is to ensure stable prices, meaning, keeping the inflation as low as possible. It has been the objective of the monetary policy, for decades now, to keep the exchange rate of the Danish Krone stable. First this was done to keep it stable against the Deutsche Mark, now the Euro. One of the reasons for this is that the cost of living in Denmark, generally is fairly high. The main goal is to keep the inflation close to, but below 2%.



Also, as shown in the graph there has been some cases of higher versus lower inflation rates since 2000; considering that the Central Bank of Denmark wants to keep these rates low, they've done a stable job keeping them low. The highest was in 2008 (financial crisis) and the lowest was in 2014, lower than 1%.

$$\mu = \sum \frac{x}{n} = 1.93019$$

$$\sigma = \sqrt{\frac{\sum (x-\mu)^2}{n-1}} = 0.733569\%$$

These statistical measures show us that the average inflation rate during the time period of 2000-2021 will be (if these inflation rate estimates are correct) *lower* than 2%; which is the goal of the *Danske Nationalbank*. Furthermore, the standard deviation in these numbers is also considerably low; 0.733569%. What this number tells us is little deviation from the mean (average) of 1.93019%. This is also good news, considering that these estimates turn out to be true or at least, within a close range.

5: Monetary Policy:

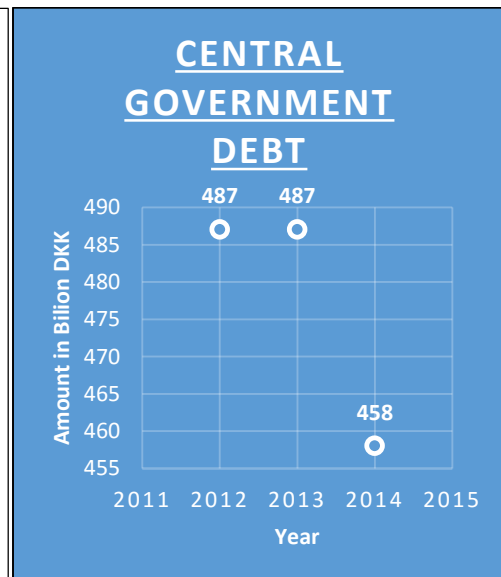
The fixed exchange rate policy means that Denmark’s policy is aimed at keeping the Krone strong/stable against the Euro; the Central Bank of Denmark conducts monetary policy by setting the monetary-policy interest rates; furthermore, these interest rates are linked to the lending as well as the deposit facilities made available by the Central Bank of Denmark to the banks and mortgage banks.

When Denmark changes its interest rates relative to those of the ECB, this normally has an effect on the exchange rate of the Danish Krone against the Euro; through the money market, the monetary policy interest rates also affect the lending and deposit rates offered to firms and consumers.

6: Fiscal Deficits/Surplus:

The Danish Government debt has received the highest ranking, AAA/Aaa, from the largest international credit rating agencies. This is partially because of the low level of debt and the composition of long term-liabilities. There has been a decline in central government debt as a percentage of the GDP over the past 2 years, which should be noted since it has not been that long since the financial crisis, it represents a turning point after the debt accumulation that happened during the crisis.

This significant drop in debt, as shown in the graph to the right, marks a significantly positive change in the performance regarding government spending.



7: Yields on Government Bonds Compared to the U.S. T-Bonds for the Past 5-10 Years:

The yields on Danish Government bonds have actually stayed close to the U.S. T-bonds for many years; the rates on the Danish bonds have been a *little* higher than the U.S. rates with the greatest difference (favorable to the Danish bonds) in 2008, almost 300 basis points difference. At its highest the Danish was almost 6%, whereas the U.S. T-note was only 3%. The Danish rates, however, have been lower than the U.S. rates, which was in 2014. Excluding the financial crisis in 2008, the rates on these two have been relatively close, with a similar pattern in movements, and a stable +0-1% for the Danish rate.

Generally speaking, Denmark is open to foreign investments. It is a small country with an open economy; because of its high dependence of foreign trade (exports is the largest component of the Danish GDP) Denmark trade and investment policies are liberal and truly do, encourage foreign investment. The Danish business environment has been characterized as one of the most attractive in the world, reflecting a great macroeconomic environment, excellent infrastructure and a well-educated and flexible labor force.

Restrictions include the purchase of real estate in Denmark by foreigners; EU citizens and companies may purchase any type of real estate except for vacation properties without authorization from the government. Non EU citizens need to have been present in Denmark for at least 5 years in a row, before being allowed to purchase real estate; again, vacation homes require authorization from the government. This obviously puts a restriction on real estate investment, as a foreign investor.

Denmark has been considering imposing capital controls, but with hardship from banks; reasoning that the country must allow the free flow of capital, one reason for this being that Denmark is a member of the European Union. The Spokeswoman for Economy Minister and Deputy Prime Minister Morten Østergaard, Sigga Nolsoe, said that the government has no plan on imposing restrictions on capital movements.

The political environment in Denmark is very stable, (it has been ranked the least corrupted country in the world) it is a democratic system, citizens exert their influence indirectly through voting, and generally a very safe place to be.

Part II: Investment Analysis:

In this part of the paper, there will be paid close attention to the investment opportunities through analysis. The actual calculations can be viewed in the Excel file submitted.

The major stock index in Denmark is called OMX Copenhagen (^OMXC20), or commonly referred to as C20. It has the 20 “biggest players” of the publicly traded Danish companies, these include A.P. Møller Mærsk, Pandora, Vestas, Novo Nordisk with many more.

The index’s data as well as various other, very thorough calculations are all included in the excel file submitted. This file includes returns, variances, standard deviations, correlations between Denmark, the U.S. and the World standard, as well as the Sharpe ratio.

The Danish stock index is (in my opinion) a stable index, just to give a quick idea of its performance for the past 2 months, it has had a return of 0.54% and 0.69%; this positive gain seems to be the general trend. All this can be seen in the Excel file.

Recommendation based on analysis:

Before I get into my actual recommendations about actions I deem appropriate to take, regarding the investment opportunities Denmark offers, I would like to address Real Estate Investing, which was briefly discussed in restrictions in part one of the paper; as an international investor. Considering the harsh restrictions the Danish government has chosen to put on international real estate investors (mentioned in the first part of paper) *and* the tax on capital gains (can be up to 50%) earned from real estate investing; one could argue, taking your money in other investment directions, would be the better alternative.

Of course there are two sides to this; the negative aspect of successfully investing in real estate in Denmark is obviously the hefty tax-rate; however, I would still deem it an extremely safe and stable environment to pursue this kind of capital gain. As mentioned earlier, Denmark has been ranked the least corrupted country in the world, it provides one of the most effective work-forces worldwide, and it should also be mentioned that “Danish design” is famous globally (there is a reason for this). Because of these positive aspects (including many more), real estate investments can be preferable as well as profitable, if the tax-rate does not cause too much pain.

Based on the information provided throughout this entire paper, it is my recommendation to invest in the very stable and secure market Denmark offers. The overall reason for this (referring to the qualitative aspects in part one) is that Denmark presents a very advanced, internationally focused, safe and advanced economy. *Advanced* and *internationally focused* includes that Danes have been ranked as the number one non-native English speakers in the world, *internationally focused* because Denmark is a part of the EU and Schengen; with little natural resources Denmark needs to use its advantages to stay competitive. It is also worth mentioning that the state of Denmark’s economy is on the right track, and the Danish Krone is a stable currency.

Referring to the quantitative data presented in this paper (as well as in the Excel spreadsheet) it is, again, recommended to invest in Denmark. Even though Denmark has a very, very little economy compared to many other countries, it still has many opportunities for the international investor. When comparing the largest index, the C20, in Denmark to the S&P500 in the United States (this is not an entirely fair/realistic comparison, considering the difference in sizes) we see an enormous difference in risks:

$$\text{US: } \sigma = \sqrt{\frac{\sum (x-\mu)^2}{n-1}} = 311.9$$

$$\text{DK: } \sigma = \sqrt{\frac{\sum (x-\mu)^2}{n-1}} = 25.4$$

$$\text{World: } \sigma = \sqrt{\frac{\sum (x-\mu)^2}{n-1}} = 67.3$$

These numbers represent the standard deviation in monthly index prices for the last 15 years; one thing to keep in mind is that the S&P500 includes 500 companies, the C20 only has 20 companies. When analyzing the Excel file attached, it is also interesting to see how much higher the average annual returns the C20 index offers, compared to that of the S&P500. C20 has an average annual return of 11% while the S&P500 has a 4% average annual return. These higher returns obviously come with a higher annualized standard deviation; the C20 has a standard deviation of 19%, whereas the S&P had an annualized standard deviation of 15%. It is worth noticing how much higher the annualized return in Denmark is though:

C20: Average annual return: 11%; Standard Deviation: 19%

S&P500: Average annual return: 4%; Standard Deviation: 15%

That is a difference of 7% in average annual return and only 4% in standard deviation; this increase in return came at a “lower than expected” risk.

Regarding the correlations between Denmark and the U.S.; it is definitely a noteworthy correlation of about 0.67. Modern Portfolio Theory states that adding assets to a diversified portfolio that have correlations of *less than 1*, with each other, can decrease risk without sacrificing return. Such diversification will serve to

increase the Sharpe ratio of the portfolio. When analyzing the data we do see that the general tendency of the returns is a mirror-effect (increase in the C20 is generally associated with an increase in the S&P500).

When comparing the Sharpe ratios of these indexes; the C20 in Denmark has the highest:

C20: 0.468

S&P500: 0.119

World: 0.049

What the Sharpe ratio tells us is the average return in excess of the risk free rate per unit of volatility or total risk; generally, the higher the Sharpe ratio, the more attractive the risk adjusted return is.

When considering the Sharpe ratio it is very clear that the C20 offers the investor a bigger average return in excess of the risk free rate per unit of volatility; which again, represents a reason as to why international investors should strongly consider Denmark.

Based on the info included in this project it is my advice to invest in Denmark. The numbers included speak for themselves, it is *far from* a bad place to put ones money; Denmark has a stable economy, is open to foreign investment, it is a very advanced nation, the economy and people have proved themselves to do very well while relying mostly on the exports of services (almost no natural resources), the currency has also proved to stay fairly stable during long periods of time, etc.

Overall, a very stable economy with great potential for capital gains.