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## Finland's Economic Freeze

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## 4

# Finland's Economic Freeze

**Shivang Mehta**

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**ABSTRACT**

The Eurozone sovereign debt crisis has been well documented and so has Germany's booming manufacturing economy but these events are relatively easy to explain. A paradoxical case has been that of Finland; the European Union's only Nordic member has suffered a stark decline of 0.6% in the 3rd quarter GDP growth of 2015, a figure worse than that of Greece (Chan, 2015). This paper seeks to analyse the fall of Finland from the perspective of Nokia and the changes in the labour market. The paper also explores the decline of the Russian economy as a quantitative reason for a lack of capital in the country and analyses Finland's participation in the single currency market as one of the obstacles to its path to recovery. The only way to thaw Finland's frozen economy involves a series of austerity measures at the very least, test the strength of the Eurozone's economy.

**KEYWORDS**

Finland, Nokia, labour reform, Russia, growth

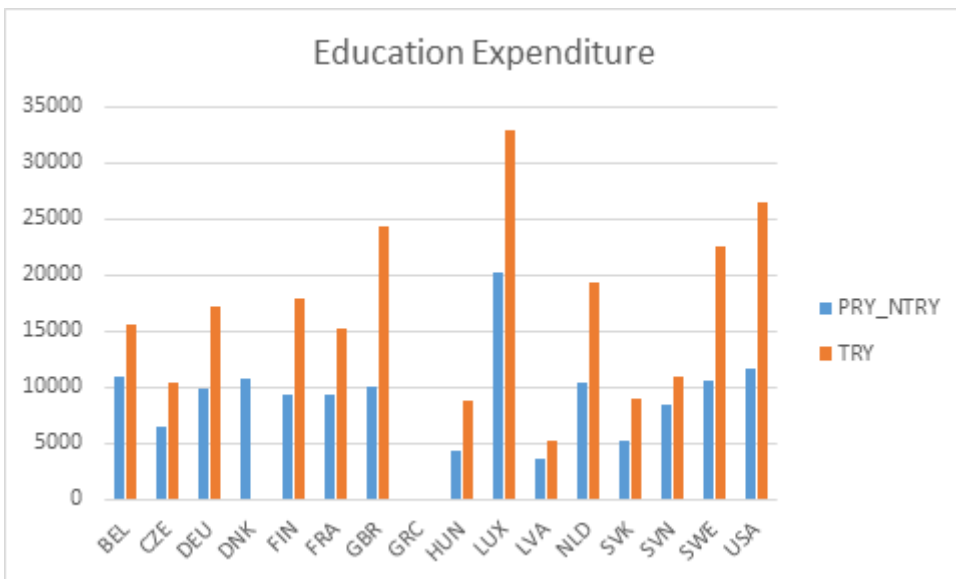
## INTRODUCTION

As the only Nordic member of the Eurozone, Finland is used to its fair share of dark, cold winters and this experience could prove to be useful as the Finnish economy shows no signs of thawing. The downfall of Finland has largely escaped public attention due to the Greek meltdown, possible because of the glaring structural problems that plague the Greek state which easily catch the eye. The Finnish economy, in turn, presents a rather paradoxical case; Finland has long been the principle proponent of financial austerity, even during the sovereign debt crisis, and has a number of factors which can easily be identified as drivers for growth.

### **Positive Aspects:**

Finland's education system has consistently been ranked as the best in the world. Transformed 40 years ago under Finland's economic recovery program, the education system adopts an approach of personal attention at an unprecedented level and has yielded the best Program for International Student Assessment (PISA) scores in English, Mathematics and Sciences consistently for over a decade (OECD, 2016). The cornerstone of the education reform has been equality, with the system being designed in a manner to proliferate the same quality and level of education, regardless of the school in any urban or rural area. This has yielded a 93% rate of education from secondary schools, 17.5% higher than that of the United States of America's (USA's) and a staggering 66% rate of enrolment in higher education institutes (OECD, 2016).

**Figure 1: Education Expenditure on Tertiary v/s Primary to not tertiary, 2012**

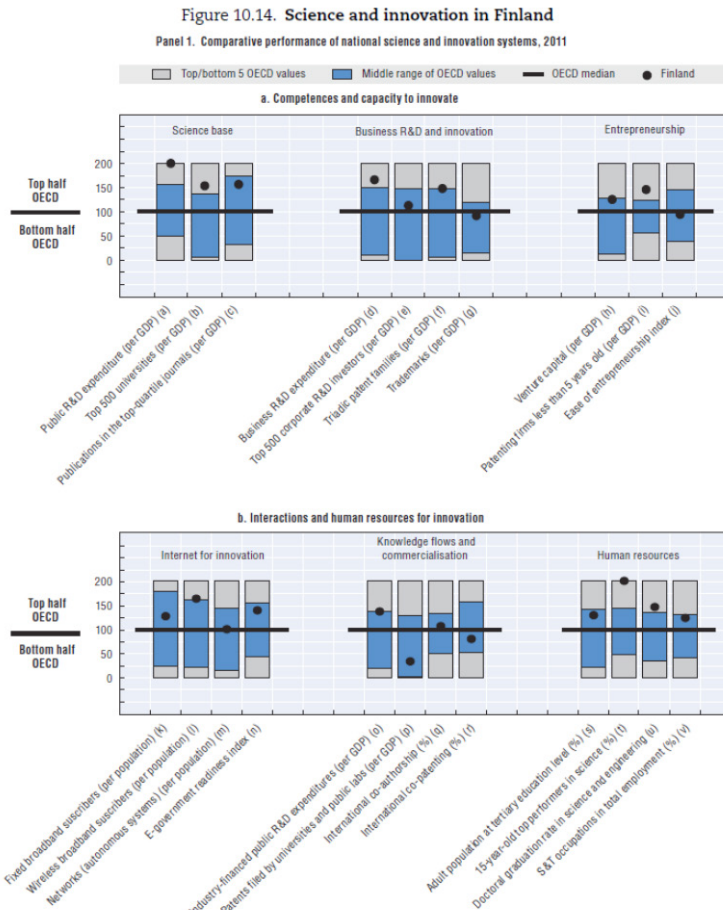


Source: OECD

The Finnish manage to do so while spending 30% less on their education system than the Americans and only spending just above the average amount in the EU. The education system thus, definitely acts as a driver for growth which can significantly impact productivity in the long run.

The rise in technological development is the primary reason for the little, if any, optimism around the future of the Finnish economy. Markku Kotilainen of the ETLA, an economic think-tank, claims that the start-up ideology has quickly proliferated among the youth (OECD, 2016). The government has treated the encouragement of such ventures as their priority. The Finnish government have already invested \$1.8 Billion to promote growth and foster the use of new technology in the country. The government has quickly reoriented its innovation policy to focus on environmental and energy business through an innovation system which is composed of incentive structures and parties that plan and propose them such as Tekes (“Innovation Policy,” 2016). This has further been bolstered by the Innovation Policy Platform, a joint initiative between the OECD and the World Bank, as well as “The Team Finland Network” which seeks to harness the ability to innovate the ability in the country and abroad. This has resulted in the World Economic Forum ranking Finland second globally for innovation in its competitiveness report and research statistics such as number of publications in scientific journals, foreign income from licenses and patents, investment in research and development activities by companies being twice the average of the rest of the EU (OECD, 2016). The investment in research and development (R&D) has largely been diversified under the science, technology and innovation (STI) policy with an emphasis on green technology and globalisation while Finland continues to lead the way in Human Resource development. The gross domestic spending on R&D has slowly risen to 3.2% of the GDP. Tekes, the Finnish agency for technology and innovation, has been shifting emphasis away from industrial and technological R&D to service firms and small to medium-sized enterprises (SMEs). The policy shift towards SMEs should improve the ease of entrepreneurship index (“Innovation Policy,” 2016).

Figure 2: Science and Innovation in Finland, 2011



Note: Normalised index of performance relative to the median values in the OECD area (index median = 100).

Source: OECD

**Not-So-Positive Aspects:**

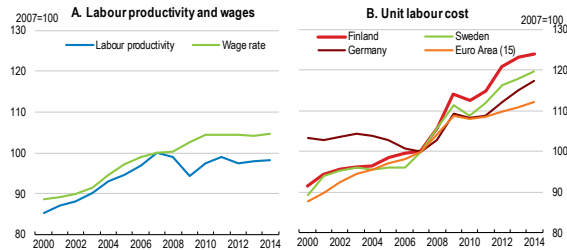
Finland has historically enjoyed a high level of income and wellbeing. The scenario changed following the 2008 recession and the economy has simply failed to recover ever since. The GDP fell by 0.6% in Q3 2015, the lowest growth rate after Greece and the predictions show the continuation of this trend (OECD, 2016). A large reason for this decline has been the fall in export growth despite the weaker euro, mainly fuelled by the weakening of the global demand for capital as well as the declining exports to Russia, Finland’s 3<sup>rd</sup> largest trading partner (“Finnish exports,” 2016). The general rate of unemployment has showcased an upward trend as well, currently at 8.3% and predicted to almost touch 10% in the coming year. The low rate of income growth has led to household debt rising to a

staggering 127% of disposable income and government debt showing an upward trend and reaching 71% of the GDP. Disposable income in itself experienced a decline of 0.9% annually in the past year with labour compensation per hour rising at a rate of 1.2% annually (OECD, 2016). Another reason has been the decline in the electronic mammoth Nokia. Originally making up 4% of Finland's GDP alone, Nokia has experienced a steady decline which has in turn dragged the overall output of the Finnish economy down and aggravated the recessionary phase ("The Nokia Effect," 2012). The paper industries have also suffered from a downturn in decline in addition to an overall fall in productivity in manufacturing and a minimal increase in business services. This coupled with the stagnant labour market is a real cause for concern. Not only has the overall productivity been falling, the labour unions have also been unwilling to accept wage cuts. Finland is beginning to suffer from the inability to devalue its currency in order to make production cheaper. The labour force in general is ageing and the baby-boom generation has slowly moved into the retirement phase, adding to the state expenditure on pensions (Khan, 2015). These factors cumulatively have made Finland lose its AAA rating which has been downgraded to AA+ by both Fitch and S&P. This in turn has led to a fall in the interest rates for government bonds from 0.58 to 10.44 and the short term interest rate now stands at -0.4% (Tiessalo, 2016). This is an alarming development which has led Finland to be the new "Sick Man of Europe" and the EU must deal with the burden of the lagging Finnish economy.

***Labour Market:***

One of the primary reasons behind the degradation of the Finnish government bonds from AAA to AA+ has been the loss in competitiveness in the local labour market. In what has been called the longest economic slump for the country since World War 2, ETLA claims that the average Finn worker is progressively working fewer hours on average than any other in the EU with a stark difference of 15% between Finland's labour cost competitiveness and that of Germany and Sweden (OECD, 2016). This factor has further aggravated the global export slowdown with a loss in the market share due to loss in competitiveness. Another concern is the fast ageing population, Finland is supposed to have the highest old-age dependency ratio among all EU countries by 2020, with 35.8 persons aged 65 or more per 100 people of working age (Rosendahl, 2015). This further raises concerns about the expected rise in government expenditure due to pensions and old-age schemes on the government pay roll expected to experience an upward trend and the debt already having exceeded the 60% of GDP level set by the EU.

**Figure 3: Labour Productivity and Wages in Finland, Germany, Sweden and EU18**



A. Labour productivity and wages		
	Labour productivity	Wage rate
2000	85.15443451	88.74919786
2001	87.07805843	89.28049903
2002	88.04146647	89.80630413
2003	90.11827683	91.49859991
2004	93.01620264	94.65607705
2005	94.70231064	97.26792453
2006	97.01547153	99.12405618
2007	100	100
2008	98.93579274	100.3616752
2009	94.32961884	102.6527755
2010	97.40791736	104.5604229
2011	98.96838217	104.5360566
2012	97.42178687	104.3579854
2013	98.02807233	104.1853092
2014	98.13127142	104.6461682

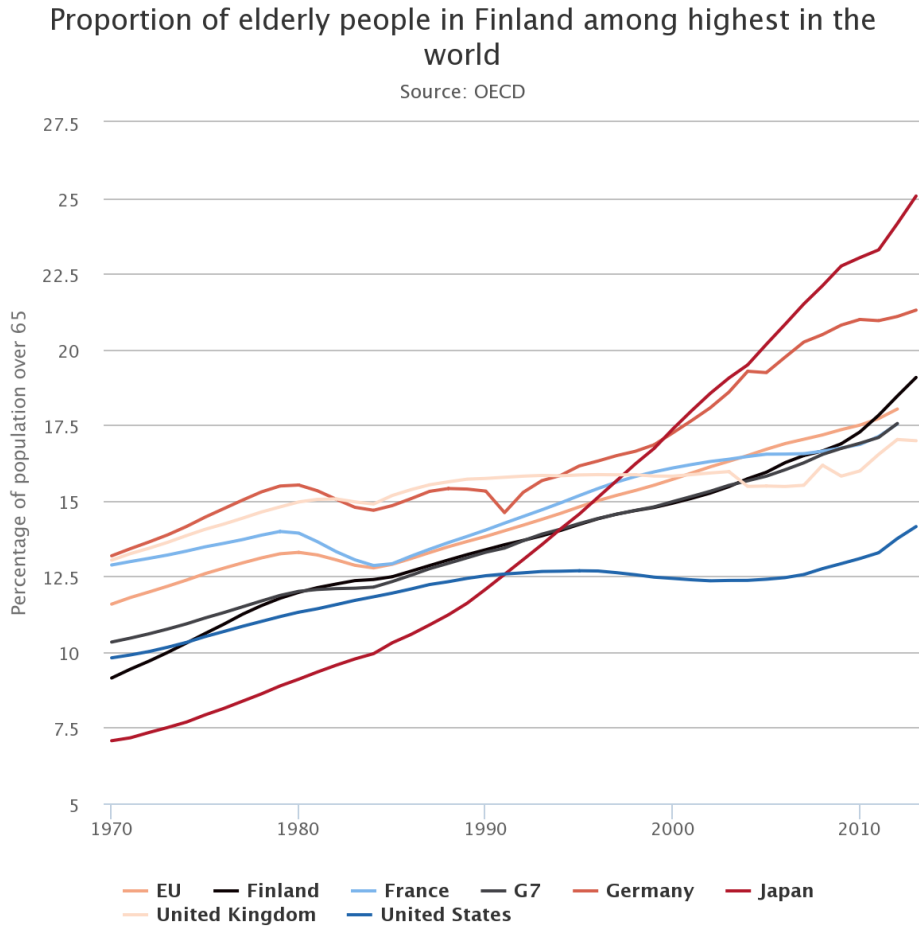
B. Unit labour cost				
	Finland	Sweden	Germany	Euro Area (15)
2000	91.59746591	89.40013771	103.2591531	87.6752711
2001	94.36987644	93.90351216	102.9467573	89.73523872
2002	95.73269589	95.17218889	103.5658151	92.39119672
2003	96.14108654	96.08839576	104.4640172	94.57697931
2004	96.37538243	95.63787462	103.9338432	95.52306388
2005	98.64587786	96.16259799	102.8007807	97.22951582
2006	99.62010354	96.05163291	100.6378178	98.25757959
2007	100	100	100	100
2008	105.8237646	105.6987568	102.8640026	104.0979988
2009	114.0550797	111.4119381	109.3109882	108.7383089
2010	112.5240976	108.6982586	108.2267295	108.0380194
2011	114.9560707	111.9015115	108.7995886	108.4123029
2012	120.7864936	116.307305	112.2594434	109.8204031
2013	123.2292076	118.0025942	114.9156924	110.8422033
2014	123.9977806	119.5774485	117.3669312	112.2639807

**Source:** OECD

The easiest way to solve the problem of competitiveness is to devalue the currency but unfortunately Finland lacks this capability given the Euro. It is important to note that Finland's neighbour, Sweden, dealt with a labour cost crisis of its own following the 2008 recession and was easily able to solve it by devaluing its crown currency. Although 64% percent of Finns still support the Euro, that number is decreasing given the inability of Finland to successfully tackle this crisis (Rosendahl, 2015). The government has proposed moderate wage deals and benefit cuts across all sectors with a special focus on healthcare, however the high degree of union presence in the country has hindered this process. The Government has proposed a social contract which attempts to increase the working hours by 5% at the same pay to try and boost productivity however the government in itself is segregated (composed of a 3-party coalition) and the unions in comparison are much stronger and present across all sectors. Alternatively, a proposal to shorten annual leaves and public holidays, reducing medical leaves and cutting employer contributions to social security has been proposed (OECD, 2016), but no headway has been made so far. This deterioration of competitiveness has also resulted in a fall in non-price competitiveness as the world market demand has shifted away from Finnish based electronics and paper as a result of the boom in digital media and Nokia missing the "smartphone revolution" (Viita, 2014). The electronics market is being restructured while the paper and pulp market is now orienting itself towards areas it has the comparative advantage in globally however neither of the two is expected to act as a driver for growth in the short run and further contributes to the surge in unemployment. Labour unions are particularly stubborn given the high rate of taxation on personal income as well as corporate profits. The government has tried creating a more tax-friendly

environment to boost growth however at the same time is also trying to battle rising debt thus these efforts remain limited.

**Figure 4: Proportion of elderly people (over 65) as a percentage of total population of country**



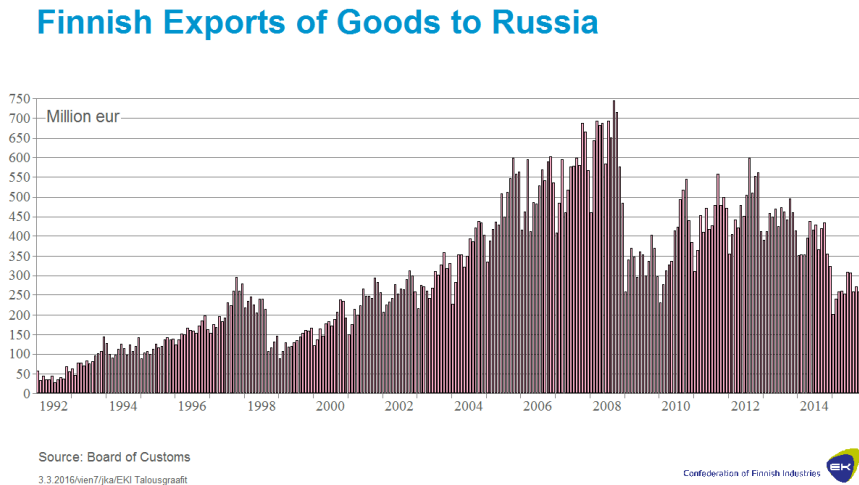
Source: OECD

**Russia and Finland:**

Russia has historically been one of Finland’s greatest trading partners, the trade alliance between the two has originated from the Soviet-era economy when the Soviet economy was Finland’s greatest trade partner and boosted exports by more than 10%. In the first decade of the 21<sup>st</sup> century, this old relation was revived with the Nordic region more than doubling exports to Russia and Finland in specific increasing investment flows by a coefficient of 8 (“Finnish exports,” 2015). When the electronic powerhouse, Nokia, began to decline and the euro region began slipping into recession, companies from all sectors such as



forestry and real estate sought to find growing markets in the world's largest energy exporter. During that time, the Russian economy acted as a driver for growth which prevented Finland from undergoing an even deeper recession, providing stability and growth potential in the face of a volatile global market. Over this period of close relations, Finnish exports grew by 143% and direct investments rose to \$4.3 Billion, amounting to 10% of Finland's overall exports. Although not as high as 26.7%, the percentage of Finland's exports that went to Russia in 1982 ("Finnish exports," 2015), the exports were steadily rising as Russia further moved towards globalisation. The trade was mainly composed of Crude Petroleum and Petroleum derivatives from Russia. In turn, Finland provided Kaolin coated paper, ethylene polymer, precipitated copper and packaged medicaments (OECD, 2016). The scenario has changed greatly following Russia's economic slowdown in the face of sanctions fuelled by political tensions. By Q2 2015, the Russian exports had already fallen by a stark 37%, accounting for just 5.5% Finnish exports overall. The exports, now valued at \$2.5 Billion ("Finnish exports," 2015), have been one of the reasons for the inability of the Finnish economy to promote growth internally. The Finnish economy is highly dependent upon the world export market and the Russian slowdown further hinders the process of recovery that the Finnish are trying to undertake. The decline in trade has resulted in a slowdown in Finnish demand as well, with the trade deficit of Finland falling in 2015, despite a great decrease in Russian exports from Finland. The industries greatly impacted by this change have been the exports of foodstuffs, which fell by 78%, oil products, which fell by 42%, forestry products, which fell by 27%, metal products, which fell by 38%, and chemicals, which fell by 15% ("Finnish exports" 2015). The political situation in Crimea has resulted in Finland being in between a rock and a hard place. While it must cooperate with the EU and place sanctions on Russia which in turn hamper its own growth and trade, it must also bear the brunt of Russia placing reverse sanctions on the EU (as with the food industry). This situation has greatly exposed the export-dependency of the Finnish economy and reports suggest that the imposition of further sanctions by either parties could further damage the struggling Finnish economy.

**Figure 5: Finnish exports to Russia, 1991–2015**

**Source:** Finnish Board of Customs

### **Single Currency and EU unity:**

Much of Finland's plans have been designed around the fact that it cannot devalue its own currency. The loss in labour cost competitiveness had occurred in 1991 and had been successfully overcome by devaluing the Markka. Similarly, the Finnish economy has suffered greatly from the sanctions placed on Russia by the EU due to the limited control it has over deciding the severity and targets of the sanctions. While Finland does publically support the need for sanctions on Russia, it has been a victim of both the EU sanctions and the counter-sanctions imposed by Russia. The Russian sanctions aren't focussed on the Finnish economy, they are meant to target the EU at large but have a lopsided impact on the Finnish exports. This aspect has been recognised and public opinion has progressively been expressing its dissatisfaction with the Finnish involvement in the single currency. The approval ratings for the Euro have fallen from 67% to 64% in the past year and are expected to continue showing this downward trend. A 50,000 strong petition has forced Finland's parliament to take up this issue and discuss it this year (Rosendahl, 2012). The changing public opinion has also been expressed through the rise of the True Finns party – a nationalist, anti-immigrant, anti-euro party that won 19% of the vote in 2011 and is part of the three party coalition that forms the current government with a 17.7% majority. At a principle level, any export-dependent economy should have greater control over its currency given that it can only remain competitive in the international market if it can change the labour costs relative to other countries. The estimated cost of exiting the euro zone has been evaluated at 20 billion euros however it has been hypothesized that such a move would prove to be helpful in the long run. Given that the indicators show that the Eurozone is heading towards a recessionary phase in its business cycle, this may prove to be one of the most pivotal discussions that the Finnish parliament undertakes. The asymmetric nature of the impact of EU

sanctions provides a great stimulus for the Finnish to value their own interests before those of the EU and they must reconsider their position on the monetary policy coordination in addition to the single currency integration. This is especially pertinent given that Finland's neighbour, Sweden, has been able to achieve much greater economic success by retaining its currency in similar circumstances and being able to adjust the value of according to its needs.

### ***Downfall of Nokia:***

The impact Nokia's slowdown has had on Finland's economy is often understated. Accounting for upto 4% of Finland's GDP at its peak, Nokia was the driving force behind Finland's export dependent economy. Microsoft's decision to cut down the Finland Nokia branch to 900 from its original 24000 effectively marked the end of Nokia's reign in the country. Once valued at \$320 billion, Nokia acted as the engine for growth until the rise of Apple inc. which resulted in the tech giant catastrophically losing its market share and subsequently shutting down operations. Acting as not only the single greatest contributor to the rising unemployment in the country, Nokia has also been the reason for the collapse of the technology industry in the country. While making way for new startups to develop now, the tech giant's presence has effectively crushed all startups in the country upto now. Now, in the absence of Nokia, Finland faces a struggle to fill the void, with innovation getting stimulus but still lagging. The sheer quantitative impact Nokia's demise has had is evident from the fact that Nokia made up 23% of Finland's exports in 2007 and accounted for more than 30% of the corporate tax revenue the government received. This factor is often underemphasised and it is important to understand it as the root cause for unemployment, fall in government revenue, rising debt, export-dependency and a myriad of other economic factors (Viita, 2014).

Quantitative relationship further explored in appendix attached below.

### ***Possible moves to consolidate economy:***

Finland must come to terms with the fact that its economy is weak and public debt will continue to rise, even as of now, it has the higher government spending as a share of GDP in the OECD. There is a dire need to consolidate public finances in order to curb the growing public expenditure as the baby-boom generation enters into the retirement phase. The main domestic financial vulnerability relates to high household debt. Although it is lower than other Nordic states, Finnish borrowers are mainly doing so via adjustable rate mortgages. While there are no signs of a housing bubble given that housing prices have been more or less constant, the OECD (2016) has already suggested that Finland should consider taking up minimum risk weights in mortgages, as is the case in Norway and Sweden, to help aid the synchronisation of risk-weight calculations across banks. One of the problems the economy is facing is that consolidation of public expenditure will impede growth to an unpredictable degree. The size of the fiscal multiplier is hard to predict, it seems to be small given that Finland has a small, open and well-functioning financial system however at the same time it has ample spare capacity, suggesting that the multiplier could be substantial. Another difficulty is that Nordic banks usually maintain low liquidity buffers. Thus a liquidity crisis triggered by events outside Finland could deepen the recession, the increasing political tension and sanctions between the EU and Russia is an example of such an event. Finland has already planned additional capital requirements which will be placed on four systematically important financial institutions from Q1 2016. The government has also been concerned

about the fact that deposits only make up 30% of the assets, a much smaller proportion compared to the rest of the OECD, and furthermore the share of liquid assets in the total assets is even lower. More reform to bring about higher liquidity barriers could benefit the Finnish economy in case of external shocks (OECD, 2016)

One of the leading lights of the recent Finnish development has been the focus on green development and environmental sustainability. While it has already pledged to reduce emissions by 16% in accordance with the EU Effort Sharing Decision and further pledged an 80% reduction by 2050 (OECD, 2016), the stringent policies may shift the economy down a path where it doesn't hold the comparative advantage even if it doesn't directly impact competitiveness and productivity. Hence the government must first focus on eliminating subsidies which promote environmentally harmful products before giving out more subsidies, this will also help with the rising public debt.

The loss in labour cost competitiveness has proven to be one of the greatest obstacles to growth and is expected to only improve gradually in the long run. The government has already begun implementing a 3 step plan to moderate wages, increasing working hours at the current ages to boost productivity and focus on cutting the number of holidays. The problem with this aspect still remains as the labour unions have a much stronger presence than the coalition government across all sectors and are unwilling to compromise any of the benefits they currently receive (OECD, 2016). This will remain a huge hindrance to growth and it is difficult to see a way forward for the Finnish economy. The easiest way would be to devalue the currency and that is where the Euro debate becomes so pertinent. The budget cuts proposed under the fiscal and pension consolidation plans need to be wary of network effects since cutting of pensions, research and education can have widespread implications that go beyond the first round effect. The unemployment increase due to these cuts must be offset by efficiency gains in order to raise employment over time. Despite these measures, the debt is still expected to rise till the 2020's and estimated to cross the 70% mark as a proportion of GDP (OECD, 2016).

Another area that is expected to be reformed is the taxation structure which currently stands as one of the most stringent is the OECD. The tax structure is argued to be at a point where the disadvantages accruing to the businesses may be greater than the advantages accruing to them in the form of public amenities and infrastructure. Finland has slowly been moving into a more tax-friendly environment to decrease the tax on corporate profits and income of labour as well as entrepreneurship as a way to increase household disposable income which is among the lowest in the OECD. The government seeks to increase employment to 72% and reduce unemployment to 5% by 2019, this proposal seems too ambitious with unemployment currently at over 9% and expected to rise due to the demographical shifts. The government must thus focus on a policy reform which allows quicker entry of the youth, postponement of retirement (63 to 65 proposed by OECD would cut pension expenditure by 6% with exceptions for different categories) and improving work incentives and unemployment benefits to help increase the employment rate. This must further be bolstered by support for work immigrations and providing incentives to attract young workers into the country to boost both the productivity and employment rates (OECD, 2016). Finally, the government must continue its R&D efforts and reemphasise the importance of education as results being to taper off.

**APPENDIX****THE NOKIA EFFECT**

Finland's economic decline has been rather paradoxical; ranked second for global innovation by the World Economic Forum and with over \$1.8 billion being invested by the government in the country's tech market, Finland's lack of success presents a unique case. The European Union's only Nordic member has suffered a stark decline of 0.6 pc in the 3rd quarter GDP growth rate of 2015, a figure worse than that of Greece. Current predictions don't paint a rosy picture with the Finnish economy destined to be one of the worst performing economies, only second to Greeks. Largely an export-import economy, Finland never truly managed to recover from the recession of 2008 despite being one of the strongest proponents of financial austerity. What really has changed since the 2007-2008 period that has frozen Finland's economy? This paper seeks to understand the quantitative impact of Nokia's downfall on the Finnish economy. Once one of the leading innovators in the telephone and technology market, Nokia simply failed to catch on to the smartphone revolution that swept the globe and Finland faced the consequences of the catastrophic decline of the tech giant. Nokia contributed a quarter of Finland's growth from 1998 to 2007, generated a fifth of Finland's exports, comprised 30% of expenditure on R&D, accounted for over 30% of Finland's corporate tax revenue and up to 20% of Finland's GDP. It is easy to heed the gravity of the impact that Nokia's slowdown had on Finland. But, was this decline merely due to a decline in exports i.e. Nokia's sales or was it due to a symbiotic chain reaction that impacted not only the manufacturing industry but also had far reaching impacts on other realms. This paper seeks to understand the true relation between Finland's GDP and Nokia's revenue while also looking at the impact on employment, short term interest rates and controlling for other changes in the economy such as a decline in the manufacturing industry, exports to Russia and participation rate due to an ever-increasing old age dependency ratio that plagues Finland.

**Data:**

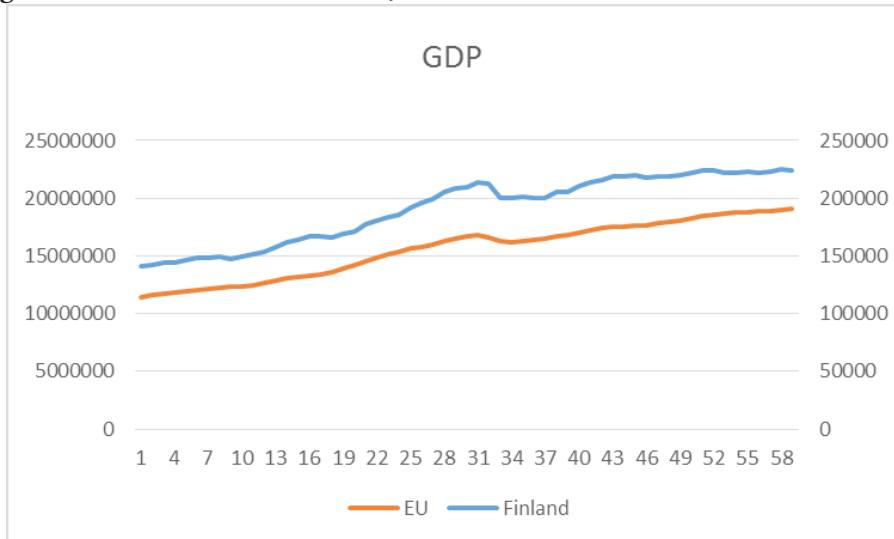
Collecting the data for such a test has been tricky. In order to get the appropriate number of observations ( $n \geq 30$ ) to get a distribution close to the normal (t-distribution beyond  $n \geq 30$  is more or less the same as a normal distribution), I had to collect quarterly data ranging from Q1 2001 to Q4 2015. The quarterly GDP data has been collected from the OECD website and comprises of 60 observations. The data has been collected for Finland, France, Germany, Greece, Japan, Sweden, United Kingdom, United States, EU (28 country average), OECD (35 country average) and Russia. Countries other than Finland have been included to try and study the relative effects that the recession had and the recovery of other EU economies while US, Japan and Russia have been taken as Finland's prominent trading partners and thus controlling for level of trade. Unfortunately, similar data on China was unavailable thus these 3 act as a generalisation for the level of trade. The GDP is in USD, using current prices and Price Power Parity (PPP), seasonally adjusted and indexed for annual levels (separate flag, actual numbers available). Collecting Nokia's revenue was a rather tedious task, I had to go through the quarterly reports from Q1 2003- Q4 2015 individually to collect the revenue stats, convert it into USD from Euro using PPP for each quarter and then extrapolate the observations to include Q1 2001- Q4 2002 using best available estimates. The unemployment data was gathered from Federal Reserve Economic Data (FRED), it expresses the quarterly harmonised unemployment rate for all persons in EU. Harmonised

unemployment rate is the measure used by the EU to express  $\frac{\text{\#unemployed}}{\text{\#labour force}}$ . The data has been seasonally adjusted and was extrapolated using best estimates from OECD to include Q1 2013– Q4 2015. I have also collected the breakdown of number of individuals employed in the economy by sector (manufacturing and tech for Nokia) from OECD. This data is quarterly and seasonally adjusted. The short term interest rates were only available annually thus have been acquired via the OECD. Since the ECB decides these interest rates, they are already controlled for intra-country fluctuations in the EU region. The output of the paper industry, exports to Russia and participation rate as a percentage of adult population have been obtained from the OECD but were only available on an annual basis. These have been expressed in USD and current PPP.

**Summary Statistics:**

We must begin by understanding the nature of the Finnish economy with respect to the Euro Zone it belongs to. Following the crisis of 2008, the Euro Zone has experienced a major downward swing characterised by an ageing population, fall in productivity and structural incompetency. Few economies have managed to succeed in this environment with Germany benefiting from the constantly undervalued currency, labour reforms and an emphasis on small scale industries which form the backbone of the economy. Greece has occupied the limelight of late, but its downfall is the result of a lack of land registry, a disproportional social security structure and the recursive nature of the debt trap in the EU. Finland, in turn, presents a rather paradoxical case. The administration based out of Helsinki has been one of the strongest proponents of financial austerity however has suffered from exogenous and endogenous shocks that have paralysed the economy.

**Figure 6: GDP of Finland and EU, 2001–2015**

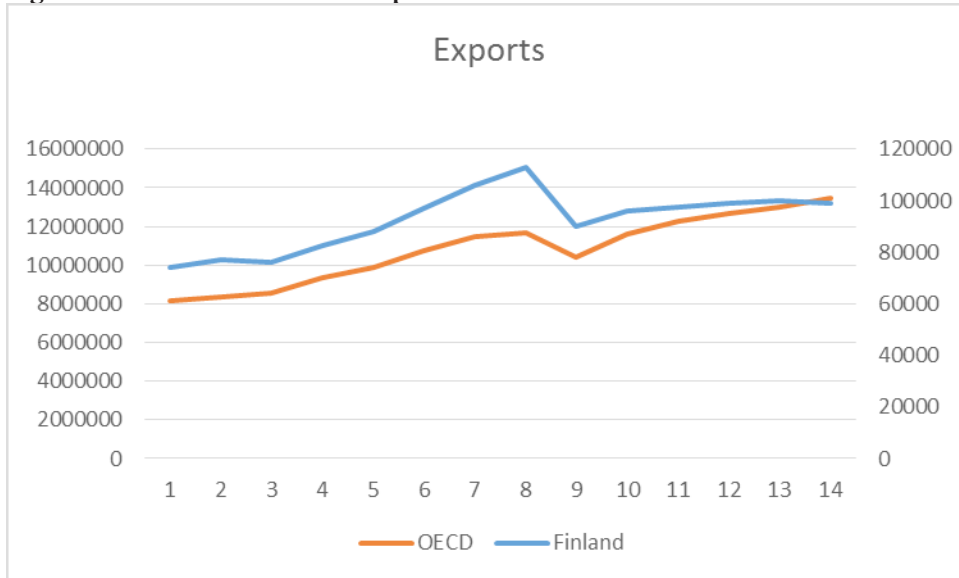


**Source: OECD**

As we can see, Finland’s GDP suffers a sharp decrease following Q3 2008, with the decrease being far more prominent than the one seen in the EU GDP. We hypothesize that

this fall in GDP was the result of the “Nokia Effect” with the null hypothesis being that it was directly the result of a recessionary trend in the global economy that impacted the entire euro zone. To analyse this claim we first understand the nature of the Finnish economy as being an export dependent one.

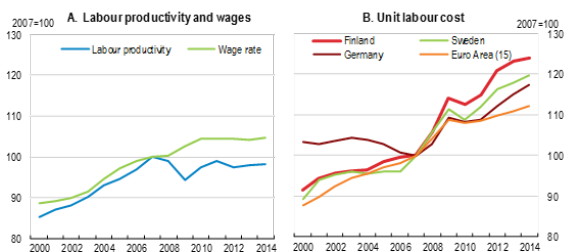
**Figure 7: Finnish and OECD exports 2001-2015**



**Source:** OECD

We can see that although the entire OECD experienced a decline in the exports following the 2008 period, the decline in Finland’s exports has been much more pronounced and the recovery has been comparatively smaller with the OECD average overtaking the Finnish exports in 2013. We propose that this was the result of Nokia missing the “smart-phone revolution” and the rise of Apple inc. which led to a steady decline in Nokia’s revenue and overall global market share. Another aspect here is of the decline of the paper industry in the country and thus the output of the paper manufacturing industry will be used to control that impact. While a decrease in revenue may have had a direct impact on the GDP, it also tends to lead to second and third round effects. We see unemployment as one of the second round effects that result from the decline of an industry and sectoral shifts that result from a move away from technology and manufacturing. The general trend of the harmonised unemployment rate agrees with this hypothesis however we argue that the true extent of unemployment has been understated and there is an underlying force of a loss in worker productivity. Finland, over the years, has lost labour cost competitiveness in the market due a strong union presence, declining worker productivity and a rise in the cost of living. Since Finland cannot devalue its currency (Euro), this has been another factor that has led to a loss in revenue for the Finnish households and thus must be controlled for to understand the true impact of Nokia. To better understand the impact of the sectoral shift we look at the individuals employed by each sector to better understand this impact.

**Figure 8: Labour Productivity and Wages in Finland, Germany, Sweden and EU15, 2000–2014**



**A. Labour productivity and wages**

	Labour productivity	Wage rate
2000	85.15443451	88.74919786
2001	87.07805843	89.28049903
2002	88.04146647	89.80630413
2003	90.11827683	91.49859991
2004	93.01620264	94.65607705
2005	94.70231064	97.26792453
2006	97.01547153	99.12405618
2007	100	100
2008	98.93579274	100.3616752
2009	94.32961884	102.6527755
2010	97.40791736	104.5604229
2011	98.96838217	104.5360566
2012	97.42178687	104.3579854
2013	98.02807233	104.1853092
2014	98.13127142	104.6461682

**B. Unit labour cost**

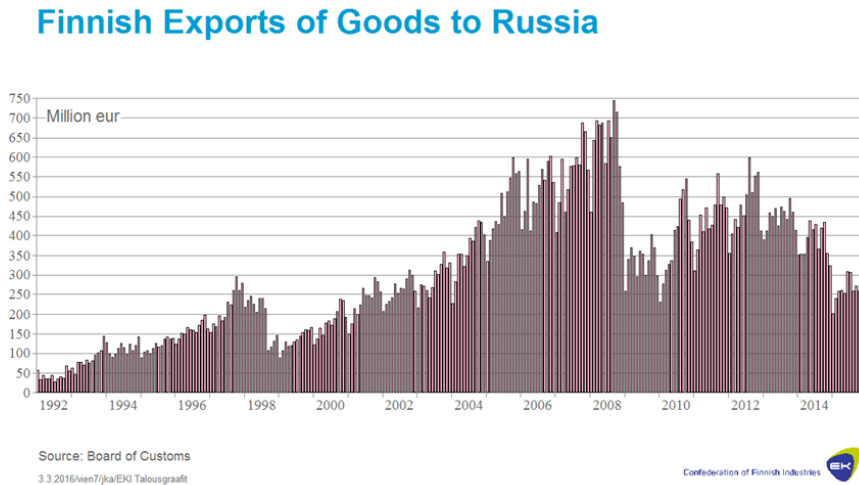
	Finland	Sweden	Germany	Euro Area (15)
2000	91.59746591	89.40013771	103.2591531	87.6752711
2001	94.36987644	93.90351216	102.9467573	89.73523872
2002	95.73269589	95.17218889	103.5658151	92.39119672
2003	96.14108654	96.08839576	104.4640172	94.57697931
2004	96.37538243	95.63787462	103.9338432	95.52306388
2005	98.64587786	96.16259799	102.8007807	97.22951582
2006	99.62010354	96.05163291	100.6378178	98.25757959
2007	100	100	100	100
2008	105.8237646	105.6987568	102.8640026	104.0979988
2009	114.0550797	111.4119381	109.3109882	108.7383089
2010	112.5240976	108.6982586	108.2267295	108.0380194
2011	114.9560707	111.9015115	108.7995886	108.4123029
2012	120.7864936	116.307305	112.2594434	109.8204031
2013	123.2292076	118.0025942	114.9156924	110.8422033
2014	123.9977806	119.5774485	117.3669312	112.2639807

**Source:** OECD

It is also important to understand that since the EU zone as a whole was experiencing a recessionary trend, the monetary union took policies to try and increase expenditure and produce a countercyclical reaction. This tends to boost the GDP and can be observed through the interest rates. We must control for this factor as it doesn't allow us to understand the true impact of Nokia's decline by cutting into the deficit via an increase in state expenditure and thus the GDP. To take exogenous impacts into account, we must consider the case of Russia, Finland's 3<sup>rd</sup> largest trading partner. The two share a historical trade relationship which can be traced back to the soviet era. Given the recent Ukrainian crisis, Russia has come under heavy scrutiny in the form of economic sanctions. Despite being one of Russia's prominent trading partners, Finland has been forced to impose sanctions along with the EU collectively which have further impacted trade relations and have a skewed effect against the Finnish due to the subjects of the sanctions and counter-sanctions by Russia.



**Figure 9: Finnish exports to Russia, 1991-2015**

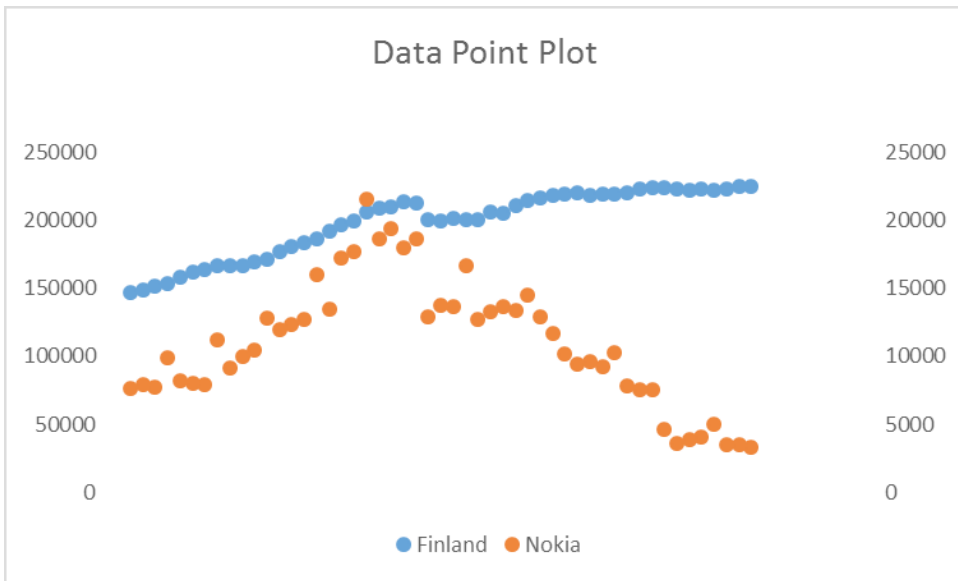


**Source:** Finnish Board of Customs

This we must also control for the impact trade with Russia's having on Finland's GDP and categorise it as an exogenous shock. It is interesting to see this trend and the sudden fall following the 2008 crisis given that the EU as a whole increased trade with Russia during that period to safeguard themselves against further shocks from the west.

Having established the basic framework, we first look at the basic relationship between Finland's GDP and Nokia's revenue without controlling for the factors mentioned. This is done simply to see the general trend from a quantitative aspect.

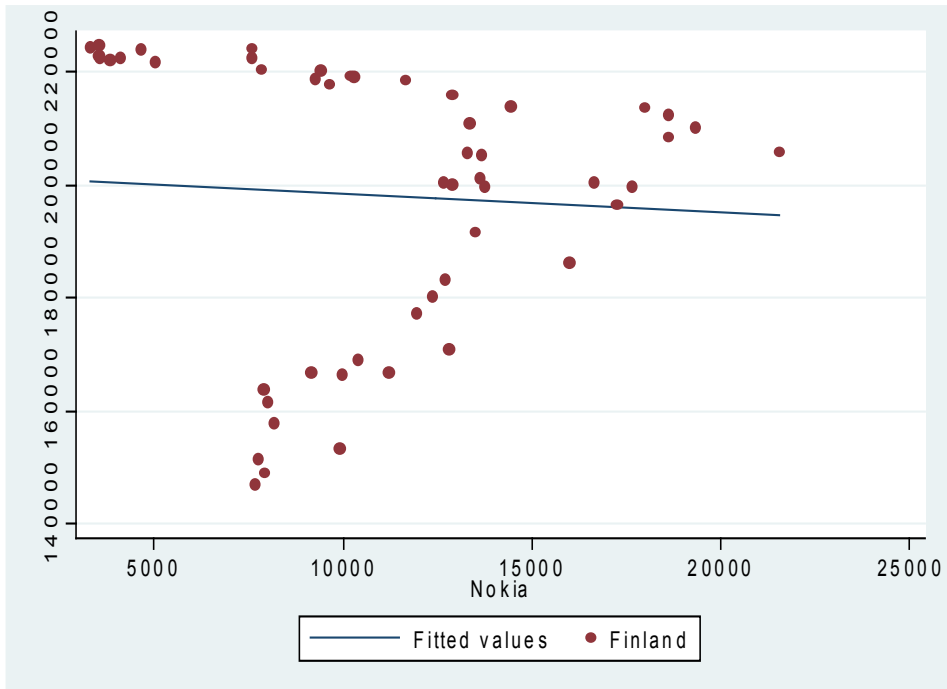
**Figure 10: Nokia’s Revenue and Finland’s GDP**



**Source:** Eurostat and Nokia Corp. Ltd.

This part of the analysis becomes rather interesting. Initially, we can see that Nokia’s Revenue and Finland’s GDP definitely have a positive relationship that continues up till 2008. Beyond this, we see a sharp decline in Nokia’s revenue while Finland’s GDP initially decreases but continues to grow at a lower rate. This is understandable given that Nokia’s decline initially produces a significant effect which causes GDP to drop but beyond that, the Finnish economy begins to adapt and replace the loss.

Figure 11: Nokia's Revenue and Finland's GDP



**Source:** Eurostat and Nokia Corp. Ltd.

We see the final coefficient as a small negative number (-0.331). This is understandable since the data is skewed towards after 2008 (more data points for after 2008 than before) and also acts as an indicator that Nokia's percentage change has been more acute than that of Finland's percentage change which is understandable.

**Table 12: Regression Coefficients under Various Controls**

VARIABLES	(1) Simple	(2) Control 1	(3) Control 2	(4) Control 3
Nokia	-0.331 (0.759)	0.720*** (0.0844)	0.601*** (0.0823)	0.160 (0.205)
EU		0.0120*** (0.000188)	0.00854*** (0.000970)	0.00818*** (0.00217)
Russia			0.00983*** (0.00272)	0.0104* (0.00519)
Unemp				-2,388*** (838.9)
Constant	201,824*** (9,040)	-4,017 (3,373)	27,622*** (9,244)	56,369** (23,281)
Observations	51	51	51	49
R-squared	0.004	0.988	0.991	0.991

**Source:** OECD, Eurostat and Nokia Corp. Ltd.

We begin by controlling for the general trend of the European Union economy. This test helps us move towards our research hypothesis of Nokia’s decline having a significant impact on the Finnish economy rather than just the recessionary cycle faced by the global economy. We see a high correlation of 0.72 with R-squared at 0.988, this already begins to show that the independent economic performance of Finland is highly dependent of Nokia’s Revenue. Next, we control for the Russian economy. Russia has long been one of the major partners for Finland with trade as high as 26.8% of Finland’s exports going to Russia. The recent sanctions of Russia in the aftermath of the Crimean incident have had a skewed effect on the Finnish economy. Even after controlling for the Russian economy, we still see a strong correlation of 0.601, the coefficient has decreased as a part of Nokia’s sales also occur in Russia thus explaining the drop in the correlation between Finland’s GDP and Nokia’ revenue. At last, we test the relation between Finland and Nokia while controlling for unemployment. This is a direct test for our research hypothesis which argues that internal factors such as unemployment were the true reason for Finland’s decline beyond just a decline in exports via fall in Nokia’s revenue sales. The results are as expected; while controlling for unemployment, the correlation coefficient between Finland’s GDP and Nokia’s Revenue falls to 0.106. This shows that the decline in GDP was a result of factors that were channelled through unemployment rather than directly through a decline in the revenue of Nokia. We can conclude that although Nokia had a significant impact on the Finnish economy in terms of exports, its impact on unemployment was, in turn, the dominant factor in the decline of Finland’s GDP. The changes in unemployment were largely a result of structural changes which stemmed from a sectoral shift in the economy caused Nokia due to factories being shut down overnight as well as large scaling back process with an intra-company shift away from hardware as well as a large fall in the labour force participation rate which seems to have skewed this effect. This impact is further aggravated due to the high old-age dependency ratios and thus fails to present a complete picture of the real unemployment scenario in Finland.

To conclude, the “Nokia Effect” has often been regarded as one of the most dominant

ones in the recent economic history of Finland, however we see that the true impact came through the unemployment that Nokia's decline caused rather than a decline in the revenue of Nokia, which formed a large proportion of Finland's exports, itself.

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