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Dutch Disease in Greenland

A comparative analysis of Dutch Disease symptoms in
Greenland, the Faroe Islands and Denmark from 2009-2023

by

Daniel Berg and Axel Ekelund

da6086be-s@student.lu.se & ax3437ek-s@student.lu.se

Abstract

This paper examines whether Greenland's annual block grant from Denmark has generated Dutch Disease effects. The foundational framework of Corden & Neary (1982) is applied to the context of aid-induced and public-sector driven transfer dependency. Using a comparative most-similar-systems design, including Greenland, the Faroe Islands and Denmark, the analysis combines a descriptive diagnostic approach with panel regression analysis. The descriptive analysis finds that Greenland exhibits characteristics consistent with Dutch Disease through a dominant public sector absorbing over 40% of employment, a public sector wage premium the private sector cannot match and an export sector almost entirely reliant on fishing. The regression analysis finds no statistically significant relationship between real wages and real exchange rate appreciation in Greenland, while positive relationships are identified for the Faroe Islands and Denmark. Taken together, the findings are broadly consistent with the presence of Dutch Disease in Greenland, though causal claims cannot be established within the scope of this thesis.

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1. Introduction

Greenland is a country characterized by a small population of around 50 000 dispersed over a massive area with no physical infrastructure between settlements and a heavy economic reliance on a single export, namely seafood (Hendriksen & Hoffmann, 2025). As an overseas territory of the Kingdom of Denmark, the Greenlandic government also receives a large annual sum from Denmark, also known as the Danish Block Grant (DBG), amounting to roughly 20% of their GDP, aimed at matching Greenlandic spending with Denmark (Bjerregaard, 2025; Paldam, 1997). The primary function of this Grant is to ensure spending which matches that of Denmark, due to the otherwise unfavorable geographic and climatic conditions of Greenland making it currently impossible to sustain similar economic activity as in Denmark (Paldam, 1997).

Due to this transfer from Denmark, the Greenlandic public sector is inflated to a level much higher than an economy of their size merits, with Paldam (1997) characterizing Greenland as an extreme welfare state. The Greenlandic government receives the DBG annually and without earmarking restrictions (Statsministeriet, 2009). This has resulted in a public sector which stands for 42% of employment, compared to the OECD average of 18.6% (Statistics Greenland, 2026; Lupi et al., 2024). Furthermore, the state owns a large portion of the private sector through state owned enterprises, which means including SOEs, the public sector accounts for approximately 75% of GDP (Nielsen, 2013).

The consistently high public expenditure because of the DBG in Greenland creates a sustained income flow from a single sector. This means Dutch Disease effects could possibly be observed in this case, a well-established macroeconomic phenomenon which arises when a single sector dominates an economy. The foundational Dutch disease model is outlined by Corden & Neary (1982), describing an economy consisting of a booming sector, causing an inflated non-tradeable sector and a lagging tradeable sector.

1.1 Research Problem

As explained above, the Greenlandic context is particularly unique. While the case looks positive from many angles, worry remains as to what a high dependency on an external flow of income can cause in terms of Dutch Disease (Paldam, 1997). Following the theoretical framework of Dutch Disease established in Section 2, the DBG can plausibly cause negative effects. Firstly, a widening gap between own production and absorption likely causes wages to become correspondingly higher than what the level of production should normally justify, leading domestic price levels to rise and causing a real exchange rate appreciation. Secondly, a large inflow of income to the public sector should inflate it beyond normal limits, causing factors of production to flow towards that sector and away from private sector activities (Nkusu, 2004).

Despite these predictions, little evidence exists as research on Dutch Disease in Greenland is scarce. While Paldam's (1997) paper proposes a framework for how Dutch Disease manifests in Greenland, it is largely based on approximations where the author provides a diagnosis without establishing any statistical relationships. On the other hand, there are substantial amounts of literature on Dutch Disease caused by foreign aid and/or remittances, which is as close as the DBG can get in terms of classifications of the income flow. However, these pieces of literature treat the income flow as a shock, which this thesis cannot do as the DBG has been consistent

since the mid-20th century and fully standardized since 2009 (Paldam, 1997; Statsministeriet, 2009). Additionally, much of the literature is applied to other context-specific cases such as Nkusu's (2004) paper on Dutch Disease in low-income countries, and Fielding's (2010) study on small Pacific island states. With these gaps in mind, this thesis will partly contribute to the debate by adding yet another case and context to the body of literature on aid-induced Dutch Disease, and partly to the literature on Greenland specifically and the viability of the DBG by providing an extensive diagnosis and attempting to establish a correlation between the grant and the spending effect.

1.2 Aim and Scope of the Thesis

With the research problem and the gap in the literature in mind, the aim of this paper is to establish whether the DBG received by Greenland has caused negative economic effects in line with the theoretical framework of Dutch Disease. This will partly be done by establishing whether there are signs of Dutch Disease in Greenland through descriptive analysis, and partly by comparing the statistical correlation between the real exchange rate and the real wage through statistical analysis. Both subsections of the empirical analysis include comparisons with the Faroe Islands and Denmark to add context to the results. Additionally, as the Faroe Islands receive a smaller but still substantial DBG, it begs the question of whether transfer dependency in general generates the Dutch Disease effects in any of the countries. Thus, the research questions are:

- 1. Do the structural economic characteristics of Greenland exhibit symptoms consistent with Dutch Disease?*
- 2. Is there an observable statistical correlation between the real exchange rate and the real wage in Greenland and the Faroe Islands relative to Denmark, and is it stronger in Greenland than in the Faroe Islands?*

The cautious framing of the first and second questions are intentional, as the robustness of the data and the scope of this bachelor's thesis does not allow for establishing strong causal links. Therefore, the scope of this thesis rests on attempting to prove correlation between real exchange rate fluctuations and real wage, which would constitute the spending effect.

Based on the theoretical framework outlined in section 2, two hypotheses are proposed, concerning the structural characteristics of the Greenlandic economy as well as the statistical relationship of Dutch Disease. The hypotheses are:

- 1. Greenland will exhibit structural characteristics consistent with Dutch Disease, including a dominant public sector, a contracted tradeable sector and a persistently high non-tradeable to tradeable price ratio. These symptoms will be more pronounced in Greenland than in the Faroe Islands and absent in Denmark.*
- 2. There is a statistically significant positive relationship between the real wage and the non-tradeable to tradeable price ratio in Greenland relative to Denmark, consistent with Dutch Disease, and this relationship is stronger in Greenland than the Faroe Islands.*

Together, these hypotheses reflect the two-part analytical approach of the thesis, as well as the expected results of Dutch Disease effects in each country relative to their level of transfer dependency.

1.3 Outline of the Thesis

This thesis is divided into 6 main sections, with the first being the introduction, outlining the research aim, scope, and questions. Section 2 will outline the previous research on Dutch Disease, linking the Greenlandic case to existing debates. Furthermore, section 2 also presents the theoretical approach of the thesis, linking the methodological approach to existing research. Section 3 presents the data used, examining reliability, representativity and validity, as well as acknowledging its limitations. Section 4 presents the methods, explaining the overall approach as well as the specific measures, divided into two dimensions of analysis, before discussing methodological limitations. Section 5 provides empirical analysis, presenting the results of the study, before discussing their broader implications and linking them to previous research. Lastly, section 6 concludes the study's findings and potential contributions to the literature and policymakers.

2. Theory

2.1 Literature Review

The two central mechanisms through which Dutch Disease operates are the spending effect and the resource movement effect. The spending effect arises when a large income flow increases overall domestic absorption beyond what domestic production could sustain. This drives up demand for non-tradeable goods and services, as non-tradeables are produced domestically and therefore insulated from international price constraints (Corden & Neary, 1982; Nkusu, 2004). As tradeable prices are anchored to world-markets, only non-tradeable prices rise significantly, creating a divergence between the two which constitutes real exchange rate (RER) appreciation (De Gregorio & Wolf, 1994; Acosta et al., 2009). As non-tradeable prices rise, wages are bid upward in the whole economy, raising unit labor costs (Buiter & Purvis, 1983). This erodes the competitiveness of the tradeable sector, manifesting in a declining export share in the economy (Paldam, 1997). The resource movement effect operates through labor and capital markets, as the booming sector can offer high wages and returns which the rest of the economy cannot match. This causes factors of production to be drawn away from the tradeable sector and toward the booming and non-tradeable sector (Van Wijnbergen, 1984; Acosta et al., 2009). This reallocation reduces tradeable sector output and productivity, observed through sectoral employment shares, wage differentials and gross value added (Ismail, 2010; Corden & Neary, 1982).

Traditional Dutch Disease literature, especially concerning aid transfers, often combines the effects of real exchange rate appreciation and nominal exchange rate appreciation, treating them as part of the same transmission (Magud & Sosa, 2013). When receiving a large influx of aid in a foreign currency, countries with independent monetary policy need to convert this into domestic currency, causing their nominal exchange rate to appreciate. Greenland receives the DBG in its domestic currency, which is also pegged to the euro, meaning any Greenlandic activity will have minimal effect on the nominal exchange rate.

2.1.1 Debates on Dutch Disease

The literature on this topic has two main debates, the first of which concerns the effectiveness of foreign aid transfers. Many scholars believe that aid can promote growth and development, claiming that together with appropriate policies and institutions, aid can finance investment, improve infrastructure and reduce poverty, serving as a force for growth (Burnside & Dollar, 2000; Bhavnani, 2004). Contrastingly, many scholars also conjecture that aid transfers fail to generate economic growth and even cause negative outcomes as they ignore incentives and institutional constraints, creating dependency, rent-seeking and corruption (Easterly, 2003; Rajan & Subramanian, 2008; Boone, 1996). In the Greenlandic context, the question is not whether the block grant promotes growth, but whether its structural effects on the economy are consistent with Dutch Disease.

The second debate concerns to what extent Dutch Disease is harmful to an economy. In the debate, many economists argue that Dutch disease can lead to deindustrialization and hinder long-term growth due to exchange rate appreciation, contraction of tradable sectors and expansion of non-tradeable sectors (Corden & Neary, 1982; Sachs & Warner, 1995; Van Wijnbergen, 1984). On the other hand, many economists also argue that Dutch Disease simply reflects efficient economic adjustment and that it may be optimal for an economy to shift resources toward non-tradable sectors (Matsen & Torvik, 2005; Brunnschweiler & Bulte, 2008; Alexeev & Conrad, 2009).

Debates also circle around the specific mechanisms large aid inflows lead to Dutch Disease. Adenauer & Vagassky (1998) find evidence that CFA franc zone countries experience increased government deficits due to higher public wage bills, along with widening trade balances in times of increased aid inflows. This would suggest that increased spending on public wages, rather than productive investment is a key sign of Dutch Disease. Outcomes are however not homogenous, as outlined by Fielding (2010), who examines aid-induced Dutch Disease across small pacific island states. The study finds that country-specific characteristics such as size, openness and economic structures are the ultimate determinant of whether aid creates Dutch Disease. This emphasizes the importance of comparative analysis, as the Faroe Islands share structural characteristics with Greenland but receives a smaller transfer, while Denmark receives none. Therefore, differences in outcomes can more credibly be attributed to transfer dependency rather than context.

2.1.2 Applying Dutch Disease to Greenland

The Greenlandic case is atypical within Dutch Disease literature in two ways: being aid-induced rather than resource-induced and having effects which are structural rather than shock-based. As the DBG is a consistent annual sum which has been received since 1979, any Dutch Disease effects are long-term distortions. This manifests itself as a persistent decline in the tradeable sector and dependence on the non-tradeable sector (Ismail, 2010; Sachs & Warner, 1995).

The spending effect operates through the public sector inflating domestic demand beyond productive capacity. When aid funds public consumption and not productive investment, domestic absorption exceeds output. This mechanism was identified in Greenland by Paldam (1997), suggesting that this widens the gap between income and production, raising demand for non-tradeables. This in turn, pushes Greenlandic prices above internationally constrained

tradeable prices, creating RER-appreciation. Evidence from studies on remittances by Acosta et al. (2009; 2012) find that external transfer inflows drive up non-tradeable prices and draw labor away from the tradeable sector. Furthermore, they find that these effects are greater under fixed exchange rate regimes, suggesting Greenland is at greater risk of spending effect symptoms.

The resource movement effects' primary transmission mechanism is through the labor market. In the Greenlandic case, the DBG-funded public sector can offer wages that are unnaturally higher than what their own productivity can sustain, creating a wage premium the private sector cannot match (Van Wijnbergen, 1984; Nkusu, 2004). Cust et al. (2022) corroborate this mechanism in resource-rich countries, finding that government spending from external revenues raises public employment and wages. In Greenland, where low unemployment and structural labor market constraints limit productive capacity, the private sector will feel this effect even more heavily (Bjerregaard, 2025; Nkusu, 2004).

Bourdet & Falck (2006) further argue that aid-induced Dutch Disease is most intense when transfers are directed toward public consumption and wages, rather than the export sector. In a similar vein, Rajan & Subramanian (2011) claim that large aid inflows hinder export sector growth, primarily through RER-appreciation. These apply to the economic structure of Greenland, which has a large public consumption and a structurally underdeveloped export sector.

2.1.3 Contributions to the Literature

As the DBG is a consistent annual sum, this study can give further insight into the extent to which the DBG creates economic dependency or allows development which can make Greenland economically self-sufficient in the long-term. Furthermore, Dutch Disease debates often examine real exchange rate effects of aid-recipients where aid is given in foreign currency (Nkusu, 2004), meaning the study will contribute to the debate around spending effect from domestic currency inflows. Additionally, Dutch Disease is mostly focused on shock-based effects, rather than structural effects, meaning this study will contribute to this debate by examining structural elements of Dutch Disease in the case of Greenland. Lastly, the Greenlandic economy has limited literature, with Paldam (1997) being the main literature contributor of Dutch Disease effects in the region, since this study, the DBG has undergone reforms and the economic situation of Greenland has changed, meaning this study will update the literature in this field.

2.2 Theoretical Approach

The overarching theoretical framework of the paper serves as the foundation for understanding the results. As the aim of the thesis is to identify whether Greenland shows clear symptoms of Dutch Disease, and through what mechanisms, a descriptive analysis will be conducted and later complemented by a statistical analysis. For both analyses, the overarching theoretical framework consists of Corden and Neary (1982), Acosta et al. (2009), Nkusu (2004) and Paldam (1997).

To measure orders of magnitude, all analysis of Greenlandic results will be compared to results in Denmark and the Faroe Islands. As Greenland receives the highest relative and absolute DBG, it should experience most Dutch Disease on both fronts. The Faroe Islands should experience it to a lesser degree, and Denmark close to none. When comparing the symptoms of Dutch Disease

and the mechanisms through which these symptoms manifest, going back to the theory in the discussion will allow for clearer interpretations.

Paldam's (1997) paper utilizes a descriptive diagnostic approach to identify the symptoms and reasoning behind the claim that Greenland's large public sector constitutes a case for Dutch Disease. The paper is largely diagnostic, presenting a basic model showcasing the logic behind Dutch Disease in Greenland without providing thorough econometric evidence. The author provides a theoretical prediction of what Dutch Disease should produce in the specific context of Greenland and compares those predictions with observations of national accounts, price surveys, sectoral composition data and growth trajectory analysis. This ties into the present study, as a similar strategy of descriptive statistics will be used to examine whether Greenland truly displays relevant symptoms.

By applying the theoretical framework to the case of Greenland and its comparators, several predictions can be made. Firstly, as the DBG accounts for a large share of Greenlandic GDP, and is to a large extent spent on public consumption, theory predicts that public expenditure and public employment should be significantly higher than in the Faroe Islands and Denmark (Corden & Neary, 1982; Bruno & Sachs, 1982; Nkusu, 2004; Acosta et al., 2009; Rajan & Subramanian, 2011). Applied to the spending effect, public wages and therefore demand should rise due to the large public employment share. This would in turn put pressure on the prices of non-tradeables and bid up wages economy wide. The effect of wages on the NT/T ratio will be referred to as the wage-channel, as it the primary measurement of the spending effect in this thesis. The result would be RER-appreciation.

Applied to the resource movement effect, the public employment share would indicate that factors of production are not flowing towards tradeable sector activity (Corden & Neary, 1982; Bruno & Sachs, 1982; Nkusu, 2004; Acosta et al., 2009; Rajan & Subramanian, 2011). This would in turn cause the Greenlandic export sector to remain structurally underdeveloped, with lower productivity and a lower share of total GDP serving as the main indicators. The RER-appreciation would also negatively affect the tradeable sectors through unit labor costs, reducing their international competitiveness (Ismail, 2010).

The theoretical transmission of Dutch Disease through the block DBG is summarized in Table 1, which maps out the causal chain of each effect specifically to the Greenlandic case. The steps follow the basic logic of the traditional Dutch Disease model by Corden and Neary (1982), but are augmented to broader aid-induced Dutch Disease theory (Nkusu, 2004; Ismail, 2010; Rajan & Subramanian, 2011) and to reflect the public sector dominance as the primary driver, as outlined by Paldam (1997). While only some steps will be observable in the available data, the chain provides the theoretical basis for both the descriptive diagnosis and the statistical analysis that will follow.

Table 1. Dutch Disease Chain of Events in Greenland.

Step	Resource movement effect	Spending effect
1	The block grant finances public sector expansion beyond what domestic tax revenues could sustain.	The block grant generates excess absorption over own production, increasing purchasing power.
2	The public sector offers a wage premium above private sector levels.	Excess demand falls on non-tradeables, which cannot be met through imports.
3	Labor moves from tradeable to public or non-tradeable sectors.	Non-tradeable sector firms expand by hiring more labor, bidding up wages and raising unit labor costs.
4	The tradeable sector faces a shrinking labor supply and rising wage costs it cannot sustain with internationally set output prices.	Non-tradeable prices rise relative to tradeable prices, constituting internal real exchange rate appreciation.
5	The tradeable sector becomes structurally underdeveloped, leading export share to fall.	The tradeable sector loses international competitiveness as unit labor costs rise beyond what world market prices allow, causing it to contract.

Source: Author's own analysis based on literature (Corden & Neary, 1982; Paldam, 1997; De Gregorio & Wolf 1994; Rajan & Subramanian, 2011; Cust et al., 2022; Van Wijnbergen, 1984; Nkusu, 2004; Ismail, 2010)

3. Data

3.1 Source Material

Each of the three regions provides publicly available primary data through their respective statistical databases (Statbank Greenland, Hagstova Føroya & Statbank Denmark). Importantly, the availability of data for the different regions has shaped the scope and approach of the analysis. For example, to examine the magnitude to which Greenland is experiencing Dutch Disease, the Faroe Islands as a most similar country is crucial, but any third reference country from the OECD would be conceptually valid as a point of comparison. The fact that Denmark's statistical database uses similar data gathering methods and classifications, along with their use of the DKK ensures consistency in the data and clarity in results. Furthermore, the scope being limited to 2023 is in large part due to data past this year not being available in Greenland, and therefore any estimations or secondary data sources could bring issues of reliability.

The statistical analysis draws on a panel dataset covering Greenland, the Faroe Islands and Denmark over the period 2009-2023, creating 45 country-year observations. Each country is observed for all the 15 years, apart from Greenlandic fishing GVA, which cuts off in 2020. Given the structural nature of the DBG, the panel is well suited to identifying persistent

relationships between the countries rather than short-run effects within a single country. Country fixed effects are therefore important to the regression analysis, accounting for time-invariant differences between the three economies. This allows the analysis to isolate within-country variation in the dependent variables.

As the descriptive diagnostic approach requires measuring very specific parts of the economic structure, much of the data must also be reworked. This means general changes to all data, as well as reworking data into variables which are not directly available in the statistical database. In general, all data in the three regions is given in nominal values, which for the purpose of the analysis have been changed to real values, using CPIs taken from the databases. To diagnose the resource movement effect, variables for percentage employment share by public, primary and private were calculated. Furthermore, private sector gross value added was calculated by taking total GVA and subtracting all GVA generated by the public sector. As for the descriptive diagnosis of the spending effect, data specifying non-tradeable and tradeable prices were not available. Therefore, country-specific non-tradeable indices were constructed using CPIs for different commodity classifications. Lastly, export income was calculated into real terms and expressed per capita to ensure consistency.

The statistical analysis includes several variables which need to be reprocessed to ensure accuracy. Publicly available data on GDP growth, public expenditure, and total employment were all taken directly from the three respective countries' statistical databases and converted into real terms. Real wages have been calculated using total compensation of employees divided by total employment and converted into real terms using tradeable CPIs for each respective country. Public wage premiums are derived as the ratio of public to private compensation per employee, using publicly available employment data converted into real terms. Sectoral employment share was aggregated by sector specific employment data and dividing them into public- or private-sector. Lastly, terms of trade are available in the Greenlandic and Danish databases, but not for the Faroe Islands, so figures were taken from UNCTADstat and rebased to the year 2009.

3.2 Limitations of the Data

The foremost limitation of the data used is that the three countries have significant differences in the depths of their statistics. The most limited database out of the three is Greenland, meaning the scope had to be adjusted to ensure consistency in measurements. Oftentimes, the time frame is short, variables lack explanations and categorizations are limited for Greenland in comparison to Denmark and the Faroe Islands. In these cases, the statistical office of Greenland has been helpful, providing clarifications upon request. The most limiting aspect of the data is the limited classifications of goods- and service-specific CPI indices, where Denmark has upwards of 400 classifications while Greenland has 24. Although these limitations may make results less conclusive, the source data is still primary, accurate and consistent across the three countries. Furthermore, the Greenlandic statistical office has been very helpful, providing clarifications and extra appendices upon requests, greatly aiding the research process.

Furthermore, there is a minor replicability limitation in calculating CPIs divided by non-tradeable and tradeable sectors. For Denmark and the Faroe Islands, the specific CPI subcategory weights are available, making it possible to calculate non-tradeable CPIs with publicly

available data. This is not the case for Greenland, where the statistical bureau had to be contacted for the weights used, allowing for the construction of the non-tradeable CPI. Furthermore, the limited classification of CPIs in Greenland meant some non-tradeable and tradeable goods were categorized in the same CPI. Therefore, the Greenland statistics had to be contacted to separate the CPI of actual rent for housing from broader housing costs.

4. Methods

The empirical analysis of this thesis proceeds in two complementary stages. The descriptive section will examine whether Greenland exhibits the structural economic characteristics predicted by the thorough review of Dutch Disease theory in the previous section, accounting for evidence of both the spending effect and the resource movement effect. Additionally, the Faroe Islands and Denmark will be studied where a comparative perspective can be of value. Subsequently, the statistical analysis will test whether the predicted transmission mechanisms that the DBG operates through are statistically observable in the panel data through multivariate analysis. The reason for this dual approach is that descriptive analysis cannot establish whether the structural characteristics and differences are products of Dutch Disease or other explanations. Similarly, statistical analysis cannot capture the full structural picture that the descriptive analysis can be due to a multitude of limitations in the data and nature of the DBG. Section 4.1 will describe the comparative approach of the thesis and the selection of cases. Section 4.1.1 will describe the descriptive methodology, and section 4.1.2 will describe the statistical methodology. Lastly, section 4.2 will present the many limitations that must be addressed to present honest and transparent results.

4.1 The Approach

A vital component of the methodological approach is to compare Greenland with the Faroe Islands as it receives a smaller DBG. The comparative framework used to perform this comparison is a Most Similar Systems Design (MSSD). MSSD is a research method in which two countries of analysis are chosen because they share as many similar traits as possible, except for the main independent variable of interest (Anckar, 2008). This is done to avoid controlling for possible extraneous variables that may otherwise skew the results, just as one would do in statistical analysis. Applied to this thesis specifically, the aim of utilizing MSSD is to increase the likelihood that the DBG as the main independent variable can be attributed to the differences in outcomes observed in Greenland and the Faroe Islands. Anckar (2008) notes that while a strict form of MSSD requires all control variables to be identical between the two countries of analysis, a looser approach requires matching according to as many similar background characteristics as possible. The latter approach will be applied in this thesis, as there are still many structural differences between the two countries that will be accounted for in section 4.2.

The use of the Faroe Islands as the main comparator is motivated by the structural and institutional similarities (Hendriksen & Hoffmann, 2025), as well as because the Faroe Islands also receives a DBG. The countries share many similarities, such as the geographical isolation of being an island economy, close to identical population numbers, a narrow export base composed mainly of seafood and lastly general institutional similarities as both are self-ruling territories of Denmark (Hagstova Føroya, 2025; Hendriksen & Hoffmann, 2025). Most importantly however, the Faroe Islands receive an annual DBG with the same aim as the one in Greenland, with the

significant exception that it is substantially smaller in both absolute and relative terms (Hagstova Føroya, 2025). In both countries, the DBG has led to a level of public expenditure above 60% of total GDP in Greenland, and above 50% of total GDP in the Faroe Islands (see figure 8).

The inclusion of Denmark in this study does not follow the same logic as the Faroe Islands and MSSD, as Denmark instead serves as a reference economy. Paldam (1997) uses a similar approach in estimating what Greenland's own production per capita, i.e. GDP per capita not induced by the DBG, would constitute in terms of price levels. While he used Portugal as a reference economy because they matched in their own production per capita, Denmark serves a better purpose in this study. While Denmark does not share the very context-specific attributes of Greenland and the Faroe Islands, all three countries share monetary and institutional frameworks, a product of Danish colonial history. Therefore, Danish results will serve as a benchmark for what key variables should look like in an undistorted Nordic economy. This approach differs from the most widely used approaches of identifying shocks in a single country or running cross-country regressions (Corden & Neary, 1982; Bjørnland & Thorsrud, 2016; Sachs & Warner, 1995; Beine et al., 2012). However, because the DBG is a consistent annual sum and time-series data is scarce, these approaches are not applicable to this study.

4.1.1 Descriptive Diagnostic Analysis

The first stage of analysis will attempt to diagnose the Greenlandic economy with the symptoms identified throughout section 2. Rather than testing for Dutch Disease through a single measure, a multi-indicator diagnostic approach will be adopted to understand if and to what extent a predicted theoretical symptom of Dutch Disease in Greenland exists. This approach follows Paldam's (1997) approach, as he similarly attempts to diagnose Greenland through structural economic characteristics. The indicators of Dutch Disease that this section seeks to identify can be organized into three thematic groups - transfer dependency, spending effect symptoms and resource movement effect symptoms.

Before examining Dutch Disease symptoms, it is crucial to establish the extent of dependency that Greenland and the Faroe Islands have on the DBG transfer. Perhaps most direct, the DBG will be presented in real terms for both countries by deflating it with a country-specific CPI. It will also be presented as a share of total public expenditure in both countries. While presenting it as a share of GDP would tell a similar story, public expenditure better explains the extent of dependency as the entire DBG is given directly to each country's respective government. Lastly, the section will present the absorption gap as discussed in Paldam (1997).

The spending effect in Dutch Disease theory will be diagnosed to the relevant countries primarily through price level evidence. Much of the literature on Dutch Disease proposes that the end product of the spending effect is that the tradeable sector loses competitiveness due to a RER appreciation (Corden & Neary, 1982; Bruno & Sachs, 1982; Acosta et al. 2009). As described in section 2, a viable and commonly used proxy for an RER appreciation is studying the tradeable and non-tradeable price levels within a country, which will be the method used for this paper. The logic is described in Table 1, where excess absorption financed by the DBG raises demand for non-tradeable goods and services, pushing their prices above internationally set tradeable prices and producing a RER appreciation measurable through a non-tradeable/tradeable price ratio (NT/T ratio). The NT/T ratio is constructed using constructed non-tradeable CPIs for each

country, taking CPIs for a basket of specific commodities deemed as non-tradeables based on Johnson (2017). The non-tradeable CPIs are then constructed using weights derived from the statistical bureaus of the three countries. The tradeable CPI used for all three countries is Denmark's, which is explained in section 4.2.

The spending effect will be diagnosed primarily through price-level evidence, as in theory, Greenland should exhibit RER-appreciation driven by domestic absorption (Corden & Neary, 1982; Acosta et al., 2009). The primary indicator is the NT/T ratio, which captures RER appreciation by measuring the relative price increase of non-tradeables over tradeables. This will be complemented by the overall CPI and a non-tradeable CPI, in order to isolate the non-tradeable price channel from general inflation. Next, indicators relating to the tradeable sector's competitiveness and output will be examined, which Dutch Disease theory suggests will decline as the non-tradeable sector expands. Total exports as a share of GDP captures the relative contraction of the tradeable sector, while public expenditure as a share of GDP is used as a proxy for the demand-side absorption of the spending effect.

As for the resource movement effect, the indicators most of interest relate to labor market structure and sector composition evidence. As described in Table 1, the central prediction is that the DBG-funded public sector draws factors of production away from the private tradeable sector. By utilizing labor as a proxy for all factors of production, this chain of events operates through the public sector offering a wage premium that private employers cannot match given the internationally set prices. The first indicator of the resource movement effect is the public sector employment share of total employment, as it directly measures the labor allocation between sectors. The second indicator is the public expenditure share of GDP that complements the first in telling a bigger story of public sector dominance and capturing the demand-side mechanism. Third, several indicators from the fishing sector will be included to understand the impact of the resource movement effect on both countries' primary sector. This will include fishing GVA as a share of total GVA, as well as fishing GVA per worker. Due to limited data availability, Greenland only has data until 2020. Additionally, Denmark is not included in the fishing indicators as it does not have the same extreme dependence on the sector. Lastly, the real compensation per employee for the total economy and broken down by public and private sector will be studied to observe a potential public sector wage premium in line with Dutch Disease.

4.1.2 Statistical Analysis

The statistical analysis addresses the shortcomings of descriptive analysis by testing specific theoretical links within the Dutch Disease spending effect. While descriptive analysis goes a long way in explaining the structural patterns of Dutch Disease, it cannot test whether the predicted relationships between variables are statistically robust after controlling for possible confounders. The overarching problem in statistical analysis during the research process has been the inability to test the DBG directly. Testing the effect of the Greenlandic DBG in real terms on a dependent variable introduced close to no variance, as it is given in a fixed amount in Danish 2009 prices (Statsministeriet, 2009). Testing it instead as a share of GDP introduced problems of endogeneity, as any variance would be the product of GDP fluctuations possibly caused by the very effects the regression sought to identify in the dependent variable. Both issues severely limit the use of such a variable, considering the scope for this thesis (Wooldridge, 2019, p. 82).

Therefore, the statistical analysis will attempt to test the spending effect of Dutch Disease specifically. While the resource movement can likely be tested statistically, panel data for 15-year time span and 3 observed countries would likely fail to capture the structural changes in employment composition and productivity loss predicted by the effect. Therefore, the NT/T ratio will be the dependent variable in all regressions, as Acosta et al. (2009) and De Gregorio & Wolf (1994) identify it as an effective proxy of RER fluctuations. All variables used in the regression can be found in Table 2.

The main independent variable will shift with each regression. In regression 1, Greenland and the Faroe Islands will serve as dummy variables to capture how the NT/T shifts with country-fixed effects. In regression 2 and 3, real wages and real public wages will be the main independent variables respectively. The reasoning behind this distinction is that regression 1 will capture broader wage channel effects in the spending effect, while regression 2 will capture the wage channel effect specifically from the public sector, as that is the dominant sector in the two transfer dependent economies. The controls will remain the same and draw upon the controls used by Acosta et al. (2009) in identifying the effects of remittances on the real effective exchange rates. GDP growth controls for cyclical demand and business fluctuations, and the terms of trade index controls for external price levels distorting the NT/T ratio.

Table 2. Calculation and Description of Variables.

Variable	Calculation	Description / What it captures
NT/T ratio	Ratio of the country-specific non-tradables CPI sub-index to the Danish tradables CPI sub-index, both rebased to 2009 = 100.	Dependent variable. Measures the relative price of non-tradable to tradable goods - a standard proxy for the real exchange rate.
Greenland (dummy)	= 1 if observation is from Greenland, 0 otherwise.	Regional fixed effect (Regression 1). Captures the average level shift in the NT/T ratio for Greenland relative to the reference country (Denmark).
Faroes (dummy)	= 1 if observation is from the Faroe Islands, 0 otherwise.	Regional fixed effect (Regression 1). Captures the average level shift in the NT/T ratio for the Faroe Islands relative to the reference country (Denmark).
Real wage (1,000 DKK)	= real_compensation_per_employee / 1000. Compensation per employee, deflated by CPI (2009 = 100).	Total-economy labour cost (Regression 2). Captures wage pressure from labour market on the relative price of non-tradables.
Real public-sector wage (1,000 DKK)	= real_public_compensation_per_employee / 1000. Compensation per public-sector employee, deflated by CPI (2009 = 100).	Public-sector labour cost (Regression 3). Isolates wage pressure originating from the public sector.
Terms of trade index	Reported directly from each country's national statistical agency. Index, rebased to 2009 = 100.	Ratio of export to import prices. Captures external price shocks.
Real GDP growth	Reported directly from each country's national statistical agency. Expressed as an annual percentage change (e.g. 2.5 = 2.5%).	Cyclical demand control. Captures domestic business-cycle conditions that affect the NT/T ratio.
Constant	Regression intercept.	Baseline level of the NT/T ratio when all regressors equal zero (or, for the dummies in Regression 1, the reference country's mean).

Source: De Gregorio & Wolf (1994), Acosta et al. (2009), Paldam (1997), Statistics Greenland, Hagstova Føroya, Statistics Denmark and authors' own estimations and interpretations.

Since the NT/T ratio is measured with very different scales, openness and transfer dependencies in each country, the variance in the NT/T ratio is likely to differ systematically. This means that the error variance is not constant across observations, motivating the choice of robust standard errors to not generate biased standard errors and p-values in regression 1 (Wooldridge, 2019, p. 263). Furthermore, Newey-West standard errors are computed in regressions 2 and 3 to control

for both heteroskedasticity and any serial correlation (Wooldridge, 2019, p. 399). The choice of lag 2 follows the original recommendation of an integer of $n^{(1/3)}$, which for a 15 time-series observations per country renders a lag of 2.

Regression 1 will be a standard pooled cross-sectional OLS-regression with robust standard errors (Wooldridge, 2019, pp. 444-446). After the regression, an equality test is conducted to observe whether the Greenlandic and Faroese NT/T ratios are structurally distinguishable from each other ($\beta_1 = \beta_2$). It will test the hypothesis that Greenland and the Faroe Islands should have a higher structural NT/T ratio than Denmark, and that Greenland should have the highest due to its transfer dependency:

$$(1) NT/T_{it} = \alpha + \beta_1(\text{Greenland}_{it}) + \beta_2(\text{Faroes}_{it}) + \beta_3(\text{ToT}_{it}) + \beta_4(\text{GDPGrowth}_{it}) + \varepsilon_{it}$$

With this intent in mind, several important statistics are worth highlighting in the results section. The coefficients of the Greenland and Faroes dummies will be vital, as they explain the structural NT/T difference relative to Denmark as the omitted country. Each coefficient's associated p-value will also be of importance, to find which correlations are statistically significant and not generated randomly. Additionally, the post-estimation equality test's F-statistic will be important to distinguish the two dummies. Lastly, the F-statistic, Prob > F and R-squared will all be examined to determine the fit and joint significance of the model (Wooldridge, 2019, p. 77 & 147).

Regression 2 will be a time series OLS-regression computed separately for each country using Newey-West standard errors with a maximum lag of 2 to correct for autocorrelation and heteroscedasticity. It will test the hypothesis that an increase in real wage should drive up the NT/T ratio through higher demand for non-tradeables (the wage channel):

$$(2) NT/T_t = \alpha + \beta_1(\text{RealWage}_t) + \beta_2(\text{ToT}_t) + \beta_3(\text{GDPGrowth}_t) + \varepsilon_t$$

Regression 3 follows the same estimation approach as regression 2 and substitutes real public wages for real wages. This partly adds robustness to potential wage channel findings and partly tests the public sector real wage specifically as the primary transmission mechanisms through which the DBG drives demand up. Therefore, it will test the hypothesis that an increase in real public wage should drive up the NT/T ratio more in Greenland than the Faroe Islands, and more in both than in Denmark:

$$(3) NT/T_t = \alpha + \beta_1(\text{RealPublicWage}_t) + \beta_2(\text{ToT}_t) + \beta_3(\text{GDPGrowth}_t) + \varepsilon_t$$

For the latter time-series OLS-regressions, the primary statistic of interest is the coefficient on the respective real wage variable to determine the extent of the spending effect wage channel. Their associated p-values will also be highlighted to determine the statistical significance which has been adjusted with the Newey-West standard errors. The F-statistics and Prob > F will also be important to assess the model fit for each country. Lastly, the intercept will be of interest, as it indicates whether each economy has a significant baseline NT/T level after controlling for the regressors. A statistically significant intercept well above or below 0 would indicate that other factors that are not controlled for may be steering the dependent variable.

In assessing the p-values of each coefficient, it is important to maintain a set threshold of significance. A p-value below 0.01 indicates statistical significance at the 1% level, meaning that

under the null hypothesis, the probability of observing results at least this extreme is below 1% (Wooldridge, 2019, p. 739). A p-value below 0.05 indicates significance at the 5% level, and a p-value below 0.1 at the 10% level. P-values above 0.1 do not provide conventional statistical evidence, but will still be discussed in terms of direction, uncertainty and sample size limitations where relevant. Given the small sample size of 15 observations per country regression, the 10% threshold is worth reporting but requires significant caution in interpretation. Conclusions will therefore be drawn primarily from results significant at the 5% level or below.

4.2 Methodological Limitations

One limitation regards the construction of the NT/T price-ratio, key to the descriptive diagnostic analysis as well as the statistical analysis. When isolating tradeable prices in each economy, it became clear that the geographic isolation of the Faroe Islands, and especially Greenland, created tradeable price levels which were unnaturally elevated, most likely due to high transportation costs. This inflates the tradeable CPI and makes it not reflective of international price levels. Therefore, the tradeable CPI for Denmark will be used in all three countries, in order to isolate the high transport costs reflected in the indices for Greenland and the Faroe Islands. While this makes the ratio reflect less on the specific economic conditions of Greenland and the Faroe Islands, many previous studies on tradeable prices use exogenous figures, as will be done in this study. This holds due to small open economy assumption (Corden & Neary, 1982; De Gregorio & Wolf, 1994; Acosta et al., 2009), concluding that the spending effect rests on the observation that non-tradeable prices rise relative to tradeable prices precisely because they are pinned to international markets. Furthermore, since the countries all use DKK and all traded goods in Greenland and the Faroe Islands are predominantly imported from Denmark, this means tradable price levels should be overwhelmingly determined by Danish price levels (Cavallo et al., 2014).

5. Empirical Analysis

The empirical analysis is divided into two sections, of which the first one attempts to diagnose Greenland using a descriptive analysis, and the second one attempts to establish correlations between the expected initial effects of the DBG and the end effect as explained by theories on Dutch Disease (Paldam, 1997; Corden & Neary, 1982; Bruno & Sachs, 1982; Rajan & Subramanian, 2011; Cust et al., 2022).

In the first section, this thesis will present figures and tables to paint the picture of how the Greenlandic economy looks like, and attempt to find patterns consistent with theories on Dutch Disease. Additionally, the Faroe Islands and Denmark will be added to tables and figures where a comparative analysis is of interest, for example in Figure 3 on GDP growth. As explained in the methods section, the aim is to better understand how the DBG may have generated structural distortions in the Greenlandic economy, which may or may not prove consistent with Dutch Disease.

The second section will look towards establishing correlations between a select number of these patterns and the DBG itself. As explained in the methods section, establishing a direct correlation between the DBG and any product of Dutch Disease has proven impossible for the scope of this thesis, as there is no significant variation in the grant that does not simply follow Greenlandic

GDP. Instead, multiple OLS-regressions will be conducted to find correlations between the channels which the DBG theoretically should transmit through and the sub- or end products of Dutch Disease.

Table 3. Descriptive Statistics.

Panel A: Greenland					
Variable	Mean	Std. Dev.	Min	Max	Obs
Real GDP per capita (DKK)	280,575	32,382	242,100	330,513	15
Real GDP growth (%)	4.02	2.41	-0.20	8.40	15
Public expenditure share of GDP (%)	63.06	4.19	58.28	71.14	15
Public employment share (%)	42.18	2.10	39.28	44.75	15
Total exports share of GDP (%)	21.41	4.46	14.65	28.38	15
Overall CPI (2009=100)	112.5	6.9	100.0	122.7	15
Non-tradeable CPI (2009=100)	115.4	8.8	100.0	128.8	15
NT/T price ratio	1.07	0.04	1.00	1.14	15
Real total compensation per employee (1000 DKK)	323	12	307	348	15
Real private compensation per employee (1000 DKK)	305	23	272	350	15
Real public compensation per employee (1000 DKK)	350	20	319	373	15
Public sector wage premium (ratio)	1.16	0.13	0.98	1.36	15
Terms of trade index (2009=100)	125.9	18.0	100.0	146.8	15
Real block grant (millions DKK)	3,336	72	3,226	3,468	15
Block grant share of public expenditure (%)	33.9	2.4	29.5	36.8	15
Block grant share of GDP (%)	21.46	2.68	17.87	25.57	15
Fish exports share of total exports (%)	88.1	4.6	76.4	95.9	15
Real fishing GVA per worker (DKK)	592,543	114,446	335,134	706,705	12

Panel B: Faroe Islands					
Variable	Mean	Std. Dev.	Min	Max	Obs
Real GDP per capita (DKK)	351,896	61,003	253,600	429,546	15
Real GDP growth (%)	2.72	3.11	-4.60	7.10	15
Public expenditure share of GDP (%)	55.58	4.14	49.89	63.90	15
Public employment share (%)	38.63	0.73	37.51	39.75	15
Total exports share of GDP (%)	41.21	3.94	33.27	48.82	15
Overall CPI (2009=100)	104.1	5.3	99.2	120.0	15
Non-tradeable CPI (2009=100)	111.0	15.3	95.9	146.0	15
NT/T price ratio	1.03	0.09	0.92	1.19	15
Real total compensation per employee (1000 DKK)	375	36	309	413	15
Real private compensation per employee (1000 DKK)	403	43	318	446	15
Real public compensation per employee (1000 DKK)	331	25	294	367	15
Public sector wage premium (ratio)	0.83	0.04	0.79	0.93	15
Terms of trade index (2009=100)	107.3	8.7	91.9	116.3	15
Real block grant (millions DKK)	609.2	30.8	514.0	641.9	15

Block grant share of public expenditure (%)	6.42	1.22	4.33	7.83	15
Block grant share of GDP (%)	3.59	0.85	2.27	5.00	15
Fish exports share of total exports (%)	85.75	4.13	74.48	90.80	15
Real fishing GVA per worker (DKK)	910,861	227,911	421,998	1,214,623	15

Panel C: Denmark					
Variable	Mean	Std. Dev.	Min	Max	Obs
Real GDP per capita (DKK)	338,287	25,366	313,200	398,274	15
Real GDP growth (%)	1.21	2.49	-5.00	6.50	15
Public expenditure share of GDP (%)	52.75	3.75	45.09	57.91	15
Public employment share (%)	31.49	0.66	30.67	32.67	15
Total exports share of GDP (%)	31.04	1.32	28.42	32.93	15
Overall CPI (2009=100)	111.5	7.2	100.0	129.6	15
Non-tradeable CPI (2009=100)	116.5	9.6	100.0	133.0	15
NT/T price ratio	1.08	0.04	1.00	1.14	15
Real total compensation per employee (1000 DKK)	354	11	340	376	15
Real private compensation per employee (1000 DKK)	352	14	336	377	15
Real public compensation per employee (1000 DKK)	358	9	346	374	15
Public sector wage premium (ratio)	1.02	0.03	0.96	1.05	15
Terms of trade index (2009=100)	102.5	5.3	96.5	114.5	15

Source: Statistics Greenland, Hagstova Føroya, Statistics Denmark, UNCTADstat and authors' own calculations.

5.1 Diagnosing Greenland

Table 4. Transfer Dependency Indicators.

Indicator	Greenland	Faroe Islands
Real block grant average 2009-2023 (millions DKK)	3,336	609
Real block grant 2009 (millions DKK)	3,468	616
Real block grant 2023 (millions DKK)	3,375	514
Block grant as share of public expenditure average (%)	33.93	6.42
Block grant as share of public expenditure 2009 (%)	35.95	7.83
Block grant as share of public expenditure 2023 (%)	29.52	4.33

Source: Statistics Greenland, Hagstova Føroya, Statistics Denmark and authors' own calculations.

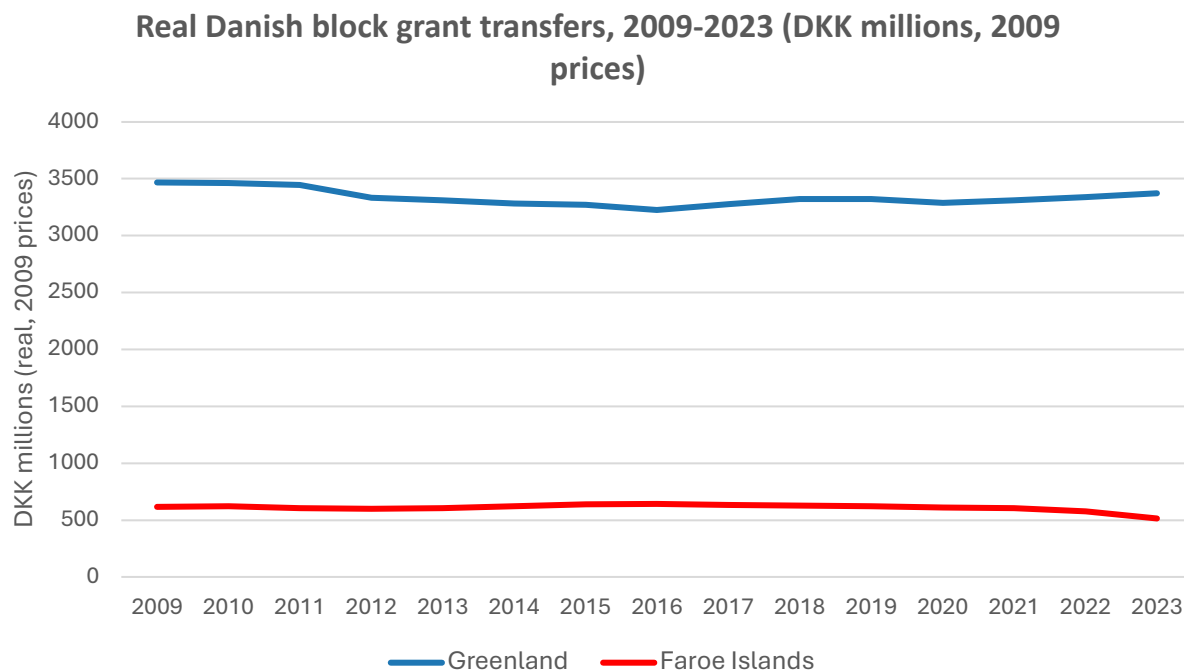


Figure 1. Real DBG in million DKK (2009 prices). Source: Statistics Greenland and Hagstova Føroya and authors' own calculations.

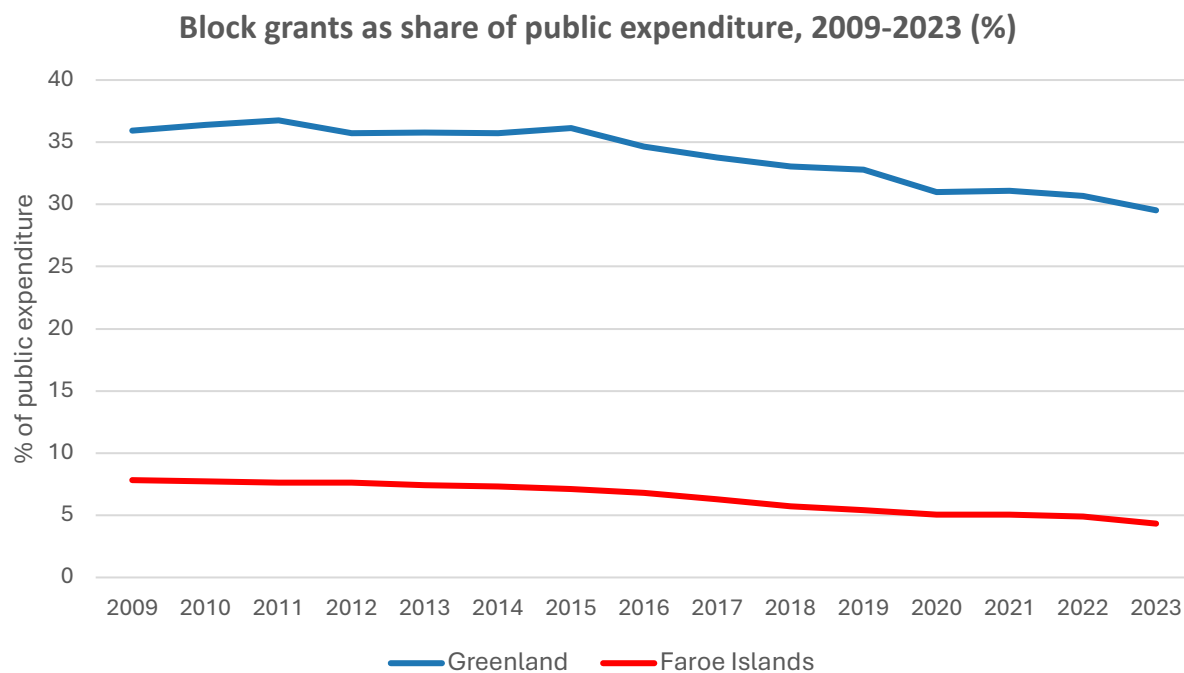


Figure 2. DBG as a percentage share of total government expenditure. Source: Statistics Greenland, Hagstova Føroya and authors' own calculations.

Table 4 gives an overview of the DBG in Greenland and the Faroe Islands, detailing indicators of transfer dependency. What is clear from these figures is that Greenland has an overwhelmingly larger dependency on the DBG when compared to the Faroe Islands. The real DBG sum and percentage share of public expenditure are over five times higher in Greenland than in the Faroe Islands, also resulting in a much higher absorption gap. Figure 1 visualizes the evolution of the DBG in Greenland and the Faroe Islands in real terms. This clearly demonstrates the gap in external transfer between the two countries, with Greenland having a range of 3.41 - 2.76 billion DKK per annum, while the Faroe Islands consistently hovers around 600 million, with a decrease in the last 2 years resulting in an end value of 514 million. Figure 2 displays the DBG expressed as a percentage share of total government expenditure, where the difference between the two is even more stark. Greenland has a share consistently above ranging from 36.8% to 29.6%, whilst the Faroe Islands has a maximum share of 7.83%, consistently decreasing every year.

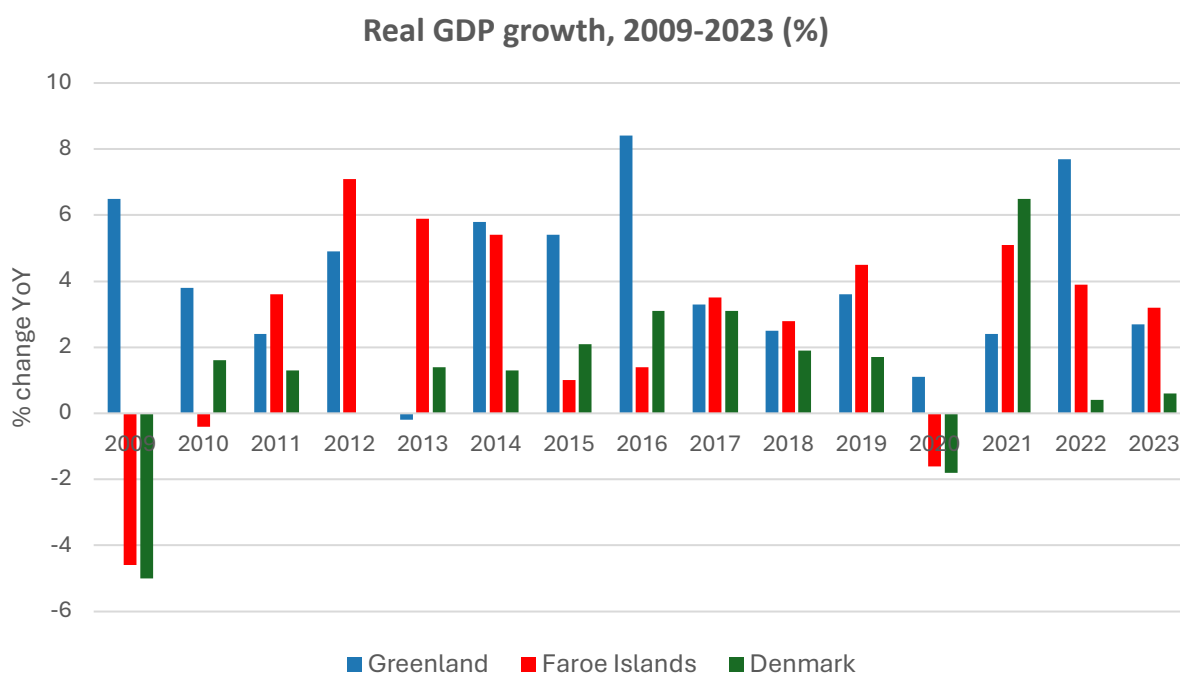


Figure 3. Real GDP growth (2009 prices). Source: Visualized from Statistics Greenland, Hagstova Føroya, Statistics Denmark.

Figure 3 displays the Real GDP growth expressed as a percentage for all three countries. To note is the consistency in growth displayed by Greenland, who show strong shock resilience considering the 2009 financial crisis and 2020 pandemic when compared to the Faroe Islands and Denmark. Greenland displayed only a single year of negative growth in 2013, with consistent year-on-year growth all other years. The lowest growth is displayed by Denmark, often hovering between 0% - 3% and a high of 6.5% in 2021, likely due to the return to status quo following the 2020 pandemic. The Faroe Islands displays a consistent growth as well, having the most years with negative growth, but also outperforming Greenland and Denmark in 7 out of 15 years.

5.1.1 The Spending Effect

Table 5. Average Annual Inflation Rates by CPI Component.

Indicator	Greenland	Faroe Islands	Denmark
Overall CPI average annual change (%)	1.47	1.31	1.87
Non-tradeable CPI average annual change (%)	1.82	2.74	2.06
Tradeable CPI average annual change (%)	1.64	1.64	1.64
NT/T ratio - value in 2009	1.00	1.00	1.00
NT/T ratio - value in 2023	1.03	1.16	1.06
NT/T ratio - total change 2009-2023 (%)	2.50	16.21	5.87

Source: Statistics Greenland, Hagstova Føroya and Statistics Denmark, and authors' own calculations.

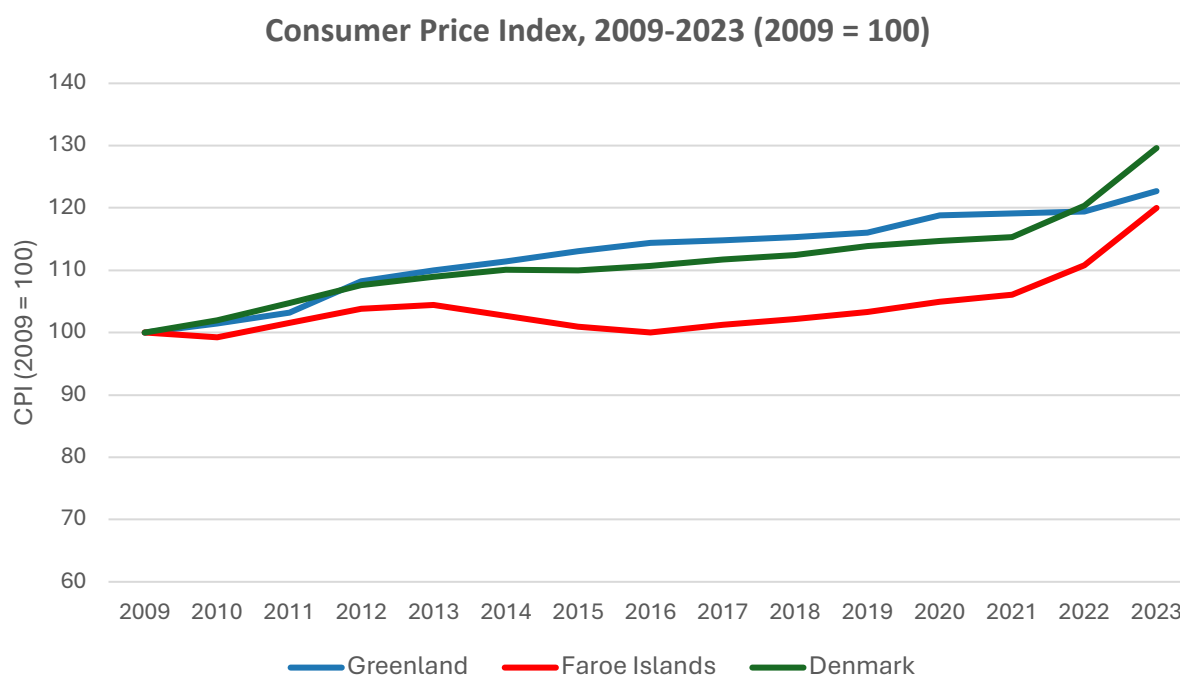


Figure 4. Consumer Price Index (2009=100). Source: Statistics Greenland, Hagstova Føroya and Statistics Denmark, and authors' own calculations.

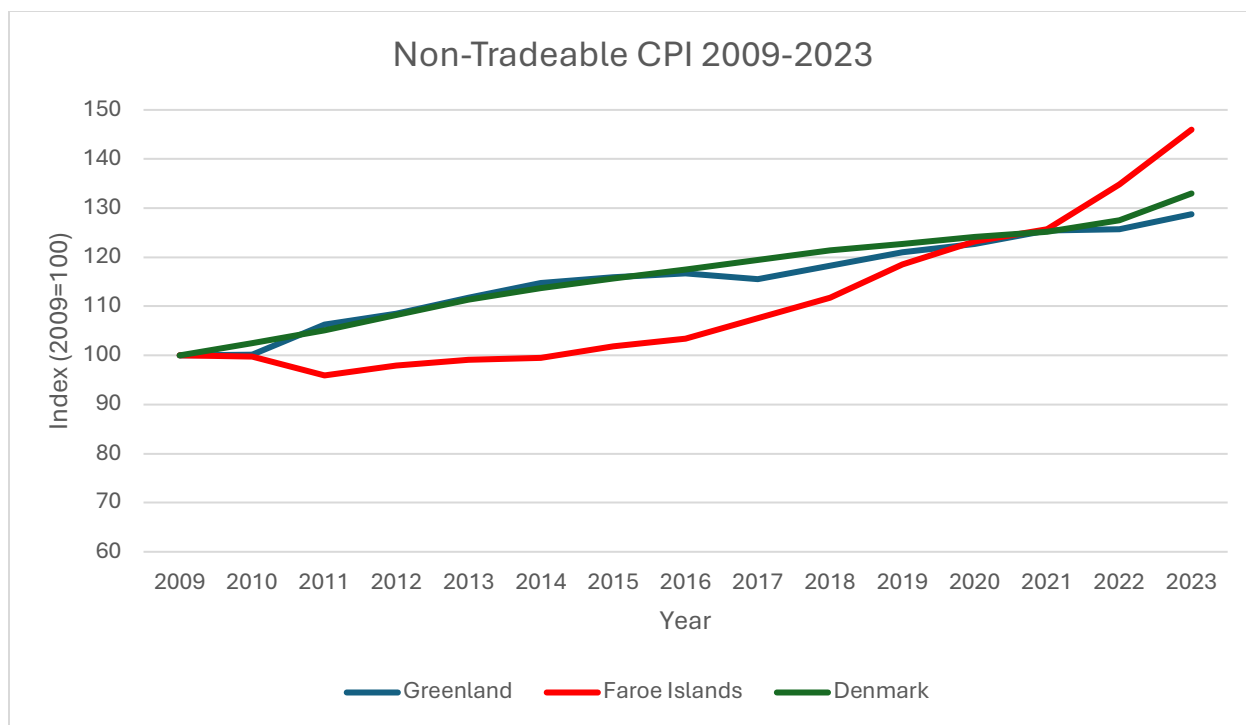


Figure 5. Non-tradeable CPI (2009=100). Source: Statistics Greenland, Hagstova Føroya and Statistics Denmark, and authors' own calculations.

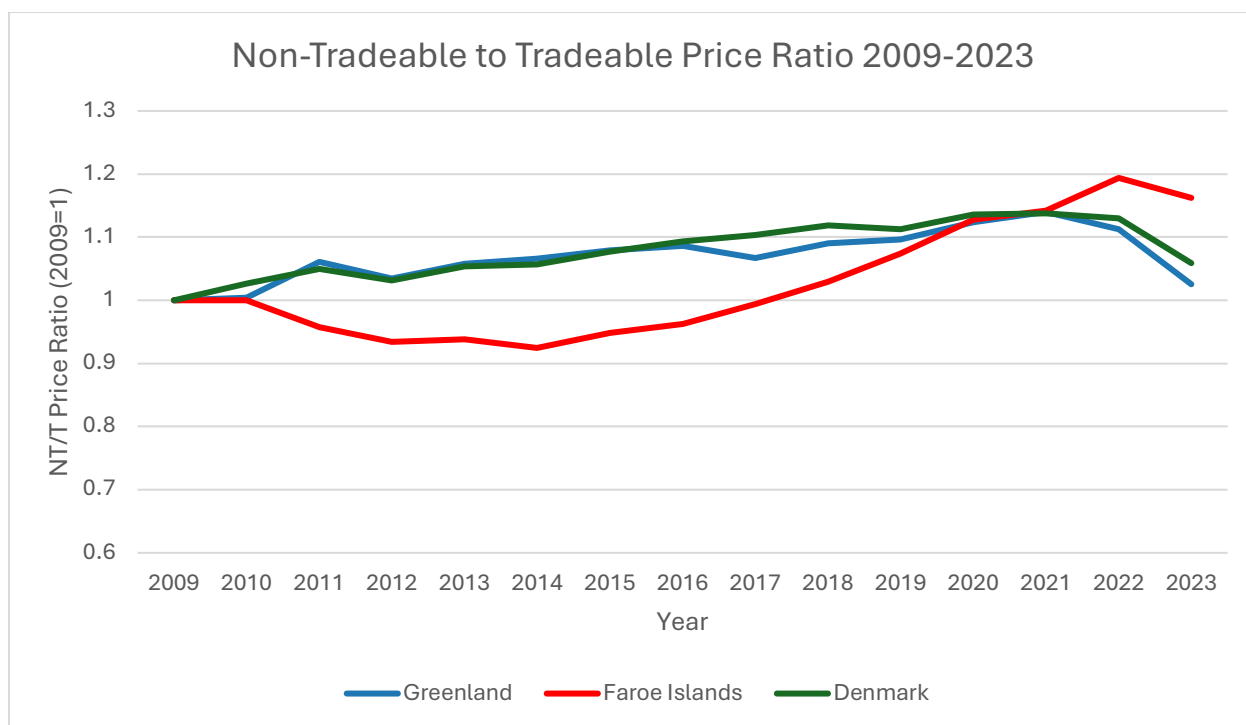


Figure 6. NT/T CPI ratio (2009=100). Source: Statistics Greenland, Hagstova Føroya and Statistics Denmark, and authors' own calculations.

Table 5 showcases annual inflation rates by CPI components, breaking the CPI down by non-tradeable and tradeable commodity groups. The overall CPI change, also displayed in figure 4, shows overall inflation to be highest in Denmark, trending similarly to that of Greenland, but diverging since 2021. The lowest inflation can be seen in the Faroe Islands but following a similar upward trend to that of Denmark in the last 3 years. Figure 5 displays the specific non-tradeable CPI, where the Faroe Islands display the highest overall non-tradeable inflation, despite very low inflation in the first half of the time frame. Greenland and Denmark follow a very similar trend, with only slight divergence giving Denmark a higher non-tradeable inflation than Greenland. Figure 6 shows the NT/T CPI ratio, which is the measurement of real exchange rate appreciation. The Faroe Islands are shown to have the highest ratio, despite again maintaining a low ratio for the first half of the timeframe. Once again, Greenland and Denmark display a similar trend but ultimately resulting in a higher ratio for Denmark.

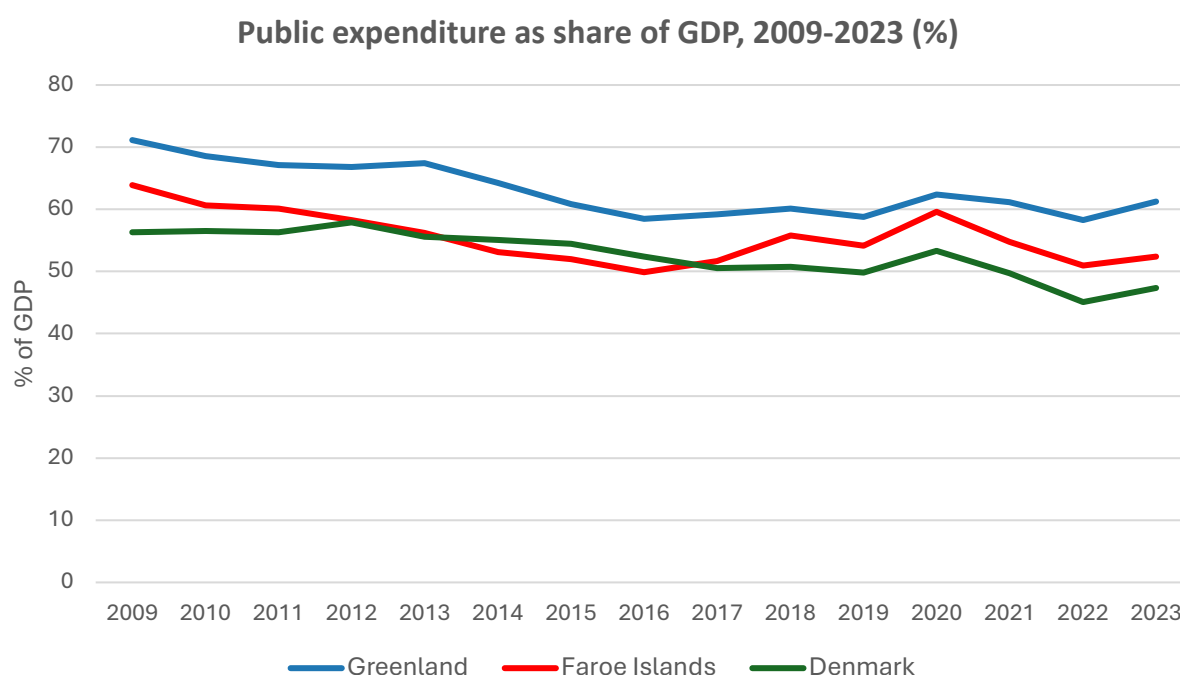


Figure 7. Public expenditure as a share of GDP. Source: Statistics Greenland, Hagstova Føroya and Statistics Denmark, and authors' own calculations.

Figure 7 shows total public expenditure as a percentage share of GDP. Greenland displays the highest public expenditure, with the Faroe Islands having the second highest and Denmark the lowest, apart from 2014 and 2015, where the two swap. All countries show a negative trend, with the share of public expenditure decreasing over time, with all countries having a decrease of around 10% from 2009-2023.

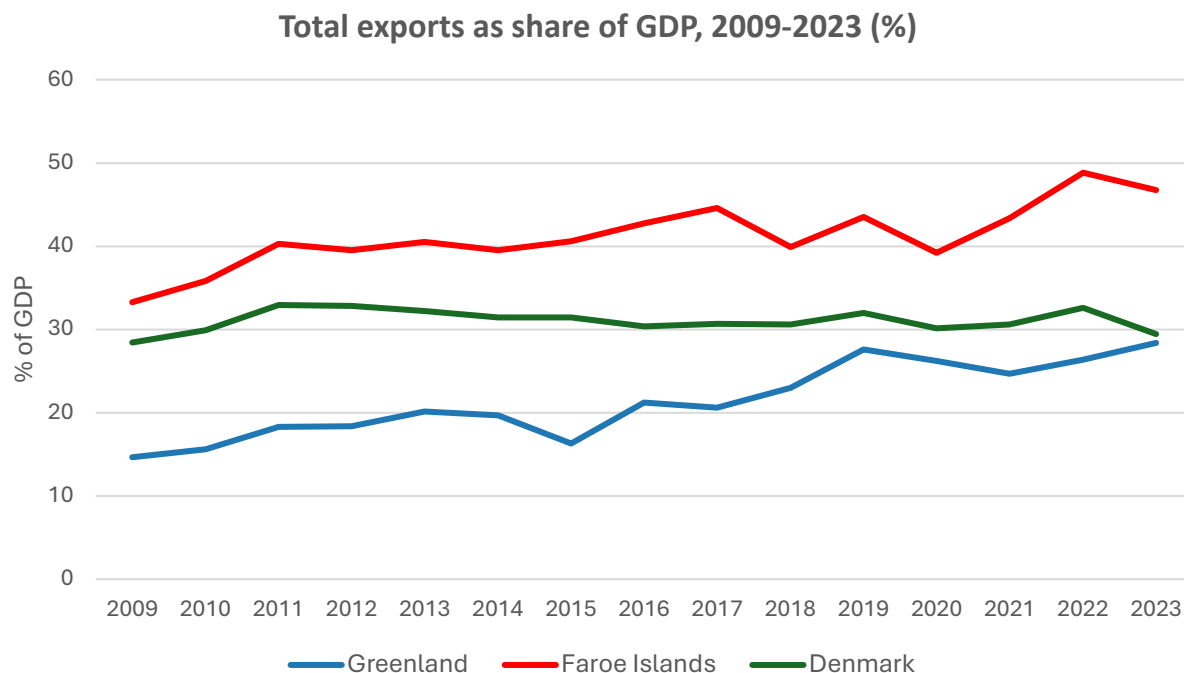


Figure 8. Total exports as a share of GDP. Source: Statistics Greenland, Hagstova Føroya and Statistics Denmark, and authors' own calculations.

Figure 8 shows the total exports as a percentage share of GDP for all three countries. In this figure, Greenland can be seen to have the lowest share of exports, although it displays a strong growth from 14.6% in 2009 up to 28.3% in 2023. The Faroe Islands display the highest share of exports, with a slightly higher growth than Greenland, from 33.3% in 2009 to 46.7% in 2023. Denmark falls in the middle, having an export share of GDP which consistently hovers around 30%. This is still higher than that of Greenland, but they are not experiencing any significant growth, likely due to their much larger size and more mature economy.

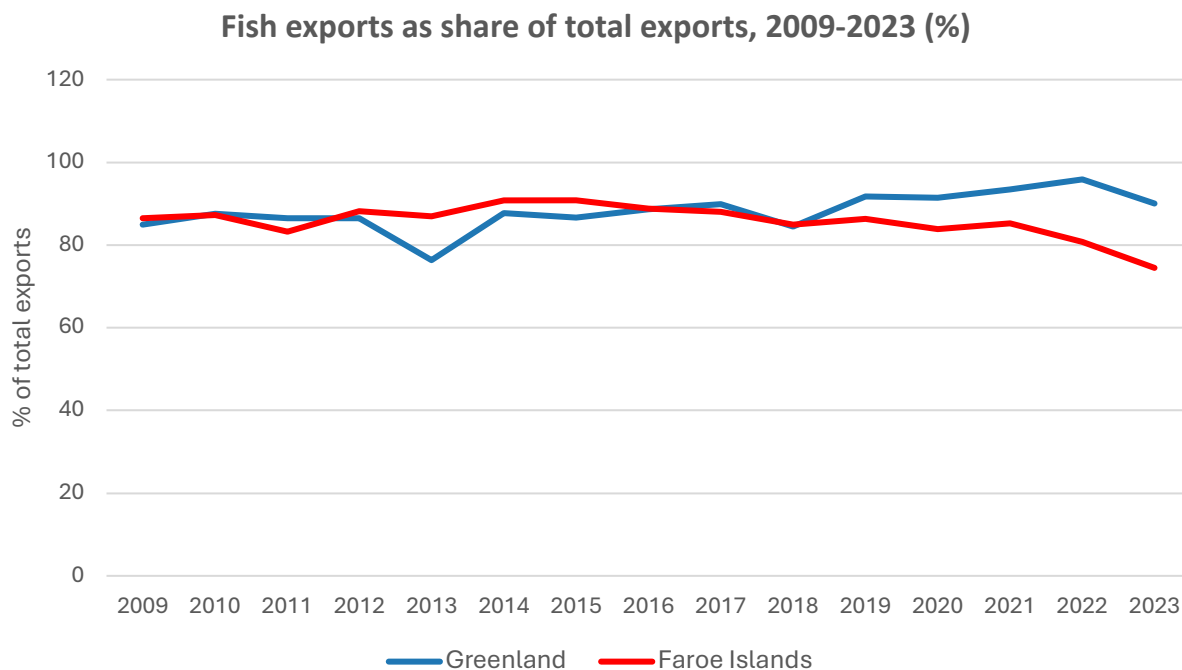


Figure 9. Fish exports as a share of total exports. Source: Statistics Greenland and Hagstova Føroya, and authors' own calculations.

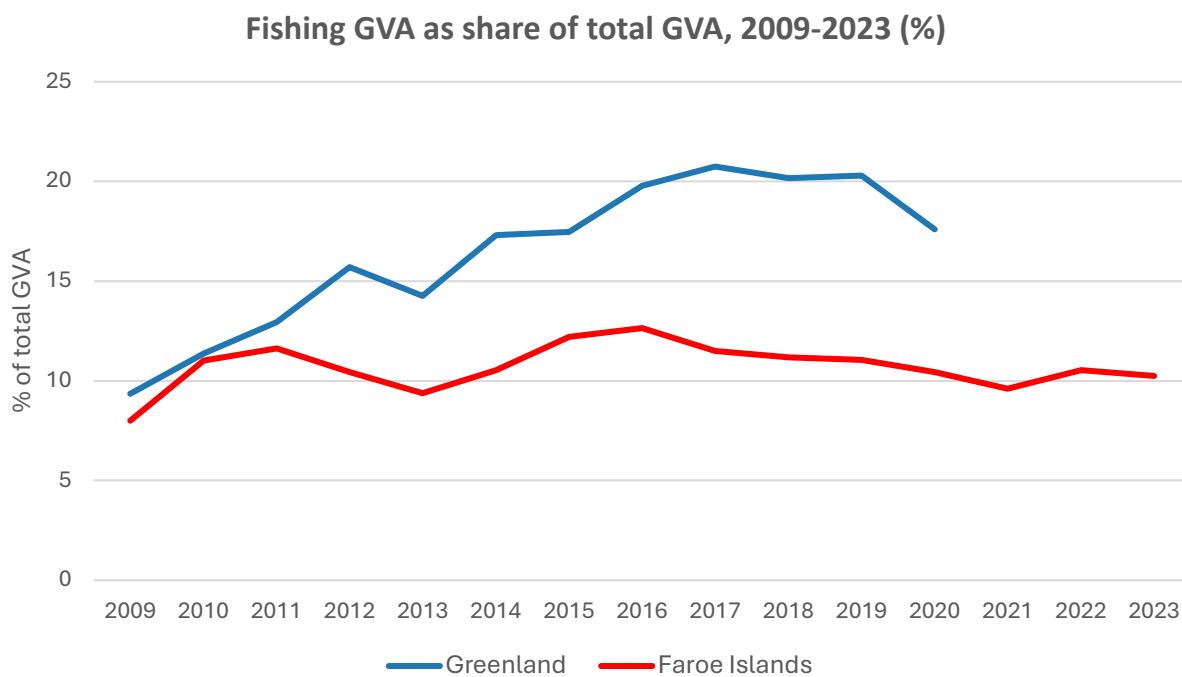


Figure 10. Gross value added from fishing as a share of total gross value added. Source: Statistics Greenland and Hagstova Føroya, and authors' own calculations.

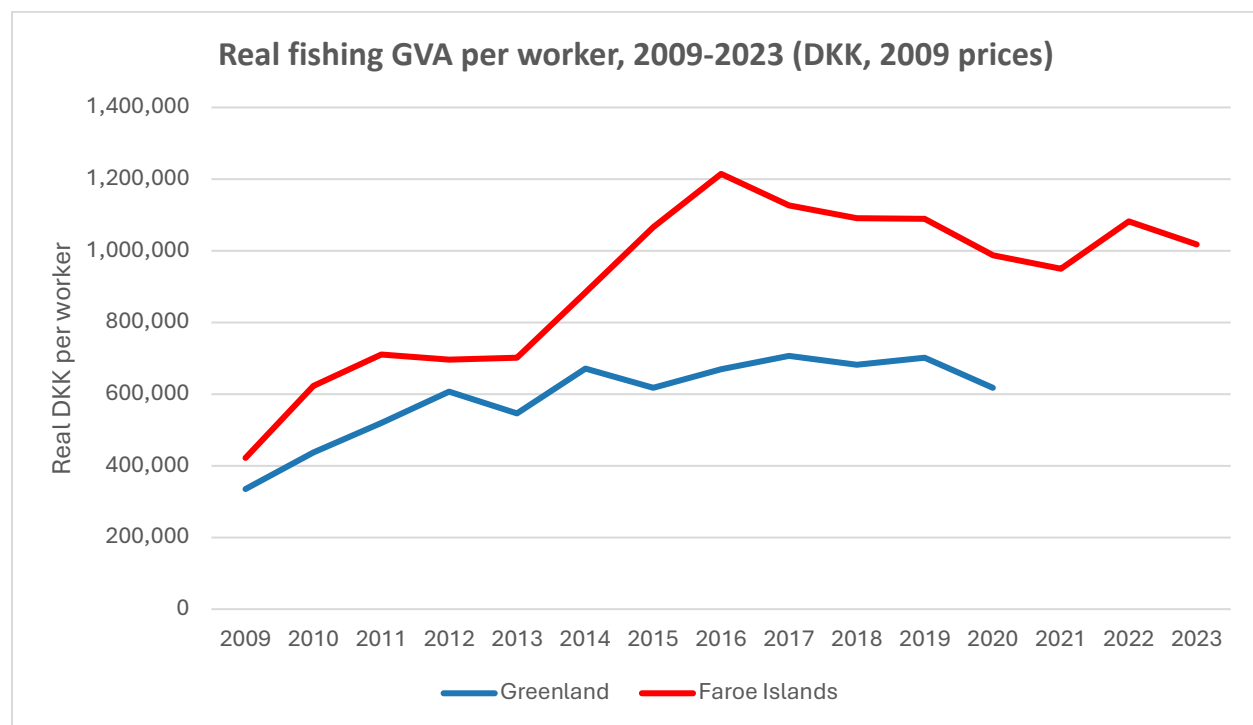


Figure 11. Real gross value added from fishing per worker in fishing. Source: Statistics Greenland and Hagstova Føroya, and authors' own calculations.

Figures 9, 10, and 11 display the share of total exports, share of total GVA and real GVA per worker for the fishing sector in Greenland and the Faroe Islands. The fishing as a share of exports paints a clear picture of how narrow the two economies' export bases are, with the fishing sector dominating all other sectors in terms of exports. Although they show similar trends throughout most of the timeframe, there is a clear divergence in 2018, where Greenland's share becomes significantly higher than that of the Faroe Islands'. Greenland displays a peak of 95.9% in 2022, having their entire export sector almost entirely relying on fishing. As for the fishing sector's share of total GVA, Greenland displays a higher share and clear upward trend, with a peak of 20.7% in 2017, while the Faroe Islands consistently fluctuates in the range of 12.6% to 8%. When accounting for real gross value added per worker in the fishing sector, the reverse is true, with the Faroe Islands having a consistently higher absolute value and a higher upward trend. Worth to note is that GVA statistics for Greenland are unavailable for 2021-2023, which are the years fishing as a share of exports peaked in Greenland.

5.1.2 The Resource Movement Effect

Table 6. Employment Structure Indicators.

Indicator	Greenland	Faroe Islands	Denmark
Public sector employment share average 2009-2023 (%)	42.18	38.63	31.49
Change in public sector employment share 2009-2023 (percentage points)	4.26	0.80	-0.79
Private sector employment share average 2009-2023 (%)	57.82	61.37	68.51
Change in private sector employment share 2009-2023 (percentage points)	-4.26	-0.80	0.79

Source: Statistics Greenland, Hagstova Føroya and Statistics Denmark, and authors' own calculations.

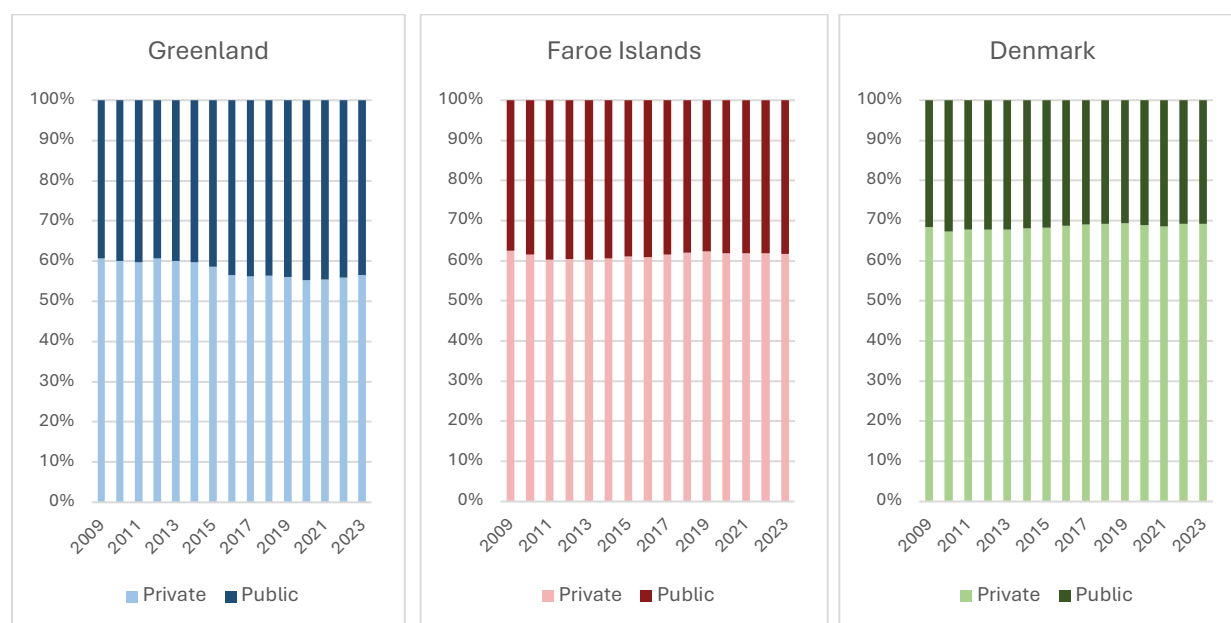


Figure 12. Public and private employment as a share of total employment. Source: Statistics Greenland, Hagstova Føroya and Statistics Denmark, and authors' own calculations.

Table 6, together with figure 12 indicate the employment structures of the three countries, categorizing by public and private employment. Greenland shows the largest share of public sector employment, along with the largest increase of public sector employment within the timeframe. The opposite is true of Denmark, who display the highest private sector employment, and are the only country with a growing employment share in the private sector. The Faroe Islands fall in the middle, with a slightly increasing share of public sector employment.

Table 7. Compensation of Employees Indicators.

Indicator	Greenland	Faroe Islands	Denmark
Average annual real growth in total compensation per employee (%)	0.75	1.92	0.28
Real public sector compensation per employee average 2009-2023 (DKK)	350,388	331,201	357,556
Real private sector compensation per employee average 2009-2023 (DKK)	304,749	402,747	351,613
Public sector wage premium average 2009-2023 (ratio)	1.16	0.83	1.02

Source: Statistics Greenland, Hagstova Føroya and Statistics Denmark, and authors' own calculations.

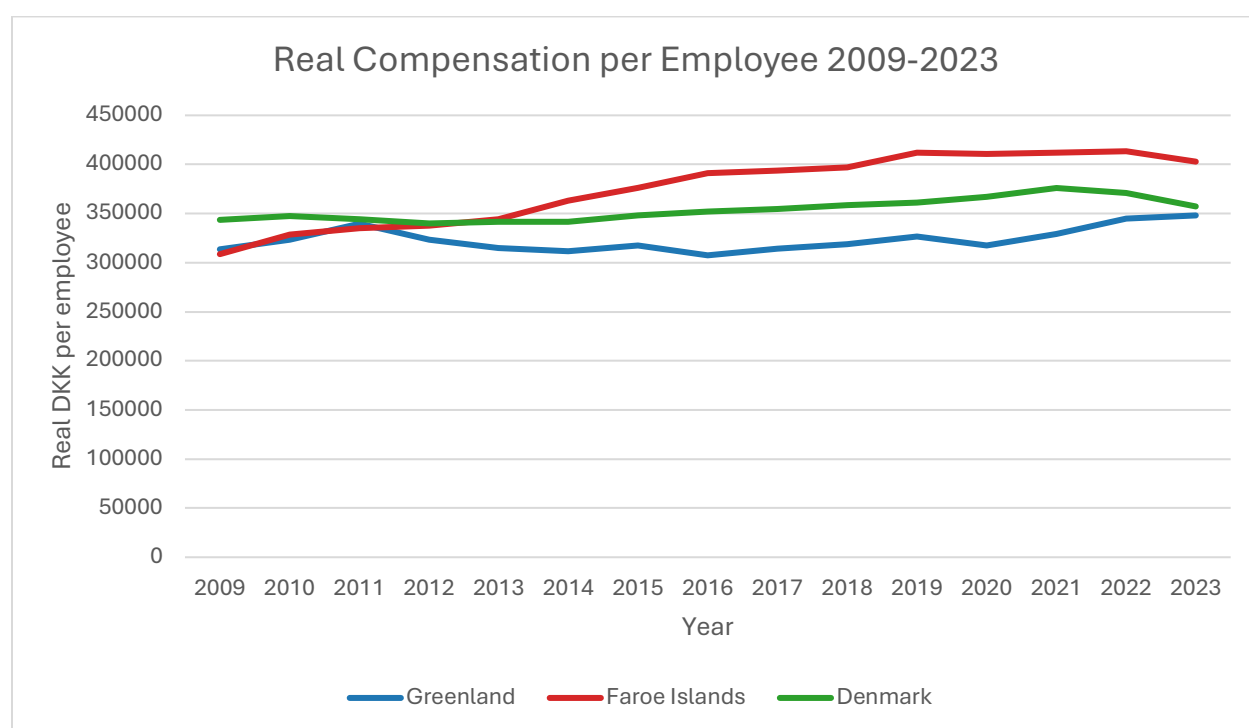


Figure 13. Real Compensation per Employee. Source: Statistics Greenland, Hagstova Føroya and Statistics Denmark, and authors' own calculations.

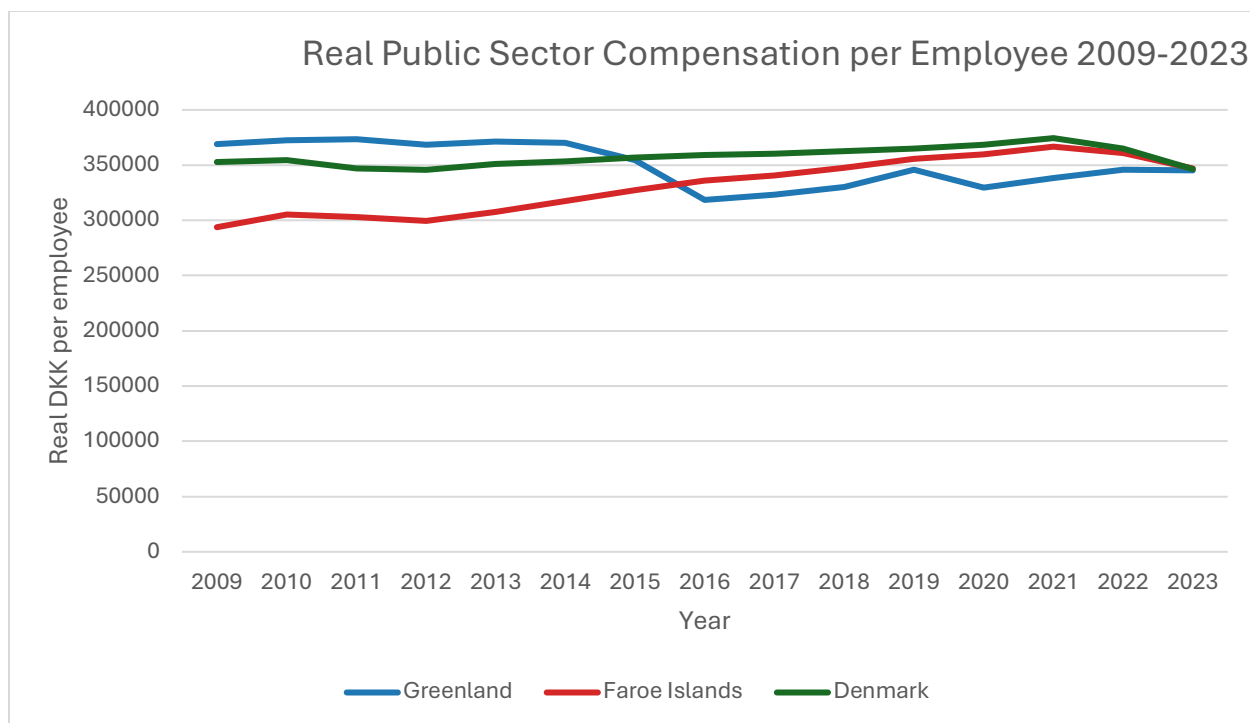


Figure 14. Real Public Sector Compensation per Employee. Source: Statistics Greenland, Hagstova Føroya and Statistics Denmark, and authors' own calculations.

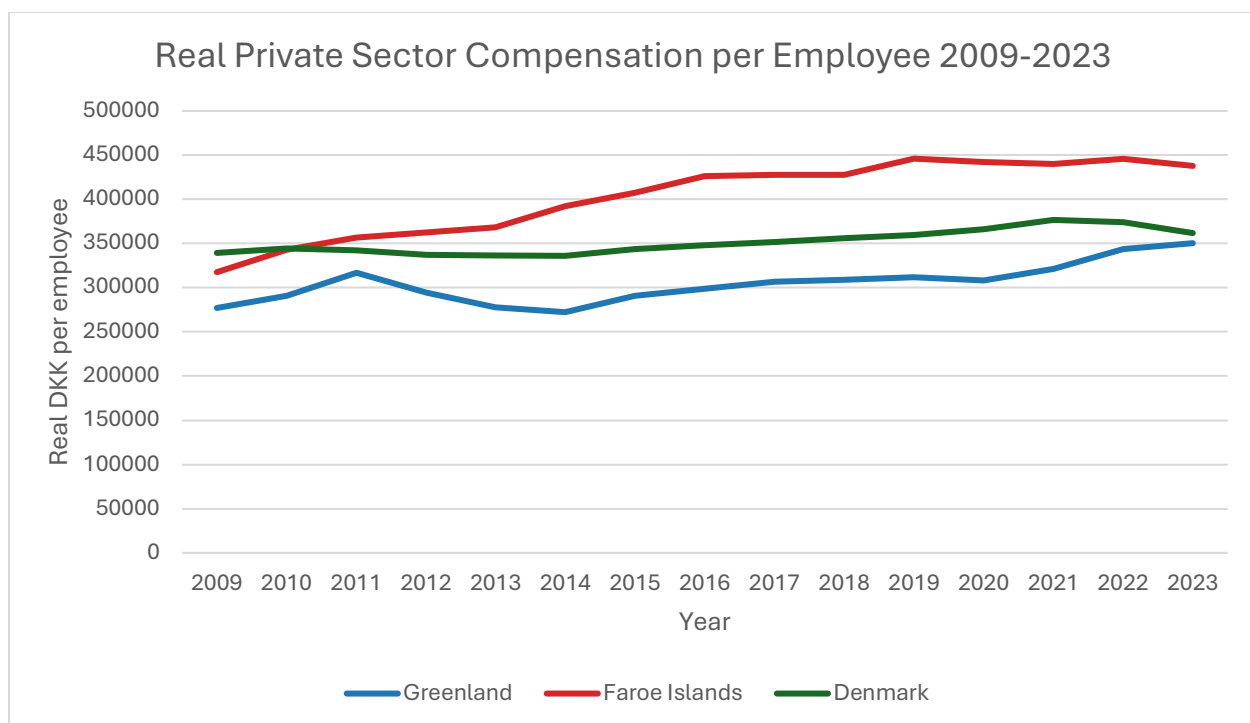


Figure 15. Real Private Sector Compensation per Employee. Source: Statistics Greenland, Hagstova Føroya and Statistics Denmark, and authors' own calculations.

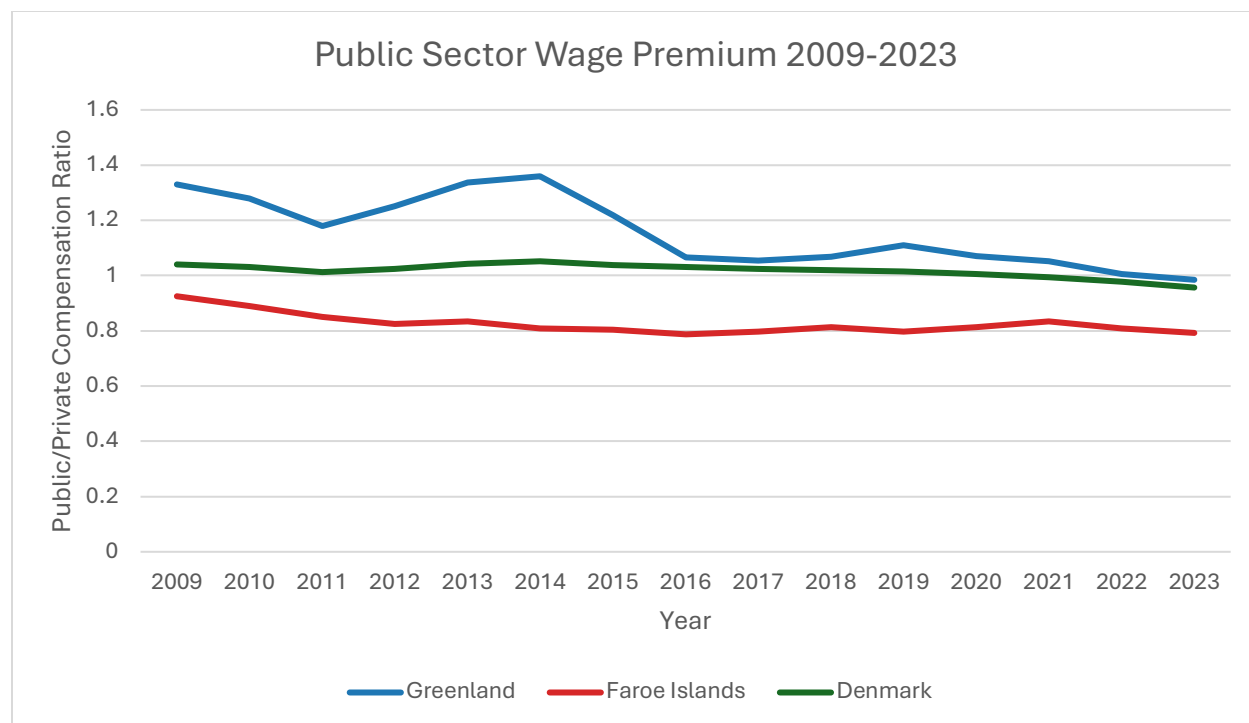


Figure 16. Public Sector Wage Premium. Source: Statistics Greenland, Hagstova Føroya and Statistics Denmark, and authors' own calculations.

Table 7 outlines indicators for the compensation of employees in all three countries. The real compensation per employee (see Figure 13) shows the overall wage level is lowest in Greenland, and highest in the Faroe Islands, with Denmark falling in the middle. This is despite Greenland and the Faroe Islands showing a similar initial level but diverging to become approximately 50000 DKK higher in the Faroe Islands in 2023. The Faroe Islands therefore have by far the highest average annual change, showcasing the highest increase in wages, while Denmark has the lowest change, consistently hovering around 350000 DKK/year.

Figures 14 and 15 isolate the compensation per employee for the public- and private sector respectively. When examining table 7, the figures are very similar for Denmark and Greenland in terms of average public sector compensation, yet figure 14 shows that Greenland has a more volatile compensation trend, starting the timeframe with the highest, before sinking to the lowest in 2016 and ending on a similar figure as the Faroe Islands and Denmark in 2023. The Faroe Islands show a different trend, having the largest upward trend out of the three, while Denmark shows the least volatile trend. In the private sector, the figures are clearer, with an average of 100 000 DKK/year larger compensation in the Faroe Islands than in Greenland, with Denmark falling almost exactly in the middle of the two. Figure 15 shows the trends are very similar for all three countries, with the Faroe Islands showing strong initial growth, but all three having a consistent stable growth overall. When examining the public sector wage premium, Greenland has the largest wage premium, with the Faroe Islands having the lowest and Denmark falling in the middle. Figure 16 visualizes this, showing a very stable trend for Denmark and the Faroe Islands, consistently having a ratio around 1 and 0.8 respectively. Greenland has the most volatile trend, but is consistently the highest, with a peak of 1.36 in 2014, before tailing off and ultimately falling to 0.98 in 2023.

5.2 Statistical Analysis

In addition to the descriptive diagnostic analysis, three types of statistical tests were run to identify potential statistically significant correlations between key variables as explained in the methods section (see Section 4.1.2). Regression 1 tested the structural differences in the NT/T ratio between all three countries to observe whether the theoretical prediction that the countries with transfer dependency would exhibit a RER appreciation (Acosta et al., 2009; Paldam, 1997; Bourdet & Falck, 2006). Regression 2 was applied to all three countries separately and tested the correlation between the NT/T ratio and the real wage. By comparing the coefficients, this test sought to determine the extent to which the increase in wages from the DBG may cause demand and therefore prices to rise for non-tradeable goods and services to rise relative to tradeable goods and services. Regression 3 was very similar to the former, with the substitution of real public wage rather than real wage, to test if the public sector wage increases specifically would be driving most of the wage channel effects.

5.2.1 Structural Differences in NT/T ratios

The results of regression 1 did not reflect what theory and much of the descriptive evidence predicted that it would, as can be seen in Table 8. Both Greenland and the Faroe Islands exhibited statistically significant coefficients that represent the NT/T ratios in each country relative to Denmark. Greenland's NT/T ratio was 0.076 or 7.6% lower over the sample period after controlling for terms of trade, GDP growth, and country-fixed effects while the Faroe Islands' NT/T ratio was 0.068 or 6.8% lower. Both P-values for the dummies remain below the desired threshold. As for the other variables, the terms of trade index showed a statistically significant positive coefficient in line with the prediction that an increase in exports relative to imports raises the real exchange rate. Real GDP growth showed a positive but statistically insignificant coefficient.

With an R-squared of 0.35, a large part of the variation remains unexplained, as expected given the earlier results. The post-estimation equality test found no statistically significant difference between the Greenlandic and Faroese NT/T ratio, meaning that they can be considered structurally indifferent in their ratios despite different transfer dependencies. This is likely due to the use of Danish tradeable CPI as the denominator in all three countries' NT/T ratio, tapering differences in the non-tradeable CPI that would otherwise show in the NT/T ratio.

Table 8. Linear Regression of Structural NT/T Ratio Differences.

Linear Regression of Structural NT/T Ratio Differences						
<i>Dependent variable: NT/T ratio Method: OLS with robust standard errors Significance: ***$p < 0.01$, **$p < 0.05$, *$p < 0.10$</i>						
Variable	Coefficient	Robust Std. Err.	t	P> t	[95% Conf.	Interval]
Greenland	-0.0755***	0.0190	-3.98	0.000	-0.1139	-0.0371
Faroës	-0.0682***	0.0216	-3.16	0.003	-0.1118	-0.0246
Terms of trade index	0.0027***	0.0006	4.30	0.000	0.0014	0.0039
Real GDP growth	0.0014	0.0029	0.48	0.636	-0.0045	0.0073
Constant	0.8049***	0.0635	12.67	0.000	0.6765	0.9333

Model statistics	
No. of observations	45
F(4, 40)	8.63
Prob > F	0.0000
R-squared	0.3488
Root MSE	0.05574

Joint test: Greenland - Faroës = 0	
F(1, 40)	0.07
Prob > F	0.7915

Source: Statistics Greenland, Hagstova Føroya, Statistics Denmark and UNCTADstat, and authors' own calculations.

With these results in mind, we do not find support for the hypothesis that Greenland and the Faroe Islands have a structurally higher NT/T ratio than Denmark. Furthermore, we do not find support for the hypothesis that Greenland has a higher NT/T ratio than the Faroe Islands because of higher transfer dependency. While the results are unsatisfactory in some regards, they are not completely unexpected if certain confounding factors are considered beyond the controls, which will be done in the discussion.

5.2.2 Testing the Spending Effect Wage Channel

Regression 2 attempted to test the wage channel in the spending effect by studying the correlation between the NT/T ratio and real wages while controlling for other factors. However, it did not fully reflect the predicted relationships (see Table 9). Greenland exhibited a statistically insignificant negative coefficient for the effect of real wage on the NT/T ratio. The Faroe Islands had a statistically significant positive coefficient of 0.0024, meaning that each 1,000 DKK increase in real wages would render a 0.24% increase in the NT/T ratio relative to the 2009 baseline. Denmark even more so, with a real wage coefficient of 0.0041 or a 0.41% increase in the NT/T ratio.

Table 9. Regression of Real Wages Impact on NT/T Ratio with Newey-West Standard Errors.

Regression with Newey-West Standard Errors (Real Wages)

Dependent variable: NT/T ratio | Maximum lag (2) | Significance: *** $p<0.01$, ** $p<0.05$, * $p<0.10$.

Panel A - Greenland

Variable	Coefficient	Newey-West Std. Err.	t	P> t	[95% Conf.	Interval]
Real wage per capita (1,000s)	-0.0007	0.0008	-0.90	0.390	-0.0024	0.0010
Terms of trade index	0.0017***	0.0004	3.81	0.003	0.0007	0.0026
Real GDP growth	-0.0015	0.0026	-0.56	0.587	-0.0072	0.0043
Constant	1.0861***	0.2451	4.43	0.001	0.5467	1.6254

Model statistics

No. of observations:

15

F(3, 11):

5.57

Prob > F:

0.0143

Panel B - Faroe Islands

Variable	Coefficient	Newey-West Std. Err.	t	P> t	[95% Conf.	Interval]
Real wage per capita (1,000s)	0.0024**	0.0010	2.26	0.045	0.0001	0.0047
Terms of trade index	-0.0020	0.0044	-0.46	0.656	-0.0118	0.0077
Real GDP growth	-0.0099**	0.0044	-2.25	0.046	-0.0197	-0.0002
Constant	0.3866	0.2461	1.57	0.144	-0.1550	0.9282

Model statistics

No. of observations:

15

F(3, 11):

15.40

Prob > F:

0.0003

Panel C - Denmark

Variable	Coefficient	Newey-West Std. Err.	t	P> t	[95% Conf.	Interval]
Real wage per capita (1,000s)	0.0041***	0.0007	6.09	0.000	0.0026	0.0056
Terms of trade index	-0.0031***	0.0008	-3.87	0.003	-0.0049	-0.0014
Real GDP growth	0.0035	0.0032	1.09	0.298	-0.0035	0.0104
Constant	-0.0545	0.1765	-0.31	0.763	-0.4431	0.3341

Model statistics

No. of observations:

15

F(3, 11):

16.28

Prob > F:

0.0002

Source: Statistics Greenland, Hagstova Føroya, Statistics Denmark UNCTADstat, and authors' own calculations.

The terms of trade index however had a statistically significant coefficient in both Greenland and Denmark, with respective coefficients of 0.0017 for the former and -0.0031 for the latter holding all other variables constant. Similarly to the last regression, real GDP growth showed no statistical significance for Greenland or Denmark. It did however for the Faroe Islands, with a coefficient of 0.0099, exhibiting the suggested relationship of increasing GDP leading to a lower real exchange rate (Acosta et al., 2009).

As for the additional statistics, the models fit the Faroe Islands and Denmark and exhibited a stronger joint significance than it did for Greenland. This is expected, considering the confounding subsidies that largely hold the non-tradeable CPI low in Greenland. The same

explanation can be given for the intercept, which is only significant and above 1 in Greenland. This indicates that the country has an elevated baseline not explained by the main independent variable or controls in 2009. Lastly, the Newey-West standard errors with lag (2) were used and fit the model well.

Table 10. Regression of Real Public Wage Impact on NT/T Ratio with Newey-West Standard Errors.

Regression with Newey-West Standard Errors (Public-Sector Real Wages)						
<i>Dependent variable: NT/T ratio Maximum lag (2) Significance: *** $p < 0.01$, ** $p < 0.05$, * $p < 0.10$.</i>						
Panel A - Greenland						
Variable	Coefficient	Newey-West Std. Err.	t	P> t	[95% Conf.	Interval]
Real public-sector wage (1,000s)	-0.0004	0.0007	-0.56	0.584	-0.0018	0.0011
Terms of trade index	0.0012	0.0009	1.36	0.202	-0.0007	0.0031
Real GDP growth	-0.0014	0.0027	-0.53	0.605	-0.0074	0.0045
Constant	1.0559***	0.3259	3.24	0.008	0.3386	1.7731
<i>Model statistics</i>	No. of observations:	15	F(4, 10):	6.54	Prob > F:	0.0085
Panel B - Faroe Islands						
Variable	Coefficient	Newey-West Std. Err.	t	P> t	[95% Conf.	Interval]
Real public-sector wage (1,000s)	0.0047***	0.0014	3.32	0.007	0.0016	0.0078
Terms of trade index	-0.0056	0.0042	-1.36	0.202	-0.0148	0.0035
Real GDP growth	-0.0103*	0.0053	-1.96	0.076	-0.0219	0.0013
Constant	0.1013	0.2036	0.50	0.629	-0.3469	0.5495
<i>Model statistics</i>	No. of observations:	15	F(4, 10):	10.96	Prob > F:	0.0012
Panel C - Denmark						
Variable	Coefficient	Newey-West Std. Err.	t	P> t	[95% Conf.	Interval]
Real public-sector wage (1,000s)	0.0037***	0.0006	6.43	0.000	0.0024	0.0050
Terms of trade index	0.0011	0.0007	1.50	0.162	-0.0005	0.0027
Real GDP growth	0.0034	0.0046	0.75	0.469	-0.0066	0.0135
Constant	-0.3554*	0.1779	-2.00	0.071	-0.7470	0.0362
<i>Model statistics</i>	No. of observations:	15	F(4, 10):	26.04	Prob > F:	0.0000

Source: Statistics Greenland, Hagstova Føroya, Statistics Denmark, UNCTADstat and authors' own calculation

Regression 3 attempted to test the same mechanism as regression 2 but did so specifically with the real public wages instead (see Table 10). Once again, the Greenlandic coefficient for the correlation between the NT/T ratio and the real public wage was statistically insignificant holding all other variables constant. The Faroe Islands exhibited a 0.47% increase in the NT/T ratio for each 1,000 DKK in real public wage and Denmark a 0.37% increase, both significant at the 1% level.

Terms of trade became insignificant in Greenland, the Faroe Islands and Denmark when real public wages were introduced, potentially pointing towards a larger collinearity issue between the two variables. GDP growth remained insignificant for both Greenland and Denmark and became only marginally significant for the Faroe Islands with a negative coefficient. Additionally, the significance level and fit of the entire model followed the same pattern as the regression 2. Lastly, it is important to note that Greenland's intercept was once again above 1 and statistically significant, confirming the structurally higher baseline that remains unexplained by the regressors.

Combining the results from the two last regressions suggests that the real public wage may be a stronger regressor in understanding the wage channel of the spending effect. For the Faroe Islands, the coefficient and significance rose considerably when substituting for the real public wage. Meanwhile for Denmark, significance stayed the same, but the coefficient decreased slightly. Additionally, it confirms the pattern that was already suggested in regression 1, being that the wage channel is absent from the model in Greenland, while it is present and significant in both the Faroe Islands and Denmark. For all three regressions, the limitation of not finding suitable non-tradeable CPIs for Greenland proved significant.

With these results in mind, we do not find support for the hypothesis that real wages drive up the NT/T ratio in all three countries, as only the Faroe Islands and Denmark examined positive and statistically significant coefficients in regression 2. Additionally, we do not find support for the hypothesis that Greenland would have a higher coefficient of correlation between the NT/T ratio and real public wage as it is negative and statistically insignificant, compared to the Faroese and Danish coefficients that are positive and significant at the 1% level. However, we do find support for the more general hypothesis that real public wage would have a stronger coefficient in a transfer dependent country (Faroe Islands) than a non-dependent country (Denmark).

5.3 Discussion

5.3.1 Transfer Dependency

The first step in diagnosing Dutch Disease is to establish whether the foundational conditions are present in Greenland, meaning the first question to be answered is: Does the DBG cause the public sector to be dominant in Greenland? Table 4 shows a substantially larger transfer to Greenland when compared to the Faroe Islands. An injection of such magnitude has led the DBG as a share of public expenditure to become approximately six times higher in Greenland than the Faroe Islands, representing around one third of all public expenditure (see Figure 2). The culmination of this is then a public expenditure as share of GDP (see Figure 7), as well as a share of public sector employment (see Figure 12) exceeding that of Denmark and the Faroe Islands, which constitutes a public sector which is structurally dominant when compared to the rest of the

countries. Furthermore, Denmark having the lowest public sector expenditure as share of GDP along with the lowest share of public sector employment further suggests that the DBG is correlated with a more dominant public sector. This lines up with previous research, with Paldam's (1997) findings of the DBG causing Dutch Disease through severe labor market and price-level distortions with government spending being the primary mechanism.

5.3.2 The Spending Effect

When isolating the spending effect, an important diagnostic tool for this is the NT/T ratio, a common proxy for real exchange rate (De Gregorio & Wolf, 1994; Acosta et al., 2009). This is made up of the constructed non-tradeable CPI of all three countries (see Figure 5), divided by the tradeable CPI of Denmark. The pattern for the non-tradeable CPI largely goes against traditional theory, as the spending effect mechanism should create excess demand from transfer income is concentrated on non-tradeables causing their prices to increase relative to tradeables (De Gregorio & Wolf, 1994; Corden & Neary, 1982). To note is that the results would suggest the contrary, with Greenland having the lowest non-tradeable inflation rate.

Greenland's low non-tradeable CPI means that despite the large DBG, they display the lowest change in the NT/T ratio for the entire period at only 2.5%, compared to Denmark's 5.8% and the Faroe Islands 16.2%, going against the existing literature. Regression 1 (Table 8) of the statistical analysis rendered similar results, with both the Faroe Islands and Greenland displaying lower structural NT/T ratios than Denmark. These results appear surprising when reading the Faroese 16.2% change over the period. However, the Faroe Islands had a significantly lower non-tradeable CPI and NT/T ratio for most of the period up until 2020 (see Figure 5 & 6).

Regressions 2 and 3 (Table 9 & 10) rendered several results that require interpretation. Firstly, there was no statistically significant relationship between real wages or real public wages and the NT/T ratio for Greenland, again pointing towards significant methodological limitations. Both the Faroe Islands and Denmark had significant and positive coefficients, indicating that real wage increases correlates to a higher NT/T ratio. This follows the logic established in the theoretical approach (Table 1), where the increased purchasing power causes demand to rise for all types of goods, but only raises the prices of non-tradeables significantly (Nkusu, 2004). Why Denmark had the highest coefficient for real wages remains unanswered, but the results from the descriptive analysis does not point towards any Dutch Disease symptoms. Meanwhile, the Faroe Islands did display multiple signs of Dutch Disease, which may be the reason for the suggested correlation. When real public wages were computed, the Faroe Islands had the strongest coefficient, and Denmark's reduced slightly. While comparing changing coefficients does not allow for any clear interpretations, it does point towards a higher elasticity of the NT/T ratio when using real public wages. This would follow the logic that it is the public sector which drives the demand and subsequent price increases (Paldam, 1997).

As established in the empirical analysis, these results are not in line with the hypothesis nor the theory of Dutch Disease. The most plausible explanation for this is the lack of subcategorized CPI data in Greenland, which led to the non-tradeable CPI containing only rent as well as hotels and restaurants. Greenland places heavy subsidies and regulations on many of their non-tradeable goods, including housing as most rented dwellings are publicly owned and do not follow market rents (Paldam, 1997; Statistics Greenland, 2010). Thus, higher absorption and

subsequent higher demand would not pressure rent prices up as it would in a market-driven environment. As the spending effect stems from demand side pressures on non-tradeables, regulations which control prices would prevent a RER appreciation (Nkusu, 2004). Additionally, there is insufficient price data from Greenland specifically, which led to the time-scope of 2009-2023 for all three countries. With a sample size of three countries and 15 observations per country, temporary price shocks unrelated to larger structural Dutch Disease effects may skew the results enough to render the wrong results. The Faroe Islands' lower NT/T ratio relative to Denmark may partly reflect a higher rate of homeownership (TRAP, 2021) as owner-occupied housing costs are weighted differently in CPI construction than rented housing. This could suppress the measured non-tradeable price-level relative to a rental-dominated housing market such as that of Denmark (Obstfeld & Rogoff, 1996).

As the spending effect ultimately results in a lagging tradeable sector, leading to a low export competitiveness, the total exports as a low share of GDP are an important symptom of Dutch Disease. Figure 8 reveals that Greenland has the lowest total export as a share of GDP across the three economies, despite showing a strong overall growth from 14.6% to 28.3%, with the Faroe Islands having the highest share and Denmark falling in the middle. The Greenlandic result is consistent with Rajan and Subramanian's (2011) findings that transfer inflows systematically reduce the relative growth rate of exportable industries, primarily through the real exchange rate appreciation channel. Ismail's (2010) findings further corroborate this, suggesting that sustained public sector dominance creates structural underdevelopment of the tradeable export sector, which is clearly manifested in Greenland's low export base. Worth noting however, is the strong growth in exports that both Greenland and the Faroe Islands display, which could suggest structural growth in manufacturing rather than the underdevelopment described by Ismail (2010). This growth is however driven almost exclusively by the two countries' primary export sector, fishing.

Figure 9 shows the degree to which Greenlandic and Faroese export sectors are reliant on fishing. This is especially pronounced in Greenland, where the fishing sector accounted for 95.9% of total exports in 2022, making almost the entire Greenlandic export economy concentrated in a single sector. This means that any export growth the Greenlandic economy has experienced comes entirely from fishing, which is dictated by catch volumes, quotas and international fish prices. This in turn implies that export growth is largely exogenous not dictated by domestic productive capacity, which follows Paldam's (1997) argument that private sectors suffer unless they have significant enough resource rents. This is also largely the case for the Faroe Islands, but to a lesser extent, as the fishing sector's share of total exports is declining since 2019, implying more export diversification. Therefore, the results could point towards what Paldam (1997) suggested, in that tradeable private sectors not dealing within fishing become structurally underdeveloped.

Figure 10 reveals the fishing sector's share of total GVA, similarly showing the large influence of this one sector in Greenland and the Faroe Islands. Greenland shows an upward trend in the fishing sector's GVA share, which at first glance indicates a growing productive sector, contrary to what the spending effect would suggest (Corden & Neary, 1982). However, it is important to keep in mind the structural reasons for this, as the public sector is the dominant sector in Greenland, accounting for the majority of total GVA. The public sector in general accounts for

low GVA growth, as its primary goal is public welfare and not economic growth. Therefore, it is possible that any relatively stable growth in Greenlandic fishing GVA may reflect the broader stagnant private economy rather than genuine sector growth. This is outlined by Sachs & Warner (1995), who claims the spending effect makes the tradeable sector not grow in absolute terms but rather becomes more visible as the rest of the private sector fails to develop. The narrow Greenlandic export base could therefore be interpreted as a structural issue, rather than a sign of competitive strength. Fishing could be interpreted to be suppressing alternative tradeable activities in tandem with the public sector, consistent with the Corden & Neary (1982) framework of Dutch Disease. When comparing the real GVA per worker in the fishing sector (figure 11) to the fishing sector's total GVA in the economy (figure 10), the limited productive capacity of Greenland would support this interpretation. This issue will be examined in detail in the context of the resource movement effect below.

5.3.3 The Resource Movement Effect

Isolating the resource movement effect, the diagnostic tools for symptoms of the resource movement effect is primarily through the mechanism of loss of productivity and bidding up wages. In figure 11, the Faroe Islands consistently display a higher real GVA per worker, with a greater upward trend than Greenland. This shows that they have higher labor productivity, consistent with Van Wijnbergen's (1984) and Nkusu's (2004) findings that the dominant public sector bids up wages beyond what the private sector can sustain given international price constraints, leaving the fishing sector with a smaller and potentially lower quality labor pool.

Contrastingly, the high Faroese GVA per worker may reflect an economy with a more market-driven structure. The relatively smaller public sector and fewer price-level distortions mean that the fishing sector is likely able to attract the investment and labor needed to generate higher GVA per worker, contrary to what Dutch Disease would cause (Corden & Neary, 1982). Taken together, these results suggest that while the two economies are both heavily dependent on the fishing sector, the Faroe Islands may be better able to leverage the fishing sector for growth. Greenland's fishing sector instead could be interpreted to function as a residual, absorbing the labor and capital the public sector does not claim. This would be consistent with both the spending- and resource movement effects, in line with the structural characteristics outlined by Ismail (2010), as well as the negative impact of aid on export competitiveness identified by Rajan and Subramanian (2011).

Despite receiving the larger DBG (figure 1) and maintaining the highest public sector wage premium (figure 16), Greenland has the lowest overall real compensation per employee of the three countries. However, when examining the wages divided by public- and private sector, the higher overall wage level for the Faroe Islands and Denmark appears to be primarily driven by higher private sector wages, rather than transfer-financed public wages. This would suggest that the Greenlandic pattern is more consistent with transfer-supported public-sector wage dynamics than with private-sector wage growth.

The public sector wage premium (figure 16) in Greenland likely represents a distortion above private sector capacity, rather than a reflection of productivity growth. This is consistent with the findings of Van Wijnbergen (1984) and Cust et al. (2022), who characterize the public wage premium as a resource movement mechanism that draws labor away from the private sector

through wages which the private sector cannot match due to international price constraints. Worth noting is also that the downward trend of Greenland's public sector wage premium aligns with the declining share of public expenditure as share of GDP (figure 7). This may partly explain the rising fishing sector GVA share over the same period, as a reduced public wage premium marginally reduces the labor cost differential between sectors. This aligns with the findings of Behar & Mok (2019), finding that public employment crowds out private employment most, when the wage premium is high.

The low overall compensation level in Greenland despite a high public wage premium is further demonstrated by the GVA per worker results (figure 11), as Greenland's fishing sector records lower labor productivity than the Faroe Islands. This productivity gap is likely a consequence of the resource movement effect, as the private tradeable sector is left with a constrained labor supply, its ability to scale up production and improve output per worker is reduced (Nkusu, 2004; Corden & Neary, 1982). This results in a labor market structure where the public sector sustains an artificially high wage that the private sector cannot compete with. Simultaneously, the private sector cannot attract sufficient labour for productivity growth that would organically raise wages to public sector levels. This is consistent with Adenauer & Vagassky's (1998) findings that aid-financed public wage expansion leads to a public-private wage gap that creates persistent structural distortions in the labor market. The Danish public sector wage hovering around 1.0 throughout the timeframe reflects a labor market where public wages are anchored to private sector productivity, reinforcing the contrast with the Greenlandic distortion.

The sectoral employment structure results in figure 12 could suggest that Greenland has undergone factor reallocation. Greenland displays the largest overall share as well as the largest increase in the share of public sector employment, with the Faroe Islands having slightly lower and Denmark having the lowest share and negative trend. This can be interpreted as a manifestation of the resource movement effect as described by Corden & Neary (1982) and Van Wijnbergen (1984), that labor migrates toward the sector offering highest wages, with wages being sustained by external transfers causing the private sector to be structurally smaller.

The employment structure also contextualizes the export and GVA findings from figure 8-11. Greenland's export dependence on fishing combined with lower GVA per worker in fishing is a predictable outcome of an employment structure where the public sector absorbs most of the labor force, leaving the private sector with less human capital to increase productivity. Furthermore, Denmark displaying the lowest public employment share, the most stable export share and most balanced compensation structure could confirm that labor market distortions in Greenland and the Faroe Islands are due to the DBG. This is consistent with the findings of Fielding (2010), that it is the size and composition of external transfers, rather than small economy characteristics that determine the extent of aid-induced Dutch Disease in the labor market.

5.3.4 Synthesis

Taken together, the descriptive and statistical evidence presents a nuanced but broadly consistent picture of Dutch Disease in Greenland. The foundational condition of transfer dependency is established, as the DBG finances a dominant public sector that exceeds both the Faroe Islands and Denmark in public expenditure and employment shares. This is consistent with Paldam's

(1997) almost 20-year-old observations of the DBG driving the economic distortions. The results of a potential resource movement effect are clearly documented, as Greenland has a crowded out private sector labor market, an underdeveloped export sector dependent on fishing, and lower fishing sector productivity than the Faroe Islands. While there remains significant uncertainty as to the DBG's role in these patterns, they are all consistent with what theory predicts should happen under a resource movement effect (Corden & Neary, 1982; Van Wijnbergen, 1984).

The spending effect is difficult to confirm empirically, primarily due to the measurement limitations as described previously rather than the effect being completely absent. Because of the publicly administered housing rents, the non-tradeable CPI is likely suppressed and thus generates a lower NT/T ratio that would not reflect demand pressure from the DBG. This can be seen throughout the statistical analysis, as the wage channel is not detected throughout regressions 2 and 3 for Greenland, while the Faroe Islands show a significant correlation between real wages (especially real public wages) and the NT/T ratio. While the Greenlandic results remain highly inconclusive and speculative due to the measurement limitations, the Faroese results indicate that there may be a spending effect operating.

The three-country comparison supports the still speculative idea that the DBG is the most plausible explanation for Dutch Disease symptoms only in the cases where Greenland had the most, the Faroe Islands had some, and Denmark had none. In the other cases, such as the NT/T ratios and the CPI measures where Greenland did not show symptoms the most, the comparison falls apart. Still, in the cases of labor market structures and export shares for example, it does to some degree point towards the DBG as the source. However, no causal conclusions can be drawn from the analysis.

6 Conclusion

This thesis set out to establish whether Greenland's Danish block grant has generated Dutch Disease effects through a descriptive diagnostic analysis and panel regression analysis comparing Greenland, the Faroe Islands and Denmark from 2009-2023.

The descriptive analysis found several indicators consistent with the first hypothesis. Greenland displays a public sector absorbing over 40% of employment, a persistent public sector wage premium, low labor productivity in the tradeable sector and an export base almost entirely concentrated in fishing. These patterns are more pronounced in Greenland than the Faroe Islands, while Denmark shows comparatively fewer symptoms. However, some indicators provided ambiguous results and therefore do not allow for causal conclusions.

The statistical analysis was unable to support the second hypothesis. Both the structural NT/T ratio regression and the wage channel regressions found the spending effect to be absent in Greenland, and mild but significant in the Faroe Islands and Denmark. This is likely due to data limitations, particularly the non-tradeable CPIs and the effect of subsidies on price-level measurements.

Overall, the findings suggest Dutch Disease-consistent patterns in Greenland, particularly regarding the resource movement effect. Both research questions are addressed within the scope

of the thesis, though neither can be answered with the degree of certainty the hypotheses originally implied.

Further research on this subject is strongly implored. Most pressing is the need for more precise price data from Greenland, allowing for a more comprehensive non-tradeable CPI and more reliable NT/T ratio, which in turn could create a stronger framework for examining the spending effect. Additionally, the declining public sector wage premium observed in Greenland raises questions on whether the DBG's Dutch Disease effects may be weakening over time, which a longer panel or time-series approach could address. Lastly, as discussions around the political status of Greenland as a territory of Denmark intensify, research on the transition risks associated with reducing or removing the DBG, as well as what structural reforms would be needed to mitigate them are relevant.

AI Statement: AI has been used in this thesis to gather sources, translate sources to be read by the authors, aid with reference list formatting, adjust structure, specific wording and grammar as well as aid initial idea brainstorming. All thoughts, points and analysis are the authors' own.

References

- Acosta, P., Lartey, E., & Mandelman, F. (2009). *Remittances and the Dutch Disease*, Federal Reserve Bank of Atlanta Working Paper, no. 2009-8, <https://www.econstor.eu/bitstream/10419/57669/1/602140013.pdf>
- Acosta, P., Lartey, E., Mandelman, F. (2012). Remittances, Exchange Rate Regimes and the Dutch Disease: A Panel Data Analysis, *Review of International Economics*, vol. 20, no. 2, pp. 377-395, <https://doi.org/10.1111/j.1467-9396.2012.01028.x>
- Adam, C., & Bevan, D. (2003). *Aid, Public Expenditure, and Dutch Disease*, Working Paper, Department of Economics, University of Oxford, <https://ora.ox.ac.uk/objects/uuid:23d3b30b-7096-4382-8b8f-0c33366589c1>
- Adenauer, I. & Vagassky, L. (1998). Aid and the Real Exchange Rate: Dutch disease effects in African countries, *Development Strategy*, vol. 33, pp. 177-185. <https://link.springer.com/article/10.1007/BF02929511>
- Alexeev, M., & Conrad, R. (2009). The Elusive Curse of Oil, *The Review of Economics and Statistics*, vol. 91, no. 3, pp. 586-598, <https://doi.org/10.1162/rest.91.3.586>
- Algieri, B. (2011). The Dutch Disease: Evidence from Russia, *Economic change and restructuring*, vol. 44. No. 3. pp. 243-277, <https://doi.org/10.1007/s10644-011-9101-4>
- Anckar, C. (2008). On the Applicability of the Most Similar Systems Design and the Most Different Systems Design in Comparative Research, *International Journal of Social Research Methodology: Theory & Practice*, vol. 11, no. 5, pp. 389-401, <https://doi.org/10.1080/13645570701401552>
- Auty, R. (2001). *Resource Abundance and Economic Development*, Oxford: Oxford University Press
- Batini, N., Eyraud, L., Forni, L., & Weber, A. (2014). *Fiscal Multipliers: Size, Determinants, and Use in Macroeconomic Projections*, IMF Technical Notes and Manuals, vol. 2014/04, International Monetary Fund, <https://doi.org/10.5089/9781498382458.005>
- Beine, M., Bos, C. S., & Coulombe, S. (2012). Does the Canadian Economy Suffer from Dutch Disease?, *Resource and Energy Economics*, vol. 34, no. 4, pp. 468-492, <https://doi.org/10.1016/j.reseneeco.2012.05.002>
- Behar, A. & Mok, J. (2019). Does Public-sector Employment Fully Crowd Out Private-sector Employment?, *Review of Development Economics*, vol. 23, pp. 1891-1925. <https://doi.org/10.1111/rode.12613>
- Bhavnani, R., Clemens, M., & Radelet, S. (2004). *Aid and Growth: The Current Debate and Some New Evidence*, Center for Global Development Working Paper, no. 6.

- Bjerregaard, S. (2025). *Reforms Can Make Greenland's Economy More Self-Sustaining*, Danmarks Nationalbank, <https://www.nationalbanken.dk/media/ixmd0nrj/reforms-can-make-greenlands-economy-more-self-sustaining.pdf> [Accessed 27 January 2026]
- Bjørnland, H. C., & Thorsrud, L. A. (2016). Boom or Gloom? Examining the Dutch Disease in Two-Speed Economies, *The Economic Journal*, vol. 126, no. 598, pp. 2219-2256, <https://doi.org/10.1111/econj.12222>
- Bjørnland, H. C., Thorsrud, L. A., & Torvik, R. (2019). Dutch Disease Dynamics Reconsidered. *European Economic Review*. Vol. 119. Pp. 411-433. <https://doi.org/10.1016/j.euroecorev.2019.07.016>
- Boone, P. (1996). Politics and the Effectiveness of Aid, *European Economic Review*, vol. 40, no. 2, pp. 289-329, [https://doi.org/10.1016/0014-2921\(95\)00127-1](https://doi.org/10.1016/0014-2921(95)00127-1)
- Bourdet, Y., & Falck, H. (2006). Emigrants' Remittances and Dutch Disease in Cape Verde, *International Economic Journal*, vol. 20, no. 3, pp. 267-284, <http://dx.doi.org/10.1080/10168730600879323>
- Brincikova, Z. (2016). The Dutch Disease: An Overview, *European Scientific Journal*, vol. 12, no. 10, <https://doi.org/10.19044/ESJ.2016.V12N10P>
- Brunnschweiler, C., & Bulte, E. (2008). The Resource Curse Revisited and Revised: A Tale of Paradoxes and Red Herrings, *Journal of Environmental Economics and Management*, vol. 55, no. 3, pp. 248-264, <https://doi.org/10.1016/j.jeem.2007.08.004>
- Bruno, M., & Sachs, J. (1982). Energy and Resource Allocation: A Dynamic Model of the 'Dutch Disease', *Review of Economic Studies*, vol. 49, no. 5, pp. 845-859, <https://doi.org/10.2307/2297191>
- Buiter, W. H., & Purvis, D. D. (1983). *Oil, Disinflation, and Export Competitiveness: A Model of the 'Dutch Disease'*, NBER Working Paper, no. 592, Cambridge, MA: National Bureau of Economic Research
- Burnside, C., & Dollar, D. (2000). Aid, Policies, and Growth, *The American Economic Review*, vol. 90, no. 4, pp. 847-868, <http://www.jstor.org/stable/117311>
- Cavallo, A., Neiman, B., & Rigobon, R. (2014). Currency Unions, Product Introductions, and the Real Exchange Rate, *Quarterly Journal of Economics*, vol. 129, no. 2, pp. 529-595, <https://doi.org/10.1093/qje/qju008>
- Corden, W. M., & Neary, J. P. (1982). Booming Sector and De-industrialisation in a Small Open Economy, *The Economic Journal*, vol. 92, no. 368, pp. 825-848, <https://doi.org/10.2307/2232670>
- Cust, J., Devarajan, S., & Mandon, P. (2022). Dutch Disease and the Public Sector: How Natural Resources Can Undermine Competitiveness in Africa, *Journal of African Economies*, vol. 31, no. 1, pp. 10-23, <https://doi.org/10.1093/jae/ejac017>

De Gregorio, J., Wolf, H. (1994). Terms of Trade, Productivity, and the Real Exchange Rate. NBER working paper no. 4807, Cambridge, MA: National Bureau of Economic Research

Easterly, W. (2003). Can Foreign Aid Buy Growth?, *Journal of Economic Perspectives*, vol. 17, no. 3, pp. 23-48, <https://doi.org/10.1257/089533003769204344>

European Commission. (2024). *Denmark's Fiscal and Structural Plan 2024* [pdf], https://economy-finance.ec.europa.eu/document/download/6139aa30-006e-4691-b8d5-82767718612a_en

Fielding, D. (2010). Aid and Dutch Disease in the South Pacific and in Other Small Island States, *Journal of Development Studies*, vol. 46, no. 5, pp. 832-856, <https://doi.org/10.1080/00220381003623855>

Finansministeriet. (2022). *Finansloven 2022* [pdf], <https://fm.dk/media/xoelonfd/fl22a.pdf>

Government of the Faroe Islands. (2023). Faroese Parliament Agrees 25 Million DKK Reduction of Danish Block Grant in 2023, <https://www.government.fo/en/news/news/faroese-parliament-agrees-25-million-dkk-reduction-of-danish-block-grant-in-2023> [Accessed 5 March 2026]

Hendriksen, K., & Hoffmann, B. (2025). Greenland – A Distinctive Island Operation Economy: Contextual Challenges in Comparing Across Societies, *Polar Record*, vol. 61, e7, <https://doi.org/10.1017/S0032247424000202>

Høgedahl, L. (ed.). (2021). *Greenland's Economy and Labour Markets*, Abingdon: Routledge, <https://doi.org/10.4324/9781003054634>

Ilzetzi, E., Mendoza, E. G., & Végh, C. A. (2013). How Big (Small?) Are Fiscal Multipliers?, *Journal of Monetary Economics*, vol. 60, no. 2, pp. 239-254, <https://doi.org/10.1016/j.jmoneco.2012.10.011>

Ismail, K., 2010. *The structural manifestation of the 'Dutch Disease': The case of oil exporting countries*. International Monetary Fund. vol. 10, no. 103. pp. 1-36 <https://doi.org/10.5089/9781455200627.001>

Johnson, M. (2017). Tradable and nontradable inflation indexes: Replicating New Zealand's tradable indexes with BLS CPI data. *U.S. Bureau of Labor statistics monthly Labor Review*. Vol. 2017. No. 5. <https://doi.org/10.21916/mlr.2017.14>

Lupi, A., Nolan-Flecha, N., & Handlos Thomassen, N. (2024). *Size and Composition of Public Employment: Data Sources, Methods and Gaps*, OECD Working Papers on Public Governance, no. 76, Paris: OECD Publishing, <https://doi.org/10.1787/32c747be-en>

Maranon, M., & Kumral, M. (2020) Empirical analysis of Chile's copper boom and the Dutch Disease through causality and cointegration tests. *Resources Policy*. Vol. 70. 10.1016/j.resourpol.2020.101895

Magud, N., & Sosa, S. (2013). When and Why Worry About Real Exchange Rate Appreciation? The Missing Link Between Dutch Disease and Growth, *Journal of International Commerce, Economics and Policy*, vol. 4, no. 2, <https://doi.org/10.1142/S1793993313500099>

Matsen, E., & Torvik, R. (2005). Optimal Dutch Disease, *Journal of Development Economics*, vol. 78, no. 2, pp. 494-515, <https://doi.org/10.1016/j.jdeveco.2004.09.003>

Mien, E., & Goujon, M. (2021). 40 years of Dutch Disease Literature: Lessons for Developing Countries. *Comparative Economic Studies*, vol. 64, no. 3, pp. 351 - 383. <https://doi.org/10.1057/s41294-021-00177-w>

Nielsen, S. B. (2013). *Exploitation of Natural Resources and the Public Sector in Greenland: Background Paper for the Committee for Greenlandic Mineral Resources to the Benefit of Society*, Copenhagen: University of Copenhagen

Nkusu, M. (2004). *Aid and the Dutch Disease in Low-Income Countries: Informed Diagnoses for Prudent Prognoses*, IMF Working Paper, no. 04/49, Washington, D.C.: International Monetary Fund, <https://doi.org/10.5089/9781451846874.001>

Obstfeld, M., & Rogoff, K. (1996). *Foundations of International Macroeconomics*, Cambridge, MA: MIT Press

OECD. (2025). Unit Labour Costs, <https://www.oecd.org/en/data/indicators/unit-labour-costs.html> [Accessed 5 March 2026]

Østrup, F. (2018). Labour Market and Current Equilibrium in Greenland, *Nationaløkonomisk Tidsskrift*, vol. 2018, no. 1, https://www.nøt.dk/files/2018/article/2018_1_4.pdf

Paldam, M. (1997). Dutch Disease and Rent Seeking: The Greenland Model, *European Journal of Political Economy*, vol. 13, no. 3, pp. 591-614, [https://doi.org/10.1016/S0176-2680\(97\)00016-5](https://doi.org/10.1016/S0176-2680(97)00016-5)

Rajan, R. G., & Subramanian, A. (2008). Aid and Growth: What Does the Cross-Country Evidence Really Show?, *The Review of Economics and Statistics*, vol. 90, no. 4, pp. 643-665, <https://doi.org/10.1162/rest.90.4.643>

Rajan, R. G., & Subramanian, A. (2011). Aid, Dutch Disease, and Manufacturing Growth, *Journal of Development Economics*, vol. 94, no. 1, pp. 106-118, <https://doi.org/10.1016/j.jdeveco.2009.12.004>

Rautava, J. (2004). The Role of Oil Prices and the Real Exchange Rate in Russia's Economy, *Journal of Comparative Economics*, vol. 32, no. 2, pp. 315-327, <https://doi.org/10.1016/j.jce.2004.02.006>

Sachs, J. D., & Warner, A. M. (1995). *Natural Resource Abundance and Economic Growth*, NBER Working Paper, no. 5398, Cambridge, MA: National Bureau of Economic Research

Statsministeriet. (2009). Self-Rule Act of 2009, <https://english.stm.dk/media/4vgewyoh/gl-selvstyrellov-uk.pdf> [Accessed 14 March 2026]

Standard Chartered. (2026). *The Greenland Problem* [pdf], <https://www.sc.com/EN/uploads/sites/66/content/docs/wm-market-watch-the-greenland-problem-21-january-2026.pdf>

Statistics Denmark. (2026). Statbank Denmark. <https://www.statbank.dk/statbank5a/default.asp?w=1280> [Accessed 12 February 2026]

Statistics Faroe Islands. (2025). *Statbank Hagstova*, <https://hagstova.fo/en> [Accessed 12 February 2026]

Statistics Greenland. (2012). *Pristallene pr. 1. januari 2012* [pdf], <https://stat.gl/publ/da/PR/201202/pdf/Pristallene%20pr.%201.januar%202012.pdf>

Statistics Greenland. (2016). *Prissammenligning mellem Grønland og Danmark 2016* [pdf], <https://stat.gl/publ/da/PR/201701/pdf/2016%20Prissammenligning%20mellem%20Gr%C3%B8nland%20og%20Danmark.pdf>

Statistics Greenland. (2026). Statbank Greenland, https://bank.stat.gl/pxweb/en/Greenland/Greenland_PR/PRXPRISF.px/table/tableViewLayout1/ [Accessed 12 February 2026]

Torvik, R. (2001). Learning by Doing and the Dutch Disease, *European Economic Review*, vol. 45, no. 2, pp. 285-306, [https://doi.org/10.1016/S0014-2921\(99\)00071-9](https://doi.org/10.1016/S0014-2921(99)00071-9)

Trap Faroe Islands. (2021). Population and Housing on the Faroe Islands, <https://trap.fo/en/society-and-business/befolkning-og-bolig-pa-faeroerne/> [Accessed 15 May 2026]

UNCTAD. (2025). Terms of Trade: Faroe Islands, *UNCTADstat*, <https://unctadstat.unctad.org/datacentre/dataviewer/US.TermsOfTrade> [Accessed 5 March 2026]

van Wijnbergen, S. (1984). The 'Dutch Disease': A Disease After All?, *The Economic Journal*, vol. 94, no. 373, pp. 41-55, <https://doi.org/10.2307/2232214>

Wooldridge, J. M. (2019). *Introductory Econometrics: A Modern Approach*, 7th edn, Mason, OH: South-Western Cengage Learning

Appendix

Table 11. Reprocessing data

Public expenditure share of GDP (%)	$(\text{Public_expenditure_t} / \text{nominal_GDP_t}) * 100$	public_expenditure_share_GDP_t
Public employment share of total employment (%)	$(\text{Public_employment_t} / \text{total_employment_t}) * 100$	Public_employment_share_t
Fishing employment share of total employment (%)	$(\text{Fishing_employment_t} / \text{total_employment_t}) * 100$	Fishing_employment_share_t
Fishing gross value added share of total gross value added	$(\text{Fishing_GVA_t} / \text{total_GVA_t}) * 100$	Fishing_GVA_share_t
Real gross value added in fishing per worker	$((\text{Fishing_GVA_t} / \text{CPI_t}) * 100) / \text{Fishing_employment_t}$	Real_GVA_perworker_t
Fishing exports share of total exports (%)	$(\text{Fishing_exports_t} / \text{total_exports_t}) * 100$	Fishing_exports_share_t
Real total exports per capita	$((\text{Fishing_exports_t} / \text{CPI_t}) * 100) / \text{population_t}$	Real_total_exports_pc_t
Tradeable CPI	$\sum (\text{CPI}_{i,t} * w_i)$ Where weight: $\text{Weight}_i / \sum \text{Weight}_i = w_i$	Tradeable_CPI_t
Non-tradeable CPI	$\sum (\text{CPI}_{i,t} * w_i)$ Where weight:	Nontradeable_CPI_t

	$\text{Weight}_i / \sum \text{Weight}_i = w_i$	
Non-tradeable / Tradeable CPI ratio	$\text{NT_CPI}_t / \text{T_CPI}_t$	NT/T_CPI_ratio_t
Real compensation per employee	$((\text{Compensation_employees}_t / \text{CPI}_t) * 100) / \text{employees}_t$	$\text{Real_compensation_employees_sector}$
Public sector premium	$\text{Real_compensation_employees_public} / \text{Real_compensation_employees_private}$	$\text{Public_sector_premium}$

Table 12. Abbreviations.

Name	Abbreviation
Danish Block Grant	DBG
State-owned enterprises	SOEs
Danish Krone	DKK
Real exchange rate	RER
Gross Domestic Product	GDP
Gross value added	GVA
Non-tradeable to tradeable price ratio	NT/T
Consumer price index	CPI