



SCHOOL OF ECONOMICS AND MANAGEMENT

Master's Programme in Global Development, Population and Economic Change

Cohesion Policy and Regional Development

*An Empirical Investigation into European Regional Development Fund
Expenditure and Regional Incomes in Ireland (1995-2024)*

By

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Abstract

One of the main activities of the European Union (EU) is fostering unity and integration through its Cohesion Policy and emphasis on regional development. The European Regional Development Fund (ERDF) represents a substantial share of the EU Structural Funds, which seek to decrease economic disparities between regions in the member states. This thesis presents the first annual estimates of ERDF expenditure at the NUTS III regional level in Ireland for the period 1989-2020, using various methods of annualisation and regionalisation of previously existing data. It evaluates the impact of ERDF expenditure on regional average incomes and growth levels in Ireland for the first time and finds mixed evidence. While ERDF is correlated with higher levels of income growth, it shows little significance in statistical regression models. The contributions of this research are important due to the novelty of the data constructed which enabled a first-of-its-kind analysis.

Key words: Regional Development, European Regional Development Fund, Ireland

EKHS21

Master's Thesis (15 ECTS)

May 2026

Supervisor: Seán Kenny

Examiner: Josef Taalbi

Word Count: 14 828

Acknowledgements

I would like to thank Lund University School of Economics and Management for providing the tools, knowledge, and academic environment that made this project possible, as well as for the professors' commitment to student learning. I also wish to express my sincere gratitude to my supervisor, Seán Kenny, for his constructive feedback and generous support throughout the process of writing this thesis.

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1. Introduction

Since its foundation, the European Union (EU) has sought to increase cohesion among member states and their regions (Heinemann et al., 2024). Disparities are considered impediments to growth, development and integration, and a certain level of homogeneity is deemed necessary for a functioning common market (Becker et al., 2012; Heinemann et al., 2024). Thus, cohesion policy (CP) has become one of the key activities of the EU in promoting peace and prosperity for all. Understanding how such policies operate is critical for the union's continuous development in a period of increasing disparities both within and between countries (de Bromhead & Kenny, 2025; European Union, 2020).

EU CP is delivered through the Structural Funds, a collective name for the European Regional Development Fund (ERDF), Cohesion Fund, European Social Fund Plus, and the Just Transition Fund (European Commission, n.d.a). The ERDF focuses specifically on sub-national regions, by allocating funds to the EU's NUTS II (Nomenclature of territorial units for statistics) regions, the second level of the regional classification system (Dall'erba & Le Gallo, 2008). The ERDF is responsible for allocating €200 billion across the EU for the period 2021-2027 (European Union, 2020). This study aims to investigate the role of the ERDF in Irish regional development in the period 1995-2024. The period is contained to these years due to lack of income data pre-1995, but the ERDF expenditure data has been collected and aggregated for the years 1989-2020. The lagged regression models in the statistical analysis means the timeframe can be expanded to include 2024 as the final year of the study.

The study will focus on the Republic of Ireland as the country makes an interesting case for evaluating the ERDF. Ireland joined the EU in 1973 as a relatively poor country, and has in the past 50 years grown to be one of the wealthiest countries in the world in gross domestic product (GDP) per capita terms (Barry, 2003; Bradley, 2004). It is considered one of the original cohesion countries, together with Spain, Portugal and Greece - the first beneficiaries of the then-newly established Cohesion Fund, due to their low relative economic performance (Hagen & Mohl, 2009). In the decades since, Ireland has left the other countries behind, as its GDP per capita grew rapidly in the late 1990s and 2000s (Figure 1) in what is known as the Celtic Tiger era (Bradley, 2002; Kenny & Stuart, 2026). During the 1990s Ireland began catching up to European counterparts, despite initial high levels of interest rates - Kenny and

Stuart (2026) even found that there were no quarterly contractions in GDP during the decade. Some scholars attribute part of this success to EU funds and membership (Bradley, 2002).

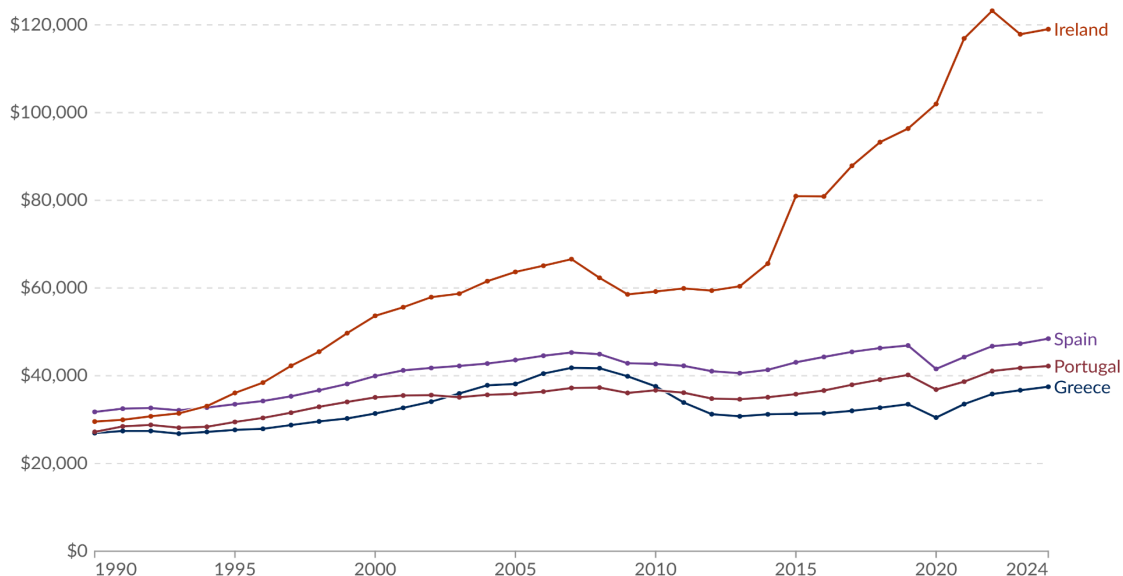
However, Honohan (2021) presents a critical view of the use of GDP per capita in the Irish case, as the wealth observed in this measure does not represent the real wealth of the Irish people, nor the living standards in the country. He makes a stark example of applying other metrics to the Irish development story, such as income and consumption per capita, and finds Ireland is barely in the top 10 among EU countries in such adjusted measures. Furthermore, Honohan (2021) suggests a measure of Actual Individual Consumption (AIC) would be more accurate, and places Ireland only 12th in comparison to the other EU member states.

Due to its relatively low initial GDP, Ireland received large sums of EU Structural Funds in the 1990s and early 2000s. This provides an important opportunity to evaluate the potential impact of these funds, especially the ERDF, and potentially measure if they succeeded in what they aimed to achieve. Yet attributing Ireland's economic success story solely to the EU funds is impossible, as the country experienced ever-increasing foreign direct investments (FDI). FDI inflows from the USA were especially significant leading up to and after the establishment of the Single Market in 1993 (Barry, 2003; Bradley, 2002; O'Rourke, 2017).

Figure 1: GDP per capita in Ireland, Spain, Portugal & Greece (1990-2024)

GDP per capita

GDP per capita is a country's gross domestic product¹ divided by its population. This data is adjusted for inflation and differences in living costs between countries.



Source: Eurostat, OECD, IMF, and World Bank (2026) – with minor processing by Our World in Data

1.1 Aim and Scope of Research

This study's aim and scope can be divided into two parts. The first part is the collection, aggregation and creation of a coherent and complete dataset of ERDF expenditure in Ireland at the NUTS III regional level for the years 1989-2020. This is one of the main contributions of this research, as it has to the best of the author's knowledge not been previously available. The specificities of how this was created will be further explained in the Data & Sources sub-section.

The second part is the statistical analysis of the data collected, where together with data on regional income levels the analysis will delve into whether there is a relationship between ERDF expenditure and regional incomes in Ireland. This will be done through two separate sections, the first displaying the descriptive statistics of the variables used as well as plots indicating relationships between the variables. Complementing these plots is a series of OLS regressions, testing different aspects of regional growth and convergence in the data.

The statistical analysis will use income growth as the main independent variable, while the constructed variable of annual ERDF expenditure per capita at the NUTS III regional level is the dependent variable. Statistical tests will be conducted, but due to the limited number of observations an advanced econometric model is not ideal. A control variable for industry share of gross value added (GVA) at basic prices is included, the selection of which will be further motivated in a later section. The ERDF expenditure values presented throughout this paper are in real terms (Cohesion Data, 2024).

The timeframe chosen 1995-2024 is based on various considerations. Although the ERDF was created in 1975, it was very small in terms of expenditure for the first decade and a half, with total cohesion expenditure barely reaching 5% of the total EU budget (Pellegrini et al., 2013). After 1989 cohesion expenditure grew rapidly to represent more than a quarter of total expenditure, with the ERDF accounting for almost 60% of cohesion funding (Dall'erba & Le Gallo, 2008). Furthermore, records and data of the pre-1989 period are scarce, both in EU records and Irish records. 1989 also saw the introduction of the multi-year framework in the ERDF expenditure instead of annual allocations (Hagen & Mohl, 2009). The multi-year framework is followed by many Irish national records, which simplifies tracing expenditure to the regional level. The current multi-year period of ERDF expenditure started in 2021 and

is set to end in 2027, and data for the current period is largely unavailable. Data for regional average incomes only exist from 1995, hence the statistical analysis starting in this year despite the collection of ERDF expenditure data from 1989. ERDF projects are often long-term, and it may take years for them to achieve economic impact. Thus, ERDF funds are collected until the end of the last completed multi-year period (2020), while income data has been collected until 2024 to enable analysis of the long-term impact of ERDF expenditure.

1.2 Research Question

The research questions of this study are two-fold:

- *Is there a statistically significant relationship between ERDF expenditure and regional average incomes in Ireland in the years 1995-2024?*
- *Has the ERDF contributed to convergence among Irish regions over the period 1995-2024?*

2. Literature Review

This section summarises Ireland's development since independence and outlines the history and basics of the EU Structural Funds and ERDF. Further, it provides a theoretical framework for the current study and reviews previous research conducted in the field of economic transfers, regional growth and convergence.

2.1 Historical Context

2.1.1 European Union Cohesion Policy and the European Regional Development Fund

EU CP includes all the union's work aimed at facilitating economic growth, sustainable development and improvements to the life quality in the regions and cities of the union (European Commission, n.d.a). It can be traced back to the 1957 Treaty of Rome, but has since been reinforced as a primary objective of the EU through the 1986 Single European Act and 2009 Treaty of Lisbon (Becker et al., 2012; European Commission, n.d.b; Heinemann et al., 2024). Although relatively scattered and fragmented at first, it laid the foundation for what today is a multi-hundred-billion euro project, operating through several different funds and programmes and representing about a third of the total EU budget (Becker et al., 2012; von Ehrlich, 2024).

A significant part of CP is the ERDF, established in 1975 in relation to the first enlargement of the EU which saw the accession of the United Kingdom, Ireland and Denmark (Heinemann et al., 2024). During the first 14 years of the ERDF, it constituted a relatively small part of the total budget, at around 6.8% (Becker et al., 2012). However, the ERDF and the broader Structural Funds underwent significant reform in the late 1980s, including the establishment of multi-year funding periods, greater concentration of funds towards less developed regions, and massive increase in financial resources in preparation for the Single Market (Becker et al., 2012; Bradley et al., 1995; Idczak et al., 2024).

The ERDF represents a majority share of total cohesion expenditure aimed at improving and strengthening cohesion within the EU, accounting for approximately 58% of cohesion policy expenses 2007-2013 (Becker et al., 2012; European Commission, n.d.b). The ERDF finances programmes in member states which are believed to contribute towards these goals, and typically about half of the expenditure for any given programme comes through the EU while the other half is financed by the country's regional or national authorities (European Commission, n.d.b). Further, the actual implementation and daily operations of each initiative rely on the national and regional administrations, thus placing the capacity of these authorities at the centre of successful ERDF programmes (European Commission, n.d.b). While the focus of the ERDF has shifted since its initial formation in 1975 and redesign in the 1980s, it has always aimed at fostering growth in relatively less prosperous regions through investments in infrastructure and human capital (Becker et al., 2012; Dall'erba & Le Gallo, 2008).

2.1.2 Irish Historical Regional Development

Both Bradley (2004) and Hagen and Mohl (2009) cite Ireland as the most efficient user of CP expenditure out of the four original cohesion countries, and attribute this success to the fact that the Irish economy has been relatively more open than that of Spain, Portugal and Greece. This may have contributed to the wealthy economy seen today, which ranks among the top countries in the world in terms of GDP per capita (de Bromhead & Kenny, 2025). However, Irish development was far from straightforward. From 1913 to 1985, income per capita failed to converge to the country's neighbour and largest trading partner, the UK - Irish incomes were on average 40% lower throughout the period (Barry, 2003). However, not all scholars agree on the narrative around early Irish independent development. Kenny (2025) argues

Ireland at independence was poorer than previously estimated, which would suggest a certain level of convergence to the UK did take place over the period.

After independence in 1922, Fitz Gerald (1998) argues that several decades of struggling growth and protectionism followed, exemplified by policies of self-sufficiency and high tariffs. O'Rourke (2017) nuances the debate suggesting that while Ireland was slow to remove tariffs, in other aspects it was equal or even more liberal than its peers. For example, Ireland was largely free from quantitative quotas and its protectionism largely mirrored that of other countries at the time (O'Rourke, 2017). Moreover, protectionism was in some ways a response to the heavy fluctuations in economic policy during an era of fixed exchange rates - loosening fiscal policy to stimulate growth led to crises in balance of payments, causing the opposite policy to be enforced (O'Rourke, 2017). O'Rourke (2017) suggests the back-and-forth between these two policies was common for former colonies of the UK, and did little to help foster sustainable growth during this era.

Ireland was on the back-foot in terms of structural transformation after independence, as the partitioning of the island left the country without the industrial base in Belfast and more than 50% of the population employed in agriculture (Bradley, 2004; Bradley et al., 1992). However, Kenny (2025) finds a greater economic performance than previously assumed during the interwar years. Despite this, almost a third of all quarters during the 1950s were negative in growth terms, contributing to the emigration of almost 15% of the population throughout the decade, as the economy experienced less than a third of the growth rate seen in Western Europe in the post-WWII era (Barry, 2003; Kenny & Stuart, 2026). Following a greater shift towards trade liberalisation by reducing tariffs, attraction of multinational corporations (MNCs) increased and the country began its path towards accession to the European Communities (later EU) - two crucial aspects of Irish development in the 20th century (Barry, 2003; de Bromhead & Kenny, 2025; O'Rourke, 2017). The change in policy coincided with a recognition of the flaws in the educational system, which through reforms such as free secondary education contributed to the creation of a high-skilled workforce in the decades leading up to the turn of the century (Bradley, 2004).

Ireland struggled to catch-up to the UK during the first six decades of independence, but evidence also suggests a greater degree of convergence than previously assumed (Kenny, 2025). The relative struggle disputes neoclassical growth theory's assumption of relatively

unconditional convergence in countries with similar preferences (Barro & Sala-i-Martin, 1992). On the other hand, Kenny (2025) argues there was catch-up to the UK during the period between 1925 and 1950, suggesting convergence even under difficult conditions. A possible explanation for the relative struggle to converge might lie in the argument made by Fitz Gerald (1998), that the low educational investment was “One of Ireland's great mistakes over its first half century as an independent nation”. He estimates more than 0.5 percentage points in annual growth during the 1990s in Ireland can be attributed to increased productivity caused by higher educational attainment, lagging countries such as Germany by two to three decades.

However, this is only one possible explanation for the relative Ireland-UK difference in national income, as Barro and Sala-i-Martin (1992) highlight that the theory is somewhat conditional on technological similarities. This would then pose the question as to why Ireland was unable to adopt and diffuse the technologies existing in the UK in order to promote catch-up earlier. Perhaps part of the answer is the relative protectionism that dominated Irish economic policy until the late 1950s, preventing new technologies from entering and transforming the country. Trade-liberalising reforms likely eased adoption and diffusion, accelerated by the increasing presence of MNCs.

Despite significant changes and improvements during the 1960s in education, FDI and ongoing structural transformation, the late 1970s and 1980s were a period of economic stagnation, instability and unemployment in Ireland (Barry, 2003). The oil shocks of 1973 and the global economic downturn that followed was correlated with Ireland having relatively higher unemployment, stronger wage-growth and lower labour-productivity compared to EU average - thus indicating that wages were too high for the labour-intensive industries to prosper (Barry, 2003). In an attempt to dampen the detrimental effects of a global recession on the Irish economy, the government introduced huge Keynesian stimulus packages, driving public debt to unsustainable levels (Barry, 2003). While successfully decreasing national unemployment, according to Barry (2003) by as much as three percentage points, it ultimately resulted in the need for fiscal corrections. The consequence was rising unemployment throughout the 1980s, culminating in 1987 at almost 18% (Barry, 2003).

The shock to the Irish economy during the 1970s and 1980s likely contributed to the lack of income convergence to the UK in this period. However, in the late 1980s and early 1990s the

Irish economy was stabilised, partially through significant expansion of the Structural Funds, laying the foundation for extraordinary growth - approximately 7% per year 1994-1997 and decline in unemployment to below 4% by the early 2000s (Barry, 2003; Bradley, 2002; Fitz Gerald, 1998). The role of the EU in this development has been discussed and highlighted by several authors. Bradley (2002) notes Ireland's "fascinating effectiveness in implementing the Structural Funds programmes", and suggests "coherent domestic policy", "healthy macroeconomic conditions" and support by "social consensus" is what enabled successful implementation. Bradley's (2002) emphasis on these important aspects adds to the literature on the productive use of economic transfers, while others highlight the importance of economic openness (Bradley, 2004; Hagen & Mohl, 2009) and human capital (Heinemann et al., 2024). While several of these factors may be mutually reinforcing and beneficial, Fitz Gerald (1998) notes especially how Irish educational attainment only really caught up to that of other countries around 1990 - coinciding with the praised implementation of the programmes.

While Fitz Gerald (1998) estimates the direct impact of the funds to be relatively modest, about 0.5% annually, the indirect effects are deemed more crucial (Williams & Varghese, 2019). Fitz Gerald (1998) argues with support from Barry (2003) and Williams and Varghese (2019) that the aid received contributed to government efficiency, as institutions were determined to display that the transfers had been put to effective use as promised, and discipline in evaluating and improving investments. Barry (2003) also argues that the funds relieved financial pressures on the government, as they followed a period of fiscal correction caused by the huge debt incurred during the previous decades. Moreover, the funds contributed significantly to the FDI inflow, leading to increased tax revenues (Barry, 2003). The creation of the Single Market doubled US-based companies' investments in the EU, with Ireland receiving a disproportionately large share - possibly due to agglomeration effects, but also Ireland's English-speaking and well-educated population (Barry, 2003).

Irish regional development during the 20th century has until recently been largely unknown due to lack of data. In a recent study, de Bromhead and Kenny (2025) present the first long-run calculations of county- and NUTS III economic performance levels, enabling subnational comparisons for the first time. Overall, they find regional convergence between 1926 and 1991, though level of regional classification matters and certain county-exceptions apply. Post-1991 the study finds a slight increase in inequality, and concludes that on the

whole, Irish regional development to a large extent has mirrored that of other developed European countries. Bringing the regional dimension to the present-day, Williams and Varghese (2019) claim Ireland remains one of the most rural countries in the EU according to the OECD definition. Further, they nuance the trend of divergence discussed by de Bromhead and Kenny (2025) by suggesting small, rural towns, more common in the more peripheral regions, were the hardest hit by the global financial crisis. Williams and Varghese (2019) argue the reason behind this was lack of attention to these areas at the national level, largely due to little political representation. They suggest these towns struggled up until 2016, but due to the insufficient consideration from national authorities a culture of entrepreneurship and self-sufficiency contributed to the survival of the small, rural towns.

In order to understand the regional analysis of this study, it is important to have an overview of Irish sub-national regions. Due to its relatively small population, Ireland has for a long time only had two NUTS II regions: the Border, Midlands and Western region and Southern & Eastern region (Bradley, 2002). In 2014, a third NUTS II region was introduced, creating a new division of the country: the Northern and Western region, the Eastern and Midland region and the Southern region (CSO, 2017). The change also introduced a change in the composition of the NUTS III regions, with County Louth moving from the Border region to the Mid-east (CSO, 2017).

As the shift is relatively recent, this does not affect the statistical analysis too much and the allocation of expenditure difference this causes has been taken into account for the relevant years and regions. However, due to ERDF expenditure data providing allocations at the previous NUTS II divisions (only two regions), this now retired division is what has been used for this study. Thus, County Louth is part of the Border region for the purpose of this study, for consistency throughout the analysis. While this does not make the analysis less insightful, it is an important caveat when drawing policy implications from this work. Below is a table showing the former divisions of counties, NUTS III and NUTS II regions, i.e. the divisions used for this analysis.

Table 1: Administrative Classifications of Irish regions (NUTS II, NUTS III, and Counties)

NUTS II Region	NUTS III Region	County
Border, Midland & Western (BMW)	<i>West</i>	Galway
		Mayo
		Roscommon
	<i>Border</i>	Donegal
		Sligo
		Leitrim
		Cavan
		Monaghan
		Louth
	<i>Midlands</i>	Longford
		Westmeath
		Offaly
		Laois
	<i>Dublin</i>	Dublin
	<i>South-east</i>	Waterford
		Kilkenny
		Carlow
		Wexford
	<i>South-west</i>	Cork
		Kerry
	<i>Mid-west</i>	Clare
		Tipperary
		Limerick
	<i>Mid-east</i>	Wicklow
		Kildare
		Meath

Note: The analysis utilises the historical "former" NUTS II and NUTS III structures to ensure consistency with ERDF funding cycles and regional reporting prior to the 2014 revisions.

Source: Adapted from Central Statistics Office (CSO).

Knowledge of the historic narrative regarding the economic regional distribution in the country is helpful in understanding the following analysis. Traditionally, the Southern and Eastern (S&E) region has been the richest. This NUTS II region includes the wealthiest NUTS III regions of Dublin, the South-west and Mid-east (Barry, 2003; de Bromhead & Kenny, 2025). While Dublin, as the capital, is an expected leader, the South-west has benefited greatly from FDI inflows in the pharmaceutical sector especially, while the Mid-west's proximity to Dublin helps drive its growth (Barry, 2003; de Bromhead & Kenny, 2025).

On the other side of the economic spectrum are the NUTS III regions that make up the Border, Midland and Western (BMW) NUTS II region. The Border region has frequently ranked the poorest region, due to its peripheral isolation on the border to Northern Ireland, and has stagnated in the post-war era (de Bromhead & Kenny, 2025; Williams & Varghese, 2019). The Border region, alongside the struggling Midlands and to a certain extent the West, have been characterised by higher agricultural dependence and low urbanisation levels (Bradley et al. 1992; Williams & Varghese, 2019). The concentration of FDI and lower transportation costs in the core regions (S&E region) has facilitated growth while not serving the periphery (BMW region), thus reinforcing this economic pecking order (Bradley, 2004; Bradley et al. 1992).

2.2 Theoretical Framework

In growth theory, scholars are in disagreement regarding what causes economic convergence and divergence. Thus, outlining the debate and the different theories is of great importance as the consensus on this topic is likely to influence policies such as the ERDF.

2.2.1 Neoclassical growth theory

One of the most influential growth theories, neoclassical growth theory, suggests economies grow through capital, labour and technological progress (Solow, 1956). Pioneered by Robert Solow (1956), he makes adjustments to the Harrod-Domar assumptions of capital and labour, and allows the factors to be substituted with one another, while neither can be zero. As an economy develops and its capital stock increases, its marginal returns to capital will diminish (Barro & Sala-i-Martin, 1992; Sala-i-Martin, 1996). Diminishing growth rates cause lower growth rates at higher levels of income, thereby implying that poorer economies will

ultimately catch up to richer ones. This type of convergence is known as β -convergence, where there is an inverted relationship between initial level of economic performance and growth (Barro & Sala-i-Martin, 1992). This is different from σ -convergence, which instead refers to the reduction in inequality and thus focuses on the absolute values of economic performance (Sala-i-Martin, 1996). Neoclassical growth theory suggests catch-up is largely unconditional, for economies with similar technology and economic preferences, but is conditional in the sense that an economy's steady state is determined by its national characteristics (Barro & Sala-i-Martin, 1992).

2.2.2 Endogenous growth theory

Endogenous growth theory has been proposed by scholars contradicting neoclassical theory, arguing that human capital can have constant or even increasing marginal productivity (Lucas, 1988). The implications of this is that there is no limit to an economy's growth, as wealth and knowledge are the prerequisites for further economic growth (Romer, 1986). The theory builds upon the existence of positive externalities - investments having positive spillovers and causing improvements also in other sectors or firms (Romer, 1986). These positive spillovers and the increasing marginal returns suggest that rich regions with more human capital and knowledge will grow at a faster rate than regions with less human capital, thus reinforcing the divergences between economies (Romer, 1986).

2.2.3 New economic geography

New economic geography (NEG) theory seeks to explain the spatial distribution of economic activity through the core-periphery pattern as firms and industries agglomerate (Krugman, 1991). As firms cluster, they likely experience increasing returns due to low transportation costs (clusters often appear near large markets), economies of scale, and knowledge spillovers (as firms learn from each other) - thus incentivising further agglomeration (Krugman, 1991). Agglomeration may cause deterioration of peripheral economies, as firms relocate to the industrial core to maximise profits, indicating convergence is not automatic (Bradley, 2004). Even lowering transportation costs between the periphery and core risks emphasising clustering, as it eases the shift towards industrial hubs (Dall'erba & Le Gallo, 2008). The theory implies a trade-off between overall efficiency and regional cohesion - a country can either become more effective by facilitating agglomeration, or losing out on economies of scale to prevent deterioration of peripheral regions (Becker et al., 2012).

2.2.4 Theoretical Discussion

By definition, the ERDF relies on the assumption that regional convergence is possible. While this does not exclusively contradict the endogenous and NEG growth theories, it aligns with neoclassical thought of convergence, accelerated by additional capital. However, the often large-scale investments in education suggest an awareness of the importance of human capital in driving growth endogenously and the associated positive spillovers.

The neoclassical, endogenous, and NEG growth theories all propose different ways in which economies develop and the conditions necessary. Neoclassical and endogenous theory directly oppose one another, as the former suggests less prosperous economies will tend to grow faster than richer ones due to diminishing returns, while the latter claims the opposite - human capital in developed economies will sustain or even increase growth rates (Barro & Sala-i-Martin, 1992; Romer, 1986). The contrast between them highlights a key debate relevant for policymakers. If neoclassical theory holds, regions should converge over time, especially with support through additional capital. If, on the other hand, endogenous theory is correct, such convergence is unlikely, as the richer areas will continue to grow at a faster pace, resulting in persistent divergence.

NEG finds similar conclusions to endogenous theory, assuming that the core (economies with higher human capital) will experience higher growth rates than other areas. Both highlight spillovers as a driver of growth in rich regions. NEG is different in that it specifically addresses the important trade-off for policymakers, in either enabling growth or protecting regional cohesion. It lies in direct contrast to neoclassical theory, in that catch-up is unlikely - even with additional investments in poorer regions, this may only facilitate further core-periphery patterns of emerging (Becker et al., 2012).

2.3 Previous Literature on Regional Development

Considerable empirical effort has been devoted to testing the respective theories. Barro and Sala-i-Martin (1992), Sala-i-Martin (1996) and de Bromhead and Kenny (2025) all provide evidence in favour of the neoclassical growth theory. Findings from US states, various countries, and Irish regions support their conclusions, implying convergence consistent with neoclassical expectations. Yet each study highlights caveats as well. Sala-i-Martin's (1996) findings are inconsistent with the typical predictions of the neoclassical model, as the

observed speed of convergence of two percent per year has an unrealistically low associated capital share, indicating other forces at play. Further, public policies do not seem to be a reasonable explanation for convergences, suggesting the ERDF may not be a driver of regional cohesion (Sala-i-Martin, 1996). Moreover, while de Bromhead and Kenny (2025) appear to find neoclassical convergence, it is conditional on the selected regional classification level of the investigation. The convergence found also ends in the late 20th century, and divergence has been prevalent in many European countries since (de Bromhead & Kenny, 2025). Thus, which growth theory is most accurate remains largely ambiguous from a theoretical and empirical point of view.

Estimating and isolating the impact of additional expenditure in driving convergence is exceptionally difficult. Despite this, studies within the field have found positive evidence in favour of regional transfers. Pellegrini et al. (2013) and Heinemann et al. (2024) find an increase of between 0.6 and 1.6 percentage points in the poorest regions annual GDP growth directly linked to CP. Both rely on a regression discontinuity design (RDD), and their findings indicate an estimated multiplier effect of transfers of about 0.8-1.4. However, the persistence of these positive effects are much disputed. Another study finds evidence of the multiplier effect increasing in the years after the funding period, but most academic research indicates that many regions experience a retraction of growth levels in the long-term, back to the equilibrium (Heinemann et al., 2024).

While studies show a positive effect of transfers, Becker et al. (2012) find a “non-linear relationship” between a region’s growth and level of transfers, indicating diminishing returns. The authors identify two critical levels of transfers as a percentage of GDP, suggesting beyond 1.3% the impact of additional transfers becomes statistically insignificant, while 0.4% appears to be the optimal level of transfers as percentage of GDP. The issue of diminishing returns causes misallocation as poor regions receive more than they can effectively make use of. Approximately 36% of regions receive transfers at a level where the multiplier effect is below one, and in half of those regions a reduction in transfers would not cause a decline in growth (Becker et al., 2012). Becker et al. (2012) suggest that putting such transfers to other regions would increase aggregate growth in the EU - however, overall growth is not the goal of CP or the ERDF, which will ultimately risk excessively funding certain regions as the objective is to facilitate convergence.

Economic regional transfers is not a one-size-fits-all solution, as certain conditioning factors impact effectiveness (Heinemann et al., 2024). Heinemann et al. (2024) argue for the importance of qualitative institutions and human capital, while Bradley (2004) and Hagen and Mohl (2009) suggest economic openness is the key determinant. Administrative competence and resources is identified as a crucial part of local governance, determining the absorptive capacity of the region (Heinemann et al., 2024). The importance of human capital is further emphasised, as Heinemann et al. (2024) state that regions with lower education levels, especially poorer regions in relatively poor countries, often struggle to make effective use of transfers while poorer regions in richer countries tend to benefit more. This highlights a flaw in the logic of regional economic transfers. Transfers are often aimed at regions with lower human capital and invest in educational programmes. But according to Heinemann et al. (2024), the lack of human capital that leads to the funds being received in the first place may ultimately prohibit the funds leading to the desired growth and catch-up.

Hagen and Mohl (2009) and Bradley (2004) both investigate the original cohesion countries Ireland, Portugal, Spain and Greece, and find economic openness to be a key determinant of absorptive capacity. In the studies, Ireland was declared the most effective user of transfers, which Bradley (2004) credits to Ireland's high exports-to-GDP ratio. Hagen and Mohl (2009) present the possible mechanisms behind this relationship, suggesting high levels of openness "disciplines governments", thereby increasing the likelihood of efficient and productive investments.

Aside from the conditional factors raised above, scholars find other caveats to regional expenditure programmes. Cohesion expenditure relies on the additionality principle, which seeks to avoid an unintended crowding out effect of national expenditure as a consequence of EU programmes (European Union, 2007). It does so by requiring that "...the Member States must maintain their own public expenditure at least at the level it was at in the preceding period" (European Union, 2007). Despite this, Heinemann et al. (2024) find what they describe as systematic violation of the additionality principle, with CP expenditure regularly replacing public investments in the member state - governments reallocate finances from investments to current spending (Heinemann et al., 2024). On the other hand, they also find a correlation between CP expenditure and increased private investments in the region, which hypothetically could reduce the crowding out effect of declining public investment. Moreover, Dall'erba and Le Gallo (2008) find inconsistencies in the spillover effects,

indicating positive spillovers are prevalent in core regions while being very limited in peripheral regions. The difference could be due to core regions often being well-connected and smaller in size, and Dall’erba and Le Gallo (2008) suggest measures may need to be taken as the observed pattern risks reinforcing current regional disparities.

3. Methodology & Data

3.1 Method

As discussed previously, there are many studies estimating the effect of financial transfers on economic performance, as it lies at the centre of economic development debates. However, many of the studies referenced above make use of data spanning hundreds of regions and many more years than possible for this study. Therefore, more advanced statistical methods have had to be dismissed, in favour of simplicity. In line with studies such as Barro and Sala-i-Martin (1992) and de Bromhead and Kenny (2025), estimating convergence among U.S. states and Irish regions respectively, this study will conduct an Ordinary Least Squared (OLS) linear regression model. The panel dataset is common among regional convergence and development studies (Becker et al., 2012; Hagen & Mohl, 2009; Sala-i-Martin, 1996), and aims to allow for more variability, information, and statistical efficiency compared a cross-sectional or time-series analysis. The analysis will be conducted in the statistical software for data science known as Stata.

3.2 Selection & Variables

The study will focus on Irish NUTS III regions. Due to the small population of the country, Ireland only has two NUTS II regions in the years investigated, which ERDF funds are allocated to. As this makes a statistical analysis difficult and would fail to capture the complexity of economic performance across the country, a NUTS III regionalisation is necessary. Ireland has been chosen as the country of interest due to its staggering growth over the past few decades, its significant inflow of ERDF funds in the 1990s and early 2000s, and the apparent lack of previous research on Ireland’s regions in relation to EU transfers.

The variables used for the statistical analysis have been mentioned briefly, but will here be explained further.

Average income per person (dependent variable): Constructed in Stata based on county-level data of average incomes subtracted by average social transfers. It is transformed

by using the natural logarithm so that estimated changes can be interpreted approximately as percentage changes.

Income growth (dependent variable): Constructed in Stata based on the income per person variable, to be able to measure changes in year-on-year growth.

ERDF expenditure per capita (independent variable): ERDF data was collected and constructed through various methods, and outlined in the Section below. The constructed set, which had ERDF expenditure values for each year at the NUTS III level, was then divided by the population in each region from the nearest year for which population census data was available. ERDF per capita will in some statistical tests be lagged, to observe potential long-term effects of expenditure and to add to the overall analysis.

Industry share of GVA at basic prices (control variable): This is used as a control variable, which to a certain extent controls for the substantial inflows to certain regions of FDI into manufacturing and export-oriented sectors.

Index of income per person, Ireland = 100: Used as an additional variable to demonstrate the regional differences over time.

Index of gross value added (GVA) per person, EU = 100: Used as an additional variable to show how regions have developed economically compared to the EU average, in GVA terms.

As mentioned previously, the role of FDI in the Irish growth story is significant, especially when using values of GDP. In terms of the regression analysis, this study attempts to reduce the impact of FDI inflows as much as possible, while maintaining relatively few variables as too many risk distorting the results in this relatively small panel of observations. It does so by using income instead of GDP as the outcome variable, thus removing the repatriation outflows which make up a significant part of the Irish GDP.

A value of FDI inflows to each region would be ideal as a control variable, but unfortunately this data does not appear to exist at the NUTS III level for the years concerned. Instead, a control variable for industry share is included, for which sufficient and accurate data exists. This was chosen on the basis that regional growth is heavily affected by the MNCs in the respective regions, which often operate in manufacturing exports such as pharmaceuticals, chemicals and tech. Such industries contribute substantially to regional employment and growth and regions with greater industrial bases tend to have stronger FDI inflows for this reason. Assuming FDI on the whole concentrates more in industrial regions, the industry

share control variable is somewhat of a proxy for FDI inflows. Of course, it is not a perfect proxy as it is a different metric, which is necessary to keep in mind.

The regression analysis will use models including year fixed effects, which seek to absorb dramatic changes affecting all regions, such as the 2008 financial crisis. Moreover, the tests will use regional fixed effects, to avoid the oversimplification of some regions having consistently and significantly higher levels of income than others. This is especially important in this study as certain regions (e.g. Dublin) are bound to be better off economically due to factors such as agglomeration and FDI inflows compared to more rural regions.

3.3 Data & Sources

Due to the complex nature of ERDF funding allocations and the relative lack of comprehensive data sources in the Irish case, data collection is one of the major obstacles to this study. Data has been compiled through a variety of sources, starting with the Cohesion Open Data Platform, created by the European Commission (2024). This source aggregates historic EU payments through various cohesion funds such as the ERDF, and has created a dataset spanning payments 1989-2022 (European Commission, 2024).

ERDF regional expenditure is generally decided through cooperation between the member states and the EC, and typically a distribution at the NUTS II level is agreed upon (European Commission, 2018). For almost three decades, the size of funding to each region has been decided through what is generally referred to as the Berlin formula (European Commission, 2018). It divides regions into three categories:

- *less developed regions, where GDP per inhabitant was less than 75% of the EU average*
- *transition regions, where GDP per inhabitant was 75–100% of the EU average*
- *more developed regions, where GDP per inhabitant was more than 100% of the EU average.*

(Eurostat, 2024)

The formula also includes other measures such as national GNI per capita, population, and unemployment (European Commission, 2018). After a sum of expenditure has been agreed upon and allocated to the country it is their responsibility to allocate it accordingly to the NUTS II regions as promised (CPMR, 2015). Moreover, below the NUTS II level, it is completely up to the national/regional authorities to ensure funding is allocated effectively and efficiently, according to their own methods and objectives (CPMR, 2015). Herein lies part of the difficulty in finding data on the regional allocation of ERDF funds, as the EU and European Commission are not responsible for the projects at a local level.

The aggregation of the NUTS III allocation of ERDF funds in Ireland is one of the major contributions of this study, and the creation of this data will be explained thoroughly. ERDF expenditure has since 1989 been allocated through multi-year periods. The periods concerned for this research, which excludes the current multi-year period of funding (2021-2027), are: 1989-1993 (period 1), 1994-1999 (period 2), 2000-2006 (period 3) 2007-2013 (period 4), 2014-2020 (period 5). Common for all periods in this research is that data from the Cohesion Open Data Platform has been used, which shows the allocated ERDF funds at the NUTS II level in Ireland for each programme period, 1989-2020. While there are Irish sources which do show allocations at the NUTS III level for certain programme periods, these often lay the foundation for the Cohesion Open Data Platform's aggregation. For the purpose of consistency and gathering all actual expenditure data from a single source, the values presented by this platform are used. However, importantly, it does not include annual or NUTS III regional distribution. The methods for creating and finding this have been different for each programme period.

For period 1, the first Irish National Development Plan is the main source of how funds are distributed annually and regionally. The National Development Plan (NDP) was created alongside the first multi-year period, as the EU required member states to showcase how funding was supposed to be used (Fitz Gerald, 1998). The NDP 1989-1993 shows a table of "ERDF allocation per year", i.e. how much of the total allocation of ERDF for the period was planned to be used in each year at the state level (Department of the Taoiseach, 1989, Table 19). As for the regional allocation, the NDP 1994-1999 presents a table of "Gross structural expenditure by sub-region", which includes expenditure of European Community aid per sub-region (Department of Finance, 1993, p.146). As noted previously, the actual values calculated for each NUTS III region and year is drawn from the Cohesion Open Data

Platform, yet the shares of how to regionalise and annualise this is based on the data discussed here for each programme period. The sub-regions of 1989-1993 are not identical to those presented above, but through population data the values have been adjusted to fit the NUTS III regions used for this study.

For period 2, the NDP 1994-1999 is the key source. It contains a series of tables which display the annual European Community aid at the state level, thus providing the annual shares of this period (Department of Finance, 1993, Tables 1-6). For the regional shares, it has a table of “Estimated structural expenditure by sub-region 1994-1999” (Department of Finance, 1993, p.150). The shares of each region, which for this period and beyond is at the NUTS III level, are used to regionalise the NUTS II data presented by the Cohesion Open Data Platform.

The third period is the first where there is separate reporting for the different NUTS II regions, presented by the regional assemblies representing the respective parts of the country, which is used alongside the reporting from the 2000-2006 NDP. For the annual allocation for this period, the NDP displays a table of “Profile of Expenditure” (Department of Finance, 2000, p.238). It shows the annual allocation of the BMW Regional Operational Programme and S&E Regional Operational Programme, which during this period were responsible for allocating ERDF funds. The NDP does not disclose the planned regional expenditure at a sub-NUTS II level. Therefore the regional assemblies are a necessary source for this multi-year period. The Southern and Eastern Regional Operational Programme 2000-06 Final Implementation Report presents a table of “ERDF Co-financed Declared Expenditure by NUTS III & IV Areas” which is divided into different sectors, and the aggregate share of these values for each region has been used (Southern & Eastern Regional Assembly, 2010, p.27). Unfortunately, no equivalent data has been found for the BMW region, thus making the regionalisation very difficult. To solve this, a last resort solution has been used, which is to take the regional shares of the former period. Thus, while the annualisation of data for both the BMW and S&E region is accurate, the regionalisation for the BMW region is identical to the regionalisation of the previous period. While not ideal, it was deemed the only solution to the apparent lack of formal records from this multi-year period in the BMW region.

The fourth period 2007-2013 is largely similar to the previous period in terms of data availability. For the S&E region, the Final Implementation Report presents the necessary data

for regionalisation in a table showing “Expenditure declared by the Managing Authority to the EU Commission” (Southern Regional Assembly, 2017, p.14). For the annual data, the S&E Operational Programme presents a table of “Annual ERDF commitment to the Operational Programme” (Southern & Eastern Regional Assembly, 2007). Once again, data is more scarce for the BMW region. For the annual data in this region, a parliamentary debate from 2009 where the annual allocation of ERDF funds in the BMW region for the 2007-2013 period is disclosed (Dáil Éireann, 2009). Unfortunately, as for the 2000-2006 period, the regional shares in the BMW region have not been found for this study. Therefore, using similar logic as in the previous case, the regionalisation has been based on the closest available data, which is that from the following period - 2014-2020.

The final period 2014-2020 is the one where the most data is available. Both NUTS II regions have records of all operations which have been supported through ERDF expenditure at the county-level (Northern and Western Regional Assembly, 2023; Southern Regional Assembly, 2023). These records include when each financed project started and ended, as well as specific details regarding the aim and objectives of the project. Using these sources, available in excel format on their respective websites, annual and regional data is created. The regionalisation is eased by the county-level projects, as each NUTS III region can be broken down into individual counties, and for projects spanning several counties or regions the funds have been allocated according to population. For annual data, projects spanning several years have been divided evenly between each year it operated - even though this may not necessarily be accurate for the specific project, it was considered the most fair way of distributing funds on a year-by-year basis.

4. Results

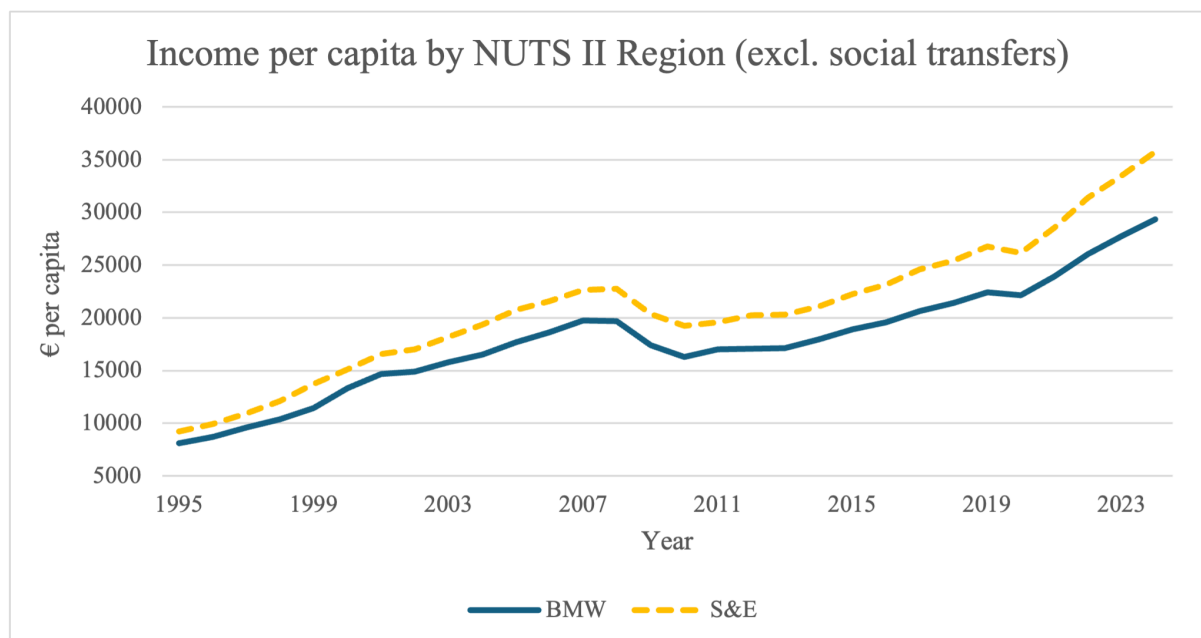
4.1 Descriptive Statistics

The following figures and graphs outline the descriptive statistics of this study, showing the relationship between the different variables and the general trend of regional development in Ireland.

Figures 2 and 3 show the development of regional income per capita 1995-2024, at the NUTS II and NUTS III regional level. Starting from a low base of below €10 000 (except Dublin), it can be observed that all regions have grown substantially in terms of income, with several

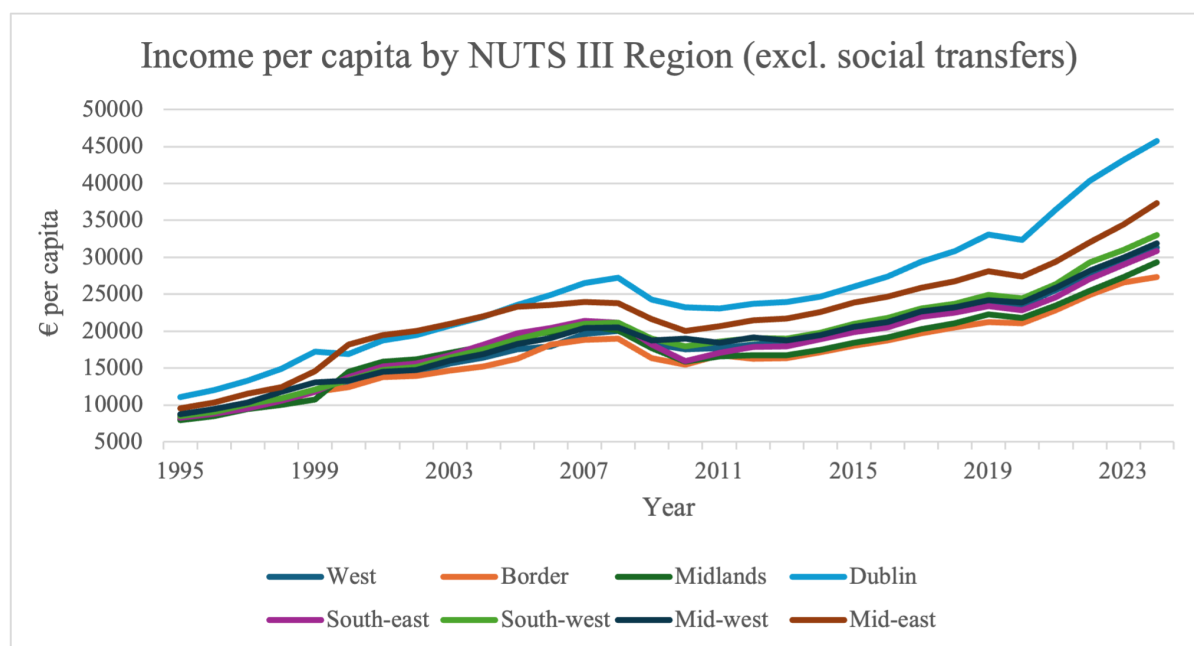
NUTS III regions seemingly developing at similar rates. In Figure 2, it is displayed that income per capita in the two NUTS II regions have diverged - starting from a very similar level, the S&E region has grown at a faster rate than the BMW region, although the patterns of growth are overall very similar. This pattern is further regionalised in Figure 3, as it can be seen that the three leading regions, Dublin, Mid-east and South-west are all in the S&E NUTS II region. Also in Figure 3 the pattern of divergence is clear, as especially Dublin and the Mid-east regions have pulled ahead of the rest. Lastly, it appears based on Figure 3 that even in the rest of the regions, aside from the three leaders, that there has been a level of divergence. Both the Border region and the Midlands are noticeably behind the others since about the year 2011.

Figure 2: Income per capita (€) by NUTS II Region (1995-2024)



Source: CSO Data and the author's calculations.

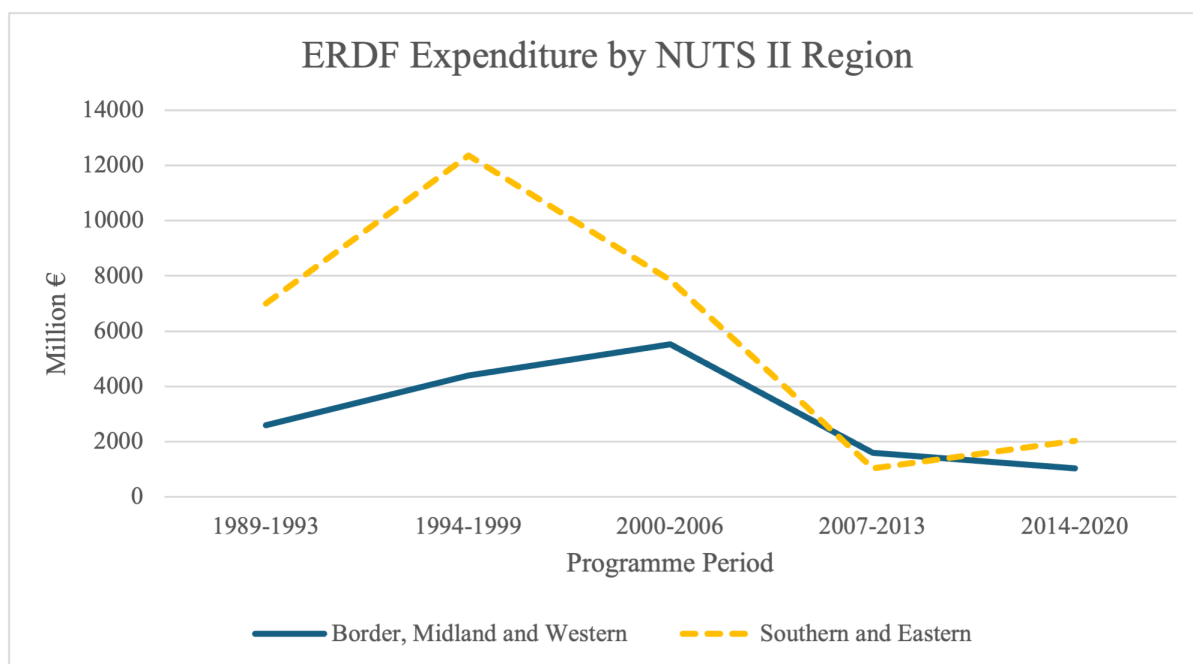
Figure 3: Income per capita (€) by NUTS III Region (1995-2024)



Source: CSO Data and the author's calculations.

Based on Figures 2 and 3, the BMW region should be receiving larger sums of ERDF funding throughout the period, even an increasing share as the differences between the regions grows. Figure 4 shows the overall ERDF expenditure by the NUTS II region, displaying a huge difference in favour of the S&E region. The S&E region starts at a significantly higher level of expenditure, which increases into the second period, before then rapidly decreasing and even falling below the BMW region in the fourth period, with a slight increase for 2014-2020. BMW meanwhile starts from a much lower level, and slightly increases for the next two periods, before also decreasing for both the fourth and fifth programme periods.

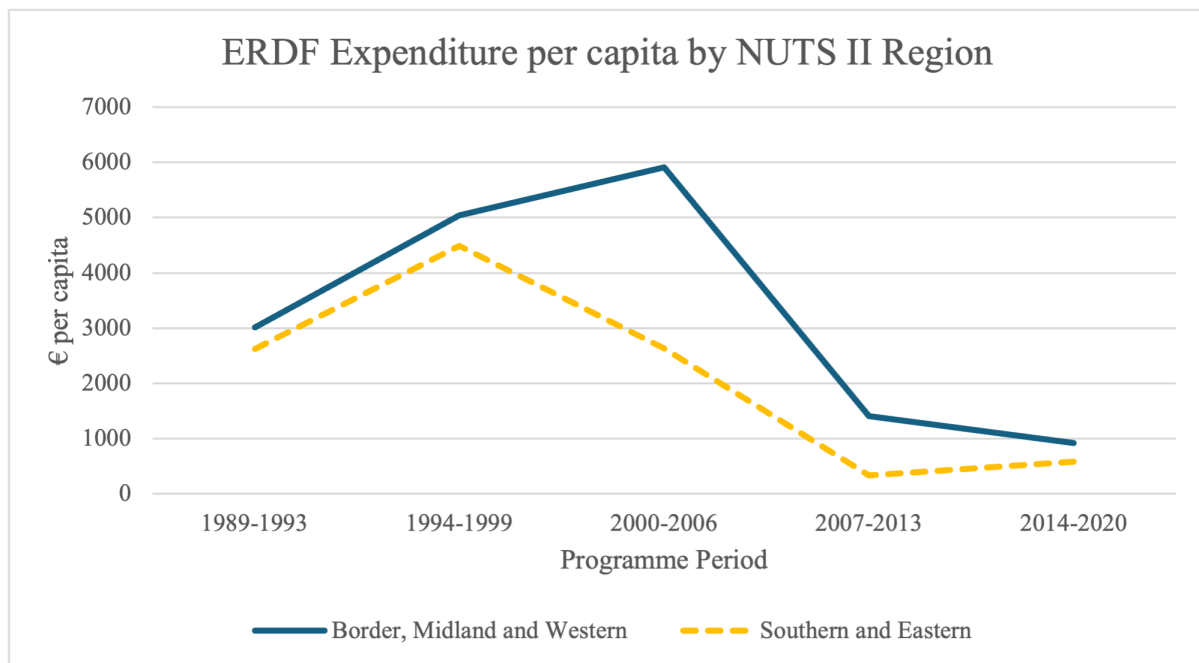
Figure 4: ERDF Expenditure by NUTS II Region, per Programme Period (million €)



Source: Cohesion Open Data Platform and author's calculations.

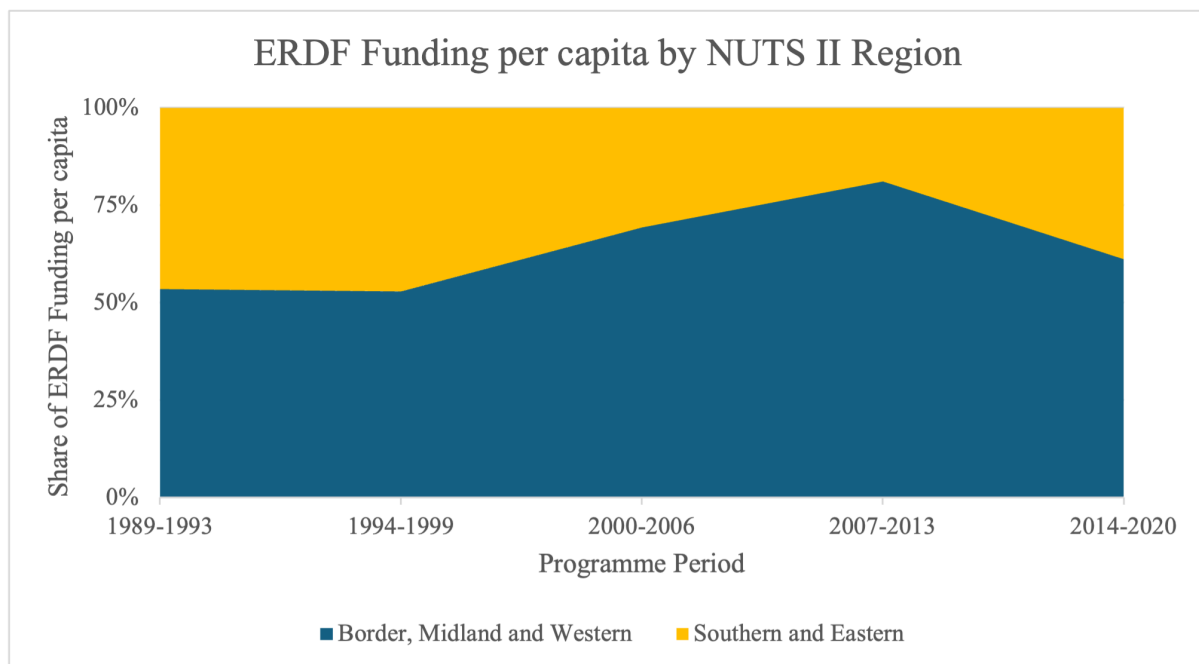
Figure 5 shows the same data as Figure 4 but in per capita terms. Here it becomes clear that the relatively less prosperous region receives higher rates of per capita funding throughout all programme periods, as expected from Figures 2 and 3. However, when looking at both Figure 5 and Figure 2, it raises the question as to why ERDF expenditure per capita converges in the final period (2014-2020) while this period sees ever greater divergences in terms of income. Although funding to both regions dropped significantly for the final two programme periods, Figure 6 shows that 2007-2013 is the period where the BMW region receives its largest share of funding relative to the S&E region. Thus, this could suggest that this region should be characterised by the largest convergence, but this is not the case as seen from Figure 2. However, there does seem to be a relatively constant difference between the regions during these years, albeit increasing slightly towards the end (Figure 2).

Figure 5: ERDF Expenditure per capita by NUTS II Region, per Programme Period (€)



Source: Cohesion Open Data Platform and author's calculations.

Figure 6: Share of ERDF Expenditure per capita by NUTS II Region, per Programme Period



Source: Cohesion Open Data Platform and author's calculations.

Shifting focus to the NUTS III regions, Table 2 shows the ERDF expenditure per capita for each programme period, and this is mapped out in Figure 7. Table 2 displays the stark drop in ERDF expenditure after the third programme period, 2000-2006. Initially, it does seem that regions with lower average incomes receive higher levels of ERDF funding, as the West,

Border, Midlands, all are among the larger recipients. However, it is not always completely clear, as for example in 1994-1999 none of them make the top two and the Midlands region is the lowest recipient out of all regions for the programme period.

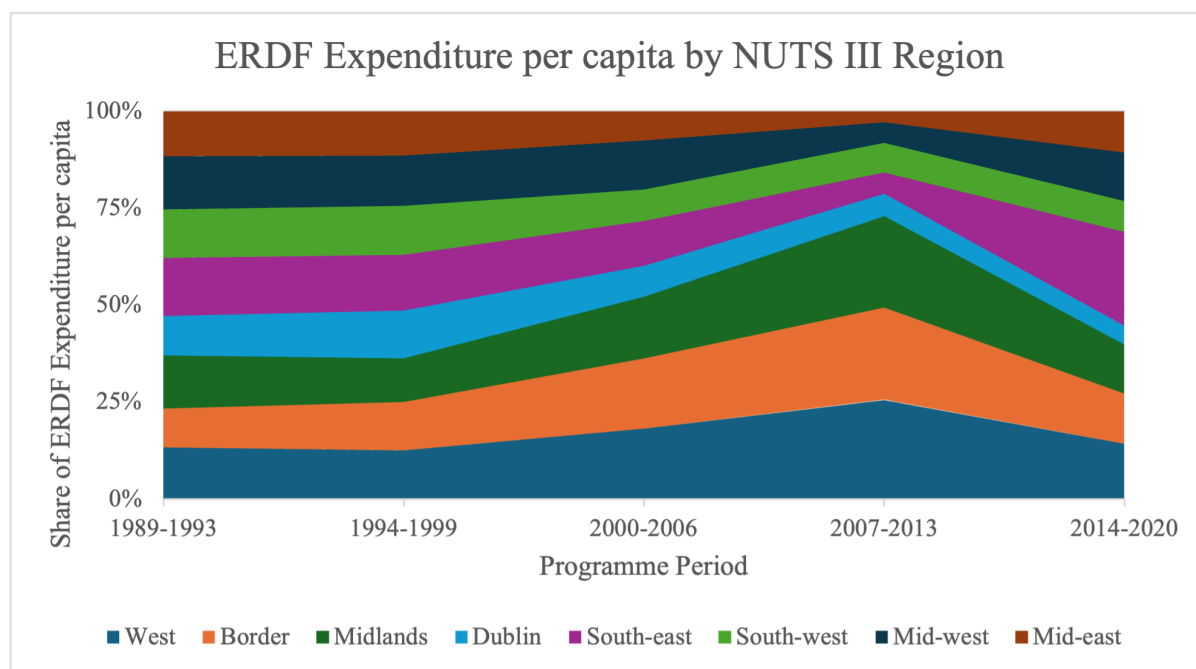
Table 2: ERDF Expenditure per capita by Programme Period and NUTS III Region (€)

	1989-1993	1994-1999	2000-2006	2007-2013	2014-2020
West	3020,37	4626,65	5328,80	1427,11	881,62
Border	2273,30	4632,08	5360,55	1333,13	812,32
Midlands	3130,31	4194,05	4661,66	1309,52	787,82
Dublin	2314,21	4509,24	2357,88	328,41	293,29
South-east	3410,60	5342,18	3411,16	304,53	1509,90
South-west	2828,70	4654,49	2387,99	421,29	497,69
Mid-west	3138,13	4799,11	3727,61	295,74	770,80
Mid-east	2641,37	4259,86	2197,51	161,75	664,89

Source: Cohesion Open Data Platform, CSO Data and author's calculations.

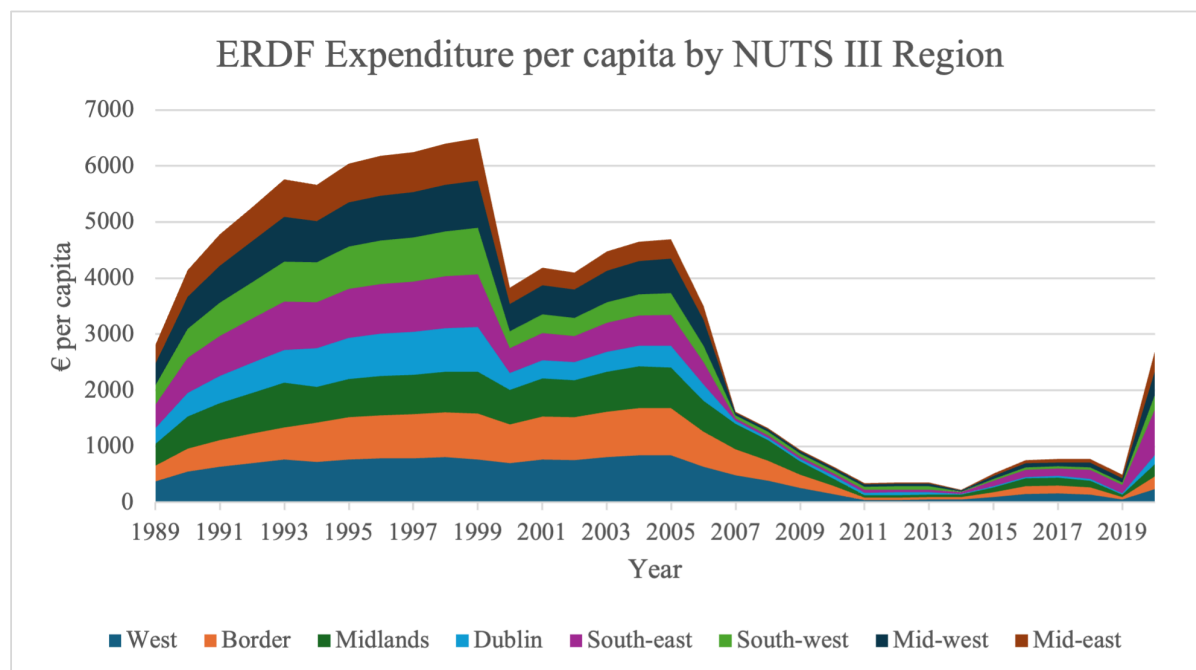
Figure 7 shows the values of Table 2, displaying the changes in the composition of ERDF expenditure throughout the programme periods. Overall, the West, Border and Midland regions experience increasing shares for the first four programme periods. The South-east increases substantially for the final period, while Dublin seemingly decreases in share throughout almost all periods. Compared to Figure 3, the contrasting developments of the Border region and Dublin are to be expected, as they are at the opposite ends of the income spectrum. The BMW regions overall grow in share of expenditure, once again as predicted by the income Figures 2 and 3. Figure 8 shows these developments on an annual basis. There seems to be a general trend of expenditure increasing throughout each programme period, often peaking in the last year of each multi-year period.

Figure 7: Share of ERDF Expenditure per capita by NUTS III Region, per Programme Period



Source: Cohesion Open Data Platform and author's calculations.

Figure 8: ERDF Expenditure per capita by NUTS III Region, annual (€)

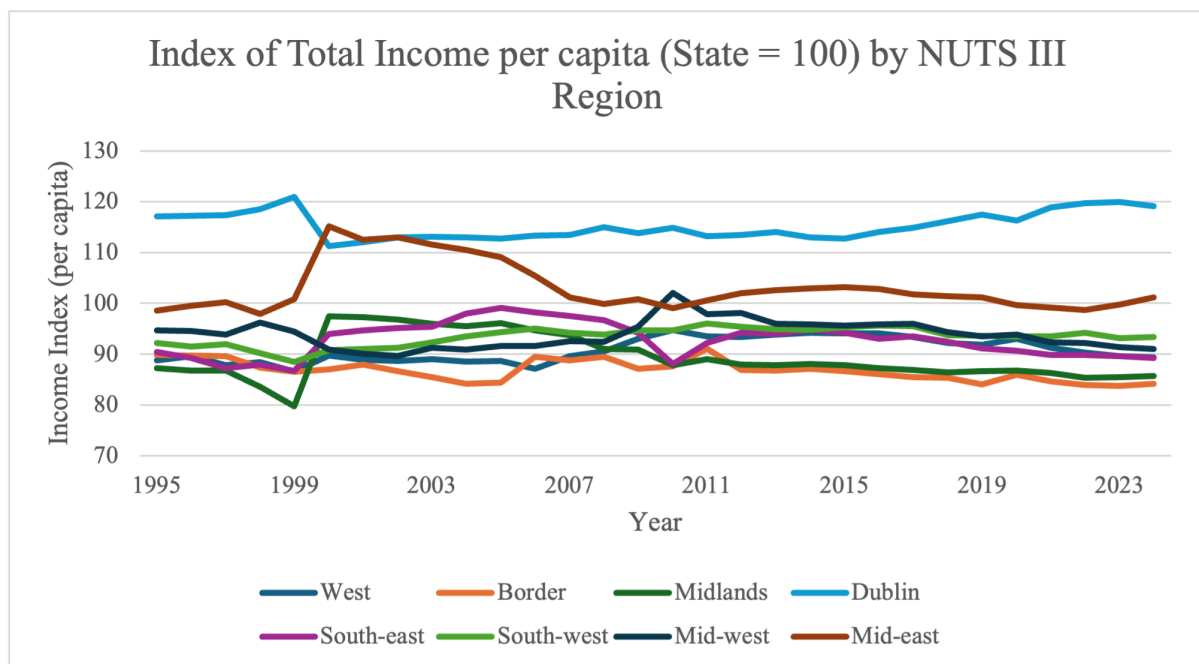


Source: Cohesion Open Data Platform and author's calculations.

Figures 9 and 10 show the income per capita and gross value added per capita of each NUTS III region relative to the Irish and EU average, respectively. Figure 9 displays a trend of divergence, where Dublin is the only region significantly above the state average at a

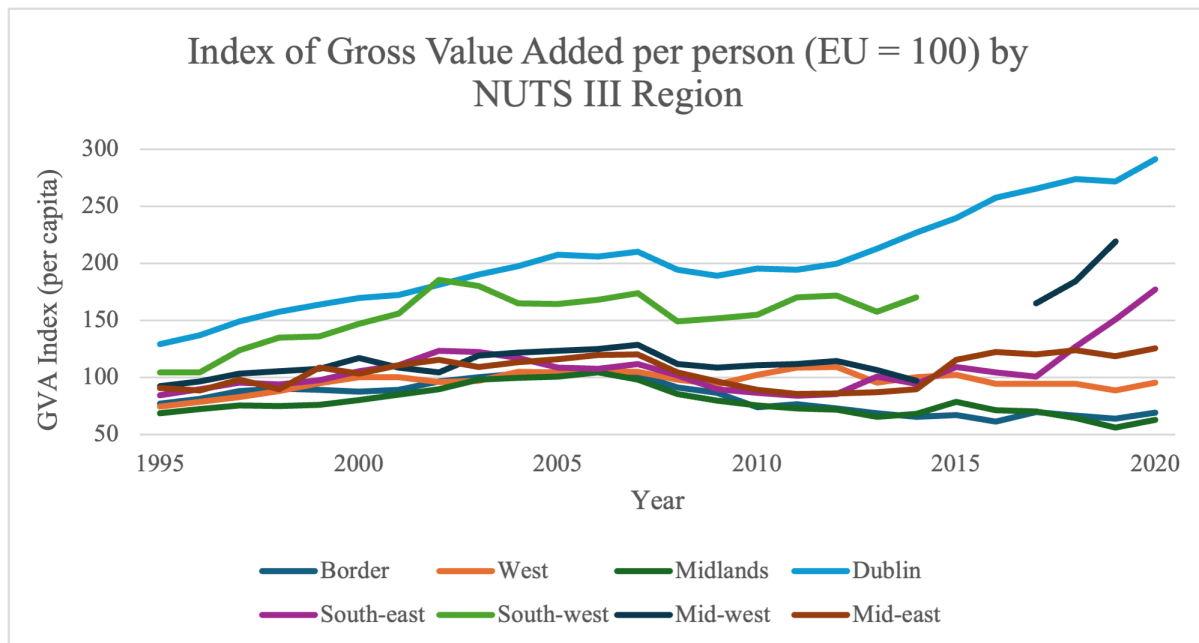
relatively constant value of about 120. While many of the other regions began around a value of 90, many of them seem to have remained or even decreased relative to the state average, most noticeably the Border and Midlands regions. Only the Mid-east and South-west have remained at a constant level, showing the overall trend of divergence. Figure 10 is not complete for all regions due to gaps in the data, but largely reinforces the observations of Figure 9. A group of regions have converged and surpassed the EU average, while the Border and Midlands regions converged up until the mid-2000s, before falling back down to less than 75% of the EU average. An important nuance is that while Figure 9 shows income per capita, arguably the more accurate measure of prosperity in Ireland, Figure 10 is created on values of gross value added. The difference is important as a large part of the Irish economy in GVA measurements is made up of MNCs, which distort the values and do not always accurately represent the wealth and prosperity of people living and working in Ireland (de Bromhead & Kenny, 2025).

Figure 9: Indexed Income per capita by NUTS III Region, annual (State = 100)



Source: CSO Data and author's calculations.

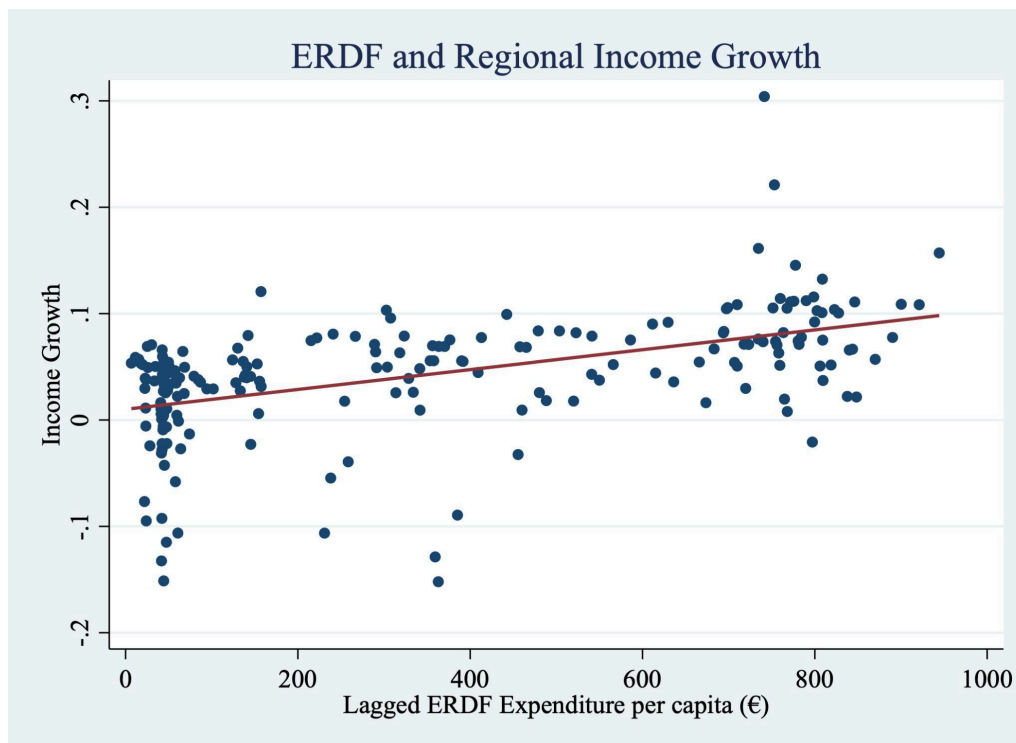
Figure 10: Indexed Gross value added by NUTS III Region, annual (EU = 100)



Source: CSO Data and author's calculations.

Figures 11-13 show a series of scatter plots of different variables, providing an indication of the relationship between them. Figure 11 shows Lagged (one-year) ERDF Expenditure per capita on the x-axis and Income Growth on the y-axis, with each observation (blue dot) displaying the growth in income and lagged ERDF expenditure for every given region and year. The Figure shows a somewhat positive correlation between the two variables, as indicated by the positive slope of the red trendline. This suggests regions receiving more ERDF funding experienced higher levels of income growth in the following year. It is important to note that while each scatter plot shows some sort of relationship between two variables, it does not show whether there is causation. For Figure 11, the correlation between ERDF expenditure and growth does not also indicate that ERDF expenditure increases growth, but merely that this is a possibility.

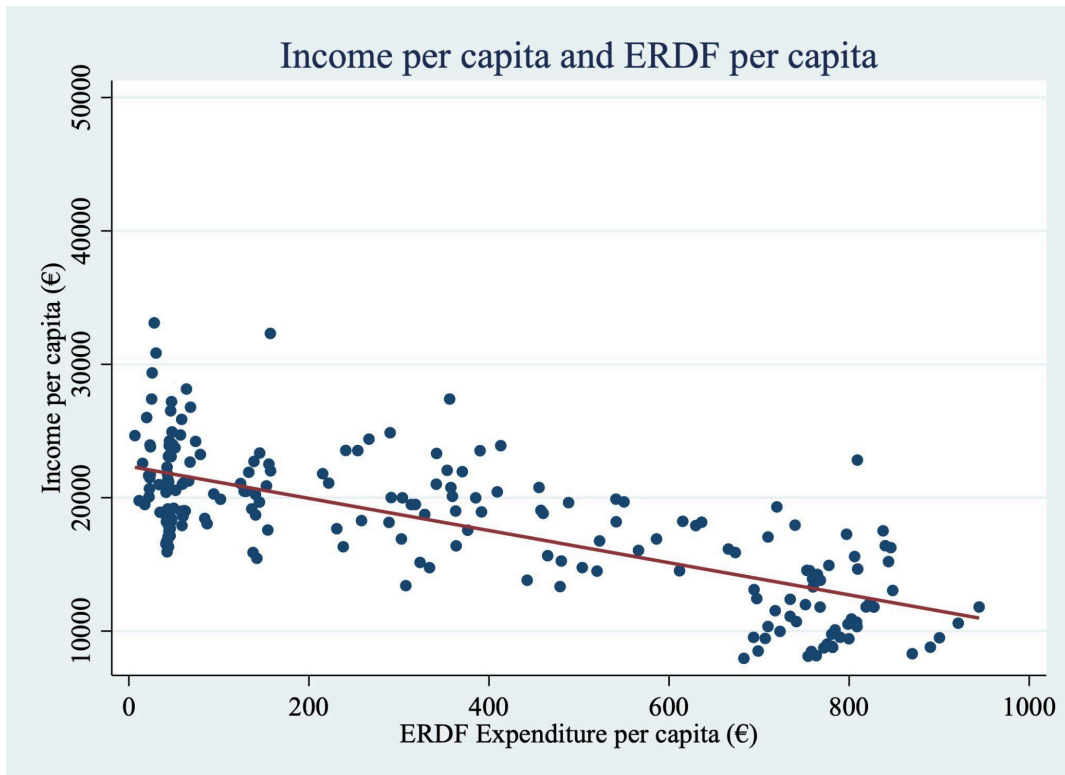
Figure 11: Relationship Between ERDF Expenditure per capita and Regional Income Growth, 1995-2020



Source: Cohesion Open Data Platform, CSO Data and author's calculations.

Figure 12 looks at the relationship between income per capita and ERDF Expenditure per capita. The scatter plot's trendline shows a clear negative correlation between the variables. This means regions with lower levels of income tend to receive higher levels of ERDF funding. Based on how the fund operates and its aim, this is to be expected, and this is also shown in Table 2 where the regions known to be less prosperous often had higher levels of ERDF expenditure. Regarding the separate conclusions from Figure 11 and Figure 12, the findings could indicate that relatively poorer regions in terms of income receive higher levels of ERDF expenditure (Figure 12), and that there is a positive correlation between level of expenditure and income growth (Figure 11). Thus, poorer regions as the main beneficiaries of funding should plausibly experience higher levels of growth, albeit if this is due to the ERDF expenditure or is not possible to conclude based on these Figures.

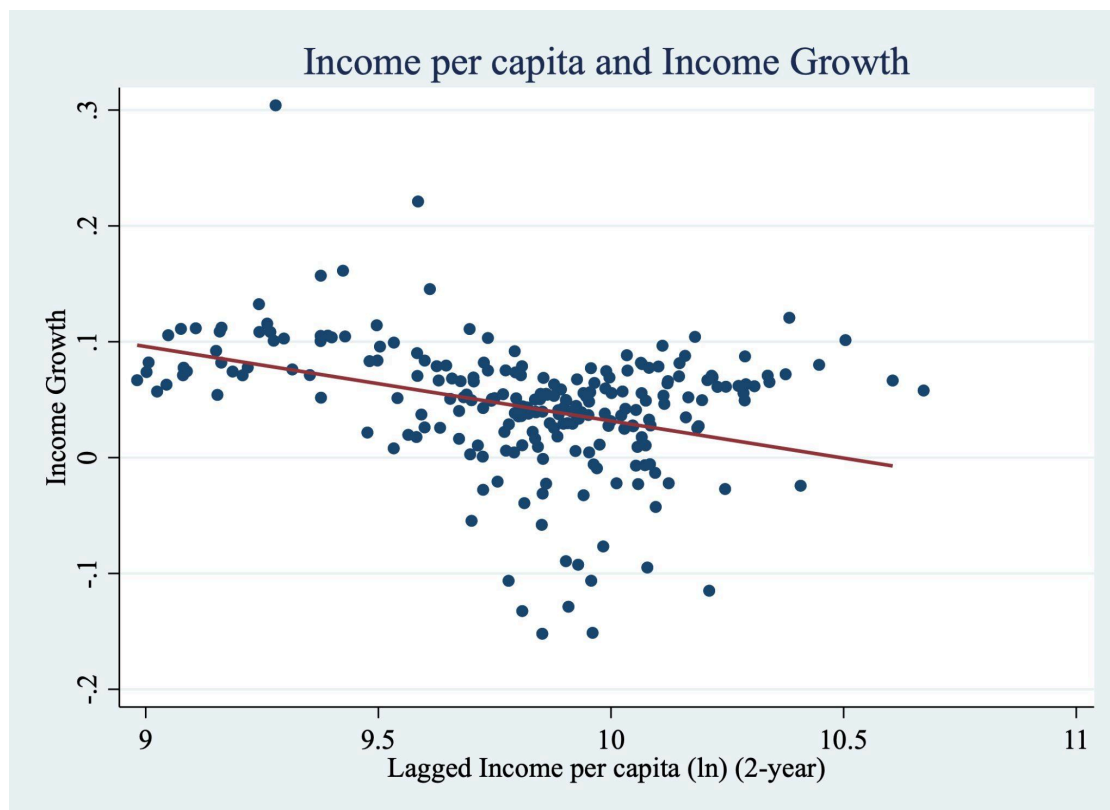
Figure 12: Relationship Between ERDF Expenditure per capita and Income per capita, 1995-2020



Source: Cohesion Open Data Platform, CSO Data and author's calculations.

The suggestion made above that poorer regions should experience higher levels of growth based on the conclusions of Figure 11 and Figure 12 is tested in Figure 13. Figure 13 shows the relationship between Income Growth (y-axis) and logarithm of average Lagged (one-year) Income per capita (x-axis). As in Figure 12, the plot indicates a negative correlation between the variables. What Figure 13 thus indicates is that a higher income per capita in a region in the previous year is negatively associated with income growth. This implies that regions with lower incomes tend to experience higher levels of growth. If this holds true, it indicates regional convergence and catch-up in the form of β -convergence among Irish regions.

Figure 13: Relationship Between Income per capita and Regional Income Growth, 1995-2020



Source: CSO Data and author's calculations.

To summarise the results of the tables and figures presented above, it seems relatively poorer Irish regions have experienced higher growth rates, exhibiting β -convergence. Furthermore, regions with lower incomes also receive higher levels of ERDF expenditure (Figure 12 & Table 2). Lastly, Figure 11 shows a positive correlation between ERDF recipients and income growth, yet the nature of this relationship is unclear. This will be further discussed after the Regression Results displayed in the next sub-section.

4.2 Regression Results

The results of the panel data regressions are shown below, in three different tables. Each table shows three different models run, with coefficients, standard errors in parentheses, number of observations, and r-squared values. Asterisks show the significance of each coefficient, as displayed below each table. The coefficients indicate how much the dependent variable changes with a one-unit change in the independent variable, holding all else constant. The associated standard error, displayed below each coefficient in parentheses, indicates the degree of accuracy of the coefficient, and the r-squared value shows how much variance in the dependent variable is explained by the variables and controls in each regression. Each table shows the same regression run but with different lags to the ERDF expenditure per capita variable, capturing short-term (one year), medium-term (three years) and long-term (five years) effects. All models displayed below have been run with year fixed effects and regional fixed effects, thus controlling for permanent differences between regions (e.g. Dublin being structurally richer than others) and shocks affecting all regions in the same year (e.g. global financial crisis 2008). Finally, all regressions are also run with a control for share of industry in GVA at basic prices.

Table 3 tests if ERDF per capita has an impact on incomes, in the short-, medium-, and long-term. The coefficients for each lag are negative, but all are miniscule and have comparatively high standard errors. This indicates little relationship between the variables. Despite this, the r-squared value is significant, suggesting the models run represent on average 98,6% of variance in the outcome variable. But as the main independent variable ERDF per capita seemingly has so little impact on incomes, the reason for this high explanatory power likely lies in the year and regional fixed effects. The industry share variable shows a statistically significant coefficient of 0.138 at the 10% level in the first model, suggesting regions with higher industry shares tend to have higher average incomes. While the other two models also have positive coefficients for this variable, they decrease in size as the associated standard errors increase, and they show no statistical significance.

Table 3: Regression Output - Effect of ERDF Expenditure per capita on Income Levels

Variable	Model 1	Model 2	Model 3
	Income (ln)	Income (ln)	Income (ln)
Lagged ERDF per capita	-0.0000334 (0.0000678)		
Lagged ERDF per capita (3-year)		-0.0000508 (0.0000315)	
Lagged ERDF per capita (5-year)			-0.0000533 (0.0000333)
Share of industry (GVA)	0.146* (0.0711)	0.116 (0.101)	0.101 (0.116)
Constant	9.042*** (0.0480)	9.064*** (0.0377)	9.064*** (0.0412)
Year FE	Yes	Yes	Yes
Region FE	Yes	Yes	Yes
<i>N</i>	216	232	240
<i>R</i> ²	0.985	0.987	0.988

Standard errors in parentheses

* $p < 0.10$, ** $p < 0.05$, *** $p < 0.01$

While Table 3 tests whether ERDF affects income levels, in Table 4 the outcome variable is instead growth. As ERDF should be targeted towards poorer regions in the idea of contributing to their growth and convergence to the mean, this is a critical point of interest. However, the results are largely similar to Table 3 - very small, often negative and statistically insignificant coefficients, with large standard errors. Once again, this indicates little relationship between ERDF and the outcome variable, which in this case is income growth. Contrary to Table 3, all coefficients of industry share are statistically insignificant in Table 4, yet the coefficients remain positive. The r-squared values are large here too, but significantly smaller than in the previous models in Table 3.

Table 4: Regression Output - Effect of ERDF Expenditure per capita on Income Growth

Variable	Model 1	Model 2	Model 3
	Income Growth	Income Growth	Income Growth
Lagged ERDF per capita	-0.0000110 (0.0000255)		
Lagged ERDF per capita (3-year)		-0.000000181 (0.0000231)	
Lagged ERDF per capita (5-year)			0.00000434 (0.0000247)
Share of industry (GVA)	0.00697 (0.0271)	0.00303 (0.0236)	0.00390 (0.0208)
Constant	0.0770** (0.0271)	0.0704** (0.0210)	0.0673*** (0.0192)
Year FE	Yes	Yes	Yes
Region FE	Yes	Yes	Yes
<i>N</i>	208	224	232
<i>R</i> ²	0.785	0.791	0.790

Standard errors in parentheses

* $p < 0.10$, ** $p < 0.05$, *** $p < 0.01$

Lastly, Table 5 runs a series of convergence models similar to the scatter plot in Figure 13. With income growth again as the outcome variable, lagged income level and lagged ERDF expenditure per capita are the explanatory variables. A fourth model is introduced as a robustness check to reduce the mechanical relationship between income growth and lagged income, where the income variable is lagged by two years instead of one. In all models run, the income variable shows statistically significant coefficients at the 1% level. The coefficients range from -0.273 in the first model to -0.219 in the fourth. The values indicate that there is a negative correlation between income level and growth, i.e. regions with lower income levels experience higher levels of growth. These findings are when including industry share as a control variable, which in this table has consistently statistically insignificant coefficients. This indicates an overall β -convergence in Irish regions during the period. Meanwhile, the ERDF expenditure per capita values are as in the other regressions, very

small, negative and associated with large standard errors. In model 1 there is however significance at the 10% level in the lagged ERDF variable, although the coefficient is still negative and very small in size. The consistent negative coefficients, here with significance, may reflect the endogeneity issue of poorer regions being targeted for ERDF expenditure. Overall, the table suggests that while poorer regions seem to be experiencing higher levels of growth, level of ERDF expenditure per capita or industry share does not seem to be a contributory variable in this relationship.

Table 5: Regression Output - Effect of ERDF Expenditure per capita and Income on Income Growth

Variable	Model 1	Model 2	Model 3	Model 4
	Income Growth	Income Growth	Income Growth	Income Growth
Lagged income (ln)	-0.275*** (0.0250)	-0.248*** (0.0332)	-0.240*** (0.0356)	
Lagged income (ln) (2-year)				-0.219*** (0.0351)
Lagged ERDF per capita	-0.0000166* (0.00000742)			-0.0000150 (0.00000999)
Lagged ERDF per capita (3-year)		-0.0000118 (0.0000142)		
Lagged ERDF per capita (5-year)			-0.00000835 (0.0000240)	
Share of industry (GVA)	0.0479 (0.0364)	0.0333 (0.0424)	0.0289 (0.0426)	0.0304 (0.0343)
Constant	2.558*** (0.227)	2.322*** (0.298)	2.241*** (0.321)	2.085*** (0.302)
Year FE	Yes	Yes	Yes	Yes
Region FE	Yes	Yes	Yes	Yes
Observations	208	224	232	200
R^2	0.814	0.816	0.814	0.802

Standard errors in parentheses

* $p < 0.10$, ** $p < 0.05$, *** $p < 0.01$

To summarise the regression results, the models run indicate that ERDF expenditure per capita has little or no impact on income levels and income growth, despite evidence of overall β -convergence in Table 5. This does not necessarily mean that ERDF expenditure is unimportant or negative, as there may be indirect effects at play or long-term structural effects which the models struggle to show. Further, the limited dataset of only eight regions and very low levels of ERDF expenditure overall in the last two periods included in the sample means that this is not a definite conclusion of ERDF expenditures impact on Irish regions. Despite this, by combining the regression results to the findings presented in the Descriptive Statistics sub-section, there are still important takeaways and implications, which will be further discussed in the next section.

5. Discussion

5.1 Summary and Interpretation of Results

The results above present a mixed picture of the relationship between ERDF expenditure per capita and income growth and convergence. While Figure 11 displayed a positive correlation between income growth and ERDF expenditure per capita, the panel data regressions find little significance between the variables. Both the scatter plots and regressions indicate a negative relationship between lagged income per capita and income growth, suggesting that on average relatively poorer regions in income terms grew faster than richer regions. The results lead to answers to the two research questions:

Is there a statistically significant relationship between ERDF expenditure and regional average incomes in Ireland in the years 1995-2024?

The panel data regressions found no statistically significant relationship between ERDF expenditure and regional average incomes in Ireland during this period. However, there was a clear positive relationship between ERDF expenditure and income growth. The results are thus inconclusive, as different parts of the analysis indicate different results. Despite this, it can still be concluded that this study has not found a statistically significant relationship between ERDF expenditure and regional average incomes in Ireland in these years.

Has the ERDF contributed to convergence among Irish regions over the period 1995-2024?

The research and results suggest convergence among Irish regions over the time period in the form of β -convergence, where poorer regions grow at a faster rate than richer regions. However, the extent to which ERDF has contributed to this convergence is unclear. The Figures 11-13 show that poorer regions receive higher levels of ERDF and grow faster than richer regions while the regressions do not find a significant relationship.

The descriptive statistics displayed previously indicated that while less developed regions did receive higher levels of ERDF expenditure per capita (Table 2; Figure 12), this did not translate into convergence, most notably shown in Figures 2 and 3. This is contradictory to the purpose and idea of ERDF funding, which believes that additional financial support should contribute to convergence. Further, this indication in the descriptive statistics seems contradictory to the results in the panel data regressions. The final regression table (Table 5) suggests a negative and statistically significant relationship between income and growth, thus suggesting β -convergence. Importantly, Figure 13 reinforces the findings of Table 5, as it also shows a negative relationship between the variables. Yet the Figures 2 and 3 seem to suggest otherwise, with greater disparities between both NUTS II and NUTS III regions.

The explanation for this seeming contradiction lies in the definition of convergence and the distinguishable difference between β -convergence and σ -convergence. Figures 2 and 3 show the gap between the richest and poorest regions growing over time, in absolute income terms. This means the absolute euro gap between the average income in Dublin and average income in the Border region has grown. However, this does not necessarily suggest growth rates have been higher in Dublin, as incomes started out at a higher initial level. Thus, it is possible for the Border region to have a higher income per capita growth (β -convergence), while simultaneously falling further behind in absolute terms (σ -divergence). σ -convergence can be defined as the reduction in inequality between regions over time (Sala-i-Martin, 1996), and de Bromhead and Kenny (2025) note how inequality has risen in the late 20th and early 21st century among Irish regions. In this sense Irish regions to a large extent mirror the development of other European countries (de Bromhead & Kenny, 2025).

5.2 Theoretical Interpretation and Alignment

The inverse relationship between income and growth indicates evidence of β -convergence, as seen in Figure 13 and Table 5. This aligns well with the neoclassical growth theory, which suggests that marginal returns will diminish as an economy develops, resulting in decreased growth rates (Barro & Sala-i-Martin, 1992; Sala-i-Martin, 1996). Thus, the richer regions' growth rates will taper off, and due to the higher returns to capital in relatively poorer regions, they can achieve higher growth rates and thus β -convergence (Barro & Sala-i-Martin, 1992). As capital is assumed to be more productive in the poorer regions, an implication of this is that additional expenditure should increase growth levels. This assumption is neither confirmed nor denied in this study, due to the ambiguity of the results.

It is worth noting that while β -convergence is necessary, it is not sufficient for σ -convergence in and of itself, hence the observed increase in inequality. The Figures 11-13 suggest ERDF may be a contributor to the observed β -convergence, but the statistical regressions insinuate that ERDF expenditure in poorer regions is not the reason for this observation. However, it is important to not completely dismiss the ERDF as a positive force for convergence based on the lack of significance in the regression results, due to the limited statistical nature of the models run.

Assuming ERDF expenditure has a relatively small or insignificant impact on the β -convergence process as indicated in the regressions, there are several possible reasons for this. One possible argument could be that as even the richer regions receive ERDF funding, at times even more than the poorer ones (Table 2), the positive effect in struggling regions is cancelled out by similar effects in more prosperous areas. However, Figure 11 does show a negative relationship between income and ERDF expenditure. Thus it implies that while the distribution in certain years or periods may be skewed in favour of richer regions, the general trend is that regions with lower average incomes receive more ERDF funding. Furthermore, even despite the insignificance of the regression results, this does not conclude that economic transfers overall are necessarily inefficient. It is possible that other regional transfers, from Irish authorities or separate substantial EU funds are more efficient in generating income growth and show statistical significance.

From an endogenous growth and NEG perspective, it is no surprise that the three leading regions are Dublin, the Mid-east (the region closest to Dublin) and the South-west are the three regions with highest incomes and that they continue to diverge from the rest in absolute terms. These regions are the core economic regions in the country, where agglomeration effects, industrial clustering and positive spillovers are likely to occur. Figure 3 reinforces the arguments of NEG as there is a clear core-periphery pattern emerging, with the risk of peripheral economic deterioration. This could explain why the Border, Midlands and South-east regions seem further away from the national average than ever before (Figure 9), as firms relocate to benefit from the spillovers in the industrial clusters. Despite this, there are significant signs of β -convergence, as discussed previously.

It is possible that the endogenous factors of human capital and knowledge contribute to the strong incomes in the top three regions, as suggested by Romer (1986) and Lucas (1988). They argue in favour of the endogenous growth theory which explains the persisting and increasing differences between regions by proposing that capital can have constant or increasing returns to scale, thus heavily favouring already-rich economies. However, the fact that there is statistically significant evidence of β -convergence still argues that poorer regions have successfully achieved higher growth rates than the richer ones, even if this does not translate to absolute σ -convergence. On the other hand, it could also be argued that part of the reason for the lack of σ -convergence and increase in regional inequality is due to the fact of higher returns to capital than expected by the neoclassical growth theory.

5.3 The Irish Context

The analysis presents a mixed picture of whether ERDF is associated with or a contributor to income growth in the regions and years investigated. Part of the difficulty in determining this relationship could lie in the Irish development context of the late 20th and early 21st century. As discussed previously, the role of FDI in Irish economic growth is undeniable, especially around the establishment of the EU Single Market. Despite this, Barry (2003) claims about 0.5 percentage points of growth annually can be attributed to the EU Structural Funds, during the period which saw a growth rate of about 6% per year.

But the growth rate of 6% may be misleading (Honohan, 2021), despite Barry's (2003) estimations of the Structural Funds contributions. As Ireland became a hub for U.S. exports

into the EU, a large share of Ireland's rising GDP did not make its way into the hands of Irish workers and consumers - Barry (2003) estimates repatriation outflows resulted in Irish GDP levels about 25% higher than the gross national product (GNP). Scholars thus make a point of using alternative measures such as income when studying Irish development (de Bromhead & Kenny, 2025), with Honohan (2021) advocating in favour of Actual Individual Consumption (AIC). As noted earlier, Honohan (2021) suggests Ireland is merely 12th in the EU in this measure, compared to the first or second place it usually occupies in economic statistics.

Yet even with this caveat, FDI has had a substantial impact in creating regional employment and thus also on Irish incomes and regional development. Foreign firms have tended to cluster near Dublin (especially tech-firms) and the South-west region (pharmaceuticals) due to the benefits of agglomeration and knowledge spillovers - these are by no coincidence the areas with significantly higher average incomes than the rest of the country (Barry, 2003; de Bromhead & Kenny, 2025). The large urban areas of Dublin and Cork successfully provided incoming MNCs with the necessary infrastructure and workforce, thus concentrating the inflow of FDI to these regions and exacerbating the rising regional inequality (Bradley, 2004). Moreover, the global financial crisis had a disproportionate impact on rural towns, which likely contributed to the observed divergence between the NUTS III regions (Williams & Varghese, 2019).

A further aspect which may explain the lack of statistical significance of the ERDF expenditure in the regression models despite correlation in Figure 11 relates to the unfortunate timing of ERDF expenditure and lack of data available for this study. ERDF expenditure was generally at its largest during the first decade of the multi-year periods (1989-1999), albeit still being substantial in the following period (Figure 8). As annual data on incomes were not found for the years pre-1995, this is when the statistical analysis in this study began. Inclusion of the period 1989-1994 may have changed the statistical outcome as this was a period of significant ERDF expenditure. Kenny and Stuart's (2026) research suggests the macroeconomic shocks in the 1990s, may also overshadow the impact of ERDF, thus also contributing to less statistical significance. However, as this period of macroeconomic shocks was largely excluded due to the reasons just stated, this may be only a small part of the answer.

Aside from the impact of FDI which may diminish the importance of ERDF expenditure in Irish regional development, it is possible that the indirect effects of ERDF are still significant. Barry (2003) suggests EU aid relieved the fiscal pressure on the Irish government, enabling continued large-scale investments while improving the fiscal deficit, while Williams and Varghese (2019) and Fitz Gerald (1998) argue the Structural Funds contributed to improved public administration. Bradley (2004) even proposes that EU funding was used strategically to enable further inflow of FDI through investments in education, training and necessary infrastructure. In this sense, it could be argued that EU funds to a certain extent enabled the huge inflows of FDI, and ensured Ireland maximised the potential growth they brought. On the other hand however, the EU Structural Funds and especially the ERDF are not supposed to facilitate further growth in already prospering areas, but rather support struggling regions and foster convergence. Bradley's (2004) note thereby implies a "misuse" of Structural Funds, in that they may not have been allocated in the optimal way for encouraging regional cohesion.

As the allocation of ERDF funds is only managed by the EU at the NUTS II level, further regionalisation of funds is and has been the responsibility of Irish national and regional authorities (CPMR, 2015). While it can be concluded from Table 2 that substantial expenditure, perhaps even a majority, has been directed towards the less developed NUTS III regions, it is also true that almost equal amounts have at times been allocated to developed regions - especially in absolute terms, as the least prosperous regions tend to have smaller populations. This is not necessarily wrong from an Irish viewpoint, as the funds are theirs to distribute according to Irish objectives. However, it is possible that if the ERDF funds were solely used to increase cohesion and convergence among Irish regions, allocations may have been different. The assumption that Irish authorities use ERDF funds in a relatively fair way in terms of focusing allocation in regions which are struggling in economic terms is critical for the purpose of this study. Whether the allocations have been optimal in this sense is difficult to establish, but based on Table 2 and other Figures, it does seem that less prosperous regions have been the main recipients of the ERDF funding.

5.4 Methodological Limitations & Future Research

There are several noteworthy methodological limitations to this study, which may have impacted the results displayed and discussed above.

As described previously, the NUTS III ERDF fund allocations are based on data of NUTS II allocations per programme period and the author's estimations. The estimations made are thereby two-fold, first estimating the share of funds allocated to each region per programme period, and second how these funds are distributed across each programme period. The estimations are defensible as they were as accurate as possible based on the available information, but are not exact values of the funding allocated to a specific region each year. With the actual allocations, the results of this study would be more conclusive, while it instead is merely educated guesses that have led to the results presented. Future research should aim to achieve greater degrees of accuracy in regionalisation by developing a greater understanding for how ERDF expenditure has been allocated regionally in the past, as this would create the prerequisites for a more exact estimation of the impact of ERDF.

The small sample size of eight NUTS III regions used is one of the main limitations of this study, which also causes further limitations. It significantly limits the statistical power of the model, and makes it difficult to distinguish ERDF funding's potential growth contributions from other macroeconomic shocks and activities, such as FDI inflows. In contrast, Becker et al. (2012) - who find a positive effect of EU transfers on growth - utilise a dataset covering several countries and hundreds of regions. Further regionalisation to the Irish county level was considered, and was possible for some of the later data. This would have increased the number of regions from eight to 26, thus increasing the number of observations substantially and perhaps allowing for a more complicated statistical analysis. However, due to the relative uncertainty already present in the first regionalisation from NUTS II to NUTS III, the county-level data would not be obtained with a sufficient level of accuracy or certainty. If possible to trace ERDF allocations to a sub-NUTS III level in a statistically reliable way, future research could greatly expand upon this analysis by providing more nuances and statistical accuracy to Irish regional development in relation to the ERDF expenditure.

One of the consequences of the small sample size is that the statistical analysis is limited. Inclusion of variables deemed conditional for the funds effectiveness, such as educational level and population density (Bradley, 2004), would have endangered the statistical accuracy of the model. However, as these factors have been excluded, the models are unable to investigate why some regions may be better equipped to make efficient use of funds than others. Thus, future research should seek to include factors such as those mentioned above,

sectoral composition and unemployment levels to better isolate the impact of the funds (Hagen & Mohl, 2009).

A further limitation is the issue of reverse causality. ERDF disproportionately funds regions with lower economic performance and struggling growth. If the regions struggling do not improve as a result of the funding and higher-performing regions receiving less support are growing, it may seemingly indicate that ERDF is negatively associated with growth. This endogeneity is likely misleading, and is rather a consequence of how funds are allocated rather than indicating a causal effect of ERDF expenditure. The analysis attempts to mitigate these challenges by using different lagged values of ERDF, fixed regional effects and fixed year effects, while acknowledging that this does not absolve the study of this issue. Endogeneity may be a possible explanation for why the ERDF coefficients displayed in the regression results were negative, although the extremely small values of the coefficients and the lack of statistical significance could indicate that this was not the main driver of the negative coefficients. Reverse causality is one of the reasons for why scholars such as Pellegrini et al. (2013) and Heinemann et al. (2024) use a regression discontinuity design instead, which enables comparison between very similar regions but with different levels of funding. Due to the limited sample size, such methods were not possible for this study.

5.5 Policy Implications

The results of this analysis are an important contribution to previous research within the field.

Previous studies on Irish development in relation to the EU funds have tended to focus on the national level, such as Barry (2003), Bradley (2002; 2004) and Fitz Gerald (1998). Part of the reason for this lies in the lack of data at the sub-national level (de Bromhead & Kenny, 2025). One of the studies on the regional developments in Ireland in relation to the EU funds in the past 10 years is that by Williams and Varghese (2019). They investigate Irish regional development in relation to spatial planning and EU CP, finding that rural towns were hit the hardest by the global financial crisis and the post-recession years that followed until 2016. However, even there, evaluating the EU CP is not the main focus of the study, and does not cover the same time period as this current study. Some pan-European studies have included certain Irish NUTS III regions in wider analysis of EU funds on regional development (Dall'erba & Le Gallo, 2008), but not with Ireland as the sole focus.

Thus, to the best of the author's knowledge, this study is the first of its kind in its statistical analysis of EU funding and the ERDF and its economic impact on Irish regions. Insofar as this statement is true, this study provides a first general understanding of how the billions of ERDF expenditure over the past 30 years has impacted Irish regional development. The analysis can therefore be a guideline for future large-scale funding projects, while also providing a basis for further analysis of the regional impact of ERDF funding. Further, the analysis provides important insights for countries at an earlier stage of economic development, in understanding the role and impact of EU funding or other regional transfers on growth.

At least as important of a contribution, if not more important than the statistical results, is the creation of a complete set of data with NUTS III allocations of ERDF 1989-2020. This seems to not have been available previously, and this opens the door to future studies in this area. While the methods for creating this data were extensively complicated, there are certainly points of improvement. However, until then, this study acts as a start for even more accurate estimations and more advanced analysis and research on the impact of ERDF expenditure at the NUTS III level in Ireland.

The analysis also contributes and strengthens previous research on regional development and transfers. Becker et al. (2012) suggest diminishing returns to EU funding beyond a certain threshold of transfers. This could arguably be reinforced by this data, as Ireland may have reached a point where funding yields limited marginal benefits. Such conclusions lead to the implication that a reduction in funding may not necessarily hamper growth in the future, and could be more efficient in other areas. Further, a significant share of ERDF expenditure focuses on large-scale infrastructure projects (Heinemann et al., 2024). Such emphasis on infrastructure may be misplaced and perhaps does not generate the long-term sustainable growth previously expected. The ongoing shift away from physical infrastructure towards human capital and entrepreneurship is advocated by Idczak et al. (2024), and a greater understanding of and alignment to the socioeconomic structure and needs of struggling regions could enhance the impact of ERDF in the future, both in the short- and long-term.

NEG theory highlights the trade-off between national efficiency and growth and regional cohesion (Bradley, 2004). Agglomeration effects are likely to drive economic growth in the

Dublin, Mid-east and South-west regions, but also risk further deterioration of peripheral economies as MNCs and high-skilled labour continue to concentrate in the core. Thus, policymakers in Ireland must face up to this decision and choose either to prioritise cohesion by supporting peripheral regions or to prioritise overall growth by facilitating urban core centres.

6. Conclusion

This study aimed to evaluate the impact of ERDF expenditure on Irish NUTS III regions in the period 1995-2024. Due to the lack of data on ERDF expenditure at this regional level and time period, a large part of the study thus also focused on creating a completely new dataset. The research questions posed concerned both if ERDF expenditure contributed or was associated with higher levels of growth as well as potential convergence.

The empirical findings of the study are largely mixed, but there is not enough evidence to reliably suggest that ERDF expenditure contributed to growth nor convergence in the period. On the other hand, there is also not enough evidence to conclude the opposite, as ERDF expenditure did show a positive correlation to higher levels of income growth. It seems Irish regions overall experienced β -convergence during the period, however especially after 2011 σ -divergence appears substantial, with leading regions pulling further ahead economically.

The slight contradiction in the correlation between ERDF expenditure and income growth and statistical insignificance of ERDF expenditure in the regression models can be due to several reasons. FDI is one of the most important aspects of the Irish growth story over these years, which may distort the impact of ERDF expenditure at the regional level. This may be especially true as the highest levels of ERDF expenditure in the late 1990s largely coincide with substantial inflows of FDI, during the launch of the EU Single Market. The lack of statistical significance could also be explained by the indirect nature of impacts of ERDF - for example, investments in human capital may improve administrative capacities, thus contributing to the attraction of FDI and facilitating growth.

While the analysis and discussion of this paper are important, the regression analysis is significantly limited due to the small sample size of only eight regions of investigation. The thorough descriptive statistics section contributes significantly to the empirical findings, but future research should aim at improving on this aspect by extending the time period and if possible regionalising further to increase the sample size and facilitate more advanced statistical models. Despite this caveat, this research does provide policy implications for ERDF and general EU CP. Due to diminishing returns of economic transfers, future expenditure allocations should evaluate whether increased expenditure will necessarily be beneficial for the region. Further, focus on physical infrastructure may be misled, as to

compete in the modern world human capital may be a more important investment. Policymakers in Ireland and other countries must also evaluate the trade-off between facilitating overall growth or maintaining relative regional cohesion, and finding a middle-path may be crucial for long-term sustainable growth.

This thesis contributes to current literature by filling a gap in Irish sub-national development in relation to EU expenditure, and specifically the ERDF. The novelty of this research makes it a first step towards a greater understanding of the impact of economic transfers on Irish regional development. Lastly, the aggregation of a completely new dataset of ERDF expenditure at the NUTS III level in Ireland enables this relationship to be tested empirically, which is crucial for taking research in this area further.

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AI Statement

Certain AI tools were used for this thesis. ChatGPT was used for outlining the debate and giving an overview of the topics discussed, thus facilitating the search for sources. NotebookLM was used to summarise certain sources, and helped in finding and identifying the most important parts of previous studies and papers. AI has not been used in any way to generate text and all content of this thesis has been written by the author.