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The Impact of Industrialization, Employment,and Income Generation on Economic Development:

A Case Study of Selected European Countries

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Abstract

This research examines industrialization, employment, income generation, and economic development in selected European nations from 2015 through 2021. Specifically, the research examines how manufacturing share of GDP, employment in the industrial sector and income inequality affect per capital GDP in selected European countries building through the lens of the Global Value Chains (GVC) theoretical framework. The study made use of the Panel Least Square (PLS) model to estimate the relationship. The findings illuminate economic progress in the selected European nations over the research period. For instance, industrialization, measured by SOMGDP, increases GDPPC statistically. According to GVC theory, countries that promote industrial growth and global value chains have greater per capita GDP. The GDPPC-industry employment link was not statistically significant. Industry sector employment does not significantly affect per capita GDP in the chosen European nations. This shows that additional factors such as productivity, technological adoption, and skill development are needed to drive economic expansion through industrial employment. GDPPC was positively correlated with GINI INDEX income inequality. GDP per capita in Europe increased in spite of rising income disparity; this indicates that more social measure of standard of living might be more affected by rising income inequality. Since, industrialization boosts per capita GDP, authorities are advised to prioritize industrial growth. This may involve encouraging industry investment, supporting R&D, and encouraging innovation and technical growth. Industrial competitiveness and global value chain integration can support economic development.

Keywords: *Industrialization, Employment, Income Generation, Economic Development, European countries, Global Value Chains Theory, GDP per capita, Income Inequality, Economic Growth, Sustainable Development.*

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CHAPTER ONE
INTRODUCTION

1.1 Background of the Study

The phrases "development" and "underdevelopment" are imprecise and have been debated for decades. This is because "Economic development" and how to achieve it are ever-changing (OECD, 2021). Increase in labour productivity, employment, incomes, industrialization and population level of living have all been attributed as means to boosting a nation's development (Li et al., 2017). In fact, Krueger and Myint (2016) explained that economic development involves adding more mechanised and updated technology to an economy's foundation. Asongu, Odhiambo and Osabuohien (2021) on the other hand indicated that social, political, institutional, and physical infrastructure investments are all critical factors to achieving economic development and change. Investments in business assistance, innovation, and competitiveness can boost economic activity, job creation, and living standards (Chu et al., 2017). Industrialization has been a major driver of economic development in many developed countries (Wong et al., 2017). Industrialization can enhance productivity, efficiency, and economic growth (Lee, 2017).

According to Acemoglu and Robinson (2021) in Europe industrialization has been a major driver of flourishing economically in industrialized nations. Gujarati and Porter (2009) stated that in order to achieve economic growth there is need for income generation and employment. Employment and income generation assist people to make a living and improve the economy (Dall'Olio & Panico, 2021). Employment and income generation can boost consumer spending and demand for products and services, according to Autor and Salomons (2020) since working people spend more, which boosts the economy. European wealth and economic growth have been connected to industrialization in Europe. In Germany, post-World War II manufacturing boom increased employment, notably in high-skilled occupations (Autor et al., 2017). In the 1990s, the UK service industry expanded, creating jobs in banking and business (Blanchflower, 2001). Northern Italy's industrialisation in the late 19th and early 20th centuries increased per capita income and boosted Italy's economy (Broadberry et al., 2013). High-tech sectors in Sweden and Finland have boosted economic growth and per capita income (OECD, 2019).

Although it is noted that industrialization has benefited Europe unequally. Automation and new technology have caused employment losses in some locations, especially in outlying areas (McCann et al., 2016). Industrialization has not always increased worker income. Despite economic development, UK income disparity has worsened (Atkinson, 2015). Given these complicated linkages, European authorities have struggled to foster industrialisation while spreading its advantages. Others have argued for

initiatives that alleviate income inequality and foster inclusive growth (OECD, 2021). Industrialization, employment, income, and economic development in Europe are interconnected. Industrialization has provided jobs and boosted economic progress, but it has also caused employment losses and unequal rewards. European industrialization and economic growth programmes must reflect these variables. This study therefore seeks investigate European nations development through the interplay of industrialization, employment, and income generation, especially in recent times.

1.2 Statement of Research Problem

Industrialization's effects on Europe's economy, employment, and income are complicated and policy-relevant. Industrialization in Europe is plagued by unequal rewards. Automation and new technology have caused employment losses in some places, notably in outlying locations (McCann et al., 2016). Industrialization has not always increased worker income. Despite economic development, UK income disparity has worsened (Atkinson, 2015). Though industrialization has created jobs in Europe, for instance, in post-World War II Germany, the industrial sector grew, creating high-skilled jobs (Autor et al., 2017). In the 1990s, the UK service industry expanded, creating jobs in banking and business (Blanchflower, 2001). European industrialization has boosted wealth and economic growth in the past, Northern Italy's industrialisation in the late 19th and early 20th centuries increased per capita income and boosted Italy's economy (Broadberry et al., 2013). High-tech sectors in Sweden and Finland have boosted economic growth and per capita income (OECD, 2019). Moreover, in recent times, recent changes in technologies adoption rate, low employment, income disparity in some European nations have led others to argued for initiatives that alleviate income-inequality and foster inclusive growth (OECD, 2021). Thus, understanding how industrialisation affects employment, income, and economic growth in Europe is an important research subject that demands greater study and policy consideration.

1.3 Significance of the Study

The study of industrialization's effects on employment, income, and economic development in Europe is important for several reasons. First, it can inform policymakers about industrialization's benefits and drawbacks and help them design policies that promote economic development and broadly share its benefits. This is crucial given rising economic inequality and the need for inclusive growth strategies. Industrialization, employment, income, and economic development are complicated and interconnected. This study can shed light on how these linkages differ among countries and areas. Policymakers, scholars, and practitioners pursuing sustainable economic growth must comprehend this.

Industrialization's effects on employment, income, and economic development in Europe can enrich economic development, labour economics, and industrial policy research. This work can help us understand these crucial concerns by building on previous studies and offering fresh insights.

Europe has different economic development, industry, and employment. This research can show how industrialisation has affected employment, income, and economic development in different European nations. This can help policymakers learn from worldwide comparisons. Industrialization's effects on European employment, income, and economic development are important for policy, academic research, and international comparisons. This study can help policymakers, academics, and practitioners support sustainable economic growth and inclusive development in Europe and beyond.

1.4 Research Objectives

The research examines how industrialization, employment, and income generation affect economic development in selected European nations. On a more specific basis:

i. It will examine these nations' industrialization and level of economic development.
ii. Employment's impact on these nations' economies' development was also studied.
iii. The research examined the link between income generation and economic development in selected European nations.

1.5 Research Questions

i. How have these nations promoted economic development through industrialization?
ii. How has the level of employment in Europe affected economic development?
iii. To what level has income generation affected economic development in selected European countries?

1.6 Research Hypothesis

i. Null hypothesis: Industrialization does not affect economic development in selected European nations.

ii. Null hypothesis: Employment does not affect economic progress in selected European nations.

iii. Hypothesis: Income generation and economic progress in selected European nations are unrelated.

1.7 Definition of Key Terms

i. Industrial policies and strategies: In this research, "industrial policies and strategies" refer to the government activities, legislation, initiatives, and programmes in the selected European nations to encourage industrialization and economic growth. These include trade, investment, taxes, R&D, innovation, infrastructure, skills, and other initiatives to boost industrial sector growth and competitiveness.

ii. Europe's working-age population's employment rate. Divide the labour force (employed and unemployed) by the working-age population and multiply by 100.

iii. Income generation: earnings, salaries, bonuses, and other work-related payments.

iii. Economic development: per capita income measures Europe's level of life. Dividing total income by population yields it.

iv. Income Inequality: a quantitative measure of economic inequality in a population or society. The Gini coefficient, which measures income inequality in Europe, was calculated. Collecting individual or family income data and utilising statistical tools to analyse population income distribution can operationalize income disparity. The researcher used the metric to quantify income disparity throughout Europe.

v. Industrialization: Industrialization is the process of changing the economy via greater industrial activity and manufacturing expansion. This research examined GDP-boosting output value. Manufacturing value-added shows industrial activity and its economic impact.

CHAPTER TWO
LITERATURE REVIEW

This chapter reviews the literature on industrialization, employment, and income generation and economic development in selected European nations. This chapter synthesises and analyses significant concepts, theories, empirical research, and disputes. The chapter outlines the theoretical and conceptual foundation for the study and identifies research gaps and inconsistencies by analysing relevant literature.

2.1 Theoretical Review

Global value chains theory proposes that the fragmentation of production processes across borders has produced new economic development and job prospects, particularly in nations striving to grow (Gereffi & Fernandez-Stark, 2011). Participation in global value chains can boost employment and income in nations that climb up the value chain and capture more value-added (Amighini et al., 2020). However, global value chains may unequally benefit enterprises and employees, resulting in persisting income and employment inequities (Gereffi et al., 2018). Neo-classical economists like Robert Solow and Paul Romer believe technical advancement drives economic growth and employment creation (Solow, 1956; Romer, 1990). This theory emphasises the significance of innovation and knowledge production in long-term economic growth and implies that government measures can promote innovation and knowledge spillovers. This hypothesis has been criticised for ignoring the possible negative consequences of technology development on employment and income inequality (Acemoglu & Autor, 2011). Technological change theory states that innovation drives economic growth and employment creation (Brynjolfsson & McAfee, 2014). AI and robotics might boost labour productivity and create new jobs in high-skilled industries (Autor & Salomons, 2020). Technological transformation may potentially replace low-skilled employees and increase income inequality (Autor, 2015). Unemployment insurance and minimum wage regulations have been found to minimise the detrimental impact of economic downturns on employment and income (OECD, 2020). Institutional structures may restrict labour market flexibility and job growth (Laroche Dupraz & Martins, 2021). In conclusion, theoretical literature reveals that industrialization, employment, income creation, and economic development are complicated and impacted by many economic, social, and political factors. Human capital theory, technological change theory, institutional economics, and global value chains theory have illuminated how industrialisation affects employment and income. Each theory has strengths and weaknesses, thus several theoretical viewpoints and empirical data from diverse settings are needed to explain this connection.

2.2 Empirical Review

Industrialization has continuously been linked to economic growth in empirical investigations. Industrial sectors like manufacturing and high-tech contribute significantly to GDP growth and productivity improvements. Baumol, Nelson, and Wolff (2019) discuss productivity convergence, the idea that countries with lower productivity levels tend to have faster productivity growth rates, narrowing the productivity gap with more advanced economies. Historical and cross-national research address these phenomena. Technological diffusion, human capital development, institutional frameworks, and structural alterations are examined as productivity convergence determinants. Empirical analysis and case studies explain productivity growth and convergence across nations and historical periods. The convergence of productivity illuminates economic progress and industrialization's impact on productivity. The study adds to economic growth literature and illuminates productivity convergence's effects on policy and sustainable development.

Acemoglu and Akcigit (2012) analysed IP (Intellectual property) rights legislation, competition, and innovation. The empirical study uses theoretical modelling and econometric analysis. Analysing data from numerous industries and nations, it explores the link between intellectual property rights (IPR) regulation, competitiveness, and innovation. IPR legislation, competition, and innovation are studied in many nations. The study examines intellectual property protection, competitive intensity, innovation outcomes including patents and R&D investment, and economic and institutional control factors. Stronger intellectual property rights protection encourages corporations to spend in R&D, the study concludes. Market rivalry affects how IPR legislation affects innovation. IPR protection boosts innovation more in competitive sectors. To promote innovation, the research emphasises balancing IPR protection and competition. Acemoglu and Akcigit recommend that innovation policymakers explore the relationship between intellectual property rights regulation and competitiveness. They emphasise the necessity to customise IPR protection to industry and market variables. To foster innovation, they emphasise competition and intellectual property rights.

Haltiwanger, Scarpetta & Schweiger (2014) explores the link between productivity, employment distribution, and economic development across nations. Cross-country panel data analysis examines how job distribution affects productivity and economic development. The study shows significant productivity and economic development variations between countries. Employment distribution is crucial to explaining these discrepancies. The authors claim that efficient labour allocation across enterprises and sectors boosts productivity and economic growth. The study found that workers in nations with higher productivity are employed in more productive industries and enterprises. Workers in low-productivity

nations are commonly misallocated. The authors also find that disparities in industry average productivity and labour allocation cause country-to-country productivity inequalities. Market rivalry and business dynamics influence job allocation and productivity. The study emphasises the necessity of policies that encourage competitiveness, labour market mobility, and effective resource allocation for economic development. It shows that labour allocation and productivity strategies can close the productivity gap between nations and boost economic growth. The study found that employment distribution explains cross-country productivity and economic development disparities. Market rivalry and company dynamics enhance labour efficiency, which boosts productivity and economic growth.

Herrendorf, Rogerson, and Valentinyi (2014) analyse preferences, structural transformation, and economic evolution using theoretical modelling. It uses economic models to show two viewpoints on how preferences affect structural transformation. Preferences dominate the study. Time preference and risk aversion affect labour supply, investment, and consumption decisions. The study addresses structural transformation factors including sectoral employment and productivity changes. The research contrasts desires and structural change. The first perspective implies that decreasing time preference might motivate people to spend more time and money on education and skill acquisition. This can move low-productivity agriculture to higher-productivity industries, encouraging economic development. Second, technical advancement and factor endowment changes cause structural transformation, not desires. Both viewpoints have factual validity, and tastes and other factors may differ among nations and time periods. The intricate link between desires, structural transformation, and economic progress requires further empirical investigation. Herrendorf, Rogerson, and Valentinyi recommend multidimensional structural transformation and economic development policies based on their findings. Sustainable economic growth requires addressing variables outside choices, such as technical progress, education, and institutional frameworks.

Autor, Dorn, and Hanson (2016) examined how Chinese import rivalry affects US local labour markets. Industrialization in China, with its reduced labour costs, affects labour markets in Western economies. The study found that Chinese import competition hurt US regions more. Import rivalry from China cost impacted areas jobs. Workers in import-competing industries lost their jobs. The survey also found that manufacturing jobs were most affected by overseas competition.

The study also found that Chinese import rivalry hurt local wages. Low-cost Chinese imports lowered salaries, lowering incomes for employees in import-competing businesses. The study found that Chinese import rivalry exacerbated income inequality. Income disparity increased in regions exposed to import competition, with more income concentration among top incomes. Industrialization in China brought

lower-cost items to consumers, but it also increased economic disparity in the US. This analysis shows that industrialisation, import competitiveness, and labour market consequences are complicated. Industrialization in China can boost development and productivity, but it can also affect distribution in developed nations. To reduce the effects of import competition on local labour markets and income inequality, policymakers must examine these processes.

Technology, trade openness, and financial globalisation cause growing income disparity in industrialised nations, according to Jaumotte, Lall, and Papageorgiou (2013). Technology-driven industrialisation can affect income disparity, according to the study. Technological advancement increases economic disparity, according to the study. Skill-biased technology progress can make some talents and jobs more valuable and in demand while making others obsolete. This creates economic disparity between skilled and unskilled people. Trade and financial globalisation also increase income inequality, the study finds. Trade openness can expose domestic sectors to foreign competition, disproportionately affecting employees in weak industries. This can increase economic disparity by eliminating jobs or lowering salaries for particular groups. Due to capital mobility and financial market liberalisation, financial globalisation may increase income concentration among the rich.

The study argues that technical advancement, trade openness, and financial globalisation have increased income disparity in affluent nations. Industrialization has generated winners and losers in the labour market, with skilled employees and those in industries linked with technological advancement benefiting more than unskilled workers and those in failing sectors. The research emphasises the role of industrialization, technical growth, trade openness, and financial globalisation in explaining income disparity. These factors of economic disparity must be addressed by policymakers to spread the gains of industrialisation. This may entail investing in education and skills development to prepare employees for the changing labour market and building social safety nets to minimise the negative impacts of technological change and foreign competition on disadvantaged populations.

Nayyar (2018) examines digitization, industrialisation, and progress across time. The report addresses digital technology's potential advantages and threats for industrialisation and economic growth.

Digitalization may boost productivity and industrialisation, boosting economic growth, the study found. Digital technology may boost efficiency, automation, and connection across industries, helping companies optimise production and grow markets. Digitally integrating industrial processes boosts productivity, innovation, and competitiveness, boosting economic growth. Digitalization poses dangers and challenges, according to the report. Unemployment is a major issue. Digital technology may

eliminate jobs, especially in regular and repetitive fields. This can affect the labour market and increase unemployment and income inequality.

The research also emphasises inclusive digital growth initiatives. Digitalization may worsen disparities without proper policies and actions. To adapt to the digital economy, people and communities must learn digital skills, get social protection, and encourage entrepreneurship. The report recommends integrating digitization with industrialisation and development programmes. Governments and authorities should foster digital innovation, boost digital entrepreneurship, and guarantee that everyone benefits from digitalization. Countries may use digital technology to promote equitable and sustainable economic growth by addressing its dangers and benefits. Nayyar (2018) concludes that digitalization, industrialization, and development are positively correlated and that digital technologies may boost productivity and economic growth. It also emphasises the significance of tackling the risks and difficulties of digitalization, notably employment displacement and inequality, through appropriate policies and initiatives to promote inclusive and equitable results in the digital future.

Rodrik (2016) studies premature deindustrialization, the loss in manufacturing employment at lower income levels relative to historical patterns. Premature deindustrialization affects growth, employment, and inequality, according to the study. The study suggests premature deindustrialization can harm economic progress. Industrialization produces jobs, advances technology, and boosts production. Premature deindustrialization reduces manufacturing jobs in low-income nations, limiting their potential to gain from industrialisation. The paper discusses premature deindustrialization's effects. First, it can limit economic growth since the manufacturing sector, which is more productive and technologically advanced, drives productivity and innovation. Manufacturing job declines might impair human capital, technological skills, and industrial upgrading, which are necessary for economic progress.

Second, early deindustrialization can increase unemployment, especially for low-skilled employees who may have trouble switching industries. Structural unemployment and labour market issues may result from manufacturing job losses not being offset by other industries. Finally, premature deindustrialization increases income disparity. Manufacturing often provides greater earnings and better working conditions than agriculture or services. Manufacturing job losses might hurt low-skilled employees and increase income inequality. To counteract premature deindustrialization, the research emphasises industrial policies that encourage productive manufacturing sectors. Infrastructure, education, R&D, and manufacturing business financing may be included in such plans. Manufacturing can prolong industrialisation, boost economic growth, create jobs, and reduce inequality. Rodrik (2016) illuminates premature deindustrialization and its economic effects. Premature deindustrialization can hurt growth,

unemployment, and inequality. Effective industrial policies enable productive manufacturing sectors and sustainable economic development, according to the report.

Yang (2019) examines industrialization and inequality using historical data from several nations. It examines industrialization's effects on inequality and related strategies. The study found that industrialisation causes U-shaped inequality. Income disparity rises when nations migrate from rural to industrial economies. The unequal distribution of land and resources, the concentration of capital and wealth, and pay differentials between skilled and unskilled employees are all contributing causes. Industrialization and economic growth reduce inequality. Industrialization allows lower-income people to rise in income and status, according to the study. It expands the middle class and balances income. The study stresses that industrialisation does not automatically cause inequality. Complementary policies shape industrialisation and ensure its advantages are shared more evenly. Social safety nets, education and skills development programmes, and targeted interventions for disadvantaged populations can reduce inequality caused by industrialisation. Countries may improve their workforces and facilitate industrialisation by providing education and skill development. Social safety nets can safeguard industrialization's victims from economic transformation's hazards and uncertainties.

The paper emphasises inclusive growth strategies with industrialisation. It indicates that industrialisation might worsen inequality by concentrating wealth and opportunity in the hands of a few. Yang (2019) concludes that industrialisation and inequality are U-shaped. As economies mature, industrialisation can reduce inequality. The study emphasises complementing policies' importance in distributing industrialization's gains more fairly. Social protection, education, and skill development can offset industrialization's unequal impacts and promote inclusive growth.

2.3 Conceptual Review

Industrialization's effects on Europe's economy, employment, and income have been extensively studied. Technological advancement, employment, and economic growth: Autor (2015). He claims that while technology has eliminated many occupations, it has also generated new ones, boosting employment. He believes this trend will continue and deepen income disparity and labour market polarisation. Gig work and platform work have increased due to technology progress and automation, according to an OECD (2019) research. The research emphasises the need for governmental actions to guarantee that non-standard employees have social safeguards and that technology advancement benefits everybody.

Fernández-Macías (2016) studies European employment polarisation during the Great Recession, which saw middle-skilled occupations fall and high- and low-skilled positions rise. He claims that this

polarisation, partially caused by globalisation and technology, affects economic inequality and social cohesiveness. Globalization's deindustrialization and job dislocation, according to Rodrik (2018), have fueled populism in Europe and elsewhere. He emphasises inclusive growth and inequality reduction measures to meet these difficulties and maintain political stability. Artis et al. (2003) explore how euro area membership affects European structural reform and economic development. Euro area membership has increased trade integration and foreign direct investment but not labour market flexibility or structural transformation. The literature reveals that industrialization's effects on employment, income, and economic development in Europe are complicated and impacted by technical advancement, globalisation, and government policy. To handle industrialization's issues and sustain political stability, the literature emphasises inclusive growth and inequality reduction programmes.

2.4 Conceptual Framework

2.4.1 Industrialization and Economic Development

Industrialization and economic development have been studied empirically in several ways. Chistruga and Crudu (2017) examined industrialisation and economic growth using panel data. Industrial sectors boost GDP growth and employment, according to their research. Maradana, et al. (2022) examined the effects of industrialization on economic development in a sample of European nations using a dynamic panel econometric model. Industrialization drives economic growth and reduces poverty, as their study showed. Nicholas (2015) used a case study to examine industrialization, technical innovation, and economic development in Britain. Industrialization boosts technical innovation, productivity, export competitiveness, and economic growth, according to his research. These empirical studies explain how industrialisation affects economic development. Industrialization boosts economic growth through technology transfer, innovation, employment creation, productivity gains, and export development. Infrastructure, human capital, institutional quality, and policy frameworks also influence industrialisation and economic development.

Hausmann and Klinger (2020) conducted a comprehensive literature assessment on structural transformation, including industrialisation, and economic development. The writers examine ideas and actual data to understand how industrialisation boosts economic growth. The paper stressed structural transformation for economic growth. Structural transformation involves shifting resources from agriculture to industry and services. Industrialization grows and diversifies the manufacturing sector, which boosts productivity, technology, and job generation. Hausmann and Klinger (2020) examine industrialisation and economic development theories. Neoclassical growth theory emphasises technology

and capital accumulation in economic progress. The New Structural Economics and Learning and Industrial Policies Framework emphasise the role of industrial policies, knowledge accumulation, and institutional variables in industrialization and economic progress. Industrialization and economic development are examined empirically. They study how industrialisation affects economic growth, poverty reduction, inequality, employment, and productivity. The review encompasses studies from industrialised and emerging nations, offering a complete assessment.

Hausmann and Klinger critique research throughout the piece. They emphasise the difficulty of determining causation between industrialisation and economic development. Institutions, governance, and policy frameworks explain the variation between nations and regions. Finally, Hausmann and Klinger's review paper examines the literature on structural transformation, including industrialisation, and economic development. The writers synthesise ideas and empirical evidence to better understand how industrialisation affects economic growth and development. Their research is useful for scholars, policymakers, and practitioners studying industrialisation and economic development. These empirical studies offer significant insights, but country-specific settings, time periods, and methodological techniques affect the results. Thus, a complete investigation of the processes and contextual elements that affect industrialization and economic growth in selected European nations is needed. In the next chapters, we will use a similar empirical technique to analyse how industrialization, employment, and income creation affect economic development in selected European nations. We want to increase our knowledge of industrialization's effects on economic development by examining contextual factors and using appropriate econometric models.

2.4.2 Employment and Economic Development

Employment and economic growth have been extensively studied. Employment influences productivity, poverty reduction, and social inclusion, according to several studies. Employment affects productivity, and a strong labour market boosts economic growth, according to several research. Acemoglu and Autor (2011) found that trained labour and technology boost productivity. Kapsos (2005) found a positive correlation between employment intensity and economic growth, implying that more jobs enhance productivity. Income and economic possibilities from work reduce poverty. Green and Mayhew (2015) discovered that employment stability and quality jobs reduce poverty. Heckman and Pagés (2004) evaluated labour market policies and poverty reduction in Latin America and the Caribbean, emphasising the relevance of employment-focused policies. Employment affects economic equality and social inclusion. Naudé (2011) explored how entrepreneurship in underdeveloped nations might provide jobs

and social inclusion. Bell and Blanchflower (2014) also examined labour market slack and social inclusion, emphasising the need of full employment and equal job prospects for marginalised populations. Acemoglu and Restrepo (2020) examine how AI will affect labour demand and the future of employment. They study how AI and automation might change job possibilities and types across sectors. The authors suggest that AI's influence on labour demand is multifaceted and varies by component. AI affects employment through work replacement and task invention. AI technologies replace human employment activities, possibly displacing workers. AI implementation creates new employment duties and positions. Acemoglu and Restrepo (2020) emphasise that the effects of AI adoption depend on whether AI and human labour complement or substitute. They list regular manufacturing and administrative operations where AI has replaced human labour. They also highlight businesses where AI has produced new duties and possibilities that require human abilities, such as AI system creation and maintenance or complicated decision-making. The research addresses job polarisation, skill-biased technology development, and pay inequality. It emphasises the need for policies that assist skill development and career transfers to offset the possible negative impacts of AI on specific workforce segments. Acemoglu and Restrepo's paper helps explain how AI and automation will change labour. The intricate interaction between AI and labour demand emphasises the need for proactive policies and investments to enable a seamless transition and leverage AI's potential for economic development and job creation.

Autor (2019) also analyses how technology and globalisation have changed labour. Automation and AI may affect work possibilities, job polarisation, and labour market skills. Autor (2019) believes technology advancements, particularly in automation and AI, will change work. Automation eliminates mundane activities but generates new possibilities and needs for complementing abilities. "Routine-biased technological change" (RBTC) occurs when automation predominantly impacts regular work, polarising jobs and changing skill demands. The author emphasises that automation affects employment differently across vocations and sectors. Some vocations are automatable, while others involve creativity, problem-solving, and social intelligence. In the changing labour market, non-routine cognitive and physical talents that complement technology are more important.

Autor (2019) argues how these developments may raise economic inequality, skill gaps, and the need for lifelong learning and skill upgrading. Investments in education and training, support for displaced employees, and entrepreneurship and innovation are highlighted in the article. Autor's paper examines the problems and potential of automation and AI in the context of globalisation and technological breakthroughs. It emphasises the necessity for proactive policies and initiatives to help individuals and

society adapt to changing work and capitalise on technology advancements for economic development and inclusive growth. Blanchard (2020) studies the economic effects of the COVID-19 epidemic on employment and considers governmental measures to boost job creation and recovery. The author discusses labour market issues and post-pandemic employment solutions. The paper emphasises the unprecedented epidemic and its catastrophic impact on worldwide labour markets. Economic activity plummeted due to unexpected shutdowns and limitations to contain the infection, resulting in massive job losses and industry disruptions. Blanchard stresses the necessity for pandemic-induced economic crisis-specific employment policy. The report emphasises fiscal stimulus for economic recovery and job creation. It addresses how income assistance programmes, job retention programmes, and public infrastructure investment maintain employment and economic growth. The author emphasises the necessity for prompt and focused policy initiatives to reduce labour market scarring and prolonged unemployment.

Blanchard (2020) discusses pandemic-induced economic restructuring. The study examines how rapid digital technology adoption and automation may change labour and employment trends. The author advocates for digital infrastructure investments, reskilling and upskilling programmes, and entrepreneurial and innovation assistance. The paper also emphasises the need for global cooperation to solve pandemic-related job issues. Blanchard stresses the importance of international policy coordination to guarantee a synchronised recovery and avoid a lengthy labour market depression. Blanchard's analysis sheds light on the COVID-19 pandemic's economic effects on employment and the policies needed to assist job growth and recovery. It emphasises the need for aggressive and comprehensive employment policies that meet pandemic issues and labour market structural changes. Policymakers may foster equitable and sustained post-pandemic job development by looking ahead.

Cingano and Leonardi (2021) explored how robot adoption affects European business employment dynamics. The research examines how robots affect job development across industries. A broad European enterprise survey is used to analyse robot usage and job outcomes. They examine how robot deployment affects employment and job creation in participating enterprises. The study shows that robotics and job development are complex. According to studies, robots may displace some jobs but create others. The authors find that businesses that use robots in manufacturing have better job growth than those that don't. The study also shows that robot adoption affects sectors differently. Robots affect employment differently per sector. Robots can boost productivity and create jobs in some areas. Other industries have a negative association, suggesting robots may displace certain employment. The research addresses worker skill composition. The data suggest that worker skill levels affect robotics and job creation.

Automation boosts employment in high-skilled jobs. Automation may threaten low-skilled jobs. Cingano and Leonardi's study shows that European enterprises that embrace robots create jobs. Robots may displace some jobs but create others, according to studies. Industry-specific characteristics and skill mix are crucial when analysing automation's employment implications. Policymakers and corporations may use automation's benefits while minimising its drawbacks by recognising the complex link between robotics and job creation. Employment drives economic growth, improving productivity, poverty reduction, and social inclusion, according to the research. These empirical studies reveal the complicated link between employment and economic growth, emphasising the necessity for inclusive and sustainable labour market reforms to improve society. Employment and economic development literature is extensive and ever-changing. These linkages are studied in diverse situations and nations through econometric analysis, case studies, and comparative research. A complete literature study is recommended to capture the newest results and trends in this discipline.

2.5 Income Generation and Economic Development

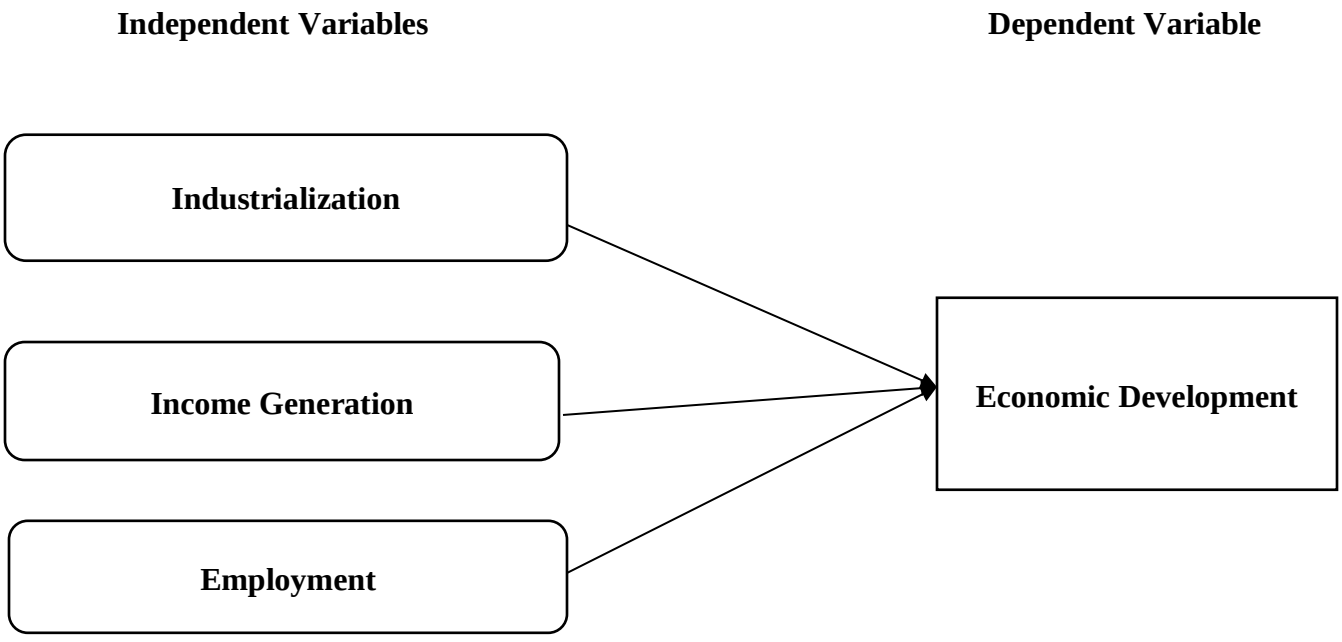
Simon Kuznets' 1950s Kuznets Curve hypothesis implies an inverted U-shaped link between income disparity and economic progress. As a country develops, income disparity reduces. Empirical investigations have shown inconsistent evidence of the Kuznets Curve. Li and Zou (1998) found evidence for the Kuznets Curve in certain regions but not others in a panel of nations analysis. Income disparity and economic development may vary by context. Income disparity and economic growth have been studied. Some research imply significant income disparity might hurt economic growth. Income disparity causes social and political instability, lowers investment, and slows human capital development, according to Alesina and Rodrik (1994). Other research have shown conflicting or ambiguous findings, suggesting that income inequality may affect economic development in different contexts. Income inequality correlates with poverty. Studies reveal a favourable correlation between income disparity and poverty. Bourguignon and Morrisson (2002) discovered that income disparity increases poverty in a broad sample of nations. Income disparity reduction may reduce poverty and increase wellbeing. Income disparity also affects education, health, and social well-being. Human development decreases with wealth disparity. Wilkinson and Pickett (2010) concluded that nations with higher economic disparity had worse health, education, and social issues.

Milanovic (2016) discovered that worldwide income inequality trends and economic development are more complicated than previously considered. The study found that some nations' income disparity decreased with development, while others increased or stayed unchanged. This suggests that income

inequality and economic progress do not always follow an inverted U-shape but vary by country and area. Income disparity and economic growth have been studied recently. Ostry et al. (2014) revealed that significant income disparity can hinder sustainable economic growth in a broad sample of nations. The study found that income disparity reduces social mobility, human capital accumulation, and political and social conflicts, which hurts long-term economic development. Income disparity also raises poverty rates, according to recent studies. Alvaredo et al. (2020) found that income disparity increases poverty rates globally. The study found that poverty reduction and sustainable development need income disparity reduction. Income disparity affects human development beyond poverty. Stiglitz (2021) examined economic disparity and education, health, and social cohesion. Higher income disparity is linked to lower educational attainment, poorer health outcomes, and greater social inequities, impeding human development.

Income generation, economic progress, and income inequality are interconnected. The Kuznets Curve hypothesis predicts an inverted U-shaped connection, although actual data is equivocal. High income disparity has been found to harm economic growth, poverty, and human development. These correlations vary by context.

Figure 2.1 Conceptual framework



Source: Authors' own elaboration

2.6 Research Gap

Despite empirical studies on industrialization, income production, employment allocation, and preferences in economic growth, a research void remains. The literature evaluation reveals the following research gap: Existing studies have mostly examined individual components or connections. Industrialization and economic growth, intellectual property rights policy and innovation, employment distribution and productivity, and preferences and structural transformation have been studied. However, little study has examined how these characteristics affect economic progress. This study seeks to explain the complicated relationships between industrialization, income creation, employment allocation, and preferences to fill this research vacuum. An integrated research paradigm that examines these issues together and their influence on economic growth can do this. A comprehensive approach would help politicians and scholars grasp economic development's many facets and create more tailored strategies. Existing research have mostly focused on chosen European nations or industries, limiting generalizability. This study includes more nations and regions to represent economic variety. These elements' effects on economic development can be better understood by studying them in diverse industries.

CHAPTER THREE
METHODOLOGY

This chapter describes the research approach. The chapter covers research design, data gathering, and analysis.

3.1 Research Approach

This study used quantitative research. This was done to identify causal linkages and test hypotheses. Quantitative research uses numerical data to examine relationships and generate statistical judgements. The World Bank Statistical database included 2015–2021 data for each European country. For a snapshot of the connections under study, a cross-sectional approach was used. This approach enabled country-to-country comparisons, revealing regional differences. The research aims and theoretical framework guided the study's variable selection. Industrialization, employment, income creation, income disparity, and economic development were significant to studying the links of interest. Panel estimate, covered in later parts, led data analysis.

3.2. Research Philosophy

Research assumes different realities and knowledge depending on context and objective (Collis & Hussey, 2014). To apply the finest methods, a researcher should pick a philosophical discipline that suits his subject. Positivist and interpretivist views are common. People align their worldviews with these two extremes of research thinking. Positivists consider research objective. Subjectivity underpins scientific inquiry, according to interpretivists (Collis & Hussey, 2014).

Positivists use statistical approaches to examine hypotheses and models before forming conclusions. Thus, positivists think that research should be verified by third-party evidence, not the researcher's viewpoint. Interpretivists think observation is preferable. Thus, observation is subjective, especially when studying social processes without third-party evidence. Thus, social scientists use it in smaller studies to get additional insight (Bryman & Bell, 2011; Saunders et al., 2012). This positivist study employs the quantitative-deductive method to evaluate theories or hypotheses and develop conclusions about the idea and subject matter. Positivists prefer numerical analysis of test hypotheses and hypothetical links (Denscombe, 2014). Using secondary data and econometric analysis, this quantitative-deductive research investigates how industrialization, employment, and income generation have influenced the economic growth of selected European countries.

3.3 Research Design

This study used quantitative research. It tests causal linkages and hypotheses. European nations' data is collected using a cross-sectional design. This design enables for a snapshot of relationships and country comparisons at a certain period.

3.4 Sample Selection

The study targets EU members. EU (2022) lists 27 member states. The research population is EU members. Statistical power and research reliability depend on sample size. Statistical factors including confidence, margin of error, and effect size will decide this study's sample size. The sample size will also be determined by data availability and practicality. EU membership and regional economic importance will determine the study's EU 15 nations. The EU 15—Austria, Belgium, Denmark, Finland, France, Germany, Greece, Ireland, Italy, Luxembourg, the Netherlands, Portugal, Spain, Sweden, and the UK—have distinct economies. These nations were chosen for their historical relevance, economic stability, and credible industrialization, employment, income, and economic development data. The sample will comprise EU 15 nations from diverse areas and economic stages to guarantee representativeness. This will provide a full investigation of how industrialization, employment, and income creation affect economic growth across diverse situations in the selected nations. Industrialization, employment, and income creation will affect economic growth in a diversified and representative sample of EU 15 members. The inclusion of nations with distinct economic development and industrial structures would allow a complete investigation of EU 15 linkages and dynamics. The sample selection will be based on the selected nations' economic contributions, geographic representation, and data reliability. This will help generalise the study's findings to the EU 15. The research covers 2012–2022.

3.5 Data Collection

The study examined the long-term effects of industrialisation on employment, income, and economic development in selected European nations using secondary data. The researchers checked their data for quality and consistency. World Development Indicators, a World Bank database, is an important data source. This reliable international database contains socioeconomic statistics for nations worldwide. This database provides credible and comprehensive statistics on GDP growth, manufacturing percentage of GDP, employment rates, income inequality, and other pertinent macroeconomic indicators. Using a respected and well-known source boosts the study's credibility.

The study uses the World Bank database and other secondary academic sources. These other sources may offer statistics and study on industrialization, employment, income creation, and economic development, which may give a more complete picture. Multiple sources strengthen the study's analysis and results. The research collected data from 2015 through 2021. This decision lets academics study industrialization's long-term effects and patterns across several years. The research can reveal trends, correlations, and probable causal linkages between industrialization and the outcome variables of interest by studying data across time. Using trusted worldwide databases and scholarly archives, the project collects data thoroughly. The research examines industrialization, employment, income creation, and economic development in selected European nations to give long-term insights.

3.6 Data Analysis

Panel study examined the link between industrialization, employment, income creation, and economic development in selected European nations. Panel data estimation helps evaluate variable connections while correcting for time-invariant unobserved heterogeneity such country-specific effects (Maddala, 2001). Mean and standard deviation were used to summarise data features. Particularly panel estimate since data comprised a cross of 10 selected EU-15 nations from 2015 to 2021. was used to study the links between independent variables including industrialization, employment, income inequality, and economic progress. Panel regression analysis controlled and identified the unique impacts of each independent variable on the dependent variable. Hypothesis testing determined variable importance. Calculating t-statistics, p-values, and confidence intervals determined if the observed connections were statistically significant. Statistical significance was determined by the significance level, usually 0.05. All analysis was done with EVIEWS (11.0).

Model Specification

Robert Solow's economic growth theory, notably the Solow-Swan model, has helped explain the importance of variables like capital accumulation and technical advancement in economic development. Simon Kuznets: Kuznets' study on economic growth and income inequality and his pioneering work on national income accounting have helped us comprehend economic development patterns. Amartya Sen: Sen's capacities perspective and work on human development have shown the relevance of education, health, and social welfare in sustainable and inclusive economic growth. Paul Romer: Romer's contributions to endogenous growth theory, notably on technical innovation and knowledge creation, have helped us comprehend how innovation and entrepreneurship drive economic progress (Solo, 1956;

Kuznets, 1955; Romer, 1990; Sen, 1999).

The fixed effect model was calculated using panel least square. This panel estimation approach after Haussmann failed to reject the null hypothesis of "the random-effect model" as the proper technique. Panel data analysis often uses the fixed effect model to account for time-invariant unobserved variation across persons or entities. The fixed effect model is ideal for controlling and capturing country-specific features that may still affect the variables of interest. The fixed effect model was used to reduce bias from unobserved country-specific variables that might confuse correlations. The model accounts for time-invariant features that change between nations but are stable within each country by introducing fixed effects. This reduces heterogeneity and improves association estimations.

Variables Description

Dependent Variable

Per-capita GDP

GDP per capita growth rate in constant local currency each year. GDP per capita = GDP / midyear population. GDP at purchaser's prices is all resident producers' gross value added plus product taxes and minus any subsidies not included in product value. It does not include depreciation of manufactured assets or natural resource depletion.

Independent variables

Manufacturing, GDP share

Manufacturing includes ISIC divisions 15-37. Value added is a sector's total output minus intermediate inputs. Depreciation of manufactured assets and natural resource depletion are not taken into account. ISIC revision 3 determines value added. VAB nations utilise gross value added at factor cost as the denominator.

Industry employment (ILO estimate)

Employment is defined as working-age people who were involved in any activity to generate products or services for compensation or profit, whether at work during the reference period or not owing to temporary absence or working-time arrangements. Mining and quarrying, manufacturing, construction, and public utilities (electricity, gas, and water) make up the industrial sector.

Gini index

Gini index measures income (or consumer spending) inequality in an economy. Starting with the poorest receiver, a Lorenz curve shows cumulative percentages of total income versus cumulative beneficiaries. The Gini index is a percentage of the greatest area under the line between the Lorenz curve and a

hypothetical line of absolute equality. A Gini index of 0 means complete equality, whereas 100 means perfect disparity.

Control variables

Inflation rate

The consumer price index measures inflation as the annual percentage change in the cost to the average consumer of obtaining a basket of goods and services that may be set or modified at predetermined intervals, such as annually. Laspeyres formula is typical.

Trade Openness

Service trade (% GDP) measures it. Service trade is service exports and imports divided by GDP in current U.S. dollars.

Population growth

Population (total) from World Bank estimates counts all residents regardless of legal status or citizenship.

$$\text{Economic development}_{it} = \alpha + \beta 1\text{Industrialization}_{it} + \beta 2\text{Employment}_{it} + \beta 3\text{Income Generation}_{it} + \beta 4\text{Inflation}_{it} + \beta 5\text{Trade openness}_{it} + \beta 6\text{Population growth}_{it} + u_{it}$$

i is the nation (EU-15) and t is the year (2015-2021). The intercept, regression coefficient, and error term are α, β, and u.

Economic development (GDP per capita)

Independent variables: Industrialization, Employment, and Income Generation.

Control variables: Population, trade openness, and inflation.

The model above analyses how industrialization, employment, income generation, inflation, trade openness, population increase, and other variables affect economic development. The study estimates the coefficients (β) for each variable to identify their influence on economic development in the EU-15 nations. Empirical study of the model will reveal these nations' economic drivers.

This model is based on the research of several researchers. These academics have researched the link between industrialization, employment, income creation, inflation, trade openness, population increase, and economic development, offering a comprehensive body of literature to support and inform this study's model.

3.6 Ethical Considerations

Research ethics are important, and this part discusses data collection, storage, and usage ethics (Louch &

Pry, 2020). The study followed research ethics by analysing secondary data from the World Bank statistics base of the WDI without manipulations or changes.

3.7 Summary

In conclusion, the technique suggests a cross-sectional design based on positivist ideology and a quantitative approach to meet the study aims and hypotheses. This governs EU-15 data gathering and analysis. The study methodologies set the tone for the future chapters, which analyse and estimate data to understand how industrialization, employment, and income creation affect economic development in the selected EU 15 nations.

CHAPTER FOUR
DATA PRESENTATION AND ANALYSIS

4.1 Preamble

This chapter summarises the empirical study on industrialization, employment, income, and economic development in selected European nations. Its rigorous technique and comprehensive statistical analysis reveal these linkages' dynamics and ramifications. Panel data regression analysis is used to estimate coefficients, evaluate statistical significance, and determine connection direction and magnitude. Coefficient estimates, standard errors, t-statistics, and p-values corroborate the conclusions, which are presented clearly.

4.2 Presentation of Data

Our study's variable-relationship data is shown here. The data includes industrialization (SOMGDP), employment, income disparity, GDP per capita (GDPPC), inflation, population growth, and trade openness. First, we describe the variables to understand their properties and patterns across the selected nations. Means, standard deviations, and ranges let us uncover dataset trends.

4.2.1 Descriptive Analysis

This section describes economic metrics including GDP per capita, manufacturing sector contribution, income inequality, inflation, trade openness, and population growth rate in the surveyed European nations.

Table 4.1 Descriptive Statistics

	GDPPC	SOMGDP	EMP	INCOME	INFLATION	TOP	POPGR
Mean	1.162155	13.20283	22.52556	30.61	1.416999	95.0256	7.374453
Median	1.458792	12.55345	20.4208	30.2	1.477577	86.4659	7.410371
Maximum	7.331699	20.66187	32.13301	36.2	5.055027	172.6745	7.920103
Minimum	-11.7576	5.494531	13.94965	26	-0.87413	55.28629	6.715051
Std. Dev.	3.445021	3.83508	4.649008	2.770529	1.125117	35.58657	0.409643
Skewness	-1.40296	0.0301	0.480389	0.476043	0.337092	0.893119	-0.12454
Kurtosis	6.084846	2.38254	2.191599	2.18117	3.389754	2.488782	1.484538
Jarque-Bera	50.7194	1.122569	4.598434	4.599445	1.768759	10.0683	6.879448
Probability	0	0.570476	0.100337	0.100287	0.41297	0.006512	0.032074
Sum	81.35086	924.1982	1576.789	2142.7	99.18996	6651.792	516.2117
Sum Sq. Dev.	818.9035	1014.841	1491.316	529.6324	87.34624	87381.88	11.57872
Observations	70	70	70	70	70	70	70

Source: Author's Computation

GDPPC ranges from -11.7576 to 7.331699, averaging 1.162155. The observed countries have diverse income levels. GDP averages 13.20283% manufacturing. This shows that manufacturing contributes little to these countries' GDPs. Industry sector employment averages 22.52556% of total employment. The industry sector employs a large share of the workers. Gini averages 30.61. Higher Gini index values imply more income disparity in a country. The studied nations have uneven income distribution based on the high mean value. Inflation averages 1.416999%. This shows the average price rise across nations. Trade openness averages 95.0256. Trade openness gauges a country's international trade. The high mean value shows these nations trade heavily. Population growth averages 7.374453%. This shows the observed nations' yearly population growth percentage.

GDPpc varies by country and year. Some countries' GDP per capita grows, whereas others don't. Poland saw strong growth from 2015 to 2021, whereas Austria, Germany, France, Italy, and Spain had good growth rates. Countries vary in manufacturing GDP. Poland has more manufacturing in GDP than Austria, Germany, France, and Spain. Industry employment (% of total employment) varies by country. France and Spain have lower industrial employment than Poland. Countries vary in Gini index income inequality. Sweden and Norway are less unequal than Poland, Germany, and Spain. Country-specific

inflation rates vary. In 2021, Poland had greater inflation than Germany and France. Trade openness indexes vary per country. Spain and Italy are less trade-open than the Netherlands. Country population growth rates vary. Poland and Norway have greater population growth rates than other countries.

Table 4.2: Hausmann Test

Null Hypothesis (H_0) The random effects model works for panel data analysis.

Alternative Hypothesis (H_1): Fixed effects are better for panel data analysis than random effects.

Correlated Random Effects - Hausman Test				
Equation: Untitled				
Test cross-section random effects				
Test Summary		Chi-Sq. Statistic	Chi-Sq. d.f.	Prob.
Cross-section random		27.60201	6	0.0001
Cross-section random effects test comparisons:				
Variable	Fixed	Random	Var(Diff.)	Prob.
SOMGDP	1.949661	-0.00346	0.89851	0.0394
EMP	-0.83225	0.055864	0.689896	0.285
INCOME	1.174138	0.610643	0.138156	0.1295
INFLATION	1.080602	1.415246	0.193227	0.4465
TOP	0.324823	0.031166	0.016426	0.0219
POPGR	-76.4893	-0.55044	6746.774	0.3552

Source: Author's Computation

Table 4.2 shows the Correlated Random Effects (CRE)-Hausman Test. Panel data analysis uses this test to assess whether to utilise fixed or random effects in the model definition. The test summary revealed a Chi-Square Statistic of 27.60201, a d.f. of 6, and a p-value of 0.0001. The difference between fixed

effects and random effects estimates determines the test statistic (Chi-Square). 27.60201 is a significant test statistic. Number of parameters compared is degrees of freedom. The p-value of 0.0001 strongly supports the fixed effects model over the random effects model.

Table 4.3: Fixed Effect Panel Regression Result

Dependent Variable: GDPPC				
Method: Panel Least Squares				
Sample: 2015 2021				
Periods included: 7				
Cross-sections included: 10				
Total panel (balanced) observations: 70				
Variable	Coefficient	Std. Error	t-Statistic	Prob.
C	489.8968	620.26	0.789825	0.4331
SOMGDP	1.949661	0.968299	2.013491	0.0491
EMP	-0.83225	0.845246	-0.98463	0.3292
INCOME	1.174138	0.451931	2.598048	0.0121
INFLATION	1.080602	0.554911	1.947341	0.0567
TOP	0.324823	0.129337	2.511446	0.015
POPGR	-76.4893	82.15226	-0.93107	0.356
R-squared	0.510767	F-statistic	3.758453	
Adjusted R-squared	0.374869	Prob(F-statistic)	0.000165	
Durbin-Watson stat 2.468128				

Source: Author's Computation

Substituted Coefficients

GDPPC=489.89 + 1.94 SOMGDP - 0.83 EMP + 1.17 INCOME + 1.08 INFLATION + 0.32 TOP - 76.49 POPGR + U

Where,

GDP per person

SOMGDP = manufacturing GDP share

Industry employment (%)

Gini index (income inequality) = INCOME

Inflation rate

Open trade

Population growth rate

U = time-cross section error term;

Table 4.3 shows the fixed effect panel regression analysis of GDPPC (Gross Domestic Product per capita) and many independent variables. The results reveal:

Coefficient Estimates: The table presents the coefficient estimates for each independent variable along with their standard errors, t-statistics, and p-values.

- C (Intercept): The intercept coefficient is 489.8968 with a standard error of 620.26. The t-statistic is 0.789825, and the p-value is 0.4331. However, the intercept is not of primary interest in this analysis.

- SOMGDP: The coefficient estimate for SOMGDP is 1.949661 with a standard error of 0.968299. The t-statistic is 2.013491, and the p-value is 0.0491. The variable SOMGDP has a statistically significant positive effect on GDPPC at a significance level of 0.05.

- EMP: The coefficient estimate for EMP is -0.83225 with a standard error of 0.845246. The t-statistic is -0.98463, and the p-value is 0.3292. EMP does not show a statistically significant relationship with GDPPC at the conventional significance level (0.05).

- INCOME: The coefficient estimate for INCOME is 1.174138 with a standard error of 0.451931. The t-statistic is 2.598048, and the p-value is 0.0121. INCOME has a statistically significant positive effect on GDPPC at a significance level of 0.05.

- INFLATION: The coefficient estimate for INFLATION is 1.080602 with a standard error of 0.554911. The t-statistic is 1.947341, and the p-value is 0.0567. Although the coefficient is positive, the relationship between INFLATION and GDPPC is not statistically significant at the conventional significance level (0.05).

- TOP: The coefficient estimate for TOP is 0.324823 with a standard error of 0.129337. The t-statistic is 2.511446, and the p-value is 0.015. TOP has a statistically significant positive effect on GDPPC at a significance level of 0.05.

- POPGR: The coefficient estimate for POPGR is -76.4893 with a standard error of 82.15226. The t-statistic is -0.93107, and the p-value is 0.356. POPGR does not exhibit a

statistically significant relationship with GDPPC at the conventional significance level (0.05).

Model Fit:

- R-squared: The R-squared value, representing the proportion of variance in the dependent variable explained by the independent variables, is 0.510767. This indicates that the model explains 51.08% of the variation in GDPPC.
- F-statistic: The F-statistic is 3.758453, indicating the overall statistical significance of the model.

Adjusted R-squared: The adjusted R-squared value is 0.374869. This value takes into account the degrees of freedom and penalizes the inclusion of additional independent variables. It is slightly lower than the R-squared value, indicating that the independent variables explain a smaller proportion of the variation in GDPPC after adjusting for the number of variables and observations.

4.3 Testing of Hypothesis

Hypothesis One

H10: Industrialization does not affect economic development in selected European nations.

Decision rule:

We reject the null hypothesis if the SOMGDP-economic development statistical test p-value is less than 0.05. This suggests that SOMGDP and economic progress in selected European nations are linked.

We cannot reject the null hypothesis if the p-value exceeds 0.05. This indicates there is no evidence linking SOMGDP to economic progress in the chosen European nations.

Interpretation: SOMGDP's coefficient estimate is 1.949661, t-statistic 2.013491, and p-value 0.0491. H10 is rejected because the p-value is less than 0.05. Industrialization (SOMGDP) and economic progress (GDPPC) in selected European nations are correlated.

Hypothesis Two

H20: Employment and economic growth in selected European nations are unrelated.

Decision rule:

We reject the null hypothesis if the statistical test for EMP and economic development has a p-value below 0.05. Employment and economic development in selected European nations are strongly correlated.

We cannot reject the null hypothesis if the p-value exceeds 0.05. Employment and economic

development in selected European nations are not strongly correlated.

Interpretation: EMP's coefficient estimate is -0.83225, t-statistic -0.98463, and p-value 0.3292. We cannot reject H20 since the p-value exceeds 0.05. This implies that employment (EMP) and economic progress (GDPPC) in selected European nations are not related.

Hypothesis Three

H30: Income generation does not affect economic progress in selected European nations.

Decision rule:

We reject the null hypothesis if the INCOME-economic development statistical test p-value is less than 0.05. Income generation and economic development in selected European nations are strongly correlated.

We cannot reject the null hypothesis if the p-value exceeds 0.05. Income generation and economic development in selected European nations are not strongly correlated.

Interpretation: INCOME has a coefficient estimate of 1.174138, a t-statistic of 2.598048, and a p-value of 0.0121. The null hypothesis (H30) is rejected since the p-value is below 0.05. Income generation (INCOME) and economic progress (GDPPC) in selected European nations appear to be linked.

4.4 Discussion of Findings

The statistically substantial positive influence of SOMGDP on GDPPC implies that industrialization is vital to economic development in selected European nations. This supports empirical research on industrialisation and economic growth. Chistruga and Crudu (2017) and Maradana et al. (2022) demonstrated a strong association between industrial development and economic growth, emphasising the role of industrial sectors in GDP growth and job creation. This consistency shows that industrialisation drives economic growth and prosperity. The lack of a statistically significant association between employment (EMP) and GDPPC suggests that industry (% of total employment) alone may not drive economic development in the chosen European nations investigated. This contradicts earlier research on employment's role in economic growth. Acemoglu and Autor (2011) and Kapsos (2005) found that employment intensity boosts economic growth.

The GINI index's statistically significant positive influence on GDPPC shows that nations with more income inequality have higher per capita GDP. However, this relationship's consequences are complicated and require additional study. Depending on context and policy, high income disparity can boost or hinder economic growth. Income disparity may increase GDPPC through several processes. Income disparity may indicate an industrious, inventive populace that fosters economic progress. Countries with high income inequality and successful entrepreneurs may have greater GDPPC. In this

case, income disparity results from a thriving economy. Income disparity also encourages economic success. Higher salaries can inspire people to study, learn new skills, and start businesses, boosting productivity and economic growth. Income disparity may boost economic growth by encouraging competitiveness, innovation, and wealth creation. However, substantial income disparity may harm economic growth. Income disparity may stifle economic and social progress. Wealth concentration can limit possibilities and prevent upward mobility. Social discontent, political instability, and social cohesiveness can hinder economic progress. Income production drives economic progress and poverty alleviation, according to several research. World Bank (2019) links greater income levels to economic progress. Berg and Ostry (2011) and Datt and Ravallion (2010) also highlighted income generation's impact on poverty and living standards.

CHAPTER FIVE

SUMMARY CONCLUSION AND RECOMMENDATIONS

5.1 Preamble

In this chapter finings made from the study is summarized and suggestions are made. This chapter synthesises major results, discusses their consequences, and makes practical suggestions for European and other economic development officials, researchers, and stakeholders.

5.2 Summary of Findings

Industrialization boosts GDPPC, suggesting countries should promote and invest in industrial growth. Industrial development may boost per capita GDP, showing economic progress and prosperity. The lack of a statistically significant link between industry employment and GDPPC suggests that increasing industry employment may not directly increase per capita GDP. Productivity, technology, and skill development may drive economic growth more. Income inequality increases GDP per capita in nations with more income disparity. This raises questions regarding wealth and opportunity distribution. To promote economic growth and equity, policymakers should address income disparity. Inflation rates may not affect per capita GDP since they are not statistically significant. However, inflation stability and management may still affect macroeconomic stability and growth. Trade openness boosts GDPPC statistically. Trade-active nations have greater GDP per capita. Trade liberalisation, trade barrier reduction, and trade policy may boost economic growth. The absence of statistical significance between population growth rate and GDPPC suggests that population increase does not affect per capita GDP. Thus, age structure, education, and labour force participation are important demographic determinants that might indirectly affect economic development.

5.3 Conclusions

We analysed industrialization, employment, income, and economic development in selected European nations from 2015 through 2021. Global Value Chains (GVC) theory, which emphasises industrialization and global production networks for economic growth, drove the study. The Panel Least Square (PLS) model allowed robust statistical inference using panel data. Our findings illuminate economic progress in the selected European nations over the research period. Industrialization—measured by SOMGDP—had a statistically significant positive influence on GDPPC. This shows that industrial expansion and global value chain integration boost per capita GDP. According to the GVC hypothesis, industrialisation boosts economic development.

The GDPPC-industry employment link was not statistically significant. This suggests that industry sector employment does not significantly affect per capita GDP in selected European nations. This shows that productivity, technological adoption, and skill development may affect economic growth more than industrial employment. GDPPC was positively correlated with GINI INDEX income inequality. Income disparity increases per capita GDP. However, this relationship's consequences are complicated and require additional study. Depending on context and policy, high income disparity can boost or hinder economic growth. Policymakers should tread carefully when addressing economic inequality and ensuring wealth and opportunity distribution. Inflation and GDPPC did not have a statistically meaningful link. Inflation rates may not directly affect per capita GDP in the selected European nations. However, macroeconomic stability and sustainable economic growth depend on inflation stability. Trade openness, as measured by "Trade openness," has a statistically significant beneficial influence on GDPPC. International commerce and global value chains are crucial for economic progress. Trade liberalisation, trade barrier reduction, and trade policies can boost per capita GDP and economic growth in chosen European nations. Finally, GDPPC did not correlate with population growth rate. Population increase does not considerably affect per capita GDP in the chosen European nations. Age structure, education, and labour force participation might indirectly impact economic development, thus these must be considered. In conclusion, this study sheds light on industrialization, employment, income creation, and economic progress in chosen European countries during seven years. Industrialization and trade openness boost economic development but raise income inequality problems. Policymakers in selected European nations should study these results and establish comprehensive measures to boost industrial development, reduce income inequality, and support favourable trade policies to ensure sustainable and equitable economic growth.

54. Recommendations

The study made the following recommendations based on the findings:

i. Industrialization boosts per capita GDP, hence authorities should prioritise industrial growth. This may involve encouraging industry investment, supporting R&D, and encouraging innovation and technical growth. Industrial competitiveness and global value chain integration can support economic growth.

ii. Income disparity positively affected GDPPC, but extreme levels of inequality can harm society and the economy. Policymakers should minimise economic inequality and distribute

wealth and opportunity. Progressive taxation, social safety nets, education and skills development, and inclusive growth may be included.

iii. Inflation does not directly affect GDPPC, but macroeconomic stability is essential for economic growth. Policymakers should continue to focus on monetary and fiscal policies that limit inflation, stabilise prices, and maintain effective macroeconomic management. This will boost corporate confidence and economic growth.

iv. The statistically substantial positive effect of trade openness on GDPPC emphasises the importance of international commerce and global value chains. Policymakers should liberalise trade, lower trade barriers, and negotiate favourable trade agreements. They should also help firms expand exports, enter new markets, and compete globally.

v. This study found no significant association between population growth rate and GDPPC, but demographic issues might indirectly affect economic development, thus they must be monitored. Age structure, education, and labour force participation rates can affect long-term economic growth and productivity, thus policymakers should consider these.

vi. Countries may promote sustainable economic growth by enacting targeted policies, providing an industrialization-friendly climate, addressing income inequality, preserving macroeconomic stability, increasing trade openness, and considering demographic concerns. Policymakers must analyse these aspects' interactions and customise policies to their country's setting and difficulties. Countries may achieve inclusive, successful economic development for all by doing so.

5.4 Contributions to Knowledge

The research expands industrialization and economic development literature in various ways:

The study increases knowledge of industrial sectors' significance in economic growth by giving empirical data on the beneficial association between industrialization and economic development. The results support the idea that industrialisation boosts economic growth. The study adds geographical variety to empirical research on this problem by offering particular findings in chosen European nations.

The study analyses industrialisation, employment, income creation, and economic development using GVC Theory. This approach helps the research comprehend how industrialization and global manufacturing networks boost economic growth. It shows how value chain participants affect economic development. This GVC theory application helps policymakers and scholars comprehend economic development dynamics in the context of global integration.

The research examines industrialization, employment, income creation, and economic development to better comprehend the complex processes of economic development. It explains how these factors affect each other. This conceptual foundation helps policymakers and academics create and implement successful economic development initiatives.

The research examines industrialization and economic growth in chosen European countries. The literature, which typically includes regional studies, benefits from this spatial focus. The research considers Europe's distinctive traits, difficulties, and prospects. This context-specific study helps policymakers establish sustainable growth policies and comprehend industrialization's influence on European economic development.

The study's empirical findings, GVC theory application, conceptual background, and context-specific analysis advance knowledge. These findings help policymakers, scholars, and practitioners comprehend industrialization's impact in economic growth. The study's findings can inform inclusive and sustainable economic growth research, policy, and strategy.

5.5 Limitations and Area for Further Study

The European research on industrialization's effects on employment, income, and economic development sheds light on these links. The study's shortcomings and opportunities for additional investigation must be acknowledged. The study's European country concentration is a drawback. This allows for regional comparisons, but the results may not apply to other areas or nations. To gain a broader global perspective on industrialization's effects on economic growth, future research might include nations from Asia, Africa, and the Americas. Researchers can find regional differences and causes by investigating a wider range of nations. This will help explain economic progress and industrialisation. Study time is another barrier. Technology, globalisation, and governmental interventions may affect industrialization's effects on employment, income, and economic development. To capture the dynamic character of these interactions, future research should examine longer time periods and longitudinal analysis. This would allow academics to study the long-term impact of industrialisation on economic development and find any trends.

Other economic growth aspects may also aid the research. Governance and institutional quality influence economic results. Future study should examine how industrialisation affects governance indicators including corruption, regulatory frameworks, and property rights. Transportation, energy, and telecommunications infrastructure development also affects industrialisation and economic growth. Understanding industrialization, infrastructure, and economic effects might help explain the mechanisms.

The investigation might also address environmental sustainability. Understanding the trade-offs between economic growth and environmental sustainability is essential. Industrialization's effects on environmental issues including carbon emissions, resource consumption, and pollution would improve economic development assessments. In conclusion, the study sheds light on Europe's industrialization, employment, income, and economic progress, although it has limits. These findings must be confirmed in other areas, time periods, and countries. Governance, institutional quality, infrastructure, and environmental sustainability may impact economic development in future research. Addressing these constraints and increasing the breadth of study will help scholars comprehend the intricate connections between industrialisation and economic development.

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Appendix

YEAR	PANEL	COUNTRY	GDPpc	SOMGDP	EMP	INCOME	INFLATION	TOP	POPGr
2015	1	AUSTRIA	-0.11154	16.69004	25.76426	30.5	0.8965633	102.4273	6.936649
2016	1	AUSTRIA	0.892469	17.04741	25.56261	30.8	0.8915918	100.9821	6.941346
2017	1	AUSTRIA	1.550724	16.84271	24.92232	29.7	2.0812691	104.9388	6.944363
2018	1	AUSTRIA	1.927713	16.82875	25.43544	30.8	1.9983798	107.9236	6.946478
2019	1	AUSTRIA	1.06697	16.59101	25.35589	30.2	1.5308956	107.886	6.948409
2020	1	AUSTRIA	-6.84154	16.41186	25.05321	29.8	1.3819106	100.2236	6.950212
2021	1	AUSTRIA	4.102317	16.54585	25.62526	30.6	2.7666667	111.2223	6.952104
2015	2	GERMANY	0.617105	20.3479	27.68915	31.4	0.5144261	86.24622	7.912151
2016	2	GERMANY	1.408102	20.66187	27.38175	31.4	0.491747	84.76965	7.915657
2017	2	GERMANY	2.297206	20.39034	27.40436	31.9	1.5094949	87.2372	7.91728
2018	2	GERMANY	0.678213	20.03884	27.33956	31.8	1.7321688	88.51987	7.918585
2019	2	GERMANY	0.828958	19.55664	27.18228	31.7	1.4456598	87.68641	7.919564
2020	2	GERMANY	-3.77543	18.70475	27.45272	32.03333	0.1448779	80.39831	7.919919
2021	2	GERMANY	2.583557	18.85506	27.6249	32.36667	3.0666667	88.74278	7.920103
2015	3	FRANCE	0.754024	10.43366	20.31859	32.7	0.0375144	61.75169	7.823137
2016	3	FRANCE	0.829057	10.28302	20.23168	31.9	0.1833349	61.10014	7.824283
2017	3	FRANCE	1.994998	10.13629	20.41102	31.6	1.0322828	62.96185	7.825543
2018	3	FRANCE	1.500539	9.971751	20.23267	32.4	1.8508151	64.43795	7.8271
2019	3	FRANCE	1.495899	10.00781	20.392	31.2	1.1082549	64.14147	7.828583
2020	3	FRANCE	-8.03447	9.267383	19.96478	30.7	0.4764989	56.86382	7.829761
2021	3	FRANCE	6.53512	8.87943	19.49668	33.05	1.6423314	60.83967	7.830907
2015	4	ITALY	0.875477	14.39537	26.60003	35.4	0.0387904	56.41818	7.783407
2016	4	ITALY	1.46569	14.79103	26.12248	35.2	-0.0940167	55.3676	7.78267
2017	4	ITALY	1.820334	14.91387	26.00163	35.9	1.2265332	58.60418	7.782019
2018	4	ITALY	1.117817	15.00978	26.10299	35.2	1.1374876	60.30355	7.781193
2019	4	ITALY	1.648503	14.88416	25.86684	34.6	0.6112469	59.87898	7.776186
2020	4	ITALY	-8.59581	14.57807	26.37132	35.2	-0.1377076	55.28629	7.77407
2021	4	ITALY	7.331699	14.90227	26.63942	35.7	1.8737833	62.98312	7.771659
2015	5	SPAIN	3.919117	11.29403	19.90368	36.2	-0.5003657	64.18321	7.666937
2016	5	SPAIN	2.950816	11.26496	19.60608	35.8	-0.202598	63.73988	7.667304
2017	5	SPAIN	2.734475	11.32799	20.05745	34.7	1.9560763	66.65706	7.668323
2018	5	SPAIN	1.83746	11.02687	20.33286	34.7	1.6749814	67.57494	7.670225
2019	5	SPAIN	1.254632	10.91382	20.43057	34.3	0.699519	66.87389	7.673342
2020	5	SPAIN	-11.7576	11.01487	20.53055	34.9	-0.322753	60.14317	7.675464
2021	5	SPAIN	5.408113	11.53523	20.18662	31.55	3.0931351	68.38178	7.675923
2015	6	NETHERLANDS	1.508266	10.80176	16.43093	28.2	0.6002481	157.8166	7.228911
2016	6	NETHERLANDS	1.649316	10.85105	16.48334	28.2	0.3166667	148.8587	7.231223
2017	6	NETHERLANDS	2.304285	11.05242	16.52443	28.5	1.3814587	156.0282	7.23379
2018	6	NETHERLANDS	1.764937	11.05716	16.17081	28.1	1.7034979	158.8232	7.236326
2019	6	NETHERLANDS	1.289889	10.77442	16.11124	29.2	2.6336991	155.2707	7.239171

2020	6	NETHERLANDS	-4.41856	10.82646	15.96049	26	1.2724604	146.4618	7.241584
2021	6	NETHERLANDS	4.315704	10.82762	13.94965	27.6	2.6757201	155.7001	7.243857
2015	7	SWEDEN	3.390176	13.60517	18.28653	29.2	-0.0467847	83.72381	6.99119
2016	7	SWEDEN	0.796146	13.19187	18.19933	29.6	0.9842692	82.32065	6.996647
2017	7	SWEDEN	1.195148	13.04553	18.16445	28.8	1.794499	84.93475	7.002499
2018	7	SWEDEN	0.772577	13.03144	18.17906	30	1.9535353	89.1312	7.007544
2019	7	SWEDEN	0.957562	12.80441	18.41933	29.3	1.784151	91.43383	7.011946
2020	7	SWEDEN	-2.87468	12.36083	18.31175	28.9	0.4973673	83.211	7.015085
2021	7	SWEDEN	4.445904	12.67778	18.15228	28.3	2.1631974	86.68557	7.017693
2015	8	BELGIUM	1.451893	12.69333	21.4341	27.7	0.5614292	154.1925	7.052086
2016	8	BELGIUM	0.755269	12.35694	21.26316	27.6	1.9738526	157.665	7.054284
2017	8	BELGIUM	1.228866	12.42912	20.75685	27.4	2.1259709	165.3258	7.055957
2018	8	BELGIUM	1.330652	12.17368	21.06258	27.2	2.053165	166.4948	7.057934
2019	8	BELGIUM	1.689776	12.34627	20.83656	27.2	1.4368196	164.1769	7.060281
2020	8	BELGIUM	-5.7684	12.29192	20.40908	26	0.7407918	157.1807	7.062153
2021	8	BELGIUM	5.636308	12.31996	19.37079	28.9	2.4402485	172.6745	7.064194
2015	9	POLAND	4.452884	17.86907	30.53658	31.8	-0.8741259	92.81879	7.579628
2016	9	POLAND	2.997773	18.4849	31.44747	31.2	-0.6647673	97.53994	7.579442
2017	9	POLAND	5.126897	17.09098	31.66676	29.7	2.0759355	101.2812	7.579496
2018	9	POLAND	5.945421	16.75377	31.81651	30.2	1.8129516	103.4505	7.579495
2019	9	POLAND	4.475505	16.92499	32.13301	28.8	2.2274788	102.6887	7.579389
2020	9	POLAND	-1.84839	16.47229	31.68234	28.36667	3.3744697	100.3242	7.578629
2021	9	POLAND	7.277815	16.72083	30.9338	27.93333	5.055027	112.4456	7.576884
2015	10	NORWAY	0.957501	6.873817	20.12406	27.5	2.1711367	69.85917	6.715051
2016	10	NORWAY	0.18506	6.562082	19.46732	28.5	3.55	68.94032	6.718877
2017	10	NORWAY	1.500181	6.400381	19.40472	27	1.8751006	69.16442	6.722384
2018	10	NORWAY	0.45355	5.996342	19.46661	27.6	2.7648313	70.20963	6.725251
2019	10	NORWAY	0.067993	6.181058	19.42179	27.7	2.16773	71.0444	6.728183
2020	10	NORWAY	-1.3	6.509326	19.46123	28.1	1.2865849	65.33048	6.73074
2021	10	NORWAY	3.326892	5.494531	19.15668	28.5	3.4838806	70.88756	6.733062

Source: World Development Indicators (WDI, 2021)

Correlated Random Effects - Hausman Test
Equation: Untitled
Test cross-section random effects

Test Summary	Chi-Sq. Statistic	Chi-Sq. d.f.	Prob.
Cross-section random	27.602009	6	0.0001

Cross-section random effects test comparisons:

Variable	Fixed	Random	Var(Diff.)	Prob.
SOMGDP	1.949661	-0.003456	0.898510	0.0394
EMP	-0.832252	0.055864	0.689896	0.2850
INCOME	1.174138	0.610643	0.138156	0.1295
INFLATION	1.080602	1.415246	0.193227	0.4465
TOP	0.324823	0.031166	0.016426	0.0219
POPGR	-76.489302	-0.550436	6746.773940	0.3552

Cross-section random effects test equation:
Dependent Variable: GDPPC
Method: Panel Least Squares
Date: 06/06/23 Time: 01:38
Sample: 2015 2021
Periods included: 7
Cross-sections included: 10
Total panel (balanced) observations: 70

Variable	Coefficient	Std. Error	t-Statistic	Prob.
C	489.8968	620.2600	0.789825	0.4331
SOMGDP	1.949661	0.968299	2.013491	0.0491
EMP	-0.832252	0.845246	-0.984627	0.3292
INCOME	1.174138	0.451931	2.598048	0.0121
INFLATION	1.080602	0.554911	1.947341	0.0567
TOP	0.324823	0.129337	2.511446	0.0150
POPGR	-76.48930	82.15226	-0.931068	0.3560

Effects Specification

Cross-section fixed (dummy variables)

R-squared	0.510767	Mean dependent var	1.162155
Adjusted R-squared	0.374869	S.D. dependent var	3.445021
S.E. of regression	2.723814	Akaike info criterion	5.039575
Sum squared resid	400.6348	Schwarz criterion	5.553517
Log likelihood	-160.3851	Hannan-Quinn criter.	5.243719
F-statistic	3.758453	Durbin-Watson stat	2.468128
Prob(F-statistic)	0.000165		

Dependent Variable: GDPPC
Method: Panel Least Squares
Date: 06/06/23 Time: 01:39
Sample: 2015 2021
Periods included: 7
Cross-sections included: 10
Total panel (balanced) observations: 70

Variable	Coefficient	Std. Error	t-Statistic	Prob.
C	489.8968	620.2600	0.789825	0.4331
SOMGDP	1.949661	0.968299	2.013491	0.0491
EMP	-0.832252	0.845246	-0.984627	0.3292
INCOME	1.174138	0.451931	2.598048	0.0121
INFLATION	1.080602	0.554911	1.947341	0.0567
TOP	0.324823	0.129337	2.511446	0.0150
POPGR	-76.48930	82.15226	-0.931068	0.3560

Effects Specification

Cross-section fixed (dummy variables)

R-squared	0.510767	Mean dependent var	1.162155
Adjusted R-squared	0.374869	S.D. dependent var	3.445021
S.E. of regression	2.723814	Akaike info criterion	5.039575
Sum squared resid	400.6348	Schwarz criterion	5.553517
Log likelihood	-160.3851	Hannan-Quinn criter.	5.243719
F-statistic	3.758453	Durbin-Watson stat	2.468128
Prob(F-statistic)	0.000165		