1. **Tax and consumer spending**

Summary of Key Findings

1. **Effects of Tax on Consumer Spending:** Tax changes significantly influence consumer spending. For example, permanent income tax cuts typically encourage higher spending, as consumers adjust their financial planning based on the expectation of long-term increased disposable income. Temporary tax cuts, however, tend to produce smaller and delayed spending increases, as consumers are less likely to make substantial changes in spending when the tax reduction is expected to be short-lived (Steindel, 2001).
2. **Life Cycle–Permanent Income Theory:** According to this theory, consumers tend to smooth their consumption over their lifetime, adjusting their spending based on their "permanent" income rather than temporary fluctuations. Permanent changes in income (such as tax cuts) affect consumer behavior more than temporary ones. Consumers anticipate and adjust their spending primarily when they believe the income change is long-term (Steindel, 2001).
3. **Vietnam's Taxation System:** The equity of Vietnam's tax system remains a subject of debate. While efforts have been made to reduce the tax burden on businesses and individuals, critics argue that the reliance on indirect taxes, such as VAT, disproportionately impacts lower-income citizens. This system contrasts with the smaller contribution of personal income tax, which primarily affects higher-income individuals (Le & Nguyen, 2022).
4. **Impact of Temporary VAT Changes on Consumer Behavior in Vietnam:** Temporary reductions in VAT rates, such as the drop from 10% to 8% in 2022, have stimulated consumer spending on necessities like food and daily goods, but have led to reduced spending on luxury or entertainment-related products. Consumers perceive temporary VAT reductions as short-term relief and tend to allocate the saved money towards essential items (Doan & Trinh, 2024).
5. **VAT vs. Income Tax:** VAT, being an indirect tax, tends to have a more immediate and noticeable effect on consumer behavior compared to income tax, which is more integrated into personal financial planning. Since VAT directly influences the price of goods, consumers feel its impact immediately upon purchase. Income tax, on the other hand, is less perceptible and primarily influences long-term financial decisions (Doan & Trinh, 2024).

Essay on Tax and Consumer Spending

Introduction

Tax policies play a critical role in shaping consumer behavior and influencing the overall economy. Taxes, both direct and indirect, can alter spending patterns by changing disposable income and affecting consumer confidence. This essay examines the impact of tax changes on consumer spending, the Life Cycle–Permanent Income Theory, and the fairness of Vietnam's tax system. Additionally, it explores how temporary VAT reductions influence consumer perceptions and compares the effects of VAT and income tax on consumer behavior.

Effects of Tax on Consumer Spending

The relationship between tax changes and consumer spending has been widely studied, with evidence suggesting that permanent tax cuts have a more significant impact on spending than temporary ones. A study on the effects of tax cuts in the U.S. revealed that consumers tend to increase their spending more when they perceive the tax change as permanent (Steindel, 2001). In contrast, temporary tax cuts, such as one-time rebates, tend to lead to smaller and delayed increases in spending. For instance, during the 1975 U.S. tax rebate, consumers saved much of the rebate rather than spending it immediately (Steindel, 2001). This suggests that while tax cuts can stimulate consumer spending, their effectiveness depends on whether they are perceived as long-term or temporary.

Life Cycle–Permanent Income Theory of Spending

The Life Cycle–Permanent Income Theory provides a theoretical framework for understanding how consumers adjust their spending in response to changes in income. According to this theory, individuals seek to maintain stable consumption over their lifetimes, smoothing out temporary fluctuations in income. Thus, a permanent increase in income, such as a tax cut, is more likely to result in increased spending than a temporary boost. For example, if a government reduces income tax permanently, consumers are more likely to feel confident in increasing their spending, knowing their disposable income will remain higher in the long term (Steindel, 2001). Conversely, temporary income increases, such as short-term tax cuts, are less likely to change consumer behavior significantly.

Fairness of Vietnam's Taxation System

Vietnam's taxation system, particularly its reliance on indirect taxes such as Value-Added Tax (VAT), raises concerns about fairness. While Vietnam has made efforts to improve its tax system, including reducing the tax burden on businesses, critics argue that the increasing share of indirect taxes disproportionately affects

lower-income households (Le & Nguyen, 2022). Unlike personal income tax, which mainly affects higher-income individuals, VAT applies universally, impacting all consumers regardless of income. This can lead to a regressive effect, where lower-income individuals pay a higher proportion of their income in taxes, thus questioning the fairness of the current system.

Temporary VAT Changes and Consumer Behavior in Vietnam

Temporary VAT reductions, such as Vietnam's reduction from 10% to 8%, have been implemented to stimulate consumer demand. Research shows that these temporary cuts have a noticeable impact on consumer behavior, particularly among low- and middle-income groups. Consumers tend to allocate the savings from reduced VAT rates to essential goods like groceries and daily necessities, while luxury or discretionary spending often remains unchanged or even declines (Doan & Trinh, 2024). This behavior indicates that temporary VAT cuts provide immediate relief for consumers, especially in times of economic uncertainty, but may not lead to sustained increases in overall spending.

Comparison of VAT and Income Tax

VAT and income tax differ in their effects on consumer behavior. VAT, as an indirect tax, has a direct impact on the price of goods and services, making it immediately perceptible to consumers. Any changes in VAT rates are reflected in the prices of products, leading to immediate adjustments in consumer spending patterns. For example, a reduction in VAT rates may prompt consumers to increase their spending on essential goods (Doan & Trinh, 2024). Income tax, on the other hand, is less visible in day-to-day transactions and tends to influence long-term financial planning rather than immediate consumption. Therefore, while VAT changes directly impact consumer spending, income tax changes may have more subtle, long-term effects on financial behavior.

Conclusion

Tax policies significantly influence consumer spending behavior, with permanent tax cuts generally leading to more pronounced spending increases than temporary cuts. The Life Cycle–Permanent Income Theory explains that consumers are more likely to adjust their spending when they perceive income changes as long-term. In Vietnam, the reliance on VAT has raised questions about the fairness of the tax system, particularly for lower-income groups. Temporary VAT reductions have shown to provide short-term relief but may not lead to sustained spending increases. Overall, VAT tends to have a more direct and immediate effect on consumer behavior compared to income tax.

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2. PROTECTIONISM: TRADE WARS

2.1 INTRODUCTION

The recent U.S.-China trade tensions and the COVID-19 pandemic have triggered significant disruptions in global supply chains, leading to inflationary pressures and stockouts across multiple sectors. The tech war between the U.S. and China, particularly in semiconductors, has compounded these challenges, raising the cost of goods, stifling innovation, and threatening national security. Additionally, protectionist policies like tariffs have exacerbated the rise in prices, with industries ranging from electronics to essential goods experiencing shortages. This case study analysis explores the interplay between protectionism, inflation, and global supply chain disruptions, examining how these factors contribute to persistent economic instability.

2.2 BODY - KEY FINDINGS

2.2.1. Supply Chain Disruptions and Inflation

- **Persistent Inflation Due to Supply Shocks:** The pandemic caused widespread shortages, from essential goods to high-tech products like electronics. Stockouts, initially seen as temporary, have turned into permanent shortages in sectors such as food and electronics. These shortages have driven prices higher, making inflation more prolonged than initially expected.
- **Sectoral Differences in Impact:** Some sectors have seen a return to pre-pandemic production levels, but others—like food and electronics—continue to face severe stockouts. These shortages translate directly into price increases, with inflation persisting in sectors where goods remain in short supply.
- **Price Response to Stockouts:** Research indicates that stockouts lead to immediate price increases, with inflation typically peaking about seven weeks after stockouts rise. Prices remain elevated for three to four months following significant supply disruptions, especially in sectors with ongoing shortages.

2.2.2. Protectionism and Its Role in Exacerbating Prices

- **Trade Wars and Tariffs Increasing Costs:** The U.S.-China trade war, particularly focused on semiconductors, has disrupted global trade routes, raising the cost of imports and production. U.S. tariffs on Chinese goods and China's retaliatory measures have led to increased prices for consumers, especially in technology-driven sectors such as AI, 5G, and electronics.

- **Impact of Semiconductor Sanctions**: Semiconductors are at the center of the U.S.-China rivalry, given their strategic importance in AI, 5G, and defense technologies. U.S. sanctions have disrupted China's access to advanced semiconductor technologies, which has led to short-term challenges but has also spurred Chinese innovation to develop domestic alternatives. Companies like Huawei have started producing local chips, while U.S. firms like Nvidia have suffered from restricted market access in China.
- **Reduced Product Variety and Higher Prices:** Protectionist policies have resulted in reduced product variety on the shelves, limiting consumer choice and keeping prices elevated. Stockouts in key sectors due to tariffs and trade restrictions have further driven price increases, with domestic producers unable to compensate for the loss of imported goods.

2.2.3. Technology as a Geopolitical Battlefield

- **Semiconductors as a Strategic Asset:** The U.S.-China tech war revolves around control over semiconductor technology, essential for industries like AI and 5G. U.S. export restrictions have slowed China's technological advancement in the short term but have incentivized Chinese companies to innovate domestically, potentially reshaping global tech leadership in the long run.
- **Innovation vs. Security:** While trade restrictions on China are aimed at protecting U.S. national security interests, particularly in military applications, they have had unintended consequences. The restrictions have spurred China to invest heavily in self-sufficiency, creating new competition in global markets for semiconductor technology.

2.3. CONCLUSION

Inflation, supply chain disruptions, and protectionism are deeply interconnected in today's global economy. Persistent stockouts in key sectors such as food and electronics, driven by both the COVID-19 pandemic and trade policies, have resulted in prolonged inflationary pressures. Protectionist policies, particularly the U.S.-China trade war and its focus on semiconductors, have raised production costs and limited consumer choice, contributing to higher prices.

While protectionism is often viewed as a way to secure domestic industries, it can lead to inefficiencies and unintended consequences. The U.S. sanctions on Chinese semiconductors have temporarily slowed China's technological progress but may accelerate Chinese innovation and self-reliance, reshaping the global technology landscape in the process.

To mitigate future economic instability, diversification of supply chains and fostering international cooperation may be key strategies. Companies and governments need to reduce their dependence on a single source for critical products, which can help stabilize prices and supply during global disruptions. In the long term, balancing innovation and security concerns will be crucial as global power dynamics continue to evolve in the tech-driven economy.

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3. Interest rate and exchange rate

- **Summary of the Case Study on Interest Rate Risk Management: ABC Depository**

Aspect	**Details**
Institution	ABC Depository – community-based financial institution in the Southwest
Assets	$226.9M in total assets
Portfolio Composition	$99.5M in loans and leases, $51.5M in investments, and $75.9M in cash, equivalents, and other assets
Deposits	$180.1M in total deposits ($23.8M in transaction accounts, $156.3M in non-transaction accounts)
Capital Structure	$19.6M in capital, leverage ratio of 10.59%, total capital ratio of 21.97%

Issue	Net interest income of $1.2M, reduced to $0.4M after non-interest income and expenses, due to interest rate risk (IRR) pressures
Causes of Problem	- Prolonged low interest rates post-2008 financial crisis - Market disruption due to the COVID-19 pandemic
Resulting Impact	- Low-yielding assets (loans) - Increasing costs of deposits (rising funding costs) - Net interest margin (NIM) squeeze
Solution: Hedging Strategy	ABC chose Eris Swap Futures to hedge interest rate risk, which provided flexibility and cost efficiency compared to other instruments like OTC interest rate swaps or Treasury futures.
Targeted Loans for Hedging	Focused on fixed-rate loan portfolios (source of interest rate risk, these loans were expected to continue growing over time, increasing ABC's exposure to rate fluctuations): family residential and nonfarm business loans
Outcome of Hedging	- Hedging led to $1.2M gain, offsetting losses from low-yielding assets - Improved net interest margin

- **Based on key findings from 2 articles of Van Anh Pham and Vo Thi Quy, combined with the suggested question, we would like to point out some criteria in the relationship between interest rate and exchange rate.**

Interest rates and exchange rates are closely intertwined in any economy, and this relationship is particularly important in Vietnam, where monetary policy and external economic factors have significant impacts. Interest rate changes, monetary policy, and fiscal policies all play vital roles in shaping Vietnam's exchange rate and overall economic environment.

Interest Rates and Exchange Rate in Vietnam

Changes in interest rates can have a profound influence on the exchange rate in Vietnam. When the State Bank of Vietnam (SBV) raises interest rates, it often leads to an appreciation of the Vietnamese dong (VND) relative to other currencies. Higher interest rates make Vietnam an attractive destination for foreign investors seeking higher returns on investments, leading to an influx of foreign capital and increased demand for the dong, which pushes the exchange rate up *(Van Anh Pham, 2019) (Vo Thi Quy, 2024)*. Conversely, lower interest rates typically result in a depreciation of the currency, as investors move capital elsewhere in search of better returns.

Additionally, shifts in the U.S. Federal Reserve's interest rates can impact Vietnam's monetary policy and exchange rate. A rise in U.S. rates often forces Vietnam to adjust its own interest rates to prevent excessive capital outflow and maintain currency stability *(Van Anh Pham, 2019)*.

Impact of Fiscal Policies and Tax Cuts (indirect)

Fiscal policies, particularly government spending and tax cuts, also impact interest rates and, indirectly, the exchange rate. In Vietnam, tax cuts can stimulate domestic consumption and investment, increasing overall economic activity. However, if these cuts lead to budget deficits, the government may need to borrow more, which can drive up interest rates. Higher interest rates may again attract foreign investment, causing an appreciation of the exchange rate*(Van Anh Pham, 2019) (Vo Thi Quy, 2024)*. Conversely, excessive government borrowing can put upward pressure on interest rates, which could stifle private investment and alter the exchange rate dynamics.

Monetary Policy, Inflation, and Foreign Investment

Vietnam's monetary policy, particularly through its interest rate decisions, is a key tool for managing inflation. In periods of inflationary pressure, the SBV often raises interest rates to curb spending and slow inflation. This has a dual effect: it controls inflation but can also lead to currency appreciation as higher interest rates attract foreign capital *(Van Anh Pham, 2019)*. This influx of investment can stabilize or strengthen the exchange rate. However, the SBV must carefully balance these policies to avoid negative impacts on domestic growth and competitiveness.

Central Bank's Role and Foreign Investment

The SBV plays a pivotal role in managing both interest rates and the exchange rate. By adjusting interest rates in response to inflation and external economic conditions, the SBV influences both domestic economic stability and foreign

investment flows. An increase in interest rates generally encourages foreign investment, as it provides higher returns. However, if rates are raised too high, it can stifle domestic economic growth *(Van Anh Pham, 2019) (Vo Thi Quy, 2024)*.

Conclusion

In Vietnam, the relationship between interest rates and exchange rates is complex and influenced by both internal monetary policy and external global factors. Interest rate adjustments by the SBV directly impact the exchange rate, affecting foreign investment flows and inflation. Fiscal policies, particularly tax cuts and government borrowing, can also shape interest rate dynamics, adding further complexity to this relationship. As Vietnam continues to grow and integrate into the global economy, managing this delicate balance will be crucial for ensuring long-term economic stability.

Note: Some findings from the article of Vo Thi Quy with further discussion

The **interest rate spread (IRS)** is crucial in determining a bank's profitability. As examined by Vo Thi Quy and Pham Dang Tuan (2024), the IRS mediates the relationship between bank-specific factors and profitability. Variables such as **cost efficiency (CE), income diversity (ID), and liquidity risk (LIQ)** positively influence the IRS, enhancing bank profitability. However, other factors like **bank size (BS), non-performing loans (NPL), and non-interest expenses (NIE)** do not significantly impact the IRS(EconPapers). This highlights the importance of effective bank management in maintaining profitability through the management of interest rate spreads.

4. Environmental Economics and Sustainability

Essay

Introduction

The intersection of environmental economics and sustainability is increasingly influenced by technological advancements and innovative policies. This essay explores how digitalization supports green development and examines the impact of carbon trading mechanisms, particularly the European Union Emissions Trading System (EU ETS), highlighting their potential to foster sustainable economic growth while addressing regional disparities through tailored policy strategies.

Digitalization and Green Development

Integrating digitalization with green development is essential for sustainability. Technologies like Artificial Intelligence (AI), Big Data, and Geographic Information Systems (GIS) enable real-time monitoring of resource use and pollution, enhancing the accuracy of environmental impact assessments. Research shows that digitalization improves efficiency, reduces emissions, and drives technological innovation through green initiatives. This mutual reinforcement is vital for sustainable growth. A study reveals regional disparities in China, with eastern regions showing a higher Coupling Coordination Degree (CCD) than central and western areas, underscoring the need for differentiated policy approaches to ensure balanced progress.

Integrating Environmental Considerations in Corporate Decision-Making

Corporations significantly advance sustainability through mandated environmental reporting, enhancing transparency and accountability. Standardized sustainability metrics enable investors to assess corporate performance effectively. The concept of triple bottom line accounting encourages businesses to integrate social and environmental factors alongside financial metrics. Sustainable investment, supported by Environmental, Social, and Governance (ESG) criteria, redirects capital toward environmentally responsible companies. Green bonds finance renewable energy and sustainable agriculture projects, further promoting corporate sustainability.

Designing Effective Environmental Policies: Cap-and-Trade Systems vs. Carbon Taxes

Effective environmental policies are essential for controlling carbon emissions, with cap-and-trade systems and carbon taxes being two prominent tools. Cap-and-trade establishes a fixed cap on total emissions, allowing companies to trade allowances and promoting cost-effective reductions. However, price volatility can complicate long-term business planning. In contrast, carbon taxes provide price certainty, facilitating investments in low-carbon technologies, though setting the optimal tax level is challenging; a tax that is too low may lack effectiveness, while one set too high could burden low-income households.

The EU ETS exemplifies a successful cap-and-trade model, achieving a 10% reduction in emissions from 2005 to 2012, particularly during its second phase, without undermining economic competitiveness. This outcome aligns with the Porter Hypothesis, suggesting

that environmental regulations can enhance innovation and performance. Further analysis revealed that the EU ETS's impact varied across sectors, with stricter targets in later phases yielding significant reductions, demonstrating its effectiveness in emission control while supporting economic growth.

Policy Recommendations for Regional Disparities

Effective environmental policies can also address economic inequality and regional disparities, promoting sustainability and social equity. Progressive taxation and targeted subsidies, such as rebates for low-income households, ensure that vulnerable populations are not disproportionately affected. Revenue recycling, using environmental tax revenues for social programs or implementing Universal Basic Income, mitigates regressive impacts. Tailored policy responses are necessary, as illustrated by the EU ETS and studies on digital-green coupling coordination. Differentiated approaches based on local resource conditions and tightening emission allowances contribute to equitable and efficient emission control.

Conclusion

In summary, integrating digitalization into green development and implementing carbon trading mechanisms like the EU ETS highlight the evolving landscape of environmental economics and sustainability. Technological advancements enable resource-efficient growth, while market-based mechanisms effectively reduce emissions without compromising economic performance. Achieving balanced and sustainable growth requires tailored policies addressing regional disparities, demonstrating how innovative technology and regulatory frameworks can pave the way for a more sustainable economic future.

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- Biancalani, F., Gnecco, G., & Metulini, R. (Year). *The impact of the European Union emissions trading system on carbon dioxide emissions: a matrix completion analysis*.

Key Findings of "Research on the relationship of coupling coordination between digitalization and green development"

Qunzhi She, Jing Qian & Liangxi He's research delves into the interconnectedness of digitalization and green development. Their key findings include:

1. **Increasing Coupling Coordination:** The study indicates a positive trend in the coupling coordination degree (CCD) between digitalization and green development. This suggests that these two areas are becoming increasingly intertwined and mutually beneficial.
2. **Regional Disparities:** The CCD exhibits spatial non-equilibrium characteristics, with eastern regions demonstrating higher levels of coupling compared to other regions. This highlights the uneven development of digitalization and green initiatives across different geographical areas.
3. **Spatial Differences:** The spatial differences in CCD are gradually diminishing. This suggests a potential convergence in the development of digitalization and green practices over time.
4. **Catch-up Effect:** The study suggests a "catch-up effect" among regions with lower CCDs, indicating that they may be able to accelerate their development and narrow the gap with regions with higher CCDs.
5. **Steady State:** In the long run, the CCD of digitalization and green development is projected to reach a steady state. This implies a future equilibrium in the relationship between these two areas.

Conclusion

Overall low CCD: Most Chinese cities are still in the antagonistic or mildly disordered stages of CCD, indicating a need for improvement.

Regional disparities: Eastern regions have higher CCDs than central and western regions, but the latter are showing rapid growth.

Shrinking regional differences: Dagum Gini coefficient analysis shows a gradual decrease in regional disparities, with inter-regional differences being the main contributor.

Catch-up effect: Cities with lower CCDs are catching up with those with higher CCDs, suggesting a narrowing gap over time.

Convergence speed: The western region has a higher convergence speed than the eastern and central regions, indicating a potential improvement in polarization.

Positive future trend: The overall CCD is expected to have a positive trend, but achieving "leapfrog" development is unlikely.

Neighborhood influence: Low CCD neighborhoods can hinder regional development and reduce the overall CCD, while high CCD neighborhoods can play a positive role.

Recommendations for Promoting CCD of Digitalization and Green Development

- **Organic integration of digitalization and green development:**
  - Green reform of production, circulation, and consumption modes.
  - Improved resource allocation efficiency through digitization.
  - Industrial structure transformation and upgrading.
  - Optimal resource utilization.
  - Win-win for economic and environmental benefits.
  - Green digitalization to reduce energy consumption and carbon emissions.
  - Avoidance of repeated consumption during digital transformation.
- **Differentiated regional development policies:**
  - Reasonable macro-control and government functions.
  - Policy resource allocation to central and western regions.
  - Guidance for CCD in central and western regions.
  - Local development strategies aligned with resource endowments.
  - Promotion of digital and green collaborative development.
- **Dynamic understanding of CCD:**
  - Understanding the dynamic nature of CCD.
  - Addressing regional disparities, field interactions, and policy implementation lags.
  - Establishment of information sharing and monitoring mechanisms.

Key Findings of "The joint impact of the European Union emissions trading system on carbon emissions and economic performance"

by Antoine Dechezleprêtre, Daniel Nachtigall, and Frank Venmans investigates the effectiveness of the EU ETS in reducing carbon emissions and its impact on the economic performance of regulated firms.

1. **Significant carbon emission reductions:** The EU ETS has successfully induced carbon emission reductions of approximately 10% between 2005 and 2012. This indicates that the system has been effective in incentivizing firms to adopt cleaner technologies and reduce their carbon footprint.
2. **No negative impact on economic performance:** Despite concerns about the potential negative effects on economic competitiveness, the study found that the EU ETS had no significant adverse impact on the profitability, employment, or investment of regulated firms.
3. **Increased revenues and fixed assets:** In fact, regulated firms experienced an increase in both revenues and fixed assets, suggesting that the ETS may have even stimulated economic activity in some sectors.
4. **Explanation for findings:** The authors explore various explanations for these findings, including the possibility that firms may have adjusted their production processes or invested in more energy-efficient technologies to comply with the ETS requirements. Additionally, the allocation of allowances may have played a role in mitigating potential negative impacts.

Overall, the study provides strong evidence that the EU ETS has been effective in reducing carbon emissions without causing significant harm to the economic performance of regulated firms. These findings have important implications for the design and implementation of carbon pricing mechanisms in other regions and countries.

Conclusion

Reduction in Carbon Emissions: The EU Emissions Trading System (EU ETS) led to a statistically significant reduction in carbon emissions of around 10%, particularly during the second trading phase (2008-2012). The reduction was primarily driven by large

installations, with the chemical sector showing the largest reductions. The study found that more generous free allowances were associated with a lower treatment effect.

Economic Impact on Regulated Firms: The EU ETS led to a statistically significant increase in revenues and fixed assets of regulated firms, indicating positive economic impacts. No negative effects on economic performance were observed, which implies that the competitiveness of European industry was not harmed by the policy.

Compatibility with the Porter Hypothesis: The findings are consistent with the Porter hypothesis, which suggests that environmental regulations can drive innovation and improve competitiveness. However, further research is needed to fully explore the underlying drivers of these effects.

Positive Environmental and Economic Outcomes: Overall, the EU ETS achieved its goal of reducing emissions without harming the economic performance of regulated firms, supporting the notion that well-designed environmental regulations can deliver both environmental and economic benefits.

Key findings of "The impact of the European Union emissions trading system on carbon dioxide emissions: a matrix completion analysis" by Francesco Biancalani, Giorgio Gnecco, Rodolfo Metulini

Reduction in Carbon Dioxide Emissions: The study uses matrix completion analysis to estimate the causal effect of the European Union Emissions Trading System (EU ETS) on carbon dioxide (CO_2) emissions. The results show that the EU ETS has significantly contributed to reducing CO_2 emissions. The analysis reveals that sectors covered by the EU ETS experienced more substantial reductions compared to those not covered by the system.

Sector-Specific Effects: The impact of the EU ETS on emissions reduction varies across sectors. The most significant reductions are found in energy-intensive sectors. This suggests that the trading system has been effective in curbing emissions in industries with higher pollution levels.

Effectiveness of Phases: The study assesses the impact of different phases of the EU ETS. It finds that the later phases, which introduced stricter targets and more robust market

mechanisms, were more effective in achieving emission reductions compared to the initial phase. The improvements in the design of the system over time have led to more effective emissions control.

Methodology and Robustness: The use of matrix completion as an analytical tool is highlighted as a robust way to account for missing data and create a counterfactual scenario for emissions without the EU ETS. This approach enables the authors to confidently attribute the observed reductions in emissions to the policy.

Policy Implications: The findings indicate that emissions trading can be an effective tool for reducing greenhouse gas emissions without imposing excessive economic costs. The study suggests that tightening the allocation of allowances and increasing market stringency over time can lead to more substantial emissions reductions, supporting the idea of a progressive approach to carbon market regulation.

Conclusion

Impact of the EU ETS on CO_2 Emissions Reduction: The EU Emissions Trading Scheme (EU ETS) was found to significantly reduce CO_2 emissions. The study used a novel approach called Matrix Completion with Fixed Effects (MCFE) to assess this impact, finding that the reductions are likely greater than those previously reported in the literature. This suggests that prior studies may have underestimated the reduction due to limitations in their methodologies and data coverage.

Use of Matrix Completion with Fixed Effects (MCFE): The adoption of MCFE allowed for a more precise evaluation of the EU ETS impact. Unlike conventional methods such as Propensity Score Matching (PSM) or the Synthetic Control Method (SCM), MCFE proved more suitable for policy evaluation, particularly when finding appropriate control groups is challenging. The robust statistical tests employed showed that the effect of the EU ETS was statistically significant.

Policy Implications:

- The findings suggest that similar emissions trading policies could be beneficial for countries with similar economic and environmental profiles to those in the EU.
- The study's methodology can also be applied to evaluate the environmental impact of other policies, offering a valuable tool for rigorous impact assessment.

- Additionally, the methodology could be used for predictive purposes when data from some countries are incomplete or available sequentially, making it useful for addressing gaps in the availability of emissions data.

Monetary Impact of CO_2 Reduction: The study briefly mentions the potential to express CO_2 reduction in monetary terms as a future research direction. Quantifying the reduction's monetary value would allow for a more comprehensive understanding of the policy's benefits in economic terms.

Future Research Directions:

- Address potential confounding factors like population and GDP growth, which might influence emission estimates.
- Increase the granularity of the analysis by examining emissions at a more detailed industry level, which would help understand the heterogeneous impact of the EU ETS across sectors.
- Evaluate phase-specific impacts of the EU ETS to understand how the different stages of the policy contributed to emissions reductions.
- Develop more sophisticated models to quantify the trade-off between emissions reduction and potential adverse economic effects, such as the decline in output due to carbon pricing.
- Use other machine learning methods like multivariate Gaussian processes or deep learning for counterfactual prediction, which could enhance the robustness and accuracy of future impact assessments.

Carbon emission

1. **How can policymakers balance economic growth with environmental sustainability?**
    - This question offers a rich field for exploring the trade-offs and synergies between environmental policies and economic expansion, considering real-world examples of policies and strategies.
2. **How can we design tax and subsidy policies that effectively reduce pollution without causing economic harm?**
    - This allows for an exploration of economic tools like carbon taxes, subsidies for green technologies, and their impact on industries and consumers, along with a discussion on mitigating negative economic consequences.

3. **What are the pros and cons of cap-and-trade systems versus carbon taxes?**
    - This question opens the door to compare two key economic instruments for controlling emissions, discussing their effectiveness, political feasibility, and potential economic impacts.
4. **How can environmental economics contribute to achieving the United Nations' Sustainable Development Goals?**
    - This topic can examine how environmental economic strategies align with global development goals such as clean energy, responsible consumption, and climate action.
5. **What role does innovation and technology play in advancing environmental economic goals?**
    - This question is ideal for discussing the intersection of economic policies with technological advancement, including how innovation can support carbon reduction and sustainability initiatives.

Essay:

Balancing Economic Growth with Environmental Sustainability: A Policy Perspective

The tension between economic growth and environmental sustainability has been a central focus of policymakers for decades. As the world faces increasing environmental challenges like climate change and resource depletion, finding solutions that promote economic progress while minimizing environmental harm is critical. This essay explores five key aspects of environmental economics, including balancing growth with sustainability, the design of effective pollution-reducing policies, comparing cap-and-trade systems with carbon taxes, contributing to the UN's Sustainable Development Goals, and the role of innovation in achieving these aims.

1. Balancing Economic Growth with Environmental Sustainability

Balancing economic growth with environmental sustainability is one of the most pressing challenges for policymakers. On one side, economic growth provides essential resources for improving living standards, but it also leads to higher consumption of natural resources and pollution. Policymakers must create frameworks that foster growth without depleting environmental resources. This balance can be achieved by promoting green industries, encouraging the use of clean energy, and enforcing stricter environmental regulations without stifling innovation and economic dynamism. For instance, renewable energy investments and sustainable infrastructure projects provide

growth opportunities while reducing carbon footprints(2. Reading 1.2)(2. Reading 1.3 Applicat...).

2. Designing Tax and Subsidy Policies to Reduce Pollution

Pollution reduction through tax and subsidy policies has proven to be effective when carefully implemented. Carbon taxes, which impose a fee on carbon emissions, create financial incentives for companies and individuals to reduce their carbon footprint. Similarly, subsidies for renewable energy sources like wind and solar power encourage investment in cleaner technologies. However, these policies must be designed to minimize economic disruption. A gradual increase in taxes allows industries time to adapt, and subsidies should be directed toward sectors where innovation can make the biggest impact. Research shows that well-calibrated environmental taxes can lead to pollution reductions without severely affecting economic performance(2. Reading 1.2).

3. Cap-and-Trade Systems vs. Carbon Taxes

Cap-and-trade systems and carbon taxes are two primary tools for controlling emissions, each with its advantages and drawbacks. Cap-and-trade limits the total amount of emissions by issuing permits that can be traded, creating a market for pollution rights. This system ensures that emissions do not exceed a certain limit, providing flexibility for companies. However, the complexity of managing such a system can lead to market volatility and higher costs. Carbon taxes, on the other hand, provide a straightforward approach by taxing emissions directly. This predictability makes it easier for businesses to plan their environmental strategies, but it does not guarantee that emissions will fall below a specific threshold. Both systems have been successful, but the choice between them often depends on political and economic contexts(2. Reading 1.2)(2. Reading 1.3 Applicat...).

4. Environmental Economics and the United Nations' Sustainable Development Goals (SDGs)

Environmental economics plays a vital role in achieving the United Nations' Sustainable Development Goals, especially those related to clean energy, sustainable cities, and climate action. By incorporating the cost of environmental degradation into economic decision-making, environmental economics ensures that the true costs of development are recognized. For example, policies that promote green investments can directly contribute to the goals of affordable and clean energy (SDG 7) and responsible consumption and production (SDG 12). Moreover, the development of green industries can create jobs while preserving the environment, further aligning economic goals with sustainability(2. Reading 1.3 Applicat...).

5. Innovation and Technology in Advancing Environmental Economic Goals

Innovation and technology are critical in addressing the complex challenges of environmental sustainability. Technological advancements in energy efficiency, carbon capture, and renewable energy have drastically reduced the cost of transitioning to a low-carbon economy. For instance, the increasing affordability of solar panels and electric vehicles is revolutionizing the energy and transportation sectors. Furthermore, digital technologies like big data and artificial intelligence can optimize resource use and reduce waste, contributing to more efficient and environmentally friendly economic systems(2. Reading 1.3 Applicat...).

Conclusion

Environmental economics provides essential tools for balancing growth with sustainability, whether through innovative policies like carbon taxes and cap-and-trade systems, contributions to the UN's SDGs, or leveraging technology to reduce emissions. As environmental challenges continue to mount, the collaboration between policymakers, businesses, and the scientific community will be crucial to advancing these goals and ensuring a sustainable future for all.

5. Economics and natural disaster

The three papers explore the complex economic impacts of natural disasters and emphasize the critical role of policy, climate change, and socio-economic factors in shaping these outcomes. Natural disasters have both **direct** and **indirect economic impacts**. Direct impacts include the destruction of infrastructure, property, and loss of life, while indirect impacts, such as reduced GDP growth, unemployment, and trade disruptions, can persist for months or years. The papers highlight how these indirect effects, particularly in large-scale disasters, can significantly weaken economic stability and development*(Vietnam case study)(Uni Chicago Press)*.

The **scale of the disaster** plays a significant role in determining economic outcomes. Small-scale disasters tend to have localized impacts with relatively quick recovery times, while large-scale disasters lead to widespread economic disruption and long-term recovery efforts. For example, large-scale events can result in substantial GDP declines, particularly in developing countries, which may struggle to recover from these losses*(Vietnam case study)(main)*.

To estimate **economic losses**, the papers identify several computational models commonly used. These include Input-Output (I-O) Models, which analyze how disruptions in one sector can affect the entire economy, and Computable General Equilibrium (CGE) models, which are more dynamic and assess how various markets adjust in response to shocks. Additionally, catastrophe models simulate direct impacts, such as property damage, while agent-based models provide granular insights into how individual behaviors post-disaster influence macroeconomic outcomes*(Uni Chicago Press)*.

One significant finding across the papers is how **population growth in disaster-prone areas** exacerbates economic losses. As populations increase in vulnerable regions, such as coastal zones, the exposure of people, infrastructure, and economic assets to disasters also rises. This greater concentration of valuable assets makes recovery more challenging and costly(Vietnam case study)(main). Furthermore, **climate change** is leading to more frequent and severe natural disasters, further compounding the economic damage. The papers argue that this increased exposure results in cascading economic effects, such as prolonged disruptions to supply chains and higher adaptation costs*(Uni Chicago Press)(main)*.

In terms of policy, the papers recommend several measures to **mitigate the economic impacts** of natural disasters. These include strengthening disaster preparedness systems, improving infrastructure resilience, and enhancing financial mechanisms like insurance and risk-sharing schemes. For instance, in Vietnam, improved coordination between government agencies and better funding allocation for disaster recovery are critical to enhancing the country's disaster risk management system*(Vietnam case study)*.

The **effectiveness of government interventions** in post-disaster recovery is also discussed. Empirical evidence suggests that strong government action, such as stimulus spending and investment in infrastructure, plays a significant role in speeding up economic recovery*(Uni Chicago Press)*. However, **long-term economic effects** often manifest in trade disruptions and infrastructure damage, which can have lasting impacts on GDP and economic productivity*(main)*.

In conclusion, these papers highlight the interconnectedness of natural disasters, socio-economic conditions, and climate change, while offering valuable insights into policy strategies aimed at reducing the economic toll of these events. Addressing the increased vulnerability of disaster-prone areas and investing in adaptive infrastructure are crucial steps in mitigating future risks.

Agricultural

1. **How can farmers best prepare for and adapt to the increased frequency of extreme weather events?**
    - This topic offers the chance to discuss practical strategies, technology, and policy support for farmers in light of climate challenges.
2. **What are the potential impacts of climate change on global food security and how can they be addressed?**
    - This question can explore how changing weather patterns affect food supply and propose global and local solutions for food security.
3. **What role do technology and innovation play in enhancing agricultural resilience to climate change?**
    - This opens the door to discussing modern technologies like precision agriculture, drought-resistant crops, and other innovations in the context of climate adaptation.
4. **How can water management and irrigation practices be improved to address changes in water availability?**
    - This question can examine the challenges posed by water scarcity due to climate change and suggest improved irrigation systems and conservation techniques.
5. **What are the economic implications of climate change for smallholder farmers compared to large-scale agribusinesses?**
    - This allows for a comparative analysis of how different scales of agricultural operations are impacted by climate shifts, focusing on economic resilience.

Essay:

Agricultural Adaptation in the Age of Climate Change: Challenges and Solutions

As climate change accelerates, agriculture faces unprecedented challenges from extreme weather, fluctuating water supplies, and changing growing conditions. This essay explores five critical aspects of climate adaptation in agriculture, focusing on how farmers can prepare for extreme weather, the impact of climate change on global food security, the role of innovation in building resilience, improvements in water management, and the economic implications for smallholder versus large-scale farmers.

1. How Can Farmers Adapt to Extreme Weather Events?

The increasing frequency and intensity of extreme weather events, such as droughts, floods, and storms, pose a severe risk to agricultural productivity. Farmers can improve their resilience by adopting **climate-smart agricultural practices**, including crop diversification, adjusting planting schedules, and using drought-resistant seed varieties. Moreover, early warning systems and weather forecasting tools can help farmers prepare for extreme events, mitigating potential losses. Governments and agricultural agencies should also support **insurance schemes** that help farmers recover after climate-related disasters(s41586-024-07219-0).

2. The Impact of Climate Change on Global Food Security

Climate change directly threatens global food security by disrupting crop yields, reducing arable land, and affecting the availability of water for irrigation. The projected income loss of 19% by mid-century due to climate change will affect food production globally, especially in vulnerable regions like sub-Saharan Africa and South Asia. To address this, policies aimed at supporting sustainable agriculture, reducing food waste, and enhancing global cooperation for food distribution are essential. Initiatives like **agroecology** and **sustainable farming practices** can increase productivity while minimizing environmental damage(s41586-024-07219-0).

3. Role of Technology and Innovation in Enhancing Agricultural Resilience

Technology and innovation are critical in helping agriculture adapt to climate change. **Precision agriculture** techniques, such as the use of sensors, drones, and satellite imagery, allow for better water use efficiency and monitoring of crop health. Innovations like **genetically modified organisms (GMOs)** that resist pests and withstand extreme temperatures can stabilize crop production in the face of changing climatic conditions. Investment in **research and development** for climate-resilient technologies is essential for long-term agricultural sustainability(s41586-024-07219-0).

4. Improving Water Management and Irrigation Practices

Water scarcity is one of the most pressing issues for agriculture as climate change leads to more unpredictable rainfall patterns and droughts. Improving irrigation efficiency through **drip irrigation** systems, which deliver water directly to plant roots, and **rainwater harvesting** techniques can help conserve water. Policymakers should also encourage farmers to adopt **water-efficient crops** and invest in infrastructure to store and distribute water more effectively, particularly in regions prone to drought(s41586-024-07219-0).

5. Economic Implications for Smallholder Farmers vs. Large Agribusinesses

Climate change affects smallholder farmers and large agribusinesses differently. Smallholders, often lacking financial resources and access to advanced technologies, are more vulnerable to the economic impacts of climate change. By contrast, large agribusinesses may have the capital to invest in climate-resilient infrastructure and technology. To mitigate these economic disparities, **financial support programs**, access to **affordable credit**, and **capacity-building initiatives** should be prioritized for smallholder farmers to help them adapt to the changing climate(s41586-024-07219-0).

Conclusion

The agricultural sector faces significant challenges due to climate change, but by leveraging modern technologies, improving water management, and addressing economic disparities between small and large-scale farmers, the industry can enhance its resilience. Effective climate adaptation requires collaboration between policymakers, scientists, and farmers to ensure sustainable and productive agricultural systems in the years to come.

6. Competition (Linh Nhi)

Summary of key Findings from 5 papers:

Competition and cooperation between fintech companies and traditional financial institutions:
while competition exists, cooperation is likely to dominate as both sectors evolve in the digital economy. Fintech enhances accessibility to financial services, particularly in developing regions, while also introducing new risks such as financial fraud and cybersecurity threats. Traditional banks, despite facing challenges from fintech, maintain a competitive edge due to their regulatory protections and resources for managing cyber risks. Future financial landscape will likely see increased collaboration between fintech and traditional banks, as both seek to leverage each other's strengths to better serve consumers.

Basel Committee on Banking Supervision: fintech has significantly driven innovation and competition across various banking sectors, including payments, lending, deposits, and investment advice. The entry of fintech firms has expanded access to financial services and pressured traditional banks' market share and pricing power. While fintech companies have successfully disrupted certain areas, traditional banks still possess enduring strengths due to their ability to bundle services and maintain customer trust. Fintech firms often evolve from niche providers to offer a broader range of services. It also emphasizes the importance of regulatory frameworks, the impact of big tech firms, and the potential for partnerships between banks and fintechs.

Can Fintech Foster Competition in the Banking System in Latin America and the Caribbean?Impact of fintech on competition in the banking systems of Latin America and the Caribbean (LAC), focusing on the early effects of fintech development in the region. Fintech is associated with a reduction in net interest margins (NIMs) and has prompted defensive responses from incumbent banks, such as increased investment in innovation and improved customer service. The case studies of Brazil and Mexico reveal that while fintech lending is growing rapidly, it still constitutes a small portion of total banking activities. Both countries have seen fintech companies targeting underserved populations, enhancing financial inclusion. Regulatory responses vary, with Brazil adopting a more integrated approach, while Mexico has established a comprehensive fintech law to promote innovation and competition.

Fintech Perception of Cooperation or Competition with Banking: while some fintechs see banks as competitors, especially in areas like digital services and customer experience, many favor collaboration. Factors such as **market position, business model, and regulatory environment influence these perceptions**. Cooperation benefits fintechs through access to resources and regulatory support, while banks leverage fintech innovations to stay competitive.

Competition Substitute DeBeers Diamond Dilemma: DeBeers faces a crucial decision in its future strategy. Should it acknowledge synthetic diamonds as a legitimate threat and enter the market with its own lab-grown diamonds? Or should it continue to bet on the allure of natural diamonds and focus on reinforcing their brand as timeless, natural treasures? The company's ability to adapt to these shifts will determine its future position in the diamond industry.

Introduction

The rise of fintech has revolutionized financial services, creating both competition and collaboration opportunities for traditional banking institutions. Fintech firms disrupt areas such as payments, lending, and investment through digital innovation, while traditional banks still hold advantages due to their regulatory protections and long-standing trust. This essay examines the factors driving competition between fintech and banks, compares different payment systems, evaluates the impact of regulations, explores the advantages of cryptocurrencies, explains the decline in fintech funding, assesses the threats posed by banks to fintech, and argues that cooperation might be more beneficial than competition.

Body

1. What drives competition between fintech and banks?

Several factors drive the growing competition between fintech firms and traditional banks. **Technological innovation** is one of the key drivers, with fintech firms offering faster, more user-friendly services through advancements like digital wallets, blockchain, and AI. This disrupts banks' traditional business models, particularly in areas such as lending and payments (Basel Committee on Banking Supervision, 2021). Fintech also e**xpands accessibility, particularly in underserved regions**, forcing banks to improve their services to reach new customer bases (Competition and Cooperation Between Fintech Companies and Traditional Financial Institutions, 2022). Lastly, **cost efficiency** plays a role, as fintechs offer lower-cost alternatives to many traditional banking services, prompting banks to adjust their pricing and service models to stay competitive.

2. Differences between account-based and token-based payments

Account-based payment systems, predominantly used by traditional banks, require verification of a user's identity by a central entity (like a bank) to authorize transfers between accounts. This centralized approach is the backbone of many traditional financial transactions, including bank transfers and credit card payments. On the other hand, **token-based payment systems**, such as those used in cryptocurrencies, validate the transaction based on the token itself rather than the identity of the user. Token-based systems, which are a hallmark of fintech innovation, offer more decentralization and sometimes greater anonymity, challenging the conventional banking framework (Basel Committee on Banking Supervision, 2021).

3. Should fintech face stricter regulations?

The question of stricter regulations on fintech is a complex one. **On the one hand**, regulations are crucial to protect consumers and manage risks related to financial

fraud and cybersecurity. Fintech companies, handling sensitive data, must be subject to frameworks that ensure privacy and security (Competition and Cooperation Between Fintech Companies and Traditional Financial Institutions, 2022). **However,** there is a risk that excessive regulation could stifle innovation. Startups, in particular, may struggle to cope with compliance costs, which could limit their capacity to develop creative solutions. **For example,** in Latin America, regulatory frameworks such as those in Mexico aim to foster both innovation and competition by balancing the need for oversight with the flexibility required for fintech growth (Can Fintech Foster Competition in the Banking System in Latin America and the Caribbean, 2020).

4. Advantages of crypto and token payments

Cryptocurrencies and token-based payment systems offer several distinct advantages. One of the key benefits is decentralization, which reduces the reliance on traditional financial intermediaries like banks and allows for more direct peer-to-peer transactions (Fintech Perception of Cooperation or Competition with Banking, 2022). This can also result in lower transaction costs, especially for cross-border payments, where traditional methods often involve hefty fees and currency conversion costs. Cryptocurrencies also enhance financial inclusion, particularly in regions where banking infrastructure is limited, providing access to financial services that would otherwise be unavailable (Can Fintech Foster Competition in the Banking System in Latin America and the Caribbean, 2020). However, despite these advantages, risks like volatility and cybersecurity threats still pose significant challenges to widespread adoption.

5. Why has fintech funding decreased?

Despite the early boom in fintech investment, funding has declined in recent years. One reason is market saturation, as many fintech companies now offer similar products and services, making it harder for new firms to differentiate themselves (Competition and Cooperation Between Fintech Companies and Traditional Financial Institutions, 2022). Additionally, regulatory uncertainties have increased operational risks, which in turn dampens investor enthusiasm. Macroeconomic factors, such as rising inflation and economic slowdowns, have also contributed to a more cautious investment environment. In regions like Latin America, where fintech is growing rapidly, regulatory complexities and market consolidation are also affecting funding flows (Can Fintech Foster Competition in the Banking System in Latin America and the Caribbean, 2020).

6. Are banks a threat to fintech?

Traditional banks, despite facing competition from fintech, still pose significant threats to fintech companies in several ways. Banks hold key advantages, such as regulatory

protections and strong customer trust (Competition and Cooperation Between Fintech Companies and Traditional Financial Institutions, 2022). Additionally, they have access to extensive financial resources, allowing them to invest heavily in cybersecurity, innovation, and customer service—areas where fintech startups often struggle. Furthermore, banks can offer a bundle of services, including savings, loans, and investment products, providing a comprehensive financial solution that many fintech firms cannot match (Basel Committee on Banking Supervision, 2021).

7. Is cooperation better than competition between fintech and banks?

Cooperation between fintech and traditional banks is increasingly seen as more beneficial than competition. Fintech firms gain access to regulatory knowledge and large customer bases by partnering with banks, while banks can leverage fintech's innovative technologies to improve their digital offerings and remain competitive (Fintech Perception of Cooperation or Competition with Banking, 2022). This approach leads to a better customer experience by combining fintech's agility and banks' stability, resulting in a win-win scenario. Partnerships between fintech and banks can drive innovation, enhance financial inclusion, and provide more efficient services to consumers.

Conclusion

The competition between fintech and traditional banks is reshaping the financial landscape. However, cooperation between these sectors offers the best path forward, as it allows both fintech and banks to leverage their unique strengths—innovation, trust, regulatory stability, and resources. Collaborative innovation ensures that both fintech and traditional banks can thrive, providing consumers with better financial services in the evolving digital economy (Competition and Cooperation Between Fintech Companies and Traditional Financial Institutions, 2022).