“Greeninflation”: evidence on the channels of transition

Studies in Economics and Finance

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Abstract

Purpose – This paper aims to explore the role of two transmission channels between “green” transition and (overall and core) inflation, the so-called “greenflation” in the USA. The first channel is related to the “green” macroeconomic characteristics, and the second channel is associated with the “green” banking/financial characteristics of the US economy.

Design/methodology/approach – The empirical analysis spans the period 1990–2023, while it uses two-stage least square regressions and causality tests. The analysis is conducted across the full sample and sub-periods to assess robustness and structural shifts.

Findings – The findings through regression estimates and causality tests, clearly document that both channels (fiscal spending on renewables and “green” credit) impact inflation, validating the effect of “green” transition on inflation, with the “green” credit channel having the strongest effect, followed by the mechanism of “green” fiscal spending.

Originality/value – To the best of the authors’ knowledge, this study is the first to determine the primary channels through which the “green” transition impacts inflation. It offers first-time evidence on the role of fiscal spending on “green” transition and “green” credit on inflation.

Keywords “Greeninflation”, Channels of transmission, Fiscal “green” spending, “Green” credit, USA

Paper type Research paper

1. Introduction

The literature has provided studies on the theoretical and practical elements of sustainable finance and their implications on financial markets and the real economy. More specifically, Studies in Economics and Finance have provided a special issue on sustainable finance with an objective to explore the economic and financial performance for consumers, businesses and society while positively influencing the environment and society. These considerations have been a critical concern for the financial industry in the current world while making investment and financing decisions. As part of the environmental considerations, it is essential to protect biodiversity, reduce pollution, promote a circular economy and preserve the climate by boosting renewable energy sources. In this regard, sustainable finance has considerably changed to the point where it is now seen as a statutory need for sustained

JEL classification – C32, E31, Q43

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growth (Zhang *et al.*, 2021). This special issue includes papers from extensive sectors of financial sustainability. The climate impact of fossil energy stocks is examined by Kumari *et al.* (2023), while others investigate green bonds (Yadav *et al.*, 2024; Piseddu and Vanhuyse, 2023) and green finance issues (Sajjad *et al.*, 2024). The relationship between green spending and energy commodities is analyzed by Sharma *et al.* (2023) and Yadav *et al.* (2024). Another work studies the relationship between short-term firm performance and sustainable financial performance (Kayani *et al.* (2023). Finally, ESG-related issues are also an important major part of this special issue (Lange and Banadaki, 2023; Niblock, 2024; Tanveer *et al.*, 2024).

There also exists a growing concern about the transition to clean energy impact on the new course of inflation known as "greenflation," which is defined as an upward inflationary pressure resulting from the "green" transition process to a state of clean energy production (Chung and Kim, 2024). While literature offers empirical evidence on the examination of "greenflation," to the best of our knowledge, this literature has not explicitly provided studies that document the transmission channel(s) through which this link is validated. This research addresses this gap by providing evidence on the nexus between "green" transition and inflation. To this end, the analysis explores two alternative potential channels, a) fiscal spending on "green" transition, and b) "green" credit by banking institutions. More specifically, the goal of this study is to provide evidence, to the best of our knowledge for the first time, on the role of these two channels in facilitating the impact of "green" transition to inflation. It is characterized by a certain novelty within the current body of literature by presenting evidence regarding the influence of two major transmission mechanisms on the link between energy transition and inflation, with a nuanced exploration of the pivotal roles played by a macroeconomic and a financial channel whose roles have not been discussed in literature yet.

In terms of the first channel, fiscal spending on the "green" transition is associated with government spending that facilitates technological innovation and the transition to a "green" economy, specifically government spending on research and development (R&D) activities (Yang *et al.*, 2019). In terms of the second channel, "green" finance, in contrast to conventional/traditional banking lending activities, is an expansion of energy saving and emission reduction efforts associated with financial/banking services (Guo *et al.*, 2022). Deng and Zhao (2022) document that financial institutions are the centers of development spillovers through the capital channel to a "green" economy and "green" financial development. The theoretical validation of this channel is based on the argument that banks, potentially induced by central banks, tend to finance environmentally friendly corporate projects with easier credit access to funding capital, i.e. special and lower interest rates for "green" productive investment activities (Muller, 2021). Credit policies must explicitly consider environmental considerations because any failure to do so is itself often detrimental from the perspective of price stability (Park and Kim, 2020; Yao *et al.*, 2021). This is justified on the grounds that investments in "green" projects have high upfront costs, making them more sensitive to changes in interest rates (Schmidt *et al.*, 2019), exposing the domestic economy to future surges in the price of high carbon energy, food or industrial inputs. Credit to "green" investments could also make the economy more vulnerable to future climate-related economic shocks (including "greenflation") as environmentally damaging economic activity is expected to continue. Thus, "green" credit cannot neglect the impact of today's investments on future price stability, since different technologies and products will face different price shocks due to climate change.

2. Theoretical framework for monetary and fiscal policies during "green" transition

Current literature suffers from the lack of research on both macroeconomic and financial channels that dictate the link between "green" transition and inflation. More specifically, literature studies bridge "greenflation" by modeling the transition from exogenous supply-side shocks (such as carbon taxes or critical mineral bottlenecks) to demand-side responses (such as shifts in consumer preferences, fiscal spending and monetary/credit policy adjustments). Ciccarelli and Marotta (2024) claim that the severity of climate change imposes direct effects, e.g. rising sea levels and more frequent severe natural disasters, as well as financial risk effects on economies, countries and industrial sectors. These risks are expected to affect the economy from both the supply and demand side through certain channels. More specifically, they illustrate that physical risks act as negative demand shocks while transition risks act as downward supply movements. In other words, when it comes to exploring the transmission channel for moving to a low-carbon footprint, understanding the impact of climate change on economic activity is highly important to distinguish between the impact of both physical and transition risks. However, the literature on the channels associated with the demand side is scarce, if not absent, with our study attempting to fill this gap by presenting evidence associated with the role of two specific channels that can explain the link between transition to sustainable economies and inflation (Economides and Xepapadeas, 2018). In a theoretical contribution, Rizzati *et al.* (2025) assess the role of the macroeconomic, environmental and distributional effects of consumption preferences in a pre-environmental framework and examine their outcomes against scenarios with various supply-side climate policies. Their findings support the role of supply against demand shocks, i.e. carbon taxes, in affecting macroeconomic outcomes, such as GDP growth.

The results could have significant policy implications for the efficiency of both monetary and fiscal policies in explaining the link between "green" transition and inflation performance. The literature on the role of monetary policy and "greenflation" highlights a major dilemma for central banks. The "green" transition exerts upward pressure on headline inflation, creating a trade-off between price stability and the speed of the transition. More importantly, central banks could offer "green" interest rates through their "green" lending mechanisms to motivate commercial banks to provide high lending support to "green" vs "brown" investment projects. However, these banks can use this policy to even lend to more vulnerable firms as well, which is expected to have a negative impact on the monetary policy transmission channel, especially in cases when central banks adopt a contractionary stance (Muller, 2021; Schnabel, 2023; Carreraa *et al.*, 2025). Moreover, "green" monetary policy may adversely impact financial stability (Liebich *et al.*, 2023). To date, very little research attention has been given to empirical analysis and assessment of the challenges related to "green" central banking in an inflationary context and their association with "green" transition.

Overall, the simultaneous presence of standard policy rates and intended "green" interest rates to support "green" transition seems to exert a substantial impact on inflation. When central banks need to implement credit tightening, while they also need to help green transition with lower rates, this generates a conflict of policy interests, which potentially ends up negatively affecting "green" activities, thus boosting medium-term inflation by delaying the transformation, which, in turn, exposes the economy to additional price increases directly related to climate change while simultaneously prolonging the inflationary effects of fossil fuel reliance (Monnet and Van't Klooster, 2023; Aguila and Wullweber, 2024). Therefore, the goal of a "greening" economy needs tools that include measures to differentiate central bank interest rates vs "green" lending volumes. This would provide cheaper funding to banks that excel at "green" lending (Van't Klooster and Van Tilburg, 2020).

In terms of fiscal spending, research highlights that targeted "green" investments boost GDP and employment, but risk unsustainable debt if not carefully balanced. Addressing climate change requires substantial upfront governmental actions on mitigation and adaptation. The impact of such actions on the fiscal accounts can vary widely depending on the tools chosen and the idiosyncratic characteristics of country or region specificities. Literature recommends the adoption of "green" fiscal rules in the form of limits on budgetary aggregates, usually aim at solving the "common pool problem," i.e. the fact that recipients of public spending ignore the externality that they impose on other taxpayers and future generations leading to a deficit bias (Wyplosz, 2013). Proponents of "green" rules call for greater flexibility regarding climate-related spending. A key objective is usually to protect "green" public investments, including during periods of fiscal adjustment to address concerns with debt sustainability (Van den Noord, 2021; Darvas and Wolff, 2021). More recent strategies include enhancing medium-term fiscal frameworks to incorporate "green" considerations. According to Caselli *et al.* (2022), medium-term fiscal frameworks can combine more flexible rules with stronger institutions to promote sound public finances. Such frameworks need to better incorporate macro-fiscal effects of climate change into macroeconomic projections and risks in the medium and long term.

Meanwhile, market failures - primarily negative environmental externalities, knowledge spillovers, positive externalities, long investment payback periods, deep uncertainty and capital constraints - continue to hinder optimal "green" capital allocation. Literature reveals that "green" fiscal rules exempt climate-related spending from standard debt limits that can lead to unsustainable debt dynamics if the net-zero transition relies too heavily on unfinanced spending and subsidies. Fiscal spending seems to be a crucial factor in helping the economy to move smoother to "green" transition, since firms' internal finance positively correlates with environmental performance, while financial constraints and high capital leverage negatively impact firms' ability to execute "green" investments. Certain fiscal mechanisms could be used to correct environmental externalities, support national climate change goals and promote clean energy investments. Such mechanisms are organized into tax policies, emission trading schemes, subsidies and expenditure programs and regulatory instruments with fiscal components.

In terms of market failures and fiscal spending during "green" transition, literature has asserted that firms usually under-invest in new technologies, R&D and innovation, because private rewards are quickly transferred from the innovator to other firms, e.g. via technological spillovers. At the same time, innovative firms do not privately enjoy the full environmental benefits; this "double externality problem" exposes market failures (owing to positive knowledge externalities and negative environmental externalities) that causes markets to underinvest in "green" innovation (Dechezleprêtre and Popp, 2015). Therefore, this "double externality" problem justifies the introduction of fiscal spending to increase "green" innovations and technology. At the same time, fiscal spending, by contributing to the maintenance of high aggregate demand, is an important macroeconomic instrument for both short- and long-term economic growth (Kaldor, 1985). Therefore, targeted "green" fiscal policies would not only contribute to shifting the incentives regime of the economy toward "green" innovations but would also sustain demand and employment levels.

Moreover, it is also validated that private sectors inherently underinvest in mitigation technologies due to positive knowledge spillovers (innovation benefits the public, but the firm bears the cost) and the lack of a fully internalized price on carbon emissions. In addition, the prevalence of "greenwashing" and a lack of standardized sustainability reporting present major information problems for investors (asymmetric information), which distorts market value and heightens financial risks.

The study is related to the literature that investigates the inflationary impact of climate change policies. This literature provides evidence of a positive link between such policies and overall inflation (Breitenfellner *et al.*, 2022). This work is also linked to literature that examines the relationship between energy transition and inflation. Most of these studies provide evidence on the strong impact of renewable energy on inflation, thus justifying the term of "greenflation" (Zhang *et al.*, 2024). Moreover, the study touches the literature that discusses the nexus between "green" finance and macroeconomy. Transforming the status of global economies into sustainable "green" growth places exemplifies the important role of using the funds mobilized from the "green" banking/financial system to "green" the economy. This process tends to reduce greenhouse gas emissions and improve adaptability to climate change (Aneja *et al.*, 2023).

This literature emphasizes the role of "green" banking/financial system through the movement of capital from savers to investors which results in firms' and economy's higher capital efficiency. The mobilized "green" capital is circulated through indirect financial channels, i.e. "green" financial intermediaries and direct financial channels, i.e. "green" financial markets. This encourages the development of a "green" financial/banking system which supports the transition to an environmentally friendly "green" economy. In other words, this "green" financial system acts as a channel for capital to increase "green" growth through certain mechanisms, such as "green" credit and investments (Lv Kun *et al.*, 2022). Finally, Gianfrate and Peri (2019) suggest that "green" bonds can be the best tools for mobilizing financial resources to support "green" and sustainable investments, while Liu *et al.*, (2020) argues that "green" finance has become the new engine for promoting "green" growth, with social responsibility and environmental benefits. The limitations of the short literature on the link between inflation and "green" policies are related to the fact that the current literature has focused on the role of specific "green" instruments, such as "green" bonds, which impact inflation, as well as how climate change risk (both physical and transition) has affected inflation, while it has ignored the overall role of "green" credit, such as "green" loans, which is a major goal of our study. Moreover, the literature has not explicitly tested the role of "green" fiscal spending (such as R&D spending) in determining inflation, which again is the other major part of our study goal. Our study attempts to fill this gap by providing solid evidence on the role of both transition channels on inflation.

3. Methodology

Empirically, based on studies within the literature of "greenflation" (Bettarelli *et al.*, 2025), the analysis estimates the following dynamic model:

$$\pi_t = a_0 + a_1\pi_{t-1} + a_2 RES_t + a_3 y_t + a_4 \Delta u_t + a_5 \Delta i_t + a_6 \Delta ER_t + a_7 \Delta Def_t + a_8 \Delta OP_t + a_9 \Delta FP_t + a_{10} TRC_t + a_{11} TRC_t x\, RES_t + a_{12} DCR_t + a_{13} DCOVID_t + \varepsilon_t \quad (1)$$

where π_t proxies overall or core inflation, RES shows the renewable energy share in total energy supply (%), y stands for the output gap, u is the unemployment rate, i is the policy interest rate, ER denotes the exchange rate, Def is the budget deficit, OP proxies oil prices, FP stands for food prices, Δ is the first differences operator and ε_t is the error term. TRC stands alternatively for the two transmission channels. DCR is a dummy that considers the global financial crisis, receiving zeros from 1990 to 2008 and from 2009 to 2023, and ones otherwise; DCOVID is a dummy that considers the recent pandemic crisis, receiving zeros from 1990 to 2019 and from 2022 to 2023, and ones otherwise. Equation (1) is estimated through Two Stages Least Squares (2SLS), while -given the absence of cointegration- the analysis also uses short-term Granger-causality.

In the first stage of the 2SLS estimation, the two variables proxying the two channels enter as the dependent variables, while they are regressed against the instrumental variables associated with the controls in equation (1). In the second stage of the 2SLS regression analysis, both types of inflations are regressed against both the control variables from equation (1) and the estimated transition channels from the first stage.

4. Data

The analysis uses US quarterly data spanning the period 1990–2023. Inflation is measured as overall and core CPI prices. The exchange rate is the effective exchange rate, the unemployment rate is defined as the percentage of total unemployed people to total labor force, the output gap is estimated through the multivariate filtering method by Alichi (2015), the policy rate is the federal funds rate, the public deficit is measured as the percentage to GDP, oil prices are West Texas Intermediate (WTI) oil prices and food prices are the retail food consumer price index (CPI) across all urban consumers. Data is retrieved from the Bureau of Labor Statistics.

In terms of the macroeconomic channel, fiscal spending on "green" transition is from the U.S. Energy Information Administration and includes both the value of fiscal spending in billions of dollars and the percentage relative to GDP. In terms of the banking/financial channel, "green" credit includes all types of "green" syndicated loans, reflecting the increasing emphasis on sustainable and environmentally conscious financial practices over the years, to the private sector, such as "green" credit cards (card users can receive discounts and lower borrowing rates on "green" products and services), "green" investment projects, "green" car loans and "green" commercial constructing loans (for energy-efficient buildings). Data is obtained from the Federal Reserve Bank of St Louis (FRED) database, includes all US commercial banks and is measured in billions of dollars, as well as in percentage terms in relevance to total loans. Table 1 provides descriptive statistics, as well as correlation coefficients for the primary variables of interest. In terms of the correlation results, the analysis clearly shows the absence of any potential multicollinearity issues in both inflation definitions. Moreover, Figure 1 visualizes the graphical association across the variables into consideration. The picture clearly shows the impact of both channels under consideration on both types of the inflation rate.

5. Empirical analysis

First, the analysis tests for the presence of unit roots through the Elliott *et al.* (1996) Generalized Least Squares (GLS) modified Augmented Dickey-Fuller (ADF) test. The results, reported in Table 2, highlight the presence of a unit root across all variables except in (overall and core) inflation and the output gap.

Tables 3 and 4 present the 2SLS estimates of the transmission channels (both directly and indirectly through their interaction with "green" transition) in terms of both overall and core inflation. The endogeneity issue is justified by the fact that inflation can also fundamentally distort the monetary policy transmission mechanism by forcing central banks to raise interest rates, which increases borrowing costs, reduces asset values and restricts loan availability. High inflation also erodes real households' wealth and alters lending behavior. This creates pressure on people's consumption decisions, which in turn affects the demand for consumption credit (Priyambudi and Thamrin, 2021). Lie and Rivai (2022) state that high inflation is negatively correlated with real credit activity. High inflation erodes people's real incomes, reduces the ability to buy goods and services and lowers the demand for consumer

Table 1. Descriptive statistics and correlation coefficients

Variable	Mean	SD	Min.	Max.
Descriptive statistics				
Overall inflation	203.9	46.0	127.5	308.7
Core inflation	210.0	44.6	132.1	313.2
Renewable energy share in total energy supply (%)	6.77	2.24	4.10	11.0
Effective exchange rate	93.6	8.2	78.4	113.0
Federal funds rate	2.8	2.4	0.1	8.3
Output gap	−0.69	1.88	−9.02	2.45
Unemployment rate	5.8	1.7	3.4	14.8
Budget deficit	−3.8	3.6	−14.7	2.3
WTI oil prices	54.3	29.2	−37.0	145.3
Food prices	200.6	45.3	129.8	304.5
Fiscal spending on “green” transition (billions US$)	22,254	3,459	3,672	36,984
Fiscal spending on “green” transition as % of GDP	9.17	8.36	1.51	29.61
Total “green” loans (billion $)	3,041.3	1,361.7	1,553.1	9,584.4
Total “green” loans as percentage of total loans	43.71	20.73	2.70	78.07
No. of obs.	136			
Correlation coefficients				
Variables	Overall inflation	Renewable energy share in total energy supply	Fiscal spending on green transition	Total green loans
Overall inflation	1.00	0.36	0.40	0.29
Renewable energy share in total energy supply		1.00	0.34	0.41
Fiscal spending on “green” transition			1.00	0.09
Total “green” loans				1.00
Variables	Core inflation	Renewable energy share in total energy supply	Fiscal spending on green transition	Total green loans
Core inflation	1.00	0.42	0.44	0.35
Renewable energy share in total energy supply		1.00	0.37	0.43
Fiscal spending on “green” transition			1.00	0.12
Total “green” loans				1.00

Note(s): This table shows descriptive statistics for the data used in terms of mean, standard deviation (SD), minimum and maximum values. Moreover, it provides correlation coefficients across the variables entering the regression model

credit. Ilan and Mugerman (2025) illustrate that low-income households adopt a prudent mortgage strategy in the short term but are vulnerable to long-term risks when inflation-indexed payments outpace income growth. At the same time, inflation could potentially exert an impact on “green” fiscal spending. Inflation fundamentally reduces the real purchasing

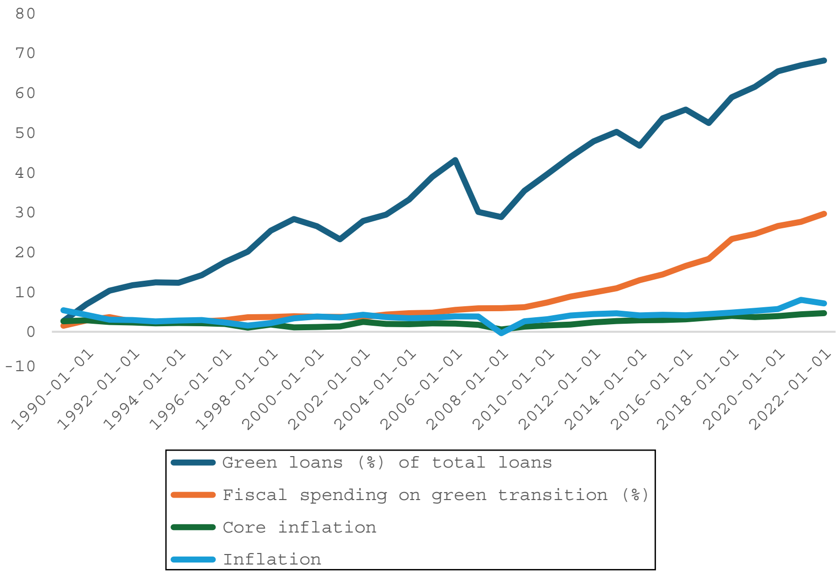

Figure 1. Graphical view of inflation, core inflation, "green" loans (as a percentage of total loans) and "green" spending as a % of GDP

Note(s): This graph shows the time trend of fiscal spending on "green" R&D expenses and "green" credit in relevance to the overall and core inflation rates in the US. To ensure the validity of the empirical results, the graph verifies certain break points considered in the robustness part of the analysis

Table 2. Unit root check based on the GLS-ADF test

Variables	Levels	First differences
Overall inflation	−5.91***	
Core inflation	−6.03***	
Renewable energy share in total energy supply (%)	−1.33	−6.37***
Effective exchange rate	−1.25	−6.11***
Federal funds rate	−1.21	−6.28***
Output gap	−6.92***	
Unemployment rate	−1.38	−6.37***
Budget deficit	−1.19	−6.94***
WTI oil prices	−1.32	−5.87***
Food prices	−1.29	−6.01***
Fiscal spending on "green" transition	−1.35	−6.72***
Total "green" loans	−1.15	−6.81***

Note(s): This table provides estimates of the Elliott *et al.* (1996) Generalized Least Squares (GLS) modified Augmented Dickey-Fuller (ADF) test. Figures in brackets denote p-values. ***$p \leq 0.01$

power of government "green" budgets, often forcing policymakers to scale back clean energy targets or face funding deficits.

Given this discussion, the issue of endogeneity in the relevant estimates can be sorted out by considering lagged versions of the independent variables as instruments in the 2SLS

Table 3. First stage estimations from equation (1)

Variables	Overall inflation	Core inflation
Panel 1. Fiscal spending on "green" transition		
Renewable energy share in total energy supply	0.108*** [0.00]	0.125*** [0.00]
Constant	0.018 [0.22]	0.014 [0.29]
Fiscal spending(−1)	0.927*** [0.00]	0.942*** [0.00]
effective exchange rate(1)	−0.048** [0.04]	−0.054** [0.03]
federal funds rate(1)	0.115*** [0.00]	0.136*** [0.00]
output gap(1)	0.091*** [0.00]	0.105*** [0.00]
unemployment rate(1)	0.097*** [0.00]	0.112*** [0.00]
budget deficit(1)	0.116*** [0.00]	0.129*** [0.00]
WTI oil prices(1)	−0.115*** [0.00]	−0.138*** [0.00]
food prices(1)	−0.122*** [0.00]	−0.137*** [0.00]
DCR	0.145*** [0.00]	0.159*** [0.00]
DCOVID	0.131*** [0.00]	0.143*** [0.00]
Diagnostics		
R^2 adjusted	0.82	0.86
Number of instruments	19	10
Sargan test	[0.35]	[0.40]
No. of obs.	136	136
Panel 2. "Green" credit		
Renewable energy share in Total energy supply	0.083*** [0.00]	0.091*** [0.00]
Constant	0.009 [0.26]	0.007 [0.32]
"Green" credit(−1)	0.905*** [0.00]	0.926*** [0.00]
effective exchange rate(1)	−0.050** [0.03]	−0.059** [0.03]
federal funds rate(1)	−0.066*** [0.00]	−0.071*** [0.00]
output gap(1)	0.085*** [0.00]	0.098*** [0.00]
unemployment rate(1)	0.077*** [0.00]	0.090*** [0.00]
budget deficit(1)	0.089*** [0.00]	0.096*** [0.00]
WTI oil prices(1)	−0.113*** [0.00]	−0.122*** [0.00]
food prices(1)	−0.112*** [0.00]	−0.124*** [0.00]
DCR	0.126*** [0.00]	0.137*** [0.00]
DCOVID	0.122*** [0.00]	0.135*** [0.00]
Diagnostics		
R^2 adjusted	0.74	0.83
Number of instruments	19	10
Sargan test	[0.36]	[0.41]
No. of obs.	136	136

Note(s): This table provides the estimates of the first stage of equation (1). Column (1) shows the results in relevance to the fiscal spending on "green" transition. Column (2) those with respect to "green" credit. Inflation is measured as the overall inflation. Figures in brackets denote p-values. The lag length is determined through the Akaike information criterion, while the lagged values are used as the instruments in the regression. $^{**}p \leq 0.05$; $^{***}p \leq 0.01$

estimation framework, and the "strict exogeneity" assumption can be relaxed to "weak exogeneity" (Grigoli *et al.*, 2014). Table 3 reports the first-stage estimates, while Table 4 presents the final stage estimates.

In Table 4, Column (1) shows the results with the fiscal "green" spending on transition, while Column (2) those in line with "green" credit. The findings with respect to overall inflation (Panel 1) illustrate that both transmission channels have a statistically significant impact on inflation, with the channel of "green" credit displaying the stronger impact. This

Table 4. Impact of transmission channels on inflation. The second stage of equation (1) estimates

Variables	(1)	(2)	Wald F-test
Panel 1. Overall inflation			
Renewable energy share in total energy supply	0.095*** [0.00]	0.106*** [0.00]	
Fiscal spending on “green” transition (from stage One)	0.068*** [0.00]		
Renewable energy share in total energy supply × fiscal spending on “green” transition	0.075*** [0.00]		
“Green” credit (from stage One)		0.081*** [0.00]	[0.00]
Renewable energy share in total energy supply × “green” Credit		0.095*** [0.00]	[0.00]
Constant	0.026 [0.17]	0.022 [0.24]	
Overall inflation(−1)	0.893*** [0.00]	0.935*** [0.00]	
Effective exchange rate	−0.067** [0.02]	−0.057** [0.03]	
Federal funds rate	−0.088*** [0.00]	−0.088*** [0.00]	
Output gap	0.068*** [0.00]	0.076*** [0.00]	
Unemployment rate	−0.086*** [0.00]	−0.072*** [0.00]	
Budget deficit	0.094*** [0.00]	0.078*** [0.00]	
WTI oil prices	0.074*** [0.00]	0.086*** [0.00]	
Food prices	0.092*** [0.00]	0.089*** [0.00]	
DCR	−0.136*** [0.00]	−0.128*** [0.00]	
DCOVID	0.125*** [0.00]	0.130*** [0.00]	
Diagnostics			
R^2 adjusted	0.77	0.82	
Number of instruments	23	23	
Sargan test	[0.29]	[0.33]	
No. of obs.	136	136	
Panel 2. Core inflation			
Renewable energy share in total energy supply	0.075*** [0.00]	0.085*** [0.00]	
Fiscal spending on “green” transition (from stage One)	0.047** [0.02]		
Renewable energy share in total energy supply × fiscal spending on “green” transition	0.056** [0.02]		
“Green” credit (from stage One)		0.074*** [0.00]	[0.00]
Renewable energy share in total energy supply × “green” credit		0.080*** [0.00]	[0.00]
Constant	0.014 [0.22]	0.011 [0.25]	
Overall inflation(−1)	0.726*** [0.00]	0.863*** [0.00]	
Effective exchange rate	−0.062** [0.02]	−0.055** [0.02]	
Federal funds rate	−0.074*** [0.00]	−0.083*** [0.00]	
Output gap	0.064*** [0.00]	0.076*** [0.00]	
Unemployment rate	−0.069*** [0.00]	−0.081*** [0.00]	
Budget deficit	0.073*** [0.00]	0.084*** [0.00]	
WTI oil prices	0.094*** [0.00]	0.107*** [0.00]	
Food prices	0.106*** [0.00]	0.120*** [0.00]	
DCR	−0.117*** [0.00]	−0.119*** [0.00]	
DCOVID	0.116*** [0.00]	0.119*** [0.00]	

(*continued*)

Table 4. Continued

Variables	(1)	(2)	Wald F-test
Diagnostics			
R^2 adjusted	0.69	0.75	
Number of instruments	12	12	
Sargan test	[0.31]	[0.37]	
No. of obs.	136	136	

Note(s): This table provides the estimates of the second stage of equation (1). Column (1) shows the results in relevance to the fiscal spending on "green" transition. Column (2) those with respect to "green" credit. Inflation is measured both as the overall *inflation* and as core inflation. Column (1) shows the results in relevance to the fiscal spending on "green" transition. Column (2) those with respect to "green" credit. Figures in brackets denote *p*-values. $^{**}p \leq 0.05$; $^{***}p \leq 0.01$

evidence is confirmed by the Wald F-test. Moreover, the diagnostics indicate the validity of the instruments used through the Sargan test. As instruments, two lags of the control variables are used for the case of overall inflation, and one lag for the case of core inflation, with the number of lags being determined through the Akaike criterion. The findings confirm how "green" credit policy can be compatible with environmental objectives (Dikau and Volz, 2021). In terms of core inflation (Panel 2), the findings remain consistently similar. Finally, with respect to the remaining controls, the results provide support for the expected theoretical signs based on the relevant literature in both panels.

6. Regime-based structural tests and estimation

Based on a reviewer's recommendation, this part of the analysis takes explicitly into consideration the presence of three major break points to explore whether the estimates obtained in Table 3 are stable across certain break points, such as environmental regulation with respect to "green" finance, the global financial crisis and the COVID-19 pandemic crisis. In terms of environmental regulation, this refers to the disclosure of climate-related data, as well as in relevance to regulations requiring comparable disclosures from asset managers and other asset owners. In an information-based "green" finance approach, benchmarks should convey high-quality information on the actual "green" performance of investment products as measured against the benchmark.

Another perhaps even more important view of Environmental, Social and Governance. (ESG) benchmark administrators is that they supply abstract portfolios, which can then be tracked by Exchange-Traded Funds (ETFs) and other low-cost index-based products. From this perspective, benchmark administrators fulfil a similar function as the investment intermediaries discussed in the previous section – an observation that has lately given rise to discussions across US legal scholars as to whether index administrators in fact do qualify as investment advisers under the federal securities laws (Mahoney and Robertson, 2021). Moreover, in environmental law, activity-level transparency requirements are common. In the US, toxic emissions of industrial facilities are disclosed annually at the plant level under the Toxics Release Inventory (TRI) program (Brandi *et al.*, 2020).

To perform the empirical investigation, we consider year 2010 as the benchmark time for the evolution of regulatory activity in relevance to the disclosure associated with climate change, formalizing expectations that firms must detail physical and regulatory climate risks if they are material to the business, plus regulatory push actions where in response to global momentum following the Paris Agreement, US financial regulators begin actively exploring "green" finance frameworks (Alexander *et al.*, 2019). Such regulatory actions refer to climate disclosures, signaling a shift toward more uniform standards for the enhancement and standardization of climate-related disclosures for investors, sparking extensive debate over mandatory greenhouse gas emissions, the adoption of finalized climate disclosure rules, regulatory actions that require registered firms to disclose material climate-related risks, board oversights and, for larger firms, material Scope 1 and Scope 2 emissions, along with the emerging of "green" bonds as the leading financial instruments to finance environmental projects and initiatives. In the US there have been substantial reforms of environmental,

Table 5. Chow and Quandt-Andrews stability/regime tests

Full inflation	*p*-values
Chow test for a break in coefficients between inflation and fiscal spending:	
2008	[0.28]
2010	[0.00]
2020	[0.32]
Chow test for a break in coefficients between inflation and "green" credit:	
2008	[0.24]
2010	[0.00]
2020	[0.29]
Core inflation	
Chow test for a break in coefficients between inflation and fiscal spending:	
2008	[0.28]
2010	[0.00]
2020	[0.32]
Chow test for a break in coefficients between inflation and "green" credit:	
2008	[0.21]
2010	[0.00]
2020	[0.27]
Full inflation	
Quandt-Andrews test for a break in coefficients between inflation and fiscal spending:	
2008	[0.35]
2010	[0.00]
2020	[0.39]
Quandt-Andrews test for a break in coefficients between inflation and "green" credit:	
2008	[0.30]
2010	[0.00]
2020	[0.36]
Core inflation	
Quandt-Andrews test for a break in coefficients between inflation and fiscal spending:	
2008	[0.32]
2010	[0.00]
2020	[0.37]
Quandt-Andrews test for a break in coefficients between inflation and "green" credit:	
2008	[0.28]
2010	[0.00]
2020	[0.34]

Note(s): This table provides the estimates of two stability tests to determine potential break points across the sample period social and governance disclosure, suggesting the replacement of the current voluntary framework with mandatory disclosure requirements which are necessary to eliminate instances of "greenwashing" and increase investor confidence in the "green" bond market. The new and increased regulatory framework is necessary to foster the growth of the "green" bond market, which is critical to supplying the funding required to meet the international goals for limiting climate change consequences (Rivera, 2022).

Based on the above discussion, we formally explore the stability of estimations around these three potential break events. To this end, we make use of both the Chow and Quandt-Andrews breakpoint tests. Therefore, the three dates through which we consider the stability of relevant coefficients associated with the channels under investigation are: regulatory behavior (2010), global financial crisis (2008) and COVID-19 pandemic crisis (2020). The results are shown in Table 5. They clearly indicate the stability behavior of the estimates around the global financial crisis and the pandemic crisis events, while both tests provide formal evidence of instability in the parameters of the model around the regulatory reforms event.

Given the instability behavior around the regulatory reforms event in 2010, the next step of the analysis performs a regime estimation analysis, with the findings being reported in Table 6. The reported findings clearly highlight that both channels get stronger over the post reform period.

7. Granger causality tests

Next, the analysis tests for causality between the two "green" transition channels and inflation through the inference procedure by the Toda and Yamamoto (1995) and Dolado and Lutkepohl (1996) model (the TYDL model). In this case, to explore this further, a Vector Autoregression (VAR) model is constructed, as determined by the Akaike Information Criterion (AIC). Granger causality tests are then applied to examine the dynamic relationship between the variables under study and apply the standard Wald criterion. The null hypothesis

Table 6. Estimates across regimes: the 2010 reforms event

Full inflation	*p*-values
1990–2010	
Inflation and fiscal spending on "green" transition:	0.039** [0.05]
Inflation and "green" credit:	0.044** [0.04]
2011–2023	
Inflation and fiscal spending on "green" transition:	0.085*** [0.00]
Inflation and "green" credit:	0.116*** [0.00]
Core inflation	
1990–2010	
Inflation and fiscal spending on "green" transition:	0.025* [0.08]
Inflation and "green" credit:	0.038** [0.05]
2011–2023	
Inflation and fiscal spending on "green" transition:	0.066*** [0.00]
Inflation and "green" credit:	0.097*** [0.00]

Note(s): This table provides estimates on the impact of both transition channels on both types of inflation across the regulation (2010) regime. *$p \le 0.10$; **$p \le 0.05$; ***$p \le 0.01$

Table 7. Short-run granger causality tests

Causality hypothesis	Lag length	Wald tests-*p*-value
Fiscal spending on "green" transmission DOES NOT CAUSE inflation	3	0.00
Inflation DOES NOT CAUSE fiscal spending On "green" transmission	3	0.15
Renewable energy share in total energy supply × fiscal spending on "green" transmission DOES NOT CAUSE inflation	2	0.00
Inflation DOES NOT CAUSE renewable energy share in total energy supply × fiscal spending on "green" transmission	2	0.13
"Green" credit DOES NOT CAUSE inflation	2	0.00
Inflation DOES NOT CAUSE "green" credit	2	0.21
Renewable energy share in total energy supply × "green" credit DOES NOT CAUSE inflation	3	0.00
Inflation DOES NOT CAUSE renewable energy share in total energy supply × "green" credit	3	0.19

Note(s): The table provides Granger-causality evidence of both transition channels on both inflation rates. The lag lengths have been determined through the Akaike information criterion

Table 8. Short-run granger causality tests (alternative lag lengths)

Causality hypothesis	Lag length	Wald tests-*p*-value
Fiscal spending on "green" transmission DOES NOT CAUSE inflation	1	0.00
Inflation DOES NOT CAUSE fiscal spending on "green" transmission	1	0.13
Renewable energy share in total energy supply × fiscal spending on "green" transmission DOES NOT CAUSE inflation	4	0.00
Inflation DOES NOT CAUSE renewable energy share in total energy supply × fiscal spending on "green" transmission	4	0.22
"Green" credit DOES NOT CAUSE inflation	1	0.00
Inflation DOES NOT CAUSE "green" credit	1	0.19
Renewable energy share in total energy supply × "green" credit DOES NOT CAUSE inflation	6	0.00
Inflation DOES NOT CAUSE renewable energy share in total energy supply × "green" credit	6	0.27

Note(s): The table provides Granger-causality evidence of both transition channels on both inflation rates, but this time it makes use of the second best lag length provided by the Akaike information criterion

is that of no causality. The findings (in Table 7) suggest the presence of unidirectional causality running from both transmission channels to inflation.

Table 8 reports causality tests under alternative lag lengths. The new findings provide support to those reported in Table 7.

Table 9. Granger causality tests: Evidence across crisis regimes

Causality hypothesis	Lag length	Wald tests-p-value
The pre-global crisis period (1990–2008)		
Fiscal spending on "green" transmission DOES NOT CAUSE inflation	2	0.00
Inflation DOES NOT CAUSE fiscal spending on "green" transmission	2	0.18
Renewable energy share in total energy supply × fiscal spending on "green" transmission DOES NOT CAUSE inflation	1	0.00
Inflation DOES NOT CAUSE renewable energy share in total energy supply × fiscal spending on "green" transmission	1	0.11
"Green" credit DOES NOT CAUSE inflation	1	0.00
Inflation DOES NOT CAUSE "green" credit	1	0.16
Renewable energy share in total energy supply × "green" credit DOES NOT CAUSE inflation	2	0.00
Inflation DOES NOT CAUSE renewable energy share in total energy supply × "green" credit	2	0.14
The post-crisis period (2009–2023)		
Fiscal spending on "green" transmission DOES NOT CAUSE inflation	4	0.00
Inflation DOES NOT CAUSE fiscal spending on "green" transmission	4	0.32
Renewable energy share in total energy supply × fiscal spending on "green" transmission DOES NOT CAUSE inflation	3	0.00
Inflation DOES NOT CAUSE renewable energy share in total energy supply × fiscal spending on "green" transmission	3	0.20
"Green" credit DOES NOT CAUSE inflation	4	0.00
Inflation DOES NOT CAUSE "green" credit	4	0.24
Renewable energy share in total energy supply × "green" credit DOES NOT CAUSE inflation	2	0.00
Inflation DOES NOT CAUSE renewable energy Share in total energy supply × "green" credit	2	0.22
The pre-COVID-19 period (1990–2019)		
Fiscal spending on "green" transmission DOES NOT CAUSE inflation	2	0.00
Inflation DOES NOT CAUSE fiscal spending on "green" transmission	2	0.25
Renewable energy share in total energy supply × fiscal spending on "green" transmission DOES NOT CAUSE inflation	2	0.00
Inflation DOES NOT CAUSE renewable energy share in total energy supply × fiscal spending on "green" transmission	2	0.18
"Green" credit DOES NOT CAUSE inflation	2	0.00
Inflation DOES NOT CAUSE "green" credit	2	0.21
Renewable energy share in total energy supply × "green" credit DOES NOT CAUSE inflation	3	0.00
Inflation DOES NOT CAUSE renewable energy share in total energy supply × "green" credit	3	0.18
The post-pandemic period (2020–2023)		
Fiscal spending on "green" transmission DOES NOT CAUSE inflation	1	0.00
Inflation DOES NOT CAUSE fiscal spending on "green" transmission	1	0.27
Renewable energy share in total energy supply × fiscal spending on "green" transmission DOES NOT CAUSE inflation	2	0.00
Inflation DOES NOT CAUSE renewable energy share in total energy supply × fiscal spending on "green" transmission	2	0.21

(*continued*)

Table 9. Continued

Causality hypothesis	Lag length	Wald tests-*p*-value
"Green" credit DOES NOT CAUSE inflation	1	0.00
Inflation DOES NOT CAUSE "green" credit	1	0.25
Renewable energy share in total energy supply × "green" credit DOES NOT CAUSE inflation	2	0.00
Inflation DOES NOT CAUSE renewable energy share in total energy supply × "green" credit	2	0.24

Note(s): this table provides Granger-causality evidence on the causality role of both transition channels prior and after the global financial crisis and the COVID-19 pandemic crisis. The lag lengths have been determined by the Akaike information criterion

Finally, after a reviewer's recommendation, this part of the analysis reports sub-periods causality across three periods: i) the pre-global crisis period (1990–2008), ii) the post-crisis period (2009–2023), iii) the pre-COVID-19 period (1990–2019) and iv) the post-pandemic period (2020–2023). The new results (reported in Table 9) provide support to the baseline findings of Table 7, with the strongest causality impact occurring in the post crises of both the global financial crisis and the pandemic crisis.

While the financial crisis caused severe deflationary pressures, the "green" transition drives "greenflation" through supply-side adjustments (Olatunbosuna *et al.*, 2026). The COVID-19 era was characterized by steep rises of inflation and associated support to the "green" transition process (Schnabel, 2023; Zaghini, 2024). Empirically, Jawadi *et al.* (2024) also document that in the post-COVID period, the U.S. Federal funds rate has become more responsive to climate-related news, implying that the Fed's monetary policy framework has been gradually evolving toward climate sensitivity.

8. Conclusion

This study provided evidence on the role of two transmission channels between (overall/core) inflation and "green" transition, measured as the share of renewable energy in the US. One channel was purely macroeconomic (fiscal spending on "green" transmission and the other purely banking ("green" credit). Regression and causality tests suggested the presence of a significant impact of both channels on inflation (strengthening the concept of "greenflation"). The impact was stronger in the case of "green" credit, followed by fiscal spending on "green" transition.

The findings imply key policy implications: fiscal policymakers must consider the role of ("green") innovation in reducing the costs of the "green" transition through the fostering of increased "green" R&D expenses. Additionally, in terms of the "green" credit channel, the results point out the important role central banks can play in designing "green" credit policy instruments, with a specific focus on how this is compatible with the objective of addressing inflationary pressures. This effort can be substantially expressed through special "green" credit lines, "green" refinancing credit at low interest rates and "green" asset purchase programs ("green" bonds schemes). Future research efforts could explore these transmission mechanisms across countries and industrial sectors. In addition, future research (based on data availability) should test the role of both transition channels on inflation in other economies, as well as whether disaggregated credit and fiscal proxies should yield consistent results.

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References

Aguila, N. and Wullweber, J. (2024), "Greener and cheaper: green monetary policy in the era of inflation and high interest rates", *Eurasian Economic Review*, Vol. 14 No. 1, pp. 39-60.

Alexander, J., Nassiry, D., Barnard, S., Lindfield, M., Teipelke, R. and Wilder, M. (2019), "Financing the sustainable urban future: scoping a green cities development bank", available at: https://odi.cdn.ngo/media/documents/12680.pdf

Alichi, A. (2015), "A new methodology for estimating the output gap in the United States", Working Paper, International Monetary Fund.

Aneja, R., Kappil, S.R., Das, N. and Banday, U.J. (2023), "Do the green finance initiatives transform the world into a green economy? ", *A Study of Green Bond Issuing Countries, Environmental Science and Pollution Research*, Vol. 30 No. 38, pp. 42214-42222.

Bettarelli, L., Furceri, D., Pisano, L. and Pizzuto, P. (2025), "Greenflation: empirical evidence using macro, regional and sectoral data", *European Economic Review*, Vol. 174, p. 104983.

Brandi, C., Schwab, J., Berger, A. and Morin, J.-F. (2020), "Do environmental provisions in trade agreements make exports from developing countries greener?", *World Development*, Vol. 129, p. 104899.

Breitenfellner, A., Fritzer, F., Prammer, D., Rumler, F. and Salish, M. (2022), "What is the impact of carbon pricing on inflation in Austria?", *Monetary Policy Economics*, Vol. 22 No. Q3, pp. 23-41.

Carreraa, EΣ., Giombinib, G. and Calcagnini, G. (2025), "Bank lending policies and green transition", *Structural Change and Economic Dynamics*, Vol. 74 No. 4, pp. 619-629.

Caselli, F., Davoodi, H., Goncalves, C., Hong, G.H., Lagerborg, A., Medas, P., Nguyen, A.D.M. and Yoo, J. (2022), "The return to fiscal rules", *IMF Staff Discussion Note*, No. 2/22 International Monetary Fund, Washington, DC.

Chung, C. and Kim, J. (2024), "Greenflation, a myth or fact? Empirical evidence from 26 OECD countries", *Energy Economics*, Vol. 139, p. 107906.

Ciccarelli, M. and Marotta, F. (2024), "Demand or supply? An empirical exploration of the effects of climate change on the macroeconomy", *Energy Economics*, Vol. 129, p. 107163.

Darvas, Z. and Wolff, G. (2021), "A green fiscal pact: climate investment in times of budget consolidation", *Policy Contribution*, Bruegel.

Dechezleprêtre, A. and Popp, D. (2015), "Fiscal and regulatory instruments for clean technology development in the European Union", *Policy Paper, ESRC Centre for Climate Change Economics and Policy and Grantham Research Institute on Climate Change and the Environment*.

Deng, L. and Zhao, Y. (2022), "Investment lag, financially constraints and company value-evidence from China", *Emerging Markets Finance and Trade*, Vol. 58 No. 11, pp. 3034-3047.

Dikau, S. and Volz, U. (2021), "Central bank mandates, sustainability objectives and the promotion of green finance", *Ecological Economics*, Vol. 184, p. 107022.

Dolado, J.J. and Lutkepohl, H. (1996), "Making Wald test work for cointegrated VAR systems", *Econometric Reviews*, Vol. 15 No. 4, pp. 369-386.

Economides, G. and Xepapadeas, A. (2018), "Monetary policy under climate change", CESifo Working Paper Series, No. 7021, CESifo.

Elliott, G., Rothernberg, T.J. and Stock, J.H. (1996), "Efficient tests for an autoregressive unit root", *Econometrica*, Vol. 64 No. 4, pp. 831-836.

Gianfrate, G. and Peri, M. (2019), "The green advantage: exploring the convenience of issuing green bonds", *Journal of Cleaner Production*, Vol. 219 No. 1, pp. 127-135.

Grigoli, F., Herman, A. and Schmidt-Hebbel, K. (2014), "World saving", *IMF Working Papers*, Vol. 2014 No. 204.

Guo, C.Q., Wang, X., Cao, D.D. and Hou, Y.G. (2022), "The impact of green finance on carbon emission-analysis based on mediation effect and spatial effect", *Frontiers of Environmental Sciences*, Vol. 10, p. 844988.

Ilan, M. and Mugerman, Y. (2025), "Cautious but short-sighted: inflation and mortgage strategy in low-income households", *Finance Research Letters*, Vol. 86, p. 108354.

Jawadi, F., Rozin, P. and Idi Cheffou, A. (2024), "Toward green Central banking: proposing an augmented Taylor rule", *Energy Economics*, Vol. 134, p. 107539.

Kaldor, N. (1985), *Economics Without Equilibrium*, M. E. Sharpe Inc, New York, NY.

Kayani, U.N., Gan, C., Rabbani, M.R. and Trichilli, Y. (2023), "Is short-term firm performance an indicator of a sustainable financial performance? Empirical evidence", *Studies in Economics and Finance*, Vol. 41 No. 3, pp. 619-637.

Kumari, V., Assaf, R., Moussa, F. and Pandey, D.K. (2023), "Impacts of climate pact on global oil and gas sector stocks", *Studies in Economics and Finance*, Vol. 41 No. 3, pp. 596-618.

Lange, E.M. and Banadaki, N.G. (2023), "ESG consideration in venture capital: drivers, strategies and barriers", *Studies in Economics and Finance*, Vol. 41 No. 3, pp. 724-739.

Lie, J.P. and Rivai, A. (2022), "Determinants of interbank money market interest rates in 1990-2019", *Scientific Journal of Social, Economic, Cultural, Technological, and Educational*, Vol. 1 No. 8, pp. 1291-1300.

Liebich, L., Nöh, L., Rutkowski, F. and Schwarz, M. (2023), "Unconventionally green: monetary policy between engagement and conflicting goals", *Review of Economics*, Vol. 74 No. 1, pp. 53-77.

Liu, C.Z., Liu, N.N., Xia, Y.F., Ren, Y. and Liang, J.Z. (2020), "Examining the coordination between green finance and green economy aiming for sustainable development: a case study of China", *Sustainability*, Vol. 12 No. 9, p. 3717.

Lv, K., Yu, S., Fu, S., Wang, J., Wang, C. and Pan, J. (2022), "The impact of financial development and green finance on regional energy intensity: new evidence from 30 Chinese provinces", *Sustainability*, Vol. 14 No. 15, p. 9207.

Mahoney, P.G. and Robertson, A. (2021), "Advisers by another name. Virginia law and economics research paper", No. 1.

Monnet, E. and Van't Klooster, J. (2023), "Using green credit policy to bring down inflation: what Central bankers can learn from history", The INSPIRE Sustainable Central Banking Toolbox Policy Briefing Paper, No. 13.

Muller, N.Z. (2021), "On the green interest rate", Working Paper, No. 28891, National Bureau of Economic Research.

Niblock, S.J. (2024), "ESG and the performance of energy and utility portfolios: evidence from Australia", *Studies in Economics and Finance*, Vol. 41 No. 3, pp. 502-521.

Olatunbosuna, A., Bizamporob, N., Nii-Okaic, E., Temitoped, A.T., Quarshiee, V.J.K., Alaof, G.U. and Yeboah, A. (2026), "Greenflation: a review of the evidence linking the green energy transition to short-run inflation pressures", *Journal of Economics and Trade*, Vol. 11 No. 1, pp. 123-135.

Park, H. and Kim, J.D. (2020), "Transition towards green banking: role of financial regulators and financial institutions", *Asian Journal of Sustainable Social Responsibility*, Vol. 5, p. 5.

Piseddu, T. and Vanhuyse, F. (2023), "Cost efficiency of municipal green bonds' measures: a marginal abatement cost curves approach", *Studies in Economics and Finance*, Vol. 41 No. 3, pp. 522-544.

Priyambudi, A.H. and Thamrin, H. (2021), "Analysis of the effect of macroeconomics and firm value on consumer goods stock returns", *International Journal of Innovative Science and Research Technology*, Vol. 6 No. 8, pp. 756-763.

Rivera, B. (2022), "Green bonds: reforming ESG regulation in the United States to meet the requisite funding demand for a decarbonized economy", *UC Law Environmental Journal*, Vol. 28 No. 2, pp. 191-212.

Rizzati, M.C.P., Ciola, E., Turco, E., Bazzana, D. and Vergalli, S. (2025), "Beyond green preferences: demand-side and supply-side drivers in the low-carbon transition", *Environmental and Resource Economics*, Vol. 88 No. 5, pp. 1239-1295.

Sajjad, S., Bhuiyan, R.A., Dwyer, R.J., Bashir, A. and Zhang, C. (2024), "Balancing prosperity and sustainability: unraveling financial risks and green finance through a COP27 lens", *Studies in Economics and Finance*, Vol. 41 No. 3, pp. 545-570.

Schmidt, T., Bjarne, S., Egli, F.M., Pahle, M., Tietjen, O. and Edenhofer, O. (2019), "Adverse effects of rising interest rates on sustainable energy transitions", *Nature Sustainability*, Vol. 2 No. 9, pp. 879-885.

Schnabel, I. (2023), *Monetary Policy Tightening and the Green Transition. International Symposium on Central Bank Independence*, Sveriges Riksbank, Stockholm, Stockholm.

Sharma, A., Tiwari, A.K., Abakah, E.J.A. and Owusu, F.B. (2023), "A cross-quantile correlation and causality-in-quantile analysis on the relationship between green investments and energy commodities during the COVID-19 pandemic period", *Studies in Economics and Finance*, Vol. 41 No. 3, pp. 478-501.

Tanveer, A., Zeng, S. and Tian, W. (2024), "Closing the loop: does corporate sustainability capability matter for improving energy efficiency? Evidence from Pakistan", *Studies in Economics and Finance*, Vol. 41 No. 3, pp. 571-595.

Toda, H.Y. and Yamamoto, T. (1995), "Statistical inference in vector autoregressions with possibly integrated processes", *Journal of Econometrics*, Vol. 66 Nos 1-2, pp. 225-250.

Van den Noord, P. (2021), "Green fiscal norms needed for the European green deal", *Economisch-Statistische Berichten*, Vol. 106 No. 4800, pp. 368-370.

Van't Klooster, J. and Van Tilburg, R. (2020), "Targeting a sustainable recovery with green TLTROs", *Positive Money Europe and Sustainable Finance Lab*.

Wyplosz, C. (2013), "Fiscal rules: theoretical issues and historical experience", In *Fiscal Policy after the Financial Crisis*, Alesina, A., Giavazzi, F. (Eds.), University of Chicago Press, Chicago.

Yadav, M.P., Ashok, S., Taghizadeh-Hesary, F., Dhingra, D., Mishra, N. and Malhotra, N. (2024), "Uncovering time and frequency co-movement among green bonds, energy commodities and stock market", *Studies in Economics and Finance*, Vol. 41 No. 3, pp. 638-659.

Yang, X., He, L., Xia, Y. and Chen, Y. (2019), "Effect of government subsidies on renewable energy investments: the threshold effect", *Energy Policy*, Vol. 132 No. 1, pp. 156-166.

Yao, S., Pan, Y., Sensoy, A., Uddin, G.S. and Cheng, F. (2021), "Green credit policy and firm performance: what we learn from China", *Energy Economics*, Vol. 101, p. 105415.

Zaghini, A. (2024), "Unconventional green", *Journal of Corporate Finance*, Vol. 85, p. 102556.

Zhang, D., Mohsin, M., Rasheed, A.K., Chang, Y. and Taghizadeh-Hesary, F. (2021), "Public spending and green economic growth in BRI region: mediating role of green finance", *Energy Policy*, Vol. 153, p. 112256.

Zhang, L., Padhan, H., Singh, S.K. and Gupta, M. (2024), "The impact of renewable energy on inflation in G7 economies: evidence from artificial neural networks and machine learning methods", *Energy Economics*, Vol. 136 No. 1, pp. 1-12.

Further reading

Lin, B. and Zhu, J. (2019), "Fiscal spending and green economic growth: evidence from China", *Energy Economics*, Vol. 83 No. 2, pp. 264-271.

Neiss, K.S. and Nelson, E. (2005), "Inflation dynamics, marginal cost, and the output gap: evidence from three countries", *Journal of Money, Credit, and Banking*, Vol. 37 No. 6, pp. 1019-1045.

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