

Climate Policies in Supply Chains

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Walmart Pledges Zero Emissions By 2040

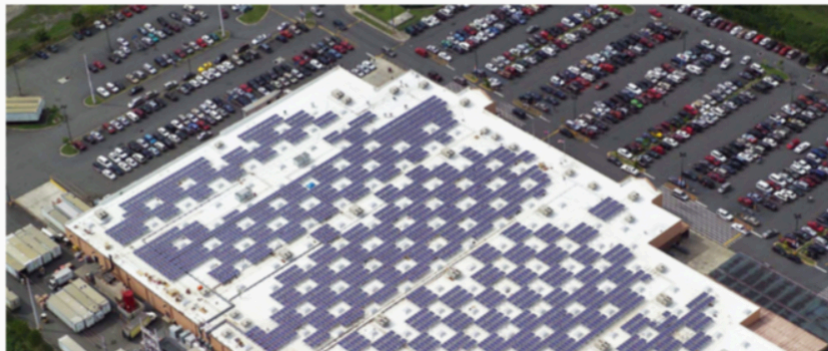
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Sep 30, 2020, 10:01am EDT

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ENVIRONMENT

General Motors Aims To Be Carbon Neutral By 2040

January 28, 2021 · 8:09 PM ET

By Dustin Jones

Automaker General Motors has announced aspirations of achieving carbon neutrality by 2040. On the way to that goal, the company hopes to eliminate tailpipe emissions by 2035.

GM said Thursday it will take a science-based approach to become carbon neutral, balancing carbon dioxide emissions and removal efforts. Furthermore, it plans to eliminate gas-powered, light-duty vehicle production by 2035, it said. It intends that by 2025, 40% of its



General Motors Chairman and CEO Mary Barra speaks in Detroit, Mich., 2019. GM has joined the Science Based Targets initiative to better reduce its carbon footprint. *Bill Puopolo/Getty Images*



Sustainable Business



2 minute read · October 11, 2021 6:47 PM GMT+2 · Last Updated 2 years ago

Chevron commits to net zero operational emissions by 2050

Reuters

Corporate greenwashing—misusing ‘net zero’ pledges

LINDSAY OTIS 9th March 2023



COP27 - Corporate climate pledges rife with greenwashing - U.N. expert group

By Gloria Dickie ▾ and Simon Jessop ▾



UN Secretary-General has urged zero tolerance for net-zero ‘greenwashing’

9 November, 2022

António Guterres applauds the growing number of governments and organisations pledging to be carbon-free but denounces greenwashing ‘net-zero’ pledges.

Introduction (2)

- A pernicious form of greenwashing happens when the climate harm is done by a firm's suppliers who are typically outside the net-zero commitments.
 - Suppliers account for [92%](#) of emissions of US firms (EPA, 2021).
- Therefore, decarbonizing supply chains is a crucial step towards achieving global carbon neutrality targets.

Why is this Important?

- **Co-ordinated Action Problem**: environmental harm by supply chain partners occur across borders making it difficult for any single government to regulate.
- Regulators are increasingly holding firms responsible for the ES impact of their suppliers:
 - German Supply Chain Act (2023)
 - UK Modern Slavery Act (2015)
 - EU Corporate Sustainability Due Diligence Directive (2023)

UK meat industry and supermarkets including Tesco, Asda, Sainsbury's and Morrisons 'causing illegal deforestation in the Amazon'

An investigation combining satellite data with observations on the ground shows evidence of a direct link between illegal deforestation in the Amazon and supplies of soya beans shipped from Brazil to the UK.



Tom Clarke

Science and technology editor @TomClarke

Supply Chain Sustainability – What do we know?

- Suppliers share information on climate change vulnerability on request from customers (Jira and Toffel, 2013)
- Customers reconfigure their supply chain when the perceived climate risk at the supplier's location is higher (Pankratz and Schiller, 2023).
- Customers diversify their supply chain away from suppliers who have negative ES events on their site (Bisetti, She, and Žaldokas, 2023).

An alternate Channel

- Current supply chain arrangements are economically efficient outcomes, and it is costly for firms to switch suppliers.
- In addition to physical climate risk, firms face **transition risk** that are affected by their supply chains.
- Customer firms can transmit climate-responsible practices upstream and commit to bilateral monitoring of its suppliers' environmental practices – **private regulation of environmental standards**

What do we do?

- We examine three questions:
 1. Do supplier firms adopt climate-responsible policies when they face climate-related pressure from customers?
 2. Does the adoption of climate policies lead to better climate outcomes of the suppliers?
 3. Which factors facilitate/hinder the policy-outcome channel for suppliers?

What do we Find?

- Supplier firms are **6-8 percentage points** more likely to adopt emission reduction targets and **10 percentage points** more likely to link executive compensation to climate targets following downstream pressure.
 - Driven by bargaining power and not spatial agglomeration or reconfiguration of the supply chain
- **No effect** of policy adoption on suppliers' CO₂e emissions and energy expenditure, or the leading indicators of abatement – CapEx and R&D (*policy-outcome gap*).
- *Policy-Outcome gap* is lower when suppliers have higher gross margins and customers can better monitor suppliers.

Data

- Granular firm-level climate-related disclosures from Carbon Disclosure Project (CDP)
- Information on climate action (such as emission-reduction initiatives and setting emission targets) and climate governance (such as having a climate-resilient business strategy, board oversight of climate-related issues and climate-related incentives for managers) practices for a global sample of firms.
- Sample period 2011-2020.
- We focus on North American customers that can be merged with Compustat – 793 unique firms.

Data (2)

- Supply chain data from [Factset Revere](#).
- Only first-tier suppliers.
 - On average, a supplier in our sample has 11 customer firms.
 - Spans 24 industry groups
- We need *both* customers and suppliers to have responded to the CDP survey

Measures – Climate Policies

Why these questions from the survey?

1. Measures that reflect firms' headline climate policies, strategic choices and outcomes.
2. Questions are informative about climate-responsible policies and practices of firms in a wide range of industries.
3. Remain unchanged in spirit for us to construct a panel of responses.

No.	Question	Year First	Unchanged
C 1.1	<i>Is there board-level oversight of climate-related issues within your organization?</i>	2010	No
C 1.3	<i>Do you provide incentives for the management of climate-related issues, including the attainment of targets?</i>	2010	Yes
C 3.1	<i>Are climate-related issues integrated into your business strategy?</i>	2010	Yes
C 4.1	<i>Did you have an emissions target that was active in the reporting year?</i>	2010	Yes
C 4.3	<i>Did you have emissions reduction initiatives that were active within the reporting year? Note that this can include those in the planning and/or implementation phases.</i>	2010	Yes



Measures – Climate Outcomes

- Total emissions (linear summation of scopes 1 and 2) from [Thomson Reuters Asset 4](#) and [Eikon](#).
- Operating expenditures on energy from the CDP surveys.
- Suppliers' capital expenditure (CapEx) and research and development (R&D) expenditure.
 - CapEx and R&D expenses are potential determinants of emission reduction, as they indicate the company's willingness to pursue green innovation and efficiency

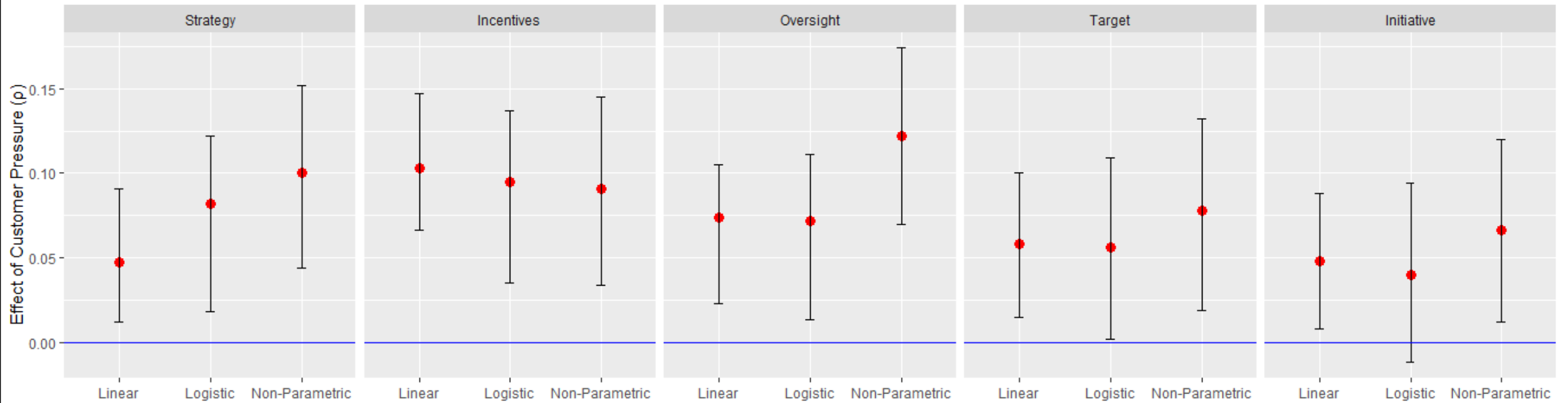
Measures – Customer Pressure

- Indicator equals 1 if any customer of a supplier firm sets an emission target.
- Using emissions targets is informative because customer firms often set goals on reducing emissions across entire supply chains. The net-zero goal includes reductions of Scope 3 emissions.
 - For example, when Unilever set itself a net-zero and an emission reduction goal in early 2019, it encouraged its suppliers to set their own science-based targets.

Results – Staggered DiD

	Strategy (1)	Incentives (2)	Oversight (3)	Target (4)	Initiative (5)
T-4	0.029 (0.028)	0.004 (0.028)	0.026 (0.025)	0.040 (0.030)	0.036 (0.027)
T-3	0.018 (0.034)	-0.010 (0.035)	0.036 (0.034)	0.025 (0.035)	0.024 (0.032)
T-2	0.033 (0.040)	0.023 (0.043)	0.053 (0.041)	0.044 (0.041)	0.037 (0.038)
T-1	0.061 (0.045)	0.060 (0.049)	0.042 (0.046)	0.065 (0.047)	0.048 (0.043)
Observations	2135	2138	2142	2138	2134
F-Stat	1.272	1.910	0.600	1.203	0.852
T	0.058** (0.027)	0.100*** (0.027)	0.028 (0.026)	0.053* (0.027)	0.062** (0.026)
T+1	0.089** (0.035)	0.131*** (0.034)	0.056 (0.037)	0.068* (0.037)	0.058* (0.033)
T+2	0.103** (0.043)	0.170*** (0.042)	0.075* (0.045)	0.095** (0.045)	0.073* (0.043)
T+3	0.099* (0.052)	0.191*** (0.051)	0.128** (0.054)	0.134** (0.055)	0.107** (0.051)
T+4	0.052 (0.061)	0.194*** (0.059)	0.118* (0.064)	0.103 (0.064)	0.044 (0.058)
T+5	0.031 (0.079)	0.234*** (0.072)	0.124 (0.077)	0.150* (0.080)	0.136* (0.074)
Observations	2950	2960	2960	2950	2950
F-Stat	20.429	8.373	14.682	188.872	111.087
Year Fixed Effects	Yes	Yes	Yes	Yes	Yes
Firm Fixed Effect	Yes	Yes	Yes	Yes	Yes

Results



Transmission Channels

- We test three channels of downstream transmission of climate policies:
 1. **Bargaining Power:** Higher bargaining power of customer relative to the supplier increases the possibility of private regulation by customers (Barrot et al. 2016, Kuruvilla, 2021).
 2. **Reconfiguration:** Customers move from “brown” to “green” suppliers.
 3. **Spatial Agglomeration:** Customers and suppliers located in the same state are more likely to be affected by region-specific regulatory pressure, climate risks and innovation capacity.

Bargaining Power

- The HHI of a suppliers' industry is a measure of relative bargaining power - a lower competition in the suppliers' industry implies that each supplier possesses greater bargaining power than their customers.
- Transmission is more likely when we use size difference as an alternate measure of bargaining power.

	Strategy (1)	Incentives (2)	Oversight (3)	Target (4)	Initiative (5)
Customer Pressure	0.054** (0.021)	0.105*** (0.021)	0.063*** (0.021)	0.057** (0.022)	0.060*** (0.021)
Customer Pressure × Supplier HHI Index	-2.127*** (0.544)	-0.606 (0.949)	0.041 (1.094)	-1.794* (1.025)	-1.804*** (0.564)
Firm Fixed Effect	Yes	Yes	Yes	Yes	Yes
Year Fixed Effects	Yes	Yes	Yes	Yes	Yes
Observations	5889	5942	5940	5888	5928
Adjusted R^2	0.693	0.707	0.675	0.688	0.702

Reconfiguration

- Subsample of new customer-supplier pairs formed within our sample period,
- We test whether a customer setting an emissions target increases the likelihood of new suppliers being 'green' (i.e., the supplier had already adopted climate policies before being linked to the customer).

	Strategy (1)	Incentives (2)	Oversight (3)	Target (4)	Initiative (5)
Customer with Emission Target	0.007 (0.016)	-0.004 (0.017)	0.014 (0.017)	0.001 (0.014)	0.005 (0.015)
Year Fixed Effects	Yes	Yes	Yes	Yes	Yes
Supplier Fixed Effect	Yes	Yes	Yes	Yes	Yes
Customer Fixed Effect	Yes	Yes	Yes	Yes	Yes
Customer Controls	Yes	Yes	Yes	Yes	Yes
Observations	4658	4667	4680	4626	4654
Adjusted R^2	0.790	0.830	0.784	0.803	0.808

Spatial Agglomeration

- Estimate our baseline models for the subsample of U.S. customer and supplier firms, controlling for the fraction of customers and suppliers in the same state.

	Strategy (1)	Incentives (2)	Oversight (3)	Target (4)	Initiative (5)
Customer Pressure	0.043** (0.020)	0.103*** (0.021)	0.058*** (0.021)	0.061*** (0.022)	0.051** (0.020)
Customers in State (%)	0.000 (0.026)	-0.025 (0.028)	0.018 (0.025)	-0.017 (0.028)	0.009 (0.036)
Firm Fixed Effect	Yes	Yes	Yes	Yes	Yes
Year Fixed Effects	Yes	Yes	Yes	Yes	Yes
Firm Controls	Yes	Yes	Yes	Yes	Yes
Observations	6105	6144	6152	6100	6121
Adjusted R^2	0.700	0.711	0.679	0.694	0.709

Policy- Outcome Gap

	Emissions (1)	OpExp Energy (2)	Capex (3)	R&D (4)
T-4	3.454 (18.782)	0.517 (1.139)	0.001 (0.003)	-0.005 (0.004)
T-3	-0.805 (27.079)	-1.075 (0.959)	-0.005 (0.003)	-0.005 (0.005)
T-2	25.745 (30.289)	-0.732 (1.041)	-0.001 (0.004)	-0.004 (0.005)
T-1	15.260 (36.468)	-1.299 (1.253)	-0.003 (0.004)	-0.010* (0.005)
Observations	1031	877	1904	884
F	1.140	0.931	2.941	1.226
T	16.850 (15.978)	0.163 (1.037)	-0.000 (0.002)	-0.005** (0.002)
T+1	21.610 (21.559)	0.914 (1.279)	0.003 (0.003)	-0.007* (0.004)
T+2	30.829 (25.164)	0.496 (1.245)	0.000 (0.003)	-0.007 (0.005)
T+3	31.407 (39.173)	-0.261 (1.819)	-0.004 (0.004)	-0.007 (0.005)
T+4	55.336 (46.464)	0.793 (2.504)	-0.001 (0.004)	-0.011 (0.007)
T+5	71.411 (59.276)	-0.670 (2.401)	0.004 (0.005)	-0.012 (0.008)
Observations	1509	1343	2616	1263
F-Stat	0.852	0.345	0.835	1.237
Year Fixed Effects	Yes	Yes	Yes	Yes
Firm Fixed Effect	Yes	Yes	Yes	Yes

Origins of the Policy-Outcome Gap

- We test three possible reasons for the policy-outcome gap:
 1. **Poor Commercial Terms**: Suppliers are often financially constrained to make significant investments towards emission reduction
 2. **Lack of Monitoring**: Difficult for customers to monitor suppliers' operating activities and environmental audits are rare.
 3. **Cultural Friction**: The political views of supplier firms likely affect whether they adopt climate action policies symbolically.

- If poor commercial terms impede the average supplier from implementing the climate policies in practice, then suppliers with higher gross margins should be better equipped to implement the policies they adopt following customer pressure.
- Example: PepsiCo's guaranteed fair price in the potato supply chain.

Commercial Terms

	Emissions (1)	Energy Exp (2)	Capex (3)	R&D (4)
Pressure × High Gross Margin × Target	9.110 (44.826)	1.674 (2.126)	0.013** (0.007)	0.003 (0.008)
Pressure × High Gross Margin	-23.321 (39.500)	-1.699 (1.823)	-0.012** (0.006)	-0.011 (0.007)
Pressure × Target	9.238 (20.192)	-1.596 (1.589)	-0.001 (0.002)	0.000 (0.003)
Target × High Gross Margin	5.816 (38.138)	0.376 (1.553)	-0.009* (0.005)	-0.000 (0.008)
Pressure	-3.644 (21.085)	1.709 (1.591)	0.001 (0.002)	-0.001 (0.003)
High Gross Margin	-80.645** (36.138)	-0.402 (1.272)	0.011** (0.005)	-0.006 (0.005)
Target	-4.300 (19.538)	0.375 (1.213)	0.003 (0.002)	-0.001 (0.002)
Year Fixed Effects	Yes	Yes	Yes	Yes
Firm Fixed Effect	Yes	Yes	Yes	Yes
Firm Controls	Yes	Yes	Yes	Yes
Observations	3361	2927	6050	3575
Adjusted R^2	0.913	0.582	0.737	0.886

- If customers' inability to monitor leads to suppliers' symbolic adoption of climate policies, then this constraint should be decreasing in the distance between the two firms.
- Example: Tesco is linked to Amazon deforestation through its supplier Cargill.

Monitoring

	Emissions (1)	OpExp Energy (2)	Capex (3)	R&D (4)
Pressure × Proximate Customer × Target	-7.311 (12.472)	1.505** (0.730)	0.003** (0.001)	0.001 (0.002)
Pressure × Proximate Customer	5.662 (10.625)	-0.837 (0.642)	-0.001 (0.001)	-0.002 (0.002)
Pressure × Target	0.517 (7.808)	-0.489 (0.464)	0.001 (0.001)	-0.002 (0.001)
Target × Proximate Customer	8.086 (7.312)	0.346 (0.440)	-0.001 (0.001)	-0.000 (0.002)
Pressure	-4.836 (9.386)	0.414 (0.474)	-0.000 (0.001)	0.001 (0.001)
Year Fixed Effects	Yes	Yes	Yes	Yes
Supplier x Customer Fixed Effect	Yes	Yes	Yes	Yes
Controls	Yes	Yes	Yes	Yes
Observations	26084	22956	46974	33758
Adjusted R^2	0.948	0.672	0.809	0.915

- Suppliers can resist sustainability programs of customers if it contradicts their conservative worldview. Using the information on political donations from Opensecrets, we test whether Democrat-leaning views of suppliers are associated with a lower policy-outcome gap.

Cultural Friction

	Emissions (1)	OpExp Energy (2)	Capex (3)	R&D (4)
Pressure × Democrat Supplier × Target	42.590 (77.437)	-0.098 (2.512)	0.000 (0.006)	-0.010 (0.016)
Pressure × Democrat Supplier	-2.149 (56.764)	1.542 (2.208)	-0.000 (0.004)	0.017 (0.013)
Pressure × Target	0.812 (62.801)	-0.196 (2.155)	0.003 (0.004)	-0.005 (0.011)
Target × Democrat Supplier	-102.947* (59.291)	-0.165 (2.236)	0.002 (0.005)	-0.010 (0.013)
Pressure	36.069 (47.432)	0.028 (1.875)	-0.001 (0.003)	0.009 (0.008)
Democrat Supplier	-17.010 (44.361)	-2.538 (1.989)	0.000 (0.004)	0.012 (0.011)
Target	78.763 (53.996)	0.621 (1.990)	-0.003 (0.003)	0.020** (0.009)
Year Fixed Effects	Yes	Yes	Yes	Yes
Firm Fixed Effect	No	No	No	No
Firm Controls	Yes	Yes	Yes	Yes
Observations	3207	2896	5718	3378
Adjusted R^2	0.266	0.177	0.499	0.248

Implications and Contributions

- Private regulations of suppliers' climate-responsible practices by customer firms can be a pathway to more sustainable supply chains at lower economic costs.
- Our results highlight the requirements to consider commercial terms of supply chain contracts and monitoring resources in designing public policies on environmental due diligence in the supply chain.
- With strong incentives to offer better prices to suppliers and monitor their climate-responsible practices, large firms' adoption of climate-responsible practices can trigger multiplier effects in the decarbonization process.

THANK YOU
