

Climate Change and Consumption Patterns in Latin America: The Urgency of a Structural Transformation

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IN SHORT

EN

- Climate change obstructs Latin America's development, affecting the economy, society, and the environment. A substantial investment is needed for the 2050-2070 deep decarbonization process.
- Latin America's unsustainable development in the last five decades has boosted consumption, employment, and poverty reduction but falls short in addressing chronic poverty and high-income concentration. This undermines economic dynamics and exposes society to climate change impacts.
- A just climate transition requires changes in consumption patterns, investment in sustainable infrastructure, and the establishment of a universal, high-quality social protection system.
- Achieving a carbon-neutral economy demands a new global economic paradigm, not just sector-specific mitigation processes. Developing a forward-looking global economic vision for the 21st century is imperative.

DE

- Klimawandel beeinträchtigt Wirtschaft, Gesellschaft und Umwelt Lateinamerikas. Für die Dekarbonisierung Lateinamerikas sind erhebliche Investitionen erforderlich.
- Lateinamerikas konnte in den letzten fünf Jahrzehnten Konsum und Beschäftigung steigern und Armut bekämpfen. Dies ist jedoch nicht ausreichend, um die chronische Armut gänzlich zu überwinden und die Einkommensungleichheit anzugehen. Dies untergräbt die wirtschaftliche Dynamik und setzt die Gesellschaft den Auswirkungen des Klimawandels aus.
- *Just transition* erfordert die Veränderung von Konsummustern, Investitionen in nachhaltige Infrastruktur und die Einführung eines universellen, hochwertigen Sozialschutzsystems.
- Die Dekarbonisierung der Wirtschaft erfordert ein neues globales wirtschaftliches Paradigma, nicht nur sektorspezifische Minderungsprozesse. Eine zukunftsorientierten globalen Vision für das 21. Jahrhundert ist unerlässlich.

FR

- Le changement climatique entrave le développement de l'Amérique latine, affectant l'économie, la société et l'environnement. Un investissement substantiel est nécessaire pour le processus de décarbonisation profonde de 2050-2070.
- Le développement non durable de l'Amérique latine au cours des cinq dernières décennies a stimulé la consommation, l'emploi et la réduction de la pauvreté, mais ne parvient pas à traiter la pauvreté chronique et la concentration des revenus élevés. Cela mine la dynamique économique et expose la société aux impacts du changement climatique.
- Une transition climatique juste nécessite des changements dans les modes de consommation, des investissements dans une infrastructure durable et la mise en place d'un système universel de protection sociale de haute qualité.
- Parvenir à une économie neutre en carbone exige un nouveau paradigme économique mondial, pas seulement des processus de mitigation spécifiques à certains secteurs. Le développement d'une vision économique mondiale tournée vers l'avenir pour le XXIe siècle est impératif.

ES

- El cambio climático obstaculiza el desarrollo de América Latina, afectando la economía, la sociedad y el medio ambiente. Se necesita una inversión sustancial para el proceso de descarbonización profunda al 2050 y 2070.
- El desarrollo insostenible de América Latina en las últimas cinco décadas ha impulsado el consumo, el empleo y la reducción de la pobreza, pero no logra abordar la pobreza crónica y la concentración de ingresos. Esto socava la dinámica económica y expone a la sociedad a los impactos del cambio climático.
- Una transición climática justa requiere cambios en los patrones de consumo, inversión en infraestructura sostenible y el establecimiento de un sistema de protección social universal y de alta calidad.
- Lograr una economía neutral en carbono exige un nuevo paradigma económico global, no solo procesos de mitigación específicos en sectores. Desarrollar una visión económica global orientada hacia el futuro para el siglo XXI es imperativo.

Introduction¹

Climate change results from a global negative externality that endangers a global public good: the climate (Stern, 2006). Indeed, it is a consequence of greenhouse gas (GHG) emissions, derived mainly from fossil fuel consumption and deforestation, leading to an increase in global temperature, modifications in precipitation patterns, sea level rise, cryosphere reduction and extreme weather events (IPCC, 2018). These climate transformations also have significant negative effects on economic activities and welfare (IPCC, 2014). For example, there is strong evidence that temperature increase has widespread and significant socioeconomic effects, probably non-linear, irreversible and more intense in poor and warmer countries or regions. It is proven also that it reduces the growth rate of Gross Domestic Product (GDP) and productivity in the long term (Dell et al., 2014).

The 2015 Paris Climate Change Agreement seeks to avoid the most intense and irreversible damage by limiting the global temperature increase to between 1.5° C and 2° C during this century via the transition to a carbon-neutral economy between 2050 and 2070. This transition requires significant and urgent structural changes to how countries seek development and mobilisation of resources. For example, current consumption patterns lead to increased spending on private transport and fossil fuels for transportation, resulting in an increase in greenhouse gas emissions. Thus, this *Extractivism Policy Brief* argues that it is necessary to transform current consumption patterns supported by a low-carbon, mainly public, transport. In this sense, climate change represents an obstacle to development (Dell et al., 2014).

Latin America has shown, over the last five decades, significant but volatile economic growth that has contributed to an increase in consumption, employment and poverty reduction. However, this economic dynamism was insufficient to mitigate chronic poverty and the high concentration of income and wealth. Moreover, this economic dynamism is associated with the generation of a set of negative externalities such as air, water and soil pollution, waste generation and greenhouse gas. It is possible to say that these

economic, social and environmental conditions are eroding the basis of sustenance of the current economic dynamism and show a style of development that is not sustainable (Stern, 2006).

At the core of this unsustainable development style are unsustainable consumption and production patterns. For example, the water footprint, input footprint, waste generation and greenhouse gas emissions contribute immensely to climate change (Duarte et al., 2010). An increase in *per capita* income is associated with an increase in the demand for goods that are more intensive in greenhouse gas emissions, such as private transportation. In this sense, moving towards sustainable development requires structural modifications to current consumption and production patterns. It is necessary to build new consumption patterns where an increase in *per capita* income does not lead to an increase in emissions. The urgency and magnitude of these structural transformations can only be realised in the context of a just climate transition where significant investments are made in sustainable infrastructure, a universal and efficient social protection system is built, and physical and climate risks of the transition are appropriately managed (NGFS, 2021). However, significant uncertainty remains about the characteristics of these consumption patterns and how they relate to climate change and an unsustainable trajectory.

Thus, this *Extractivism Policy Brief* analyses the main characteristics of consumption patterns in Latin America in reference to the climate challenge. It shows that while the current economic dynamism is associated with an increase in consumption, employment and poverty reduction, it is insufficient to meet the challenges of chronic poverty and high-income concentration. Moreover, this development style has created a set of negative externalities that are even eroding the foundations of the current economic dynamism. Thus, in order to meet these economic and social challenges and negative externalities in Latin America, it is necessary to implement deep structural transformations to current consumption (and production) patterns.

processing. The usual disclaimer of errors applies. Judgments and opinions are solely the responsibility of the author.

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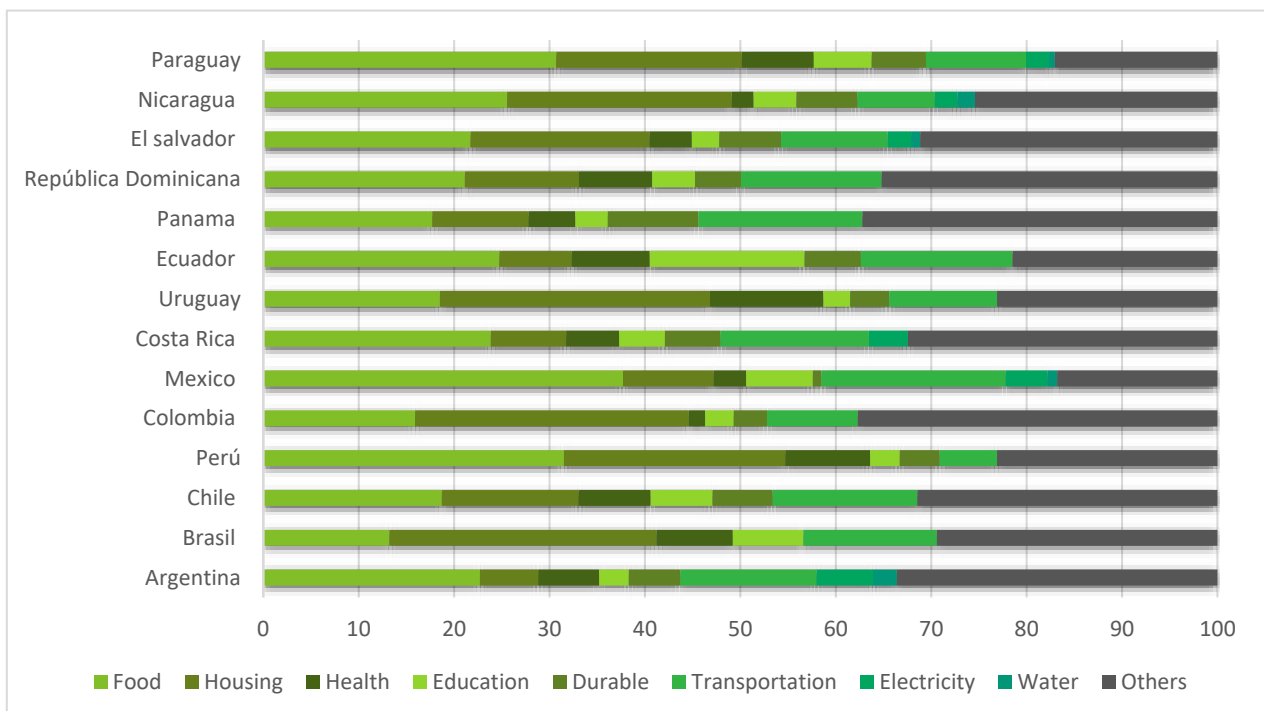
Climate change and consumption patterns

Climate change has significant generalised effects, probably non-linear, in some cases irreversible and more intense in poor and warmer countries (Burke, 2015; Hsiang et al., 2015). Indeed, evidence shows that climate change has adverse effects on agricultural, industrial and service activities, productivity, electricity and water consumption, energy generation, ecosystems, health, migration, and social and political conflicts (Burke, 2015; Dell et al., 2009; Kahn et al., 2021; Nordhaus and Moffat, 2017). Likewise, climate change impacts the rate of productivity and, consequently, the long-term growth rate of the GDP. In this context, the Paris Agreement on climate change seeks to avoid the most damaging and irreversible effects of climate change by limiting the global temperature increase to between 1.5° C and 2° C during this century. This requires urgent structural transformations to the current style of development to enable the decarbonisation process, build a climate-resilient economy and manage the risks of the transition. Hence,

climate change represents an obstacle to development in terms of its negative, widespread and significant impacts, as well as the structural transformations and resource mobilisation required to reach a carbon-neutral economy between 2050 and 2070.

Consumption patterns are a fundamental component of the current development style. Indeed, consumption typically represents more than 60 percent of aggregate final demand in modern economies, being a fundamental indicator of social welfare and inducing, through effective demand, the growth of productive activities (Deaton and Muellbauer, 1980). In Latin America, the main expenditure items correspond to food and beverages, housing, health, education, transportation, durables, electricity and water, and other expenses (Figure 1, Table 1). These consumption patterns show the relevance of items such as food and transportation in all countries.

FIGURE 1: SPENDING STRUCTURE IN LATIN AMERICA²



² Source: Own elaboration with data from INDEC, 2019; IBGE, 2020; INE, 2018; CEPLAN, 2021; DANE, 2018; INEGI, 2023; INEC, 2019; INE, 2018; INEC, 2013; INEC, 2019; Central Bank of the Dominican Republic, 2020; Ministry of Economy of El Salvador, 2008; Central Bank of Nicaragua, 2008; INE, (n.d.).

TABLE 1: SHARED OF TOTAL EXPENDITURE BY ITEM (%)³

Countries	Food	Housing	Health	Education	Durable	Transportation	Electricity	Water	Others
Argentina	22.7	6.1	6.4	3.1	5.4	14.3	5.9	2.5	33.6
Brazil	13.2	28	8	9.1		14			29.4
Chile	18.7	14.3	7.6	6.5	6.3	15.2			31.5
Peru	31.5	23.2	8.9	3.1	4.2	6.0			23.1
Colombia	15.9	28.7	1.7	3	3.5	9.5			37.7
Mexico	37.7	9.5	3.4	9.8	0.9	19.3	4.4	1.0	16.8
Costa Rica	23.8	7.9	5.6	5.6	5.8	15.6	4.1		32.5
Uruguay	18.5	28.3	11.9	3.4	4.1	11.3			23.1
Ecuador	24.8	7.5	8.2	4.4	5.9	15.9			21.5
Panama	17.7	10.1	4.9	3.4	9.5	17.2			37.2
Dominican Republic	21.1	12.0	7.7	4.5	4.8	14.8			35.2
El Salvador	21.7	18.7	4.5	3.4	6.5	11.2	3.9	1.0	31.1
Nicaragua	25.6	23.5	2.3	4.5	6.4	8.1	4.5	1.8	25.4
Paraguay	30.7	19.5	7.5	6.1	5.7	10.5	3.4	0.61	17.0

Table 1 shows that the share of food expenditure in total expenditure decreases as *per capita* income (Engel's Law) increases (Banks et al., 1997). Moreover, there is evidence of the hard version of Engel's Law where equation (1) in the Appendix relating the share of food expenditure to total expenditure and GDP *per capita* reports a coefficient of -0.12, implying that a 100 percent increase in *per capita* income translates into a 12 percent reduction in the share of food expenditure in total expenditure (Clements and Selvanathan, 1994). Other points to stress, concerning Latin American consumption patterns, are:

- The share of housing expenditure in total expenditure relative to GDP *per capita* is decreasing. This should be taken with caution as housing expenditure data are classified differently by country.
- The share of health spending in total spending increases with the increase in *per capita* income. This shows a process of migration from the public health system to the private health system, indicating that the public system does not meet the needs and aspirations of the lower-middle, middle and high-income groups.

This also illustrates the presence of a large sector of the population that is not incorporated into basic contributory public health systems and is, therefore, exposed to various macroeconomic shocks, including climatic events.

- The share of education spending in total spending has a very volatile behaviour by country. This illustrates that the process of migration from public to private education as income increases, again as a result of dissatisfaction with public education services, is concentrated in some countries.
- The share of spending on durable goods in total spending grows with the increase in *per capita* income. This illustrates the rising use of various household appliances in modern economies.
- The share of transportation spending in total spending increases with the increase in per capita income (Figure 2). This is the result of two components with differentiated behaviours: on the one hand, public transportation expenditure as a proportion of total expenditure decreases as per capita income increases. On the other hand, the

³ Source: Own elaboration with data from INDEC, 2019; IBGE, 2020; INE, 2018; CEPLAN, 2021; DANE, 2018; INEGI, 2023; INEC, 2019; INE, 2018; INEC, 2013; INEC, 2019; Central Bank of the Dominican Republic, 2020; Ministry of Economy of El Salvador, 2008; Central Bank of Nicaragua, 2008; INE, (n.d.).

proportion of private transportation expenditure in total expenditure (mainly expenditure on fossil fuels) increases as per capita income increases. This is reflected in the process of migration from public to private transport as a result of inefficient and unsafe public transport, which is a poor substitute for private transport.

- The share of electricity expenditure in total expenditure increases with the increase in per capita income. This reflects two distinct behaviours: first, the growing acquisition in durable goods with rising income and, second, low-income households consume more energy-intensive products (Wang et al., 2016) as they have budget constraints that make it difficult for them to purchase more energy-efficient durable goods (Zachmann et al., 2018). However, available evidence is insufficient to draw general inferences.

Therefore, the reduction in the share of spending on food is covered, among other items, by an increase in the share of spending on transportation (basically private transportation), health and education (in some countries). This reflects a continuous process of migration from the use of public goods and services for transportation, health and education (in some countries) to the use of private goods and services for transportation, education and health as *per capita* GDP increases. This creates a paradox in Latin America: the increase in *per capita* income during this century, supported by the boom in prices of renewable and non-renewable natural resources, contributed to a significant part of the population moving out of poverty but, at the same time, shows general dissatisfaction with the current style of development. These new low and middle-income groups are gradually migrating from public services to private services as a consequence of a low-quality and segmented supply of public transportation, health and education services that is not consistent with the new aspirations of the emerging middle and lower classes in Latin America. This translates into:

- An increasingly segmented society where the poor and low-income groups use public transportation, education and health services while middle-income, upper-middle-income, and high-income groups use private transportation, education and health services.

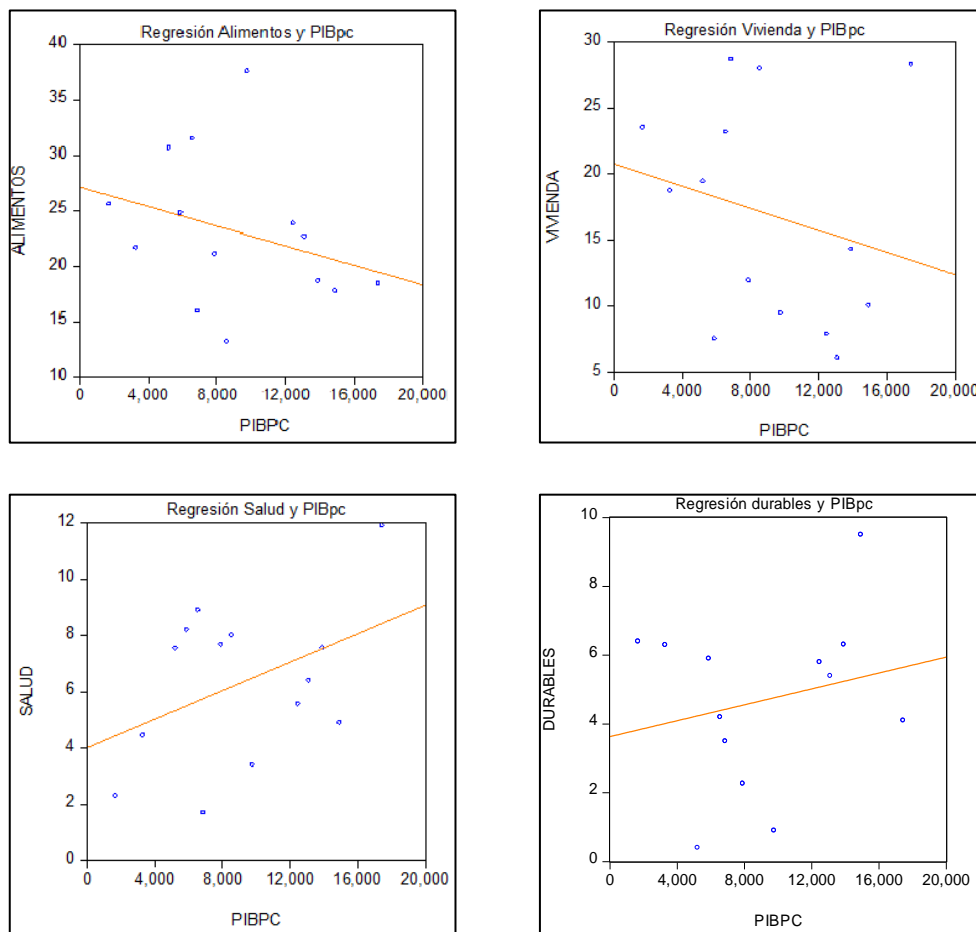
- A society with increasing difficulties in meeting the Paris Agreement goals or controlling a set of negative externalities. For example, current private transportation shows a high dependence on fossil fuels, generating greenhouse gas emissions. This can be seen in the mitigation strategies, usually synthesised in the Nationally Determined Contributions (NDCs) (Carbon Tracker, 2021), which highlight the high dynamism and growing importance of emissions from transportation and the difficulties in controlling them in Latin America. Likewise, private transport increase is associated with another set of negative externalities, such as road accidents and congestion or local air pollution (Parry and Small, 2005).
- A growing dissatisfaction with the development results among the low and middle-income groups. These groups, who left conditions of poverty and/or meagre income, need to use their new income in education, health and transportation. This has resulted, for example, in social unrest over access to education in Chile or over the cost of public transportation in Brazil.
- This situation may even be reflected in the constitution of an anti-tax or anti-state coalition based on the fact that low and middle-income groups feel that they do not use public transportation, education and health services and do not receive security services either; nevertheless, they have to pay taxes. This raises a discussion about the size of the state and the utility of taxes.
- Lack of recognition of the importance of inclusive societies where different income groups use the full range of public services. This requires recognition that affluent societies are those where high-income groups continue to use public services.
- The increasing use of durable goods with rising incomes does not necessarily translate directly into more inclusive and egalitarian societies. That is, there are substantial differences in the quality of durable goods and in their access and use. This translates into asymmetric effects in the face of various shocks in different income groups. For example, online education during the COVID-19 pandemic had asymmetric effects, considering that some students used

their cell phones or computers for their academic activities or had differentiated access to the Internet (Escalante, et al., 2022).

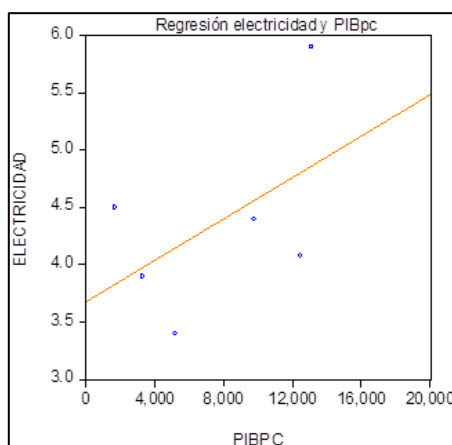
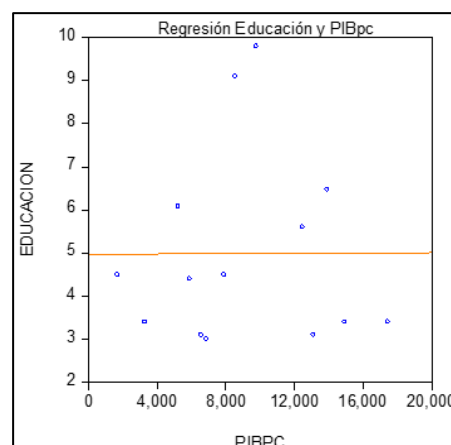
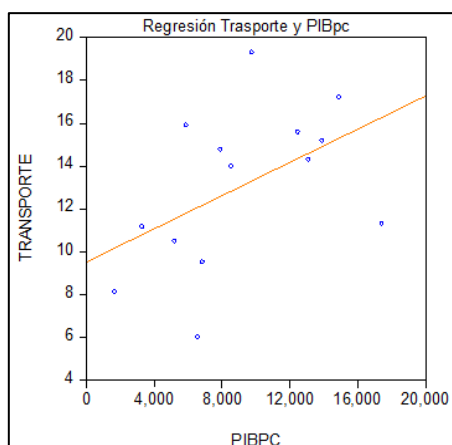
These characteristics define consumption patterns that are not sustainable and are generating a set of negative externalities, such as climate change, with asymmetric effects segmented by income groups (Ferrer-i-Carbonell

et al., 2004). For example, in Europe, the poorest 50 percent of the population has per capita emissions that are almost 85 percent lower than those of the wealthiest 10 percent of the population (Chancel, 2022). However, lower-income groups are more vulnerable to the adverse effects of climate change (Galindo et al., 2014).

FIGURE 2: SHARED OF EXPENDITURE ITEMS IN TOTAL EXPENDITURE (%) WITH RESPECT TO GDP PER CAPITA⁴



⁴ Source: Own elaboration with data from INDEC, 2019; IBGE, 2020; INE, 2018; CEPLAN, 2021; DANE, 2018; INEGI, 2023; INEC, 2019; INE, 2018; INEC, 2013; INEC, 2019; Central Bank of the Dominican Republic, 2020; Ministry of Economy of El Salvador, 2008; Central Bank of Nicaragua, 2008; INE, (n.d.).



Thus, it is necessary to implement the construction of a new public-private matrix of universal and quality transportation, education and health services. The construction of this new matrix in Latin America should be implemented in the context of a just climate transition that includes the structural transformation of current consumption and production patterns. This requires a broad mobilisation of resources, the construction of a new sustainable infrastructure and a quality universal social protection system to replace the fragmented contributory systems associated with the formal sector of the economy. Estimates on the investment required to move towards sustainable development are heterogeneous and still show a high degree of uncertainty. In general, it is projected an annual investment of around 5 percent, between 2 and 8 percent of GDP in infrastructure, between 2 and 5 percent in the construction of a universal social protection system and additional investments to achieve other social benefits such as the reduction of infant mortality, completion of the middle school cycle or the construction of a care system (Galindo et al., 2022). This indicates that at least an annual investment of 7 percent of GDP and probably more is needed to support a just transition. Some of this investment is

already being made. For example, between 2008 and 2019, the average annual public and private investment in the water and sanitation, electricity, transport and telecommunications sectors was 1.8 percent of GDP (Brichetti et al., 2021). However, more private sector participation and alignment of all investments with climate change and sustainability goals is necessary. The urgency and magnitude of the structural transformations and resource mobilisation required are only possible in the context of a favourable political, economic and social consensus. This consensus cannot be built on the basis of specific mitigation targets alone but through the establishment of a progressive coalition that links mitigation goals to economic structural transformation. That should result in a more dynamic economy, with a new matrix of universal and quality public and private services that generate formal jobs, tops poverty and contributes to a better income distribution simultaneously with the construction of a climate-resilient economy. These aspects tend to reinforce each other. For example, an improvement in income distribution where the whole population uses public transport is more likely to contribute to reducing GHG emissions (Chancel, 2022). Also, continued price reductions in renewable energy generation (IEA, 2022)

indicate that the energy transition can relax households' budget constraints. Today, households in Latin America spend about 20 percent of their total expenditure on electricity and transportation (Figure 3). Thus, the provision of electricity and electric transportation based on renewable energies can lead to a reduction in costs and, therefore, to a reduction in household spending.

This energy transition should also contribute to managing the risks of the climate transition in Latin America in terms of stranded assets. Indeed, the climate transition implies that a large set of assets related to high GHG emissions, such as oil and gas production, will

have to disappear in the next three decades (McGlade and Ekins, 2015). The contraction of oil and gas activities will directly impact overall economic dynamics, exports and tax revenues. For example, the loss of fiscal revenues from oil and gas in Brazil, Colombia, Bolivia and Mexico can be significant (Table 4), which, together with energy subsidies, can have adverse effects on public finances and make it unfeasible for the public sector to support a just climate transition. Hence, it is essential to consider an environmental fiscal reform that contributes to controlling negative externalities, generating additional tax revenues and shaping a double dividend of a better income distribution.

FIGURE 3: SHARE OF ELECTRICITY AND TRANSPORTATION IN TOTAL EXPENDITURES⁵

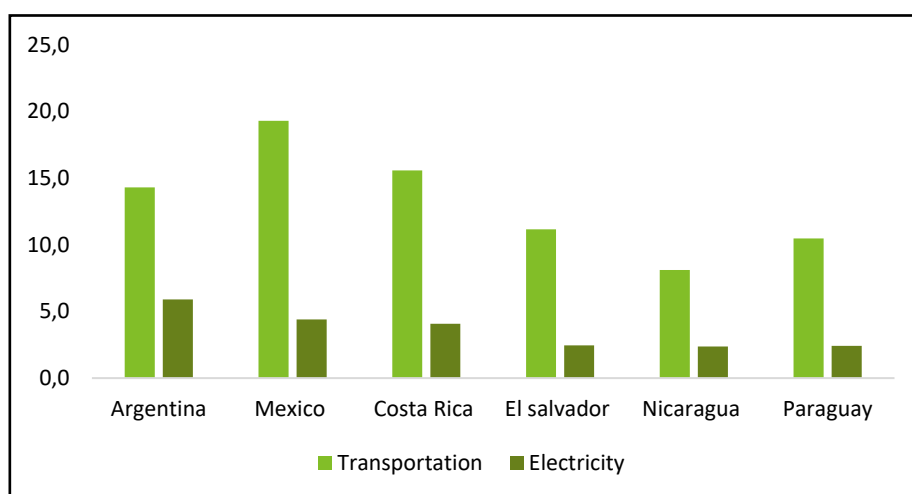


TABLE 4: SHARE OF TAX REVENUES DERIVED FROM OIL AND GAS ACTIVITIES⁶

Period	Bolivia	Brazil	Colombia	Ecuador	Mexico	Trinidad and Tobago
2000-2004	11.8	2.4	6.3	20.3	23.1	32.3
2005-2009	27.7	3.1	9.6	28.8	35.2	49.5
2010-2014	29.7	2.0	13.6	34.9	32.9	41.0
2015-2019	16.7	2.2	5.6	24.2	11.7	16.7

In this sense, contributing to the fulfilment of the Paris Agreement requires building a new sustainable global economy. Thus, developed economies can contribute to

this through the construction of this new global economy and not exclusively by supporting the implementation of GHG mitigation targets.

⁵ Source: Own preparation with data from INDEC, 2019; INEGI, 2023; INEC, 2019; Ministry of Economy of El Salvador, 2008; Central Bank of Nicaragua, 2008; INE, (n.d.).

⁶ Source: Elaboration based on Titelman et al., 2022.

Conclusions

Climate change is a development challenge, given the magnitude of its negative effects on economic activities, social welfare and the environment. One cannot understate the urgency and magnitude of the structural transformations and resource mobilisation required to achieve a carbon-neutral economy between 2050 and 2070.

In this context, Latin America shows a style of development that is not sustainable. Indeed, the current economic dynamic in the region has contributed to increasing consumption, improving employment rates and reducing poverty. However, this economic dynamism has been insufficient to solve the challenge of chronic poverty and a high concentration of income distribution. Likewise, that has also been associated with the generation of a set of negative externalities, such as GHG emissions, which are even eroding the basis for sustaining the current economic dynamism.

At the core of this unsustainable development style are unmaintainable consumption and production patterns, where the relationship between climate change and consumption patterns stands out. Indeed, current consumption patterns show a gradual reduction in the share of food expenditure in total expenditure (Engel's law), which is offset by increased spending on private transportation, education (in some countries) and health. This shows the dissatisfaction of low and middle-income groups with the current availability of public

services of public transportation, public health and public education. That translates into a social process of migration from public to private services, which contributes to the formation of a society that is even more segmented, making it harder to put a decarbonisation process into practice and to control negative externalities.

Thus, it is necessary to implement structural transformations to the current style of development based on the construction of a new matrix of public and private services –universal and of quality– enabling a new system of social protection. The only way of making a *just* climate transition is by giving urgency and magnitude to these structural modifications necessary to build consumption patterns consistent with decarbonisation and the construction of a climate change-resilient economy. This requires the building of a stable economy as well as enabling a political and social coalition that links the processes of decarbonisation with an improvement in the living conditions of the population. In this sense, contributing to the fulfilment of the Paris Agreement on climate change requires building a new sustainable global economy that focuses on improving public services and, in this way, avoiding the social migration towards private services. This means that countries should not focus their policies exclusively on supporting compliance with GHG mitigation targets but, most importantly, on building a new economy.

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Appendix

Estimation of equation (1) by Ordinary Least Squares (Pesaran, 2015):

$$(1) \quad \ln S_{jit} = \alpha_0 + \alpha_1 \ln GDP_{PCit} + u_t$$

Where S_{it} represents the share of the different expenditure items in total expenditure, GDP_{PCt} , u_t corresponds to the error term, the subscript j represents the different expenditure items, i corresponds to the country, and t is time.

TABLE 1.A: ELASTICITIES OF THE SHARE OF EXPENDITURE ITEMS WITH RESPECT TO GDP PER CAPITA⁷

	Food	Housing	Health	Education	Durable	Transportation	Electricity	Water
α_0	4.19	5.28	-1.78	1.19	8.87	0.10	0.80	-0.34
α_1	-0.12	-0.28	0.39	0.03	0.05	0.27	0.07	0.06
R^2	0.076	0.11	0.21	0.003	0.005	0.29	0.11	0.008
R^2 Adjusted	-0.005	0.042	0.14	-0.079	-0.08	0.23	0.11	-0.32
S.E.	0.28	0.53	0.50	0.41	0.69	0.28	0.19	0.644

⁷ Source: Own elaboration with data from INDEC, 2019; IBGE, 2020; INE, 2018; CEPLAN, 2021; DANE, 2018; INEGI, 2023; INEC, 2019; INE, 2018; INEC, 2013; INEC, 2019; Central Bank of the Dominican Republic, 2020; Ministry of Economy of El Salvador, 2008; Central Bank of Nicaragua, 2008; INE, (n.d). Econometric estimates are indicative only.

EXTRACTIVISM

| The Project

The collaborative research project ***extractivism.de*** links the Universities of Kassel and Marburg. The project scrutinizes the extractivist development model and proposes new economic, political, and sociological conceptions of extractivism. It preliminarily focuses on Latin America and the Maghreb patterns. The project researches the conditions under which these patterns affect the persistence and transformative capacity of extractivism and its respective institutional settings. Finally, it explores how extractivism affects cultural processes and habitual routines and questions under what conditions and how far the development model extends into institution-building and social practice, i.e., everyday life.

The project aims to understand extractive societies not as deviants from the Western trajectory of development but in their own logic and their own particularities. The project, therefore, combines a strong empirical focus with theoretical work. It links both broad field research and data gathering of primary data and the qualitative and quantitative analysis of available secondary sources with a stringent transregional comparison. It develops methods in cross-area studies and investigates whether and why similar patterns of social change emerge in different areas and world regions despite significant cultural, social, or religious differences. Finally, the project intends to translate the findings for politics, society, and development cooperation.

Please visit www.extractivism.de for further information.

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