

Low-carbon transition policies and current accounts

The impact of low-carbon transition policies on foreign trade has not been greatly explored, but the gradual implementation of the Paris Agreement pledges and macroeconomic transition scenarios such as those prepared by the NGFS (Network for Greening the Financial System) are providing some insight on the issue. The transition could lead to a reduction in global trade due to the expected decline in fossil fuel imports, which would see the trade balances of advanced countries, which are net importers, improve at the expense of fossil fuel exporters. However, the financing for the investments needed will be a determining factor. If the public deficits of advanced countries increase as a result of these investments, their current account balances could deteriorate. Furthermore, if oil-producing countries anticipate the transition by reducing their fossil fuel investments, the negative effect of the transition on their current account would be mitigated. Lastly, private capital flows must be directed towards the green sectors of emerging economies to ensure a balanced transition.

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-15%

the reduction in global fossil fuel consumption in 2050 relative to the baseline scenario according to announced Paris Agreement pledges

-1.2 percentage points of GDP

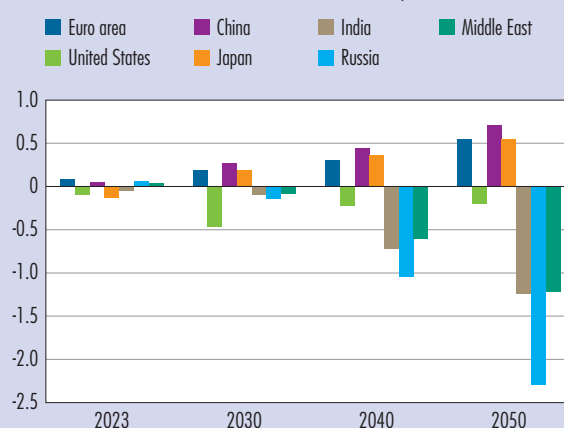
the decline in the Middle East's trade surplus in 2050

+0.5 percentage point of GDP

the increase in the euro area's current account balance in 2050

Impact of the NGFS' NDC scenario on the current account

(in percentage points of GDP, absolute deviation from the baseline scenario)



Sources: NGFS (phase IV NiGEM model with REMIND input); authors' calculations.

Notes: NDC, nationally determined contributions;

NGFS, Network for Greening the Financial System.

Baseline scenario: theoretical scenario without global warming or climate transition.

Historically, the trade in fossil fuels – oil, gas, coal – has had a major impact on the balance of payments and its associated financial flows. The low-carbon transition is expected to lead to a decline in this trade in favour of renewable energies, with capital flows redirected to meet the significant investments needed during the transition. However, the geographical distribution of these financial flows remains difficult to predict and will depend on individual countries' transition strategies – including the industrial policies they implement – and on the appetite of private investors to get involved. We use macroeconomic simulations to illustrate some of these mechanisms. We first examine the impact on current accounts under the long-term low-carbon transition scenarios developed by the Network for Greening the Financial System (NGFS).¹ We then analyse variants of these NGFS scenarios by simulating different methods of financing the public investment needed for the transition. Finally, we discuss the uncertainties associated with modelling choices and agents' expectations.

1 Impact of the low-carbon transition on current accounts

A decline in global trade in the short term

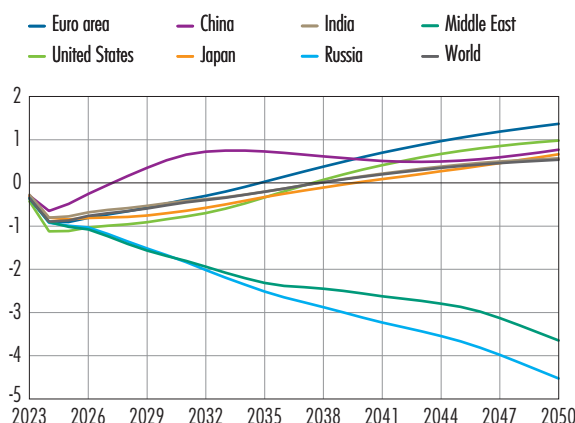
Most transition scenarios feature the introduction of a rising carbon price to alter the relative prices between brown and green products or sectors, and thereby encourage the transition. In this instance, we base our work on the NGFS scenario that includes countries' announced pledges under the Paris Agreement (nationally determined contributions or NDCs). The assumptions underlying this scenario are briefly outlined in the box below.

This scenario would see a 15% decline in global fossil fuel consumption in 2050 relative to the baseline scenario,² and a drop in oil prices of around 20%.³ Consequently, and given the time-lags involved in adjusting the energy

C1 Impact of the NDC scenario

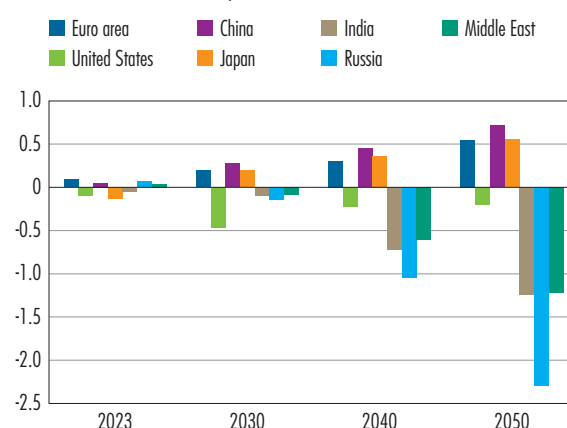
a) on exports

(deviation from the baseline scenario in %)



b) on current account balances

(in percentage points of GDP, absolute deviation from the baseline scenario)



Sources: NGFS (phase IV NiGEM model with REMIND input); authors' calculations.

Notes: NDC, nationally determined contributions; NGFS, Network for Greening the Financial System.

Baseline scenario: theoretical scenario without global warming or climate transition.

mix, most countries' GDP would fall in the short term to a greater or lesser extent depending on each of their specific energy characteristics. In terms of trade, advanced countries would experience a sharp drop in their imports

¹ The NGFS is a network of central banks and supervisors that develops climate scenarios for the financial sector.

² Theoretical scenario without global warming or climate transition. All variations mentioned in this paragraph are expressed as deviations relative to this baseline scenario and not relative to the situation in 2023 when this simulation begins.

³ Impact on global oil prices, without specific assumptions about supply, as the model only includes historical elasticities.

and their exports due to the rising cost of carbon-based inputs and the decline in production that would result, despite a boom in trade in mineral inputs and semi-finished and finished products as part of the energy transition (see Appendix 1 on changes in the structure of global trade). However, their exports would bounce back in the

medium term once the transition was on track, while the exports of oil-producing countries would slump over the long term (see Chart 1a above). Overall, global trade would fall in the short term but gradually recover once the transition had begun (see the “World” line).

BOX

The NDC scenario of the Network for Greening the Financial System (NGFS)

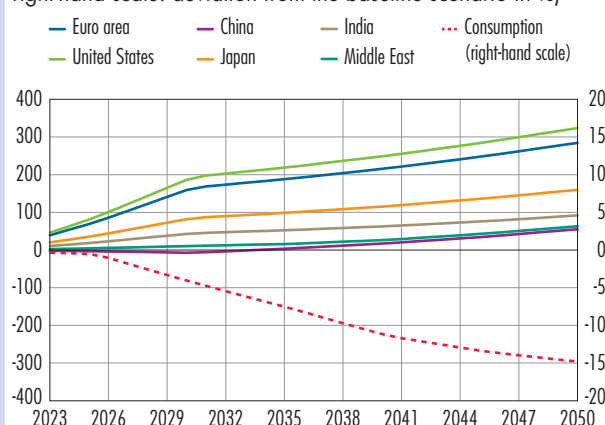
The NGFS’ nationally determined contribution (NDC) scenario incorporates the transition pledges of countries aiming to comply with the Paris Agreement. For example, for France, this scenario corresponds to its target of Net Zero by 2050. For the euro area, it includes the “Fit for 55” climate package, and for the United States, the assumption retained is still that of the Inflation Reduction Act (IRA). This bulletin article is based on the phase IV scenarios published in November 2023, when we started our present work. In November 2024, the NGFS published a new update (phase V), the main changes of which relate to physical risk, which is not considered in this article. Furthermore, even in the updated phase V, the Trump administration’s overhaul of US climate policy has not been taken into account, as its implications remain unclear.¹

The transition policies in this scenario are reflected in a theoretical “shadow carbon price” (see chart below) that is supposed to incorporate all measures currently in place and included in the announced pledges. At the macroeconomic level, the scenario features a rising carbon tax, whose revenue is redistributed to households in the form of transfers, and therefore has a neutral impact ex ante on the fiscal balance.

The macroeconomic model used to simulate these scenarios is the NiGEM model, combined with the NGFS integrated assessment models (GCAM, REMIND and MESSAGE) for assumptions on carbon pricing, energy mix and carbon tax-related fiscal revenues (which vary according to countries’ emissions). In this scenario, the model imposes a long-term fiscal solvency assumption, namely that any government balance deviation from a long-term trajectory is offset by a change in taxation on household incomes. The simulations were carried out within a rational expectations framework.

Carbon prices and global fossil fuel consumption

(left-hand scale: price per tonne of CO₂ in constant 2020 US dollars; right-hand scale: deviation from the baseline scenario in %)



Sources: NGFS (phase IV, NDC scenario); authors’ calculations.

¹ In May 2025, the NGFS also published a different set of scenarios over a shorter time horizon, modelled using other tools.

An improvement in the current accounts of advanced countries and a deterioration in the current accounts of oil-producing countries

Generally speaking, advanced countries' imports are expected to fall more sharply than exports, resulting in an increase in their trade balance relative to the baseline trajectory. In fossil fuel-producing countries – in the Middle East, for example – exports are expected to drop massively, over the entire horizon and much more than their imports, resulting in a decline in their trade balance (still relative to the baseline scenario). These transition-related impacts on trade balances appear to be consistent with certain studies previously carried out on the subject (Espagne et al., 2023).

The impact under this NDC transition scenario on current accounts is similar to the impact on trade balances (see Chart 1b), although the United States is an exception, due to its highly negative net external position.⁴ The rise in US interest rates, driven by carbon pricing-induced inflation, results in an increase in the United States' net interest payments to the rest of the world, which worsens its current account balance.

The sum of the absolute values of current account imbalances would increase slightly under the NDC scenario relative to the baseline (up 0.3 percentage point of global GDP in 2050), as the current account surpluses of China, Europe and Japan widen, Russia's surplus narrows, and the Middle East records a deficit (see Chart 2).

2 The impact of transition-related public policies on external adjustments

Savings and investment dynamics: the return of twin deficits?

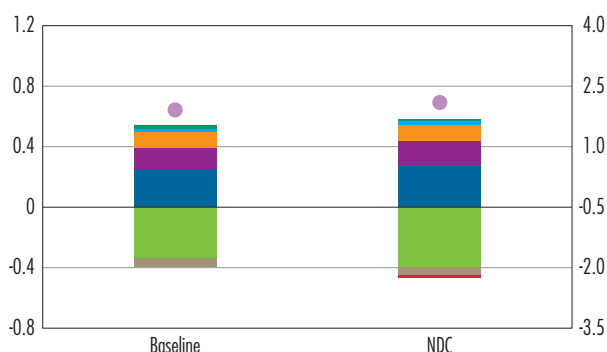
The NGFS scenarios do not go into the detail of public policies implemented during the transition (beyond the implicit carbon pricing), as they are specific to each country. However, their implementation and their financing will have a decisive impact at the macroeconomic level and on the evolution of current account balances. Most estimates highlight the need for significant green investment if we are to achieve the goal of carbon neutrality by 2050. In Europe, the total annual investment required (private and public) is estimated at between 3% and 4% of GDP (European Commission, 2023). Over the long term,

C2 Current account balances under the baseline and NDC scenarios

(in percentage points of global GDP)

■ Euro area ■ United States ■ China ■ Japan ■ India ■ Russia

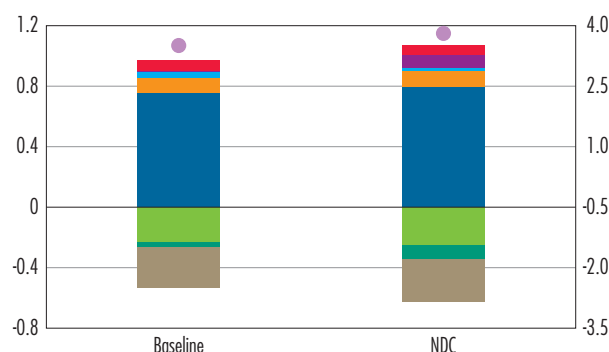
a) 2030



Sources: NGFS (phase IV, NDC scenario); authors' calculations.

■ Middle East ■ Rest of the world ● Current account imbalances (right-hand scale)

b) 2050



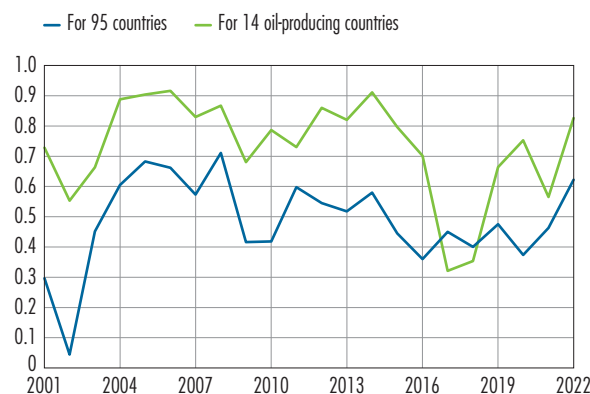
⁴ See the literature on the exorbitant privilege of the United States, such as Gourinchas and Rey (2007, 2022), or Maggiori (2017), although Bertaut et al. (2024) partially challenged the concept. See also IMF (2024), *External Sector Report. Imbalances Receding*, on external imbalances.

public investment would account for around 15% of the total, but studies agree that this proportion should be higher during an interim period, at between 20% and 50% of total (Darvas and Wolff, 2022; Pisani-Ferry and Mahfouz, 2023), which represents between 0.6 percentage point and 2 percentage points of GDP per year.

The scale of these investments and their financing will inevitably have an effect on external dynamics. The literature has often addressed the link between government balances and external balances (see Chart 3), particularly for oil-producing countries, whose high oil revenues have fuelled fiscal surpluses (Afonso and Coelho, 2022; Furceri and Zdzienicka, 2018; Arezki and Hassanov, 2009).

In order to illustrate the impact of public investment on external dynamics, we simulate two variants of the NGFS' NDC scenario, drawing a distinction between (i) a scenario with increased public investment in Europe, without associated financing (which therefore accentuates the public deficit), and (ii) a second scenario with a neutral effect on the government balance as funding for the investment comes from raising household taxes.⁵ An increase in unfunded public investment should, all other things being equal, lead to a deterioration in the

C3 Cross-sectional correlation between government and current account balances



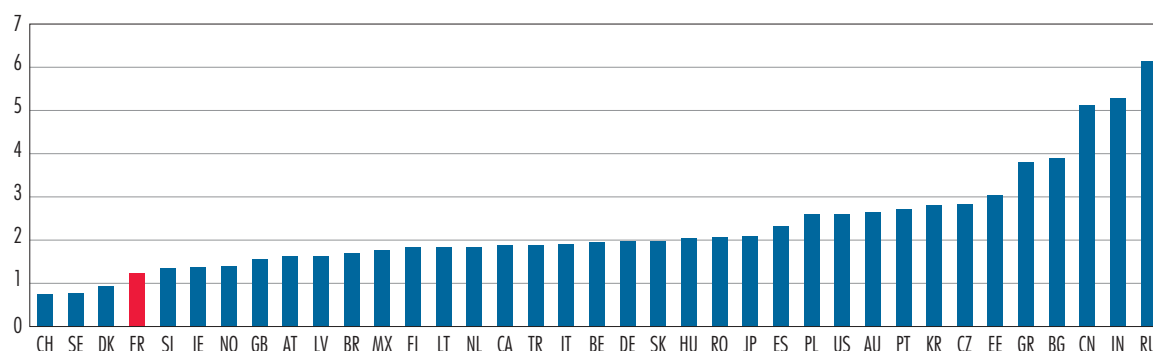
Sources: IMF; authors' calculations.

current account, which reflects the balance between investment and total savings in the economy. Investment funded by domestic private savings, however, would have a neutral effect (see Appendix 2).

To examine the asymmetry of external flows, we focus our analysis on one region, Europe. In the absence of consensus on the amount of investment needed, we use the International Energy Agency (IEA) estimate of global investment needs in its Net Zero Emissions by 2050 scenario. We then allocate this investment by region

C4 Estimated investment needed

(in percentage points of 2020 GDP)



Sources: Allen et al., 2023, based on International Energy Agency data.

Note: For ISO country code correspondences, see <https://www.iso.org>.

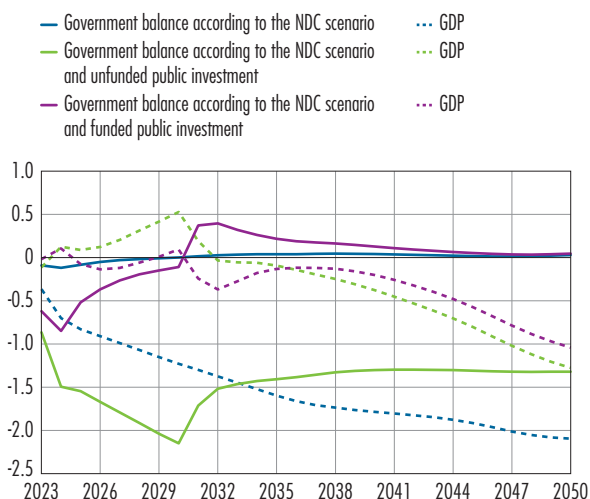
⁵ According to the NiGEM macroeconomic model used to simulate NGFS scenarios. Investment will be funded through a fiscal solvency rule that adjusts the tax rate on household income.

according to energy investment estimates from the integrated assessment models used by the NGFS, and finally derive investments per country based on national carbon emissions⁶ (see Allen et al., 2023, Chart 4 above and Appendix 2). For France, for example, we arrive at an annual investment requirement of 1.2 percentage points of GDP, which equates to roughly half of the amount estimated by Pisani-Ferry and Mahfouz (2023), but which we attribute entirely to public investment.

The impact of this type of unfunded European public investment in the NGFS' NDC scenario would be to increase the euro area public deficit by 1.5 percentage points to 2 percentage points of GDP by 2030 (including feedback effects – see Chart 5). The public deficit continues to remain higher by around 1.3 percentage points of GDP in 2050 (green line in the chart). When the investment is funded through taxation, the deficit generated at the beginning of the period is quickly absorbed (purple line). The impact of these variants on euro area GDP clearly reflects the positive effects of the fiscal multiplier: while the NDC scenario projects a negative impact on GDP,

C5 Impact of the NDC scenario and public investment on the government balance and GDP of the euro area

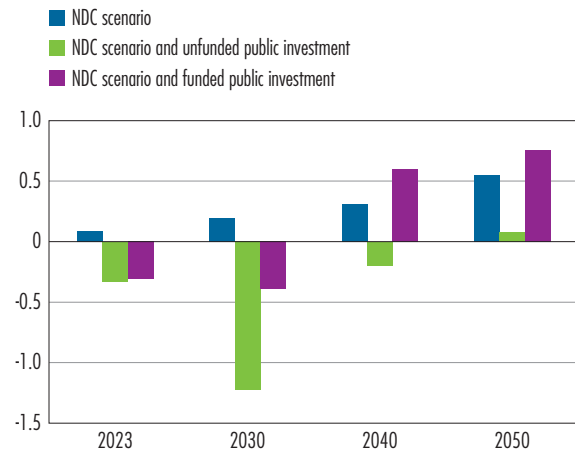
(deviation from the baseline scenario in percentage points of GDP and %, respectively)



Sources: NGFS (phase IV); authors' calculations (NiGEM simulations).

C6 Impact of the NDC scenario and public investment on the current account balance of the euro area

(deviation from the baseline scenario in percentage points of GDP)



Sources: NGFS (phase IV); authors' calculations (NiGEM simulations).

introducing an unfunded increase in public investment means the impact becomes positive by 2030, as the beneficial effects of investment outweigh the adverse effects of the carbon tax on GDP. Conversely, when public investment is funded, the final impact on GDP is relatively neutral (dotted lines in the chart).

The effect on the euro area current account varies significantly depending on the scenario (see Chart 6). In the unfunded scenario, the current account deteriorates until 2030 (green bars), but it improves under the basic NDC scenario (blue bars). In the funded scenario, it deteriorates initially before recovering after 2030, reflecting the positive effects of Europe's lead in decarbonisation, as is the case under the basic NDC scenario (purple bars).

Expectations and investment: a net effect difficult to assess using models

There is still a great deal of uncertainty with regard to the dynamics of private investment during the transition. On the one hand, as explained above, the transition will require significant investment if we are to green the economy. On the other, carbon taxation policies tend to

⁶ The distribution according to IAM projections takes into account abatement curves (the more carbon emissions are reduced, the higher the marginal abatement cost). The national distribution of emissions assumes that the greater a country's emissions, the more it will have to invest to "abate" them.

have a recessionary effect, which, as a result of the supply shock, provokes a drop in investment in brown sectors or in the economy as a whole. The net effect on investment is difficult to assess and will depend on investor behaviour, and investor expectations in particular.

According to most integrated assessment models (IAMs) such as those used by the NGFS, achieving a Net Zero target requires a positive net investment in sectors that produce carbon-free energy. After macroeconomic second-round effects, the obligation to meet the emissions target still tends to favour investment. Conversely, in macroeconomic or DSGE-type⁷ models, which often assume that agents are able to perfectly anticipate the full trajectory of future GDP or interest rates, investment ultimately tends to decline as GDP decreases. Oil-producing countries, for example, would accurately anticipate globally implemented carbon pricing policies and the resulting fall in demand. They would thus very quickly reduce their investment, which by definition is heavily focused on the brown sector, while the renewables sectors develop. This can be seen, for example, in the G-Cubed model, which simulates a dramatic drop in investment in oil-producing countries relative to the REMIND model used

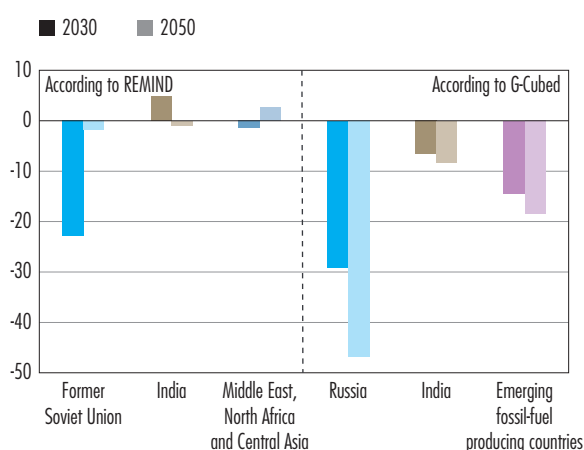
by the NGFS (see Chart 7). This drop in investment tends to improve their trade balance (see Chart 8) rather than worsen it, as projected in the NGFS scenarios.

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The impact of the low-carbon transition on external dynamics should lead to an improvement in the trade balances of advanced countries at the expense of fossil fuel exporters. However, the impact on current account deficits will depend heavily on investment behaviour. Some studies are starting to explore this topic, grappling with the difficulty involved in taking into account the heterogeneity of capital flows and credit risk characteristics of the different countries. In the case of foreign direct investment (FDI), Knutsson et al. (2022) highlight that renewable energy FDI has increased in recent years as a result of a generally favourable economic environment and incentive-based climate policies. However, the authors also demonstrate that investment from outside the energy sector seems relatively unresponsive to the climate policies of host countries, whereas investment location remains determined by the broader conditions prevailing in the destination economy (structural conditions, country risk, etc.).

C7 Investment in emerging and fossil fuel-producing countries under the Net Zero scenario

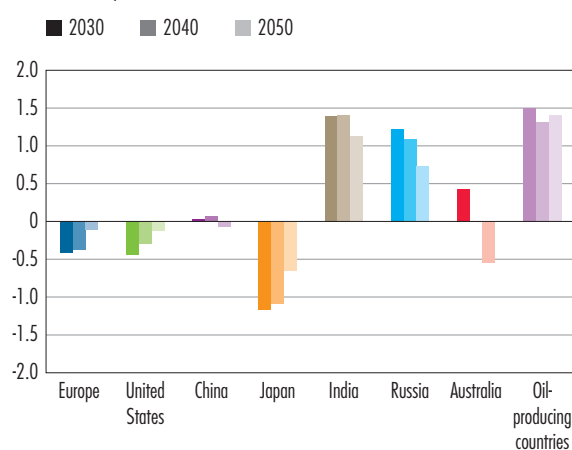
(deviation from the current policies scenario in %)



Sources: NGFS (phase IV) for REMIND, W. McKibbin website for G-Cubed.

C8 Trade balance trajectory for a Net Zero-equivalent scenario (G-Cubed simulation)

(deviation from the current policies scenario in percentage points of GDP)



Source: W. McKibbin website.

⁷ Dynamic stochastic general equilibrium model.

With regard to portfolio investments, Lepers et al. (2024) find that factors that traditionally influence portfolio flows, such as the degree of openness of countries or the presence of funds in indices, also influence green investments. Furthermore, older funds or funds with more passive investment strategies tend to invest less in green assets. These studies therefore establish that there is a certain appetite for green investments in both types of capital flows, but that traditional portfolio allocation factors play a predominant role, nonetheless. This could handicap developing countries (higher credit risk, poorer weighting in financial asset benchmarks, greater return volatility).

These findings, combined with developing countries' often constrained public financing capacities, argue for the need to complement carbon pricing policies with measures to incentivise private transition funding. These measures may be linked to structural issues not necessarily associated with the transition (improving institutional frameworks, public policy predictability, financial market depth, etc.) or may specifically target the financing of low-carbon projects such as the establishment of a transition taxonomy, expanded use of public guarantees by multilateral development banks, or public-private financing structures (IMF, 2023a). For the latter, international collaboration would seem essential.

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Appendix 1

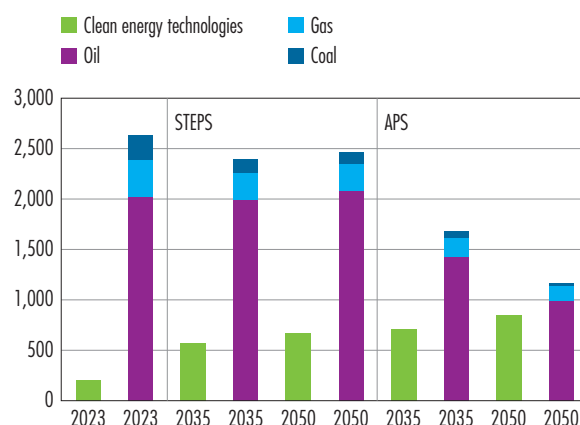
Expected structural changes between trade in renewables and trade in fossil fuels

The development of new technologies for the production of renewable energy (wind turbines, solar panels, battery storage, etc.) should lead to new exports of the commodities needed to produce them, particularly so-called “critical” metals. As their extraction is heavily concentrated among a few countries, this could in turn reshape the structure of trade. Overall, three main producers extract nearly 50% of copper, more than 60% of nickel and more than 80% of cobalt and lithium (IMF, 2023b). The refining of these materials is also highly concentrated in certain countries, notably China, which refines around 35% of nickel, 50% to 70% of lithium/cobalt and 90% of rare earth elements (Espagne et al., 2023). Trade flows would also adjust to adapt to the manufacturing locations of low-carbon energy technologies. With the notable exception of the United States, countries that export fossil fuels do not export technologies to produce renewable energy. Oil-exporting countries (again, excluding the United States) are therefore likely to suffer the twofold negative shock of a decline in their oil exports and an increase in their imports of low-carbon technologies, while advanced countries, and especially China, would benefit from the opposite trend (less fossil fuel imports and more low-carbon technology exports).

We can, however, assume that renewable energy-related trade flows will be smaller in scale than fossil fuel trade flows (see chart and IEA).¹ For critical metals and equally for production technologies, trade will mainly revolve around the installation of capital and its renewal, as most countries have access to sources of renewable energy (solar, wind, hydro). Consequently, after an initial steep adjustment, trade frequencies and volumes for renewables will be lower than those for fossil fuels in the medium term.

Inter-regional trade value of fossil fuels and key clean energy technologies under the IEA scenario

(USD billions)



Source: International Energy Agency (IEA, 2024).

Note: STEPS, stated policies scenario; APS, announced pledges scenario.

The scale of these new flows also remains shrouded in uncertainty due to countries’ trade and industrial policies. Despite the collective advantage associated with technology transfer, the green industrial policies currently being implemented in advanced countries could hamper these exchanges. For example, some countries impose minimum local content requirements as a precondition to benefiting from public support for the implementation of renewable technologies, which holds back trade and the deployment of new energies in the short term (Hogan, 2021). In general, according to the literature, non-tariff barriers significantly affect import and export volumes, even if – due to trade rerouting in particular – the net impact on trade balances is more modest (Estefania-Flores et al., 2022).²

¹ <https://www.iea.org/data-and-statistics/charts/inter-regional-trade-value-of-fossil-fuels-and-key-clean-energy-technologies-by-scenario-2023-2050>

² However, the impact on the low-carbon transition would be more significant: the IMF estimates that barriers to trade in raw materials would reduce investment in renewable energy by around 20% compared to a Net Zero scenario (IMF, 2023b).

Appendix 2

Investment needs and theoretical impacts on the external balance

1 Mechanical estimate of investment needs per country

There is no consensus on the estimated amounts of national investment needed for the low-carbon transition. For the euro area, the European Commission puts the required investment at nearly 4% of GDP by 2030.

In order to illustrate the macroeconomic impacts of public investment and its financing methods, we use a relatively mechanical approximation based on the International Energy Agency (IEA) estimate of global investment needs in its Net Zero Emissions by 2050 scenario. The IEA considers a set of economic sectors, including electricity, transport, fossil fuels, construction, industry and infrastructure.

We then break down this overall estimate to the regional level, using as a distribution key the energy investment projections from the integrated assessment models (IAMs) used by the NGFS in its Net Zero scenario. This is of course an approximation, based on a distribution of investment needs per country proportional to the needs of the energy sector. However, the advantage is that it takes into account the rising costs of reducing emissions, in the same way as the IAMs. To do this, we take the average of the estimates from the three IAMs (GCAM, REMIND and MESSAGE).

These IAMs only model the main regions of the world. In order to assign investment needs at the national level, we apply countries' CO₂ emissions as the distribution key, thus assuming that the countries with the highest emissions will have to make the greatest investment effort for the transition.

The detailed methodology for this estimate is presented in Allen et al. (2023).

2 Theoretical transmission channels from the low-carbon transition to the current account

In national accounting, the current account balance is the sum of the trade balance (exports less imports) and net income from financial assets (the difference between income received from foreign investments and income paid to foreign investors).

At the macroeconomic level, the current account (CA) balance also corresponds to the difference between domestic savings (S) and investment (I), according to national accounting identities:¹ $CA = S - I$.

Putting it more intuitively, a country with a high savings rate will generally run a current account surplus and be a net exporter of capital (the savings surplus will be invested in foreign assets). Conversely, a country with a low domestic savings rate will tend to run a current account deficit, due to its dependence on foreign capital to finance domestic investment.

Below, we summarise some possible transmission channels from the low-carbon transition to the current account:

- 1 From the perspective of foreign trade flows, the transition could lead to a decline in the exports of hydrocarbon-producing countries (worsening their trade balance) and a reduction in the imports of the destination countries (improving their trade balance).

¹ More formally, the accounting identity of GDP is written as: $Y = C + I + G + X - M$, for the sum of private consumption, investment, government consumption and the difference between exports and imports. The latter term corresponds to the trade balance (TB), which allows us to write: $Y = C + I + G + TB$.

If we add net income from financial assets from the previous period ($rNFA_{t-1}$) to each term of the equation, it becomes: $Y + rNFA_{t-1} = C + I + G + TB + rNFA_{t-1}$.

As $Y + rNFA_{t-1}$ represents national income (NI) and $TB + rNFA_{t-1}$ represents the current account balance (CA), we obtain: $NI = C + I + G + CA$.

National savings are defined as the difference between national income and private and government consumption ($S = NI - C - G$), so $CA = S - I$: in other words, the current account balance is equal to the difference between savings and national investment.

2 From the perspective of savings and investment flows, generally speaking, any increase in investment (such as in renewable energy) that is not funded by national savings will have a negative effect on the current account balance, while conversely, any increase in national savings will have a positive effect.

In terms of household savings, we can discern two types of transition effects. All other things being equal:

- any mechanism for carbon tax proceeds redistribution or direct transfer to households associated with the transition will tend to increase private savings and therefore the current account balance;
- but the transition may also lead to a loss of purchasing power (for example through a carbon tax or lower-carbon substitutes that could potentially be more expensive), which may put a strain on savings and thus negatively affect the current account.

In terms of public savings (the fiscal balance), two opposing effects are possible:

- an increase in the fiscal balance and therefore in the current account balance as a result of carbon tax revenues;

- a deterioration in the fiscal balance and therefore in the current account balance as a result of public investment unfunded by any taxation.

More generally, the impact of public investment on the external balance will depend on the investor structure of the country's public debt holdings (domestic or foreign). Most macroeconomic models do not include detailed modelling of financial asset holdings, which is rendered difficult by often highly volatile capital flows. The share of assets held by foreign investors is therefore often exogenous and set at a proportion reflecting a historical average. As a result, a widening of the public deficit commonly goes hand-in-hand with a deteriorating current account balance, since, by assumption, only part of public debt is financed by domestic private savings.

Another effect can be observed in open economy models that focus on trade flows. Investments – both public and private – generally have a high import content (Bussière et al., 2013), which open economy models attempt to incorporate by calibrating import elasticity to domestic expenditure. As a result, an increase in investment will often entail an increase in imports and thus a deterioration in the trade balance.

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