Increasing sustainable investment through global financial reform

9 June 2023

MANDALA

The G20 needs to find practical areas for cooperation between G20 members, but particularly between China and the United States

1 The G20 needs to find practical areas for cooperation

- The multilateral order upon which most countries' prosperity is underpinned is under threat, and this includes the G20 itself.
- The G20 needs to find practical areas for cooperation between the United States and China that brings them into the multilateral order
- It needs to have broader appeal for the G20 membership, particularly emerging countries to capitalize on the troika of emerging G20 presidents

2 Much of the G20's agenda covers topics that are the subject of strategic rivalry

- The challenge is that much of the G20's agenda deals with issues that are the subject of strategic rivalry: trade, investment, technology, digital economy
- The G20 should definitely keep focusing on these issues. But it also needs areas of agreement through which trust and cooperation can be built

3 Climate change is an area of common interest for the US and China

- Climate change is one of the rare areas of common interest between the US and China
- China has done a great deal of work in this space and it is a top priority for President Biden

4 There is a great deal that needs to be done outside of the UNFCCC framework

- There are a whole range of issues which are not being dealt with within the UNFCCC framework that are critical to addressing climate change
- Much of this relates to how we should price carbon
- Pricing carbon isn't just about taxes and permits. Carbon needs to be reflected in all prices: the prices for output, the prices of inputs, the prices of loans, the prices of financial assets, the prices of goods and services at the border.

Reform options

We can promote sustainable investment through G20-led reforms to the Basel III global capital rules which determine the 'quality' of bank capital

1 Sustainable investment paradox – bringing in private finance

- More than US$18 trillion was sitting in government bonds in 2020 yielding negative real returns, while $35 trillion of sustainable investment required to avoid 1.5 degree increase in global temperatures (IPCC, 2022)

2 Green borrowers are safer borrowers

- A growing body of research shows that firms with good environmental credentials are also better borrowers because they are less likely to face liability risks, transition risks and physical risks

3 We are not seeing green borrowers being rewarded by the financial system as much as the evidence would suggest

- In a well-functioning market we would expect environmentally-friendly borrowers to enjoy a lower cost of capital than their environmentally-unfriendly peers. We are seeing this to some extent, but not to the extent that would be predicted by the evidence.

4 The Basel III rules are partly to blame for the lack of sustainable investment

- These rules require banks to hold low-risk assets on their balance sheets to buffer them from shocks. The rules prescribe a variety of variables which determine the riskiness of those assets, but these rules do not include whether the capital is environmentally friendly or not.
- If these rules were reformed so that green assets were treated as safer capital than brown assets, banks would have an incentive to hold more green assets on their balance sheets and thus increase green lending. The result would be a lower cost of capital for green firms compared to brown firms, more sustainable investment, and stronger incentives for firms to improve their green credentials.

5 There are significant benefits to reform if barriers can be overcome by the G20

- Our modelling shows that sustainable investment could increase by $10.7 trillion, if barriers around data quality and consistent taxonomies are addressed.

The research shows that green borrowers are safer borrowers

Jun and Yu (2014) found that the non-performing loan ratio for green loans was only 0.4 per cent compared to 1.7 per cent for the average loan portfolio of the 21 largest Chinese banks, and that the green loan default rate is less than half of the average default rate of the banking system.

Aslan et al. (2021) found the probability of corporate credit default in the US was significantly lower for firms with high environmental, social, and governance (ESG) performance using S&P credit ratings data on 902 publicly listed firms. Scatigna et al. (2021) found that debt from entities with a higher carbon footprint trade at higher yields than firms with lower carbon footprints. Sun and Cui (2014) find that firms with stronger corporate socialresponsibility metrics have a lower default risk. Albuquerque et al. (2018) found a similar result.

Source: APRA (2022) *Climate Vulnerability Assessments – November 2022*

Green firms face lower physical, transition and liability risks than 'brown' firms

Risk	Transmission	Impact
Physical risk	Direct damage to assets or property from extreme weather events	Lower asset values Increased insurance claims Supply chain disruptions
Transition risk	Disruption from changes to policy and community attitudes	Impacts on pricing and demand Increased number of stranded assets Rising defaults on loans
Liability risk	Being held liable for costly environmental clean-ups	Reduced profits from higher penalties Defaults on loans Business disruption

Source: APRA (2022) *Climate Vulnerability Assessments – November 2022*

Combining firm-level environmental data with a CGE model lets us model the impact of Basel III reforms

The objective of the research is to simulate what would happen if, because of reforms to the Basel III rules to differentiate between green and brown debt, green firms received a lower cost of capital. The goal is to explore the relative impacts on sectors and economies and the flows of capital, goods, and services between them.

The simulation requires two steps. The first step is to calibrate the size of the shock for each sector and each country using a firm-level ESG dataset. The second step is to measure the impact of the shock using a general equilibrium model to understand the implications for different sectors, different G20 economies, and the flows of goods, services, and capital between them.

Exhibit 10: Changes in Australia's capital stock over 10 years after climate risks priced-in

$AU billions, 2022 dollars

	Industrials	Basic materials	Technology	Consumer cyclicals	Consumer non-cyclicals	Real estate	Health care	Financials	Energy	Utilities
Argentina	15	20	18	39	19	30	57	27	46	34
Australia	29	23	9	11	31	36	4	27	27	30
Brazil	59	62	48	26	59	11	54	18	40	54
Canada	38	30	16	26	12	26	4	6	36	51
China	28	33	23	23	19	35	31	36	61	32
France	55	50	57	67	78	85	30	70	60	64
Germany	36	62	33	45	62	37	63	36	57	53
Italy	55	60	29	50	49	69	38	55	73	77
India	66	60	56	46	49	32	49	26	57	48
Indonesia	25	56	23	20	37	35	67	19	66	58
Japan	63	69	57	57	64	68	69	44	72	61
Korea	66	60	50	23	14	68	69	64	60	71
Mexico	47	52	39	36	32	54	31	24	43	54
Russia	26	59	45	37	46	69	31	31	52	39
Saudi Arabia	26	22	34	47	45	69	31	1	50	28
Turkey	66	42	67	68	65	17	35	72	68	78
UK	33	40	26	45	47	56	39	21	33	50
USA	29	42	15	24	33	26	39	3	27	45
EU	46	58	38	51	69	52	38	40	56	58
South Africa	45	64	39	48	49	52	51	31	79	10
Rest of the OECD	46	58	38	51	69	52	38	40	56	58
Rest of the world	47	60	39	47	35	36	48	26	79	10
Rest of Asia	44	44	39	42	42	51	38	33	61	48

Source: Mandala analysis using the G-Cubed model

Looking at an individual economy – South Korea – we see a big increase in investment from the reforms

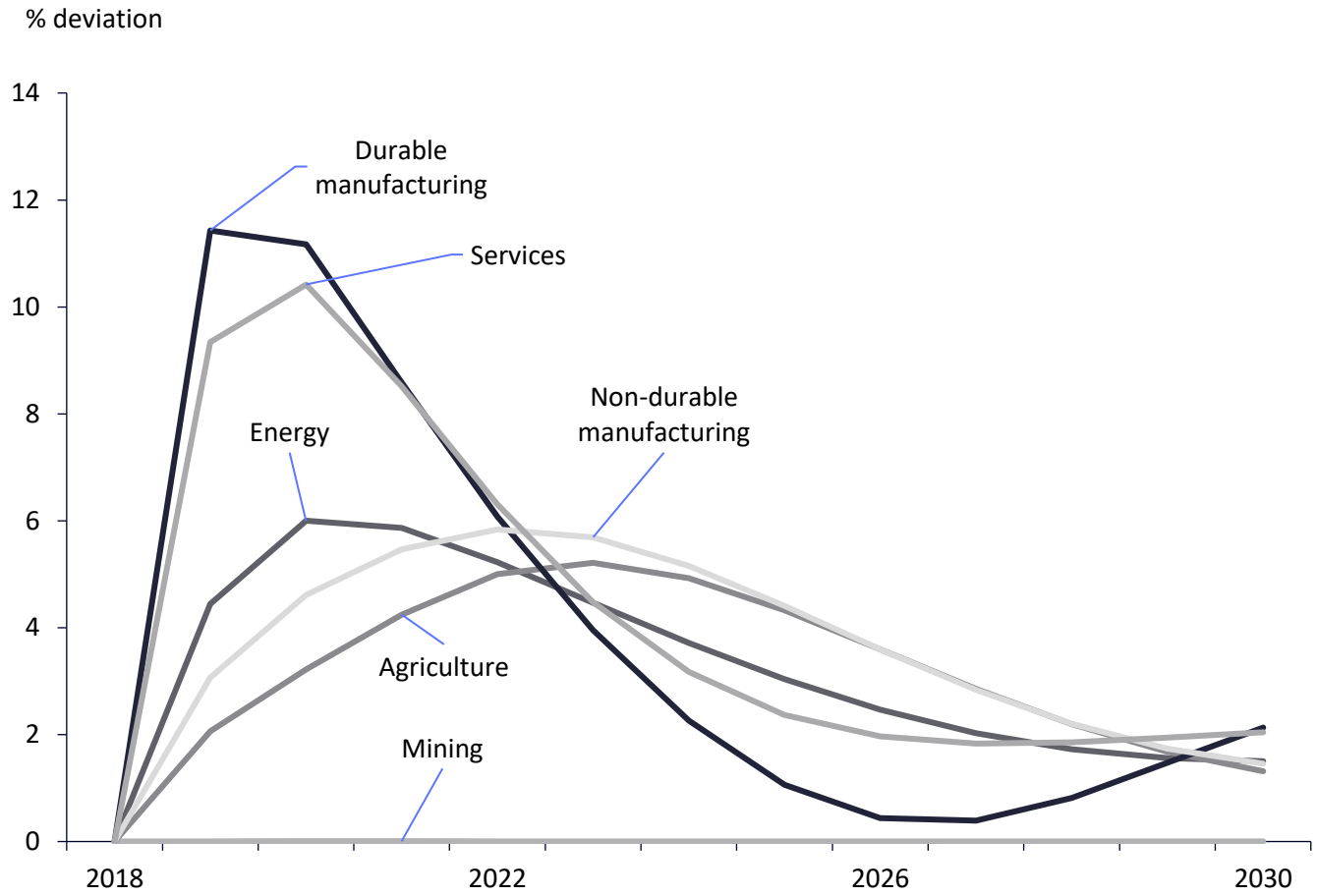
The Basel III reforms see a substantial reallocation of capital between these sectors. Investment in durable manufacturing is 12 per cent above the baseline in the first year as forward-looking firms anticipate the impact of cost of capital adjustments on production and re-allocate their portfolios accordingly.

Investment in services is almost 10 per cent higher, while the mining sector sees almost no increase in investment at all.

The size and composition of the capital stock of the South Korean economy looks very different after this shock than it did before the shock.

Changes in investment in Korea when environmental factors are taken into account

Percentage deviation



Source: Mandala analysis using the G-Cubed model

South Korea experiences a 6 per cent increase in GDP over 10 years because of the reform

South Korea's openness to foreign investment and the degree of flexibility in its exchange rate play a key role in shaping the impact of Basel III reforms on its economy.

If South Korea is less open to foreign investment, more of the investment boom needs to be financed through domestic savings. This results in higher domestic interest rates, lower consumption, and a smaller investment boom as a result.

The net effect of the Basel III reforms for South Korean GDP is positive. Although GDP is reduced by a contraction in the trade balance and consumption, the investment boom sees GDP almost 1.2 per cent above the baseline by the fourth year.

The Basel III reforms deliver substantial economic benefits for South Korea

Percentage deviation from the baseline

Figure 2: Investment, South Korea

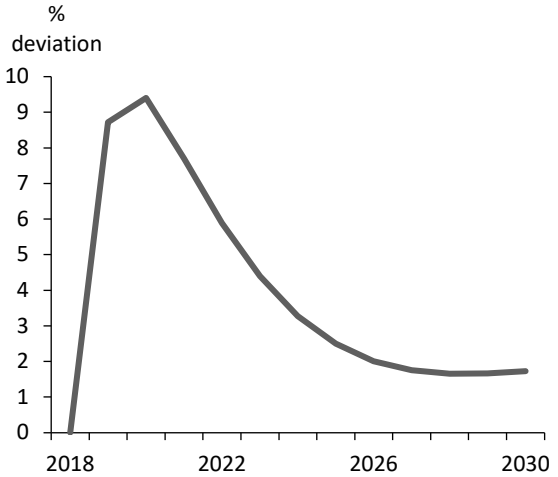


Figure 3: Trade balance, South Korea

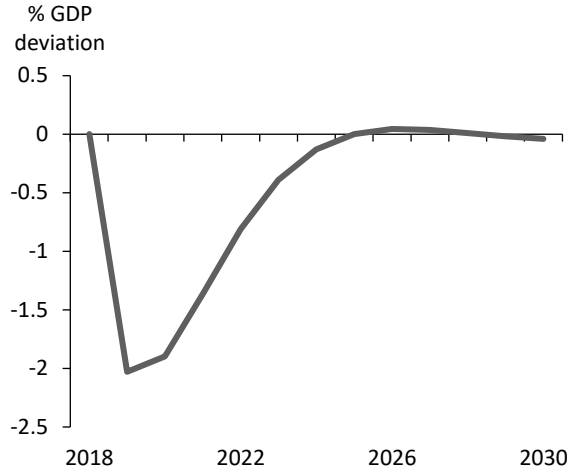


Figure 4: Consumption, South Korea

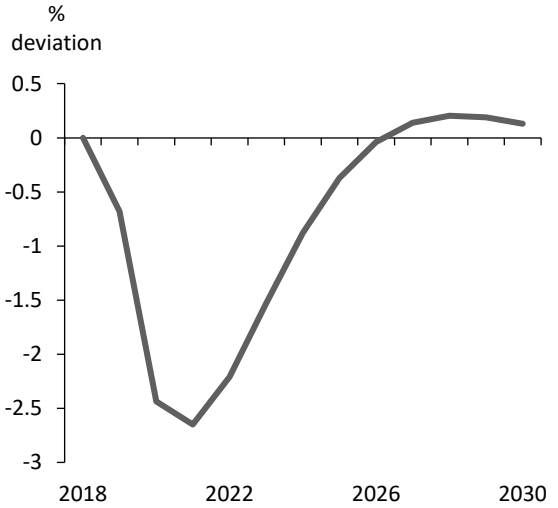
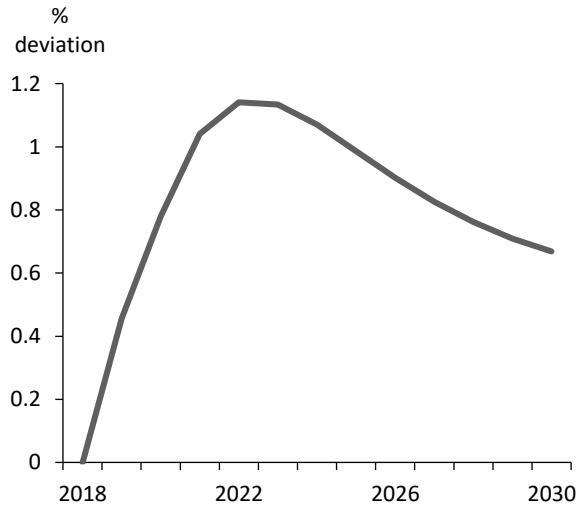


Figure 5: Real GDP, South Korea



Source: Man

The benefit to China from these reforms is significant: GDP is 0.6 per cent higher in the first year alone

The impact of having countries undertake these reforms alone varies widely for different economies for both GDP and investment.

The countries which benefit the most are the European countries and Japan, whereas the countries which benefit the least tend to be the emerging market economies.

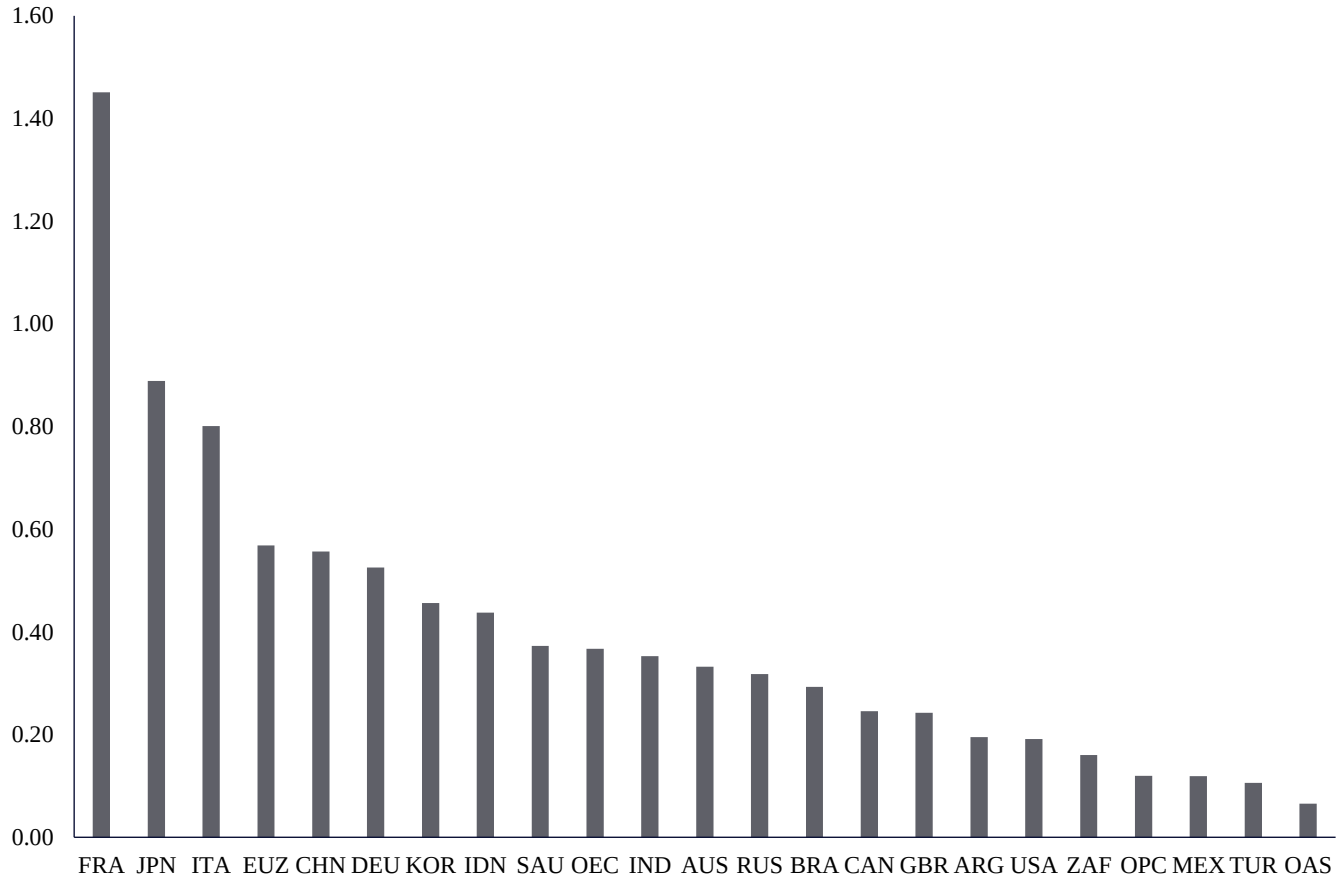
The extent to which countries benefit from the reforms depends on two key variables:

(i) how well their sectors do on their environmental scores; and

(ii) the degree of flexibility in their exchange rate and monetary policy frameworks.

First year GDP impact when each country reforms alone

Percentage deviation



Source: Mandala analysis using the G-Cubed model

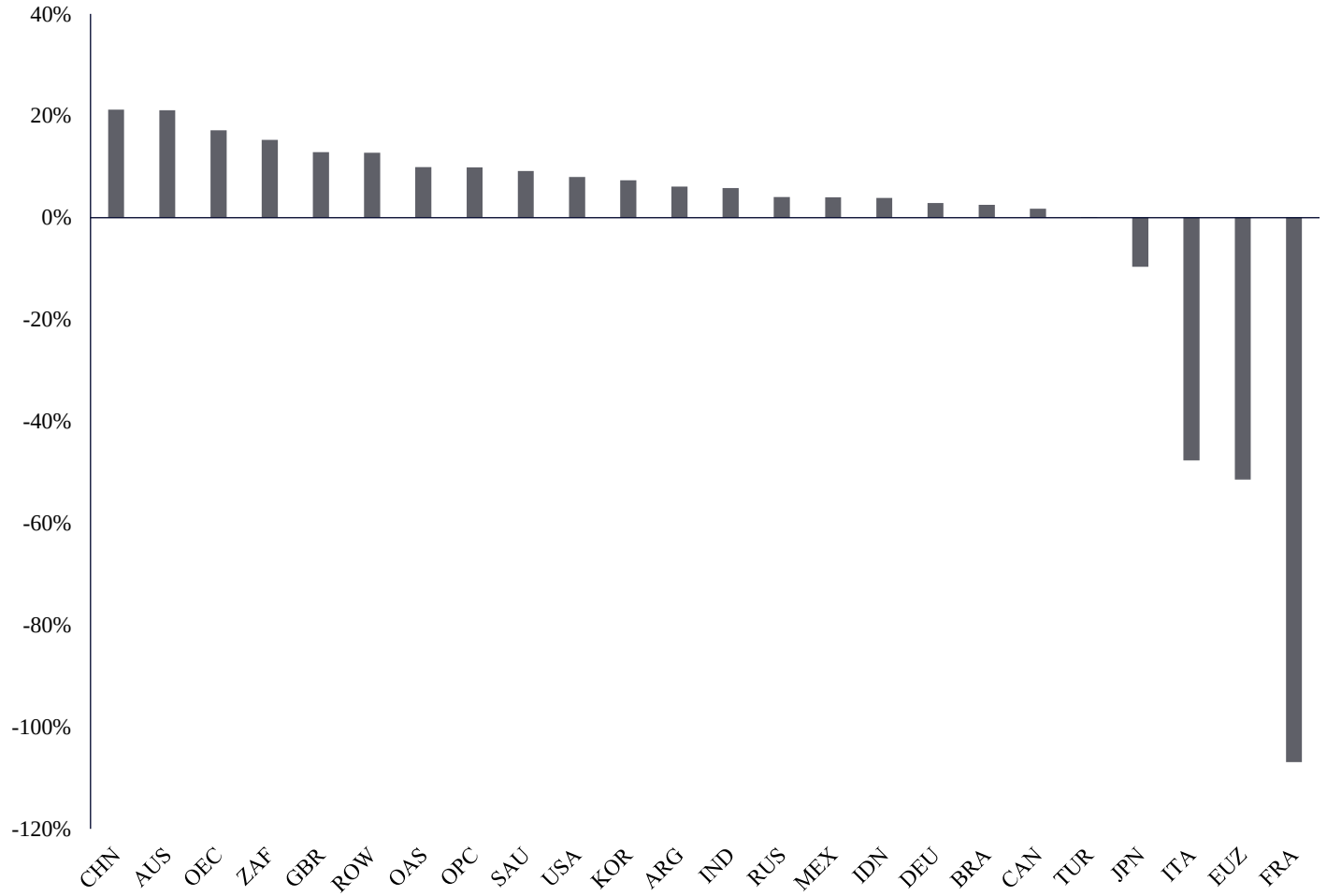
Countries are much better off undertaking reforms together – particularly China and the G20's developing countries

The extent to which countries benefit from cooperation hinges on the extent to which they export the things that feed into the investment booms in other countries and the degree of flexibility in their exchange rate and monetary policy frameworks.

The emerging economies benefit from cooperation because they export the manufacturing and energy materials required for the investment booms that follow from the Basel III reforms. Conversely, the eurozone countries do not benefit from cooperation because of their shared currency. When France undertakes these reforms alone, for example, it benefits significantly because it does not suffer the rise in its exchange rate since the rest of the eurozone is not acting. But when the rest of the eurozone undertakes these reforms at the same time, France does suffer the rise in its exchange rate and is thus made worse off from cooperation.

Countries are better off acting together on these reforms than going it alone

Percentage difference between acting alone versus acting together



Source: Mandala analysis using the G-Cubed model

The benefits of reform are substantial – delivering more than US$10.7 trillion of sustainable investment in over 10 years

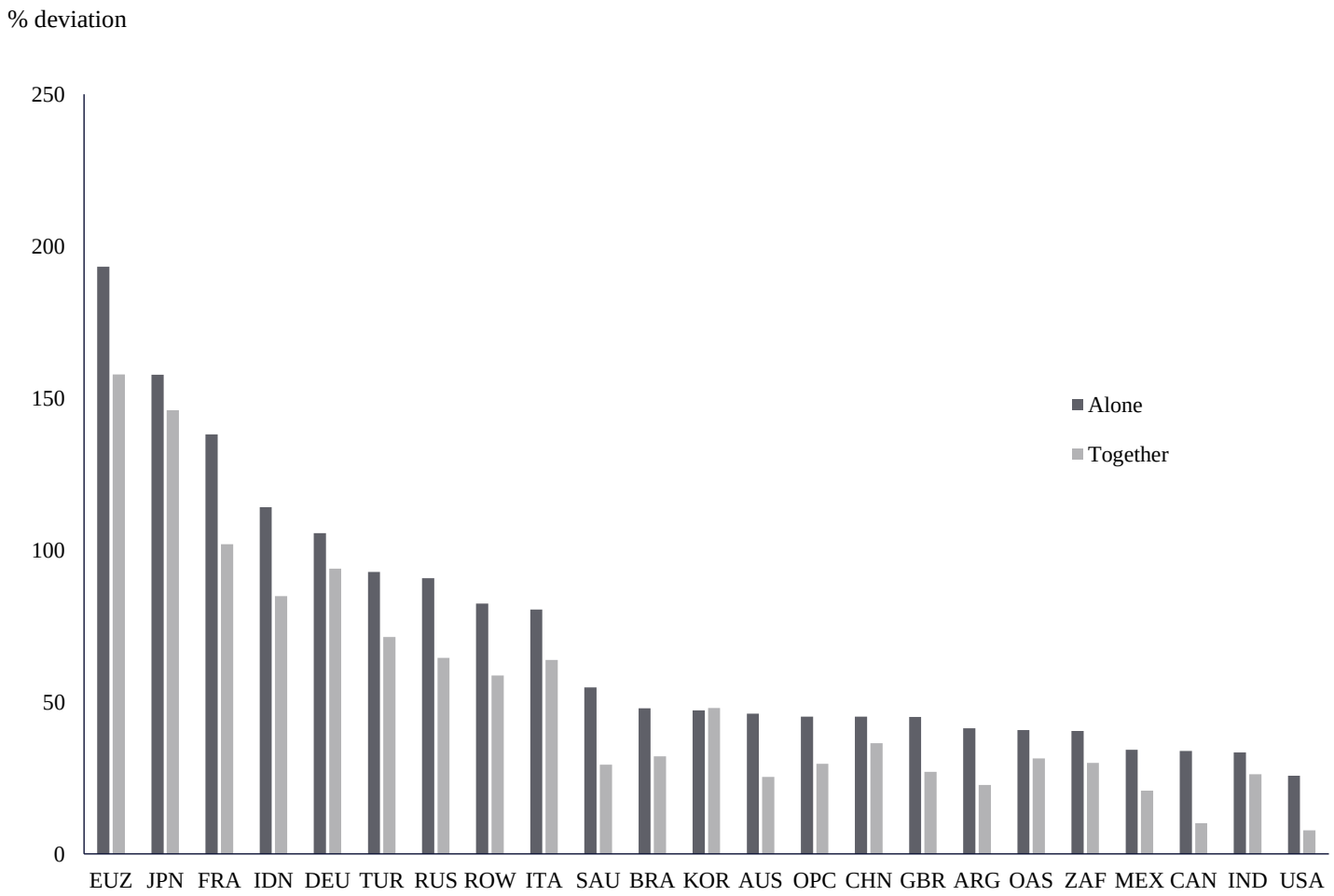
The overall benefit of undertaking the Basel III reforms is significant. The global economy is 6.3 per cent larger because of these reforms over 10 years with an additional $10.7 trillion in investment, meaning that the sustainable investment gap identified by IPCC could, theoretically, be closed by up to one-third.

It may be that the objective of cooperation is not to increase GDP but is instead to increase investment (either sustainable investment or total investment). In that case, the story is somewhat more complex. That is because the increase in investment is larger when countries act alone than if they act together (Figure 12).

When countries act together, they are together drawing on the same pool of global savings which pushes up interest rates and results in less investment than when they are acting alone.

Increase in investment over 10 years: reforming alone compared to reforming together

Percentage deviation over 10 years



Source: Mandala analysis using the G-Cubed model

There are barriers to achieving these reforms which the G20 is well-placed to address

Addressing these challenges should be a multi-year agenda item for the G20. To its existing agenda, the G20 should add the empirical assessment of whether green borrowers are better borrowers and the extent to which the Basel III rules are constraining investment, and have a more specific focus on the interoperability of green taxonomies and support for developing countries in collecting and curating data. G20 study groups and working groups are the right place to resolve technical challenges relating to data and taxonomies.

But there is a role for G20 leaders and finance ministers to outline the practical steps that these efforts should be moving towards.

There are three key barriers to achieving these reforms

Barriers to reforming Basel III

Reliable data

Credit ratings agree with each other 99 per cent of the time. ESG ratings only agree half the time. We need to improve the quality of ESG data, particularly in developing countries where such datasets are less accessible.

Taxonomies

Berg et al.(2019) found substantial differences in methodologies between the six leading ESG rating methodologies. They found that these methodologies used more than 700 different variables across 64 categories. Only 10 variables were common across all methodologies, which, perhaps surprisingly, did not include greenhouse gas emissions.

Greenwashing

'Green washing' is the term commonly used to refer to these practices where firms will seek to either game the metrics used in environmental scores to improve their rating or will actively misrepresent their environmental credentials. Governments need to actively policy against this.

Source: Mandala analysis using the G-Cubed model

There is a critical role for development banks to play in overcoming these challenges

Processes

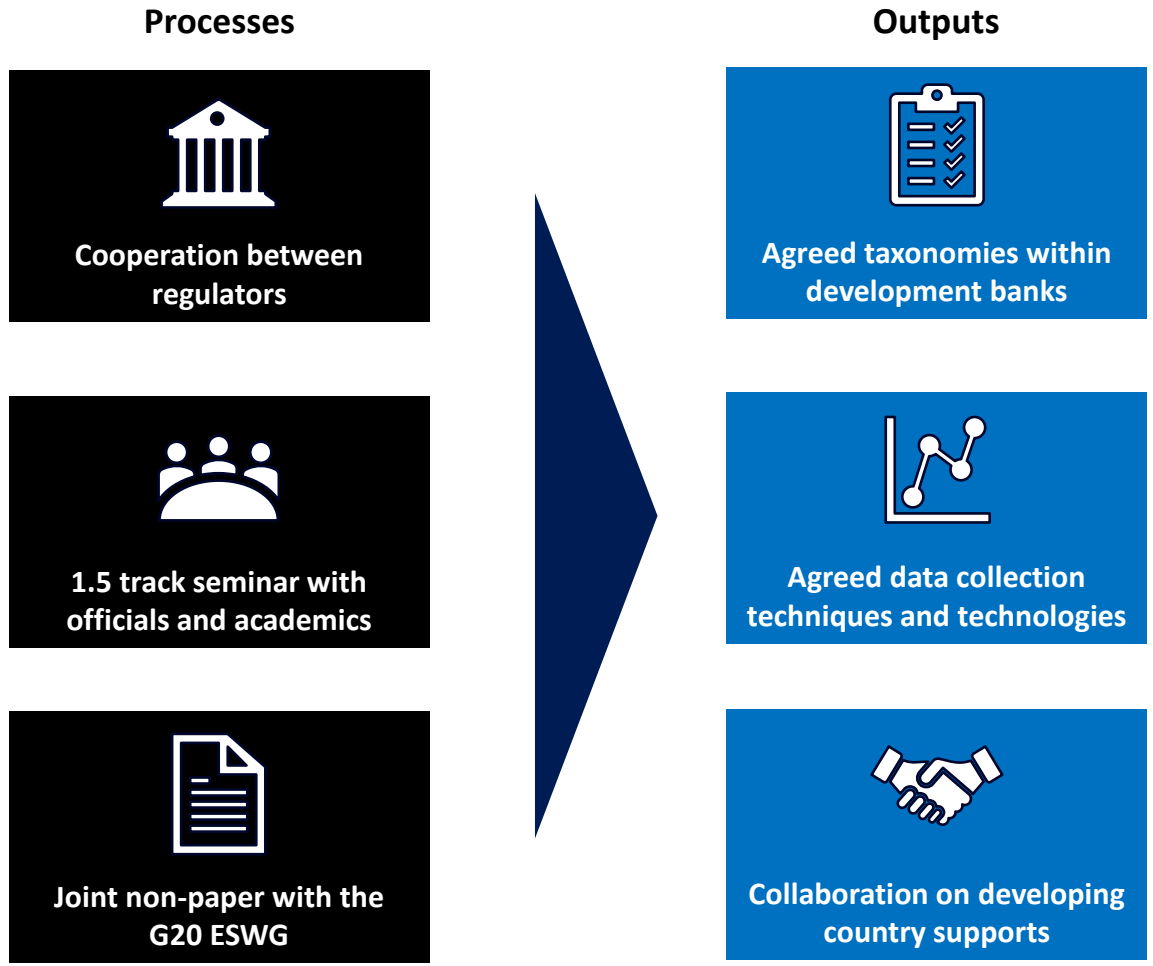
- Development banks should use their lending as a 'regulatory sandbox' for testing alternative models of these regulatory changes
- Development banks should host seminars with officials, regulators and academics to develop their taxonomies and regulatory methodologies
- Development banks should set up annual meetings between regulators to share experiences on greenwashing

Outputs

- Agreed taxonomies between countries will provide a framework for others to adopt
- Agreed data collection techniques can support similar initiatives in the region
- Development banks could prepare a collaborative approach to support countries in the region

Opportunities for collaboration by development banks

Process and outputs



Climate risks result in a significant reallocation of capital away from mining and towards services

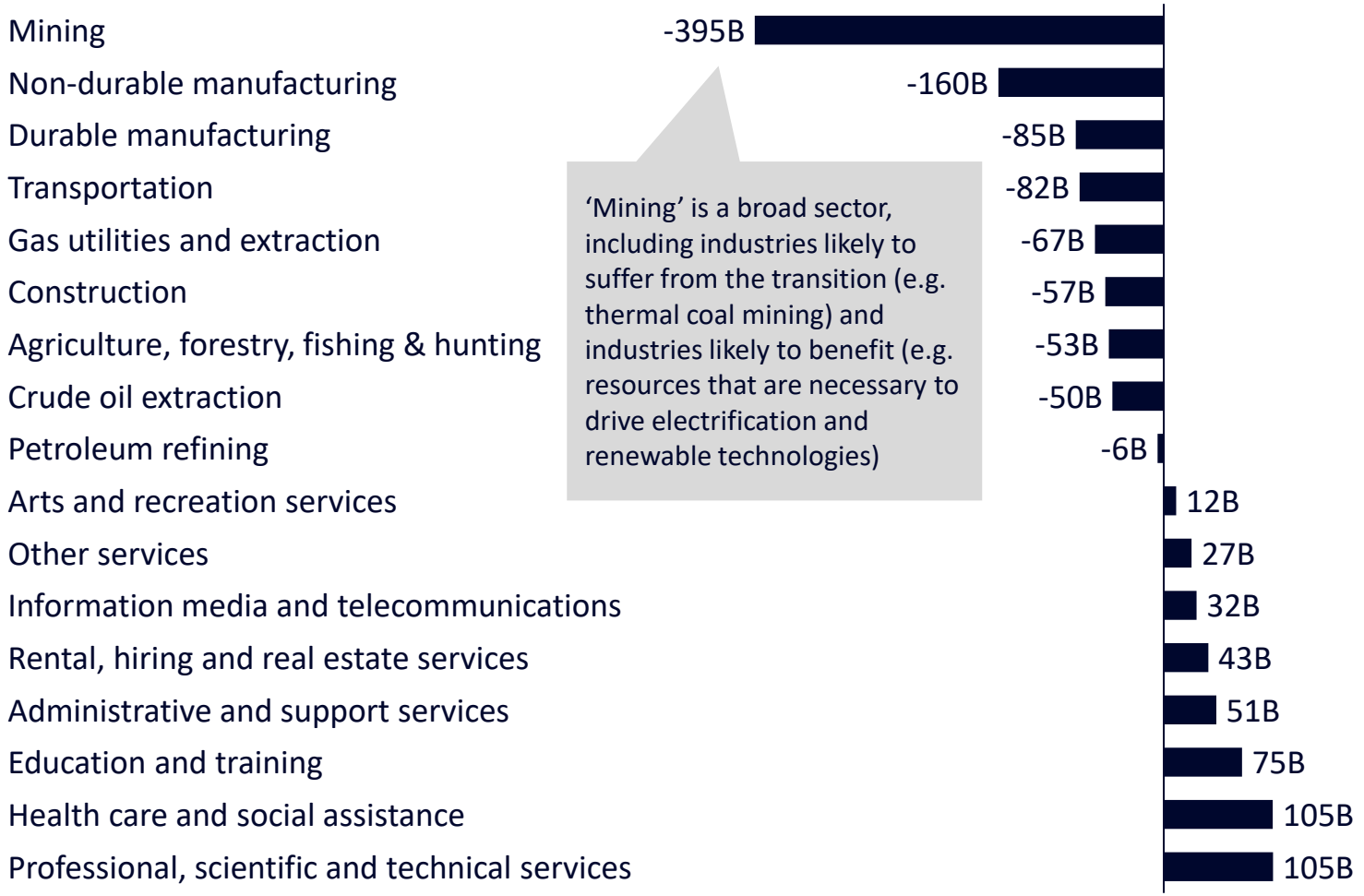
Mandala modelled the implications of APRA's credit rating assessments for the Australian economy using the G-Cubed CGE model.

The results show there is a significant reallocation of capital within the Australian economy under this scenario. The investment reductions were highest in mining and manufacturing between $395B to $245B respectively, reflecting the carbon and capital intensity of the sectors. Crude oil extraction and petroleum found lower reductions despite their carbon intensity. This reflects the relative size of these industries in Australia. The least carbon intensive sector, the services sector, saw a cumulative increase in investment of $450B over 20 years.

This modelling also highlights the harms from delaying Australia's climate transition. If the rate of change was to increase, capital and businesses would be able to adjust to the clean economy in a more orderly way.

Exhibit 1: Changes in Australia's capital stock over 20 years after climate risks priced-in

$AU billions, 2022 dollars



Source: Mandala analysis using the G-Cubed model

Coal mines employ workers from a range of occupations and compete with other industries for those workers

As a sector, coal mining employs 44,600 people. But coal mining as an industry is in structural decline as demand for its product falls domestically and internationally. Government forecasts predict that Australia's coal exports will fall by 50-80% in volume over the next two decades.

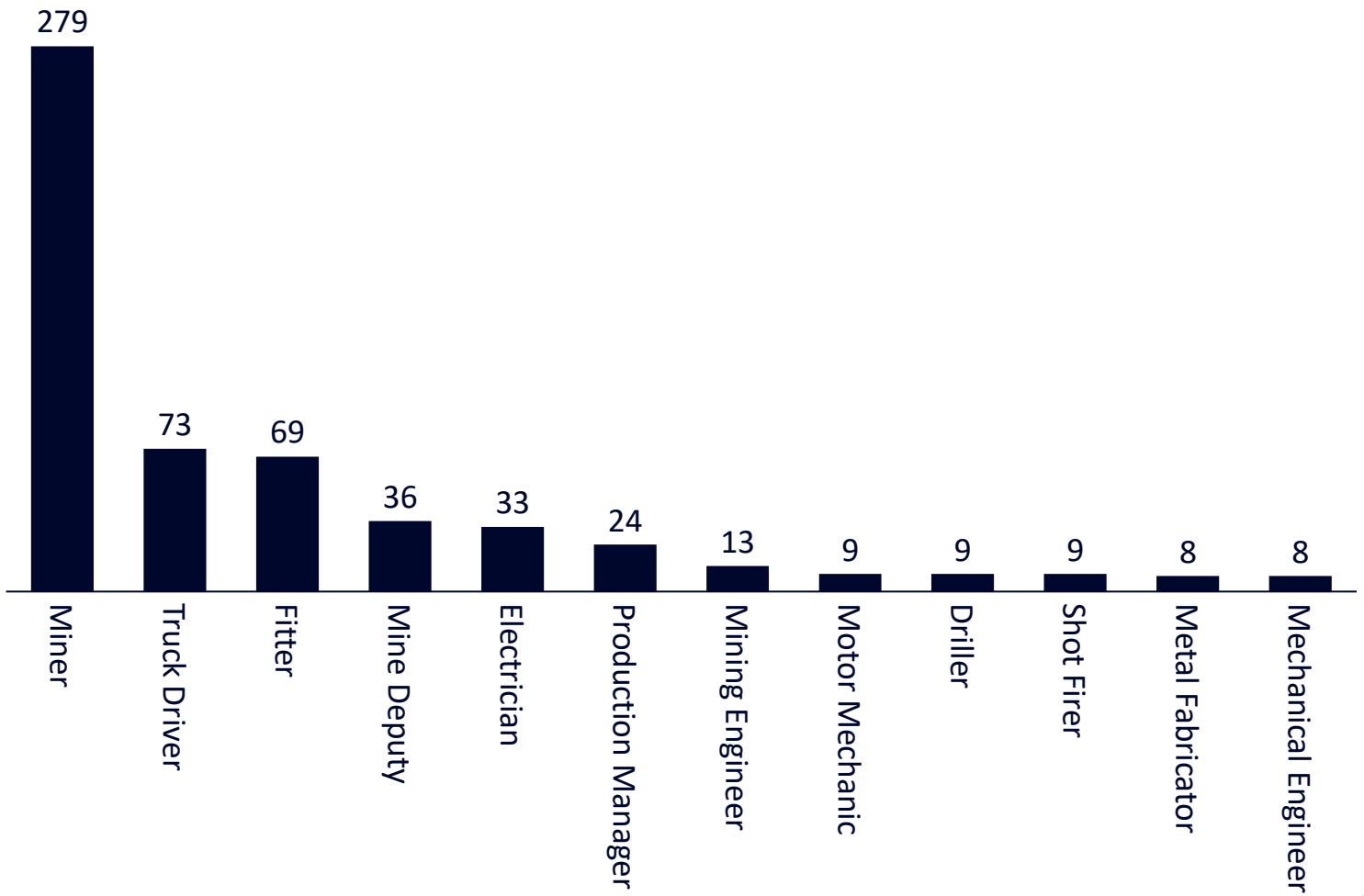
Mandala wanted to understand the impact of this decline on mine workers. To do this, we used microdata on job advertisements to estimate how long it would take workers at a specific coal mine to find new jobs if it closed 5 years ago.

The mine chosen was a coal mine in New England which employs 766 people. The largest professions in the mine were miners, truck drivers and fitters. Most of its workforce lives locally.

Sources NSW Department of Treasury (2021) *The sensitivity of the NSW economic and fiscal outlook to global coal demand*.

Exhibit 2: Coal mine workers at a mine in New England

Headcount by top 12 occupations in the mine, 2023

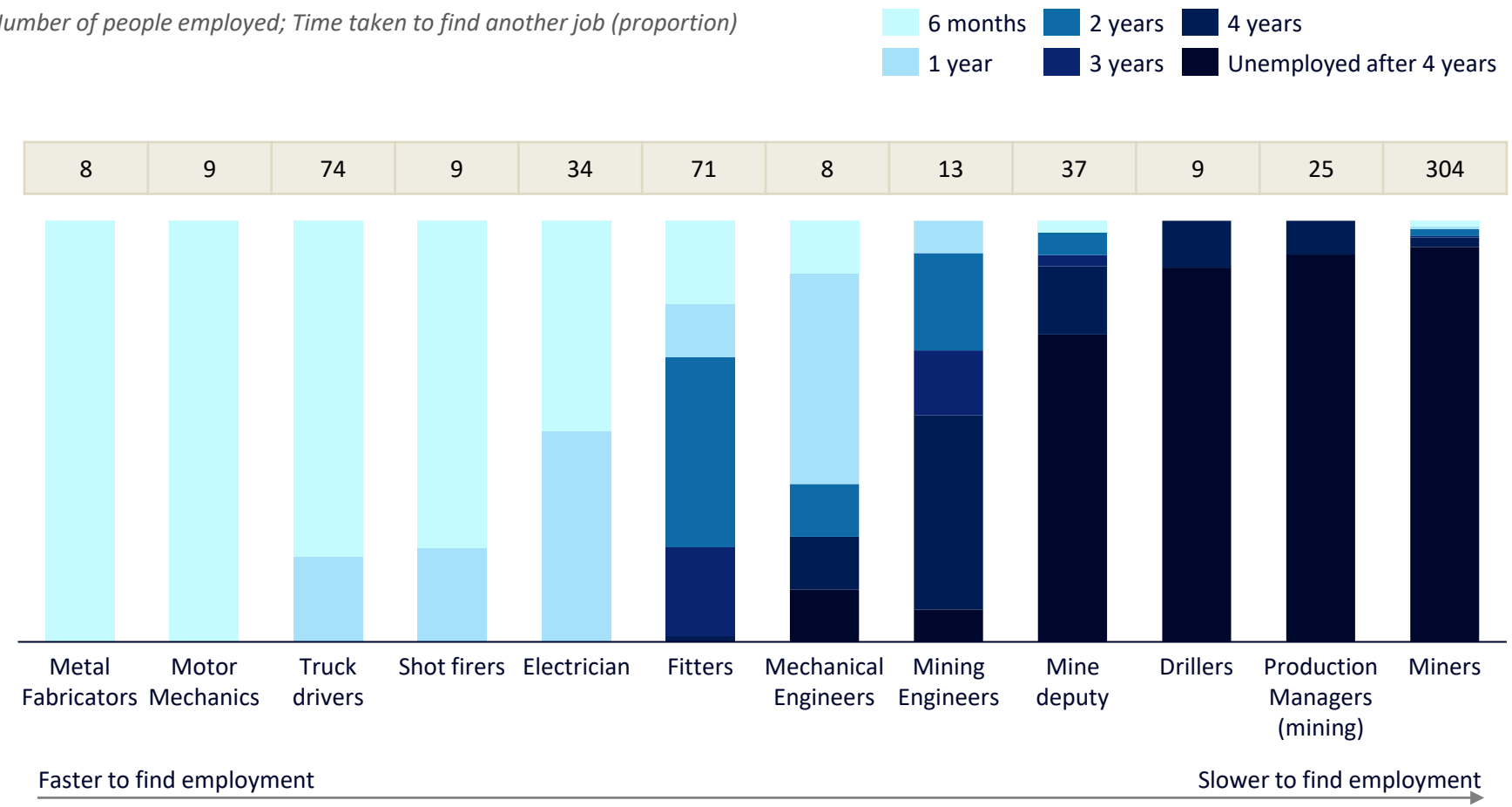


Sources: Mandala analysis

If this coal mine was to close and workers did not relocate, 28% of people would find another job within their region in the first year

Exhibit 3: Time required to find another job outside coal mining in the same occupation within New England and the North West

Number of people employed; Time taken to find another job (proportion)



Occupations that are specific to mining will suffer more in the transition

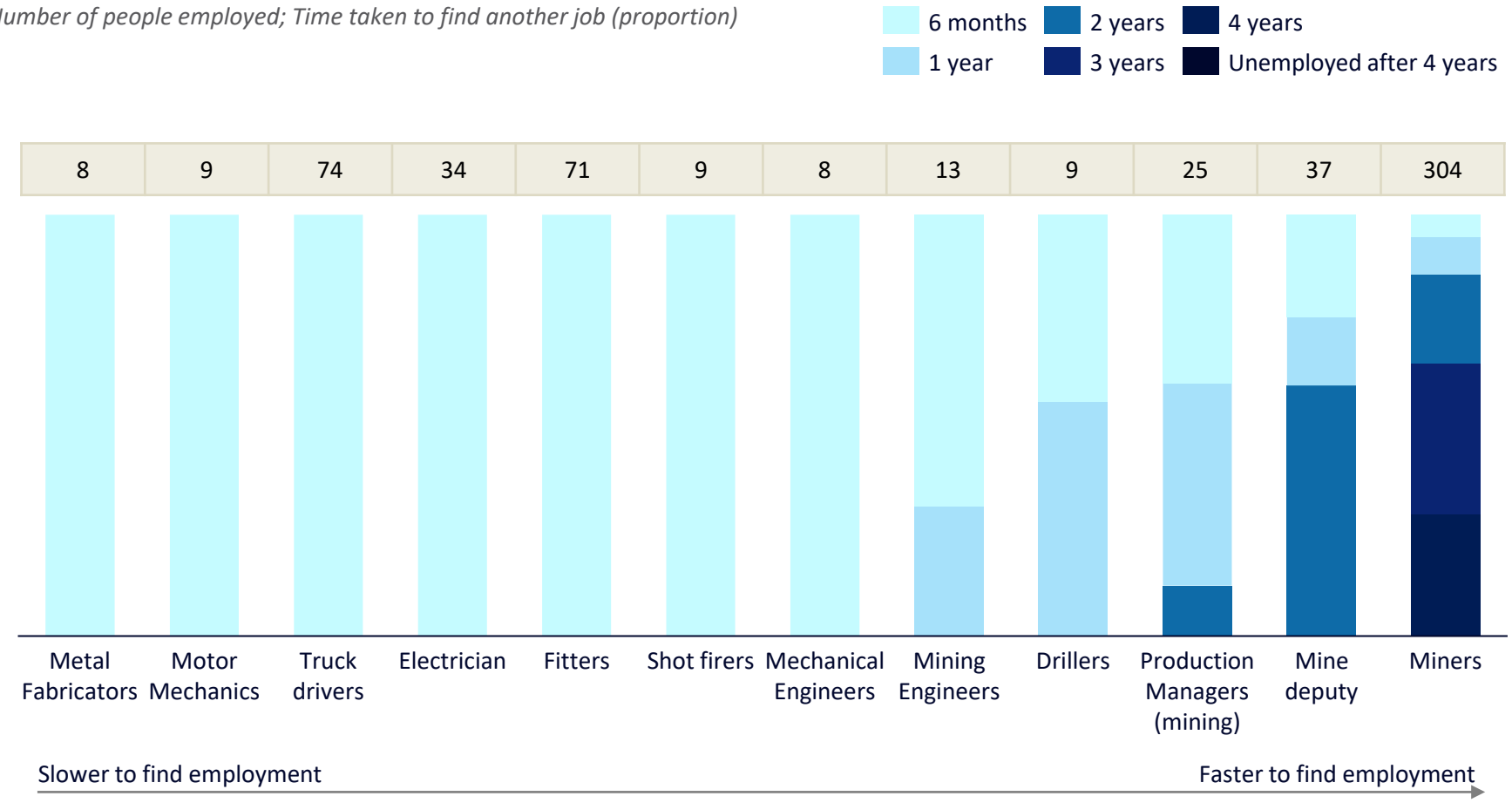
- If workers do not relocate, 28% of workers find a new job within one year, 35% find a new job within two years, 39% find a new job within three years and 43% find a new job within four years.
- Mandala found that metal fabricators, mechanics and truck drivers returned to work the fastest.
- Occupations that are specific to mining took longer to find new jobs.
- Strong employment in the agriculture and construction sectors in the region explains the difference in outcomes for occupations with transferable skills.
- Mandala found that if workers don't leave the region, 71% of workers would be considered long-term unemployed (unemployed for more than a year). Workers that are long-term unemployed are less likely to find a jobs and their employment chances are hurt for years after.

Source: Lightcast; Mandala analysis.

If this coal mine was to close and workers were willing and able to relocate within NSW, 52% of people would find a job within a year

Exhibit 4: Time required to find another job outside coal mining in the same occupation within NSW

Number of people employed; Time taken to find another job (proportion)



Employees with skills in other industries like construction will be forced to move to find work quickly

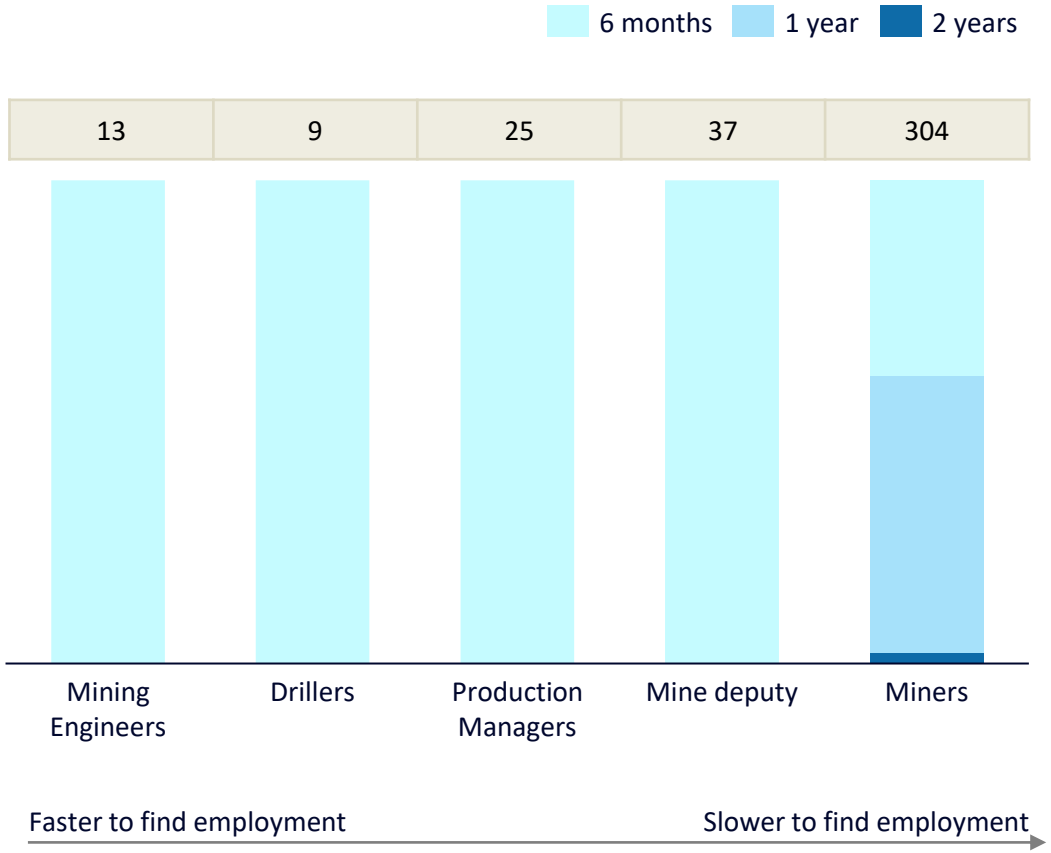
- If workers are willing to relocate to somewhere else within NSW, 52% find a job in one year, 67% in two years, 85% in three years and 100% in four years.
- When workers moved within NSW, Mandala found metal fabricators, mechanics, and electricians returned to work the fastest.
- Lower skilled occupations that are specific to mining still took the longest to find new jobs, with miners taking the longest.
- However, skilled occupations like drillers and mining engineers fared better due to the high demand for their skills within the industry.
- Occupations that benefited most from moving were skilled and in demand in relatively small industries in New England, e.g., fitters and mechanical engineers who are required in manufacturing.

Source: Lightcast; Mandala analysis.

If this coal mine was to close and workers were willing and able to relocate anywhere in Australia, 98% of people would find a job within a year

Exhibit 5: Time required to find another job outside coal mining in the same occupation within Australia

Number of people employed; Time taken to find another job (proportion)



Labour mobility, transferable skills and targeting are critical in easing the transition risk

- If workers are willing to relocate to anywhere in Australia, 98% find a job in one year and 100% find a job in two years.
- These results mean three things for governments:
    1. For workers in any occupation who would like to and are able to move, supporting labour mobility is a critical part of what government can do to ease the transition into new work. These supports could include incentives to move, changes to stamp duty taxes that disincentivise selling property, etc.
    2. For workers who are unable or would not like to move, transferable skills that are in demand in other industries in the region are key to returning to work. For workers that do not have these skills, these can be provided through localised retraining programs.
    3. The transition will be most acutely felt by workers in occupations that are specialised in those industries most impacted by the transition, i.e. miners in coal mining. This means that governments should target their transition support towards these workers and provide the most support to workers with the lowest ability to find new work. This is opposed to providing broad-based support for all displaced workers.

Source: Lightcast; Mandala analysis.

Efforts to ease the net zero transition should focus on occupations that will struggle the most to gain employment

Mandala has developed a transition risk framework to help government prioritise support for workers in occupations that will struggle the most to find new jobs. This framework develops three categories for workers based on occupations:

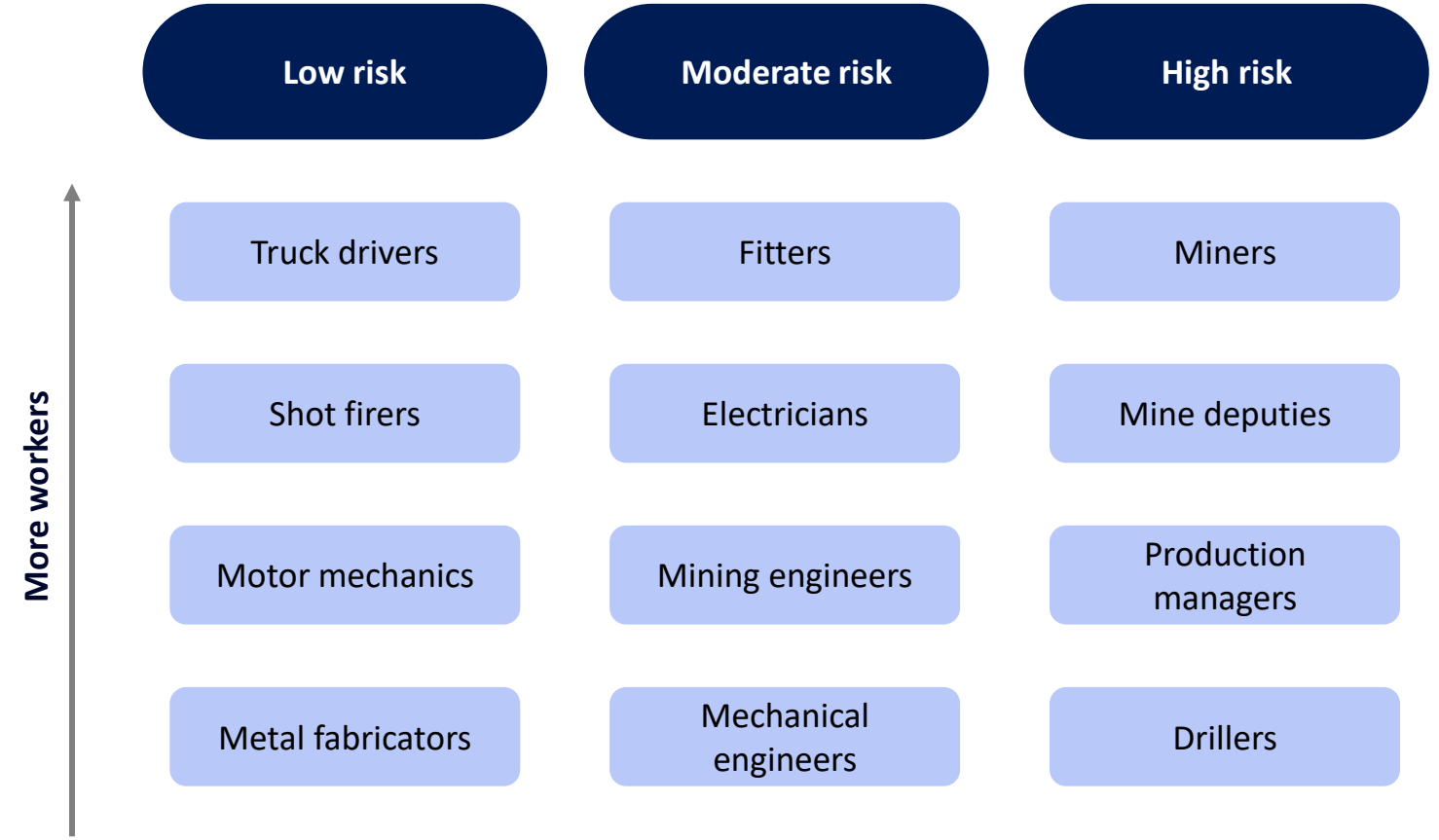
Low risk: These are occupations where the majority of workers gain employment in the **region** they live within six months.

Moderate risk: These are occupations where the majority of workers gain employment in the **state** they are in, within six months.

High risk: These are the occupations where workers must move outside their state to gain employment.

This analysis suggests that efforts to ease the net zero transition should focus on: mining engineers, mine deputies, miners, production managers and drillers.

Exhibit 6: Framework for the transition risk of occupations



Sources: Mandala analysis