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How is investment doing? A cross-country analysis

October, 2024

Creating Opportunities

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01

Main messages

Investment: large cross-country heterogeneity, but no widespread weakness

- There is not a widespread weakness in investment despite tight monetary conditions and geopolitical, political and economic uncertainty.
- There are strength signs in countries such as the US, France and some Northern European and Baltic countries and in segments such as intellectual property and ICT and some other services.
- Still, there is evidence of weak investment in Spain, Canada, Australia and most Emerging Market countries and for investment in equipment assets and in transportation and mining sectors.
- In line with the literature, our findings show that GDP growth is the key driver of investment and that other variables (such as expectations, investment price, the rule of law, credit conditions, etc.) seem to be less important, although they can still be significant, at least in some cases.
- AI, digitalization, climate transition and protectionism will potentially drive investment up ahead, despite some expected negative effects (mainly related to protectionism); in fact, recent investment dynamics suggest these factors are already supporting fixed capital spending, at least in some countries.

Investment: large cross-country heterogeneity, but no widespread weakness

2023 INVESTMENT GAP: OBSERVED INVESTMENT - ESTIMATED EQUILIBRIUM (IN REAL TERMS) (*)

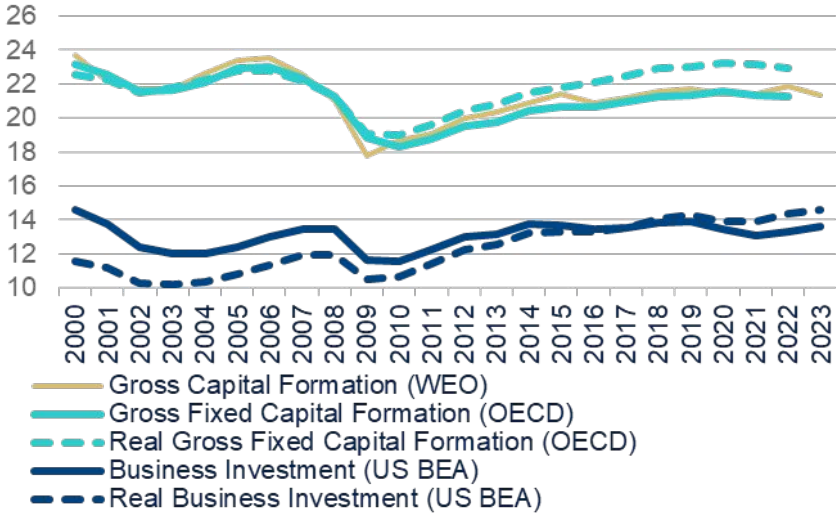
(CHANGE IN INVESTMENT AS SHARE OF GDP IN PERCENTAGE POINTS, GFKF: GROSS FIXED CAPITAL FORMATION, BI: BUSINESS INVESTMENT)

	USA	UK	GER	FRA	ITA	ESP
GFKF: based on 2000-2019 average	1.1	1.7	0.3	2.1	2.2	-2.5
BI: based on 2000-2019 average (**)	2.5	1.0	-0.5	1.8	0.7	-0.3
GFKF: based on country-specific accelerator model	4.2	-	-2.0	2.2	-	-1.7
BI: based on country-specific accelerator model	0.2	-	-1.7	4.1	-	-2.4
GFKF: based on panel accelerator model	2.8	-0.9	1.2	0.4	1.1	-4.8
BI: based on panel accelerator model	3.7	-0.4	1.0	1.9	-	-

(*) Ratios of investment to GDP calculated from data in constant local currency.Equilibrium estimations based on 2000-2019 average and on accelerator models, where investment is a function of GDP growth.
(***) Eurostat data for European Union countries.
Source: BBVA Research based on data by OECD, BEA and Eurostat.

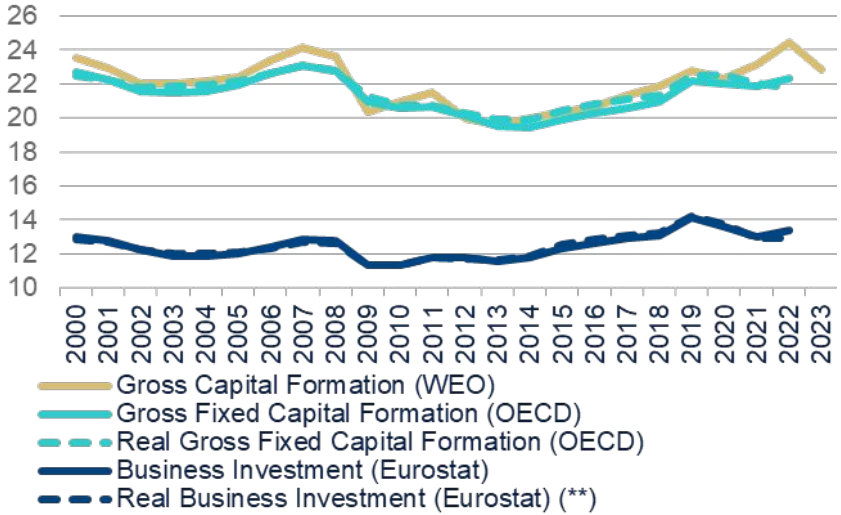
Investment: large cross-country (and cross-measure!) heterogeneity, but no widespread weakness

INVESTMENT: US (*)
(SHARE OF GDP)



(*) Gross fixed capital formation is the gross capital formation minus inventories variation. Business investment (non-residential private gross formation of fixed capital) is the gross fixed capital formation minus public and residential gross formation of fixed capital. “Real” investment measures are based on investment and GDP measured with constant local currency, while other measures are based on nominal (current local currency) data.
Source: WEO, OECD, US BEA.

INVESTMENT: EUROZONE (*)
(SHARE OF GDP)



(*) Gross fixed capital formation is the gross capital formation minus inventories variation. Business investment (corporate gross formation of fixed capital) is the gross fixed capital formation by the financial and non-financial corporate sector . “Real” investment measures are based on investment and GDP measured with constant local currency, while other measures are based on nominal (current local currency) data. (**) Deflated using the GFKF implicit deflator.
Source: WEO, OECD, Eurostats.

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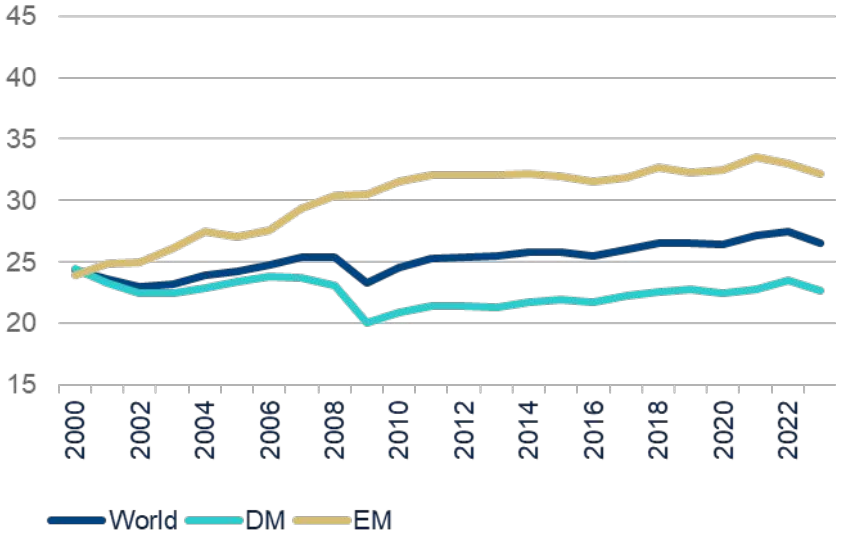
02

Investment: recent dynamics

Gross capital formation (WEO data): high levels due to a post-GFC recovery and a larger contribution of "high-investment" Asian countries

GROSS CAPITAL FORMATION: WORLD, DEVELOPED AND EMERGING MARKETS (*)

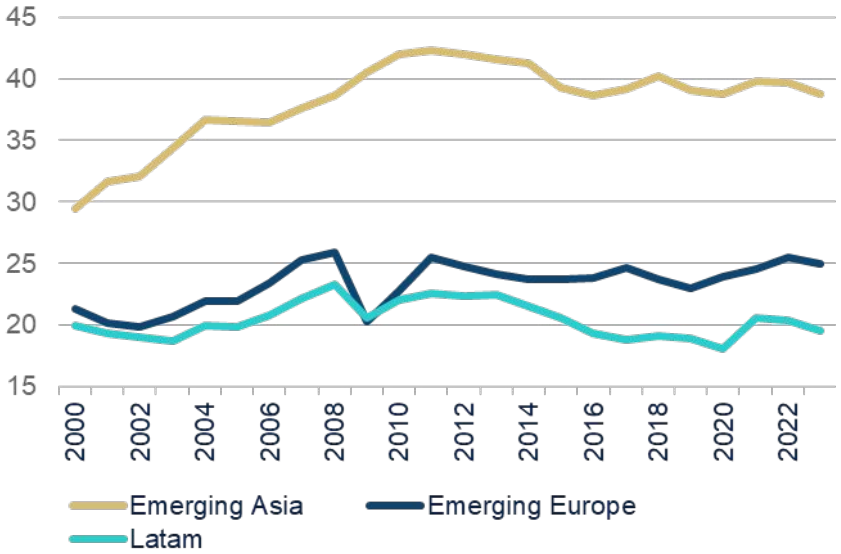
(SHARE OF GDP)



(*) Ratio of total investment in current local currency and GDP in current local currency. Investment or gross capital formation is measured by the total value of the gross fixed capital formation and changes in inventories and acquisitions less disposals of valuables for a unit or sector.
Source:WEO.

GROSS CAPITAL FORMATION: EMERGING EUROPE, LATAM AND EMERGING ASIA (*)

(SHARE OF GDP)



(*) Ratio of total investment in current local currency and GDP in current local currency. Investment or gross capital formation is measured by the total value of the gross fixed capital formation and changes in inventories and acquisitions less disposals of valuables for a unit or sector.
Source: WEO

GFKF (OECD data): investment has recovered since the GFC, while in China it has weakened lately following a sharp growth till mid-2010s

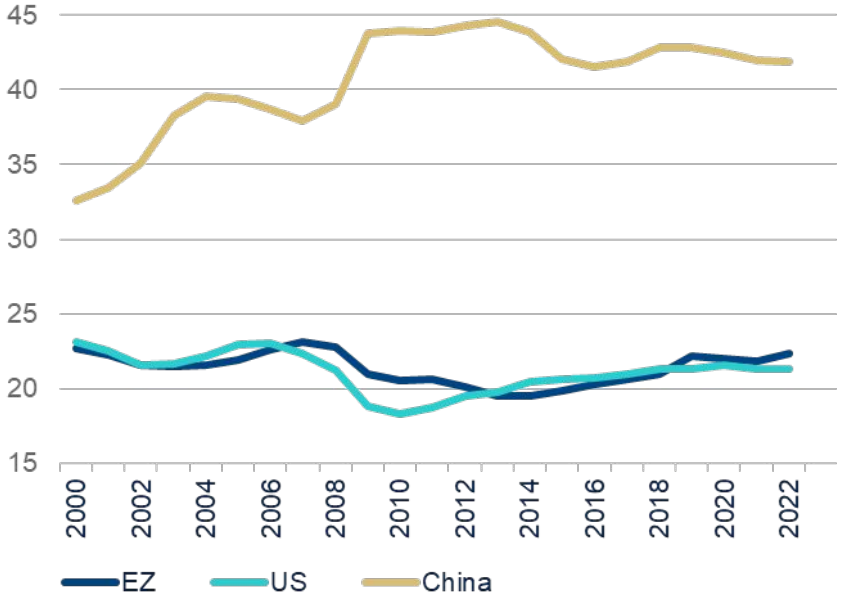
GROSS FIXED CAPITAL FORMATION (GFKF): OECD (*)

(SHARE OF GDP)

(*) Ratio of total investment in current local currency and GDP in current local currency
Source:OECD.

GROSS FIXED CAPITAL FORMATION (GFKF): EZ, US AND CHINA (*)

(SHARE OF GDP)

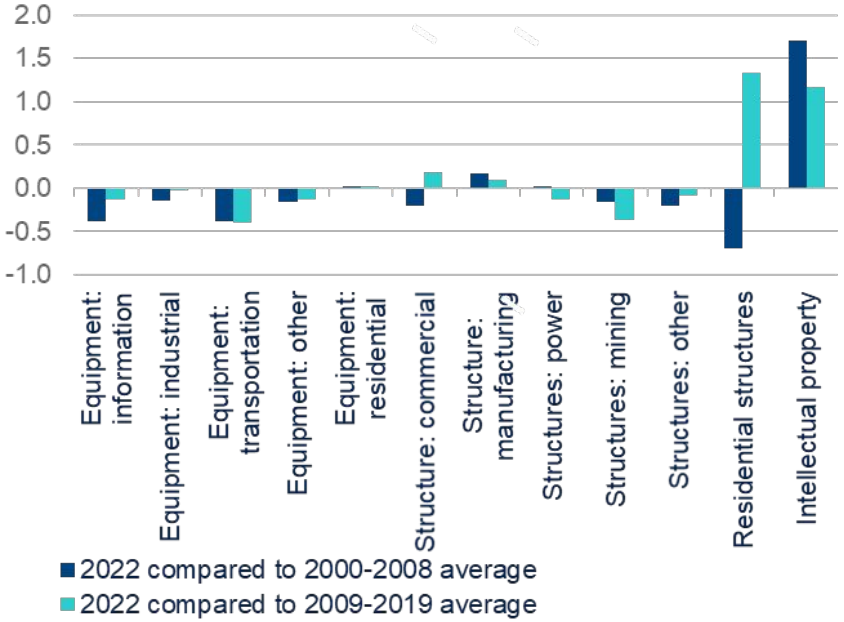


(*) Ratio of total investment in current local currency and GDP in current local currency.
Source: OECD

GFKF (BEA and Eurostat data): dynamic investment in intellectual property, recovery in residential structures; weakness in equipment investment

US: PRIVATE GFKF BY ASSET TYPES

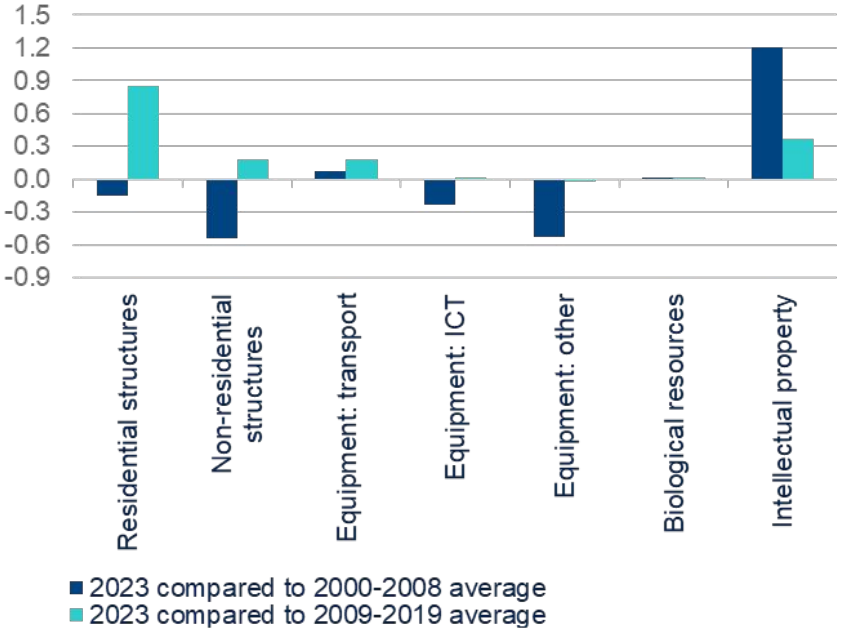
(CHANGE IN INVESTMENT AS SHARE OF GDP BETWEEN 2022 AND SELECTED PERIODS)



Source: BEA

EZ: GFKF BY ASSET TYPES

(CHANGE IN INVESTMENT AS SHARE OF GDP BETWEEN 2023 AND SELECTED PERIODS)

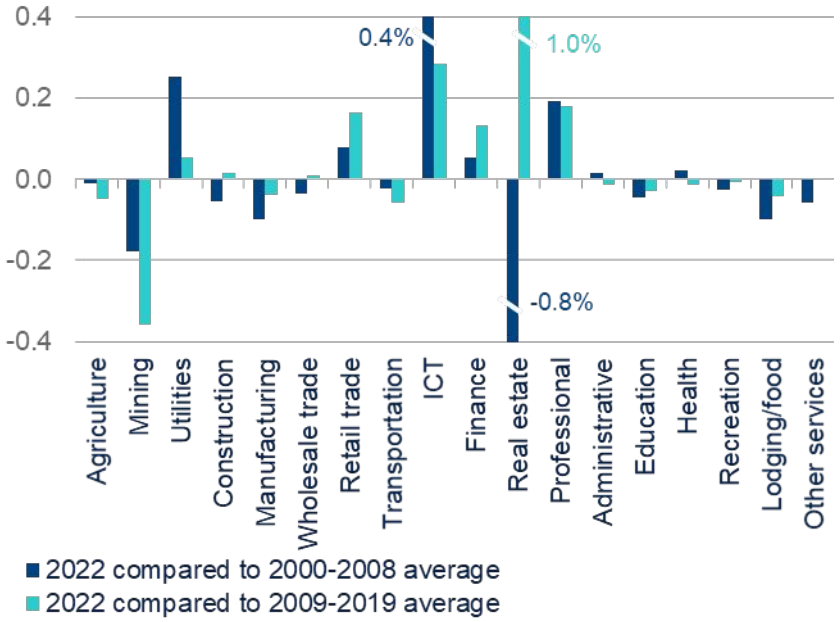


Source: Eurostat

GFKF (BEA and Eurostat data): evidence of dynamism mainly in ICT, but also in real estate, electricity as well as in financial and professional services

US: PRIVATE GFKF BY INDUSTRIES

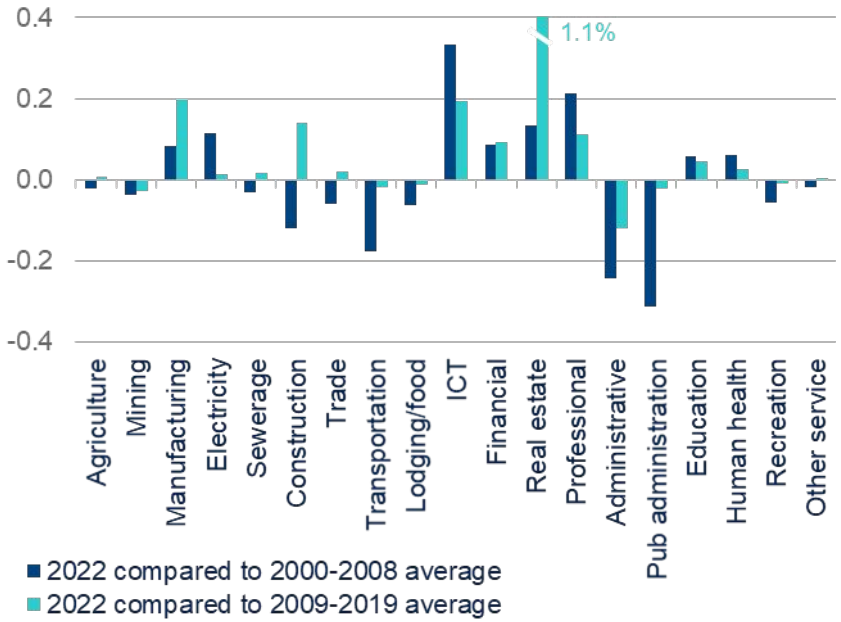
(CHANGE IN INVESTMENT AS SHARE OF GDP BETWEEN 2022 AND SELECTED PERIODS)



Source: BEA

EZ: GFKF BY INDUSTRIES

(CHANGE IN INVESTMENT AS SHARE OF GDP BETWEEN 2022 AND SELECTED PERIODS)

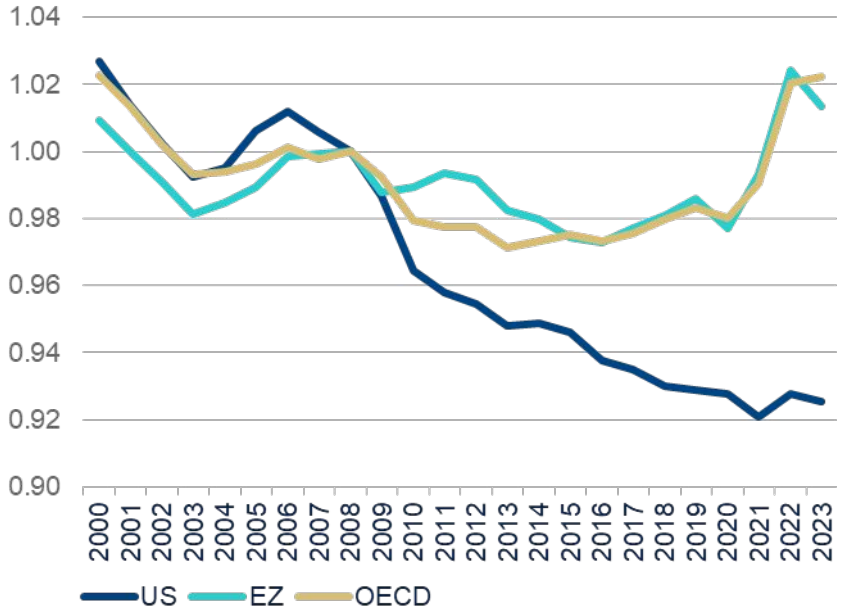


Source: Eurostat

Investment prices have trended very differently across countries; declines in the US contrast with the price evolution in other regions

GFKF PRICE: US, EZ, OECD

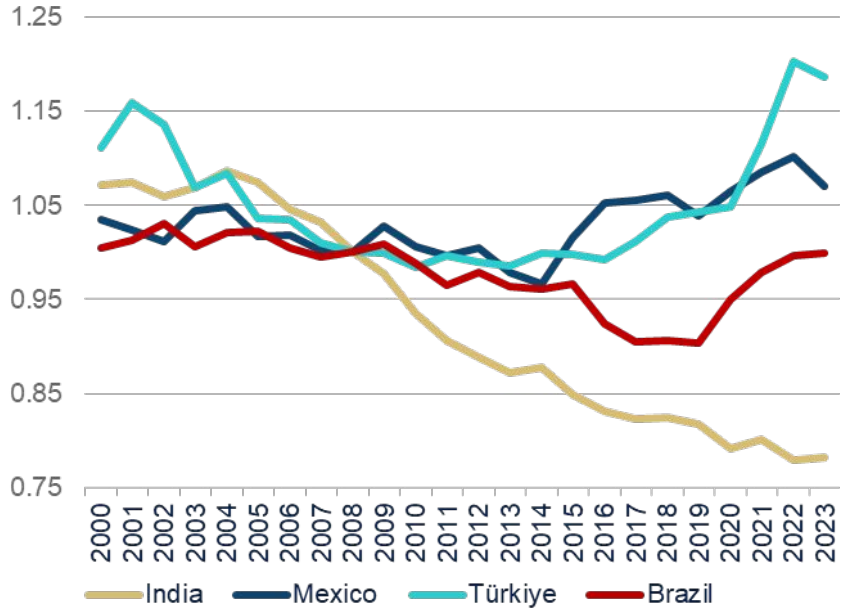
(GFKF IMPLICIT DEFLATOR / GDP IMPLICIT DEFLATOR; 2008=1)



Source: OECD.

GFKF PRICE: INDIA, MEXICO, TÜRKIYE AND BRAZIL

(GFKF IMPLICIT DEFLATOR / GDP IMPLICIT DEFLATOR; 2008=1)

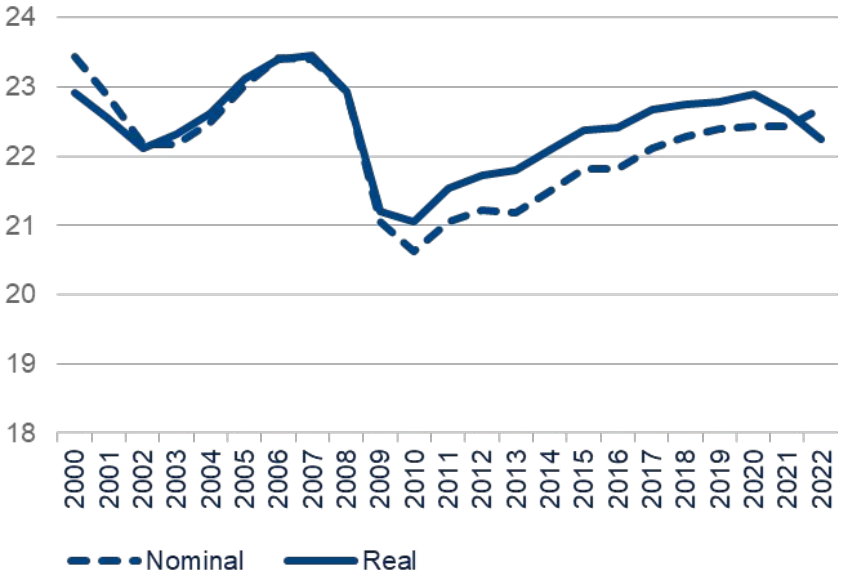


Source: OECD.

The focus on real term measures, which strip out price effects, suggest a stronger investment performance in the US, and weaker in other DMs

REAL AND NOMINAL GROSS FIXED CAPITAL FORMATION: OECD (*)

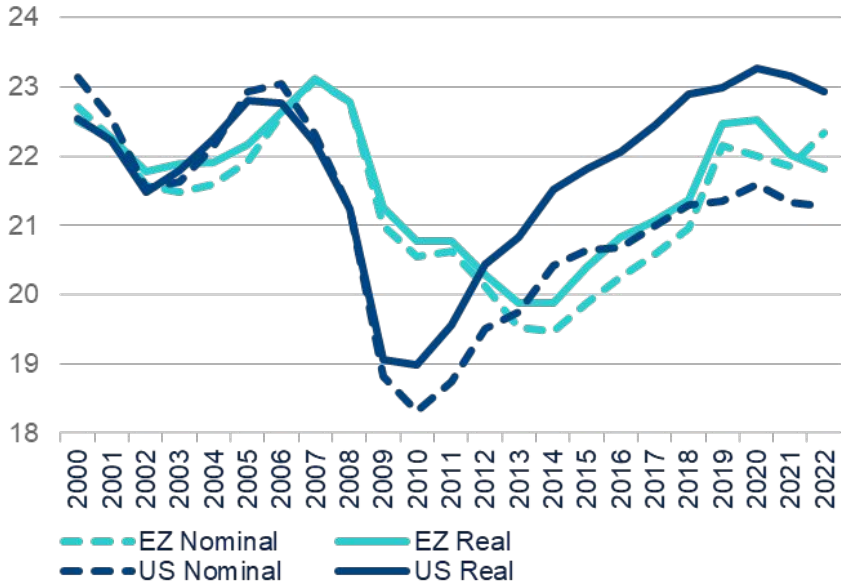
(SHARE OF GDP)



(*) Real GFKF: calculated using GDP and GFKF in real terms, using 2008 as reference year.. Nominal GFKF: calculated using GDP and GFKF in current local currency.
Source:OECD.

REAL AND NOMINAL GROSS FIXED CAPITAL FORMATION: US AND EZ (*)

(SHARE OF GDP)

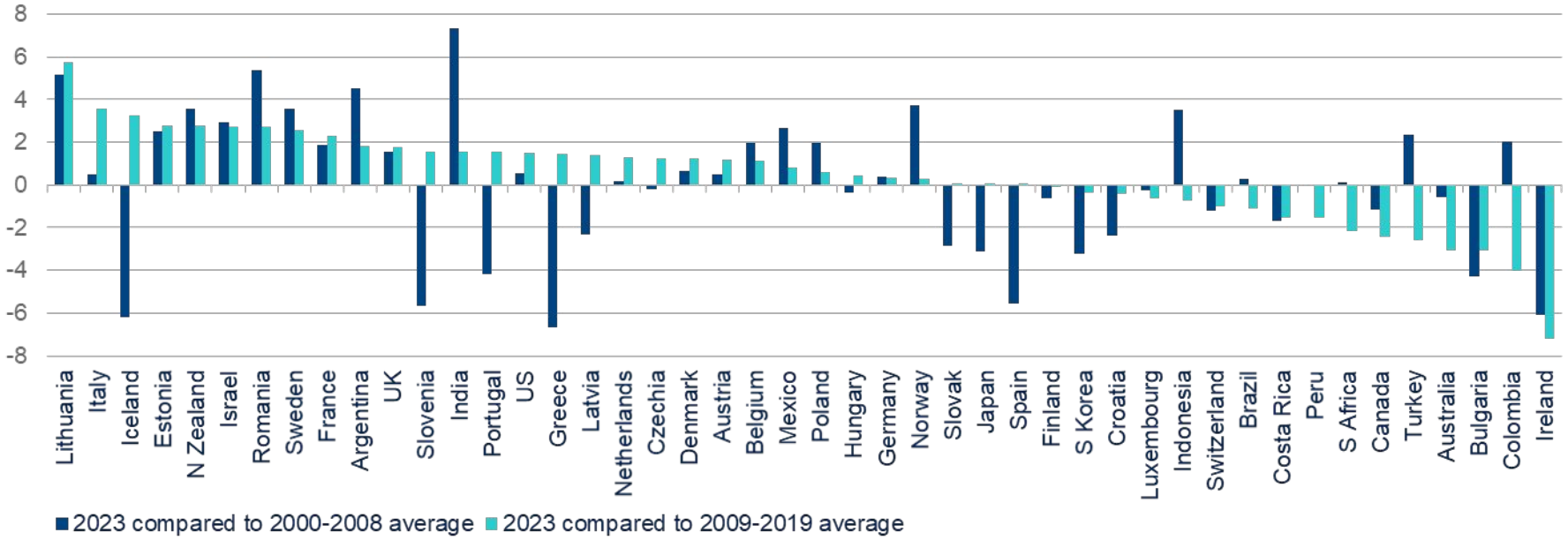


(*) Real GFKF: calculated using GDP and GFKF in real terms, using 2008 as reference year.. Nominal GFKF: calculated using GDP and GFKF in current local currency.
Source:OECD.

Real GFKF (OECD data): strength in the US and some European countries (FRA, SWE, ITA, UK) contrast with weakness in most EMs and Spain

REAL GROSS FIXED CAPITAL FORMATION (*)

(CHANGE IN INVESTMENT AS SHARE OF GDP BETWEEN 2023 AND SELECTED PERIODS)

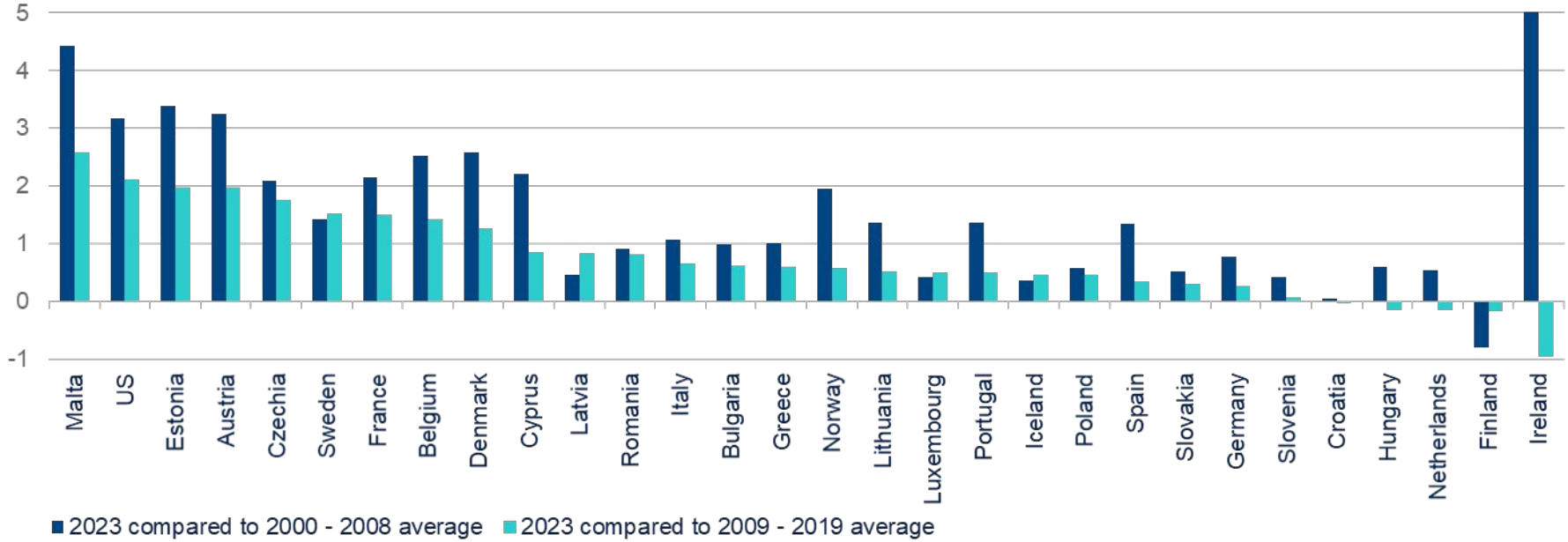


(*) Ratio of total residential investment in constant local currency and GDP in constant local currency.
Source: OECD.

Real GFKF (BEA/Eurostat data): a generalized growth in intellectual property investment over the last few decades in Europe and in the US

REAL GROSS FIXED CAPITAL FORMATION: INTELLECTUAL PROPERTY (*)

(CHANGE IN INVESTMENT AS SHARE OF GDP BETWEEN 2023 AND SELECTED PERIODS)

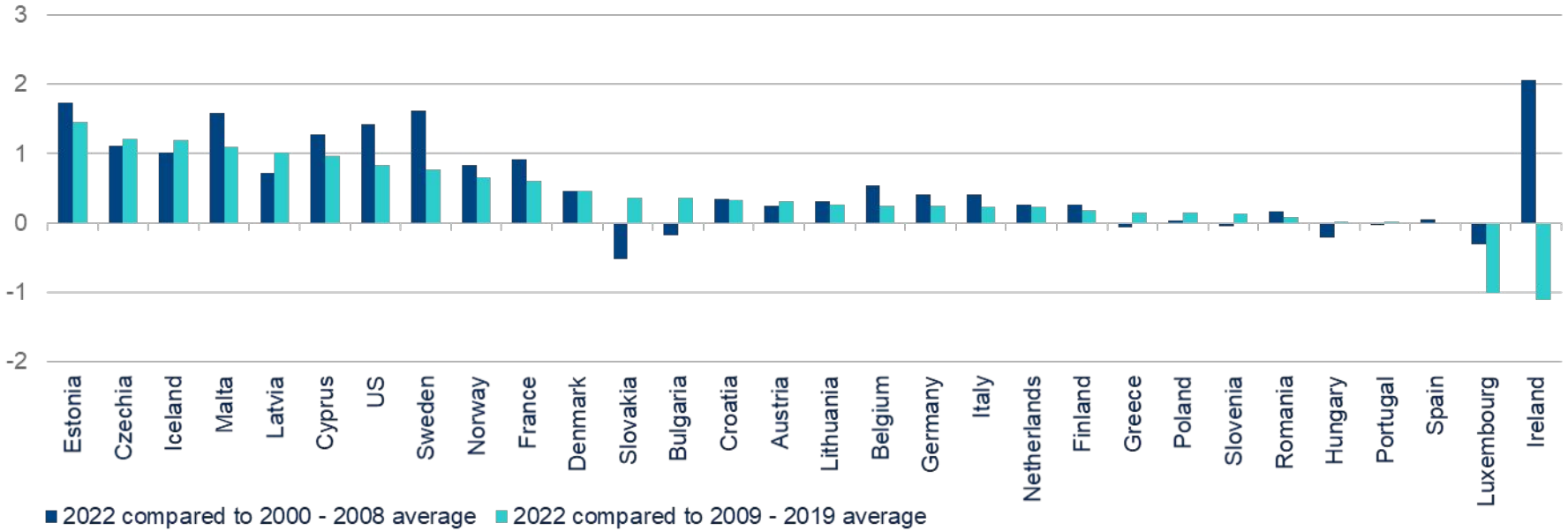


(*) Ratio of intellectual property investment in constant local currency and GDP in constant local currency..
Source: Eurostat and BEA.

Real GFKF (BEA/Eurostat data): ICT investment has also expanded significantly in the US and most European countries, but not in Spain

REAL GROSS FIXED CAPITAL FORMATION: INFORMATION AND COMMUNICATION (*)

(CHANGE IN INVESTMENT AS SHARE OF GDP BETWEEN 2022 AND SELECTED PERIODS (**))

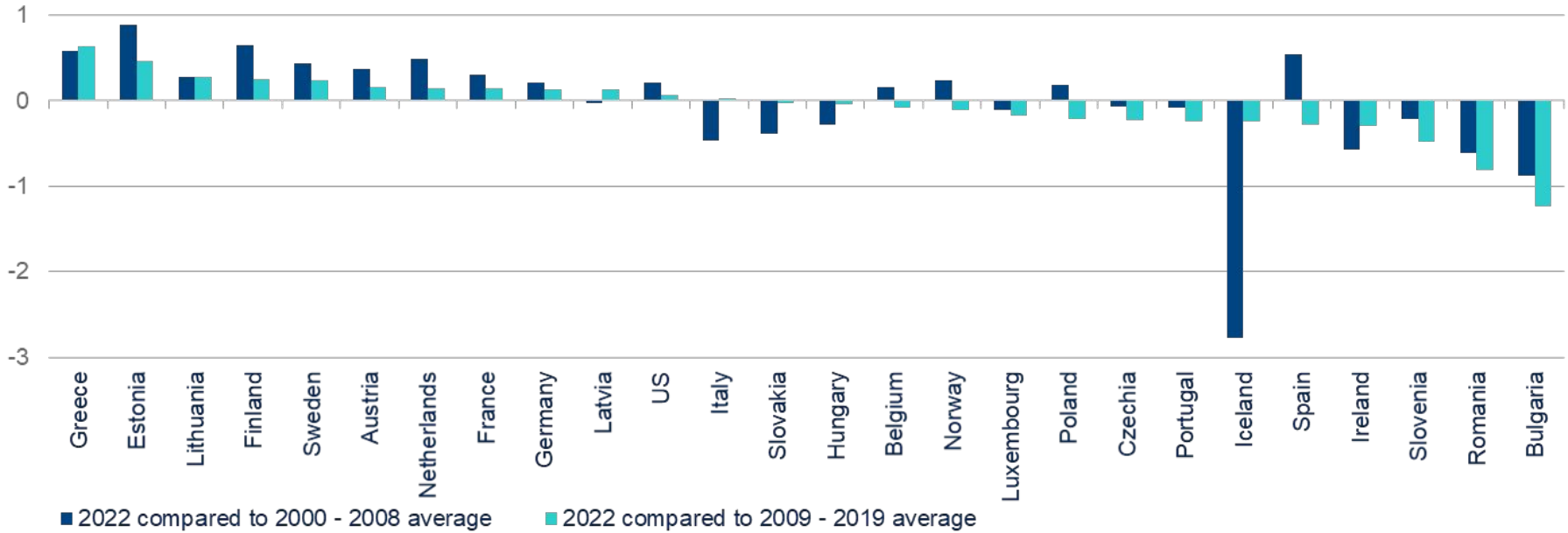


(*) Ratio of ICT investment in constant local currency and GDP in constant local currency.
(**) 2023 rather than 2022 data for Czechia, Italy, Netherlands, Slovakia, Finland, Iceland and Norway.
Source: Eurostat and BEA.

Real GFKF (BEA/Eurostat data): electricity investment (a green investment proxy) has grown in FRA, GER, US and some Northern and Baltic countries

REAL GROSS FIXED CAPITAL FORMATION: ELECTRICITY (*)

(CHANGE IN INVESTMENT AS SHARE OF GDP BETWEEN 2022 AND SELECTED PERIODS (**))

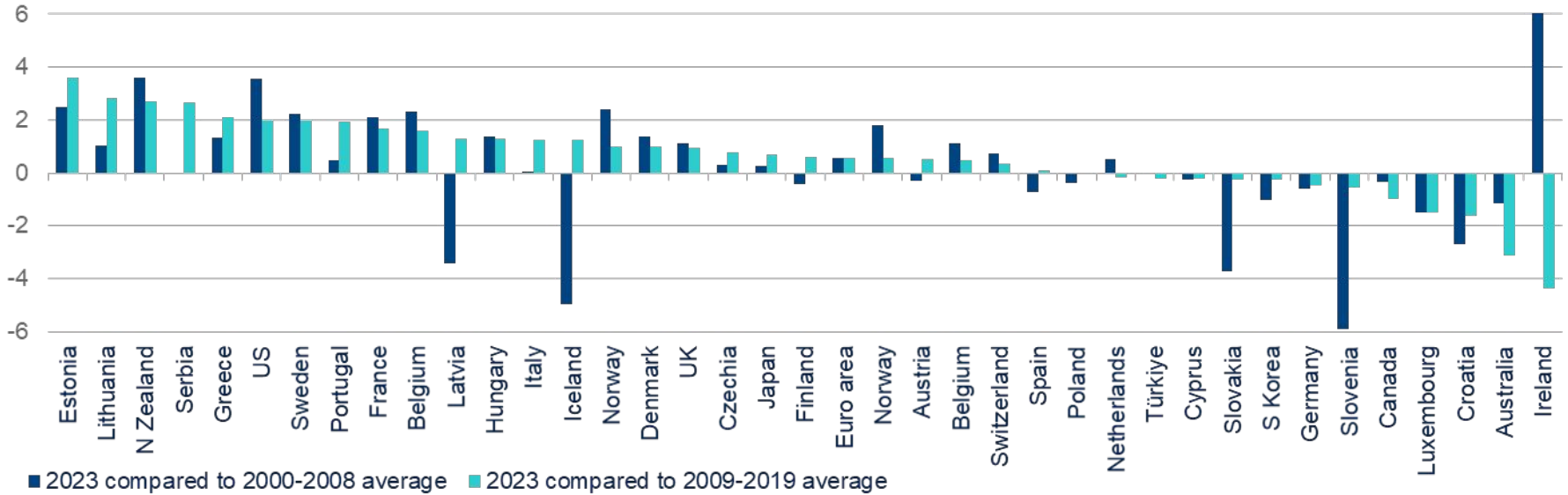


(*) Ratio of electricity investment in constant local currency and GDP in constant local currency.
(**) 2023 rather than 2022 data for Czechia,Slovakia, Finland, Iceland and Norway. 2021 data for Spain and Portugal.
Source: Eurostat and BEA.

Real Business Investment (OECD/Eurostat data): dynamism in the US, SWE, FRA, other European countries; weakness in ESP, TUR, GER, CAN, AUS...

REAL BUSINESS INVESTMENT (*)

(CHANGE IN INVESTMENT AS SHARE OF GDP BETWEEN 2023 AND SELECTED PERIODS)



(*) Ratio of business investment in constant local currency and GDP in constant local currency. Corporate gross fixed capital formation, based on the GFKF deflator, by Eurostat, for European countries. Non-residential private gross fixed capital formation, by OECD, for other OECD countries.2022 data for Estonia, Lithuania, Serbia, Greece, France, Latvia, Hungary, Czechia, Euro Area, Norway, Austria, Belgium, Switzerland, Spain, Poland, Netherlands, Turkyie, Cyprus, Slovenia, Luxembourg, Croatia and Ireland.
Source: OECD and Eurostat.

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03

Business Investment: an accelerator model for the US, Spain, France and Germany

Accelerator model

- Conventional model specification (see Jorgenson and Siebert, 1968; WEO, 2015; IMF, 2018):

$$\frac{I_t}{K_{t-1}} = \gamma + \frac{\alpha}{K_{t-1}} + \sum_{i=1}^{12} \beta_i \Delta \frac{Y_{t-i}}{K_{t-1}} + \epsilon_t \qquad (1)$$

  where I□, K□ and ΔY□ denote business investment, business capital stock and real GDP growth, respectively.

- This model hold that business invest more when the economy grows faster.
- The inclusion of many lags can be associated with, for example, the idea of implementation lags or adjustment costs of investment (ECB, 2018).
- The lagged capital stock has typically been used as a “de-trending” variable.
- Parameters γ, α and β_i with i in {1,...,12}, in equation (1), are estimated using quarterly data ranging from 2000-Q1 to 2024-Q1.
- Two dummy variables are included to account for Covid-19 extreme movements observed in 2020-Q2 and 2020-Q3, moreover, output growth is treated as an outlier in these quarters.

Accelerator model: augmented with macro and financial factors

ACCELERATOR MODEL: ESTIMATED COEFFICIENTS

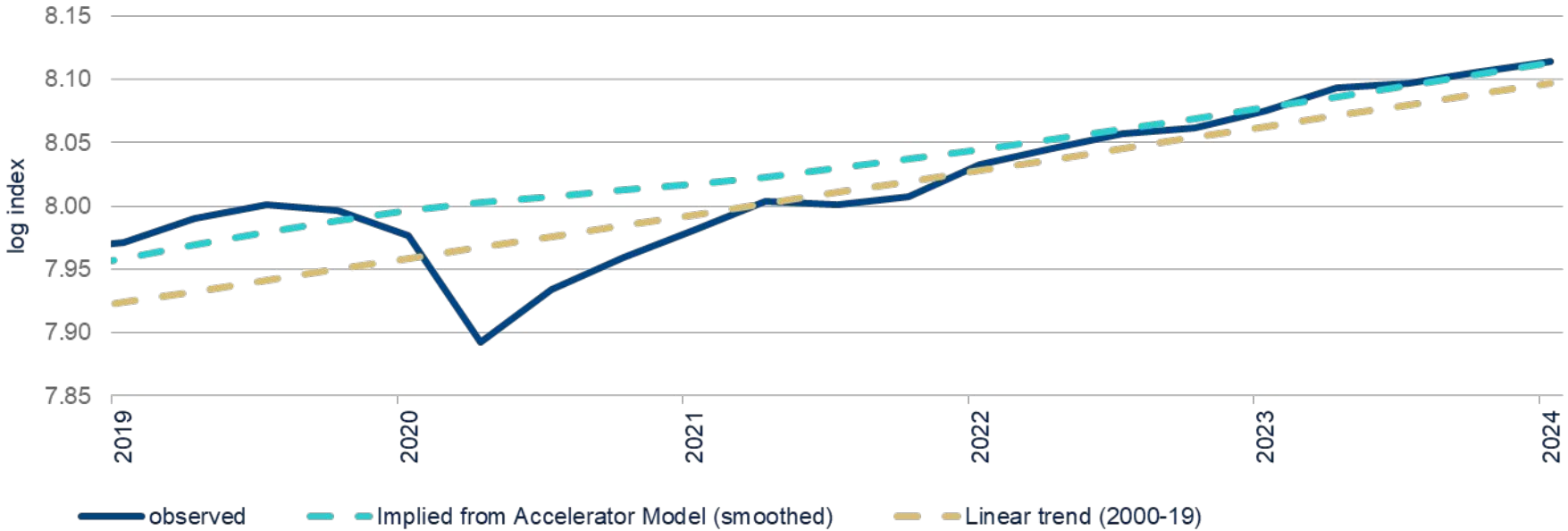
	US		Spain		France		Germany	
	Benchmark	Extended	Benchmark	Extended	Benchmark	Extended	Benchmark	Extended
γ	1.890 ***	1.817 ***	0.373 ***	0.437 ***	1.231 ***	1.410 ***	0.088 ***	0.148 ***
$\frac{1}{K_{t-1}}$	-11.274 ***	-10.52 ***	5.031 ***	4.080 ***	-8.052 ***	-10.810 ***	10.177 ***	9.122 ***
$\sum_{i=1}^{12} \frac{\Delta Y_{t-i}}{K_{t-1}}$	0.237 ***	0.148 ***	0.195 ***	0.065 ***	0.175 ***	0.131 ***	0.095 ***	0.059 *
D 20Q2	-0.010 ***	-0.008 ***	0.001	-0.009 ***	-0.008 ***	-0.010 ***	-0.002	-0.002
D 20Q3	-0.006 *	-0.006 *	0.030 ***	0.012 ***	0.012 ***	0.009 ***	0.006 **	0.005 **
Risk aversion		-0.004 *						
Expectations		4.05E-04 *		0.003 ***		0.009 ***		0.002 *
Lending conditions		0.001 ***						
Uncertainty								-1.41E-04 *
BIC	-786.26	-818.98	-694.77	-841.61	-803.37	-870.3	-853.21	-872.66

Note: Signif. Codes: *** for p-value < 1%, ** for p-value < 5% and * for p-value < 10%. We report the sum of coefficients of GDP growth lags. Regarding the drivers, risk aversion is proxied by the High Yield Corporate Spread; Expectations are proxied by the Business Conditions Expected During the Next Year (University of Michigan) for US and the Expected Demand (services sector) over next three months (European Commission) for Spain and France, while Expected Sentiment Indicator is used for Germany; Uncertainty is proxied by the News-Based Economic Policy Uncertainty Index; finally, Lending Conditions is proxied by the Tightening of Lending Standards index (as higher the index, the stronger the demand)..

- Model (1) is augmented with macro and financial variables to assess their impact on business investment.
- The left-hand side table shows the estimated parameter coefficients.
- In general, augmenting the model with expectations/uncertainty results in a better model specification.
- Risk aversion and lending conditions seems to improve the explanatory power of the accelerator model for US.
- Other variables such as real exports, policy rates, inflation, financial uncertainty do not seem to improve the estimation; however, relative price of investment slightly improves the fit for US.

U.S. business investment is in line with the accelerator model in the aftermath of the covid-19 crisis

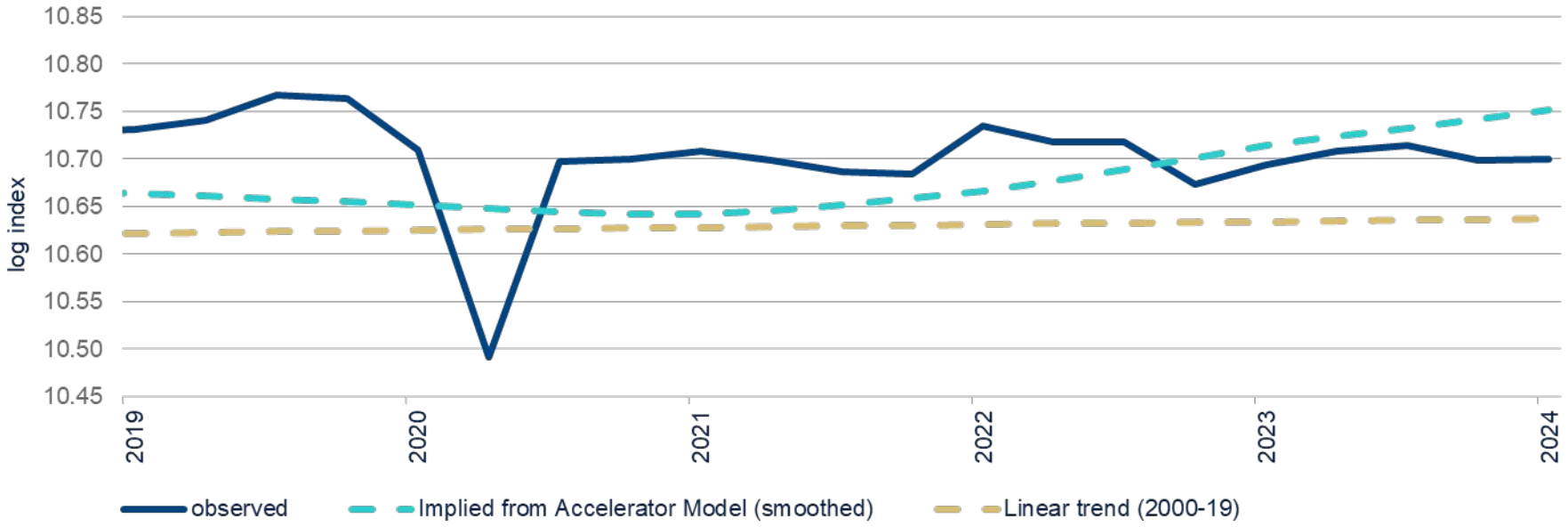
US: REAL BUSINESS INVESTMENT VS. BENCHMARK ACCELERATOR MODEL



Note: US BI is corresponds to real private nonresidential investment from the Bureau of Economic Analysis.
Source: BBVA Research.

In 2023, Spanish business investment has been lower than suggested by output growth

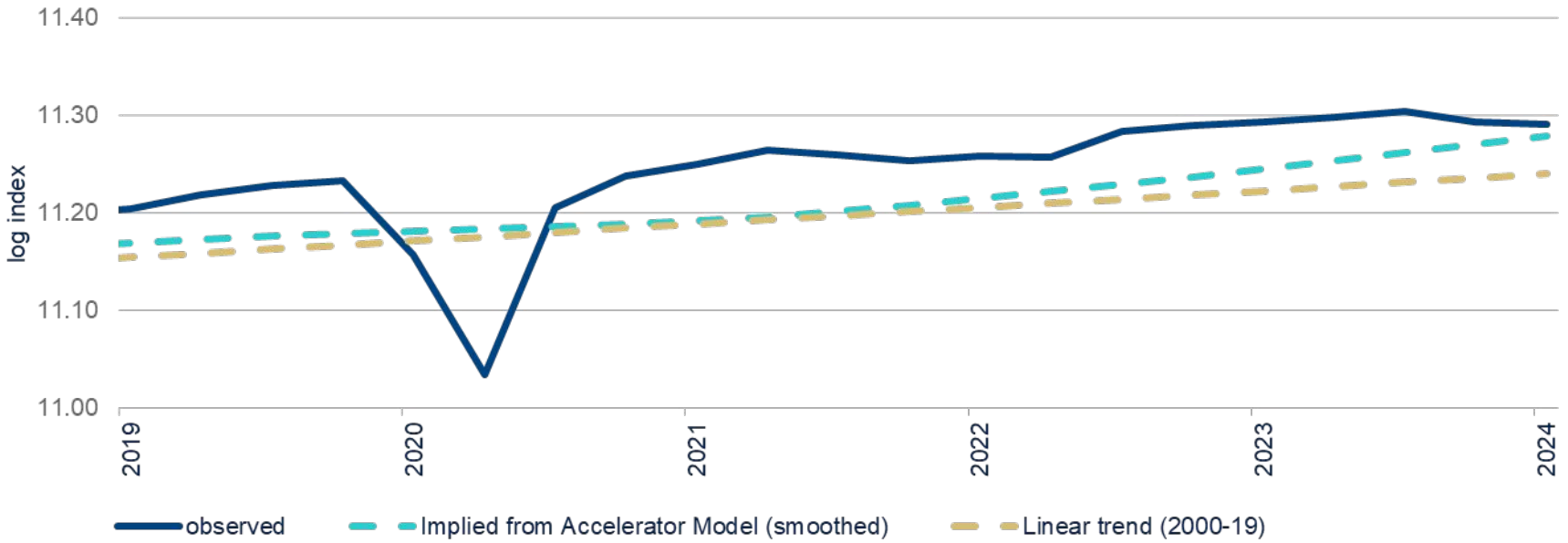
SPAIN: REAL BUSINESS INVESTMENT VS. BENCHMARK ACCELERATOR MODEL



Note: Spanish BI is approximated by GFCF excluding residential construction.
Source: BBVA Research.

In 2023, French real business investment is clearly above the level implied by the accelerator model

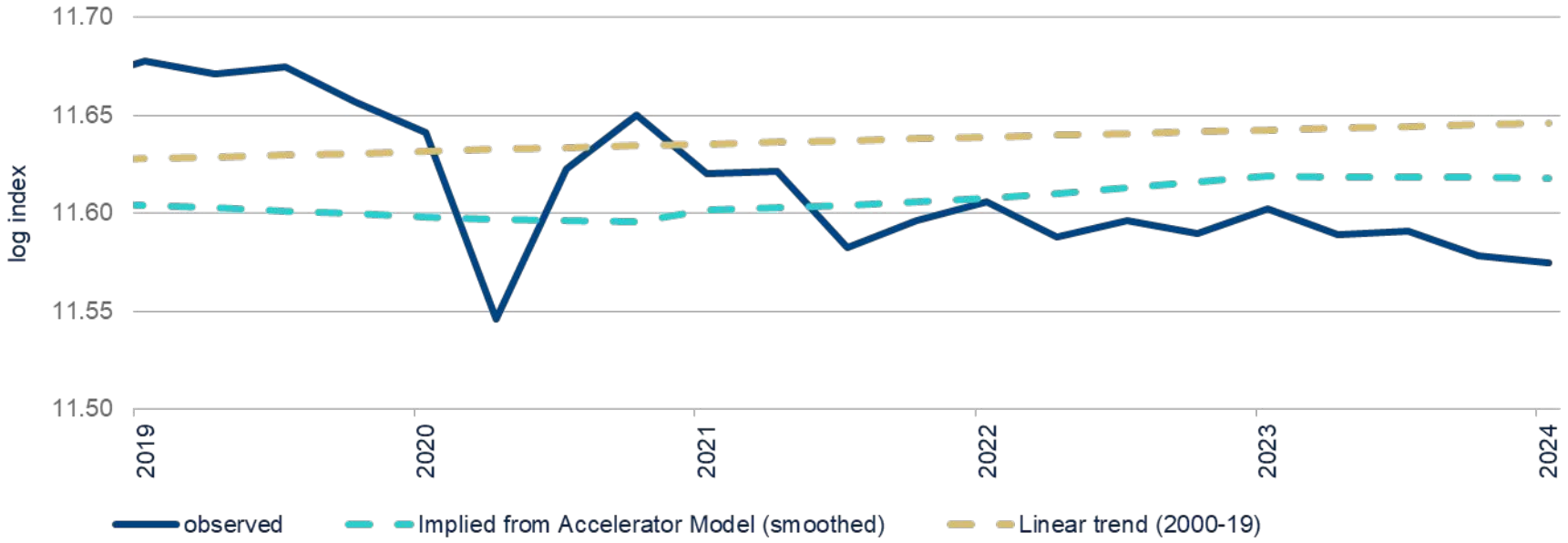
FRANCE: REAL BUSINESS INVESTMENT VS. BENCHMARK ACCELERATOR MODEL



Note: French BI is approximated by the sum of private financial and non-financial investment.
Source: BBVA Research

In 2023, German business investment has been lower than suggested by output growth according to the accelerator model

GERMANY: REAL BUSINESS INVESTMENT VS. BENCHMARK ACCELERATOR MODEL



Note: German BI is approximated by the GFCF excluding dwellings.
Source: BBVA Research.

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04

Investment: a panel model

A panel model for investment using OECD data

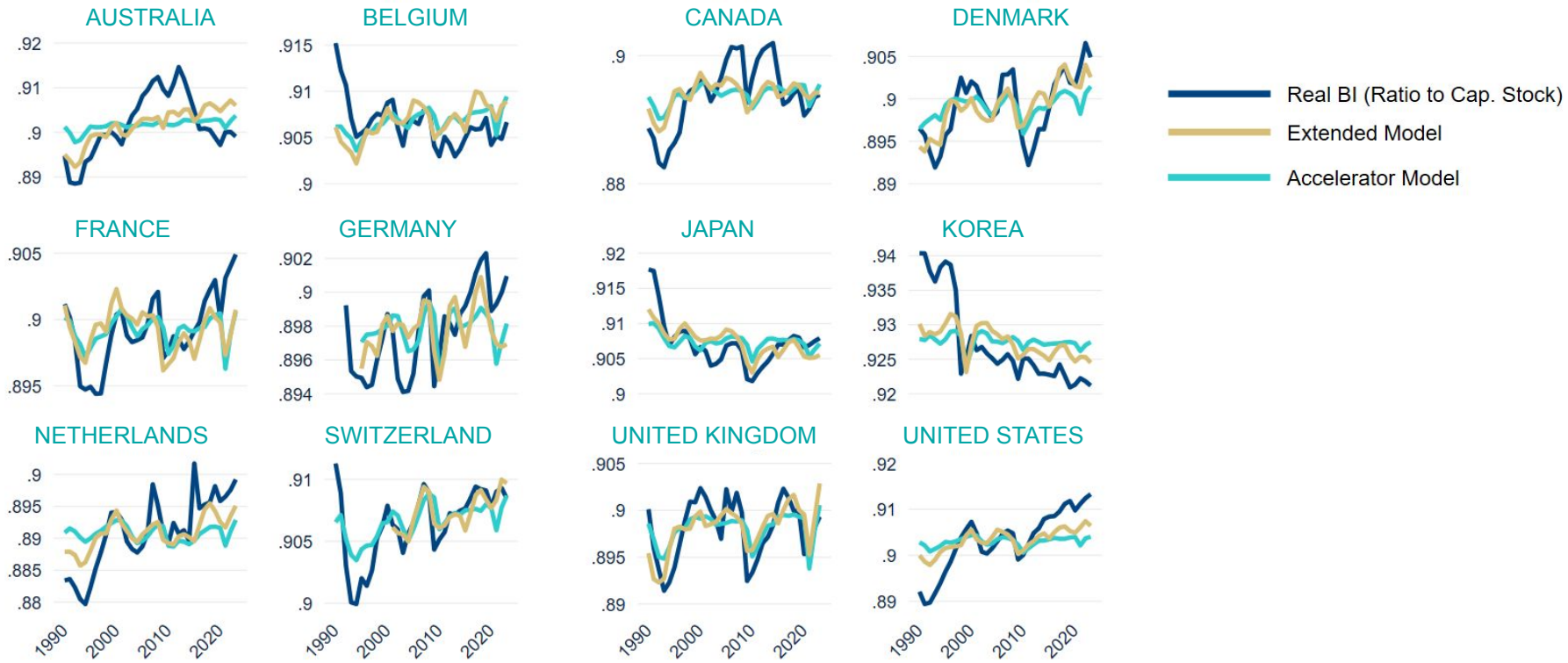
- A panel model with annual data from 1990 to 2023 using OECD data. We consider two different dependent variables: Business Investment and GFKF.
- A “pure” accelerator model (based only on GDP growth as independent variable) and an “extended” accelerator model (where other independent variables are included) are estimated, both for real GFKF (37 countries) and real Business Investment (17 countries).
- For the extended model we run a code that test different variables and different specifications to find the best potential drivers of investment: We consider a set of different variables and transformations such as Energy Commodity prices, Non-Energy Commodity prices, Relative price of investment (vs GDP Deflator), BAA Spread, Rule of Law, Regulatory Quality, Government Efficiency, Population Growth, Median Age, Old Dependency Ratio, Credit Gap, Short-term interest rate, US 10-year Treasury rate.
- Both dependent and independent variables are expressed as ratios to the lagged capital stock.

A panel model for investment using OECD data: estimated parameters

	Real BI (Accelerator)	Real BI (Extended Model)	Real GFCF (Accelerator)	Real GFCF (Extended Model)
1/Stock (t-1)	-3.0733*** (0.000)	-1.5492 (0.191)	-1.8792*** (0.000)	-1.2034*** (0.000)
GDP (t-1)	1.2291*** (0.000)	1.6823*** (0.000)	0.8154*** (0.000)	1.0195*** (0.000)
GDP (t-2)	0.9912*** (0.000)	1.585*** (0.000)	0.6271*** (0.000)	0.8292*** (0.000)
GDP (t-3)	0.492*** (0.000)	0.5954*** (0.000)	0.4748*** (0.000)	0.2734*** (0.000)
Energy Prices		0.0669*** (0.000)		0.368*** (0.000)
Non-Energy Prices				0.1087*** (0.000)
Relative Price Investment		-0.0186*** (0.001)		
Short-term Interest Rate		-0.0079*** (0.001)		
Credit Gap (t-1)		0.0008*** (0.005)		
Regulatory Quality				0.0543*** (0.000)
Median Age				-0.0153*** (0.000)

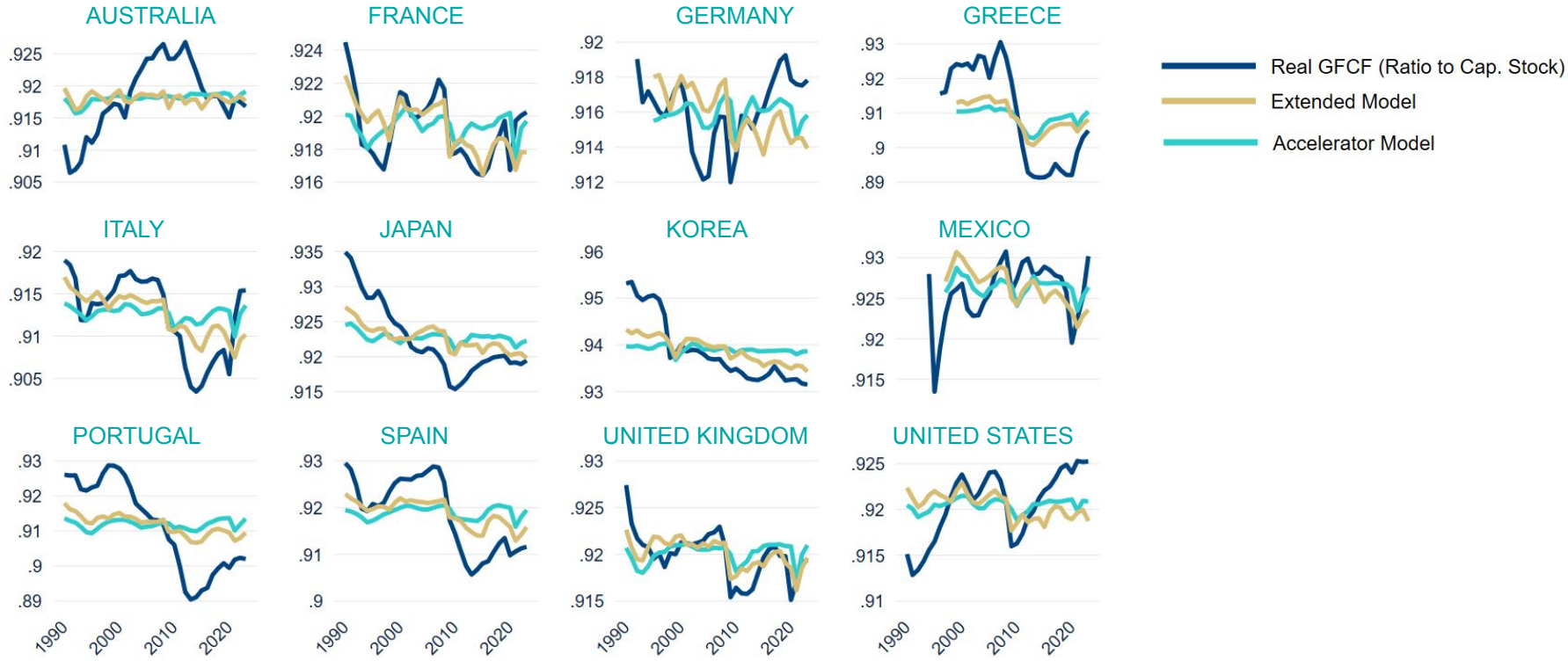
Source: BBVA Research.

A panel model for investment: observed vs. fitted BI data for selected countries



Source: BBVA Research.

A panel model for investment: observed vs. fitted GFKF data for selected countries



Source: BBVA Research.

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05

The potential impact on investment of some ongoing trends:

protectionism and interventionism, climate transition, digitalization and ageing

Climate transition, digitalization and protectionism will create opportunities; impact on investment will depend on productivity gains, public policies...

Protectionism and interventionism	Protectionism and interventionism will create new investment opportunities, at least in main developed countries and their main allies, but could reduce FDI flows, efficiency gains and incentives to innovate.
AI and digitalization	AI and digitalization are likely to drive investment up; the magnitude of related fixed capital spending ahead will depend on productivity gains, capital cost, public policies... AI expansion will also increase the demand for renewable energy (which is an opportunity for countries not in the AI frontier)
Climate transition	Climate transition has mixed effects on investment; its overall impact will likely be positive, as investment spending will likely increase to satisfy clean energy needs and guarantee production resilience in a context of more frequent climate shocks; policy uncertainty is still high.
Demographics	Ageing is expected to drive investment down as it reduces population growth (labor supply) and increases the share of elderly people, which seem to have lower investment needs in comparison to younger cohorts.

Major policy measures by the three largest economic blocks include protectionist, climate and digitalization approaches

China

2015: **Made in China 2025** ✓✓✓

Increase competitiveness and market share of the Chinese manufacturing and reduce reliance on foreign goods. Includes goals for environmental sustainability, green manufacturing and to promote a *digitalized*, *networkized*, and *intelligentized* manufacturing industry.

✓ ***Protectionist policies***
✓ ***Climate policies***
✓ ***Digitalization policies***

United States

2017: **America First policy** ✓
Protect domestic companies & labour market

2018: **Foreign Investment Risk Review Modernization Act** ✓✓
Monitor inbound investments and outbound technology transfers

2021: **Infrastructure, Investment and Jobs Acts** ✓✓
Fund infrastructure projects.

2022: **Chips and Science Act** ✓✓✓
Strengthen domestic semiconductor manufacturing, design and research

2022: **Inflation Reduction Act (IRA)** ✓✓
Spur domestic innovation and production in batteries, electric vehicles, and renewable tech

European Union

2018: **Strategic Plan for Batteries** ✓✓
Achieve autonomy and global leadership across the battery value chain

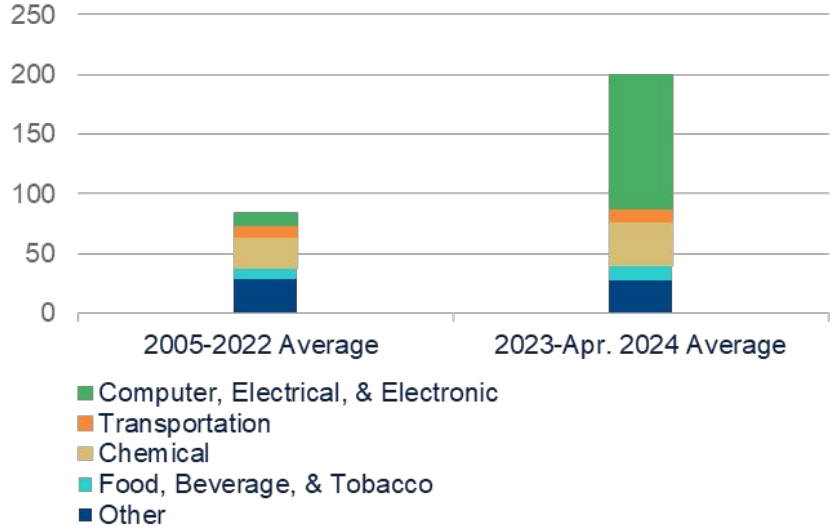
2020: **EU Industrial Strategy** ✓✓✓
Drive the transformation to a more sustainable, digital, resilient and globally competitive economy

2023: **European Chips Act** ✓✓✓
Bolster competitiveness and resilience in semiconductor technologies and applications, and help achieve digital and green transition

2023: **Net-Zero Industry Act** ✓✓
Strengthening Europe's net-zero technology products manufacturing ecosystem

Protectionism and interventionism may boost investment in protected sectors, but reduce FDI flows, efficiency gains and innovation incentives

US REAL MANUFACTURING CONSTRUCTION SPENDING BY TYPE
(BILLIONS OF 2022 USD)

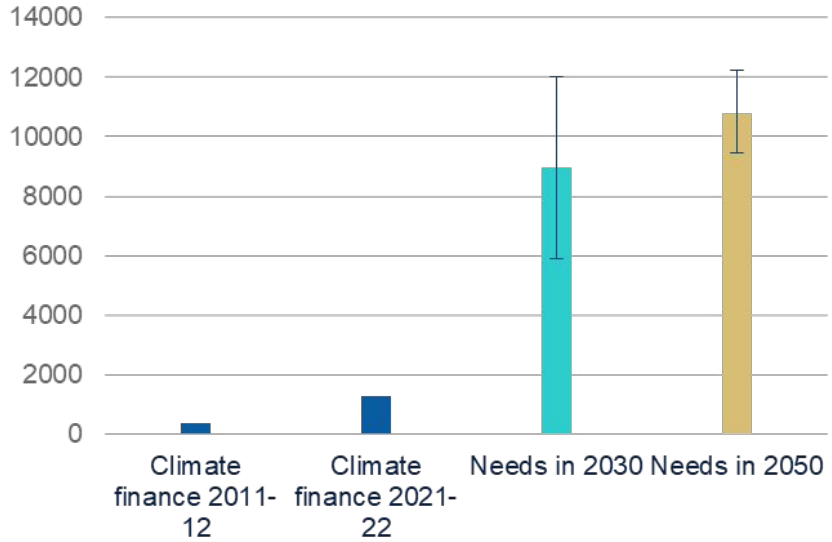


Notes: The value of Private Construction Put in Place for Manufacturing, US Census Bureau decomposed by Detailed Type. Monthly at seasonally adjusted, annualized rate. Nominal spending deflated by the Producer Price Index for Intermediate Demand Materials and Components for Construction, Bureau of Labor Statistics.
Source: BBBVA Research from US Department of the Treasury

- Government subsidies, incentives to export and protective measures on importations can lower production costs and shield domestic firms from foreign competition, fostering investment in export-oriented industries and protected sectors. (potential impact: +)
- Tariffs and other non-tariff measures can affect the firms' competitiveness abroad, affecting its investment in production capacity aimed at foreign markets. (potential impact: -)
- Prolonged protection can reduce the incentives for domestic firms to innovate and improve efficiency (potential impact: -)
- Protectionist policies can create economic uncertainty, deterring long-term investment decisions. (potential impact: -)

Climate change policies require significant investment

WORLD. CLIMATE FINANCE. GLOBAL TRACKING AND AVERAGE ESTIMATED ANNUAL NEEDS(*)
(USD BILLION)

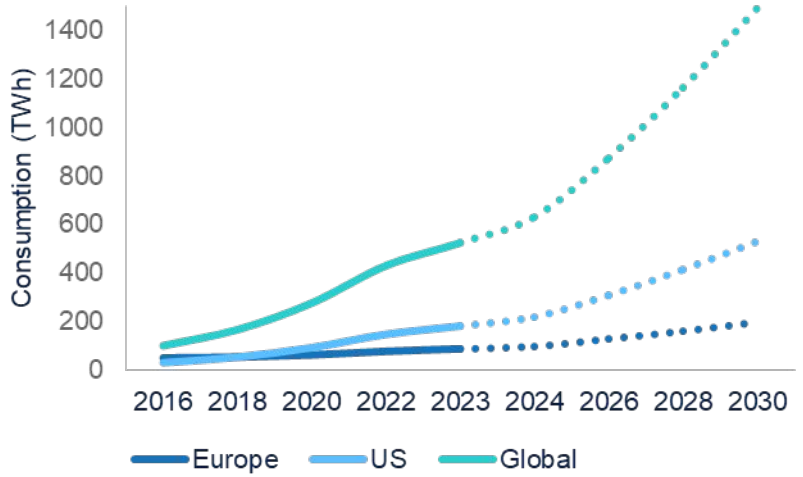


(*) Direct investments in climate-specific physical assets and excludes transition-related unabated fossil fuel finance. Estimates are based on secondary data collected from over 15 sectoral scenarios (see Methodology document for detail). Climate finance needs for 2023-2050 are expressed in 2022 USD to ensure comparability of estimates from several different scenarios.
Source: BBVA Research from Global Landscape of Climate Finance 2023

- Increased frequency and severity of extreme weather events can damage infrastructure, requiring significant investment in repairs and rebuilding. (potential impact: +)
- To mitigate impacts, countries may need to invest in adaptive infrastructure (e.g. flood defenses, new agricultural systems). (potential impact: +)
- Climate change can lead to resource scarcity, requiring investment in technologies and infrastructure to manage and utilize resources more efficiently. (potential impact: +)
- Favoring clean energy projects that “may” raise net investment demand. (potential impact: +)
- Growing restrictions to “dirty” energies would reduce investments in the sector and raise the price of overall energy, which would contract investment demand. (potential impact: -)

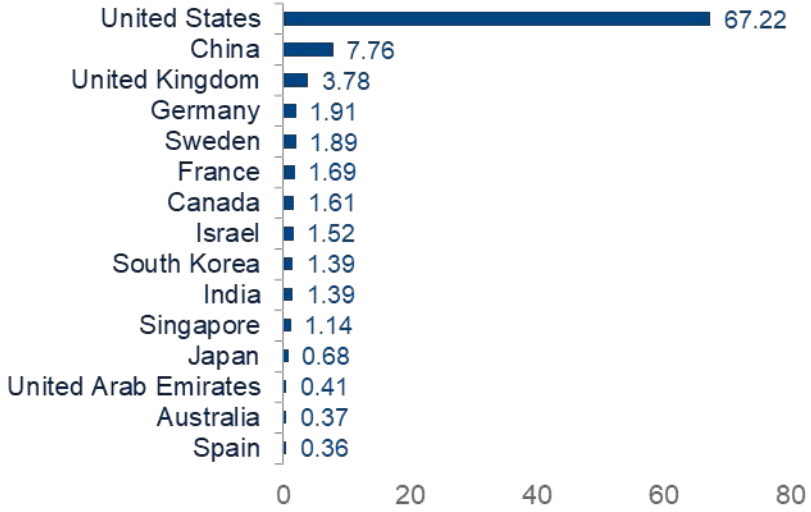
Digitalization and Artificial Intelligence are likely to drive investment up

DATA CENTER ELECTRICITY CONSUMPTION
(TWH)



Source: BBVA Research from Jefferies, 2024.

PRIVATE INVESTMENT IN AI BY COUNTRY, 2023
(USD BILLION)



Source: BBVA Research from AI Index Report, 2024.

- Digitalization and IA require high investment to upgrade networks to support data traffic, increase the space and energy for data centers, buy AI licences, and in research and development (potential impact: +)
- Investments in IA might cause a crowding out of investment in other sectors (potential impact: -)

Unfavorable demographics are likely to weigh negatively on investment

ESTIMATION OF DEMOGRAPHICS CONTRIBUTION TO INVESTMENT GROWTH IN THE US (*)
(5-YEAR MOVING AVERAGE)

(*) Based on estimations of the impact of changes in the working-age population on annual investment, controlling for a set of variables (fiscal impulse, real interest rates and the change in oil prices.
Source: BBVA Research.

- Our estimations suggest that ageing weakens investment and GDP growth (see graph)
- Investment seems to be driven down by: i) lower growth of the working-age population; ii) a lower share of young people (0 to 39 years old) in total population; iii) a higher share of elders (65 years old or more).
- These results are in line with the literature showing a negative impact on growth of lower labor supply and smaller fertility. (potential impact: -)
- Still, the ageing impact on investment is not obvious; the aforementioned negative impacts could be offset by factors such as higher public investment on elders (who represent an increasing share of the voters) or the incentives that ageing creates to increase automation. (potential impact: +)

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