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Green finance: market adaptation and green innovation

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Long version of a panel presentation at the United Nations University World Institute for Development Economics Research (UNU-WIDER) and the Bank of Finland Institute for Emerging Economies (BOFIT) conference on Debt and innovative finance in developing countries.

Helsinki, Finland, 27 October 2022

Introduction

In this presentation, we discuss the relative importance of green finance in developing countries and the potential role of green finance in the promotion of green innovation.

Key points:

- The bulk of green finance in developing countries is driven by scale and remains highly concentrated in terms of sectors and geographies.
- The impact of Development Finance Institutions and international climate mitigation initiatives remains systemic for the diffusion of green finance products.
- Green finance has a role to play but a broader policy mix is needed for the timely development of green innovation.

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Market adaptation of Green Finance

- Green finance has experienced significant growth over the past decade from a low base. However, it remains a small part of overall financing activity dominated by green bond issuance and only 6% of total issuance amounts in ODA-recipient countries.
- Developing countries differ from advanced economies as the local ecosystem is still more concentrated, with a significant risk premia, and is dominated by the financial sector. Developing countries also face a number of challenges including data disclosure quality, data standards and credibility of ESG scores.
- We observe variation of product mix in emerging markets, green bonds are dominant in China, Indonesia and Poland; social bonds are dominant in Chile; sustainability-bonds are dominant in Malaysia and Peru and sustainability-linked loans are dominant in Russia and Turkey.

➢ Green finance products designed and administrated by Development Finance Institutions benefit from preferred creditor status, longer maturities, smaller size eligibility, higher propensity to consider long term projects and credible impact monitoring.

➢ Low profile activities such as green trade finance and energy efficiency products deserve more attention in the policy discourse.

➢ Green finance adaptation depends on international coordination. Financial interlinkages of institutional sectors within financial networks could result in significant indirect exposure to climate policy shocks and banks may be willing to replace lost capital market funding in the context of increased climate policy risk with increasing cross-border lending.

➢ Liquidity constraints could amplify the adverse impact of tighter financing conditions in the less liquid credit and structured finance markets, including green bonds with higher risk profile (small issuances, unrated).

Facilitating Green Innovation

- Patent activity for low-carbon technologies surged in the first decade of the 21st century, but has slowed significantly since 2013.
- While patenting in the area of low-carbon energy supply has declined, patenting in end-use technologies has remained relatively stable.
- The share of co-invented technologies reveals potential missed opportunities for shared learning.
- The bank lending channel has limited material effect on the development of patented green technologies because banks do not materially contribute to innovation in new technologies.
- To the extent that bond financing is a form of debt and not of equity, purchasing green bonds would also achieve little in the way of stimulating green innovation.

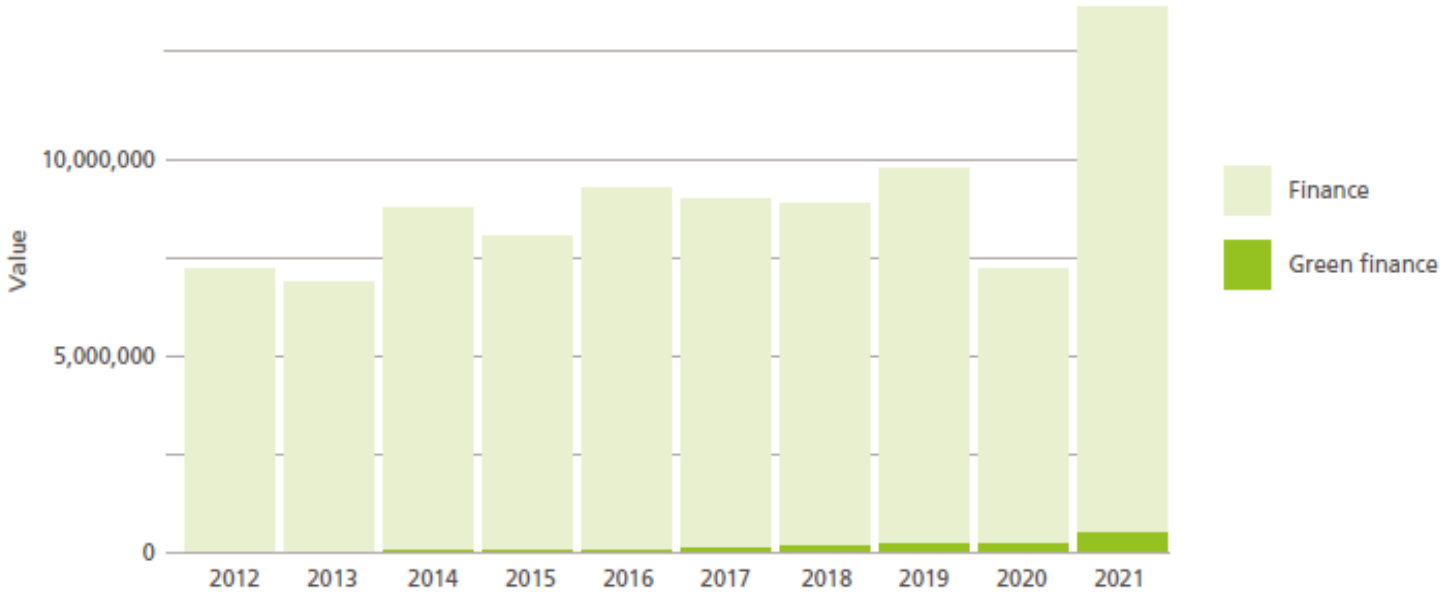
➢ Further support for clean innovation with higher R&D subsidies for green applied science and dedicated risk capital, and accelerated diffusion via investments in the appropriate clean infrastructure assets and effective regulation are required if a zero carbon transition is to be achieved.

➢ Policies that promote clean innovation in high-income countries may not lead to socially optimal emission reduction unless there are additional interventions that support the transfer and deployment of clean technologies elsewhere.

➢ Long-term development finance institutions will boost upstreaming investment capacity and reduce the cost of capital, by sharing and reducing risk.

➢ “Intermediate” or “bridge technologies” may warrant support as long as it does not crowd out support for fully clean alternatives.

Green finance and global financial activities



Green bonds dominated green finance overall, accounting for fully 93.1% of total green finance over 2012-21. (The share of green IPOs and green private equity in total green finance over the same period has been nearly equal, at 3.4% each.)

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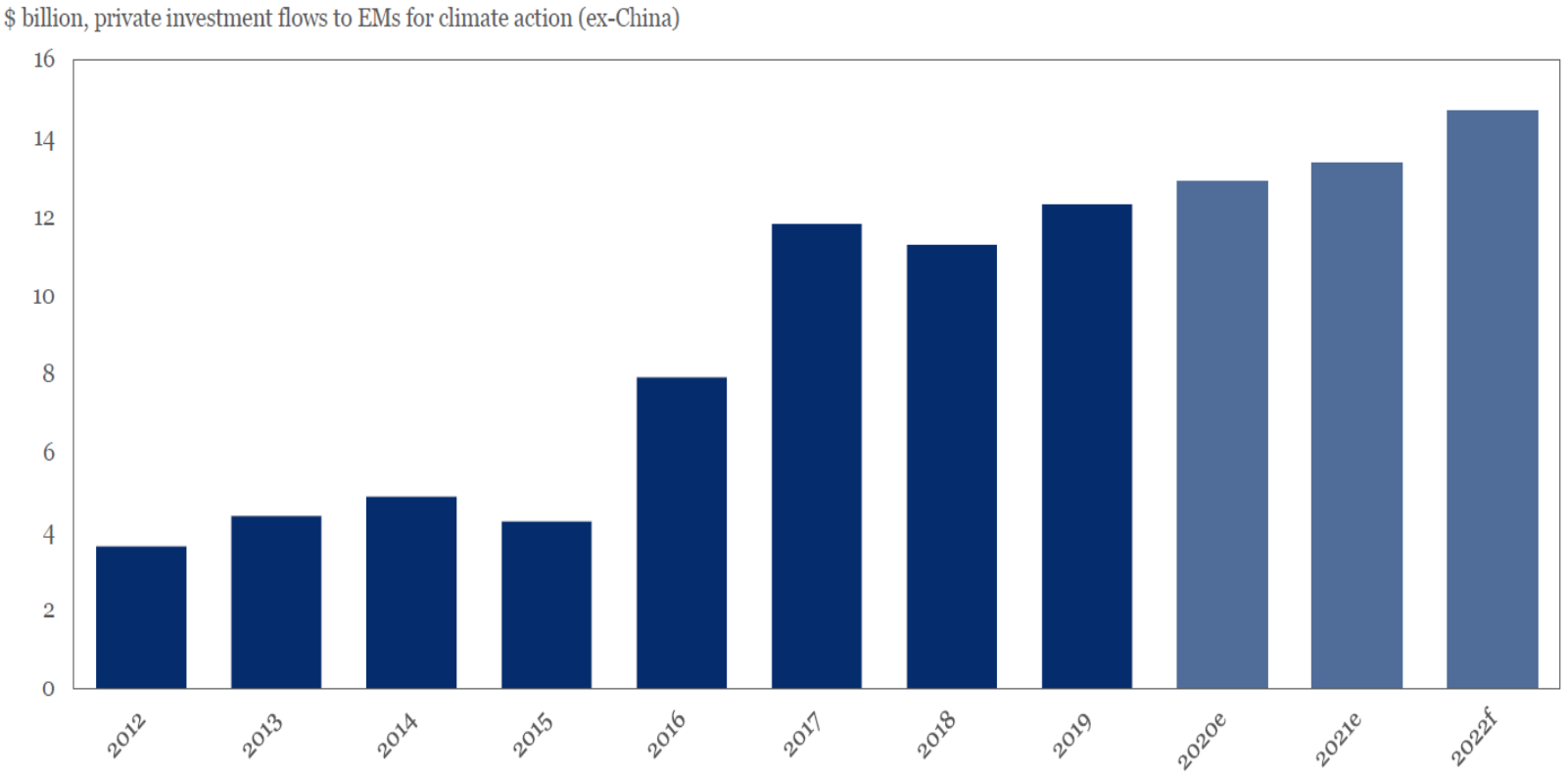
Private climate finance flows to emerging markets are expected to surpass $14 billion in 2022, but still account for only 2% of total EM capital flows



Source: OECD, IIF estimates; see OECD series on the mobilization of private investment for climate change, includes equity and debt investment

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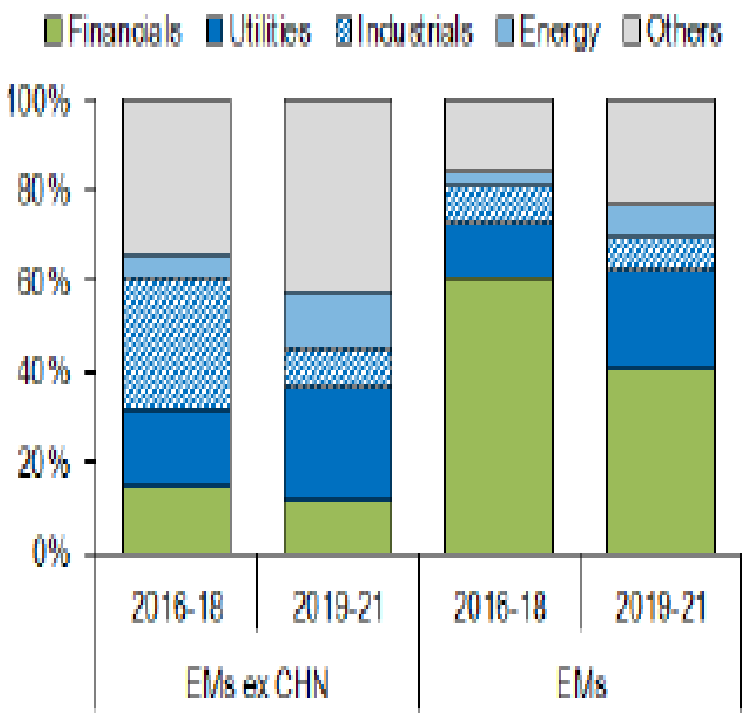
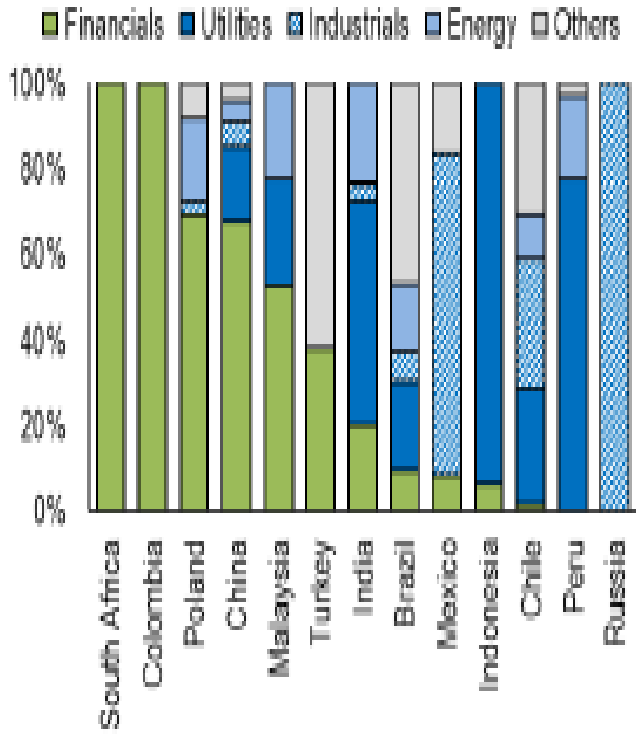
Green Bonds: Split by Economic Sectors and Countries





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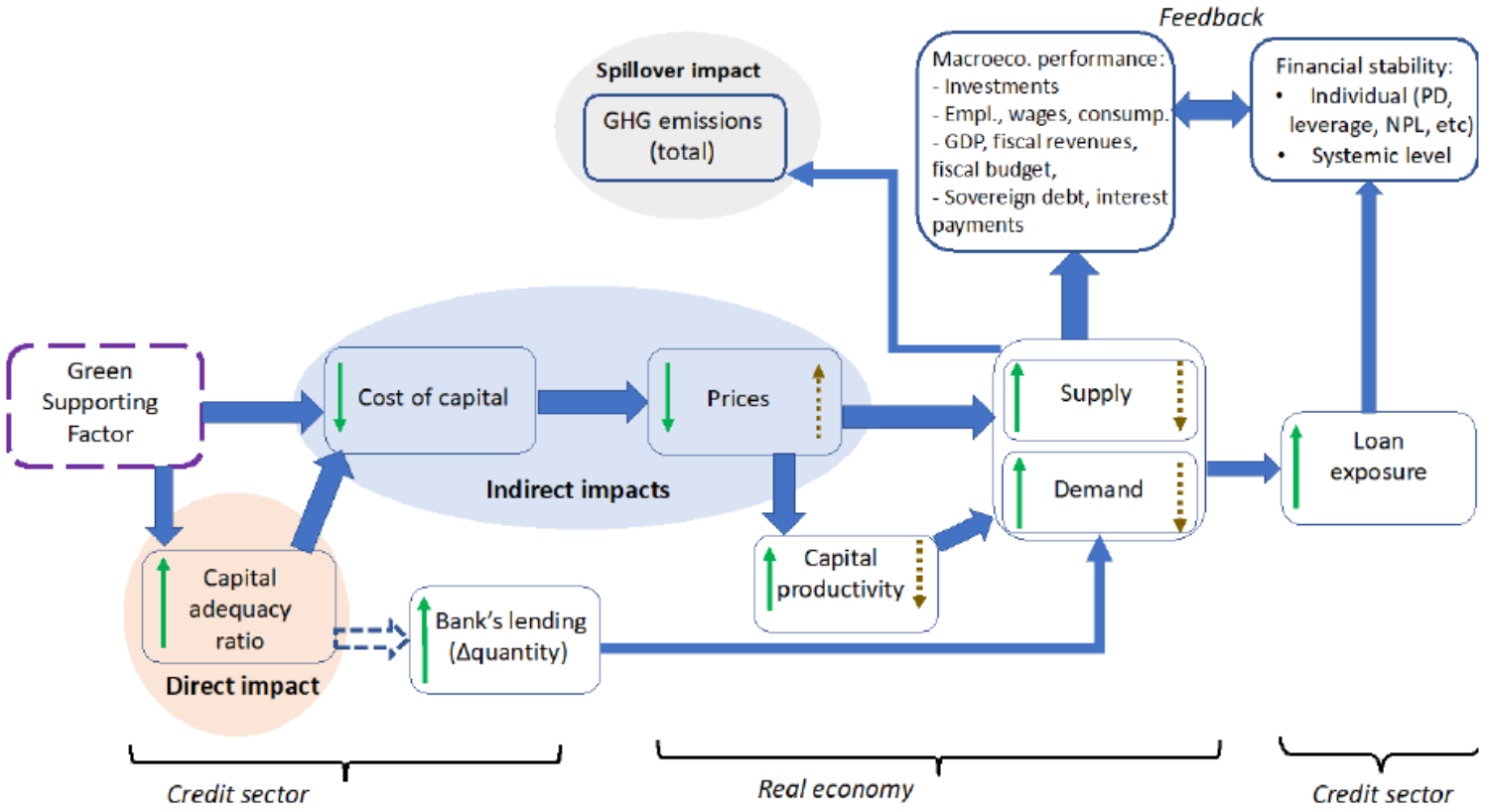
Green finance and the real economy



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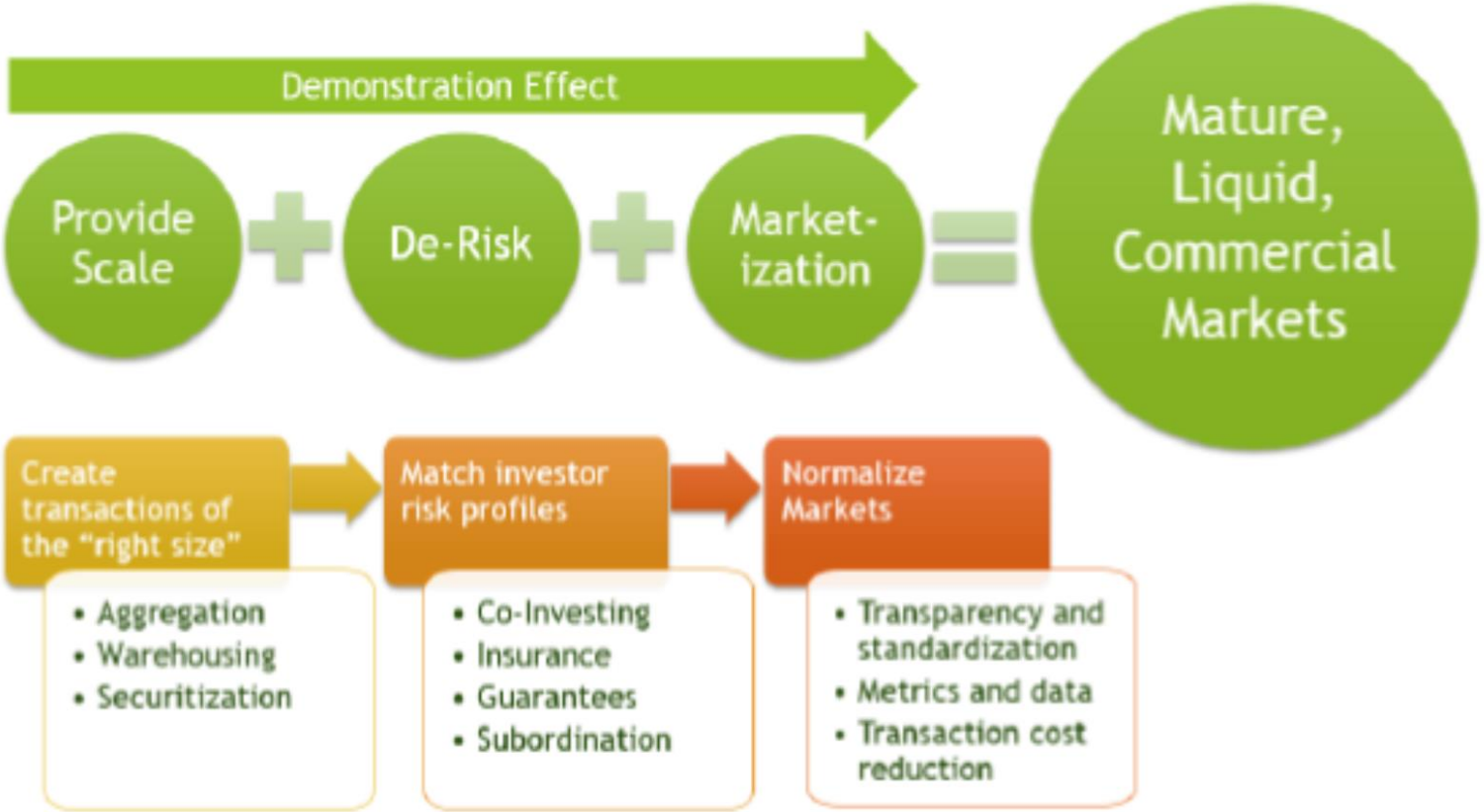
Key Types of Green finance products

Type of Debt	Instruments	Key properties
Fixed income	Green bonds	Specific bonds that are labeled green, with proceeds used for funding new and existing projects with environmental benefits.
	Green money market funds	Apply ESG factors to the investment of money market instruments.
	Social bonds	Bonds that raise funds for new and existing projects that create positive social outcomes.
	Sustainable bonds	Bonds with proceeds that are used to finance or refinance a combination of green and social projects.
	Sustainability-linked bonds	Bonds that use proceeds for pre-defined ESG related KPI, targets, and periodic appraisals.
	Green mortgage-backed securities (MBS)	Green MBS securitize mortgages that go toward financing green properties.
Loans	Green loans	Loans that have proceeds used to finance or refinance green projects, including other related and supporting expenditures such as R&D.
	Sustainability loans	Loan instruments and/or contingent facilities such as guarantees or letters of credit that incentivize the borrower to meet green or social projects.
	Social loans	Loan instruments that are used to finance eligible social projects.
	Sustainability-linked loans	Loan instruments that incentivize the borrower to meet predetermined sustainability performance goals.

The market creation role of DFIs



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Sovereign or quasi sovereign bonds issues by DFIs over 2012-2021

	Number of issuances	Total amount (billion USD)
The World Bank Group	145	16.8
of which		
IBRD	91	9.2
IFC	54	7.6
EIB	120	47.7
KfW	56	51.5
EBRD	53	6.4
AsDB	39	9.3
Other issuers	497	317.6
of which		
International organisations	63	30.9
Local governments	221	72.0
Sovereign-backed institutions	179	94.3
Sovereigns	34	120.4
Total	909	449

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Greenium estimates

	EM	AE	Difference	All
Greenium	-2.70	-5.48*	2.78	-4.77*
Std. err	(3.83)	(2.35)	(4.60)	(1.99)
No. obs	16	47		63
	Sovereign	**Guaranteed**	**Difference**	**All**
Greenium	-1.57	-6.27*	4.70	-4.77*
Std. err	(3.07)	(2.54)	(4.27)	(1.99)
No. obs	20	43		63
	High Rated	**Medium Rated**	**Difference**	**All**
Greenium	-5.24*	-3.98	-1.26	-4.77*
Std. Err	(2.37)	(3.64)	(4.17)	(1.99)
No. obs	40	23		63
	Euro	**USD**	**Difference**	**All**
Greenium	-5.29	-1.53	-3.76	-4.19
Std. Err	(3.09)	(3.61)	(5.35)	(2.42)
No. obs	34	14		48
	Euro & USD	**Other currencies**	**Difference**	**All**
Greenium	-4.19	-6.6*	2.44	-4.77*
Std. err	(2.42)	(3.26)	(4.70)	(1.99)
No. obs	48	15		63

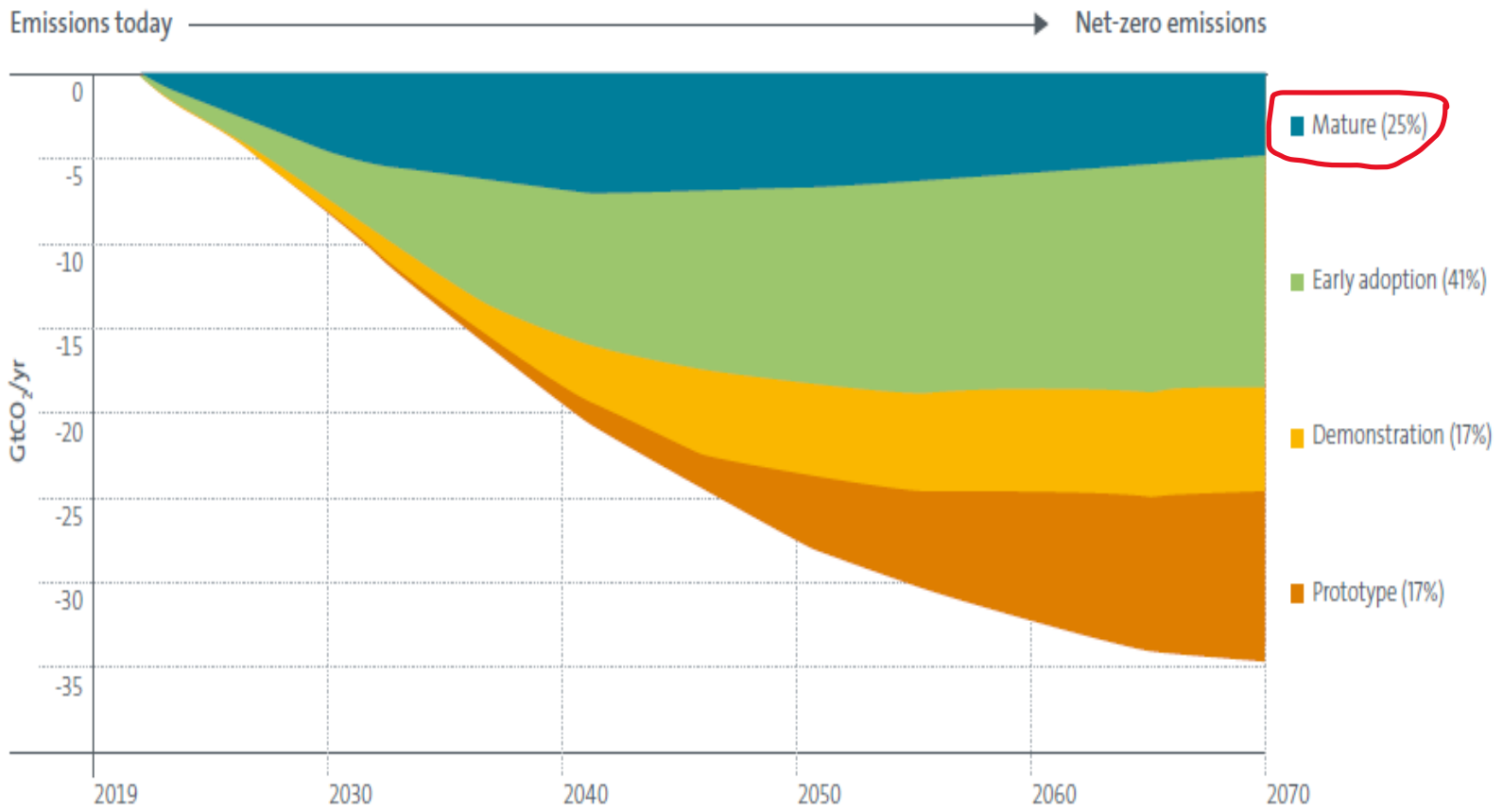
Learning from case studies: innovative bond instruments in Asia

Instrument	Issuing authority	Year	SDG	Key learnings
Green bond	Ministry of Finance, Indonesia	2018	SDG 7 SDG 13	• SDG bonds can be used to raise capital for both climate mitigation and adaptation • Sovereign issues of nascent SDG instruments raise investor confidence and showcase the country's focus on SDG • Clear processes for the governance and monitoring of green bond issue is critical
Social bond	SIDBI, India	2019	SDG 5	• Empowering local organizations to raise capital through SDG issues can ease the welfare burden on the state while meeting SDG targets • SDG issues with transparent monitoring systems will garner the support of corporates
Sustainability bond	EWP, Republic of Korea	2018	SDG 7	• SDG bonds can be used for the transformation of environmentally "dirty" businesses • Transparent monitoring is crucial for the success of SDG issues

Selected innovative climate finance instruments in Africa

Instrument	Sector	Barriers addressed	Instruments and strategies deployed
TerraFund	AFOLU	Insufficient project size, limited technical capacity, counterparty risk, climate risk	Grants, debt, aggregation, capacity building and training
SCF	Energy, AFOLU	Administrative risk, regulatory risk, limited technical capacity	Technical assistance, blended equity
Acorn PBSA	Buildings	Insufficient project size, technology risk, refinancing risk	Green bond, REIT, guarantee
Revego Africa Energy Fund	Energy	Refinancing risk, counterparty risk	YieldCo, aggregation

Energy sector CO2 emissions and green innovation: reductions by current technology readiness category



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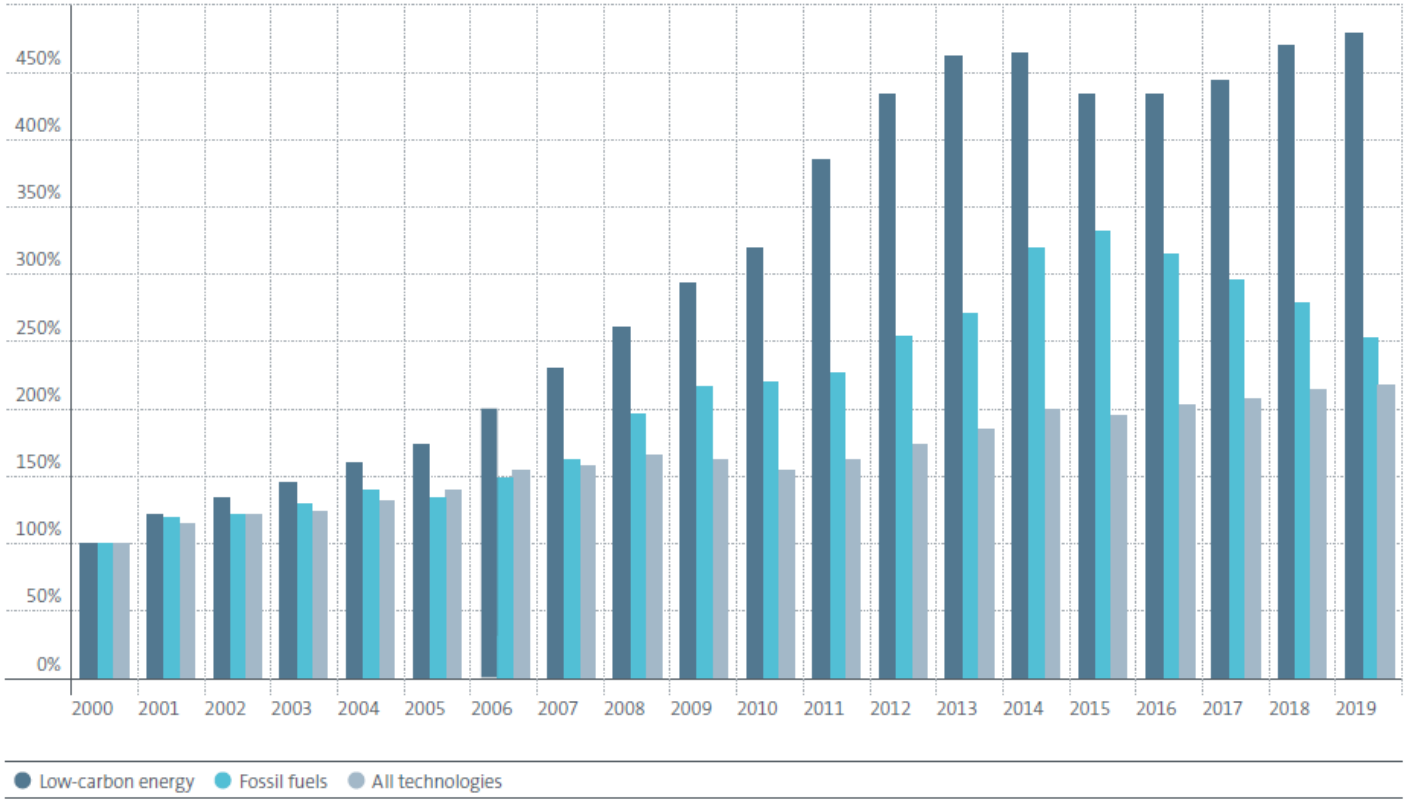
Global growth of patents in low-carbon energy technologies versus all technologies, 2000-2019 (base 100 in 2000)



Source: European Patent Office

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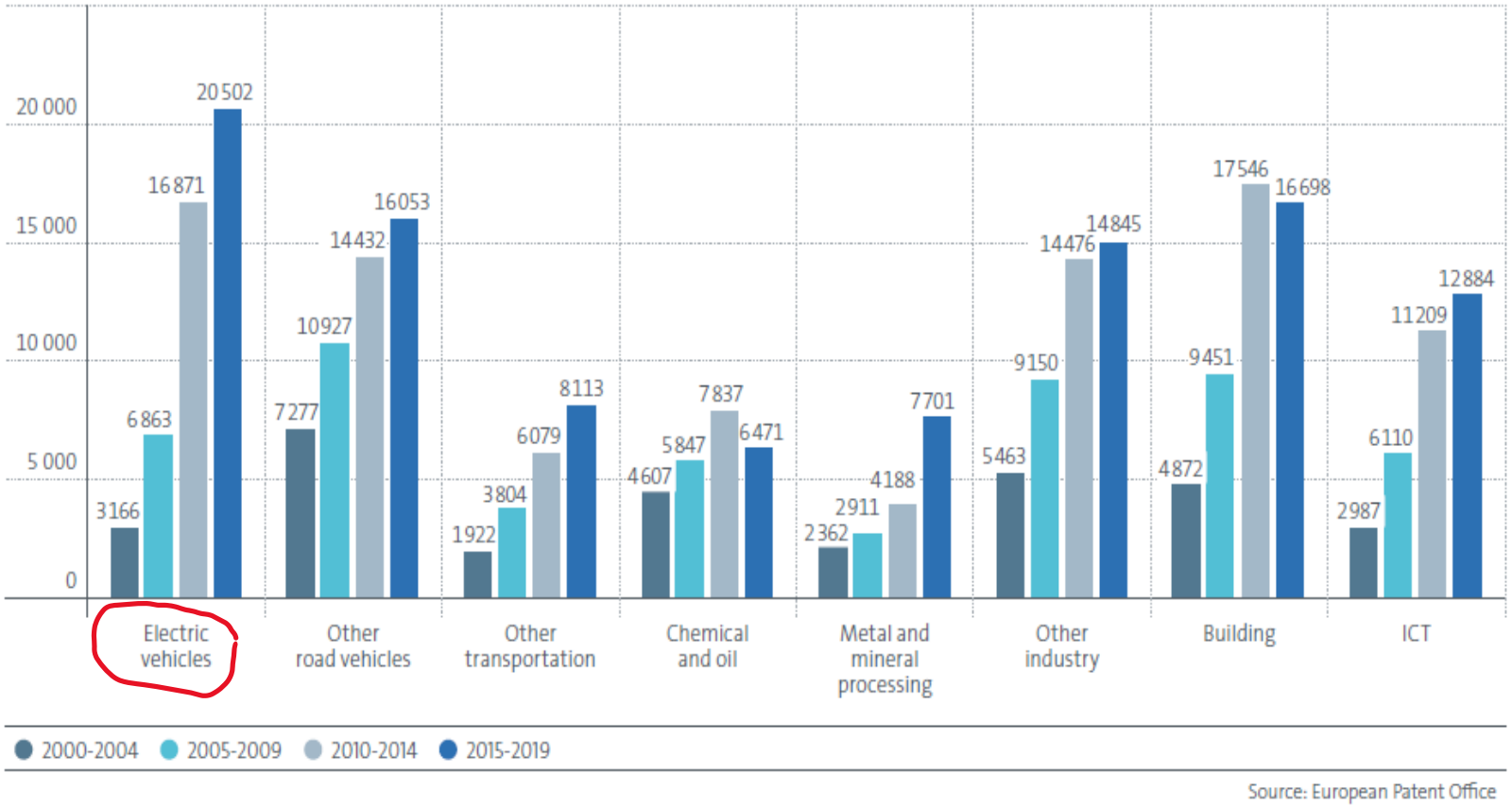
Growth of patents in end-use technologies, 2000-2019



Source: European Patent Office

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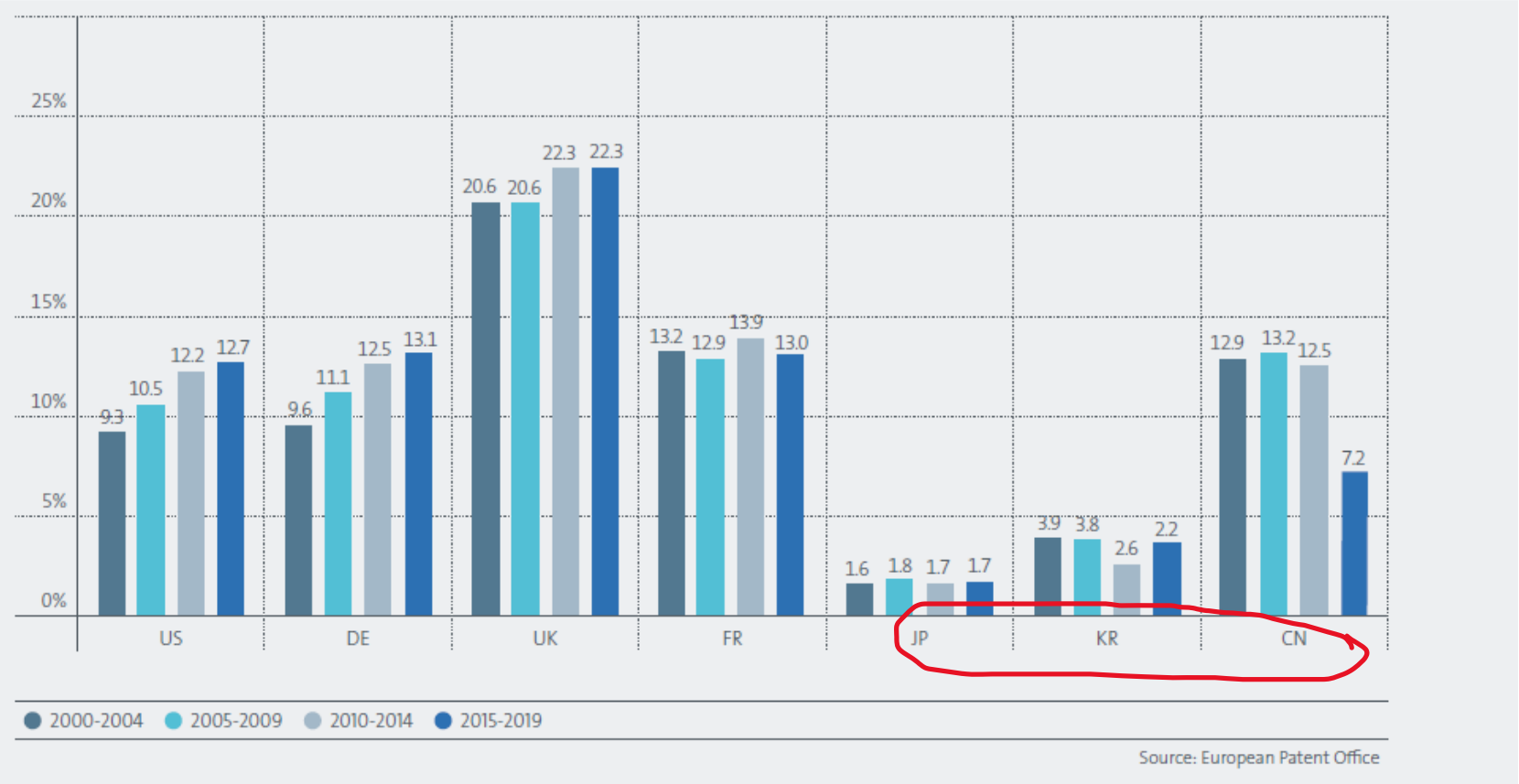
Share of patents in leading innovation centres that are co-invented with other countries, 2000-2019



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Financial structure and green innovation in EU, 2005—2014

Source: World Bank's Financial Structure Database and PATSTAT

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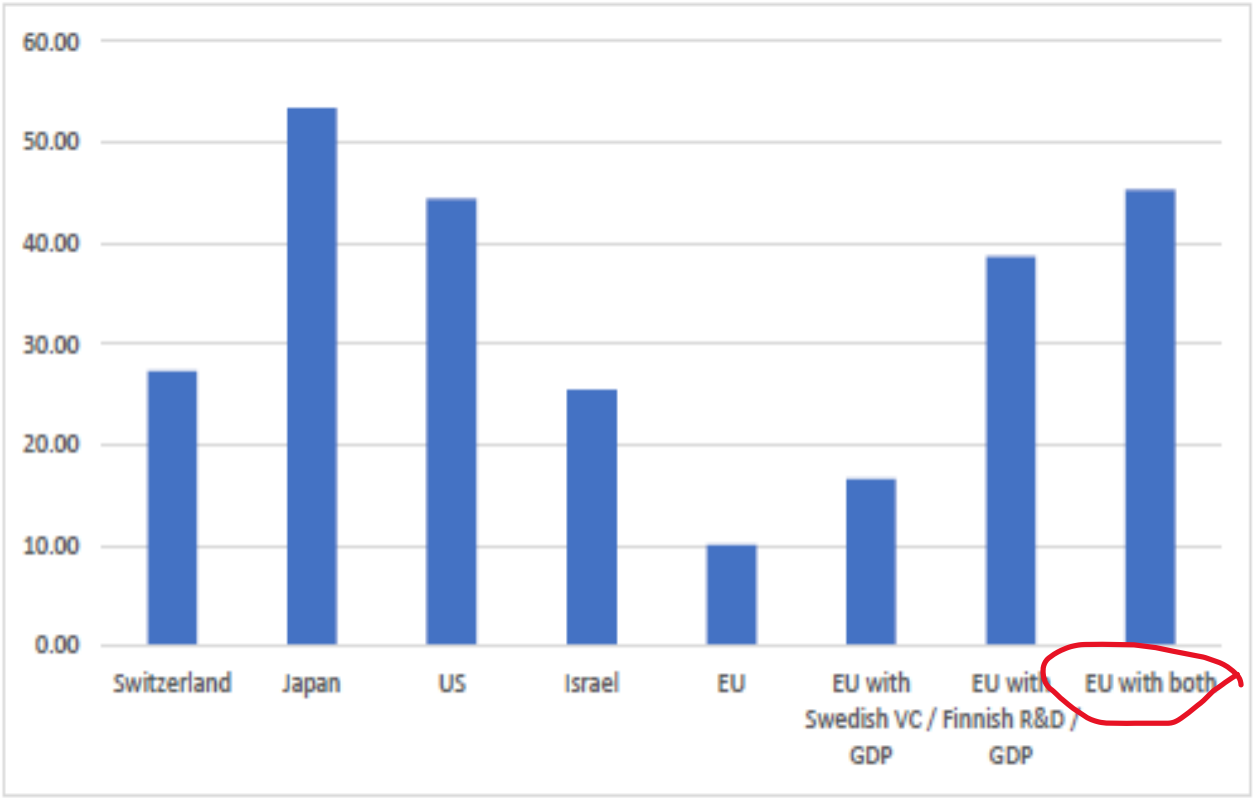
Green innovation in EU under difference scenarios, 2005—2014



Source: European Venture Capital Association, Eurostat, PATSTAT, and authors' calculations

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