PGIM REAL ESTATE

A BIRD'S EYE VIEW OF REAL ESTATE MARKETS

Estimating the Size of Real Estate Markets Around the World

October 2021 | Investment Research

EXECUTIVE SUMMARY

- Our update of *A Bird's Eye View of Real Estate Markets* estimates the size of real estate markets around the world, distinguishing between the stock of high-quality, institutional-grade investable real estate and the stock that has been invested in.[1,2]
- We estimate that at the end of 2020, the global value of investable real estate stock was $31.1 trillion. We expect that during the next 20 years, that value will grow by an average of 5.2% a year and be worth more than $85 trillion.
- We also find that today, only 36% of that stock – roughly $11.2 trillion – is actually traded. Given both the ongoing emergence of real estate as an asset class and the outlook for economic prosperity and financial markets, we estimate that by 2040, the size of invested stock will be worth more than $40 trillion.
- With developed markets remaining a dominant feature of the investment landscape, the fastest growth in invested stock is set to take place in Asia Pacific. We expect China to become the second-largest real estate investment market in the world by 2030.
- The investment case for holding a portfolio of international real estate remains compelling. The diversification benefits alone make the case as countries grow and evolve in different ways and at different rates. Even in the presence of global shocks such as the COVID-19 pandemic, countries are impacted differently and recover differently.

[1] As in the original paper "A Bird's Eye View of Real Estate Markets," published in 2003, our estimate of the real estate market excludes owner-occupied housing.

[2] MSCI/IPD defines real estate invested stock "as the aggregation of real estate assets that meet all of the following conditions: They are held as investments for the purposes of delivering a mix of income and capital returns; They are professionally managed for the achievement of these purposes, either by the beneficial owners or by third party management businesses; They are structured as investment interests within portfolios." See *Real Estate Market Size 2020, Annual Update on the Scale of the Professionally Managed Global Real Estate Investment Market*, Hariharan, G.G., Patkar, R., and Neshat, R., August 2021.

INTRODUCTION

The investment case for holding a portfolio of international real estate remains compelling. The diversification benefits alone make the case as countries grow and evolve in different ways and at different rates. Even in the presence of global shocks such as the COVID-19 pandemic, countries are impacted differently and recover differently.

Whilst the dynamics of real estate markets are an important part of a portfolio strategy, knowing the current value and potential future value of the investment opportunity set is also important. Because the stock of a country's real estate is tied to the country's economic activities, it is the economic value of that stock and how that economic value grows over time that matter.

The value of a country's real estate stock, however, does not translate directly into the size of the country's real estate investment market. Differences between the two arise based on various factors such as differences in the legal and regulatory frameworks that govern real estate ownership, cultural practices, preferences for owner occupation and quality of the stock. And those differences influence the way the markets develop over time. It is important to recognize that countries with large real estate stock do not necessarily have large real estate investment markets.

From an investment perspective, we further distinguish between the value of a country's investable (high-quality, institutional-grade) stock[3] and the value of the country's invested stock of real estate. The size of the invested stock tells investors how big the real estate investment opportunity is today – it represents the investment market - with associated links to transparency and liquidity. Separately, investable stock tells investors how big the invested stock could become. And that is of use when building a portfolio over time.

As in our last update of *A Bird's Eye View of Real Estate Markets*, we estimate and forecast the value of both investable and invested real estate markets around the world for the next 20 years.

The Investable Universe

In 2003, we published our first estimates of the value of investable real estate stock around the world in *A Bird's Eye View of Real Estate Markets*. Based on our in-house experience, we modeled the relationship between the size of a country's investable stock by using GDP – which is a measure of overall economic output that acts as a proxy for real estate market scale – and GDP per capita, which measures income and productivity levels and acts as a proxy for real estate quality.

In Exhibit 1, we rerun our model by using updated economic data, and we present our latest estimates of the value of investable stock in a universe of 55 countries that are judged to have functioning real estate investment markets.[4]

We find that global investable real estate stock was worth an estimated $31.1 trillion at the end of 2020. Within the total, the distribution of stock remains heavily concentrated in a small number of developed countries, most notably in the United States, which accounts for 30% of global stock. The main exception is China, which has recorded rapid growth in recent years and is now the home of 12% of all global investable stock.

[3] See later the formula that derives the estimated value.

[4] As in the original paper, a number of geographies are omitted. However, the model has been run for all countries around the world. Results for other markets are available on request.

EXHIBIT 1: GLOBAL UNIVERSE OF REAL ESTATE MARKETS[5]

Population (Millions), **GDP** (US$ Billions), **GDP per Capita** (US$ Billions) **and Total Real Estate Market Size** (US$ Billions)

		Population (Millions)	GDP (US$ Billions)	GDP per Capita (US$ Billions)	Real Estate (US$ Billions)
Asia Pacific	Australia	26	1,358	52,861	623
	China[6]	1,440	14,768	10,254	3,821
	Hong Kong	8	347	46,193	356
	India	1,382	2,608	1,887	462
	Indonesia	274	1,062	3,879	215
	Japan	126	5,044	39,887	2,277
	Malaysia	32	338	10,414	114
	New Zealand	5	209	41,527	92
	Philippines	110	362	3,298	74
	Singapore	6	340	59,661	322
	Taiwan	24	669	28,338	284
	Thailand	70	502	7,192	130
	South Korea	51	1,640	31,990	747
	Vietnam	97	341	3,500	59
Europe	Austria	9	430	48,251	197
	Belgium	12	516	44,680	236
	Bulgaria	7	69	10,005	17
	Czech Republic	11	246	22,990	86
	Denmark	6	357	61,204	158
	Finland	6	270	48,775	121
	France	67	2,630	39,009	1,210
	Germany	83	3,838	46,143	1,741
	Greece	11	190	17,741	76
	Hungary	10	155	15,896	51
	Ireland	5	425	85,259	180
	Italy	59	1,886	31,709	870
	Netherlands	17	914	52,344	407
	Norway	5	363	67,367	178
	Poland	38	596	15,712	202
	Portugal	10	231	22,473	90
	Romania	19	249	12,907	63
	Russia	146	1,482	10,154	407
	Slovak Republic	5	104	19,097	38
	Spain	47	1,282	27,025	565
	Sweden	10	543	52,357	294
	Switzerland	9	749	86,458	332
	Turkey	84	717	8,488	256
	Ukraine	42	155	3,729	24
	United Kingdom	67	2,714	40,458	1,560
Latin America	Argentina	45	389	8,600	170
	Brazil	213	1,453	6,829	506
	Chile	19	254	13,148	91
	Colombia	51	272	5,337	81
	Ecuador	18	99	5,600	22
	Mexico	129	1,081	8,371	388
	Peru	33	204	6,193	55
	Venezuela	28	31	1,097	10
Canada and the United States	Canada	38	1,647	43,324	761
	United States	330	20,894	63,396	9,370
Gulf Cooperation Council	Bahrain	2	33	22,025	18
	Kuwait	4	106	24,809	66
	Oman	5	72	15,776	24
	Qatar	3	146	51,997	92
	Saudi Arabia	35	700	19,996	270
	United Arab Emirates	9	359	39,189	220
Total weighted average		**5,398**	**78,437**	**14,532**	**31,084**

Sources: Oxford Economics, PGIM Real Estate. As of October 2021.

[5] Note this table is not exhaustive of all real estate markets around the world, but, rather, it represents the major markets as set out in our 2003 paper.

[6] For the sake of consistency with previous versions of the paper, we continue to treat Hong Kong as separate from China.

EXHIBIT 2: COUNTRY CONCENTRATIONS OF INVESTABLE REAL ESTATE STOCK

Country Share and Cumulative Share (%)

		Country Share	Cumulative Share
1	United States	30.1%	30.1%
2	China	12.3%	42.4%
3	Japan	7.3%	49.8%
4	Germany	5.6%	55.4%
5	United Kingdom	5.0%	60.4%
6	France	3.9%	64.3%
7	Italy	2.8%	67.1%
8	Canada	2.4%	69.5%
9	South Korea	2.4%	71.9%
10	Australia	2.0%	73.9%
11	Spain	1.8%	75.7%
12	Brazil	1.6%	77.4%
13	India	1.5%	78.9%
14	Netherlands	1.3%	80.2%
15	Russia	1.3%	81.5%
16	Mexico	1.2%	82.7%
17	Hong Kong	1.1%	83.9%
18	Switzerland	1.1%	84.9%
19	Singapore	1.0%	86.0%
20	Sweden	0.9%	86.9%
	Rest of the world	**13.1%**	**100.0%**

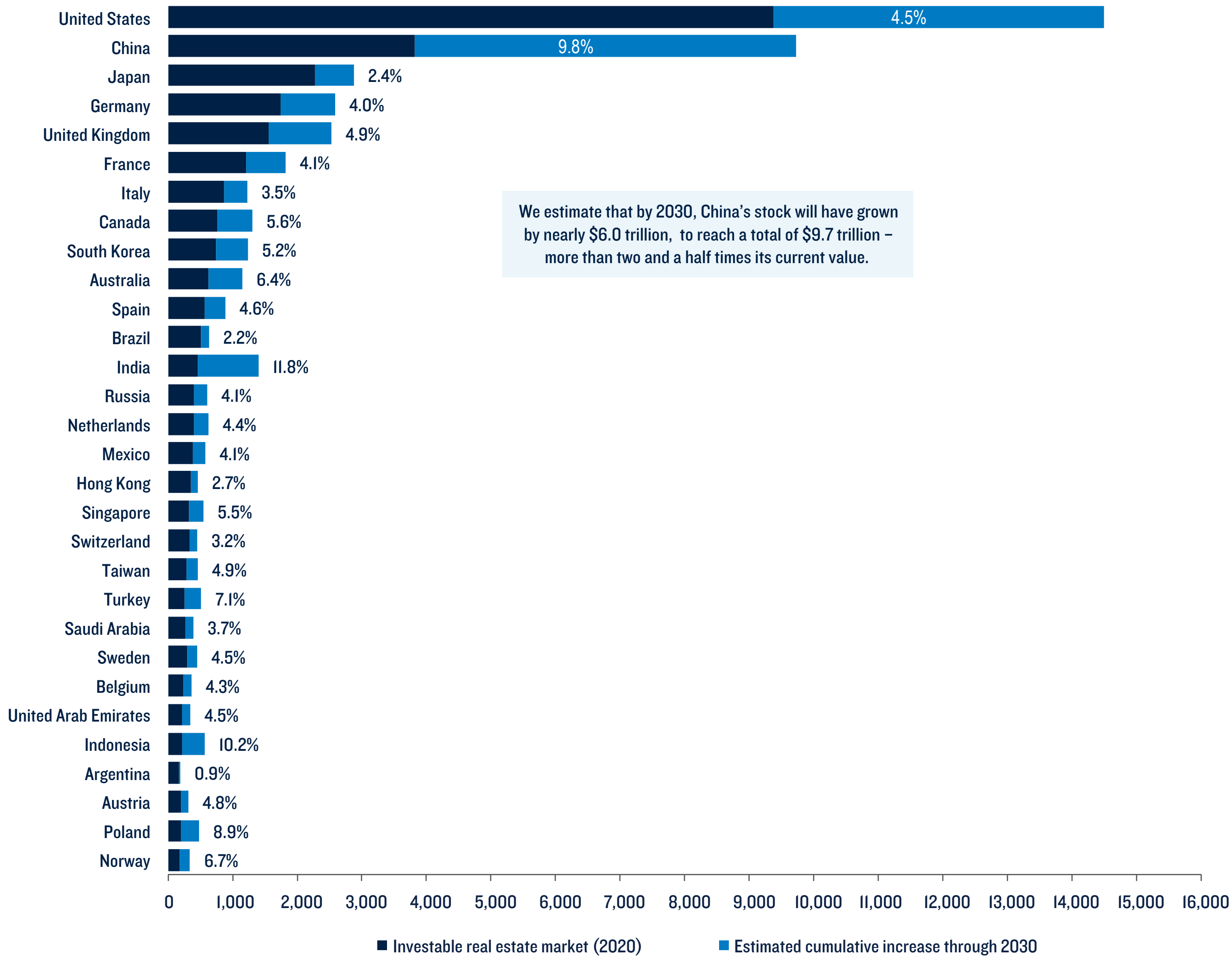
Source: PGIM Real Estate. Totals do not equal 100% due to rounding. As of October 2021.

Exhibit 2 shows the top 20 countries by total value of investable stock. It is striking that the top five – the United States, China, Japan, Germany and the United Kingdom – comprise 60% of the global market. After that, the top 10, rounded out by France, Italy, Canada, South Korea and Australia, encompass a cumulative share of just under 75%. More than 80% of investable stock is held in just 15 countries, and the bottom 40 countries in our universe account for less than 19% of global investable stock.

Using economic projections, Exhibit 3 provides our forecast for the value of investable stock in 10 years. The big standout result is China. We estimate that by 2030, China's stock will have grown by nearly $6.0 trillion to reach a total of $9.7 trillion – more than two and a half times its current value. Alone, China's stock is set to contribute 30% to the increase in global stock. By comparison, the value of stock in the United States is set to grow by $5.1 trillion. We anticipate that in 2030, China and the United States combined will account for 45% of the world's investable real estate stock by value.

EXHIBIT 3: FORECAST FOR THE VALUE OF INESTABLE STOCK IN 10 YEARS

Estimated Annual Growth Rates and Size of Investable Real Estate 2020 Versus 2030 (US$ Billions)



Note: Any projections or forecasts presented herein are subject to change without notice. Actual data will vary.

Sources: Oxford Economics, PGIM Real Estate. As of October 2021.

Owing to the influence of China, the regional distribution of investable stock will continue to change. We expect that by 2030, Asia Pacific will have the largest regional concentration of investable real estate, accounting for 37% of global stock and up from 31% in 2020. At the same time, Europe's share is set to fall from 30% in 2019 to 28% in 2030, and the combined share of the United States and Canada is set to fall from 33% to 30%. Given their much smaller markets, the Latin America and Gulf Cooperation Council (GCC) regions' much smaller shares are expected to change only modestly.

Our projections reflect differences in the outlooks for GDP and GDP per capita, both of which inform us about likely changes to the built environment in each region. Economic growth is projected to be faster in Asia Pacific than it is in other regions. The relative wealth of Asian countries is set to improve, but many Asian countries have low GDPs per capita, which means that large parts of their populations have neither access to nor needs for institutional-grade real estate – positions that are set to change as wealth grows to levels more in line with those of developed countries.

The Investment Market

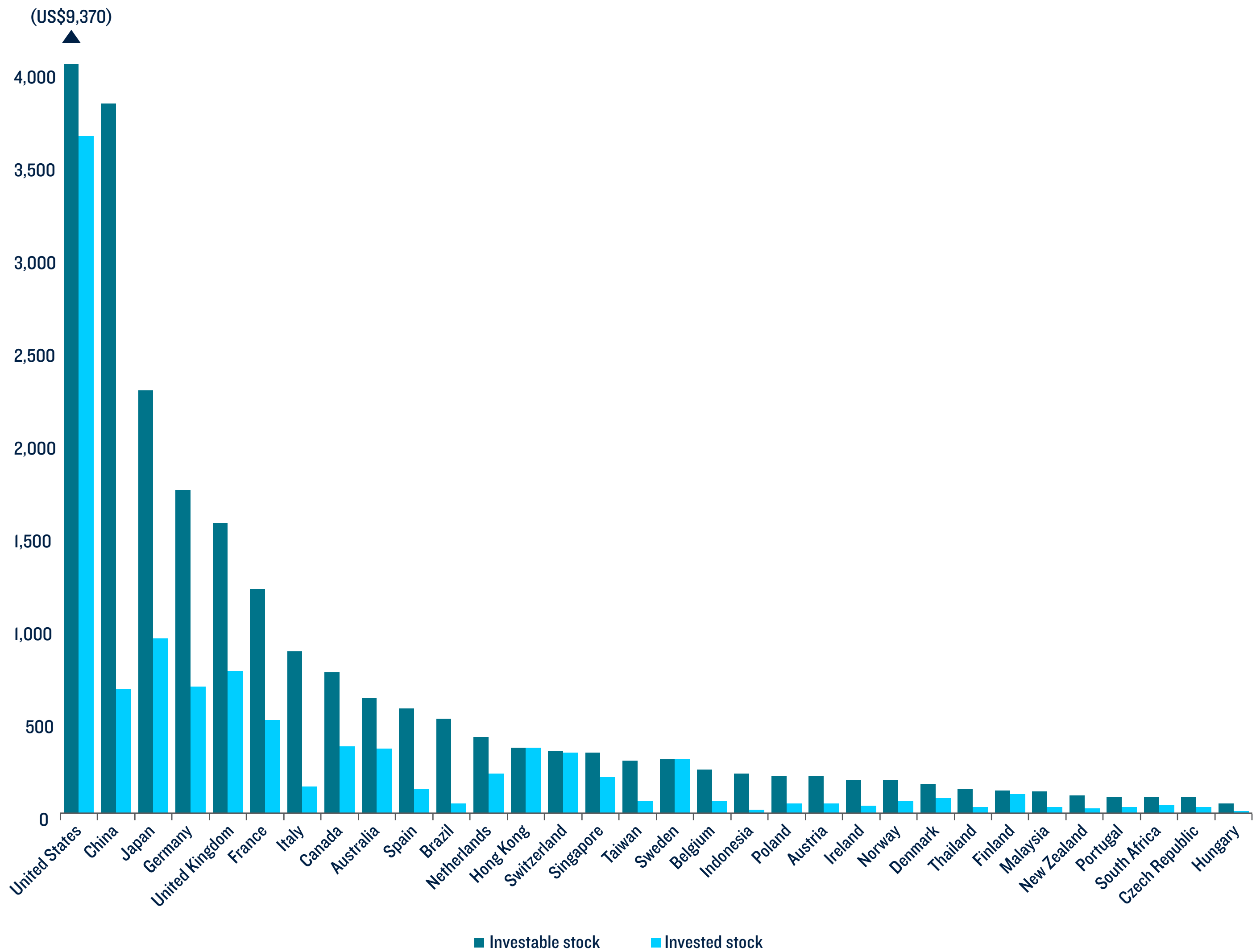
Investable stock does not tell the whole story about what investors can acquire in today's market. In fact, there can be major differences between the amount of investable stock in a country and the size of the country's investment market. The value of invested stock is more relevant for investment decision making, particularly in the short term. For investors seeking to build global real estate portfolios, reliance solely on investable stock could lead to misallocations by sector and geography, thus affecting returns performance.

In Exhibit 4, we use MSCI's latest published estimates of the sizes of 32 major-country investment markets[7], – a measure of invested stock for 2020 – and compare them with our broader estimates of investable stock.

It is striking that just 38% of the high-quality, institutional-grade stock across these 32 countries is currently reported as being traded in investment markets. The ratio does, however, vary around the world. In the United States, approximately 39% of investable stock is traded, whereas in China, it is just 17%. In contrast, in Switzerland and Hong Kong it is close to 100%.

EXHIBIT 4: INVESTED STOCK FOR 2020 AS COMPARED WITH ESTIMATES OF INVESTABLE STOCK

Investable and Invested Stock by Country (US$ Billions)



Sources: MSCI/IPD, Oxford Economics, PGIM Real Estate. As of October 2021.

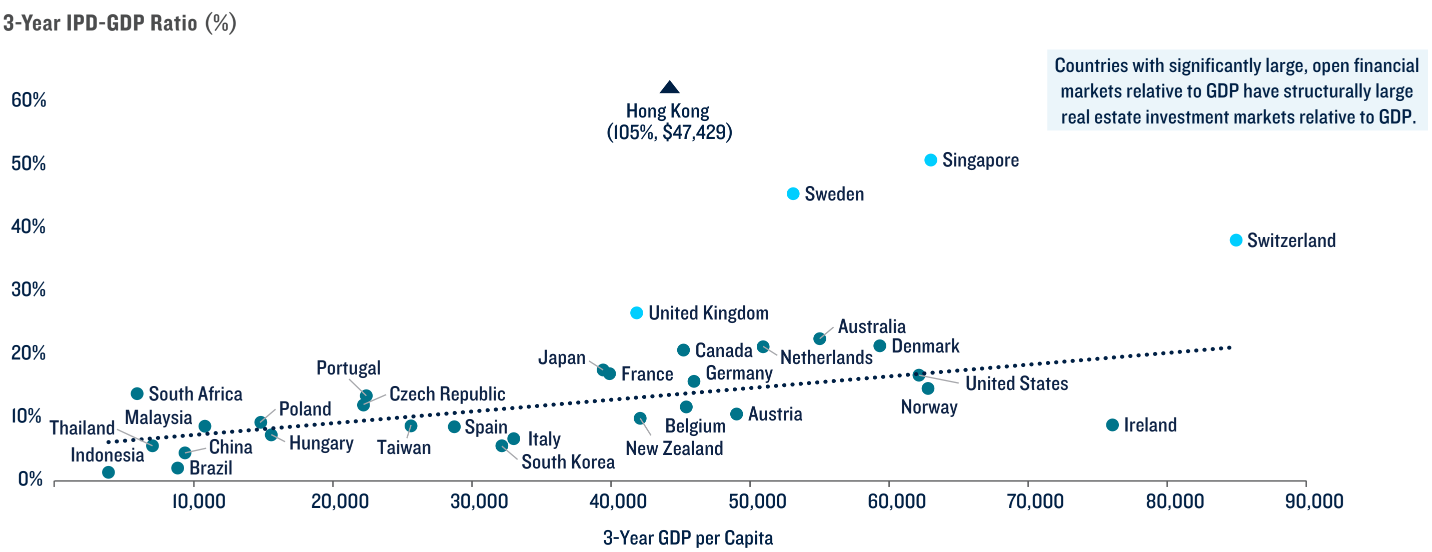
[7] Source: *Real Estate Market Size 2020, Annual Update on the Scale of the Professionally Managed Global Real Estate Investment Market*, Hariharan, G.G., Patkar, R., and Neshat, R, August 2021.

The difference between investable and invested stock reflects a number of factors, which include legal and regulatory frameworks that govern real estate ownership, cultural practices and values, preferences, historical precedents etc that can, for instance, encourage or discourage the development of real estate investment over time. Together such factors broadly relate to the openness, maturity and size of a country's financial market. As such, countries with more-open and more-sophisticated financial markets tend to have larger real estate investment markets.

Most countries have high correlations between financial market openness, incomes and productivities, which are broadly characterized by GDP per capita.[8] Exhibit 5 shows invested stock, expressed as a share of GDP, against GDP per capita for each of the 32 major countries.[9,10]

As expected, countries with higher incomes and productivities, shown by higher GDP per capita, have larger real estate investment markets relative to the sizes of their economies.[11] It is also clear that countries with significantly large and open financial markets relative to GDP have structurally large real estate investment markets relative to GDP – notably the United Kingdom, Singapore, Sweden, Switzerland and Hong Kong. Nonetheless, they still exhibit similar relationships with GDP per capita.

EXHIBIT 5: RELATIONSHIP BETWEEN INVESTED MARKET AS PERCENT OF GDP AND GDP PER CAPITA (2020)



Sources: MSCI/IPD, Oxford Economics, PGIM Real Estate. As of October 2021.

[8] See, for instance, *Financial Openness and Productivity*, Bekaert, G., Harvey, C.R. and Lundblad, C., *World Development*, vol 39, issue 1, January 2011, 1-19.

[9] The estimated relationship was tested and is robust for different years and time periods. We do find, however, that for different sample periods, the standard errors on the estimated relationship fall over time, suggesting improvements in data accuracy.

[10] MSCI/IPD defines real estate invested stock "as the aggregation of real estate assets that meet all of the following conditions: They are held as investments for the purposes of delivering a mix of income and capital returns; They are professionally managed for the achievement of these purposes, either by the beneficial owners or by third party management businesses; They are structured as investment interests within portfolios." See *Real Estate Market Size 2020, Annual Update on the Scale of the Professionally Managed Global Real Estate Investment Market*, Hariharan, G.G., Patkar, R., and Neshat, R., August 2021.

[11] Note Hong Kong is off the chart because of the large size of its financial market relative to GDP. We nonetheless apply the same formula but from a structurally higher starting point. In addition, we used mainland GDP for Norway. Finland is also dropped from the analysis for consistency. Although estimates for Finland are published by MSCI/IPD, they are compiled and provided by KTI, Finland.

EXHIBIT 6: CURRENT AND FUTURE SIZES OF INVESTED AND INVESTABLE STOCK BY COUNTRY, 2020–40

Invested Stock and Investable Stock (US$ Billions)

		Invested Stock (US$ Billions)			Investable Stock (US$ Billions)		
		2020	**2030**	**2040**	**2020**	**2030**	**2040**
Asia Pacific	Australia	348	914	1,895	623	1,155	1,895
	China	668	1,885	4,442	3,821	9,727	19,207
	Hong Kong	356	635	1,062	356	635	1,062
	India	163	456	1,174	462	1,406	3,668
	Indonesia	15	40	98	215	569	1,297
	Japan	940	1,400	2,058	2,277	2,876	3,540
	Malaysia	31	85	173	114	270	486
	New Zealand	24	61	116	92	175	260
	Philippines	23	62	157	74	208	503
	Singapore	194	464	893	322	553	893
	South Korea	105	232	367	747	1,235	1,609
	Taiwan	65	136	211	284	460	594
	Thailand	33	59	100	130	226	364
	Vietnam	20	54	127	59	168	386
Europe	Austria	50	105	178	197	314	428
	Belgium	66	130	209	236	361	481
	Bulgaria	5	10	18	17	32	50
	Czech Republic	32	92	198	86	185	312
	Denmark	84	173	314	158	246	347
	Finland	101	182	296	121	182	296
	France	500	948	1,490	1,210	1,817	2,394
	Germany	684	1,312	2,069	1,741	2,588	3,363
	Greece	18	37	57	76	132	178
	Hungary	12	26	45	51	97	145
	Ireland	37	105	199	180	336	488
	Italy	146	245	340	870	1,227	1,495
	Netherlands	210	419	672	407	624	826
	Norway	67	203	357	178	339	457
	Poland	56	166	357	202	476	819
	Portugal	33	57	82	90	135	173
	Romania	19	47	96	63	130	219
	Russia	122	200	385	407	608	1,011
	Slovak Republic	10	21	35	38	69	102
	Spain	128	236	339	565	888	1,133
	Sweden	294	800	1,457	294	800	1,457
	Switzerland	324	531	903	332	531	903
	Turkey	56	124	243	256	509	900
	Ukraine	9	31	134	24	75	229
	United Kingdom	769	1,654	3,010	1,560	2,527	3,604
Latin America	Argentina	36	40	60	170	185	269
	Brazil	50	65	97	506	632	891
	Chile	23	43	79	91	153	252
	Colombia	21	36	62	81	137	229
	Ecuador	7	10	16	22	30	46
	Mexico	87	139	235	388	579	910
	Peru	15	29	56	55	103	191
	Venezuela	3	8	13	10	28	43
Canada and the United States	Canada	364	833	1,489	761	1,309	1,900
	United States	3,651	7,459	14,196	9,370	14,491	21,271
Gulf Cooperation Council	Bahrain	4	5	8	18	23	30
	Kuwait	14	24	42	66	98	148
	Oman	6	9	16	24	33	51
	Qatar	27	70	179	92	166	287
	Saudi Arabia	72	115	186	270	389	564
	United Arab Emirates	52	98	193	220	341	508
Global totals		**11,246**	**23,320**	**43,280**	**31,084**	**53,586**	**85,160**

Applying the same relationship to other countries allows us to estimate the value of invested real estate stock globally and, by using third-party economic forecasts, to determine how much it is set to grow over time. Exhibit 6 presents our estimates of invested real estate stock around the world as of end 2020, 2030 and 2040.[12]

Our approach suggests that at the end of 2020, the size of invested stock was approximately $11.2 trillion. Moreover, it is set to grow to more than $23 trillion by 2030 and more than $43 trillion by 2040. This amounts to a growth rate of 7% per year.

A comparison of our two measures of real estate stock shows that invested stock is set to grow faster than investable stock during the next 20 years. This is particularly true for emerging markets, as opposed to developed markets. The ongoing institutionalization of real estate as an asset class is driving the growth in invested stock. As countries develop, become wealthier and gain access to more-open financial markets, more and more investable stock will become invested.

According to Exhibit 6, the United States will continue to dominate the invested real estate market. However, we estimate that by 2030, China's invested stock will reach $1.8 trillion, surpassing Japan and the United Kingdom to become the world's second-largest real estate investment market.

EXHIBIT 7: 2020 COUNTRY CONCENTRATIONS OF INVESTED STOCK

Country and Cumulative Share (%)

		Country Share	Cumulative Share
1	United States	32.5%	32.5%
2	Japan	8.4%	40.8%
3	United Kingdom	6.8%	47.7%
4	Germany	6.1%	53.7%
5	China	5.9%	59.7%
6	France	4.4%	64.1%
7	Canada	3.2%	67.4%
8	Hong Kong	3.2%	70.5%
9	Australia	3.1%	73.6%
10	Switzerland	2.9%	76.5%
11	Sweden	2.6%	79.1%
12	Netherlands	1.9%	81.0%
13	Singapore	1.7%	82.7%
14	India	1.4%	84.2%
15	Italy	1.3%	85.5%
16	Spain	1.1%	86.6%
17	Russia	1.1%	87.7%
18	South Korea	0.9%	88.6%
19	Finland	0.9%	89.5%
20	Mexico	0.8%	90.3%
	Rest of the world	**9.7%**	**100.0%**

Sources: MSCI/IPD, Oxford Economics, PGIM Real Estate. As of October 2021.

Exhibit 7 ranks countries by size of invested stock. The top five countries are the United States, Japan, the United Kingdom, China and Germany, which together account for a cumulative share of 60% of the market. The top 10, rounded out by France, Hong Kong, Canada, Australia and Switzerland, have a combined share of 77%. Eighty-six percent of the world's real estate investment market is contained in just 15 countries.[13]

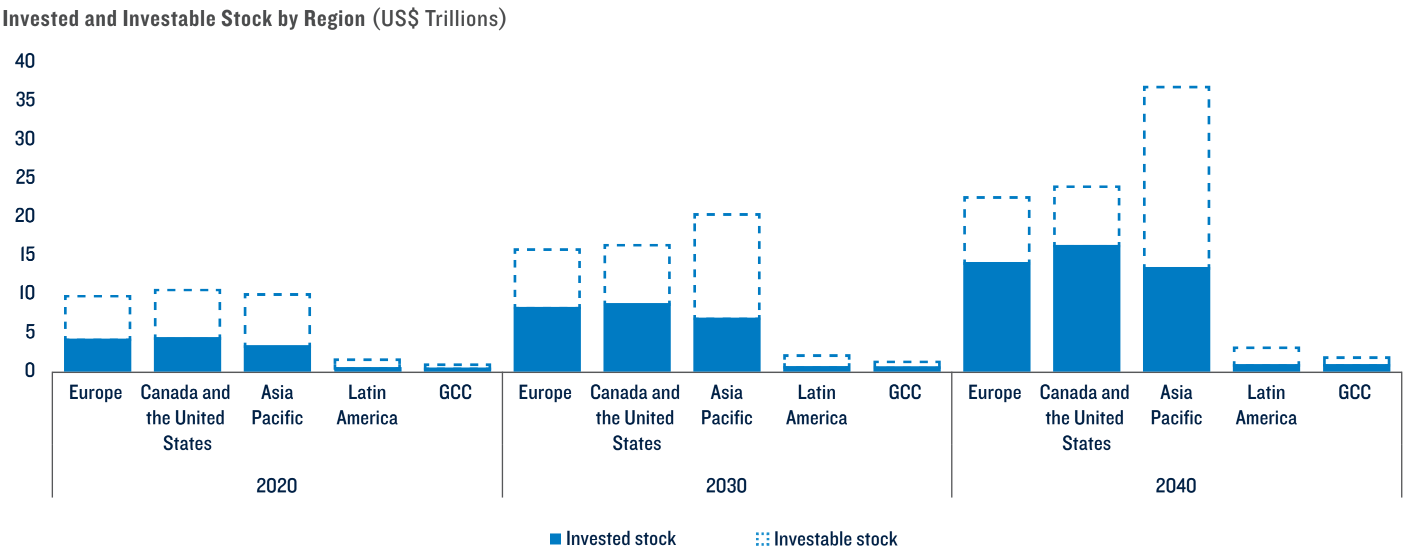
At the same time, the bottom 40 countries in our universe contain just 14% of the investment market, less than their share of investable stock, confirming that invested stock is more heavily concentrated in larger, more-developed countries.

Although developed countries dominate the distribution of invested real estate today, the gap with emerging markets will continue to narrow. Over the next 20 years, emerging markets will continue to record the fastest growth in invested stock, especially in Asia Pacific, where the investment market is expected to almost double every decade.

[12] Note, as in previous versions GDP and GDP per capita adjustments were made in the cases of oil-rich economies, notably across the GCC, where estimates of non-oil GDP were used to more closely link economic activity to the volume of real estate.

[13] From a portfolio construction standpoint, these relative sizes matter. In building a global real estate portfolio that holds risk–return constant, investing in only the eight biggest markets will give you over 70% exposure to the global real estate universe. Investing in 12 gives you over 80%.

EXHIBIT 8: DIFFERENCES BETWEEN INVESTED AND INVESTABLE STOCK ACROSS MAJOR REAL ESTATE REGIONS OVER THE NEXT 20 YEARS



Note: Any projections or forecasts presented herein are subject to change without notice. Actual data will vary.
Sources: MSCI/IPD, Oxford Economics, PGIM Real Estate. As of October 2021.

In Exhibit 8, we identify some of the key differences between our two measures of real estate stock across the major real estate regions over the next 20 years. Asia Pacific is once again worth focusing on. While we estimate that by 2040 Asia Pacific will contain 37% of the world's investable real estate stock, this does not translate directly into the size of Asia Pacific's investment market. We estimate that only 33% of investable stock will be invested, reflecting a gradual pace of capital market liberalization.

Even so, by 2040, Asia's invested market is expected to be four times bigger than it is today, slightly larger than Europe's. Together the three regions of Asia Pacific, North America and Europe are set to continue to dwarf real estate investment activity in other parts of the world like Latin America and the GCC.

CONCLUSION

Growth in the value of real estate stock in both absolute and relative terms is an important consideration for global real estate investors. An understanding of market scale and growth potential helps inform investment decision making and portfolio construction. Updating our *Bird's Eye View* analysis, we estimate that at the end of 2020, the global value of real estate investable stock was worth $31.1 trillion, and we expect that value to grow to $85.1 trillion over the next 20 years. Meanwhile, the investment market is expected to grow from $11.2 trillion at the end of 2020 to reach more than $40 trillion by 2040.

In terms of the opportunity set for real estate investors, today's major core markets are set to grow significantly and will remain dominant features of the investment landscape – most notably, the United States. However, the most-significant expansion in the built environment and the fastest growth in invested real estate are set to take place in Asia Pacific. Even accounting for likely gradual progress in financial liberalization, we expect China to become the world's second-largest real estate investment market by 2030.

AUTHORS

DR. PETER HAYES
Managing Director
Global Head of Investment Research
peter.hayes@pgim.com

DEAN JOSEPH DEONALDO
Assistant Vice President
dean.joseph.deonaldo@pgim.com

ADDITIONAL KEY CONTACTS

GREG KANE
Executive Director
Head of European Investment Research
greg.kane@pgim.com

LEE MENIFEE
Managing Director
Head of Americas Investment Research
lee.menifee@pgim.com

DR. CUONG NGUYEN
Executive Director
Head of Asia Pacific Investment Research
cuong.nguyen@pgim.com

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