



Insurance Risk Study | Fifteenth Edition

Global Risk, Profitability, and Growth Metrics

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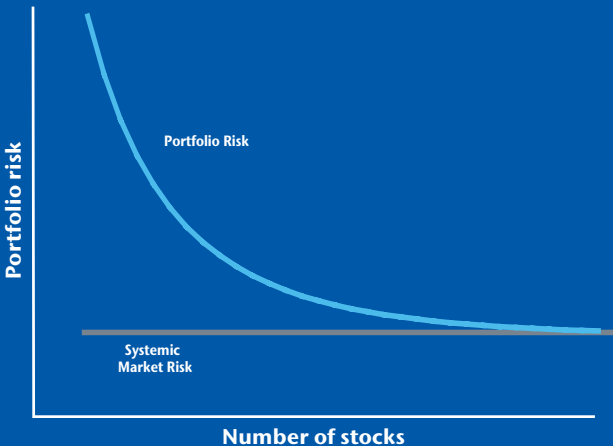
About the Study

Rating agencies, regulators, and investors today are demanding that insurers provide detailed assessments of their risk tolerance and quantify the adequacy of their economic capital. To complete such assessments requires a credible baseline for underwriting volatility. The Insurance Risk Study provides our clients with an objective and data-driven set of underwriting volatility benchmarks by line of business and country as well as correlations by line and country. These benchmarks are a valuable resource to CROs, actuaries, and other economic capital modeling professionals who seek reliable parameters for their models.

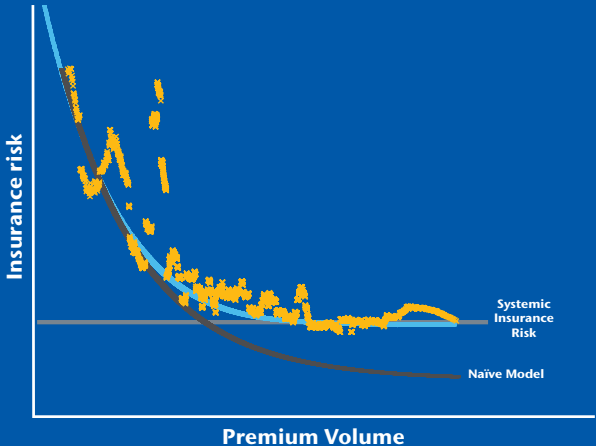
Modern portfolio theory for assets teaches that increasing the number of stocks in a portfolio will diversify and reduce the portfolio’s risk, but will not eliminate risk completely; the systemic

market risk remains. This is illustrated in the left chart below. In the same way, insurers can reduce underwriting volatility by increasing account volume, but they cannot reduce their volatility to zero. A certain level of systemic insurance risk will always remain, due to factors such as the underwriting cycle, macroeconomic trends, legal changes and weather (right chart below). This study calculates this systemic risk by line of business and country. The Naïve Model on the right chart shows the relationship between risk and volume using a Poisson assumption for claim count—a textbook actuarial approach. The study clearly shows that this assumption does not fit with empirical data for any line of business in any country. It will underestimate underwriting risk if used in an ERM model.

Asset portfolio risk



Insurance portfolio risk



Introduction

The Insurance Risk Study, now in its 15th year, has evolved from its beginnings as a quantification study for enterprise risk management. We now take an expansive view of many issues related to risk, encompassing the growth dynamics, emerging risks, and operational challenges for insurers globally.

Analytics remains at the core of this report, and indeed in Aon's offerings as a global professional services firm. In this regard, the Insurance Risk Study continues to provide the insurance industry's leading set of risk parameters for modeling and benchmarking underwriting risk and global profitability. This volume includes critical metrics and parameters that insurers can use to advance their decision making in areas ranging from growth strategy to performance benchmarking, risk tolerance, and capital management. All parameters are produced using a consistent methodology that we have employed since the first edition.

The 15th Study begins with a review of the insurance industry's performance globally: premium and capital levels, areas of growth, and profitability. Since the 8th edition, industry combined ratios are calculated across the top 50 countries. Beginning with Aon's Country Opportunity Index on page five, we turn from numerical highlights to strategic considerations that identify the countries showing an attractive mix of growth and profitability with limited political risk. Page eight focuses on the risk parameters that can be used to model underwriting volatility and insurance capital. Here are just a few of the key findings of this year's report:

Using the study

Beyond risk modeling, we provide our clients with very granular, customized market intelligence to create business plans that are realistic, fact-based, and achievable. With access to global resources and capabilities, and a broad network of local market practitioners, we are equipped to provide insight across a spectrum of lines, products, and geographies. Inpoint, the consulting division of Aon, helps insurers and reinsurers address challenges, from sizing market opportunities to identifying distribution channel dynamics, assessing competitor behavior, and understanding what it takes to compete and win. Our approach leverages Aon's USD350 million annual investment in analytics, data, and modeling to help our clients grow profitably. If you have any questions or suggestions for items we could explore in future editions of the Insurance Risk Study, please contact us through your local Aon broker or one of the contacts listed on the last page.



Globally, property casualty business again produced an **underwriting profit in 2019 with a combined ratio of 97.4 percent**, a decrease from last year's 98.0 percent combined ratio.



Motor insurance is also the fastest growing line of business, with 6.0 percent annual growth over the last five years, driven by strong growth in China, South Korea, and the U.S.



For the fourth year in a row, Malaysia and Indonesia are **ranked within the top ten positions in Aon's Country Opportunity Index**. These countries have shown low combined ratios, healthy premium and GDP growth, and a stable political environment.

Global Premium, Capital, Profitability, and Opportunity

Globally, property casualty business again produced an underwriting profit in 2019 with a combined ratio of 97.4 percent, a decrease from last year's 98.0 percent combined ratio. Europe averaged a 95.5 percent combined ratio, while Asia Pacific and the Americas each averaged 98.0 percent.

In 24 of the top 50 markets, combined ratios were below 95 percent, and 14 countries were below 90 percent, compared to 24 and 10 countries last year. Furthermore, 5 countries showed five-year premium growth in excess of 10 percent, led by very strong growth in China. The overall global combined ratio result, and the variation in results by country, demonstrates there are many desirable areas for profitable growth in the market today.

Premium, capital and profitability highlights

At year end 2019, global premium stands at an all time high of USD5.6 trillion, an increase of 3.2 percent over the prior year. Property-casualty premium increased by 4.1 percent, life & health premium increased by 2.3 percent, and reinsurance premiums grew by 12.8 percent.

Global insurance premium and capital, USD trillions

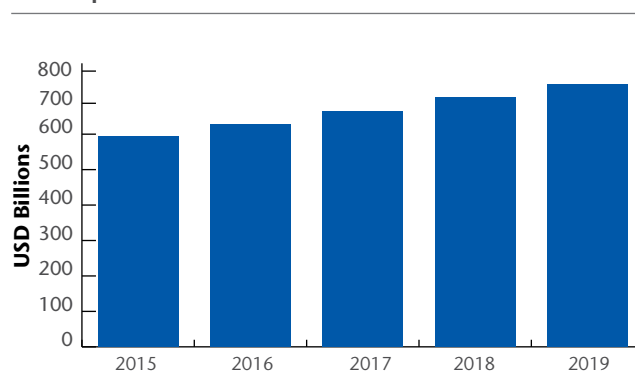
| | Premium | Capital |
|---------------------|-------------|-------------|
| Property & Casualty | 1.55 | 1.41 |
| Life & Health | 3.86 | 2.82 |
| Reinsurance | 0.20 | 0.63 |
| Total | 5.62 | 4.85 |

Global capital increased 3.5 percent year on year to USD4.9 trillion, and reinsurance capital grew 6.8 percent, as we discuss at greater length in Aon Reinsurance Market Outlook.

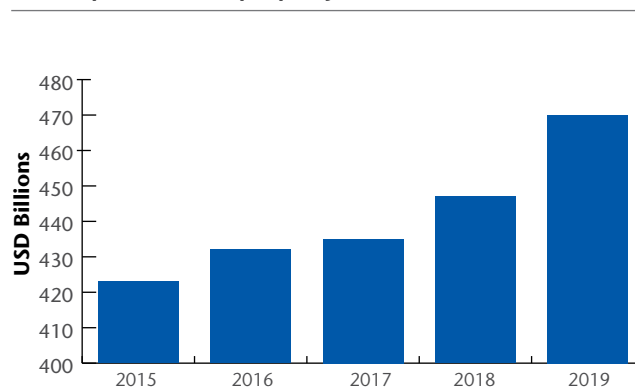
Property casualty penetration is 1.9 percent of GDP, flat from last year based on 50 of the largest countries. Auto insurance accounts for 48 percent of property casualty premium, while property accounts for 31 percent and liability for 21 percent.

Motor insurance is also the fastest growing line of business, with 6.0 percent annual growth over the last five years, driven by strong growth in China, South Korea, and the U.S. Liability is growing at an annual rate of 5.3 percent, and property at 3.0 percent.

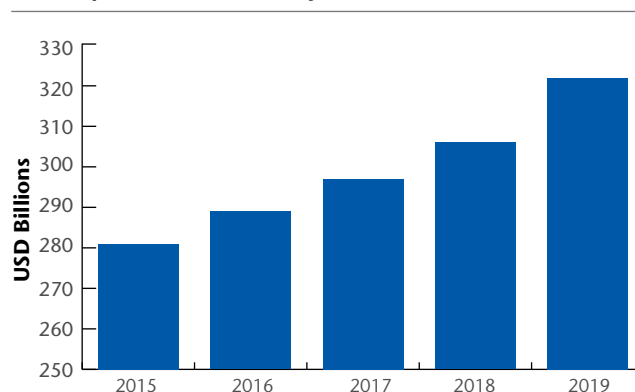
Global premium for motor



Global premium for property



Global premium for liability

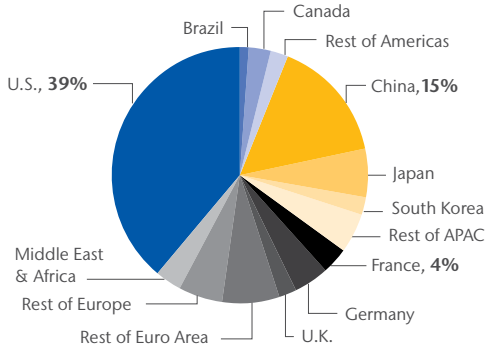


Note: Historical premium reported in local currency is converted to US dollars using the latest foreign exchange rate for that currency. This removes the effect of changes in foreign exchange rates over time.

Global P&C gross written premium and growth rates by product line

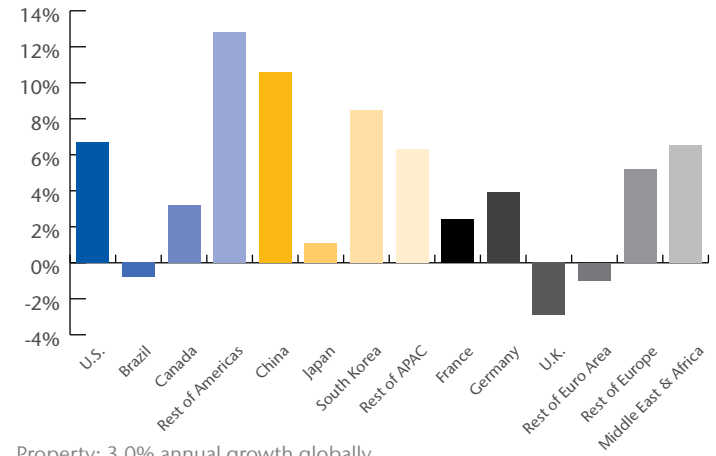
Premium by product line

Motor: USD 741 billion

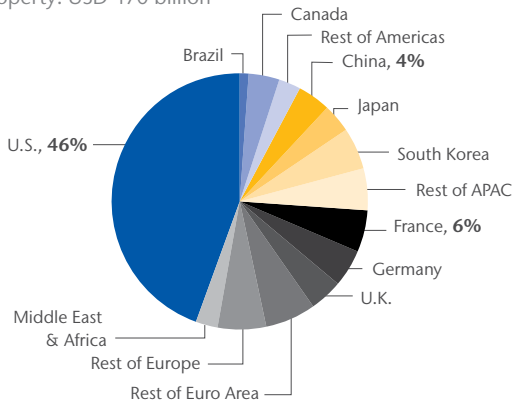


Five-year average annual growth rate

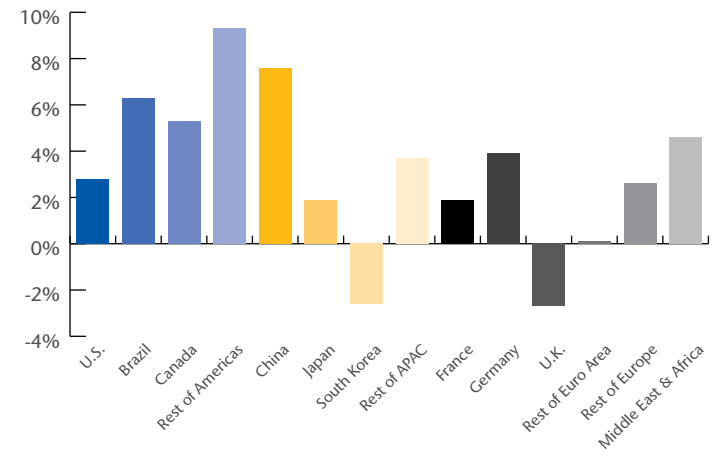
Motor: 6.0% annual growth globally



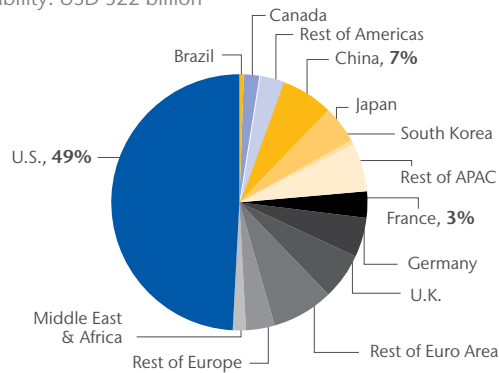
Property: USD 470 billion



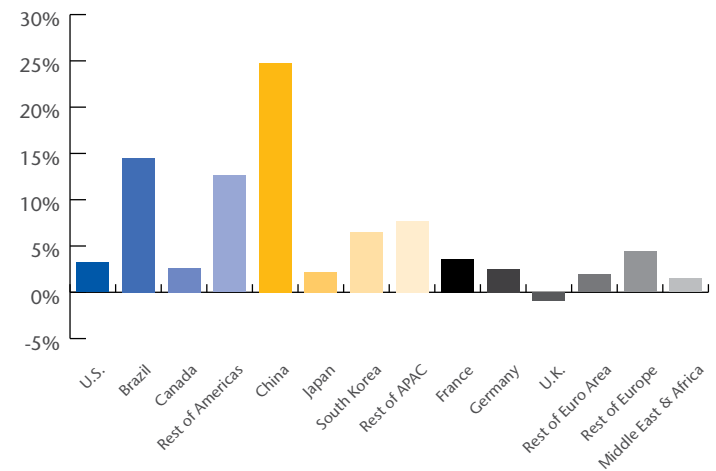
Property: 3.0% annual growth globally



Liability: USD 322 billion



Liability: 5.3% annual growth globally



Notes: All statistics are the latest available. "Motor" includes all motor insurance coverages. "Property" includes construction, engineering, marine, aviation, and transit insurance as well as property. "Liability" includes general liability, workers' compensation, surety, bonds, credit, and miscellaneous coverages.

Top 50 P&C markets ranked by gross written premium by region

| | P&C GWP (USD M) | Premium/GDP Ratio | Annualized Premium Growth | | | Cumulative Net Loss Ratio | | | Cumulative Net Expense Ratio | | | Cumulative Net Combined Ratio | | |
|---|------------------|-------------------|---------------------------|-------------|-------------|---------------------------|--------------|--------------|------------------------------|--------------|--------------|-------------------------------|--------------|--------------|
| | | | 1yr | 3yr | 5yr | 1yr | 3yr | 5yr | 1yr | 3yr | 5yr | 1yr | 3yr | 5yr |
| Americas | | | | | | | | | | | | | | |
| U.S. | 660,617 | 3.2% | 5.2% | 4.6% | 4.5% | 72.7% | 74.2% | 73.8% | 25.5% | 25.6% | 26.0% | 98.2% | 99.8% | 99.8% |
| Canada | 45,463 | 2.7% | 3.1% | 3.7% | 3.9% | 67.1% | 70.3% | 70.0% | 31.6% | 30.6% | 30.6% | 98.7% | 100.9% | 100.5% |
| Brazil | 18,294 | 0.9% | 0.8% | 2.6% | 2.6% | 54.5% | 53.7% | 54.8% | 32.3% | 33.3% | 33.6% | 86.8% | 87.0% | 88.4% |
| Mexico | 12,145 | 1.0% | 9.0% | 8.9% | 10.2% | 59.2% | 61.4% | 60.8% | 29.6% | 30.0% | 30.8% | 88.8% | 91.3% | 91.6% |
| Argentina | 7,799 | 2.0% | 34.4% | 29.9% | 33.8% | 85.1% | 81.7% | 78.7% | 37.3% | 36.9% | 36.0% | 122.3% | 118.6% | 114.7% |
| Colombia | 4,173 | 1.3% | 9.1% | 7.5% | 8.5% | 52.3% | 56.2% | 57.3% | 48.3% | 47.3% | 47.2% | 100.6% | 103.4% | 104.5% |
| Chile | 4,024 | 1.4% | 7.2% | 6.5% | 7.0% | 56.2% | 54.4% | 55.2% | 44.0% | 43.9% | 43.4% | 100.2% | 98.3% | 98.6% |
| Peru | 1,823 | 0.7% | 7.9% | 4.3% | 5.6% | 33.3% | 34.3% | 38.5% | 54.5% | 55.7% | 54.2% | 87.8% | 90.0% | 92.8% |
| Ecuador | 1,491 | 1.4% | 4.3% | -1.1% | -3.8% | 46.3% | 45.1% | 46.9% | 46.8% | 47.1% | 45.5% | 93.1% | 92.2% | 92.4% |
| Subtotal | 755,830 | 2.8% | 5.3% | 4.9% | 4.8% | 71.4% | 73.0% | 72.6% | 26.6% | 26.6% | 26.9% | 98.0% | 99.6% | 99.6% |
| Europe, Middle East & Africa | | | | | | | | | | | | | | |
| Germany | 75,709 | 1.9% | 3.8% | 3.6% | 3.6% | 70.7% | 71.0% | 70.5% | 25.3% | 25.2% | 25.3% | 96.0% | 96.2% | 95.8% |
| France | 62,227 | 2.3% | 3.2% | 2.8% | 2.4% | 75.0% | 75.5% | 76.2% | 21.8% | 21.5% | 21.6% | 96.8% | 96.9% | 97.8% |
| U.K. | 56,933 | 2.2% | 6.7% | -8.2% | -5.0% | 64.8% | 66.6% | 63.6% | 35.9% | 35.8% | 36.7% | 100.7% | 102.4% | 100.4% |
| Italy | 31,305 | 1.5% | 2.3% | 0.5% | -1.0% | 63.6% | 63.3% | 63.7% | 26.7% | 26.7% | 26.6% | 90.4% | 90.0% | 90.4% |
| Spain | 30,137 | 2.1% | 1.6% | 4.7% | 3.2% | 71.9% | 71.7% | 71.7% | 22.4% | 22.4% | 22.3% | 94.3% | 94.0% | 94.0% |
| Switzerland | 14,751 | 2.1% | 1.1% | 0.8% | 0.5% | 66.0% | 67.5% | 68.2% | 31.9% | 31.8% | 31.8% | 97.9% | 99.4% | 100.0% |
| Russia | 12,902 | 0.8% | 7.2% | 2.5% | 3.8% | 52.1% | 54.1% | 56.7% | 37.1% | 35.0% | 33.9% | 89.2% | 89.1% | 90.6% |
| Netherlands | 11,974 | 1.3% | 4.8% | -3.0% | -3.3% | 90.1% | 90.6% | 90.7% | 8.5% | 8.6% | 8.8% | 98.6% | 99.2% | 99.5% |
| Belgium | 10,766 | 2.0% | 2.1% | 1.5% | 1.2% | 63.4% | 62.8% | 63.2% | 30.6% | 30.8% | 30.5% | 94.0% | 93.6% | 93.7% |
| Austria | 9,688 | 2.1% | 3.5% | 2.8% | 2.4% | 67.4% | 67.9% | 68.4% | 27.9% | 27.9% | 27.9% | 95.3% | 95.8% | 96.3% |
| Poland | 9,563 | 1.6% | 5.8% | 13.9% | 8.0% | 61.9% | 62.1% | 62.3% | 27.4% | 27.4% | 28.5% | 89.3% | 89.5% | 90.8% |
| South Africa | 8,941 | 2.6% | 6.9% | 8.2% | 7.8% | 56.8% | 57.5% | 58.3% | 32.4% | 32.1% | 31.4% | 89.2% | 89.6% | 89.7% |
| Sweden | 8,428 | 1.5% | 5.1% | 3.9% | 4.3% | 72.3% | 72.7% | 72.8% | 20.6% | 20.1% | 20.2% | 92.9% | 92.8% | 92.9% |
| Denmark | 8,035 | 2.3% | -5.3% | -1.2% | 1.3% | 73.4% | 72.6% | 72.7% | 16.0% | 16.2% | 16.6% | 89.5% | 88.8% | 89.2% |
| Norway | 7,359 | 1.6% | 8.7% | 4.1% | 3.3% | 71.8% | 71.4% | 70.5% | 16.7% | 17.1% | 16.6% | 88.5% | 88.5% | 87.1% |
| Turkey | 7,166 | 0.9% | 16.3% | 17.4% | 15.9% | 79.1% | 78.8% | 78.3% | 22.3% | 23.0% | 22.7% | 101.4% | 101.8% | 101.0% |
| Israel | 6,441 | 1.7% | 4.6% | 5.3% | 4.3% | 71.2% | 72.8% | 73.9% | 28.1% | 28.2% | 28.2% | 99.3% | 101.0% | 102.1% |
| U.A.E. | 4,118 | 1.0% | -3.5% | 2.5% | 3.1% | 61.3% | 62.1% | 66.6% | 27.9% | 27.5% | 26.3% | 89.1% | 89.6% | 92.9% |
| Finland | 4,070 | 1.6% | -1.9% | -1.1% | -1.5% | 77.6% | 75.2% | 74.0% | 22.6% | 22.3% | 21.8% | 100.2% | 97.4% | 95.8% |
| Portugal | 3,982 | 1.7% | -1.0% | 4.1% | 3.8% | 75.3% | 75.2% | 75.1% | 27.9% | 28.5% | 29.0% | 103.2% | 103.7% | 104.1% |
| Czech Republic | 3,923 | 1.8% | 4.1% | 5.4% | 2.3% | 60.6% | 60.8% | 60.0% | 29.0% | 28.8% | 29.0% | 89.6% | 89.6% | 89.0% |
| Saudi Arabia | 3,741 | 0.5% | -14.1% | -5.3% | 4.1% | 81.6% | 82.2% | 81.2% | 15.4% | 15.9% | 15.1% | 97.0% | 98.1% | 96.2% |
| Ireland | 2,994 | 0.8% | -9.4% | -4.3% | -0.2% | 66.5% | 67.8% | 69.4% | 27.7% | 28.3% | 28.8% | 94.2% | 96.0% | 98.2% |
| Greece | 2,061 | 1.0% | -0.4% | -4.1% | -3.2% | 38.4% | 38.8% | 38.5% | 50.5% | 48.7% | 46.3% | 88.9% | 87.5% | 84.8% |
| Romania | 1,939 | 0.9% | 24.4% | 8.5% | -9.1% | 60.6% | 60.6% | 60.7% | 36.6% | 36.5% | 36.4% | 97.2% | 97.1% | 97.1% |
| Morocco | 1,737 | 1.6% | 4.2% | 4.2% | 5.1% | 67.9% | 68.5% | 67.2% | 34.5% | 34.4% | 34.9% | 102.4% | 102.9% | 102.1% |
| Bulgaria | 1,189 | 1.8% | 20.2% | 10.2% | 8.0% | 51.9% | 52.0% | 52.5% | 32.1% | 32.2% | 31.6% | 84.0% | 84.2% | 84.1% |
| Luxembourg | 959 | 1.5% | 5.1% | 2.2% | 3.0% | 73.0% | 71.0% | 65.4% | 25.2% | 26.9% | 27.6% | 98.1% | 97.9% | 93.0% |
| Nigeria | 665 | 0.2% | 14.6% | 4.8% | 2.7% | 53.8% | 54.9% | 52.5% | 46.9% | 46.5% | 47.5% | 100.8% | 101.4% | 100.0% |
| Subtotal | 403,703 | 1.7% | 3.8% | 1.6% | 1.6% | 69.0% | 69.5% | 69.3% | 26.5% | 26.3% | 26.4% | 95.5% | 95.9% | 95.8% |
| Asia Pacific | | | | | | | | | | | | | | |
| China | 162,802 | 1.2% | 9.6% | 10.5% | 11.6% | 62.1% | 60.5% | 60.4% | 35.2% | 37.2% | 37.4% | 97.3% | 97.7% | 97.8% |
| Japan | 78,994 | 1.6% | 2.1% | 0.4% | 1.5% | 71.6% | 68.1% | 64.3% | 27.4% | 26.7% | 25.7% | 98.9% | 94.8% | 90.0% |
| Australia | 30,082 | 2.2% | 7.1% | 4.7% | 3.8% | 72.2% | 71.8% | 72.5% | 22.1% | 21.9% | 21.6% | 94.3% | 93.7% | 94.1% |
| S. Korea | 21,775 | 1.3% | 13.0% | 7.8% | 6.7% | 84.5% | 82.9% | 83.3% | 22.5% | 21.6% | 20.8% | 107.0% | 104.4% | 104.1% |
| India | 16,276 | 0.6% | 15.5% | 20.0% | 15.6% | 78.5% | 78.9% | 80.1% | 28.0% | 27.2% | 27.7% | 106.5% | 106.1% | 107.8% |
| Thailand | 6,016 | 1.2% | 5.4% | 2.4% | 1.6% | 57.4% | 56.8% | 56.1% | 35.7% | 36.5% | 36.9% | 93.2% | 93.3% | 92.9% |
| Taiwan | 4,819 | 0.8% | -1.4% | 2.9% | 4.5% | 56.3% | 55.7% | 56.2% | 36.9% | 37.1% | 37.4% | 93.2% | 92.9% | 93.6% |
| New Zealand | 4,325 | 2.1% | 9.5% | 7.4% | 5.8% | 59.5% | 60.5% | 61.4% | 27.2% | 27.2% | 29.3% | 86.7% | 87.8% | 90.7% |
| Indonesia | 4,270 | 0.4% | 11.6% | 6.7% | 9.9% | 51.1% | 51.9% | 52.3% | 39.7% | 40.3% | 39.0% | 90.8% | 92.1% | 91.3% |
| Malaysia | 3,853 | 1.1% | 1.0% | 0.7% | 2.2% | 56.9% | 58.3% | 58.2% | 30.6% | 31.4% | 30.9% | 87.5% | 89.7% | 89.0% |
| Hong Kong | 2,893 | 0.8% | 4.4% | 1.2% | 2.0% | 61.0% | 61.2% | 61.5% | 35.2% | 35.8% | 34.5% | 96.2% | 97.0% | 96.0% |
| Singapore | 2,373 | 0.7% | 1.7% | -0.3% | 0.5% | 70.2% | 65.9% | 68.5% | 33.9% | 38.0% | 36.2% | 104.1% | 104.0% | 104.8% |
| Subtotal | 338,478 | 1.2% | 7.7% | 7.3% | 7.8% | 67.1% | 65.4% | 64.6% | 31.0% | 31.7% | 31.5% | 98.0% | 97.1% | 96.2% |
| Grand Total | 1,498,011 | 1.9% | 5.5% | 4.5% | 4.6% | 69.8% | 70.4% | 69.9% | 27.5% | 27.7% | 27.8% | 97.4% | 98.1% | 97.8% |

Geographic Opportunities

Aon's Reinsurance Solutions business created the Country Opportunity Index to identify countries with a desirable mix of profitability, growth potential, and a relatively stable political environment. The table below displays the 50 property casualty markets ranked by this Index and divided into quartiles.

Six of the 13 countries in Quartile 1 were also in the top quartile last year, and two have been in Quartile 1 for all six years of this Index. Asian countries dominate the top positions, but Quartile 1 also includes countries in Latin America, Scandinavia, and the Middle East.

For the fourth year in a row Malaysia and Indonesia are ranked within the top ten positions. Both countries have shown low combined ratios, healthy premium and GDP growth, and a stable political environment.

Poland entered the top quartile this year due to an increase in its real GDP 5 year growth and 5 year premium growth. Saudi Arabia and Singapore fell out because their premium growth decreased and their other growth figures did not keep pace with the countries currently in the top quartile.

Note that the U.K., Japan, and most of Western Europe are in Quartiles 3 and 4. This index suggests that to achieve strong insurance growth, it is best for insurers to look beyond the developed economies.

Aon's Country Opportunity Index

| Rank | Country | Syr Cumulative Net Combined Ratio | Syr Annualized Premium Growth | Real GDP Syr Growth | Population Syr Annualized Growth | Political Risk Assessment |
|-------------------|----------------|-----------------------------------|-------------------------------|---------------------|----------------------------------|---------------------------|
| Quartile 1 | | | | | | |
| 1 | New Zealand* | 90.7% | 5.8% | 5.2% | 1.9% | Low |
| 2 | Australia* | 94.1% | 3.8% | 4.1% | 1.6% | Low |
| 2 | Malaysia** | 89.0% | 2.2% | 6.6% | 1.3% | Medium Low |
| 4 | Indonesia** | 91.3% | 9.9% | 6.7% | 1.1% | Medium |
| 4 | Poland | 90.8% | 8.0% | 5.9% | 0.0% | Medium Low |
| 4 | Peru | 92.8% | 5.6% | 4.9% | 1.1% | Low |
| 4 | Sweden* | 92.9% | 4.3% | 4.2% | 1.2% | Low |
| 4 | Luxembourg* | 93.0% | 3.0% | 4.9% | 2.3% | Low |
| 9 | Turkey | 101.0% | 15.9% | 5.8% | 1.3% | Medium |
| 9 | India | 107.8% | 15.6% | 8.5% | 1.3% | Medium |
| 9 | Bulgaria | 84.1% | 8.0% | 5.2% | -0.7% | Medium |
| 9 | South Africa | 89.7% | 7.8% | 2.4% | 1.7% | Medium |
| 9 | Israel | 102.1% | 4.3% | 5.0% | 2.0% | Medium Low |
| Quartile 2 | | | | | | |
| 14 | China | 97.8% | 11.6% | 8.4% | 0.5% | Medium |
| 14 | Mexico | 91.6% | 10.2% | 3.7% | 1.0% | Medium |
| 14 | Chile | 98.6% | 7.0% | 3.7% | 1.0% | Medium Low |
| 14 | U.S. | 99.8% | 4.5% | 4.1% | 0.7% | Low |
| 14 | U.A.E. | 92.9% | 3.1% | 4.0% | 2.9% | Medium Low |
| 14 | Czech Republic | 89.0% | 2.3% | 5.2% | 0.2% | Medium Low |
| 14 | Denmark | 89.2% | 1.3% | 4.1% | 0.7% | Low |
| 21 | Colombia | 104.5% | 8.5% | 4.1% | 1.1% | Medium |
| 21 | S. Korea | 104.1% | 6.7% | 4.4% | 0.4% | Medium Low |
| 21 | Canada | 100.5% | 3.9% | 3.3% | 1.1% | Low |
| 21 | Germany | 95.8% | 3.6% | 3.4% | 0.5% | Low |
| 21 | Norway | 87.1% | 3.3% | 3.2% | 0.8% | Low |
| Quartile 3 | | | | | | |
| 21 | Austria | 96.3% | 2.4% | 3.6% | 0.9% | Low |
| 21 | Ireland | 98.2% | -0.2% | 11.7% | 1.2% | Medium |
| 28 | Morocco | 102.1% | 5.1% | 4.7% | 1.1% | Medium |
| 28 | Taiwan | 93.6% | 4.5% | 4.1% | 0.2% | Medium |
| 28 | Saudi Arabia | 96.2% | 4.1% | 3.2% | 1.9% | Medium |
| 31 | Spain | 94.0% | 3.2% | 4.5% | 0.1% | Medium |
| 31 | Brazil | 88.4% | 2.6% | 1.0% | 0.8% | Medium |
| 31 | Hong Kong | 96.0% | 2.0% | 3.6% | 0.8% | Medium |
| 31 | Thailand | 92.9% | 1.6% | 5.1% | 0.3% | Medium High |
| 31 | Switzerland | 100.0% | 0.5% | 3.4% | 1.1% | Low |
| 31 | Singapore | 104.8% | 0.5% | 4.6% | 0.8% | Low |
| 31 | Finland | 95.8% | -1.5% | 3.4% | 0.3% | Low |
| 31 | Netherlands | 99.5% | -3.3% | 4.0% | 0.4% | Low |
| Quartile 4 | | | | | | |
| 39 | Argentina | 114.7% | 33.8% | 1.3% | 1.1% | Medium High |
| 39 | Russia | 90.6% | 3.8% | 2.4% | 0.0% | Medium High |
| 39 | Japan | 90.0% | 1.5% | 2.6% | -0.1% | Medium Low |
| 39 | Belgium | 93.7% | 1.2% | 3.3% | 0.5% | Medium Low |
| 39 | Ecuador | 92.4% | -3.8% | 2.1% | 1.5% | Medium High |
| 44 | Portugal | 104.1% | 3.8% | 4.1% | -0.2% | Medium |
| 44 | Nigeria | 100.0% | 2.7% | 2.8% | 2.7% | Very High |
| 44 | France | 97.8% | 2.4% | 3.2% | 0.3% | Medium Low |
| 44 | Italy | 90.4% | -1.0% | 2.6% | 0.0% | Medium |
| 44 | U.K. | 100.4% | -5.0% | 3.4% | 0.7% | Medium Low |
| 44 | Romania | 97.1% | -9.1% | 6.6% | -0.4% | Medium High |
| 50 | Greece | 84.8% | -3.2% | 2.6% | -0.5% | High |

*Indicates top quartile performer in 2018.

**Indicates top quartile performer in each year since 2013. Index methodology explained in Sources and Notes.

Growth markets and out/underperformers

To determine expansion opportunities we examined premium growth and loss ratio performance by country across motor, property, and liability lines of business as well as premium growth and combined ratio performance by country for all lines. The quadrant plots below identify countries as either low growth or high growth, and as either out performers or under performers.

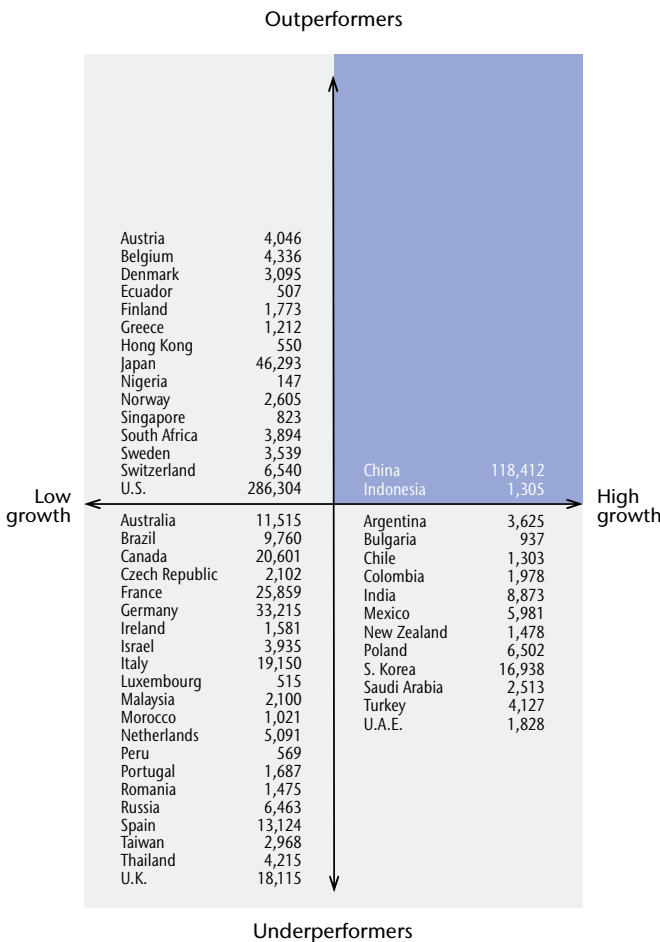
To measure performance, the first three quadrant plots use loss ratio for each line of business while the fourth plot shows combined ratio for all lines of business. Each plot also provides the gross written premium size, in USD millions, of each country.

For all quadrant plots, growth is determined based on five-year annualized premium growth. Countries with values greater than 7.5 percent are classified as high growth.

Loss ratio and combined ratio performance is determined based on five-year cumulative loss ratio and five-year net cumulative combined ratio, respectively. Each country's loss ratio performance is compared against its income level peers, using a USD 30,000 GDP per capita split between high income and low income countries; whereas, combined ratio performance is compared against the global combined ratio. Countries with five-year loss ratios lower than the average of their income peers, or combined ratios below the global combined ratio, are classified as outperformers.

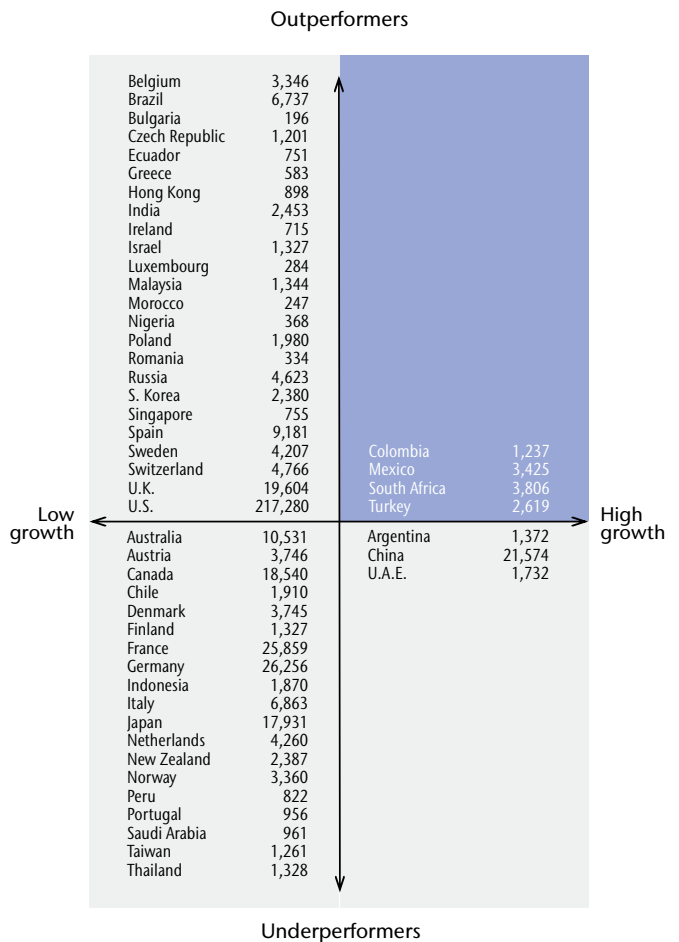
Motor

Loss ratio performance



Property

Loss ratio performance



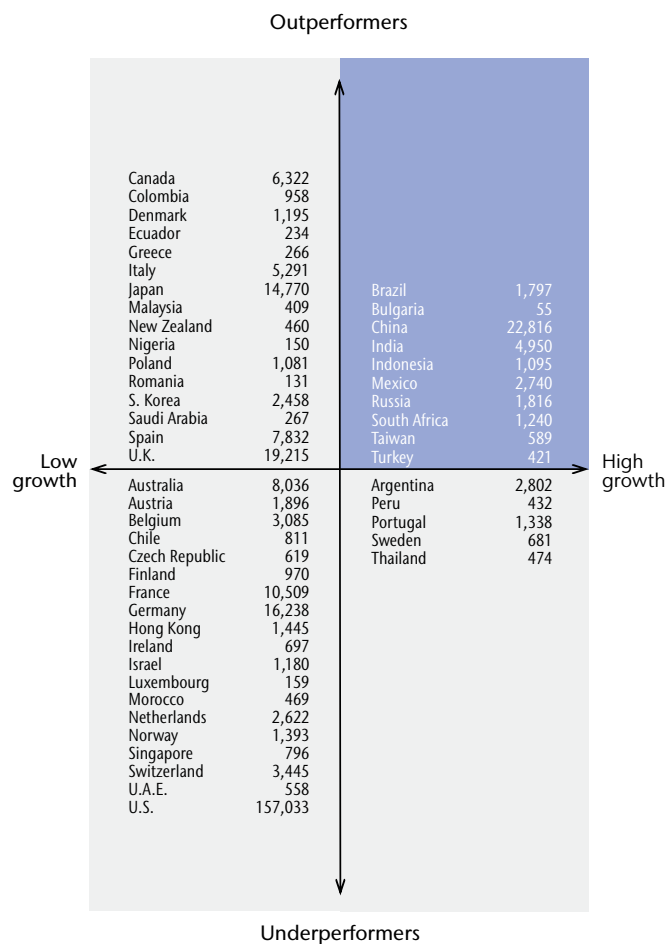
Eleven countries are high growth, loss ratio outperformers in at least one line of business. Of these eleven countries, five appear in two of three lines of business analyzed as high growth outperformers: China, Indonesia, Mexico, South Africa, and Turkey.

If we compare these countries based on overall combined ratio, China, Indonesia, Mexico, and South Africa are outperformers globally. The exception is Turkey, which underperform their peers with a five-year net combined ratio of 101.0 percent. In addition to the five outperforming countries mentioned above, two additional countries outperform the global averages for both growth and profitability. Bulgaria, for instance, outperforms for liability insurance, and its five-

year combined ratio of 84.1 percent is better than both the global average and the average among its EMEA peers. See the Top 50 P&C Markets table for more details on page four. Using combined ratio in addition to loss history allows us to further analyze and target high growth opportunities.

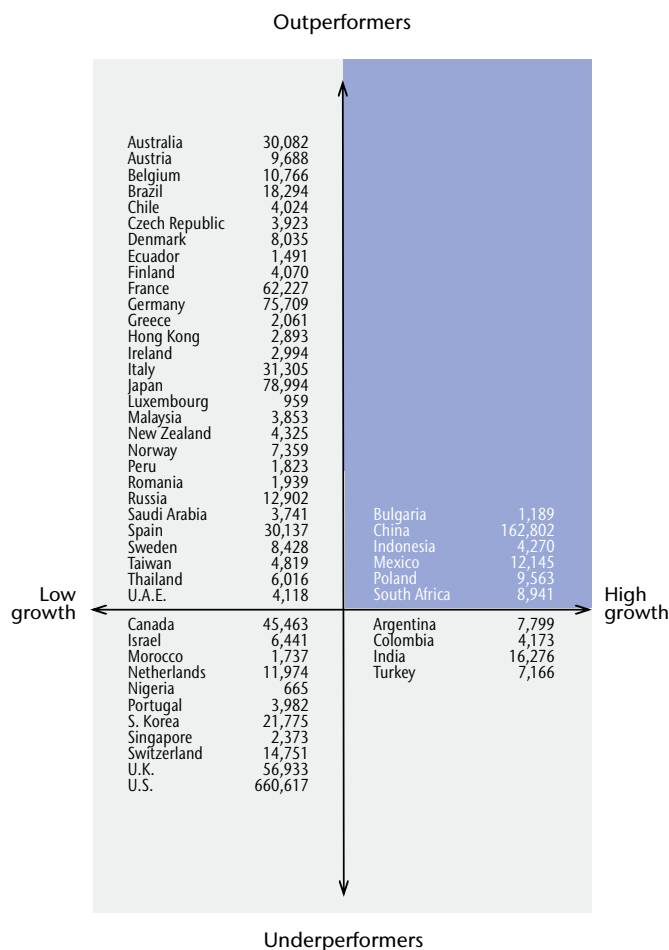
Liability

Loss ratio performance



All Lines

Combined ratio performance



Global Risk Parameters

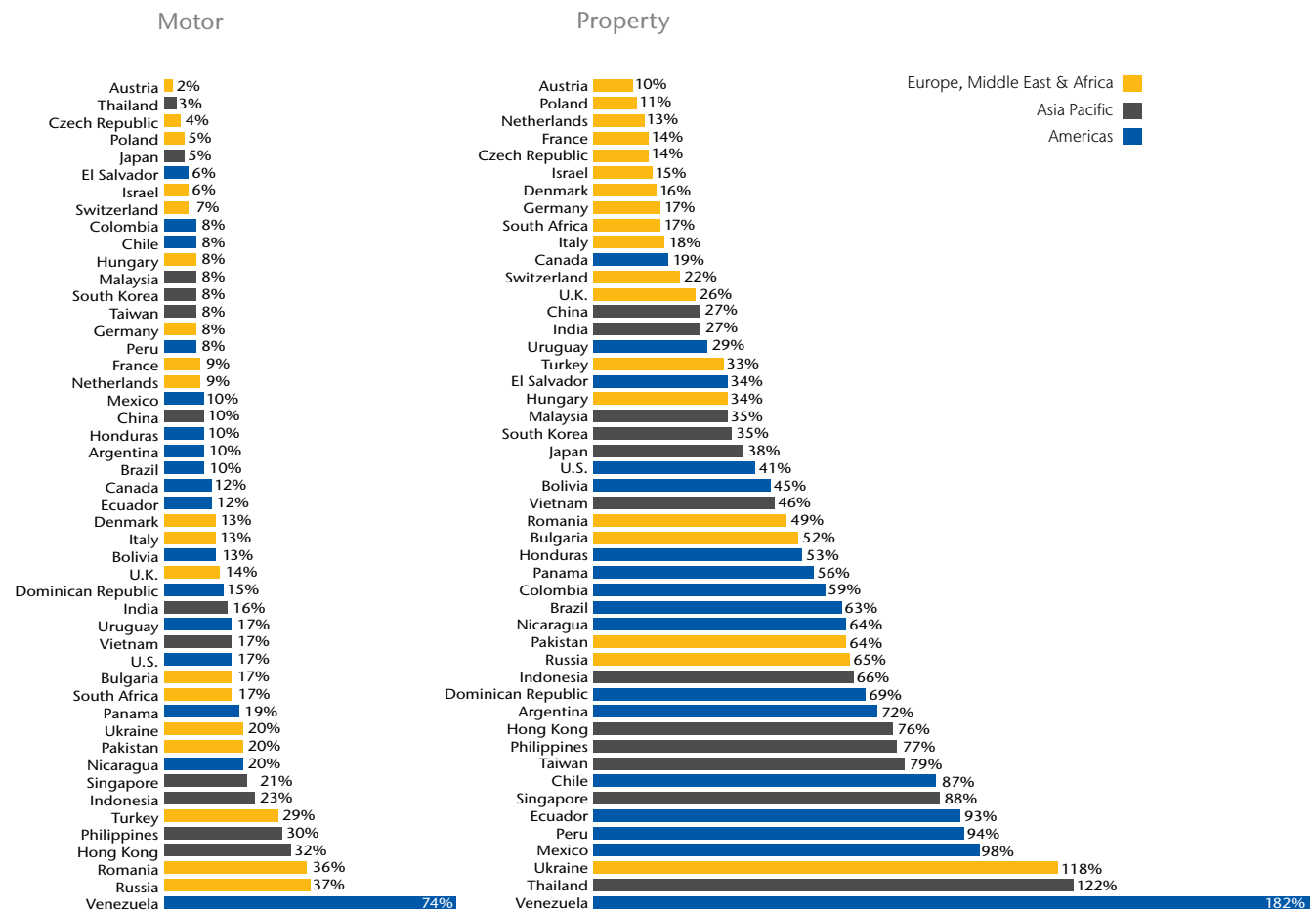
The insurance business is always a tradeoff of assuming risk in exchange for potential—presumed—return. We now turn to the “risk” side of the risk and return equation. Measuring the volatility and correlation of risk has long been the hallmark of the Study.

The 2020 edition of the Study quantifies the systemic risk by line for 48 countries worldwide. By systemic risk, or volatility, we mean the coefficient of variation of loss ratio for a large book of business. Coefficient of variation (CV) is a commonly used normalized measure of risk defined as the standard deviation divided by the mean. Systemic risk typically comes from non-diversifiable risk sources such as changing market rate adequacy, unknown prospective frequency and severity trends, weather-related losses, legal reforms and court decisions, the level of economic activity, and other

macroeconomic factors. It also includes the risk to smaller and specialty lines of business caused by a lack of credible data. For many lines of business systemic risk is the major component of underwriting volatility.

The systemic risk factors for major lines by region appear on the next page. Detailed charts comparing motor and property risk by country appear below. The factors measure the volatility of gross loss ratios. If gross loss ratios are not available the net loss ratio is used.

Coefficient of variation of gross loss ratio by country



Coefficient of variation of loss ratio for major lines by country

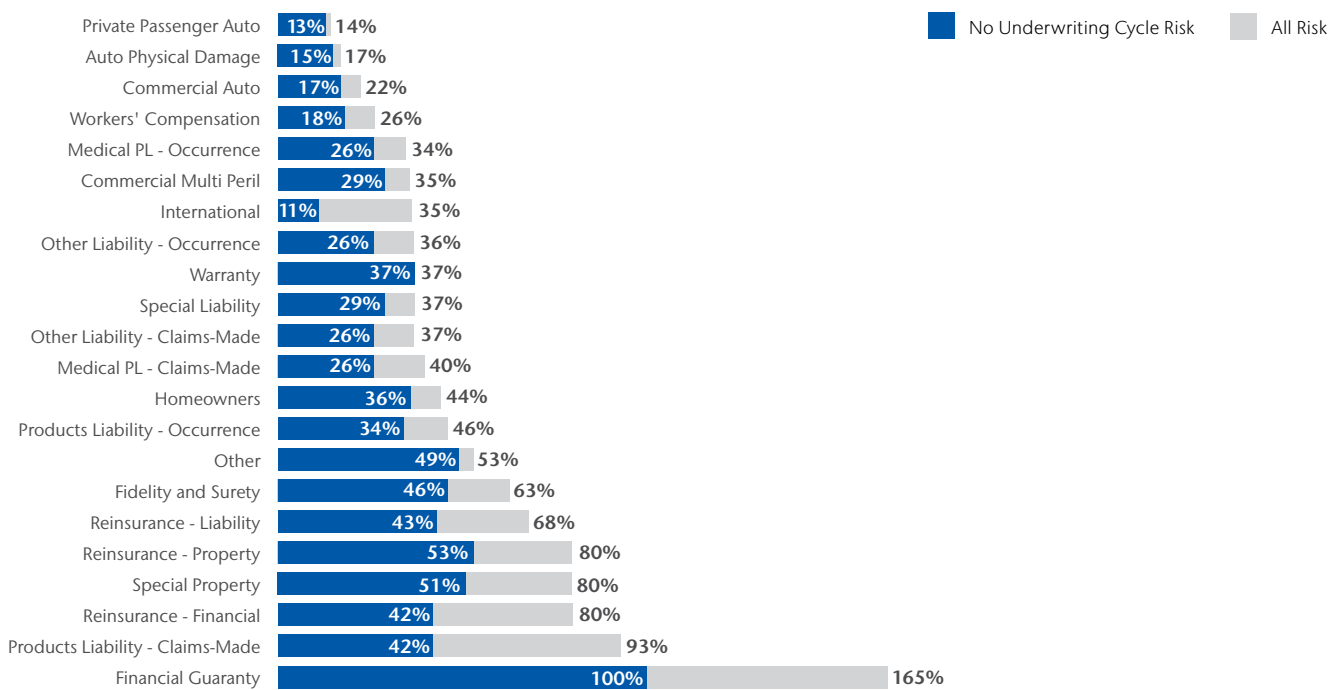
| | Motor | Motor— Personal | Motor— Commercial | Property | Property— Personal | Property— Commercial | General Liability | Accident & Health | Marine, Aviation & Transit | Workers Compensation | Credit | Fidelity & Surety |
|------------------------------|--------------------|--------------------|----------------------|----------|-----------------------|-------------------------|----------------------|----------------------|----------------------------------|-------------------------|--------|----------------------|
| Americas | Argentina | 10% | | 72% | | | 118% | 74% | 85% | | | 187% |
| | Bolivia | 13% | | 45% | | | | 8% | | 45% | | 89% |
| | Brazil | 10% | | 63% | | | 96% | 97% | 41% | | 99% | |
| | Canada | 12% | | 19% | 17% | 30% | 33% | 35% | 53% | | 76% | 93% |
| | Chile | 8% | | 87% | | | 80% | 50% | 66% | | | 79% |
| | Colombia | 8% | | 59% | | 64% | 39% | 32% | 66% | | | 84% |
| | Dominican Republic | 15% | | 69% | | | | 31% | | | | 133% |
| | Ecuador | 12% | | 93% | | | 101% | 38% | 71% | | | 80% |
| | El Salvador | 6% | | 34% | | | | 13% | | | | 151% |
| | Honduras | 10% | | 53% | | | | 13% | | | | 72% |
| | Mexico | 10% | | 98% | | | 75% | 6% | 60% | | | 63% |
| | Nicaragua | 20% | | 64% | | | | 77% | | | | 153% |
| | Panama | 19% | | 56% | | | | 35% | | | | 165% |
| | Peru | 8% | | 94% | | | 69% | 21% | 36% | | 34% | 119% |
| | Uruguay | 17% | | 29% | | | | | | 9% | | 81% |
| | U.S. | 17% | 14% | 22% | 41% | 44% | 35% | 36% | 53% | 37% | 26% | |
| Venezuela | 74% | | | 182% | | | | 125% | | | | 329% |
| Asia Pacific | China | 10% | | 27% | | | 18% | 36% | 26% | | 33% | |
| | Hong Kong | 32% | | 76% | | | 73% | 22% | 56% | 63% | | |
| | India | 16% | | 27% | | | | 11% | 24% | | | |
| | Indonesia | 23% | | 66% | | | 126% | 36% | 86% | | 37% | 93% |
| | Japan | 5% | | 38% | | | 13% | 8% | 17% | 16% | | |
| | Malaysia | 8% | | 34% | | | 81% | 42% | 32% | 65% | | 50% |
| | Pakistan | 20% | | 64% | | | | 29% | 48% | | | |
| | Philippines | 30% | | 77% | | | | 74% | 97% | | | 128% |
| | Singapore | 21% | | 88% | | | | 39% | 66% | 29% | | |
| | South Korea | 8% | | 35% | | | 22% | | 49% | | | 134% |
| | Taiwan | 8% | 8% | 79% | | | 25% | 9% | 55% | | 107% | |
| | Thailand | 3% | | 122% | | 99% | | 23% | 41% | | | |
| | Vietnam | 17% | | 46% | | | 87% | 58% | 43% | | | |
| Europe, Middle East & Africa | Austria | 2% | | 10% | 13% | 45% | 5% | 5% | 35% | | | 21% |
| | Bulgaria | 17% | | 52% | | | 47% | 7% | 54% | 9% | | 2% |
| | Czech Republic | 4% | | 14% | | | 6% | 20% | 56% | | | 14% |
| | Denmark | 13% | | 16% | 14% | 20% | 26% | 13% | 27% | 70% | | |
| | France | 9% | | 14% | | 14% | 5% | 13% | 10% | | | 9% |
| | Germany | 8% | | 17% | 18% | 30% | 24% | 24% | 21% | | 50% | |
| | Hungary | 8% | | 34% | | | | | | | | |
| | Israel | 6% | | 15% | | | 12% | | | | | |
| | Italy | 13% | | 18% | | | 29% | 20% | 44% | | 41% | 71% |
| | Netherlands | 9% | | 13% | | | 17% | 13% | 30% | | | 25% |
| | Poland | 5% | | 11% | | | | | 21% | | | 47% |
| | Romania | 36% | | 49% | | | 100% | | | | | |
| | Russia | 37% | | 65% | | | | | | | | |
| | South Africa | 17% | | 17% | | | 55% | 38% | 42% | | | |
| | Switzerland | 6% | | 22% | | | 13% | 9% | 41% | | 82% | |
| Turkey | 29% | | 8% | 33% | | 26% | 87% | 12% | 57% | | 61% | 123% |
| Ukraine | 20% | | 118% | | | | | | | | | |
| U.K. | 14% | 13% | 17% | 26% | 22% | 24% | 34% | 5% | 8% | 7% | | 32% |

U.S. Risk Parameters

For the U.S. risk parameters of the Study, we use data from 24 years of NAIC annual statements for over 2,890 individual groups and companies. Our database covers all 22 Schedule P lines of business and contains more than five million records of individual company observations from accident years 1987-2019.

The chart below shows the loss ratio volatility for each Schedule P line, with and without the effect of the underwriting cycle. The underwriting cycle effect is removed by normalizing loss ratios by accident year prior to computing volatility. This adjustment decomposes loss ratio volatility into its loss and premium components.

Coefficient of variation of gross loss ratio (1987-2019)



The underwriting cycle acts simultaneously across many lines of business, driving correlation between the results of different lines and amplifying the effect of underwriting risk to primary insurers and reinsurers. Our analysis demonstrates that the cycle increases volatility substantially for all major commercial lines, as shown in the table. For example, the underwriting volatility of reinsurance liability increases by 58 percent and commercial auto liability by 29 percent. Personal lines are more formula-rated and thus show a lower cycle effect, with private passenger auto volatility only increasing by 11 percent because of the cycle.

See page 58 of the [2015 Insurance Risk Study](#) for a detailed description of how the underwriting cycle input is calculated.

U.S. underwriting cycle impact on volatility

| Line of Business | Impact |
|-------------------------------|--------|
| Reinsurance - Liability | 58% |
| Medical PL - Claims-Made | 49% |
| Workers' Compensation | 43% |
| Other Liability - Claims-Made | 41% |
| Other Liability - Occurrence | 37% |
| Commercial Auto | 29% |
| Special Liability | 28% |
| Homeowners | 23% |
| Commercial Multi Peril | 21% |
| Private Passenger Auto | 11% |

Macroeconomic, Demographic, and Social Indicators

| Country | GDP—PPP, USD billions | GDP 5yr Annualized real growth | Population—millions | Population 5yr annualized growth | GDP Per Capita—PPP, USD | Government consumption as % of GDP | Actual individual consumption as % of GDP | General government debt as % of GDP | New foreign direct investment—USD billions | Inflation rate | Unemployment rate | Corporate tax rate | Political risk assessment | Aon terrorism risk assessment | World Bank relative ease of doing business |
|----------------|-----------------------|--------------------------------|---------------------|----------------------------------|-------------------------|------------------------------------|---|-------------------------------------|--|----------------|-------------------|--------------------|---------------------------|-------------------------------|--|
| Argentina | 911.6 | 1.3% | 45.1 | 1.1% | 17,839 | 15.3% | 72.3% | n/a | 6.2 | 23.2% | 9.8% | 30.0% | Medium High | Medium | More difficult |
| Australia | 1,362.1 | 4.1% | 25.6 | 1.6% | 46,777 | 15.8% | 57.6% | 20.4% | 38.6 | 2.3% | 5.2% | 30.0% | Low | Low | Easiest |
| Austria | 476.8 | 3.6% | 9.0 | 0.9% | 46,913 | 15.3% | 57.4% | 48.8% | 13.1 | 2.0% | 4.5% | 25.0% | Low | Low | Easiest |
| Belgium | 572.9 | 3.3% | 11.5 | 0.5% | 43,214 | 18.7% | 57.4% | 87.0% | -28.5 | 1.6% | 5.4% | 29.0% | Medium Low | Medium | Easiest |
| Brazil | 3,480.5 | 1.0% | 209.8 | 0.8% | 14,552 | 21.6% | 61.2% | 56.2% | 78.6 | 4.1% | 11.9% | 34.0% | Medium | Medium | More difficult |
| Bulgaria | 170.9 | 5.2% | 7.0 | -0.7% | 21,384 | 20.5% | 63.0% | 7.9% | 1.5 | 2.3% | 4.2% | 10.0% | Medium | Low | Easier |
| Canada | 1,904.4 | 3.3% | 37.5 | 1.1% | 44,215 | 18.7% | 58.3% | 26.6% | 44.9 | 1.9% | 5.7% | 26.5% | Low | Low | Easiest |
| Chile | 495.2 | 3.7% | 18.7 | 1.0% | 23,632 | 15.5% | 66.6% | 8.3% | 6.1 | 3.0% | 7.3% | 27.0% | Medium Low | High | Easier |
| China | 27,307.0 | 8.4% | 1400.2 | 0.5% | 17,048 | 13.0% | 32.2% | n/a | 155.8 | 2.5% | 3.6% | 25.0% | Medium | Medium | Easiest |
| Colombia | 785.8 | 4.1% | 50.4 | 1.1% | 13,603 | 20.0% | 64.8% | 40.8% | 14.5 | 3.2% | 10.5% | 32.0% | Medium | High | Easier |
| Czech Republic | 413.0 | 5.2% | 10.6 | 0.2% | 34,139 | 23.2% | 51.9% | n/a | 9.3 | 2.0% | 2.0% | 19.0% | Medium Low | Low | Easiest |
| Denmark | 319.5 | 4.1% | 5.8 | 0.7% | 46,771 | 20.4% | 49.0% | 14.7% | -6.5 | 1.3% | 5.0% | 22.0% | Low | Low | Easiest |
| Ecuador | 203.6 | 2.1% | 17.3 | 1.5% | 10,219 | 16.3% | 61.8% | n/a | 1.0 | 1.2% | 3.8% | 25.0% | Medium High | Medium | More difficult |
| Finland | 265.9 | 3.4% | 5.5 | 0.3% | 41,926 | 20.1% | 59.7% | 21.8% | 8.3 | 1.5% | 6.7% | 20.0% | Low | Negligible | Easiest |
| France | 3,061.8 | 3.2% | 65.0 | 0.3% | 41,029 | 20.1% | 57.1% | 88.2% | 67.1 | 1.5% | 8.5% | 28.0% | Medium Low | Medium | Easiest |
| Germany | 4,443.6 | 3.4% | 83.0 | 0.5% | 47,034 | 15.7% | 55.8% | 38.6% | 51.0 | 1.7% | 3.2% | 30.0% | Low | Low | Easiest |
| Greece | 323.7 | 2.6% | 10.7 | -0.5% | 26,643 | 18.9% | 72.7% | n/a | 4.6 | 1.4% | 17.3% | 24.0% | High | Medium | Easier |
| Hong Kong | 482.2 | 3.6% | 7.6 | 0.8% | 58,094 | 16.7% | 29.7% | n/a | n/a | 2.5% | 3.0% | n/a | Medium | Medium | Easiest |
| India | 11,043.2 | 8.5% | 1351.8 | 1.3% | 7,409 | 12.1% | 59.7% | n/a | 50.6 | 4.2% | n/a | 30.0% | Medium | High | Easier |
| Indonesia | 3,735.6 | 6.7% | 267.0 | 1.1% | 12,244 | 11.5% | 55.2% | 25.8% | 24.6 | 3.6% | 5.3% | 25.0% | Medium | High | Easier |
| Ireland | 417.9 | 11.7% | 5.0 | 1.2% | 72,000 | 8.3% | 27.5% | 53.6% | -79.3 | 1.5% | 5.0% | 12.5% | Medium | Negligible | Easiest |
| Israel | 354.9 | 5.0% | 9.1 | 2.0% | 34,201 | 22.4% | 56.0% | 55.9% | 18.2 | 1.7% | 3.8% | 23.0% | Medium Low | High | Easiest |
| Italy | 2,454.8 | 2.6% | 60.7 | 0.0% | 35,115 | 14.3% | 62.0% | 121.5% | 29.2 | 1.2% | 10.0% | 24.0% | Medium | Low | Easier |
| Japan | 5,711.9 | 2.6% | 126.2 | -0.1% | 39,795 | 18.4% | 57.8% | 153.6% | 37.2 | 1.5% | 2.4% | 30.6% | Medium Low | Low | Easiest |
| Luxembourg | 68.8 | 4.9% | 0.6 | 2.3% | 95,033 | 12.8% | 39.6% | -9.6% | -5.6 | 1.9% | 5.4% | 24.9% | Low | Negligible | Easier |
| Malaysia | 1,076.4 | 6.6% | 32.8 | 1.3% | 28,345 | 17.7% | 58.4% | n/a | 8.6 | 2.5% | 3.3% | 24.0% | Medium Low | Medium | Easiest |
| Mexico | 2,616.3 | 3.7% | 125.9 | 1.0% | 18,435 | 15.4% | 69.3% | 45.6% | 28.9 | 3.1% | 3.3% | 30.0% | Medium | Medium | Easier |
| Morocco | 327.3 | 4.7% | 35.6 | 1.1% | 8,108 | 21.3% | 52.4% | 64.9% | 1.6 | 2.0% | 9.2% | 31.0% | Medium | Medium | Easier |
| Netherlands | 1,005.3 | 4.0% | 17.2 | 0.4% | 50,878 | 18.3% | 46.7% | 42.6% | 28.1 | 1.6% | 3.4% | 25.0% | Low | Low | Easiest |
| New Zealand | 208.7 | 5.2% | 5.0 | 1.9% | 35,965 | 17.2% | 63.9% | 10.3% | 3.9 | 1.9% | 4.1% | 28.0% | Low | Negligible | Easiest |
| Nigeria | 1,215.4 | 2.8% | 199.2 | 2.7% | 5,326 | 7.9% | 78.7% | 26.3% | 2.0 | 11.7% | n/a | 30.0% | Very High | Severe | More difficult |
| Norway | 407.4 | 3.2% | 5.4 | 0.8% | 67,021 | 15.8% | 41.9% | -84.5% | 1.8 | 1.7% | 3.7% | 22.0% | Low | Low | Easiest |
| Peru | 476.0 | 4.9% | 32.5 | 1.1% | 13,006 | 16.3% | 68.1% | 11.6% | 6.5 | 2.0% | 6.6% | 29.5% | Low | Low | Easier |
| Poland | 1,287.3 | 5.9% | 38.0 | 0.0% | 29,474 | 19.8% | 63.1% | 42.8% | 15.0 | 1.9% | 3.3% | 19.0% | Medium Low | Medium | Easiest |
| Portugal | 346.9 | 4.1% | 10.3 | -0.2% | 28,966 | 18.2% | 70.4% | 107.0% | 8.3 | 1.7% | 6.5% | 21.0% | Medium | Negligible | Easiest |
| Romania | 549.2 | 6.6% | 19.5 | -0.4% | 24,239 | 19.0% | 62.8% | 29.8% | 6.9 | 3.0% | 3.9% | 16.0% | Medium High | Low | Easier |
| Russia | 4,390.0 | 2.4% | 143.9 | 0.0% | 26,449 | 16.7% | 62.8% | n/a | n/a | 4.5% | 4.6% | 20.0% | Medium High | Medium | Easiest |
| Saudi Arabia | 1,900.9 | 3.2% | 33.9 | 1.9% | 49,622 | 20.4% | 41.5% | 8.8% | 4.6 | 2.2% | n/a | 20.0% | Medium | High | Easier |
| Singapore | 593.8 | 4.6% | 5.7 | 0.8% | 90,584 | 11.7% | 32.1% | n/a | 105.5 | 1.4% | 2.3% | 17.0% | Low | Low | Easiest |
| South Africa | 804.7 | 2.4% | 58.6 | 1.7% | 12,109 | 20.7% | 61.0% | 53.3% | 4.6 | 5.4% | 28.7% | 28.0% | Medium | Medium | Easier |
| South Korea | 2,320.5 | 4.4% | 51.9 | 0.4% | 37,542 | 16.7% | 29.7% | 12.4% | n/a | 1.6% | 3.8% | n/a | Medium Low | High | Easiest |
| Spain | 1,923.6 | 4.5% | 46.7 | 0.1% | 36,278 | 15.1% | 58.7% | 83.5% | 18.5 | 1.6% | 14.1% | 25.0% | Medium | Medium | Easiest |
| Sweden | 564.8 | 4.2% | 10.3 | 1.2% | 47,224 | 21.0% | 51.5% | 5.2% | 24.2 | 1.7% | 6.8% | 21.4% | Low | Low | Easiest |
| Switzerland | 566.2 | 3.4% | 8.6 | 1.1% | 57,386 | 7.2% | 48.6% | 19.8% | -18.4 | 0.9% | 2.3% | 14.8% | Low | Low | Easiest |
| Taiwan | 1,339.8 | 4.1% | 23.6 | 0.2% | 48,249 | n/a | 57.7% | 32.0% | n/a | 1.2% | 3.8% | 20.0% | Medium | Medium | Easiest |
| Thailand | 1,377.5 | 5.1% | 67.9 | 0.3% | 17,882 | 17.8% | 53.0% | n/a | 6.3 | 1.3% | 1.1% | 20.0% | Medium High | High | Easiest |
| Turkey | 2,361.8 | 5.8% | 83.0 | 1.3% | 23,922 | 19.4% | 53.7% | 25.8% | 8.4 | 14.1% | 13.7% | 22.0% | Medium | High | Easiest |
| U.A.E. | 744.1 | 4.0% | 10.7 | 2.9% | 61,550 | 20.7% | 64.9% | n/a | 10.4 | 2.1% | n/a | 55.0% | Medium Low | Low | Easiest |
| U.K. | 3,162.4 | 3.4% | 66.9 | 0.7% | 40,858 | 15.7% | 68.0% | 76.2% | 27.0 | 2.0% | 3.8% | 19.0% | Medium Low | Medium | Easiest |
| U.S. | 21,427.7 | 4.1% | 329.6 | 0.7% | 56,566 | 12.0% | 71.8% | 83.4% | 310.8 | 2.7% | 3.7% | 27.0% | Low | Medium | Easiest |

Global Correlation Between Lines

Correlation between lines of business is central to a realistic assessment of aggregate portfolio risk, and in fact becomes increasingly significant for larger companies where there is little idiosyncratic risk to mask correlation. Most modeling exercises are carried out at the product or business unit level and then aggregated to the company level. In many applications, the results are more sensitive to the correlation and dependency assumptions made when aggregating results than to all the detailed assumptions made at the business unit level.

The Study determines correlations between lines within each country. Correlation between lines is computed by examining the results from larger companies that write pairs of lines in the same country.

Aon's Reinsurance Analytics team has correlation tables for most countries readily available and can produce custom analyses of correlation for many insurance markets globally upon request. As examples, tables for the U.S., Canada, Colombia, and China appear below.

U.S.

| | Homeowners | Private Passenger Auto | Commercial Multi Peril | Commercial Auto | Workers' Compensation | Other Liability - Occurrence | Medical PL - Claims Made | Other Liability - Claims-Made | Products Liability - Occurrence |
|---------------------------------|------------|------------------------|------------------------|-----------------|-----------------------|------------------------------|--------------------------|-------------------------------|---------------------------------|
| Homeowners | | 1% | 28% | 5% | -4% | 3% | 5% | 3% | 14% |
| Private Passenger Auto | 1% | | 10% | 17% | 40% | 17% | 23% | 20% | 16% |
| Commercial Multi Peril | 28% | 10% | | 46% | 28% | 48% | 48% | 44% | 37% |
| Commercial Auto | 5% | 17% | 46% | | 44% | 58% | 60% | 40% | 54% |
| Workers' Compensation | -4% | 40% | 28% | 44% | | 47% | 48% | 51% | 53% |
| Other Liability - Occurrence | 3% | 17% | 48% | 58% | 47% | | 71% | 53% | 58% |
| Medical PL - Claims Made | 5% | 23% | 48% | 60% | 48% | 71% | | 66% | 53% |
| Other Liability - Claims-Made | 3% | 20% | 44% | 40% | 51% | 53% | 66% | | 26% |
| Products Liability - Occurrence | 14% | 16% | 37% | 54% | 53% | 58% | 53% | 26% | |

Canada

| | Accident & Health | Credit | Fidelity & Surety | General Liability | Marine, Aviation & Transit | Motor | Property | Special Liability |
|----------------------------|-------------------|--------|-------------------|-------------------|----------------------------|-------|----------|-------------------|
| Accident & Health | | 69% | -11% | 24% | -6% | 1% | 25% | -15% |
| Credit | 69% | | -42% | 33% | 28% | -5% | 29% | -28% |
| Fidelity & Surety | -11% | -42% | | 16% | 28% | -1% | -1% | 78% |
| General Liability | 24% | 33% | 16% | | -2% | 13% | 0% | 21% |
| Marine, Aviation & Transit | -6% | 28% | 28% | -2% | | 3% | 9% | 20% |
| Motor | 1% | -5% | -1% | 13% | 3% | | 11% | 5% |
| Property | 25% | 29% | -1% | 0% | 9% | 11% | | 0% |
| Special Liability | -15% | -28% | 78% | 21% | 20% | 5% | 0% | |

Columbia

| | Accident & Health | Crop & Animal | Fidelity & Surety | General Liability | Marine, Aviation & Transit | Motor | Property | Special Liability | Special Property |
|----------------------------|-------------------|---------------|-------------------|-------------------|----------------------------|-------|----------|-------------------|------------------|
| Accident & Health | | 22% | -2% | -3% | -3% | 15% | 17% | 9% | 18% |
| Crop & Animal | 22% | | 17% | 14% | 2% | 42% | 12% | 11% | 1% |
| Fidelity & Surety | -2% | 17% | | 46% | 2% | 20% | 7% | 19% | 8% |
| General Liability | -3% | 14% | 46% | | -7% | 20% | 10% | 14% | 12% |
| Marine, Aviation & Transit | -3% | 2% | 2% | -7% | | 6% | 8% | 4% | 10% |
| Motor | 15% | 42% | 20% | 20% | 6% | | 17% | 28% | 24% |
| Property | 17% | 12% | 7% | 10% | 8% | 17% | | 14% | 31% |
| Special Liability | 9% | 11% | 19% | 14% | 4% | 28% | 14% | | 10% |
| Special Property | 18% | 1% | 8% | 12% | 10% | 24% | 31% | 10% | |

China

| | Accident & Health | Agriculture | Credit | Engineering | Financial Guaranty | General Liability | Marine, Aviation & Transit | Motor | Other | Property | Special Risks |
|----------------------------|-------------------|-------------|--------|-------------|--------------------|-------------------|----------------------------|-------|-------|----------|---------------|
| Accident & Health | | 19% | 11% | 13% | 8% | 8% | 1% | 13% | -6% | 12% | -8% |
| Agriculture | 19% | | 21% | 17% | 12% | 28% | -3% | 7% | -16% | 25% | -23% |
| Credit | 11% | 21% | | 33% | -6% | 6% | 3% | 13% | 6% | 10% | 1% |
| Engineering | 13% | 17% | 33% | | -3% | 18% | -1% | 23% | 11% | 14% | 9% |
| Financial Guaranty | 8% | 12% | -6% | -3% | | -1% | -3% | 5% | -18% | 0% | -21% |
| General Liability | 8% | 28% | 6% | 18% | -1% | | 13% | 20% | 13% | 9% | -6% |
| Marine, Aviation & Transit | 1% | -3% | 3% | -1% | -3% | 13% | | 5% | 70% | 1% | 41% |
| Motor | 13% | 7% | 13% | 23% | 5% | 20% | 5% | | 15% | 9% | -6% |
| Other | -6% | -16% | 6% | 11% | -18% | 13% | 70% | 15% | | 17% | 61% |
| Property | 12% | 25% | 10% | 14% | 0% | 9% | 1% | 9% | 17% | | 19% |
| Special Risks | -8% | -23% | 1% | 9% | -21% | -6% | 41% | -6% | 61% | 19% | |

Correlation is a measure of association between two random quantities. It varies between -1 and +1, with +1 indicating a perfect increasing linear relationship and -1 a perfect decreasing relationship. The closer the coefficient is to either +1 or -1 the stronger the linear association between the two variables. A value of 0 indicates no linear relationship whatsoever.

All correlations in the Study are estimated using the Pearson sample correlation coefficient.

In each table the correlations shown in bold are statistically different from zero at the 95 percent confidence interval.

Sources and Notes

Global Premium, Capital, Profitability & Opportunity

Sources:

A.M. Best, Axco Insurance Information Services, IMF World Economic Outlook Database April 2020 Edition, SNL Financial, Standard & Poor's, World Bank

Notes:

Premium amounts stated in USD are converted to USD by Axco. Growth rates are calculated in original currency and exclude currency exchange fluctuation.

Country Opportunity Index Calculation: For each combined ratio, growth and political risk statistic, countries were ranked and segmented into quartiles. A score of 1 to 4 was assigned to each metric based on quartile. Opportunity Index Score = one-third multiplied by combined ratio score plus two-thirds multiplied by average of premium, GDP and population growth and political scores. Ties were broken by premium growth.

Growth Markets and Out/Underperformers—Premium and growth calculated using Axco data. Loss ratios for motor, property and liability lines also calculated using Axco. “All lines” loss, expense, and combined ratios are calculated using A.M. Best’s Statement File—Global and are based on the net results of the largest 25 writers for a given country (where available).

Global Risk Parameters and US Risk Parameters

Sources:

Superintendencia de Seguros de la Nación (Argentina), FMA (Austria), Superintendencia de Pensiones, Valores y Seguros (Bolivia), Superintendencia de Seguros Privados (Brazil), Financial Supervision Commission (Bulgaria), MSA Research Inc. (Canada), Superintendencia de Valores y Seguros de Chile, China Insurance Yearbooks, Superintendencia Financiera de Colombia, Czech National Bank, Danish FSA (Denmark), CADOAR (Dominican Republic), Superintendencia de Bancos y Seguros (Ecuador), Superintendencia de Pensiones de El Salvador, NACI Annual Statements (France), BaFin (Germany), Comisión Nacional de Bancos y Seguros de Honduras, Hong Kong Insurance Authority, Magyar Nemzeti Bank (Hungary), IDRA (India), bapepam.go.id (Indonesia), Ernst & Young Annual Statements (Israel), ANIA (Italy), The Statistics of Japanese Non-Life Insurance Business, ISM Insurance Services Malaysia Berhad, Comisión Nacional de Seguros y Fianzas (Mexico), DNB (Netherlands), Superintendencia de Bancos y Otras Instituciones Financieras de Nicaragua, The Insurance Association of Pakistan, Superintendencia de Seguros y Reaseguros de Panama, Superintendencia de Banca y Seguros (Peru), Insurance Commission (Philippines), Polish Financial Supervision Authority KNF, Autoritatea de Supraveghere Financiară (Romania), Central Bank of the Russian Federation, Monetary Authority of Singapore, Quest Market Profile/ FSB (South Africa), FSIS (South Korea), Finma (Switzerland), Taiwan Insurance Institution, Annual Reports (Thailand), Undersecretariat of Treasury (Turkey), National Financial Services Commission (Ukraine), SFCR (UK), SNL Financial (US), Banco Central del Uruguay, Cámara de Aseguradores de Venezuela, Association of Vietnam Insurers, and annual financial statements

Macroeconomic, Demographic, and Social Indicators

Sources:

Aon Terrorism & Political Violence Map 2020, Axco Insurance Information Services, Bloomberg, IMF World Economic Outlook Database April 2020 Edition, KPMG, Penn World Table Version 9.0, World Bank

Notes:

Table—GDP (PPP) is GDP in local currency adjusted using purchasing power parity (PPP) exchange rate into US dollars. The PPP exchange rate is the rate at which the currency of one country would need to be converted in order to purchase the same amount of goods and services in another country.

Global Correlation Between Lines

Sources:

MSA Research Inc. (Canada), SNL Financial (US), Superintendencia Financiera de Colombia, and China Insurance Yearbook

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