FRASER INSTITUTE

Global Petroleum Survey | 2016

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Contents

Executive Summary

This report presents the results of the Fraser Institute's 10th annual survey of petroleum industry executives and managers regarding barriers to investment in oil and gas exploration and production facilities in various jurisdictions around the globe. The survey responses have been tallied to rank provinces, states, other geographical regions (e.g. offshore areas), and countries according to the extent of such barriers. Those barriers, as assessed by the survey respondents, include high tax rates, costly regulatory obligations, uncertainty over environmental regulations and the interpretation and administration of regulations governing the "upstream" petroleum industry, and concerns with regard to the political stability and security of personnel and equipment.

A total of 381 respondents participated in the survey this year, providing sufficient data to evaluate 96 jurisdictions, which hold 66 percent of proved global oil and gas reserves and account for 75 percent of global oil and gas production.

The evaluated jurisdictions are assigned scores on each of 16 questions pertaining to factors known to affect investment decisions. These scores are then used to generate a "Policy Perception Index" for each jurisdiction that reflects the perceived extent of the barriers to investment. The jurisdictions are then sorted into clusters based on the size of their proved reserves, allowing for an apples-to-apples policy perception comparison of the resources that are available for commercialization.

Of the 12 jurisdictions with the largest petroleum reserves, Texas, United Arab Emirates, Qatar, Alberta, and China are the five most likely to attract, or least likely to deter, investment. The five large-reserve jurisdictions least likely to attract investment on the basis of their Policy Perception Index scores (Venezuela, Libya, Russia, Indonesia, and Nigeria) account for 45 percent of the proved oil and gas reserves of all the jurisdictions included in the survey. Alberta is the only Canadian jurisdiction in the group of jurisdictions with large reserve holdings.

In the group of 36 jurisdictions with medium-sized reserves, the 10 that are the most attractive for investment are: Oklahoma, Wyoming, North Dakota, Norway—North Sea, the Netherlands, Arkansas, Norway—Other, Louisiana, United Kingdom—North Sea, and West Virginia. The only Canadian jurisdictions in this group are Newfoundland & Labrador (12th of 36) and British Columbia (18th of 36).

Of the 45 jurisdictions with relatively small proved oil and gas reserves, the top 10 performers are Kansas, Saskatchewan, Mississippi, Utah, Montana, Alabama, United Kingdom—Other, Manitoba, New Zealand, and Morocco. Nova Scotia, Yukon, and the Northwest Territories rank near the middle to the bottom of the small-reserve-holder group. New Brunswick was the least attractive jurisdiction in this group due to its poor Policy Perception Index scores on a number of survey questions.

When the attractiveness for investment is considered independently from the reserve size of jurisdictions (historically the primary focus of this survey), we find that jurisdictions with first quintile Policy Perception Index scores, suggesting that obstacles to investment are lower than in all other jurisdictions assessed by the survey, are almost all located in Canada, the United States, and Europe. According to this year's survey, the 10 most attractive jurisdictions for investment worldwide are Oklahoma, Texas, Kansas, Saskatchewan, Wyoming, North Dakota, Norway—North Sea, Mississippi, Utah, and Montana. All but three of these jurisdictions—Wyoming, Utah, and Montana—ranked in the worldwide top 10 in the 2015 survey.

The 10 jurisdictions that are least attractive for investment are (starting with the worst): Venezuela, Quebec, Libya, Bolivia, New Brunswick, California, New South Wales, Ecuador, Ukraine, and Russia.

Our analysis of the 2016 petroleum survey results indicates that the extent of negative sentiment regarding key factors driving petroleum investment decisions has increased somewhat in many of the world's regions. The United States continues to remain as the most attractive region for investment, followed by Australia, which moved ahead of Canada this year. Canada's fall to the third most attractive region in the world for investment is reflective of Alberta's continued deterioration, as investors continue to view the province as less attractive for investment.

Survey Methodology

Sample design

This survey is designed to identify provinces, states, and countries, as well as offshore regions and other geographic areas, with the greatest barriers to investment in oil and gas exploration and production. When investors assess jurisdictions as relatively unattractive, those jurisdictions may be prompted to consider policy reforms that could improve their rankings. Petroleum companies can use the survey's information to corroborate their own assessments, and to identify jurisdictions where business conditions and the regulatory environment are most attractive for investment. The survey results are also a useful source of information for the media, providing independent comparisons of particular jurisdictions.

The survey was distributed to managers and executives in the "upstream" petroleum industry. This industry includes companies exploring for oil and gas, those producing crude oil from conventional and non-conventional sources (such as bitumen from oil sands and shale formations), and those producing natural gas from both conventional and non-conventional sources, such as coalbed methane and gas embedded in shale formations. It does not include companies that are refining, upgrading, or processing crude oil, bitumen, and raw natural gas, or involved in the transportation and marketing of petroleum products, unless such companies are also directly involved in the upstream.

The names of potential respondents were taken from publicly available membership lists of trade associations and other sources. In addition, some industry associations and non-profit think tanks provided contact information.

The survey was conducted from May 24, 2016, until August 12, 2016. For the second consecutive year our response rate has declined. A total of 381 individuals responded to the survey, compared with 439 in 2015. The main reason for the drop appears to be the downturn in oil prices and the effect that it has had on the industry. In a number of the jurisdictions where we had previously ranked investment and production, activity has slowed considerably, which has led to significant layoffs and churn across the sector.[1] For example, a recent Wood Makenzie report indicated that planned upstream spending was expected to be US$1 trillion lower between 2015 and

1 An additional reason for the drop in the response rate is that in order to enhance the reliability of responses, we no longer distribute an open survey link to various associations so that they can then redistribute it to their members. This allows us to ensure that only those qualified are answering the survey.

Figure 1: The position survey respondents hold in their company, 2016

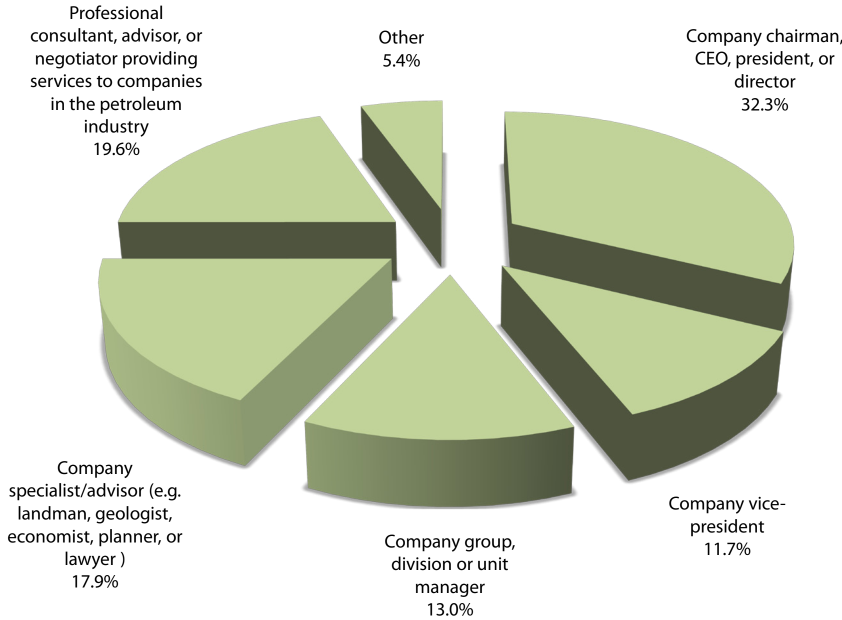
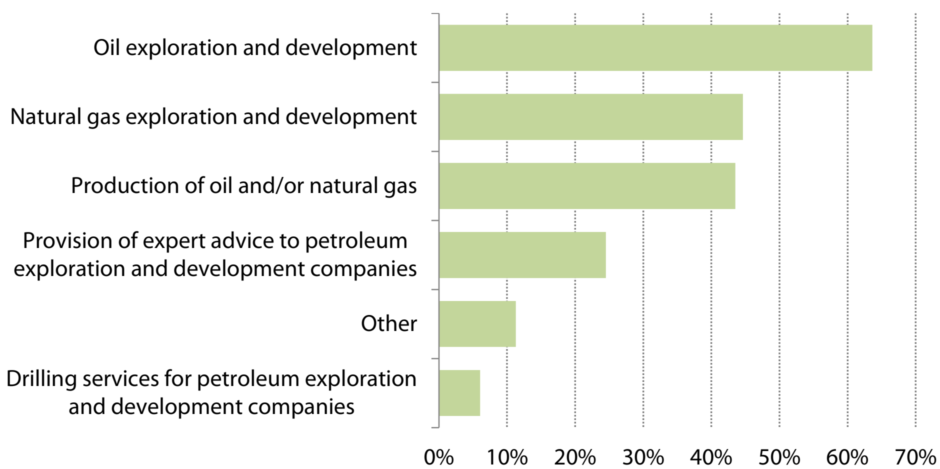


Figure 2: Activities performed by firms of survey respondents, 2016



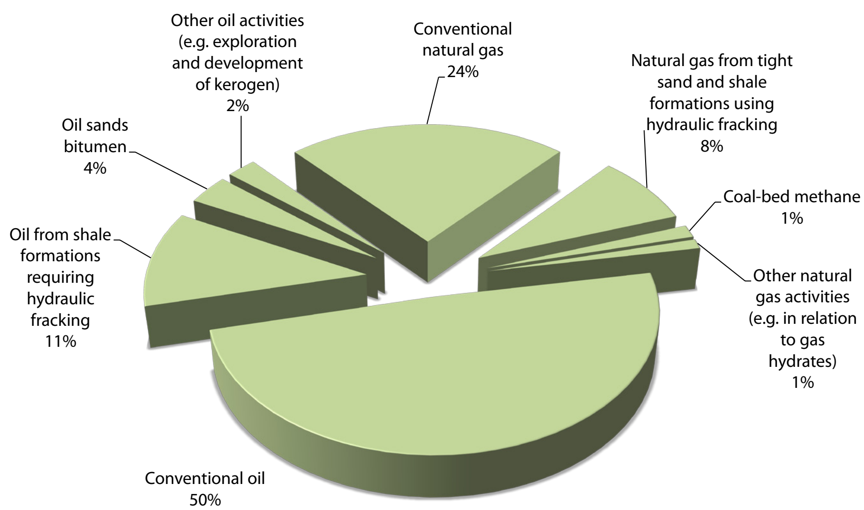
2020 than had previously been expected and the IEA (2016) recently noted that global upstream oil capital expenditures were expected to fall by 17 percent in 2016, after a 24 percent cut in 2015. While the oil price decline has certainly taken its toll on the upstream industry, the jurisdictions included in this year's survey comprise 66 percent of global oil and gas reserves and 75 percent of global oil and gas production.

As **figure 1** illustrates, just over half of the respondents (57 percent) identified themselves as either a manager or holding a higher-level position. **Figure 2** shows that 64 percent of the firms participating in the survey are engaged in the exploration and development of oil, 45 percent are engaged in the exploration and development of natural gas, 44 percent are engaged in production of oil and/or natural gas, and 31 percent provide expert advice and/or drilling services.

Figure 3 shows the principal focus of the petroleum exploration and development activities of companies whose managers or other representatives participated in the survey. The focus of most of these companies (74 percent) is on finding and developing conventional oil and gas reserves. That percentage has declined in recent years from 82 percent in 2011. Unconventional oil and natural gas exploration and development represented 28 percent of the focus of companies in 2016.

Participants employed by petroleum firms reported that 17 percent of their upstream activity involves unconventional oil resources. The majority of this activity (65 percent) includes the recovery of oil from shale formations

Figure 3: Company focus in petroleum exploration and development business, as indicated by respondents



using hydraulic fracturing, 20 percent is focused on oil sands bitumen, and 14 percent on other oil activities, such as the exploration or development of oil from kerogen found in shale rock.

Participants in the survey also reported that 11 percent of their upstream activity involves unconventional natural gas resources. The majority of this activity (77 percent) involves the recovery of natural gas from tight sand and shale formations using hydraulic fracturing. Thirteen percent is focused on coal-bed methane. Ten percent of the petroleum firms responding to the survey reported other unconventional natural gas activities (e.g., related to gas hydrates).

Survey questionnaire

The survey was designed to capture the opinions of managers and executives about the level of investment barriers in jurisdictions with which they are familiar. Respondents were asked to indicate how each of the 16 factors listed below influence company decisions to invest in various jurisdictions.

1. **Fiscal terms**—including licenses, lease payments, royalties, other production taxes, and gross revenue charges, but not corporate and personal income taxes, capital gains taxes, or sales taxes.
2. **Taxation in general**—the tax burden including personal, corporate, payroll, and capital taxes, and the complexity of tax compliance, but excluding petroleum exploration and production licenses and fees, land lease fees, and royalties and other charges directly targeting petroleum production.
3. **Environmental regulations**—stability of regulations, consistency and timeliness of regulatory process, etc.
4. **Regulatory enforcement**—uncertainty regarding the administration, interpretation, stability, or enforcement of existing regulations.
5. **Cost of regulatory compliance**—related to filing permit applications, participating in hearings, etc.
6. **Protected areas**—uncertainty concerning what areas can be protected as wilderness or parks, marine life preserves, or archaeological sites.
7. **Trade barriers**—tariff and non-tariff barriers to trade and restrictions on profit repatriation, currency restrictions, etc.

8. **Labor regulations and employment agreements**—the impact of labor regulations, employment agreements, labor militancy or work disruptions, and local hiring requirements.
9. **Quality of infrastructure**—includes access to roads, power availability, etc.
10. **Quality of geological database**—includes quality, detail, and ease of access to geological information.
11. **Labor availability and skills**—the supply and quality of labor, and the mobility that workers have to relocate.
12. **Disputed land claims**—the uncertainty of unresolved claims made by aboriginals, other groups, or individuals.
13. **Political stability.**
14. **Security**—the physical safety of personnel and assets.
15. **Regulatory duplication and inconsistencies** (includes federal/provincial, federal/state, inter-departmental overlap, etc.)
16. **Legal system**—legal processes that are fair, transparent, non-corrupt, efficiently administered, etc.

The above 16 factors were unchanged from the 2015 survey. However, two questions that had been included earlier—on socioeconomic agreements/community development conditions and on the corruption of government officials—were dropped in 2013 because respondents from previous years had complained that the survey had become onerously lengthy. In addition, those questions were seen to be redundant, or to overlap heavily with other questions.

For each of the 16 factors, respondents were asked to select one of the following five responses that best described each jurisdiction with which they were familiar:

1. Encourages investment
2. Is not a deterrent to investment
3. Is a mild deterrent to investment
4. Is a strong deterrent to investment
5. Would not invest due to this criterion

The 2016 survey included a list of 159 jurisdictions that respondents could evaluate, including all of the Canadian provinces and territories except Prince Edward Island and Nunavut; many US oil and gas producing states (as well as the US Alaska, Pacific, and Gulf Coast offshore regions); all six Australian states, the Australian offshore, and the Timor Gap Joint Petroleum Development Area (JPDA); and countries with current or potential petroleum production capacity. Russia was split into four categories: Offshore Arctic, Offshore Sakhalin, Eastern Siberia, and the rest of the country. Six provinces in Argentina were also included in the survey: Chubut, Mendoza, Neuquen, Salta, Santa Cruz, and Tierra del Fuego. Brazil was again represented by three separate categories: onshore concessions, offshore concessions, and offshore "pre-salt" regions. Saudi Arabia, where investment in upstream petroleum exploration and development is mostly confined to government-owned facilities, was again excluded from the list of jurisdictions that respondents could rank.

With the opening up of oil and gas exploration and development for foreign investment in Mexico, as well as the first contracts being recently awarded, Mexico was included for the third time this year.

Scoring the survey responses — Policy Perception Index

This year, we used a new methodology[2] which follows that used in the Fraser Institute's *Annual Survey of Mining Companies* (see Jackson and Green, 2016). The methodology differs from that used in previous years in that it is an average of the responses for all five possible response categories,[3] which are weighted equally. In previous years, the index was based only on the prevalence of responses in the "deters investment" categories. The measure also takes into consideration how far a jurisdiction's score is from the average in each of the policy areas. To calculate the PPI, a score for each jurisdiction is estimated for all 16 factors addressed by the survey questions by calculating each jurisdiction's average response in relation to each survey question. This score is then standardized using a common technique, where the average response is subtracted from each jurisdiction's score on each of the policy factors and then divided by the standard deviation. A jurisdiction's scores on each of the 16 policy variables, as reflected by the responses to the survey questions, are then added to generate a final, standardized PPI score. That score is then normalized using the formula ((Vmax–Vi))/((Vmax–Vmin)) × 100.[4] The jurisdiction with the most attractive policies receives a score of 100 and the jurisdiction with the policies that pose the greatest barriers to investment receives a score of 0.

2 See appendix 2 for an overview of the previous methodology.

3 Encourages investment, not a deterrent to investment, mild deterrent to investment, strong deterrent to investment, and would not invest for due to this factor.

4 Where Vmax is the maximum value, Vmin is the minimum value, and Vi represents the summed score of a jurisdiction.

As in past years, only jurisdictions that had at least five respondents for all 16 policy factors were included in the rankings. However, any jurisdictions with fewer than 10 responses have been noted in subsequent tables to indicate that the results for these jurisdictions may not be as robust as others. We excluded a number of jurisdictions from our analysis because they received an insufficient number of responses. Most of the countries excluded had little or no reserves, likely explaining the limited response rate, particularly in the midst of a downturn in upstream investment. We were able to rank 96 of the jurisdictions listed in the questionnaire.

Global Results

Policy Perception Index Rankings Segmented According to Jurisdictions' Proved Reserves

As we first noted in the 2013 *Global Petroleum Survey*, while it is certainly useful to measure the attractiveness of jurisdictions for investment according to regulatory climate, political risk, production taxes, quality of infrastructure, and the other factors which respondents are asked to address, simply ranking jurisdictions according to their Policy Perception Index scores alone does not recognize the fact that decisions to invest in petroleum exploration and development are heavily conditioned by the size of the oil and gas resources that are generally recognized to be available for exploitation.

Jurisdictions with relatively small proven petroleum reserves and relatively small production may be recognized as very attractive for investment as reflected by favorable Policy Perception Index scores and high rankings—as Manitoba is, for example. However, jurisdictions with small resource endowments cannot be expected to attract nearly as much investment as those with relatively large undeveloped oil and gas reserves, such as Alberta, the United Arab Emirates, and Kuwait. In this section we compare jurisdictions with similar proved reserve sizes (relatively large, medium, or small) on their Policy Perception Index rankings.

Proved petroleum reserves are discovered oil and gas resources that are deemed feasible for commercialization, assuming current prices and infrastructure. By excluding already discovered but as yet "unproven" resources, and resources thought to exist but not yet discovered, this approach most likely does not accurately reflect how jurisdictions which have large unproven oil and gas resources (such as much of Brazil's offshore pre-salt region) are regarded by potential investors and, therefore, how much investment they are likely to attract in the foreseeable future. However, our group comparisons were limited by the fact that comparable data for so-called "P2" reserves (i.e., proved reserves plus probable reserves from already discovered yet unproven resources) are not available for most jurisdictions. Comparable information for "P3" reserves (i.e., proved, probable, and possible resources—the latter based on estimates of potential production from as yet undiscovered resources) is very limited.

Table 1: Large Reserve Holder Comparisons

		Policy Perception Index Score	Proved reserves (bboe)
1	**Texas**	97.65	29.53
2	**United Arab Emirates**	83.00	138.00
3	**Qatar**	75.44	188.14
4	**Alberta**	66.87	175.30
5	**China**	65.80	55.29
6	**Algeria**	56.57	41.93
7	**Iraq**	47.26	165.05
8	**Nigeria**	46.69	70.80
9	**Indonesia**	45.83	23.01
10	**Russia**	39.21	395.53
11	**Libya**	15.24	58.30
12	**Venezuela**	0.00	335.19

Large Reserve Holders

Table 1 provides Policy Perception Index (PPI) values for 12 jurisdictions that each hold at least 1 percent (when rounded to the nearest decimal) of the sum of the proved petroleum reserves of the 93 (of 96) jurisdictions ranked by the survey that have at least some proved oil and/or gas reserves.[5] Proved reserves holdings in this group range from Indonesia's 23.01 billion barrels of oil equivalent (Bboe) to Russia's 395.53 Bboe. As a whole, the proved reserves of these 12 large reserve holders constitute 86 percent of the reserves held by the 93 jurisdictions with at least some proved reserves.

Of the large reserve holders, the five with the highest degrees of attractiveness on the Policy Perception Index (in that they were the five that received the highest PPI scores) are Texas, United Arab Emirates, Qatar, Alberta, and China. Texas again ranks in the highly attractive first quintile. Alberta fell from being the 2nd most attractive large reserve holder in 2014 (of 27) to the 3rd most attractive in 2015 (of 14) and this year ranks as the 4th most

5 The three jurisdictions ranked in the survey this year that have no proved reserves are Cambodia, New South Wales, and Quebec.

attractive amongst 12 large reserve holders. All five most attractive large reserves holders have PPI scores in the top two quintiles.[6]

Top five large reserve holder jurisdictions

1. Texas
2. United Arab Emirates
3. Qatar
4. Alberta
5. China

Two of the 12 large reserve holders have highly undesirable (i.e., fifth quintile) scores on the Policy Perception Index: Venezuela and Libya. Together, these countries' proved reserves comprise 20 percent of the reserves of the 93 jurisdictions with proved reserves. Only one of the jurisdictions with large reserves—Russia, the country with the largest reserves in our sample, accounting for 20 percent of the reserves of the 93 jurisdictions with proved reserves—lies in the unattractive fourth quintile. Combined, the three large reserve holder jurisdictions with 4th or 5th quintile PPI scores hold 40 percent of the proved reserves of the 93 jurisdictions ranked in the 2016 survey that have proved reserves.

Bottom five large reserve holder jurisdictions

1. Venezuela
2. Libya
3. Russia
4. Indonesia
5. Nigeria

6 Jurisdictions are separated into quintiles based on their PPI scores. The first quintile contains jurisdictions with PPI scores from 80 to 100, second quintile scores are from 60 to 79.9, third quintile scores are from 40 to 59.9 fourth quintile scores are from 20 to 39.9, and fifth quintile scores are from 0 to 19.9.

Medium Reserve Holders

Table 2 provides Policy Perception Index scores for the 36 jurisdictions with at least 0.1 percent, but less than 1 percent, of the proved reserves of the group of 93 reserve holders. As a whole, these jurisdictions with modest reserves have 13 percent of total proved reserves. Their reserve holdings range in size from Thailand's 2.03 Bboe to Malaysia's 19.5 Bboe.

Table 2: Medium Reserve Holder Comparisons

		Policy Perception Index Score	Proved reserves (bboe)
1	**Oklahoma**	100.00	6.36
2	**Wyoming**	93.26	7.35
3	**North Dakota**	93.16	7.11
4	**Norway—North Sea**	91.67	13.21
5	**Netherlands**	87.21	6.07
6	**Arkansas**	86.40	2.63
7	**Norway—Other**	85.83	5.82
8	**Louisiana**	83.24	4.37
9	**United Kingdom—North Sea**	82.42	3.38
10	**West Virginia**	81.13	4.34
11	**New Mexico**	79.19	4.07
12	**Newfoundland & Labrador**	78.66	2.14
13	**Australia—Offshore**	77.59	6.71
14	**US Offshore—Gulf of Mexico**	76.24	5.79
15	**Brunei**	74.70	3.68
16	**Pennsylvania**	71.19	9.46
17	**Vietnam**	68.59	9.02
18	**British Columbia**	68.13	6.54
19	**Malaysia**	67.44	19.51
20	**Thailand**	67.01	2.03
21	**Alaska**	63.49	4.27
22	**Gabon**	62.84	2.19
23	**Egypt**	62.57	18.83
24	**Colombia**	61.84	3.64
25	**Pakistan**	57.85	4.99
26	**Colorado**	57.44	5.46
27	**Angola**	56.69	10.83
28	**Peru**	56.04	3.55
29	**Mexico**	52.78	12.91
30	**India**	49.77	15.09
31	**Brazil—Offshore Presalt Area PSC**	44.50	16.67
32	**Yemen**	42.74	6.16
33	**Ukraine**	38.03	7.68
34	**Ecuador**	37.47	8.87
35	**California**	33.02	2.87
36	**Bolivia**	26.64	2.07

Ten jurisdictions in this group, six US states and four European jurisdictions, achieved first quintile (most attractive) Policy Perception Index scores. Fourteen jurisdictions have reasonably attractive second quintile scores. Collectively the jurisdictions with modest reserves that achieved first or second quintile scores have proved petroleum reserves of 158.5 Bboe, or approximately 62 percent of the combined reserves of the 36 jurisdictions in this group.

Top five medium reserve holder jurisdictions

1. Oklahoma
2. Wyoming
3. North Dakota
4. Norway—North Sea
5. Netherlands

Four jurisdictions in the group of 36—Ukraine, Ecuador, California, and Bolivia—have index values in the unattractive fourth quintile. Combined, these jurisdictions have proved reserves of 21.5 Bboe, or 8 percent of holdings of all 36 jurisdictions. By way of comparison, the combined reserves of the eight jurisdictions in the group of modest reserve holders that achieved 3rd quintile index scores, including Colorado, Mexico, and Brazil, constitute nearly 30 percent of the group's reserves.

Bottom five medium reserve holder jurisdictions

1. Bolivia
2. California
3. Ecuador
4. Ukraine
5. Yemen

Small Reserve Holders

Table 3 provides Policy Perception Index scores and rankings for the 45 jurisdictions with the smallest proved petroleum reserves. Each of these jurisdictions has less than 0.1 percent of the proved reserves of the 93 jurisdictions addressed in this section, ranging from 0.01 Bboe in Victoria, Australia, to Utah's 1.86 Bboe. Together, the group of 45 jurisdictions represents just over 1 percent of the reserve holdings of the 93 jurisdictions ranked in the survey that have at least some proved reserves.

Table 3: Small Reserve Holder Comparisons

		Policy Perception Index Score	Proved reserves (bboe)
1	Kansas	94.47	1.10
2	Saskatchewan	94.18	1.58
3	Mississippi	91.63	0.34
4	Utah	89.76	1.86
5	Montana	88.98	0.56
6	Alabama	87.85	0.37
7	United Kingdom—Other	87.65	1.19
8	Manitoba	87.01	0.06
9	New Zealand	83.61	0.32
10	Morocco	81.31	0.01
11	Ireland	79.57	0.07
12	France	76.33	0.14
13	Ohio	74.95	0.68
14	Namibia	74.55	0.41
15	Bahrain	74.21	0.73
16	Chile	71.78	0.80
17	Western Australia	71.63	0.03
18	Hungary	68.87	0.08
19	South Africa	67.92	0.02
20	Illinois	66.34	0.04
21	Cameroon	64.47	1.09
22	Queensland	63.99	0.05
23	Ghana	63.51	0.81
24	Philippines	61.93	0.79
25	Michigan	61.14	0.40
26	Argentina—Salta	59.17	0.19
27	Nova Scotia	59.12	0.03
28	Timor Gap (JPDA)	58.60	0.27
29	Argentina—Neuquen	57.82	1.05
30	Equatorial Guinea	57.75	1.34
31	Brazil—Offshore CC	53.60	0.39
32	Romania	53.38	1.30
33	Myanmar	53.37	0.05
34	Tunisia	52.71	0.85

Table 3 continues on page 16

Table 3: Small Reserve Holder Comparisons *(continued from page 15)*

		Policy Perception Index Score	Proved reserves (bboe)
35	**Northwest Territories**	51.80	0.12
36	**Victoria**	51.79	0.01
37	**Spain**	50.75	0.17
38	**Argentina—Mendoza**	49.88	0.29
39	**Papua New Guinea**	49.13	1.20
40	**Yukon**	45.04	0.02
41	**Brazil—Onshore CC**	44.47	1.28
42	**Argentina-Chubut**	43.67	1.24
43	**Bangladesh**	42.53	1.62
44	**Argentina—Santa Cruz**	42.28	0.77
45	**New Brunswick**	31.53	0.02

The 10 small reserve holder jurisdictions with first quintile scores are Kansas, Saskatchewan, Mississippi, Utah, Montana, Alabama, United Kingdom—Other, Manitoba, New Zealand, and Morocco. Together these 10 jurisdictions comprise 29 percent of the reserves in this group. If one includes the 15 reserve holders with second quintile scores, the 25 jurisdictions hold just over 50 percent of this group's reserves.

Top five small reserve holder jurisdictions

1. Kansas
2. Saskatchewan
3. Mississippi
4. Utah
5. Montana

Only one jurisdiction in this group—New Brunswick—had a PPI Index Score in the unattractive fourth quintile. Another 19 jurisdictions in the group of small reserve holders also received poor marks from survey respondents as evidenced by their third quintile scores.

Bottom five small reserve holder jurisdictions

1. New Brunswick
2. Argentina—Santa Cruz
3. Bangladesh
4. Argentina—Chubut
5. Brazil—Onshore CC

Policy Perception Index Rankings Without Regard to Reserve Holdings

Table 4 compares the scores and rankings on the Policy Perception Index (PPI) from 2016 back through 2012. The first set of columns shows the absolute scores for the jurisdictions in each of the five years, based on the methodology described above. The second set of columns shows the rankings. Readers are reminded that these rankings are driven purely by responses to the survey questions and do not account for the extent of any jurisdiction's proved oil and gas reserves. Hence, some jurisdictions with relatively small or even no reserves may rank more highly on the basis of the respondents' perceptions of business conditions, regulatory regimes, and other factors than some jurisdictions with significant reserve holdings.

This year only 96 jurisdictions are ranked. This compares with 126 jurisdictions in 2015, 156 in 2014, 157 in 2013, and 147 in 2012. The jurisdictions that were ranked in 2015 that we were unable to rank this year are: Argentina—Tierra del Fuego, Bulgaria, Denmark, Faroe Islands, Iran, Israel, Italy, Ivory Coast, Japan, Jordan, Kazakhstan, Kenya, Kuwait, Mozambique, Netherlands—Offshore, Netherlands—Onshore, New York, Northern Territory, Oman, Ontario, Republic of the Congo (Brazzaville), Russia—Eastern Siberia, Russia—Offshore Arctic, Russia—Offshore Sakhalin, Russia—Other, South Australia, South Sudan, Spain—Offshore, Spain—Onshore, Syria, Tanzania, Tasmania, Trinidad and Tobago, Uruguay, US Offshore—Alaska, and US Offshore—Pacific.[7]

The 10 jurisdictions with the greatest barriers to investment, with the least attractive last, are:

1. Venezuela
2. Quebec
3. Libya
4. Bolivia
5. New Brunswick
6. California
7. New South Wales
8. Ecuador
9. Ukraine
10. Russia

Due to a low response rate for many of the jurisdictions that were in the bottom 10 last year, leading to their exclusion, two of the jurisdictions are new to the group of 10 least attractive jurisdictions. New Brunswick experienced

7 Responses for the two jurisdictions in the Netherlands and Spain and the four jurisdictions in Russia were combined to produce one ranking for each of the three countries.

Table 4: Policy Perception Index

		Score					Rank				
		2016	2015	2014	2013	2012	2016	2015	2014	2013	2012
CANADA	Alberta	66.87	77.71	85.90	85.64	84.51	43/96	26/126	14/156	17/157	17/147
	British Columbia	68.13	67.99	64.47	73.05	76.49	39/96	46/126	60/156	49/157	36/147
	Manitoba	87.01	85.69	96.82	87.90	88.33	14/96	11/126	6/156	13/157	11/147
	Newfoundland & Labrador	78.66	78.76	77.53	82.51	71.65	25/96	22/126	28/156	24/157	46/147
	New Brunswick*	31.53	55.31	59.95	58.87	30.23	92/96	78/126	71/156	84/157	134/147
	Northwest Territories*	51.80	66.96	63.95	62.82	63.36	70/96	51/126	62/156	72/157	68/147
	Nova Scotia*	59.12	60.99	68.52	77.64	82.49	56/96	64/126	49/156	41/157	22/147
	Quebec*	3.96	32.41	23.32	21.08	39.06	95/96	119/126	150/156	152/157	120/147
	Saskatchewan	94.18	89.69	97.48	96.87	90.16	4/96	6/126	4/156	3/157	8/147
	Yukon*	45.04	74.42	65.14	70.87	63.91	80/96	36/126	58/156	55/157	65/147
UNITED STATES	Alabama*	87.85	93.63	95.22	82.70	N/A	11/96	3/126	8/156	23/157	N/A
	Alaska	63.49	65.37	60.17	58.33	65.14	49/96	56/126	70/156	91/157	62/147
	Arkansas*	86.40	85.37	90.88	91.95	N/A	15/96	12/126	9/156	9/157	N/A
	California	33.02	49.05	41.29	56.17	70.42	91/96	98/126	115/156	97/157	50/147
	Colorado	57.44	64.45	59.43	65.84	83.48	61/96	58/126	72/156	65/157	19/147
	Illinois*	66.34	67.19	72.99	73.35	N/A	44/96	49/126	37/156	48/157	N/A
	Kansas	94.47	90.51	96.14	94.48	83.37	3/96	5/126	7/156	6/157	20/147
	Louisiana	83.24	82.63	87.62	86.35	92.36	18/96	14/126	12/156	16/157	5/147
	Michigan	61.14	57.87	76.36	61.53	77.75	54/96	74/126	30/156	75/157	31/147
	Mississippi	91.63	87.11	100.00	88.50	92.01	8/96	9/126	1/156	10/157	6/147
	Montana	88.98	82.10	81.55	78.68	80.81	10/96	17/126	23/156	35/157	27/147
	New Mexico	79.19	68.15	78.82	78.31	94.15	24/96	45/126	26/156	39/157	4/147
	North Dakota	93.16	89.51	97.35	95.67	88.72	6/96	7/126	5/156	4/157	9/147
	Ohio	74.95	80.52	82.55	76.94	88.26	30/96	20/126	20/156	43/157	12/147
	Oklahoma	100.00	92.64	99.38	100.00	100.00	1/96	4/126	2/156	1/157	1/147
	Pennsylvania	71.19	77.57	67.04	66.61	76.42	36/96	27/126	53/156	64/157	37/147
	Texas	97.65	95.67	98.19	98.46	97.04	2/96	2/126	3/156	2/157	2/147
	Utah	89.76	77.13	83.10	81.76	84.65	9/96	28/126	18/156	28/157	16/147
	West Virginia*	81.13	82.50	72.51	78.62	86.19	22/96	15/126	39/156	37/157	14/147
	Wyoming	93.26	80.88	88.83	87.43	94.25	5/96	19/126	11/156	14/157	3/147
	US Offshore—Gulf of Mexico	76.24	82.18	72.67	76.92	82.40	28/96	16/126	38/156	44/157	23/147
AUSTRALIA	New South Wales*	37.27	36.64	47.12	55.01	61.65	90/96	116/126	98/156	100/157	73/147
	Queensland	63.99	71.34	65.95	61.46	67.64	47/96	40/126	55/156	76/157	55/147
	Victoria*	51.79	57.13	67.78	64.31	71.53	71/96	76/126	51/156	68/157	47/147
	Western Australia	71.63	73.23	68.81	73.51	76.79	35/96	37/126	47/156	47/157	35/147
	Australia—Offshore	77.59	74.77	73.97	71.17	79.35	26/96	32/126	34/156	54/157	30/147
	Timor Gap (JPDA)*	58.60	43.41	53.17	50.97	60.43	57/96	109/126	88/156	110/157	77/147
OCEANIA	Brunei*	74.70	69.31	65.59	79.76	55.59	31/96	43/126	56/156	33/157	89/147
	Indonesia	45.83	44.34	30.90	39.48	38.46	79/96	108/126	142/156	130/157	123/147
	Malaysia	67.44	66.53	59.08	68.08	56.66	41/96	53/126	73/156	60/157	84/147
	New Zealand	83.61	83.72	86.44	78.51	83.23	17/96	13/126	13/156	38/157	21/147
	Papua New Guinea	49.13	52.47	45.45	44.63	40.27	76/96	88/126	105/156	123/157	118/147
	Philippines	61.93	65.51	63.06	63.50	56.48	52/96	55/126	63/156	71/157	86/147

* Between 5 and 9 responses

Table 4 continues on page 19

Table 4: Policy Perception Index *(continued from page 18)*

		Score					Rank				
		2016	2015	2014	2013	2012	2016	2015	2014	2013	2012
EUROPE	France*	76.33	41.63	44.01	84.37	66.26	27/96	112/126	106/156	20/157	58/147
	Hungary*	68.87	66.54	55.19	59.32	72.91	37/96	52/126	81/156	83/157	44/147
	Ireland*	79.57	76.25	71.98	65.40	82.32	23/96	29/126	40/156	66/157	24/147
	Netherlands	87.21	N/A	N/A	N/A	N/A	13/96	N/A	N/A	N/A	N/A
	Norway—Other Offshore (except North Sea)*	85.83	78.87	83.69	95.53	80.24	16/96	21/126	17/156	5/157	28/147
	Norway—North Sea*	91.67	88.72	82.54	88.48	84.16	7/96	8/126	21/156	11/157	18/147
	Romania*	53.38	63.33	65.41	72.19	68.18	66/96	61/126	57/156	50/157	53/147
	Russia	39.21	N/A	N/A	N/A	N/A	87/96	N/A	N/A	N/A	N/A
	Spain	50.75	51.27	37.48	36.82	N/A	73/96	93/126	N/A	134/157	N/A
	Ukraine*	38.03	26.08	37.58	76.22	43.70	88/96	122/126	127/156	45/157	112/147
	United Kingdom—Other Offshore (except North Sea)*	87.65	78.43	77.43	34.03	74.57	12/96	24/126	29/156	138/157	40/147
	United Kingdom—North Sea	82.42	81.84	77.76	83.62	81.21	20/96	18/126	27/156	22/157	25/147
ASIA	Bangladesh*	42.53	38.66	39.38	58.81	47.05	85/96	115/126	124/156	85/157	105/147
	Cambodia	50.83	48.22	40.62	38.26	33.86	72/96	102/126	117/156	131/157	132/147
	China*	65.80	62.60	40.58	37.09	49.63	45/96	62/126	119/156	133/157	99/147
	India*	49.77	46.58	41.18	59.95	40.32	75/96	105/126	116/156	80/157	117/147
	Myanmar	53.37	48.76	41.32	34.97	38.59	67/96	100/126	114/156	137/157	122/147
	Pakistan*	57.85	55.17	54.59	43.36	42.69	58/96	79/126	85/156	125/157	114/147
	Thailand	67.01	67.27	57.60	57.29	58.94	42/96	48/126	77/156	96/157	79/147
	Vietnam	68.59	66.03	58.97	21.03	53.40	38/96	54/126	74/156	153/157	93/147
AFRICA	Angola	56.69	59.83	48.37	55.04	45.07	62/96	69/126	93/156	99/157	108/147
	Cameroon*	64.47	58.53	49.23	81.38	58.17	46/96	72/126	91/156	29/157	82/147
	Equatorial Guinea*	57.75	51.71	46.56	48.36	47.23	60/96	90/126	101/156	117/157	104/147
	Gabon	62.84	58.41	47.41	53.26	50.46	50/96	73/126	97/156	104/157	97/147
	Ghana*	63.51	65.29	61.06	53.98	58.47	48/96	57/126	67/156	101/157	80/147
	Namibia*	74.55	74.43	69.44	57.90	64.43	32/96	35/126	45/156	94/157	63/147
	Nigeria	46.69	43.13	37.33	53.74	32.14	78/96	110/126	130/156	103/157	133/147
	South Africa*	67.92	52.76	41.78	36.59	51.84	40/96	85/126	111/156	135/157	94/147
MENA	Algeria	56.57	54.76	40.45	47.99	38.96	63/96	80/126	120/156	118/157	121/147
	Bahrain*	74.21	67.00	62.90	44.34	60.90	33/96	50/126	64/156	124/157	75/147
	Egypt*	62.57	52.98	33.50	78.67	50.60	51/96	83/126	135/156	36/157	96/147
	Iraq	47.26	40.12	28.17	8.23	28.91	77/96	114/126	154/156	155/157	136/147
	Libya*	15.24	0.00	22.29	57.48	25.45	94/96	126/126	151/156	95/157	141/147
	Morocco*	81.31	61.70	66.32	58.43	70.79	21/96	63/126	54/156	90/157	48/147
	Qatar*	75.44	69.71	74.03	77.52	80.93	29/96	42/126	32/156	42/157	26/147
	Tunisia*	52.71	54.76	50.64	29.86	67.87	69/96	81/126	89/156	148/157	54/147
	United Arab Emirates*	83.00	78.09	79.41	60.93	73.80	19/96	25/126	25/156	79/157	43/147
	Yemen*	42.74	34.53	39.70	83.84	35.50	84/96	118/126	123/156	21/157	129/147

Notes: Due to a low response rate Netherlands—Onshore and Netherlands—Offshore were combined to this year into Netherlands; Spain—Offshore and Spain—Onshore were combined into Spain ; and Russia—Eastern Siberia, Russia—Offshore Arctic, Russia—Offshore Sakhalin, and Russia—Other were combined into Russia.

Table 4 continues on page 20

Table 4: Policy Perception Index *(continued from page 19)*

		Score					Rank				
		2016	2015	2014	2013	2012	2016	2015	2014	2013	2012
ARGENTINA	Chubut*	43.67	49.18	33.04	33.66	45.94	83/96	97/126	136/156	140/157	107/147
	Mendoza*	49.88	48.07	42.45	26.58	37.99	74/96	103/126	108/156	150/157	124/147
	Neuquen	57.82	51.53	46.87	32.04	44.38	59/96	91/126	99/156	142/157	110/147
	Salta*	59.17	48.84	47.99	44.64	37.34	55/96	99/126	96/156	122/157	125/147
	Santa Cruz*	42.28	44.73	31.87	30.55	29.55	86/96	107/126	140/156	143/157	135/147
LATIN AMERICA & CARRIBEAN	Bolivia*	26.64	34.91	17.40	30.30	5.71	93/96	117/126	153/156	145/157	146/147
	Brazil—Onshore CC*	44.47	60.84	54.08	14.40	56.09	82/96	66/126	87/156	154/157	88/147
	Brazil—Offshore CC	53.60	67.82	60.20	48.96	61.97	65/96	47/126	69/156	114/157	72/147
	Brazil—Offshore presalt area PSC*	44.50	60.38	46.39	49.29	62.52	81/96	68/126	102/156	113/157	70/147
	Chile*	71.78	N/A	80.06	48.54	55.15	34/96	N/A	24/156	116/157	90/147
	Colombia	61.84	63.70	64.54	80.83	67.17	53/96	60/126	59/156	31/157	57/147
	Ecuador*	37.47	26.92	11.07	62.40	25.12	89/96	121/126	155/156	74/157	143/147
	Mexico	52.78	54.63	37.58	58.57	N/A	68/96	82/126	126/156	87/157	N/A
	Peru	56.04	51.96	55.68	48.92	50.34	64/96	89/126	79/156	115/157	98/147
	Venezuela	0.00	2.22	0.00	0.00	0.00	96/96	125/126	156/156	157/157	147/147

* Between 5 and 9 responses

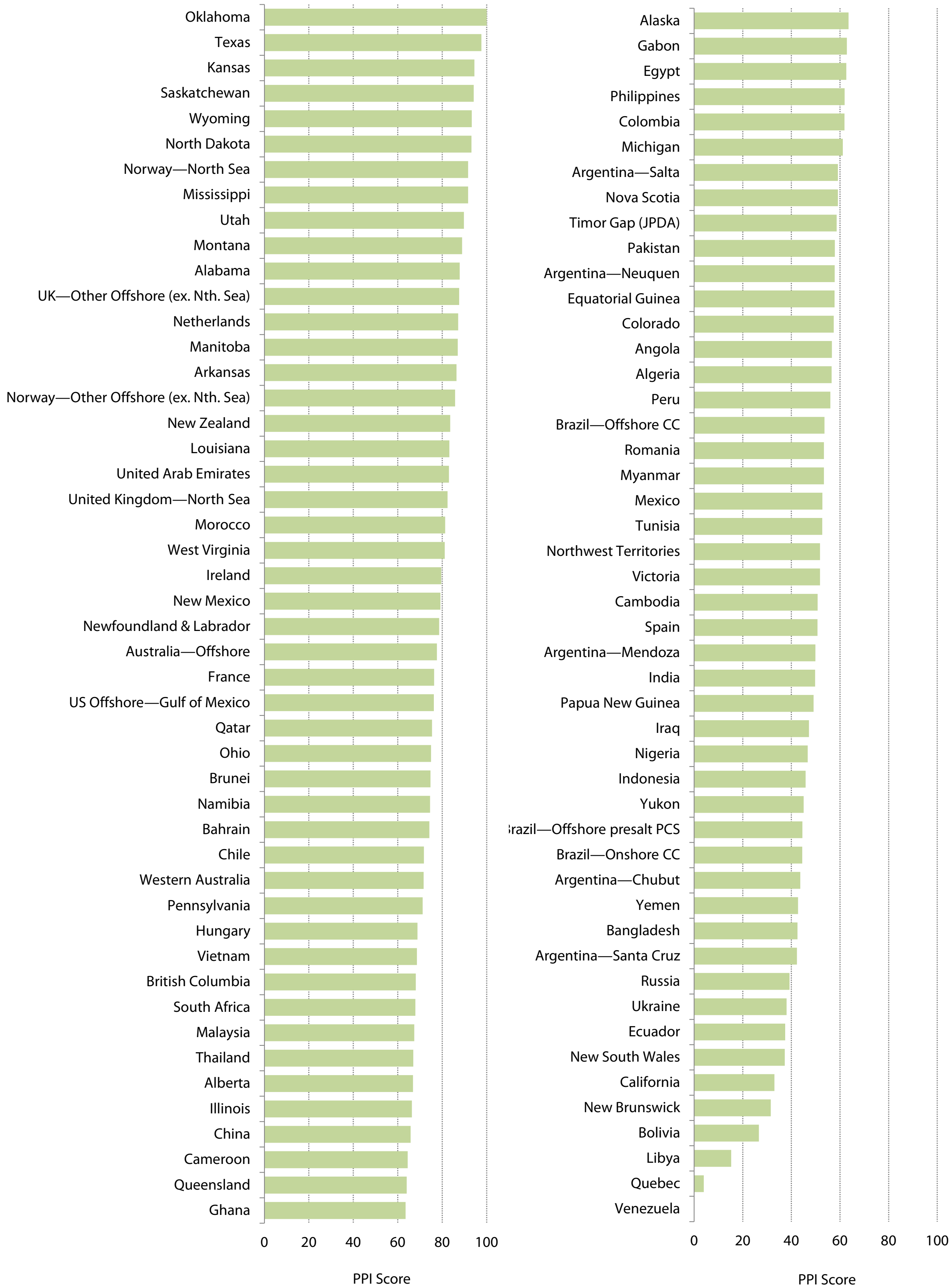
a large deterioration in its score this year falling more than 20 points, moving from the third quintile to the fourth as a consequence. In addition, while the Australia State of New South Wales saw its score improve slightly, that jurisdiction's score was low enough in 2016 to place it among the bottom 10.

Figure 4 presents the Policy Perception Index rankings for the 96 jurisdictions ranked this year. Among the three Brazilian jurisdictions, "CC" refers to "concession contracts" and "PSC" refers to "production sharing contracts."

Respondents ranked the following 10 jurisdictions as the most attractive for investment in petroleum exploration and development:

1. Oklahoma
2. Texas
3. Kansas
4. Saskatchewan
5. Wyoming
6. North Dakota
7. Norway—North Sea
8. Mississippi
9. Utah
10. Montana

Figure 4: Policy Perception Index



All but three of these jurisdictions—Wyoming, Utah, and Montana—ranked in the top 10 jurisdictions worldwide in the 2015 survey. Five of the jurisdictions—Oklahoma, Texas, Saskatchewan, North Dakota, and Mississippi—consistently rank in the top 10, having been there in the last five iterations of the survey.

Oklahoma moved into the first spot this year after ranking 4th (of 126) in 2015. Texas remained in the second position this year after moving up to this spot in 2015. Kansas moved up into the third position in 2016 from 5th in the previous year. Saskatchewan moved up two spots from 6th (of 156) place in 2015. Wyoming jumped 14 spots this year into 5th (of 196), after placing 19th (of 96) in 2015. This is the first time Wyoming has been in the global top 10 since 2012. North Dakota moved up to 6th (of 96) from 7th (of 126) in the previous year. Norway—North Sea moved up one spot this year from 8th last year. This marks the second year in a row that Norway—North Sea has ranked in the top 10. Like Norway—North Sea, Mississippi moved up one spot to 8th this year. Both Utah and Montana experienced large increases in their relative ranks this year. Neither US state has ranked in the top 10 in the last five years. Utah moved up 19 spots from 28th (of 126) in 2015 to 9th in 2016. Montana moved up from 17th in the previous year, marking the third straight year in a row that Montana has climbed in the rankings.

The only two jurisdictions displaced from the top 10 were Netherlands—Offshore, which was ranked as just the Netherlands this year, and Alabama.[8] The Netherlands ranked 13th this year and Alabama dropped from 3rd to 11th place.

Eleven jurisdictions achieved much higher Policy Perception Index scores this year (by at least 10 points) than in 2015. These included Wyoming, Utah, Morocco, New Mexico, France, South Africa, Argentina—Salta, Timor Gap (JPDA), Ukraine, Ecuador, and Libya. The improved scores enabled some of these jurisdictions to move up considerably in the rankings, indicating that survey respondents now regard them as more favorable for upstream petroleum investment than in 2015. For example, Wyoming now ranks as the 5th (of 96) most attractive jurisdiction among those ranked compared with 19th (of 126) in 2015, and France moved up into the second quintile after being at the bottom of the third quintile in the previous year. The reasons underlying these and other significant improvements are examined in the regional analysis presented later in this report.

Respondents gave lower (i.e., less favorable) overall scores to a number of jurisdictions this year, indicating that their barriers to investment appear

8 South Australia ranked 10th last year but could not be ranked this year due to insufficient responses.

to have considerably increased since the 2015 survey. Scores for nine jurisdictions of the 96 (or 9.4 percent of the total) deteriorated 10 points or more: Alberta, Brazil—Offshore CC, Northwest Territories, Yukon, Brazil—Offshore Presalt Area PSC, Brazil—Onshore CC, California, New Brunswick, and Quebec. This compares with seven jurisdictions of 126 (or 5.6 percent) who saw their scores drop in 2015.

These rankings are driven purely by responses to the survey questions and do not take into account the extent of the proved oil and gas reserves in each jurisdiction, as discussed above. The scores, from a potential low of 0 to a high of 100, have been divided into five equal ranges (quintiles). Those in the 100 to 80 range (first quintile) are rated as most attractive for investment because they reflect the lowest percentages of negative responses, while jurisdictions with scores ranging from 0 to 19.9 (fifth quintile) are the least attractive.

First Quintile

Twenty-two jurisdictions (23 percent) have scores in the top range (first quintile) in 2016. Five of them rose to the first quintile from other quintiles (↑). These are:

- Oklahoma
- Texas
- Kansas
- Saskatchewan
- Wyoming
- North Dakota
- Norway—North Sea
- Mississippi
- Utah ↑
- Montana
- Alabama
- United Kingdom—Other Offshore (except North Sea) ↑
- Netherlands
- Manitoba
- Arkansas
- Norway—Other Offshore (except North Sea) ↑
- New Zealand
- Louisiana
- United Arab Emirates ↑
- United Kingdom—North Sea
- Morocco ↑
- West Virginia

This compares with 20 (16 percent) jurisdictions with first quintile scores in 2015, 24 (15 percent) in 2014, and 32 (20 percent) in 2013. Except for Utah, United Kingdom—Other Offshore, Norway—Other Offshore, United Arab Emirates, and Morocco, all jurisdictions in the first quintile this year were in the first quintile in 2015. Only US Offshore—Gulf of Mexico and Ohio slipped from the first quintile this year.[9]

Jurisdictions in the United States account for 12 of the 22 with first quintile scores this year. Two jurisdictions (Saskatchewan and Manitoba) are in Canada, while five are in Europe.

Second Quintile

There are 32 jurisdictions (33 percent) with scores from 60 to 79.99 (second quintile) according to the Policy Perception Index. This compares with 48 second-quintile jurisdictions (38 percent of the total number ranked) in 2015 and 46 (29 percent) in 2014. Geographically this group is diverse this year and is much less concentrated in North America and Europe than the first quintile group.

All of the jurisdictions with scores in the second quintile are listed below in the order of their rank (i.e., best to worst score). Twenty-three jurisdictions in the second quintile were also in this group in 2015. Six jurisdictions moved up into the group this year as the result of improved survey results and one, Chile, was included for the first time since 2014.

- Ireland
- New Mexico
- Newfoundland & Labrador
- Australia—Offshore
- France ↑
- US Offshore—Gulf of Mexico ↓
- Qatar
- Ohio ↓
- Brunei
- Namibia
- Bahrain
- Chile
- Western Australia
- Pennsylvania

9 Note that the reason there was an increase of just two jurisdictions in the first quintile given that five jurisdictions moved up while only two moved down, is due to the 2015 split of the Netherlands into two jurisdictions, with both in the first quintile.

- Hungary
- Vietnam
- British Columbia
- South Africa ↑
- Malaysia
- Thailand
- Alberta
- Illinois
- China
- Cameroon ↑
- Queensland
- Ghana
- Alaska
- Gabon ↑
- Egypt ↑
- Philippines
- Colombia
- Michigan ↑

Third Quintile

Investors generally perceive jurisdictions with Policy Perception Index scores from 40 to 59.99 (i.e., in the third quintile) as somewhat less attractive than those with scores in the first and second quintiles. The 32 jurisdictions that achieved third quintile scores this year are listed below in order of their rank (best to worst).

This year almost one-third of the jurisdictions ranked in the third quintile. This compares with 37 percent (22 jurisdictions) in 2015, and 33 percent of jurisdictions in 2014. Of the 32 jurisdictions with scores in the third quintile this year, eight dropped from the second quintile in 2015 (↓). Twenty-two jurisdictions were also present in the third quintile in 2015. Two jurisdictions moved up into the third quintile this year from the fourth in the previous year (↑).

- Argentina—Salta
- Nova Scotia ↓
- Timor Gap (JPDA)
- Pakistan
- Argentina—Neuquen
- Equatorial Guinea
- Colorado ↓
- Angola

- Algeria
- Peru
- Brazil—Offshore concession contracts ↓
- Romania ↓
- Myanmar
- Mexico
- Tunisia
- Northwest Territories ↓
- Victoria
- Cambodia
- Spain
- Argentina—Mendoza
- India
- Papua New Guinea
- Iraq
- Nigeria
- Indonesia
- Yukon ↓
- Brazil—Offshore Presalt Area PSC ↓
- Brazil—Onshore CC ↓
- Argentina—Chubut
- Yemen ↑
- Bangladesh ↑
- Argentina—Santa Cruz

Fourth Quintile

Jurisdictions with Policy Perception Index scores from 20 to 39.99 (i.e., in the fourth quintile) all have relatively high percentages of negative responses to the survey questions. This indicates that investors regard them as less attractive than jurisdictions with higher scores, i.e., those in the first, second, or third quintiles. About seven percent of jurisdictions had fourth quintile scores in 2016; down from six percent in 2015.

This year's fourth quintile jurisdictions are listed below in order of rank. Two jurisdictions slipped from the third quintile last year (↓) to the fourth quintile this year. The other five jurisdictions in the fourth quintile this year also had scores in this range in 2015.

- Russia
- Ukraine
- Ecuador
- New South Wales
- California ↓

- New Brunswick ↓
- Bolivia

Fifth Quintile

Survey participants regard jurisdictions in with fifth quintile PPI scores as least attractive for upstream investment. This year there are three jurisdictions (about three percent of the total of 96) in this category. This compares with eight jurisdictions (of 126) in 2015 or six percent.

Quebec fell into the fifth quintile in 2016 from the fourth (↓).

In order of their ranking, with the worst last, the fifth quintile jurisdictions are:

- Libya
- Quebec ↓
- Venezuela

Certainly, the fact that the majority of proved oil and gas reserves are located in jurisdictions with fourth and fifth quintile ratings must be cause for some concern.

Results over time

The drop in the number of jurisdictions we have been able to rank over the past couple of years presents a problem for analyzing trends in the ranks of jurisdictions over time. For this reason we have re-estimated the PPI scores for the four previous years using only the 96 jurisdictions for which we had sufficient data to include in this year's survey. Therefore, the data from the **table 5** (below) are used in the following section to discuss changes in the ranks of jurisdictions over the past few years and to compare regions over the past few years.

Table 5: Policy Perception Index— 2016 Jurisdictions Only

		Score					Rank				
		2016	2015	2014	2013	2012	2016	2015	2014	2013	2012
CANADA	Alberta	66.87	82.72	85.98	85.66	83.65	43	25	14	15	13
	British Columbia	68.13	70.90	64.43	73.22	75.44	39	39	43	36	30
	Manitoba	87.01	89.92	97.19	87.71	88.04	14	10	6	11	10
	Newfoundland & Labrador	78.66	83.48	77.37	82.11	70.40	25	22	25	20	35
	New Brunswick*	31.53	59.82	59.51	58.53	28.28	92	59	52	58	87
	Northwest Territories*	51.80	70.38	63.31	62.13	61.56	70	40	45	50	48
	Nova Scotia*	59.12	65.04	68.43	77.25	80.87	56	53	35	30	22
	Quebec*	3.96	35.28	22.57	20.50	36.93	95	91	92	92	80
	Saskatchewan	94.18	93.89	97.65	96.71	89.51	4	7	4	3	7
	Yukon*	45.04	78.62	64.69	70.35	61.88	80	28	42	39	47
UNITED STATES	Alabama*	87.85	98.73	95.20	82.31	N/A	11	2	8	19	N/A
	Alaska	63.49	66.77	59.73	58.05	64.13	49	48	50	60	44
	Arkansas*	86.40	89.88	90.88	91.73	N/A	15	11	9	7	N/A
	California	33.02	54.03	41.47	56.51	68.99	91	69	74	62	37
	Colorado	57.44	68.26	59.51	65.93	82.69	61	45	51	44	17
	Illinois*	66.34	68.64	72.93	73.27	N/A	44	44	29	35	N/A
	Kansas	94.47	95.49	96.29	94.40	82.84	3	5	7	6	16
	Louisiana	83.24	86.95	87.78	86.37	92.04	18	14	12	14	5
	Michigan	61.14	60.96	76.38	61.27	76.62	54	58	26	54	27
	Mississippi	91.63	91.48	100.00	88.25	91.29	8	9	1	9	6
	Montana	88.98	86.09	81.38	78.17	80.29	10	15	19	29	23
	New Mexico	79.19	69.99	78.85	78.30	93.63	24	42	22	26	4
	North Dakota	93.16	92.94	97.24	95.00	88.57	6	8	5	4	9
	Ohio	74.95	84.15	82.51	76.69	87.15	30	19	18	32	11
	Oklahoma	100.00	96.60	99.65	100.00	100.00	1	3	2	1	1
	Pennsylvania	71.19	82.91	67.02	66.38	75.65	36	24	37	43	28
	Texas	97.65	100.00	98.48	98.43	96.78	2	1	3	2	2
	Utah	89.76	80.05	83.02	81.58	83.20	9	26	17	21	14
	West Virginia*	81.13	88.01	72.32	78.24	86.03	22	13	31	27	12
	Wyoming	93.26	83.85	88.72	87.14	93.78	5	21	11	12	3
	US Offshore—Gulf of Mexico	76.24	85.92	72.82	76.95	82.14	28	16	30	31	19
AUSTRALIA	New South Wales*	37.27	35.27	47.17	55.10	59.91	90	92	66	63	50
	Queensland	63.99	74.58	66.06	61.30	65.91	47	32	38	53	41
	Victoria*	51.79	58.35	68.07	64.43	70.05	71	62	36	46	36
	Western Australia	71.63	75.94	68.99	73.48	75.59	35	31	33	34	29
	Australia—Offshore	77.59	78.63	74.35	71.13	78.11	26	27	27	37	26
	Timor Gap (JPDA)*	58.60	47.02	52.88	50.61	59.54	57	82	60	69	51
OCEANIA	Brunei*	74.70	73.94	65.25	79.26	55.54	31	34	41	24	58
	Indonesia	45.83	48.92	30.48	39.01	38.63	79	81	90	80	76
	Malaysia	67.44	71.31	59.09	67.88	56.41	41	37	53	41	56
	New Zealand	83.61	85.35	86.41	78.20	82.30	17	17	13	28	18
	Papua New Guinea	49.13	53.24	44.38	43.29	40.33	76	71	71	77	73
	Philippines	61.93	65.38	62.36	62.67	56.58	52	52	47	48	55

* Between 5 and 9 responses

Table 5 continues on page 29

Table 5: Policy Perception Index— 2016 Jurisdictions Only *(continued from page 28)*

		Score					Rank				
		2016	2015	2014	2013	2012	2016	2015	2014	2013	2012
EUROPE	France*	76.33	44.95	44.72	54.29	64.55	27	84	70	65	43
	Hungary*	68.87	72.07	55.14	65.85	73.33	37	36	56	45	33
	Ireland*	79.57	78.04	71.65	80.83	81.56	23	29	32	22	20
	Netherlands	87.21	96.03	89.12	94.41	88.68	13	4	10	5	8
	Norway—Other Offshore (except North Sea)*	85.83	83.90	84.48	89.02	78.93	16	20	15	8	25
	Norway—North Sea*	91.67	95.26	83.33	85.38	82.85	7	6	16	16	15
	Romania*	53.38	67.12	65.27	58.20	68.58	66	47	40	59	38
	Russia	39.21	36.86	35.30	64.01	29.44	87	89	86	47	85
	Spain	50.75	49.71	40.26	66.66	N/A	73	80	78	42	N/A
	Ukraine*	38.03	36.15	36.90	33.48	44.63	88	90	84	85	70
	United Kingdom—Other Offshore (except North Sea)*	87.65	84.21	78.03	83.79	73.37	12	18	24	17	32
	United Kingdom—North Sea	82.42	88.91	78.37	87.13	80.10	20	12	23	13	24
ASIA	Bangladesh*	42.53	41.73	38.54	37.30	47.52	85	86	82	81	67
	Cambodia	50.83	51.06	39.65	35.85	34.26	72	78	80	82	82
	China*	65.80	66.57	40.33	59.43	50.21	45	49	77	56	64
	India*	49.77	50.37	40.86	41.72	39.57	75	79	75	79	74
	Myanmar	53.37	51.21	40.26	41.97	38.62	67	77	79	78	77
	Pakistan*	57.85	57.59	54.35	56.55	42.89	58	64	58	61	72
	Thailand	67.01	69.97	57.42	69.59	58.49	42	43	55	40	53
	Vietnam	68.59	70.26	58.72	54.33	53.41	38	41	54	64	60
AFRICA	Angola	56.69	62.68	48.01	51.81	39.00	62	55	63	68	75
	Cameroon*	64.47	59.49	48.54	62.46	45.58	46	60	62	49	68
	Equatorial Guinea*	57.75	53.22	45.93	54.09	58.33	60	72	69	66	54
	Gabon	62.84	61.88	46.83	52.95	50.76	50	57	67	67	63
	Ghana*	63.51	67.87	60.68	58.75	48.14	48	46	48	57	66
	Namibia*	74.55	76.13	68.78	70.81	51.16	32	30	34	38	62
	Nigeria	46.69	45.81	36.88	35.69	58.50	78	83	85	83	52
	South Africa*	67.92	52.52	41.56	61.82	25.35	40	74	73	52	88
MENA	Algeria	56.57	59.32	40.65	43.50	71.17	63	61	76	76	34
	Bahrain*	74.21	71.22	62.79	78.32	64.84	33	38	46	25	42
	Egypt*	62.57	56.08	33.32	50.55	32.36	51	67	88	70	83
	Iraq	47.26	44.65	27.51	29.11	51.57	77	85	91	89	61
	Libya*	15.24	0.00	21.68	29.34	67.90	94	95	93	88	39
	Morocco*	81.31	62.05	65.87	75.02	60.95	21	56	39	33	49
	Qatar*	75.44	74.48	74.11	88.15	28.77	29	33	28	10	86
	Tunisia*	52.71	56.88	50.31	60.42	81.36	69	65	61	55	21
	United Arab Emirates*	83.00	83.23	79.60	83.52	73.94	19	23	21	18	31
	Yemen*	42.74	36.96	39.04	43.54	35.70	84	88	81	75	81

Notes: Due to a low response rate Netherlands—Onshore and Netherlands—Offshore were combined to this year into Netherlands; Spain—Offshore and Spain—Onshore were combined into Spain ; and Russia—Eastern Siberia, Russia—Offshore Arctic, Russia—Offshore Sakhalin, and Russia—Other were combined into Russia.

Table 5 continues on page 30

Table 5: Policy Perception Index— 2016 Jurisdictions Only *(continued from page 29)*

		Score					Rank				
		2016	2015	2014	2013	2012	2016	2015	2014	2013	2012
ARGENTINA	Chubut*	59.17	53.91	47.90	26.68	37.09	55	70	64	91	79
	Mendoza*	49.88	52.33	42.69	32.25	38.04	74	76	72	86	78
	Neuquen	57.82	56.54	47.33	34.17	44.24	59	66	65	84	71
	Salta*	43.67	55.60	33.41	30.99	45.25	83	68	87	87	69
	Santa Cruz*	42.28	53.05	32.25	27.18	29.51	86	73	89	90	84
LATIN AMERICA & CARRIBEAN	Bolivia*	26.64	37.67	16.90	14.07	5.73	93	87	94	93	90
	Brazil—Onshore CC*	44.47	64.37	53.69	48.32	56.13	82	54	59	73	57
	Brazil—Offshore CC	53.60	72.89	60.32	49.00	62.11	65	35	49	71	46
	Brazil—Offshore presalt area PSC*	44.50	65.55	46.26	48.33	62.67	81	51	68	72	45
	Chile*	71.78	N/A	79.76	80.23	54.57	34	N/A	20	23	59
	Colombia	61.84	65.87	64.20	61.89	66.74	53	50	44	51	40
	Ecuador*	37.47	31.08	10.49	7.24	23.89	89	93	95	94	89
	Mexico	52.78	58.32	37.27	N/A	N/A	68	63	83	N/A	N/A
	Peru	56.04	52.48	55.03	48.28	49.64	64	75	57	74	65
	Venezuela	0.00	5.64	0.00	0.00	0.00	96	94	96	95	91

* Between 5 and 9 responses

Results by Continental Region

North America

Compared to other regions of the world, many jurisdictions in Canada and the United States are rated as relatively attractive for upstream investment.

Canada

Table 6 summarizes this year's shifts in the relative attractiveness of Canadian jurisdictions compared with 2015. Readers are reminded that these rankings are based on the factors in the Policy Perception Index only, and do not factor in the proved oil and gas reserves or the petroleum resource potential of the various jurisdictions. This year, the relative investment attractiveness of all Canadian jurisdictions except for Saskatchewan declined from 2015, and when compared with the 96 jurisdictions ranked in this year's survey.

As in the previous five years, Saskatchewan and Manitoba are again the top two Canadian jurisdictions. Saskatchewan maintained its position atop the Canadian Policy Perception Index rankings, and was the only Canadian jurisdiction to improve its PPI score this year. Although it remained the second most attractive jurisdiction in Canada, Manitoba's PPI score declined slightly this year, which caused it to move down a bit on the Policy Perception Index scale from a rank of 10th overall to 14th this year. Saskatchewan improved from 7th in 2015 to 4th in 2016.

Figure 5 illustrates the relative performance of the Canadian jurisdictions in the 2016 survey. Where Saskatchewan is the most attractive Canadian jurisdiction for upstream petroleum investment on the Policy Perception Index, Quebec is at the other end of the scale as the Canadian jurisdiction posing the greatest barriers to investment.

Ten of Canada's jurisdictions were ranked in the 2016 survey, but only two, Saskatchewan and Manitoba, achieved commendable first quintile rankings. This year both Alberta and Newfoundland & Labrador dropped into the second quintile where they join British Columbia. However, investors now perceive British Columbia as more attractive for investment than Alberta. Northwest Territories, Nova Scotia, and Yukon all dropped from the second quintile to the third this year. New Brunswick is the only Canadian jurisdiction with a fourth quintile score. Again, the outlier is Quebec, whose PPI score dropped into the fifth quintile this year from the fourth in the previous year.

Alberta has experienced another significant decline in rank as oil and gas executives continue to see the province besieged by increasing uncertainty

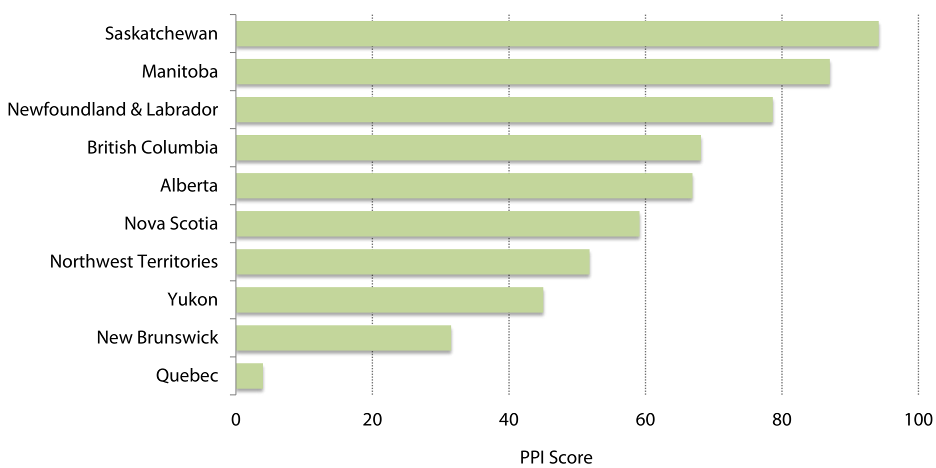
Table 6: Rankings of Canadian Jurisdictions for 2016 and their Policy Perception Index Scores

	2016		2015	
	Rank	**Score**	**Rank**	**Score**
Saskatchewan	1	94.18	1	93.89
Manitoba	2	87.01	2	89.92
Newfoundland & Labrador	3	78.66	3	83.48
British Columbia	4	68.13	7	70.90
Alberta	5	66.87	4	82.72
Nova Scotia*	6	59.12	9	65.04
Northwest Territories*	7	51.80	8	70.38
Yukon*	8	45.04	5	78.62
New Brunswick*	9	31.53	10	59.82
Quebec*	10	3.96	11	35.28

*Between 5 and 9 responses.

Note: Ontario was included in the 2015 survey.

Figure 5: Policy Perception Index—Canada



and barriers to investment. The election of an NDP government in May 2015 has led to a number of changes in policies that affect the oil and gas industry. Those policy changes include higher corporate and personal income taxes, a cap on GHG emissions from oil sands production, a new carbon tax, and a review of royalties (which created some uncertainty for a while but left the royalty framework relatively unchanged), among others (Green and Jackson, 2015, 2016). All these changes in the policy environment come at a time when Canada continues to struggle to build new pipelines to access tidewater and is dealing with lower global prices for oil and gas (Angevine and Green, 2016).

Alberta's score ranks it in the second quintile, but the province's overall rank has dropped drop from 14th in 2014 (compared to the 96 jurisdictions in this year's survey) and the third most attractive jurisdiction in Canada, to 43rd in 2016 and the fifth most attractive jurisdiction in Canada. Much of the change has been driven by poorer performance in the areas of regulation and taxation. Specifically, the percentage of negative responses increased the most in the areas of regulatory duplication and inconsistencies (30 points),[10] taxation in general (26 points), and environmental regulations (20 points). The deteriorating policy environment in the province may mean that the more negative perceptions of the province remain into the future.

British Columbia's score this year was similar to its score in 2015, but the province achieved more positive results on a number of factors affecting investment decisions. British Columbia is now the fourth most attractive jurisdiction in Canada, although the province's overall ranking remains 39th. The province's scores improved the most on survey questions about the availability of labour and skills (-21 points), quality of infrastructure (-20 points), and protected areas (-3 points). While the percentage of negative responses for protected areas did decline this year, this policy area, together with disputed land claims, still seriously concern potential investors. In fact, over 80 percent of respondents indicated that disputed land claims in BC are a deterrent to investment. Disputed land claims and protected areas are also the chief concerns of mining investors in the province (Jackson and Green, 2016).

Manitoba's score declined slightly leading to a decrease in the province's overall rank from 10th in 2015 to 14th in 2016. Driving this shift were increases in negative sentiment related to regulatory duplication and inconsistencies (26 points), environmental regulations (17 points), and taxation in general (8 points). Despite those declines, Manitoba maintained its position as the 2nd most attractive Canadian jurisdiction for upstream petroleum investment.

Saskatchewan slightly improved its global attractiveness for investment, moving from 7th place in 2015 to 4th. This was due to more positive scores on labor availability and skills (-15 points), trade barriers (-12 points), and the quality of infrastructure (-9 points).

Comments from respondents about various Canadian provinces and territories ranged from complimentary to critical. The comments in the following

10 These numbers refer to the percentage point increases from 2015 to 2016 in the percentage of respondents indicating that this policy area was either a mild or strong deterrent to investment or that they would not invest all together due to the policy area.

section have been edited for length, grammar and spelling, to retain confidentiality, and to clarify meanings.

Canada—General

> "This country needs to get our product to Canadian tidewater to allow us to sell into other markets (non-US). Until we do, we will be beholden to the US which is not Canada's interest. The political infighting provincially and federally to approve projects takes far too long and will result in lower economic benefit to all Canadians."

Alberta

> "Drawn out royalty review, caused capital market uncertainty."

> "Carbon tax, royalty review, raising of income tax rates—all during a time of depressed commodity prices—is hurting the investment environment."

> "The announcement of a new royalty review once the NDP was elected made it impossible to raise investment capital if you had operations in the province. The delay until the review results were announced made the problem worse."

> "Repeated royalty reviews, carbon tax implementation, increase of corporate and personal taxes in a major downturn have all been deterrents to investment."

Saskatchewan

> "Keeping royalty rates/taxation the same even in a low-price environment has been exemplary policy."

New Brunswick

> "The New Brunswick government placed a moratorium on hydraulic fracturing despite having an independent panel prepare a report indicating that a moratorium was not necessary."

Yukon

> "Spent more than two years in the regulatory system with a district office applying for the same kind of work that we had already been granted approval for in the past. After more than two years they were not able to render a decision and referred it to an executive office where the process starts all over from the beginning."

The United States

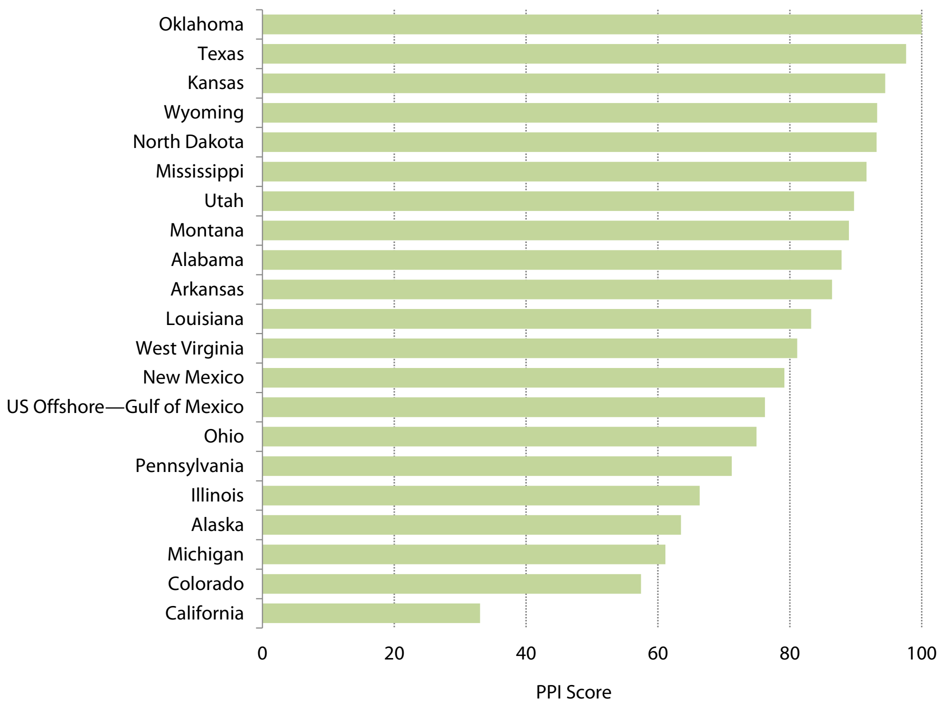
Twenty-four US jurisdictions were included in the 2015 survey and sufficient responses were received to allow us to rank 21 of them.

Oklahoma is not only the most attractive US jurisdiction, but the most attractive jurisdiction in the world. In the United States, Texas is second most attractive jurisdiction and the second most attractive in the world, as Oklahoma displaced Texas from the global top spot this year. Ten other US jurisdictions also received scores in the first quintile this year: Kansas, Wyoming, North Dakota, Mississippi, Utah, Montana, Alabama, Arkansas, Louisiana, and West Virginia (**figure 6**). Eight of the world's top 10 jurisdictions are located in the United States.

Both Wyoming and Utah achieved increases in their PPI scores of about 9.5 points this year. These increases allowed both US states to move into the global top 10. Wyoming moved up from 21st in 2015 to 5th in 2016. In large part this improvement was driven by lower percentages of responses indicating that issues around protected areas (-26 points), the cost of regulatory compliance (-22 points), and environmental regulations (-20 points) were deterrents to investment. Utah rose from a rank of 26th in 2015 to 9th in 2016 largely based on improvement in the areas of regulatory duplication and inconsistencies (-15 points), regulatory enforcement (-12 points), and quality of infrastructure (-8 points). Alabama remained in the top quintile, but its score dropped considerably, from 98.7 in 2015 to 87.9 in 2016. Investors had a more negative perception of environmental regulations (22 points) and regulatory duplication and inconsistencies (15 points) in the state than previously.

Seven US jurisdictions are in the second quintile group this year compared with five in 2015. The four states that were in this group in 2015—Alaska, Illinois, Michigan, and New Mexico—have been joined in 2016 by Ohio, Pennsylvania, and US Offshore—Gulf of Mexico, which dropped from the first quintile. US Offshore—Gulf of Mexico's lower overall ranking, from 16th position last year to 28th in 2016, is the result of declining performance on several factors addressed in the survey, including regulatory enforcement (18 points), political stability (17 points), and regulatory duplication and inconsistencies (16 points). Pennsylvania also experienced a significant decline in its Policy Perception Index score and rank this year, moving from 24th position overall in 2015, to 36th in 2016. This is due to significantly worsened scores for the quality of infrastructure (34 points), quality of the geological database (28 points), and labor availability and skills (25 points). Ohio is another US state that dropped out of the first quintile. Ohio dropped 11 places, from 19th position overall in 2015, to 30th in 2016. Investors expressed more concern over issues around the quality of infrastructure

Figure 6: Policy Perception Index—United States



(27 points), fiscal terms (26 points), and the legal system (20 points) than in 2015.

As in 2015 there is only one US jurisdiction with a third quintile PPI score this year. This year, however, it is not California falling in that range but Colorado, which dropped from the second quintile. Colorado has fallen in the overall ranking from 45th in 2015 to 61st this year. Contributing to the decline have been worse scores on political stability (22 points), the legal system (19 points), and regulatory enforcement (15 points).

This year's only US jurisdiction with an unattractive fourth quintile score is California. The state's score dropped this year by a remarkable 20 points, causing it to fall from 69th place overall to 91st place and tumble into the fourth quintile range. California continues to be plagued by concerns regarding regulations, taxation, and fiscal terms.

Comments by survey participants on a number of American jurisdictions are presented below. Comments in have been edited for length, grammar and spelling, to retain confidentiality, and to clarify meanings.

Colorado

> "Local land use boards require a 'Special Land Use Permit' to drill in their county. This is in addition to the state approved

drilling permit. This causes delays, additional costs, and possible censoring of the drilling activity."

"Colorado makes it very difficult to drill wells from a county to state perspective. There is a constant risk that fracking will be banned."

[A success story is the] "Sheep Mountain CO_2 field development where the E&P [exploration and production] companies, BLM [Bureau of Land Management], state and federal agencies, and environmental groups worked together to develop a plan that allowed the drilling and production from this environmentally sensitive area as well as minimize the impact on the land and ecosystem."

Kansas

"The federal government gave protected status to the Lesser Prairie Chicken, which is quite abundant and has been hunted. It drove up well costs 10% and mitigation was just a stick-up to pay fees to a quasi-government agency."

"Easy and efficiently run permitting system."

"Cooperation and professional courtesy between state personnel and operators in vast majority of cases. Never much of an adversarial position by state people."

Montana

"All control in certain areas of the state has been ceded to the manager of the Sage Grouse Recovery Program. Even routine maintenance must be pre-approved, a process that takes weeks."

North Dakota

"Very stable regulatory body over oil and gas. Consults with the industry but is independent."

Pennsylvania

"Environmental policy related to oil and gas drilling and fracturing activities is an example of exemplary policy."

West Virginia

"Passed a 'Temporary Production Tax' supposed to last 5 years until a bond was paid off, then never allowed to lapse."

Oceania

We were able to rank 12 jurisdictions in Oceania this year. These are four of the six Australian states (New South Wales, Queensland, Victoria, and Western Australia), Australian Offshore (which falls under Australian federal jurisdiction), the Timor Gap Joint Petroleum Development Area (JPDA), Brunei, Indonesia, Malaysia, New Zealand, Papua New Guinea, and the Philippines.[11]

As **figure 7** illustrates, the results for this region range across the first, second, third, and fourth quintiles. This year New Zealand achieved the highest score in the region, keeping its rank of 17th overall and remaining as the only jurisdiction in Oceania in the first quintile.

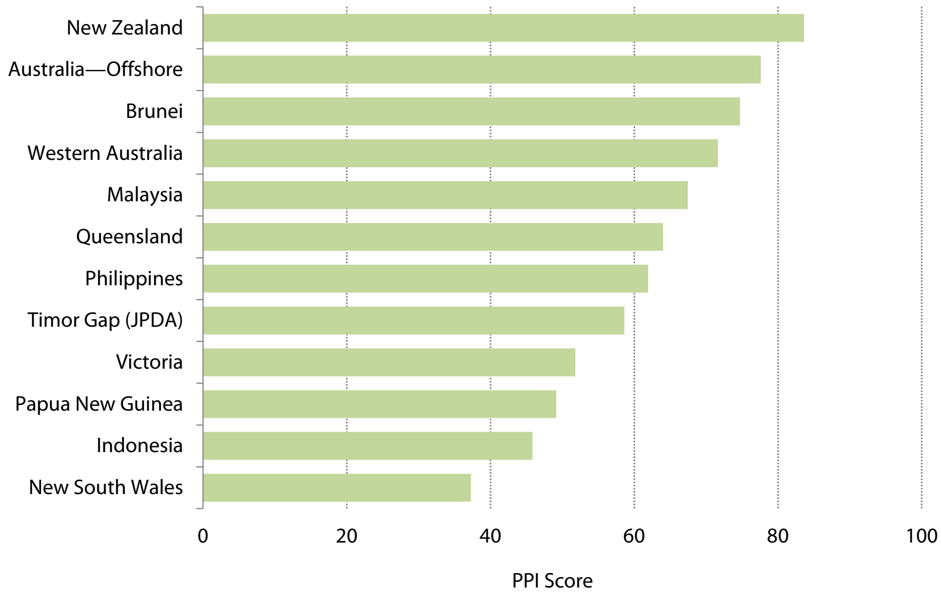
There are six jurisdictions in the region with second quintile scores: Australia—Offshore, Brunei, Western Australia, Malaysia, Queensland, and the Philippines. Queensland achieved a score of 63.99 (47th overall) on the Policy Perception Index this year, a drop of 10.59 points from 74.58 (32nd overall) in the 2015 survey. This drop, the largest of any jurisdiction in the region, is based on poorer scores on the cost of regulatory compliance (23 points), quality of infrastructure (22 points), and fiscal terms (21 points). Among the second quintile jurisdictions, Malaysia also ranked lower this year, moving from 37th to 41st in the global ranking due to increased concerns surrounding security (13 points), labour regulations and employment agreements, and disputed land claims (both 9 points).

Indonesia, Papua New Guinea, Victoria, and the Timor Gap (JPDA) are the four Oceania jurisdictions with third quintile scores this year, all of which were in the third quintile in 2015 as well. Indonesia ranked higher this year (79th) than it did in 2015 (81st), moving the jurisdiction just three countries behind Papua New Guinea, which dropped in rank from 71st to 76th this year. Indonesia's improvement is a result of lower negative perceptions on regulatory duplications and inconsistencies (-18 points), disputed land claims (-15 points), and trade barriers (-19 points). While Indonesia performed better on a number of the survey questions, investors viewed political instability as a much larger (31 points) deterrent to investment in 2016 than in 2015. Papua New Guinea's drop is due to an increase in negative perceptions on two factors on which Indonesia showed improvement—regulatory duplication and inconsistency (32 points) and trade barriers (21 points)—as well as labour availability and skills (38 points).

Only one jurisdiction in the region, New South Wales, achieved a poor fourth quintile PPI score this year. This is consistent with the state's placement in

11 This year two of the six Australian states, South Australia and Tasmania, as well as the Northern Territory (under federal jurisdiction) did not receive sufficient responses to be ranked.

Figure 7: Policy Perception Index—Oceania



2015. None of the 12 jurisdictions in Oceania received a fifth quintile PPI score.

Respondents offered both positive and negative comments about conditions in the jurisdictions that we surveyed in the Oceanic region. The comments in the following section have been edited for length, grammar and spelling, to retain confidentiality, and to clarify meanings.

Australia—General

> "All data, including well logs, core, wells tests, and seismic are made available through a web-based system for the cost of digital copying. This promotes exploration."

Indonesia

> "Recent regulation on the mandatory use of Rupiah for domestic transactions is an issue."

> "Refusal to grant work permits to your foreign personnel over age 55 can make investment difficult."

> "Implementation of a Land and Building Tax on offshore blocks that contain no land acts as a deterrent to investment."

> "In Indonesia we were forced to use under-qualified people and under-spec equipment (often of Chinese manufacture, not

Indonesian). It was an annoyance, and drove up bottom line costs somewhat, but we could manage it."

New South Wales

[There are problems with] "government opposition to the gas industry [which is] expressed as a ban on exploration in many areas—after having licensed [that exploration] and [there is also a] lack of will to support responsible gas development."

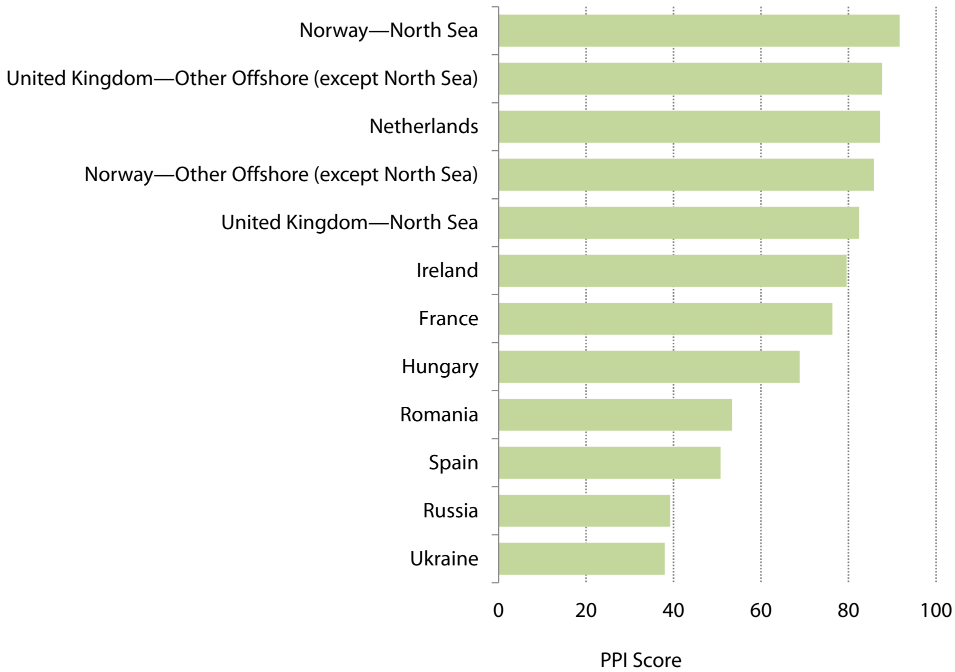
New Zealand

"New Zealand Petroleum & Minerals (the regulator) suddenly taking a stance that all P&A [plugging and abandonment] obligations must be able to be funded up front—i.e., clear evidence of present financial capability to meet the P&A obligations is required up front (but without any guarantee that capability will be maintained. This is a new requirement and has had the effect of upsetting sale and purchase transactions where a smaller player (the purchaser of petroleum producing and processing assets, in this case) cannot prove that capability. This result despite the existing owner having the capability to guarantee the purchaser's P&A performance."

Papua New Guinea

"The notion of reserving 15% of the gas from all sizes of gas fields no matter where they are located or the status of their development as a National Gas Option on top of the state equity entitlement of 22.5% in each project is a deterrent to investment."

Figure 8: Policy Perception Index—Europe



Europe

Figure 8 shows the rankings for European jurisdictions based on this year's Policy Perception Index scores. We were only able to evaluate 12 jurisdictions in the region this year, down from 19 in 2015.[12]

This year only eight European jurisdictions have PPI scores in the attractive first and second quintiles compared with nine in 2015. However, that eight of 12 jurisdictions or 67 percent have scores in these ranges, compared with nine of 19 or 47 percent in 2015, suggests that there may have been some improvement in the region's attractiveness for investment.

The five European jurisdictions in first quintile, beginning with the most attractive, are Norway—North Sea, UK—Other Offshore (except North Sea), the Netherlands, Norway—Other Offshore (except North Sea), and UK—North Sea. Although the Netherlands also achieved a positive first quintile score in 2015, its placement this year is lower. The Netherlands dropped from an overall rank of 4th to 13th due to increased uncertainty over taxation (33 points), the cost of regulatory compliance (31 points), and

12 The European jurisdictions that had to be dropped this year from 2015 as a consequence of insufficient responses are: Bulgaria, Denmark, Faroe Islands, and Italy. Note that due to a low response rate for the sub-jurisdictions of the Netherlands, Russia, and Spain, the responses for these countries' sub-jurisdictions were aggregated and those countries then were each ranked as a single jurisdiction.

fiscal terms (27 points). The UK—North Sea also dropped in rank, from 12th in 2015 to 20th in 2016 due in part to more negative perceptions regarding political stability (19 points) and protected areas (24 points).

Ireland, France, and Hungary received attractive second quintile scores and Romania and Spain were ranked in the third quintile this year. Russia and Ukraine are the only European jurisdictions in the fourth quintile. No European jurisdiction scored in the fifth quintile. Of the four European jurisdictions in the bottom three quintiles, Spain experienced the biggest change, rising in overall rank from 80th to 73rd. This improvement is attributable to a decrease in negative perceptions surrounding regulatory duplication and inconsistencies (-17 points), labour regulations and employment agreements (-18 points), and protected areas (-25 points).

The comments about European jurisdictions range from positive to critical. Some are provided below; comments have been edited for length, grammar and spelling, to retain confidentiality, and to clarify meanings.

Bulgaria

> "About four months after their shale gas concession bid round, the parliament banned fracking."

France

> "Ban on shale gas fracking is a significant deterrent to investment."

Hungary

> "Once awarded [the license], the new licensee has access to all the technical data that exists in the official archive. This means all seismic, well, and production data covering the asset."

Ireland

> "Excellent fiscal terms, good data rooms, historic data available at cost, clear and transparent processes, stick to the timetable, helpful attitude."

Norway

> "Norway has a consistent and stable policy environment."

> "Fiscal policy to return exploration spending to explorers as if they were a producing company has been an encouraging policy. This has resulted in exploration activity increasing with

small companies and exploration discoveries that the majors would not have made."

Spain—Onshore

"Lack of permits for program activity due to local opposition and environmental issues."

Ukraine

[There was an] "imposition in 2015 of a 58% gas royalty, based on a theoretical gas price, meaning the effective royalty is above 65%."

"The Ukrainian government doubled the royalty taxes. The Ukrainian currency, the hryvnia, has devalued from 8 to the USD to 27 to the USD and there is no liquidity or [ability to] transfer funds out of Ukraine. Corruption is endemic at the level of government ministers and their officials."

United Kingdom

"Recently to make exploration more attractive terms have been changed and not only are well data available, but older seismic surveys have been made available."

"Corporate taxes are structured to encourage 'maximum recovery' from oil and gas assets."

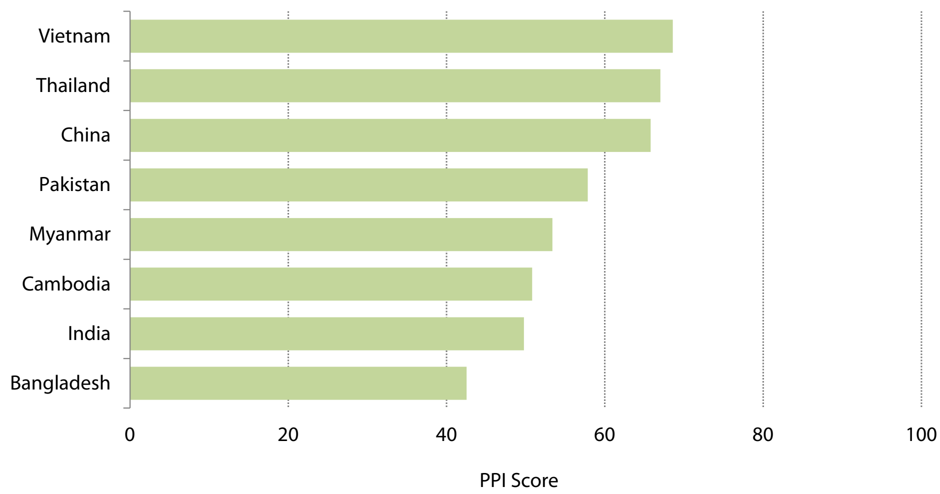
Asia

Figure 9 shows the eight Asian jurisdictions that were ranked this year according to their respective Policy Perception Index values. This is down from 10 jurisdictions in 2015. The two jurisdictions that are missing this year are Japan and Kazakhstan.

As has been the case since the survey began in 2007, none of the Asian jurisdictions achieved first quintile scores in 2016. Vietnam, Thailand, and China rank in the second quintile, whereas the five remaining Asian jurisdictions ranked this year (Pakistan, Myanmar, Cambodia, India, and Bangladesh) all achieved third quintile scores.

There was very little change among the Asian jurisdictions in the second quintile. Vietnam changed in the overall ranking from 41st (of 126) to 38th (of 96), and Thailand from 43rd to 42nd. However, both jurisdictions experienced slightly lower Policy Perception Index scores with Vietnam dropping from 70.26 to 68.59 and Thailand from 69.97 to 67.01. The apparent increase in

Figure 9: Policy Perception Index—Asia



rank despite lower PPI scores in each case is attributable to the jurisdictions' scores relative to the other ranked jurisdictions. However, the lower PPI scores are due to an increase in negative responses with respect to certain policy factors. The lower scores for both Vietnam and Thailand reflect an increase in uncertainty over fiscal terms (19 and 20 points respectively). Thailand's lower score reflects an increase in concern over protected areas (15 points), and Vietnam's reflects increased concern about the quality of infrastructure (11 points).

Of the jurisdictions in the third quintile, Myanmar saw the greatest improvement, moving 10 places from 77th to 67th in rank. This year Myanmar was perceived to have fewer barriers regarding environmental regulations (-29 points), political stability (-28 points), and labour regulations and employment agreements (-25 points). Cambodia also improved within the third quintile, increasing its rank by six points, from 78th to 72nd. Cambodia's improvement was due to better performance on regulatory enforcement (-35 points), the quality of infrastructure (-15 points), and disputed land claims (-26 points)., Pakistan also saw is score improve slightly, allowing the country to move up to 58th from 64th in the previous year.

Below are some of the comments received about the environment for petroleum industry investment in various Asian countries. The comments in the following section have been edited for length, grammar and spelling, to retain confidentiality, and to clarify meanings.

India

> "Getting environmental clearance can be a prolonged process. Even after getting environmental permission, there can be

> nasty surprises. Decisions within the bureaucracy can also be a long, drawn-out procedure."

Kazakhstan

> [My company was] "not allowed to export an oil sample for laboratory analysis. Laboratory facilities in the country are very limited. So we don't fully understand the petroleum system [in Kazakhstan]."

Thailand

> "Thailand is one of the few places I've worked that has no government mandated local content policy on personnel, materials, tools, equipment, or supplies. Contrast this to Indonesian and Nigerian local content laws. So Thailand, without any LC laws at all, has ended up with the higher use of local content (personnel, materials, tools, equipment, chemicals, etc.) in my experience. Businesses have switched over to Thai products and people because it makes economic sense to do so. It is also long-term sustainable."

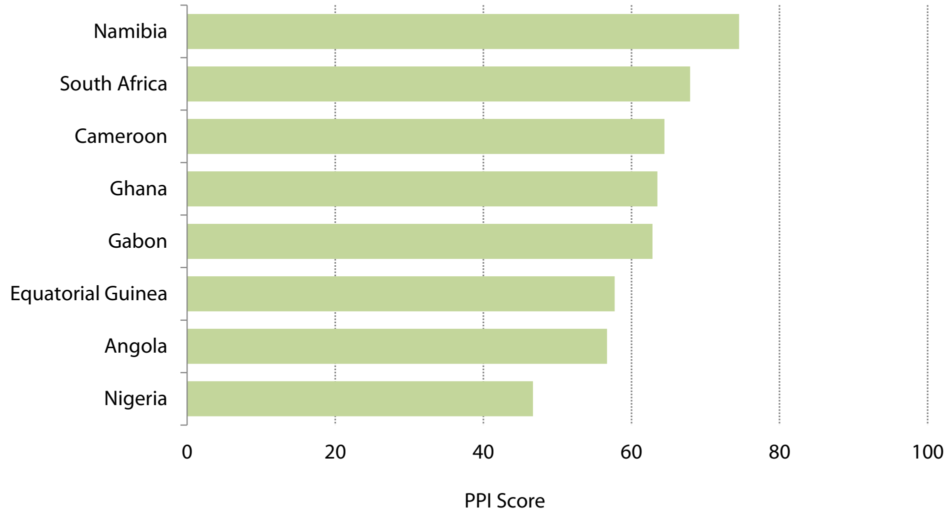
Africa

This year, and since 2013, we grouped the Middle East and African jurisdictions in this manner: 1) the Middle East and North Africa (MENA), and 2) the remainder of Africa (Africa). This change (from what was previously a simple split between the Middle East and All of Africa) was made to be more consistent with the regional reporting and statistics produced by international organizations. This section examines the survey results with respect to Africa (as redefined). Results for the MENA region are presented in the following section.

Figure 10 compares the attractiveness of the eight African jurisdictions that were assessed this year, compared with 14 in 2015. The six countries included in 2015 that we were unable to rank this year are Ivory Coast, Kenya, Mozambique, Republic of the Congo (Brazzaville), South Sudan, and Tanzania.

Namibia, the top-ranked African jurisdiction, is in the second quintile along with South Africa, Cameroon, Ghana, and Gabon. South Africa moved into the second quintile this year from the third last year. Africa's southernmost country saw its score move up by over 10 points from the previous year and South Africa now ranks as the 40th most attractive jurisdiction in the world

Figure 10: Policy Perception Index—Africa



for oil and gas investment. Angola achieved a second quintile score in 2015, but dropped to the third quintile this year because of a 5.99 point decrease in its Policy Perception Index score (from 62.68 in 2015 to 56.69 in 2016). As a consequence, Angola has dropped in rank from 55th (of 126) to 62nd (of 96). Angola's drop, the largest drop of any African jurisdiction, is the result of significant increases in the percentages of negative perceptions with regard to fiscal terms and taxation in general (increases of 23 and 38 points, respectively). Another issue of growing concern for investors in Angola is trade barriers, which is reflected in an 18 point increase in the percentage of responses that indicate that this matter is a deterrent to investment.

The lowest ranked African jurisdiction overall, Nigeria, improved its standing from 83rd to 78th this year. The improvement is due to respondents having fewer negative perceptions of the quality of the geological database (-30 points), labour availability and skills (-18 points), and disputed land claims (-15 points). However, Nigeria still receives many negative responses for the security and quality of infrastructure categories. Although the jurisdiction is the least attractive in Africa for investment based on the policy environment, Nigeria has the largest reserves in the region, which suggests that there could be considerably more investment if the barriers to upstream development were not so high.

Some of the respondents' comments concerning various African jurisdictions are presented below. These comments have been edited for length, grammar and spelling, to retain confidentiality, and to clarify meanings.

Ghana

> "The decision that all payments need to be in local currency and go through the Bank of Ghana is a deterrent to investment."

Nigeria

> "Working in Nigeria, we constantly had problems with Nigerian officials (usually, the more minor the official, the worse the problem) expecting bribes to do their work or grant approval for something."

> "Nigeria's Petroleum Industry Bill (PIB), kicked off in 2007 (although it was actually started in 2000), has yet to be enacted. It has left a regulatory vacuum and a lot of uncertainty about future fiscal terms. The fact that it cannot get past a second reading—or wherever they are now—is a tragedy for the country and investors."

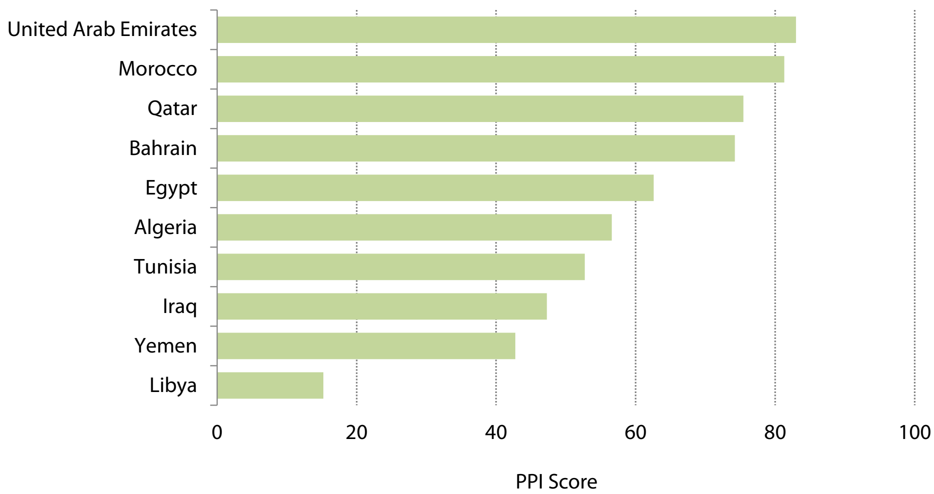
> "In Nigeria, the local content laws can be crippling. Many times there simply were no qualified local workers for what we wanted, and not only did we have to import them, we had to pay for Nigerian 'ghost workers' as well (doubling labor costs). Materials and chemicals were another area where we were often forced to buy local products we couldn't use and had to import useful items after wasting time and effort trying to force local products to work before throwing them away. [Local content laws are] forced and unsustainable. They probably also partially explain the serious pullback of companies operating there with today's oil prices."

The Middle East and North Africa (MENA)

The 10 Middle East and North African countries evaluated in this year's survey are presented in **figure 11**, ranked according to their relative attractiveness for investment as measured by the Policy Perception Index. In 2015, 16 MENA jurisdictions were ranked. Iran, Israel, Jordan, Kuwait, Oman, and Syria could not be ranked this year due to low response rates.

Only two MENA countries (United Arab Emirates and Morocco) achieved first quintile rankings in the 2016 survey, up from one (United Arab Emirates) in 2015. The first quintile score for United Arab Emirates is virtually unchanged from last year. Again this year this jurisdiction benefitted from above average responses on many policy factors. For example, in 2016

Figure 11: Policy Perception Index—Middle East and North Africa



UAE received no negative responses for quality of infrastructure, security, and political stability, while the average in the region on the same three factors was 50%, 58%, and 62% negative responses, respectively. Morocco also experienced a large rise (almost 20 points) in its score to move it into the first quintile. This score increase helped Morocco move from being the 56th most attractive jurisdiction in the world in 2015 to the 21st most attractive in 2016.

Qatar, Bahrain, and Egypt ranked in the second quintile, with Algeria, Tunisia, Iraq, and Yemen following in the third quintile. Egypt moved into the second quintile after ranking in the third in the previous year. No MENA jurisdiction received a score in the fourth quintile, but Libya is again in the fifth quintile.

Among the 5 MENA jurisdictions in the third and fifth quintiles there is little change in overall rankings, with the exception of Iraq. Iraq's ranking improved from 85th to 77th with a corresponding 2.61 point increase on the Policy Perception Index, moving the countryfrom a score of 44.65 to 47.26. The improvement is due in part to improved responses regarding disputed land claims (-37 points), regulatory duplication and inconsistencies (-20 points), and protected areas (-15 points). While Iraq benefitted from improved performance with respect to some survey questions, ongoing conflict in the region is a serious concern for investors and likely mitigates any improvements in the country. For example, 100 percent of respondents indicated that security and political stability in Iraq were a deterrent to investment. Most of these responses were in the category of "strong deterrent to investment."

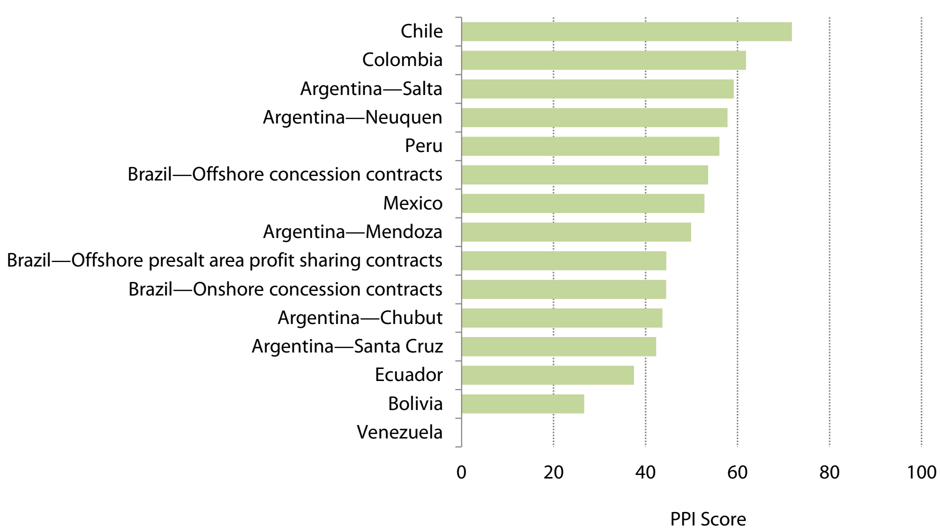
Latin America and the Caribbean

Figure 12 presents the Latin American and Caribbean jurisdictions that were evaluated this year on the Policy Perception Index. Again this year, Brazil was broken into three distinct regions: Onshore Concession Contracts (CCs), Offshore Concession Contracts (CCs), and Offshore Pre-salt Area Profit Sharing Contracts (PSCs). Argentina was broken down into six petroleum-producing provinces: Chubut, Mendoza, Neuquen, Salta, Santa Cruz, and Tierra del Fuego. Fifteen jurisdictions were ranked compared with 17 in 2015. Tierra del Fuego, Trinidad and Tobago, and Uruguay could not be included this year because, in each case, the number of responses was insufficient. Chile was included this year, but was not ranked in 2015.

No jurisdictions in the region achieved first quintile rankings this year and only two countries—Chile and Colombia—rank in the second quintile. Colombia dropped in rank from 50th in 2015 to 53rd this year with a corresponding decrease in PPI from 65.87 to 61.84. The lower score and rank comes as a result of increased negative perceptions concerning the legal system (21 points), fiscal terms (18 points), and trade barriers (17 points).

Brazil—Offshore CC was in the second quintile in 2015, but moved to the third quintile this year after a drop of 19.29 points on the Policy Perception Index from 72.89 to 53.60 (a change in rank from 35th to 65th). The drop is attributable to an increase in uncertainty concerning environmental regulations (42 points), political stability (41 points), and taxation in general (25 points). Nine other Latin American and Caribbean jurisdictions are in the third quintile this year, including Brazil—Offshore Presalt Area PSC and

Figure 12: Policy Perception Index—Latin America and the Caribbean



Brazil—Onshore CC (ranked 81st and 82nd respectively). Brazil—Offshore Presalt Area PSC and Brazil—Onshore CC received low rankings due to increases in negative perceptions of the same policy factors. Respondents displayed increased uncertainty over taxation in general in Brazil—Offshore Presalt Area PSC (38 points) and Brazil—Onshore CC (39 points) as well as over regulatory duplication and inconsistencies (a 46 point increase for Brazil—Offshore Presalt Area PSC and a 47 point increase for Brazil—Onshore CC). Note that the lower ranking of Brazil—Offshore CC was also due in part to increased uncertainty over taxation in general (25 points).

Ecuador and Bolivia are in the fourth quintile this year and Venezuela ranks in the fifth quintile. The latter is the lowest-ranked jurisdiction this year in the region and the world. Venezuela has received a PPI score of 0 for four of the past five years, ranking higher than only Libya in 2015. As in 2015, Venezuela had (or shared) the highest percentage of negative responses (100%) on survey questions about political stability, trade barriers, and the legal system. Moreover, this year, an increase in uncertainty about labor availability and skills (18 points) pushed Venezuela to the maximum degree of negative sentiment for that factor as well.

Respondents' comments on jurisdictions in Latin American and the Caribbean Basin are provided below and have been edited for length, clarity of meaning, grammar and spelling, and to remove identifying information.

Brazil

> "Local content rules where expertise and equipment is scarce or nonexistent is deterring investment."

Colombia

> [The country's] "formation of the ANH [Agencia Nacional de Hidrocarburos] and the way that group has functioned professionally and legally [has given the industry] clear rules and regulations."

> "After four years of environmental studies and after acceptance of them by the environmental authority, the environmental permits for E&P [exploration and production] activities were revoked one week later because of press and political hesitation on the area, without any technical support."

Mexico

> "President Peña has enacted vast changes in Mexican law (including changing the constitution) to allow investors to

participate in developing Mexico's hydrocarbons. And Mexico has hosted very impressive license rounds recently."

"Recent reforms to open the upstream sector to private and foreign investment should pay great dividends to the country."

Peru

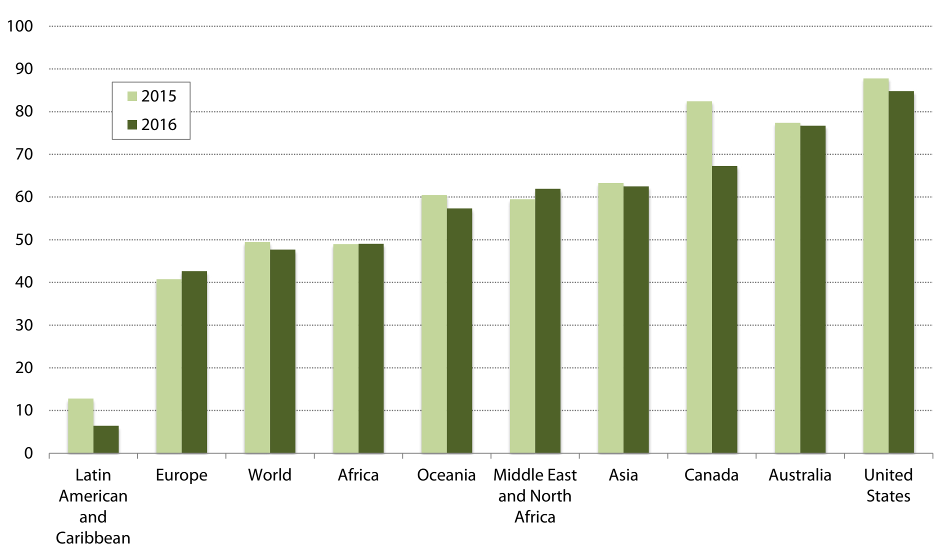
"Due to political pressure from various political and non-political sectors, the groups responsible for energy development could not and would not make a timely decision on a temporary extension for two E&P licenses. At the last minute, they decided to quickly negotiate a temporary extension to the licenses so production would not be shut down. The uproar from some political and non-political entities was deafening—all this due to a lack of planning, foresight, and willingness to do the right things."

Overview

Our analysis of the 2016 petroleum survey results indicates that the extent of negative sentiment regarding key factors driving petroleum investment decisions has increased somewhat in most of the world's regions. In fact, as **figure 13** illustrates, this year the average PPI scores, weighted by reserves, have decreased in seven out of 10 regions from where they were in 2015. The region with the greatest improvement this year was the Middle East and North Africa, where the weighted average score increased by just over two points, placing the region's median score in the second quintile. Europe also saw its weighted average score improve by almost two points this year. Australia's weighted average score is now slightly superior to Canada's. Most of the deterioration in Canada can be explained by the perception of a less favorable investment climate this year in Alberta, the Canadian province with the vast majority of the country's oil and gas reserves. The United States remains the region with the most attractive policy environment for investment in upstream oil and gas. The average weighted PPI score for the United States is almost 10 points better than the next most attractive region, Australia.

The declines in certain world regions should be taken with caution because low response rates prevented us from ranking a considerable number of jurisdictions that were indicated to be among the least attractive for investment in the 2014 and 2015 surveys.

Figure 13: Global Barriers to Investment, Regional Average PPI Score, Weighted by Reserve Size



Appendix 1: Calculating Proved Oil and Natural Gas Reserves

Proved oil and gas reserves for each jurisdiction were estimated using data from the US Energy Information Administration's (EIA) online International Energy Statistics site (EIA, 2016). At the time of publication, data for 2016 reserve totals were not yet available and as a result 2015 totals were used. The approach followed was consistent with that used in recent iterations of the survey.

The EIA retrieves its data for all countries, excluding the US, from the *Oil & Gas Journal*. Reserve data for the United States are compiled by the EIA.

Separate data were used in order to allocate a country's reserve totals to the various sub-jurisdictions included in the survey (i.e., Canadian provinces, US states, etc.). Oil reserve data for the US states and offshore regions were obtained from the EIA's report, *U.S. Crude Oil and Natural Gas Proved Reserves, 2014* (EIA, 2015a). Gas reserve data for US sub-jurisdictions were obtained from the EIA's data series, *Estimated Dry Natural Gas contained in Total Natural Gas Proved Reserves* (EIA, 2015b).

To distribute Canada's reserves, we relied on the oil and gas reserve data provided in the National Energy Board's report, *Canadian Energy Overview 2014—Energy Briefing Note* (NEB, 2015).

Because the United Kingdom only publishes data for so-called "P2" (proved plus probable) reserves, we were advised to allocate the EIA's estimate of that country's total proved oil and gas reserves between the North Sea and "other" offshore regions (i.e., in the Irish Sea and West of the Shetland Islands) according to the information about those reserves as at December 31, 2014. These were derived from the UK Government's *Pie Charts Showing Potential for UK Reserves Growth* online documents (United Kingdom, 2016). While there has been considerable discussion regarding possible production of natural gas from shale formations, the country's shale gas activity remains in the exploration stage. At this time, the UK is not extracting any substantial quantities from onshore oil and gas reserves.

Like the UK, the government of Australia only publishes data for P2 reserves. Data for combined proved and probable reserves in the respective states and territories, and in the offshore (like the Northern Territory, under federal jurisdiction), were provided by Geoscience Australia (2012). This information was used to allocate the EIA's estimate of proved reserves among the eight Australian jurisdictions. Oil and gas estimates for the Australia—East Timor JPDA (also in terms of the P2 reserves definition) were assumed to be the same as those used in 2014, when they were kindly provided by Mr. G. Bethune, CEO of the Australian consulting firm Energy Quest.

Data available for Norway only provides information for P2 reserves as well. The Norwegian Petroleum Directorate reports data on reserves, contingent resources, and undiscovered resources for the North Sea, the Norwegian Sea, and the Barents Sea. Reserves—"recoverable petroleum volumes for which a development decision has been made" —and contingent resources— "proven oil and gas for which no production decision has been made" along with "potential future improved recovery measures"—were combined to obtain P2 reserves for each region (Norwegian Petroleum Directorate, 2016). The Norwegian Sea and the Barents Sea were combined in the Norway—Other Offshore jurisdiction due to less exploration and production activity in these regions than in the North Sea.

For Argentina, estimates of proved oil and gas reserves as at December 31, 2014, by province were obtained from the website of the ministry of energy and mining (Ministerio de Energía y Minería, 2014).

For Brazil, total reserves were allocated to the Brazil—Onshore, Brazil—Offshore PSC, and Brazil—Offshore Concession Contracts regions according to data from the most recent document *Reservas Nacionais de Petróleo e Gás Natural* that was available (as at December 31, 2015) on the website of the national petroleum agency (Agência Nacional do Petróleo, Gás Natural e Biocombustíveis, 2016). We assumed that all offshore oil reserves in the Campos and Santos basins were part of the pre-salt reserves.

Appendix 2: Previous Methodology and Additional Sub-Indices

The methodology previously used to calculate the PPI is as follows. For each jurisdiction, we calculated the percentage of negative scores for each of the 16 factors. We then developed an index for each factor by assigning the jurisdiction with the highest percentage of negative responses a value of 100, and correspondingly lower values to the other jurisdictions according to their scores. Upstream investors consider jurisdictions with the lowest index values the most attractive, and thus rank them above jurisdictions that scored higher as a consequence of having greater proportions of negative scores.

The Policy Perception Index value (referred to in surveys prior to 2013 as the All-Inclusive Composite Index) for each jurisdiction is derived from the equally-weighted scores achieved on all 16 factors. This index is the most comprehensive measure of the extent of policy-related investment barriers within each jurisdiction. Most of the discussion that follows is based on the jurisdictional scores and rankings obtained using this index. **A high score on this measure reflects considerable negative sentiment on the part of respondents and indicates that they regard the jurisdiction in question as relatively unattractive for investment.**

In previous surveys we also included three additional sub-indices that focused on particular dimensions of policy, such as the regulatory climate and perceptions of geopolitical risk. In order to streamline the report and in response to feedback from respondents, we are not calculating these separate indices this year. However, below are descriptions of the indices and which measures would be used to calculate them. For those wishing to calculate these additional indices, all data from the survey is made publically available at www.fraserinstitute.org.

Commercial Environment Index

The Commercial Environment Index ranks jurisdictions on five factors that affect after-tax cash flow and the cost of undertaking petroleum exploration and development activities:

- fiscal terms
- taxation in general
- trade barriers
- quality of infrastructure
- labor availability and skills

The scores for the Commercial Environment Index for each jurisdiction were calculated by averaging the negative scores for each of these five factors. A high index value indicates that industry managers and executives consider that the business conditions reflected in this measure constitute significant barriers to investment.

Regulatory Climate Index

The Regulatory Climate Index reflects the scores assigned to jurisdictions for the following six factors:

- the cost of regulatory compliance
- regulatory enforcement
- environmental regulations
- labor regulations and employment agreements
- regulatory duplication and inconsistencies
- legal system

A relatively high value on the Regulatory Climate Index indicates that regulations, requirements, and agreements in a jurisdiction constitute a substantial barrier to investment, resulting in a relatively poor ranking.

Geopolitical Risk Index

The Geopolitical Risk Index represents scores for political stability and security. These factors are considered to be more difficult to overcome than either regulatory or commercial barriers, because for significant progress to be made on them, a change in the political landscape is usually required. A high score on the Geopolitical Risk Index indicates that investment in that jurisdiction is relatively unattractive because of political instability and/or security issues that threaten the physical safety of personnel or present risks to an investor's facilities.

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Single Factor Barriers: Full Survey Responses

Figure 14: Fiscal terms

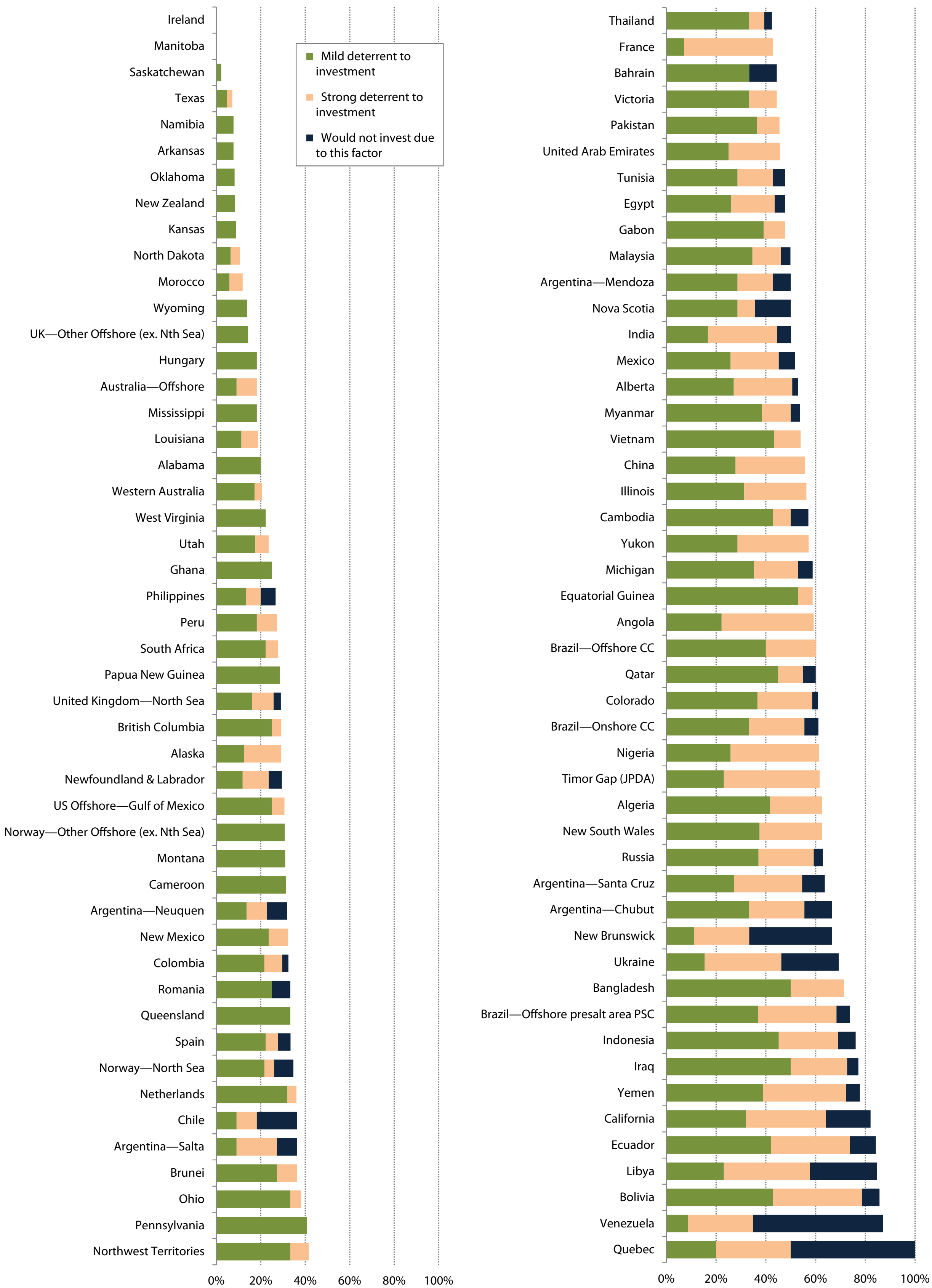


Figure 15: Taxation in general

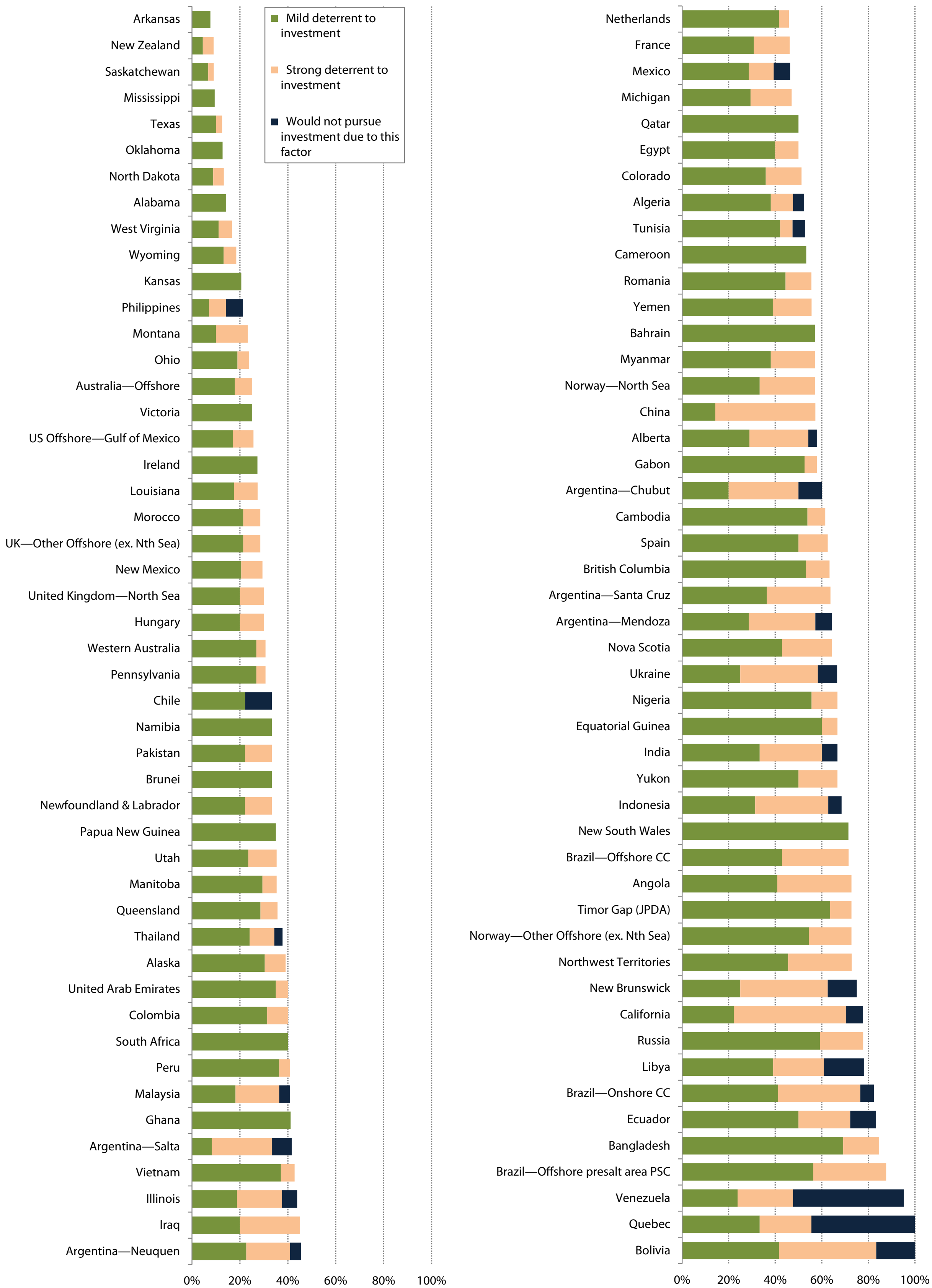


Figure 16: Environmental regulations

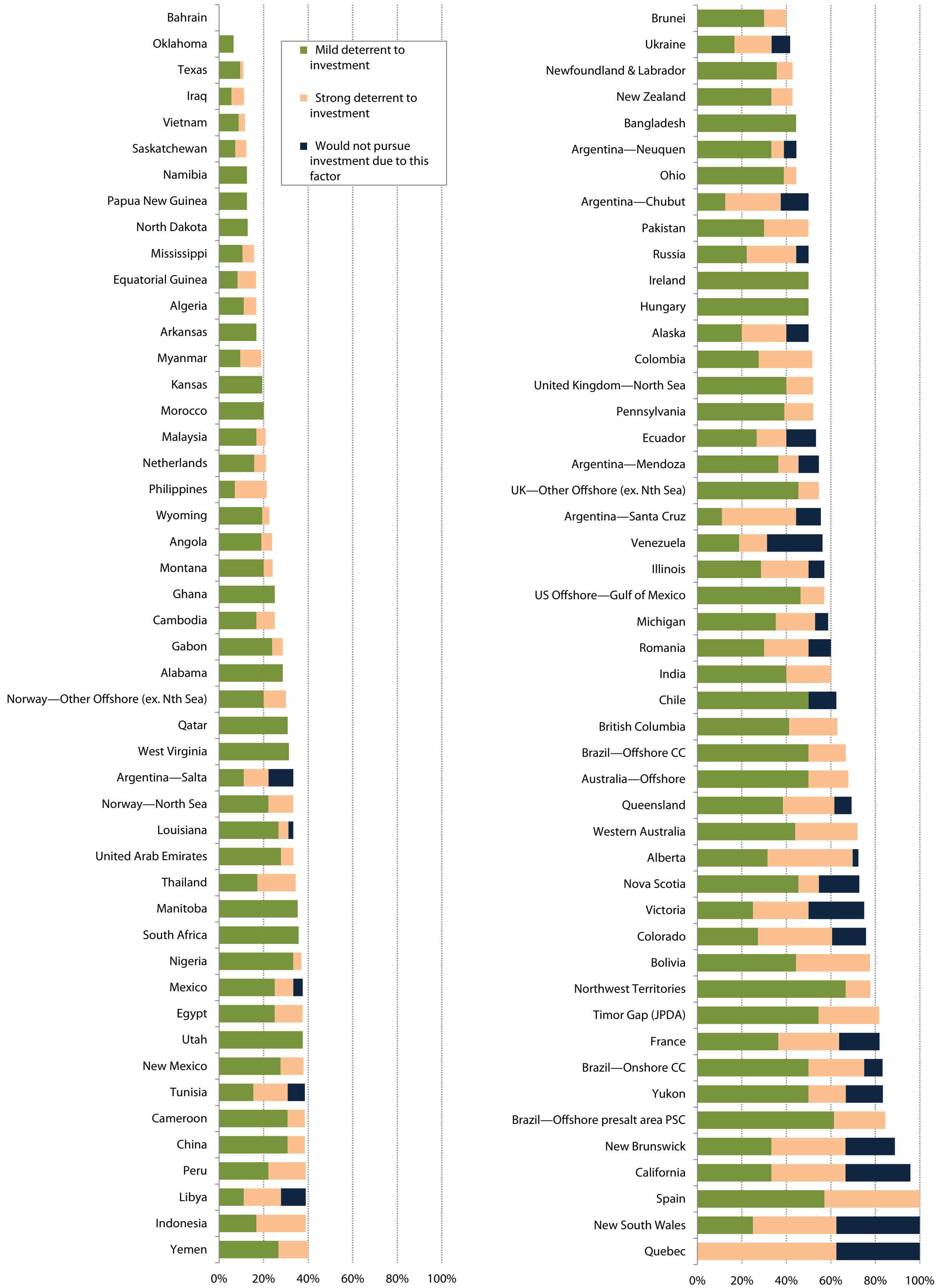


Figure 17: Uncertainty concerning the administration, interpretation, and enforcement of regulations

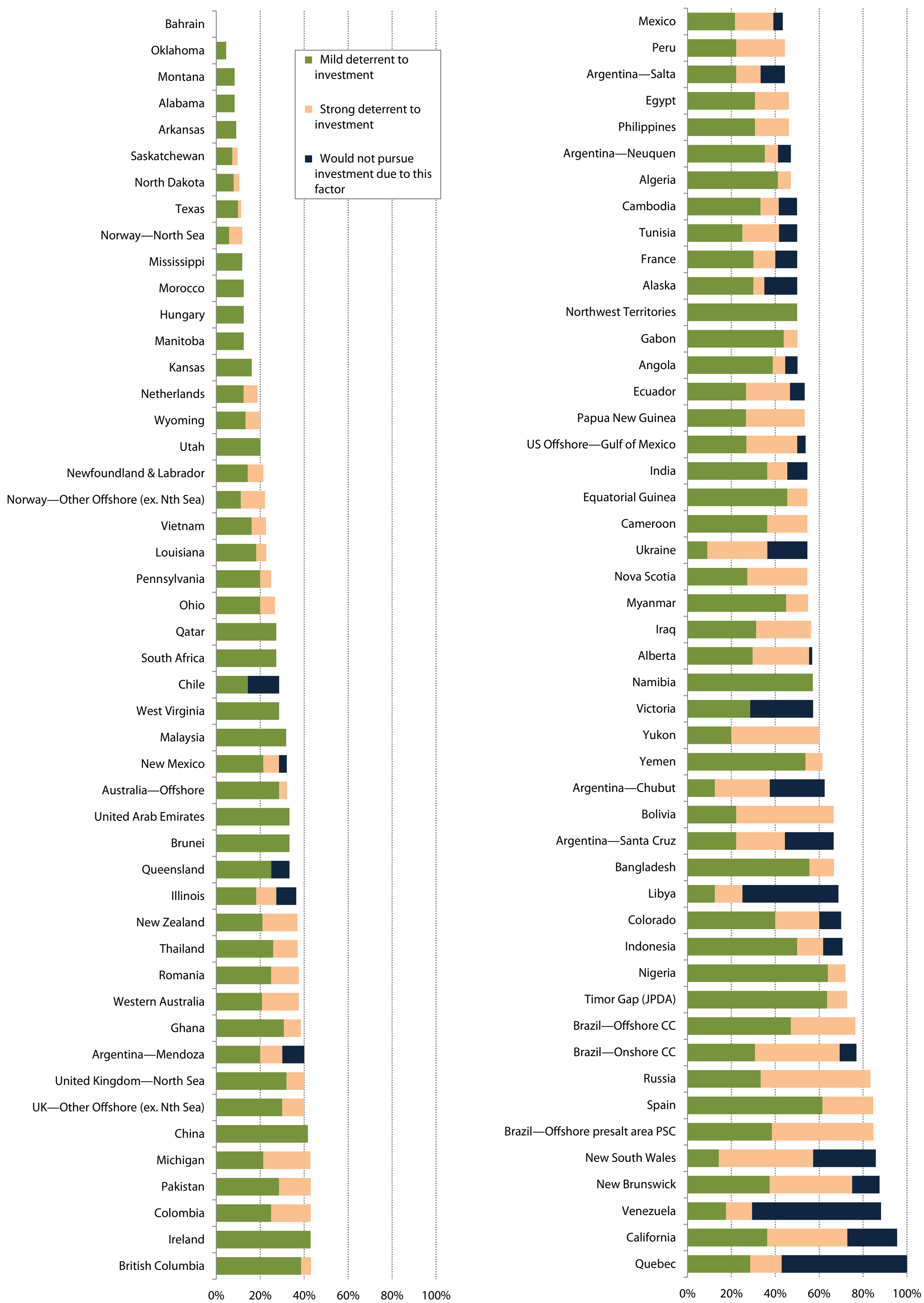


Figure 18: Cost of regulatory compliance

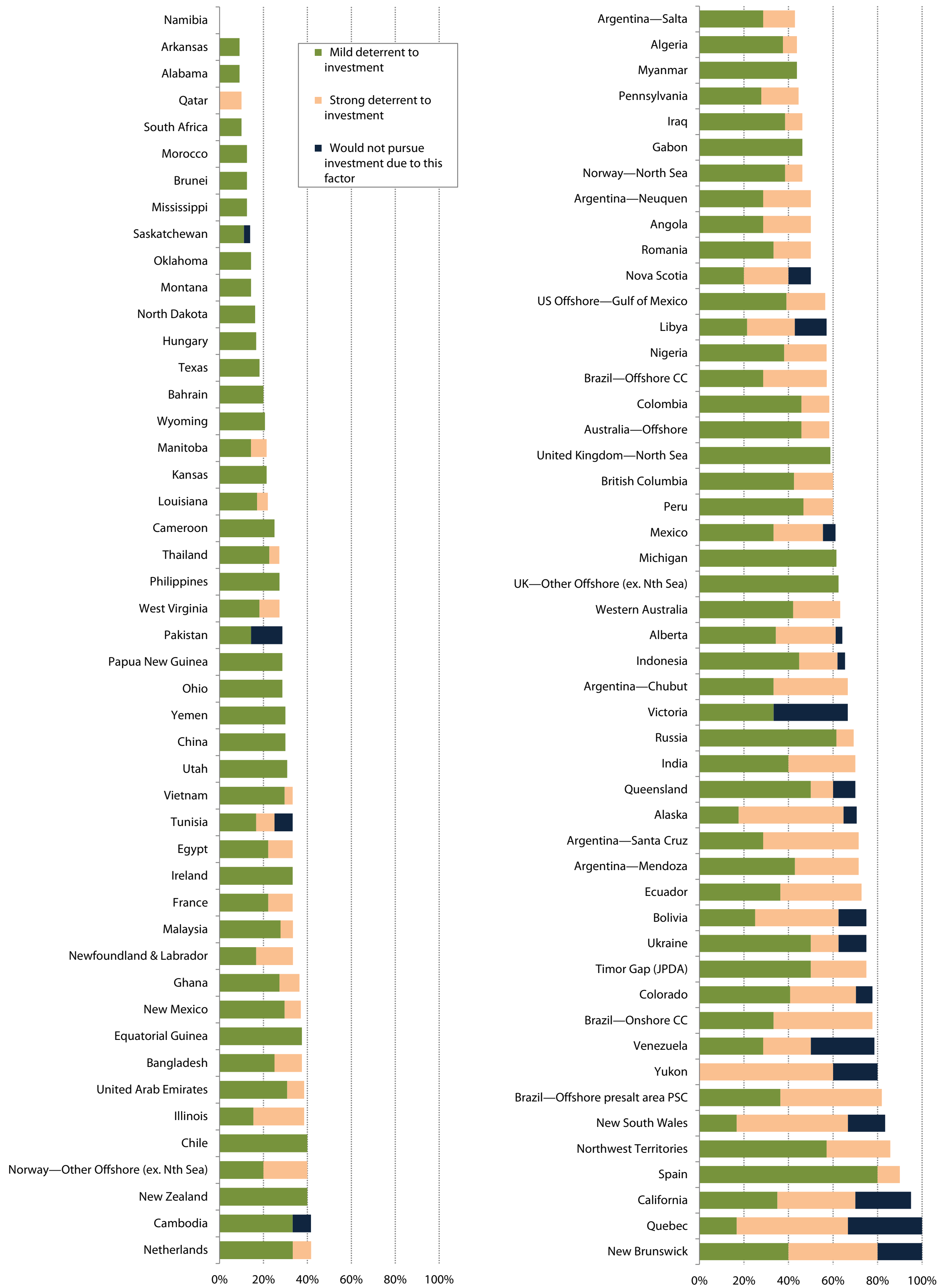


Figure 19: Uncertainty regarding protected areas

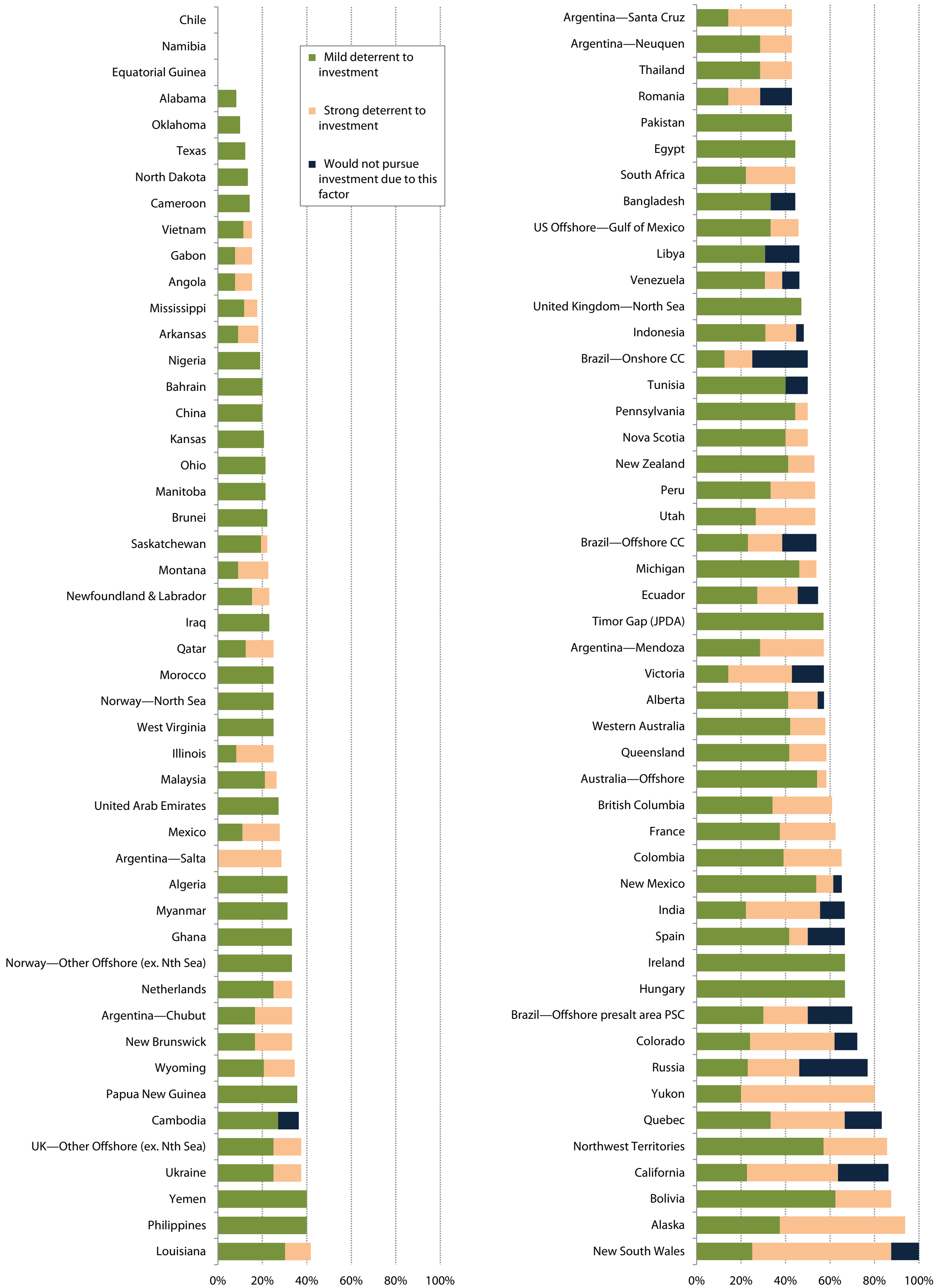


Figure 20: Trade barriers

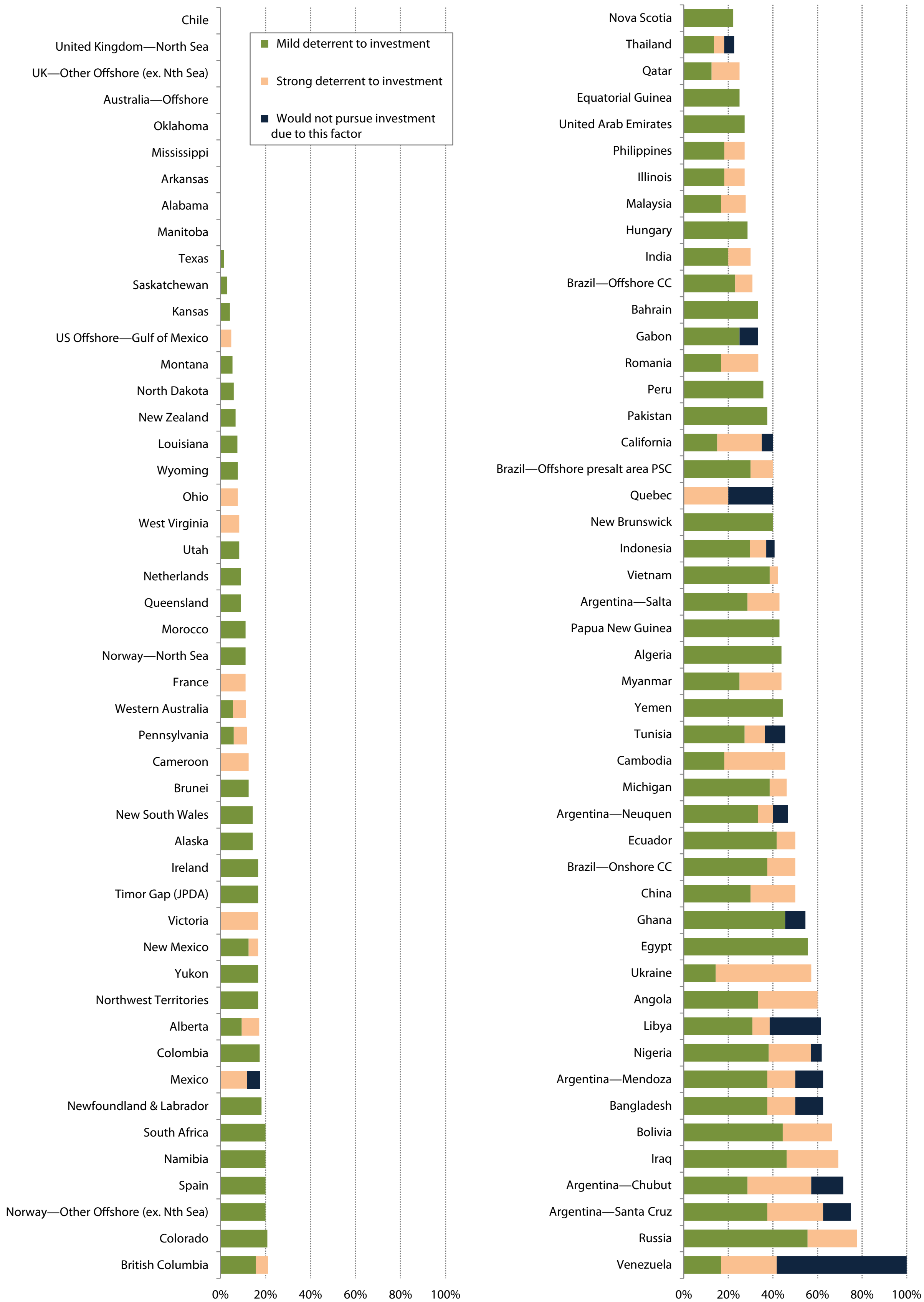


Figure 21: Labour regulations and employment agreements

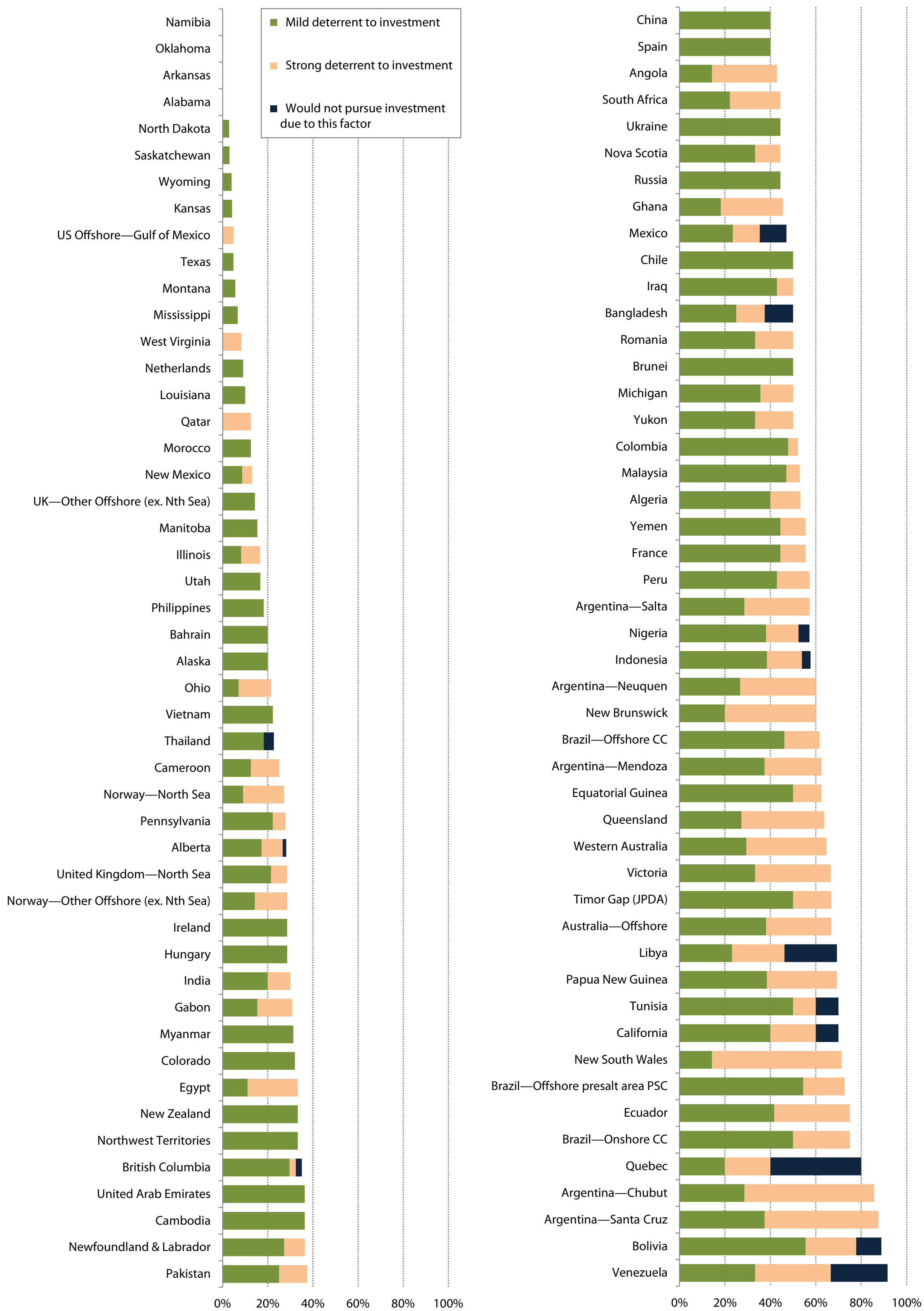


Figure 22: Quality of infrastructure

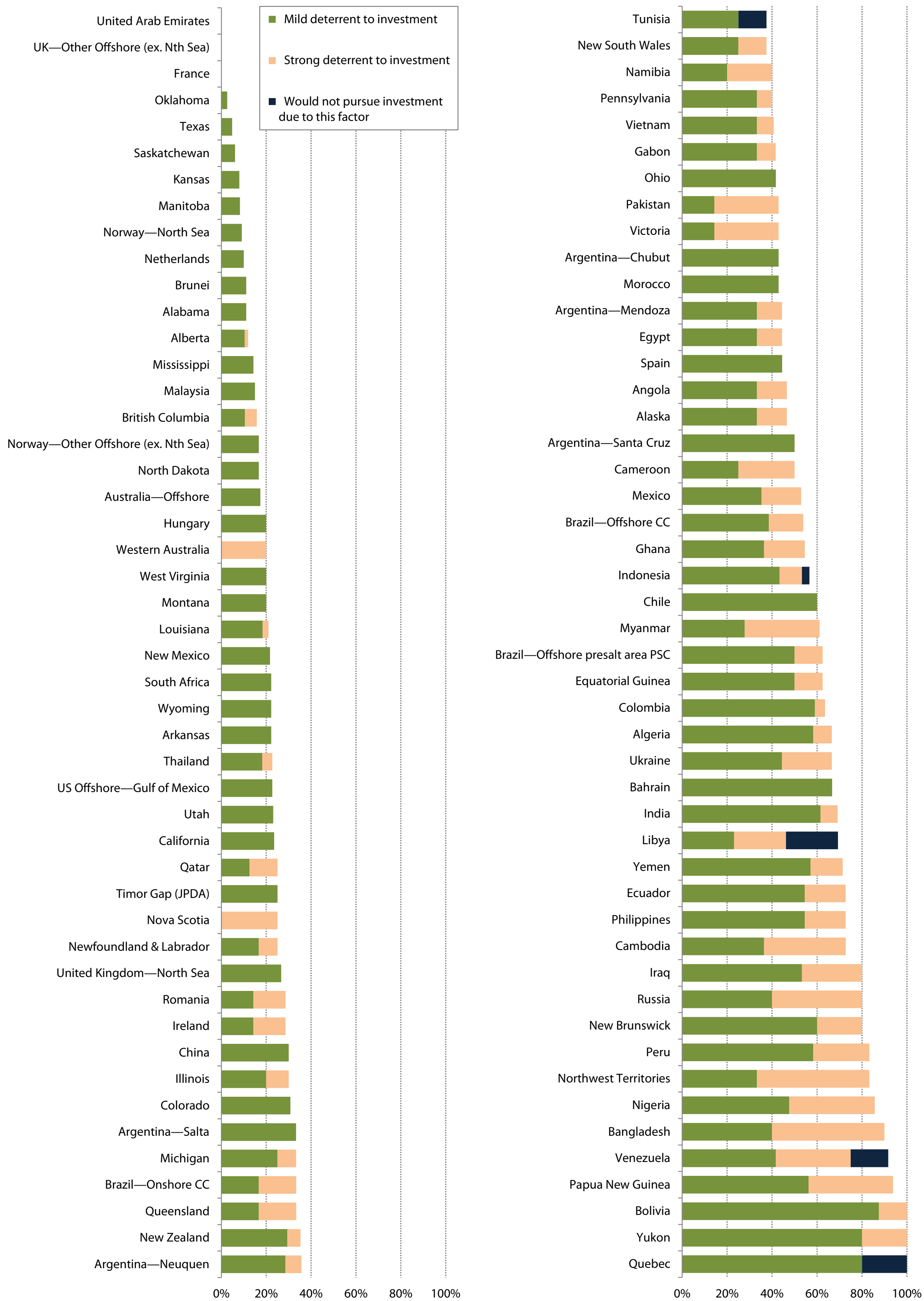


Figure 23: Geological database

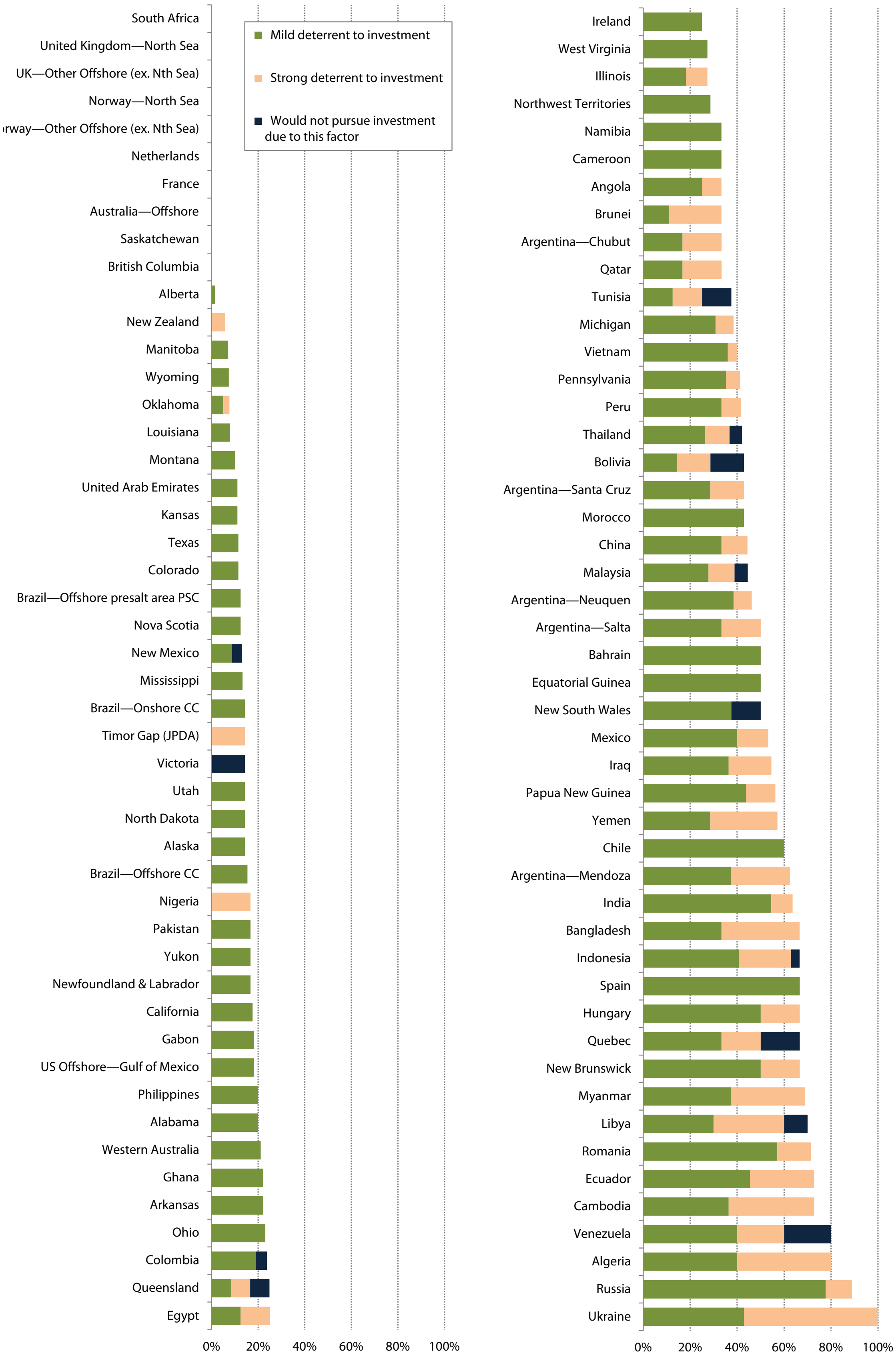


Figure 24: Labour availability and skills

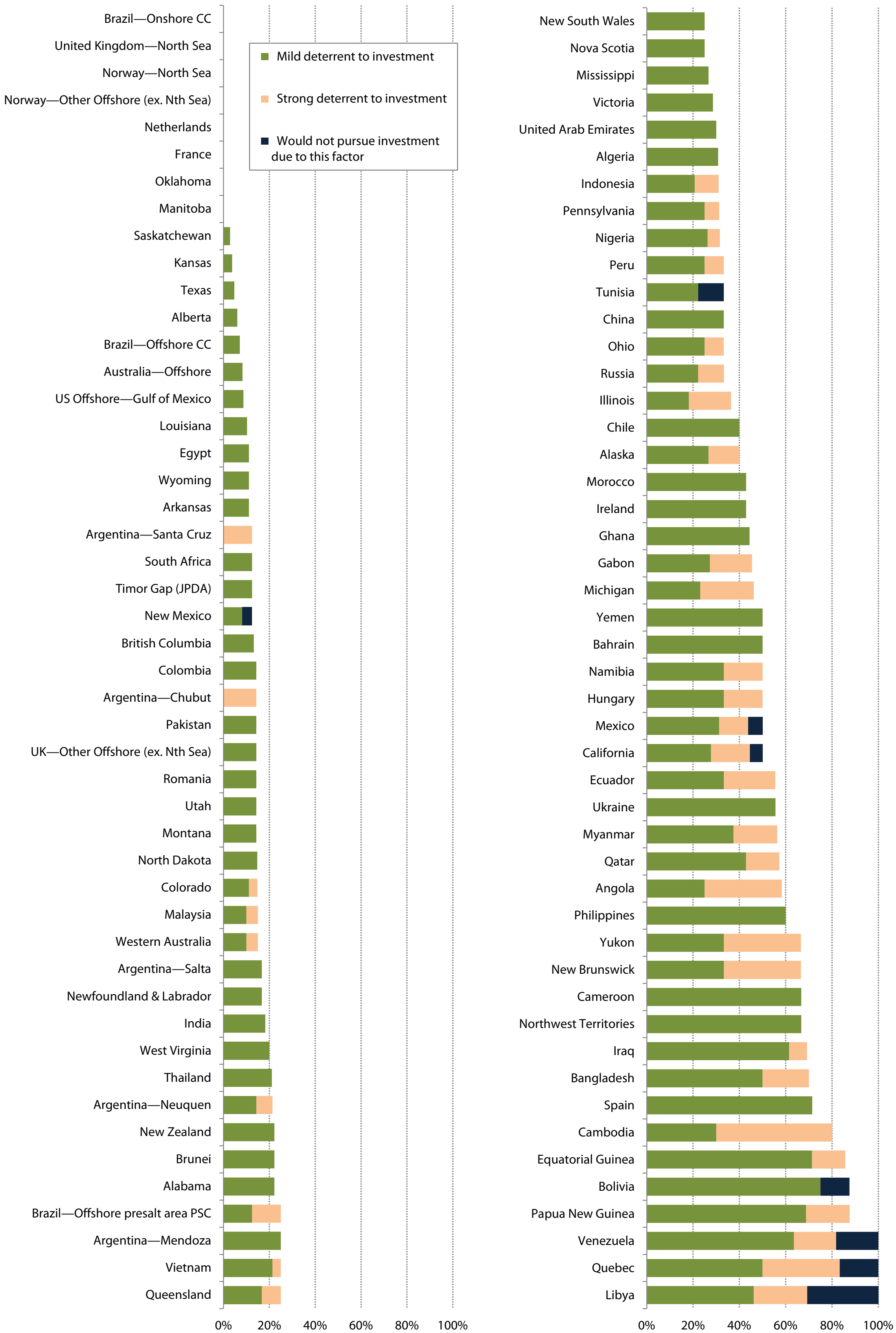


Figure 25: Disputed land claims

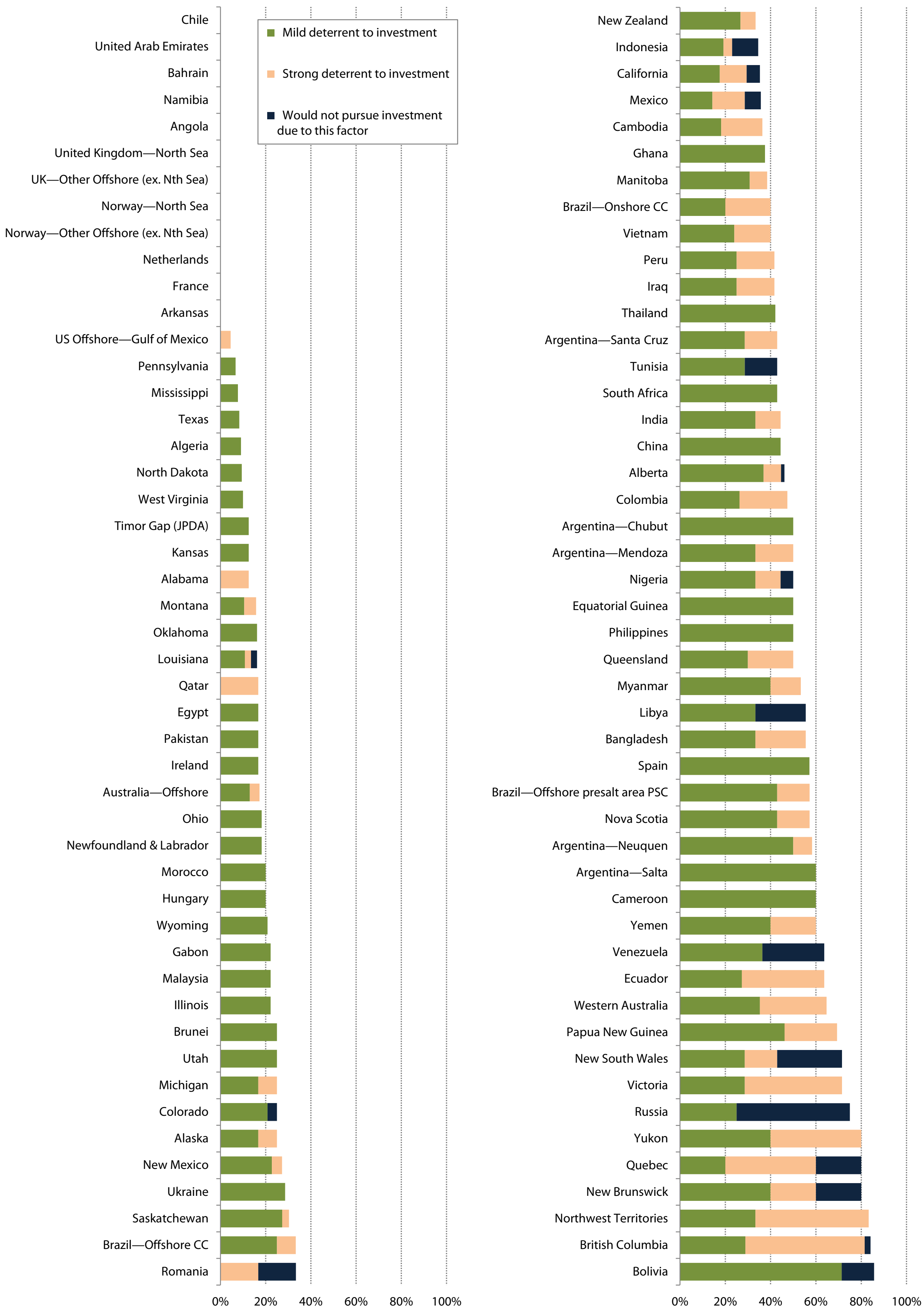


Figure 26: Political stability

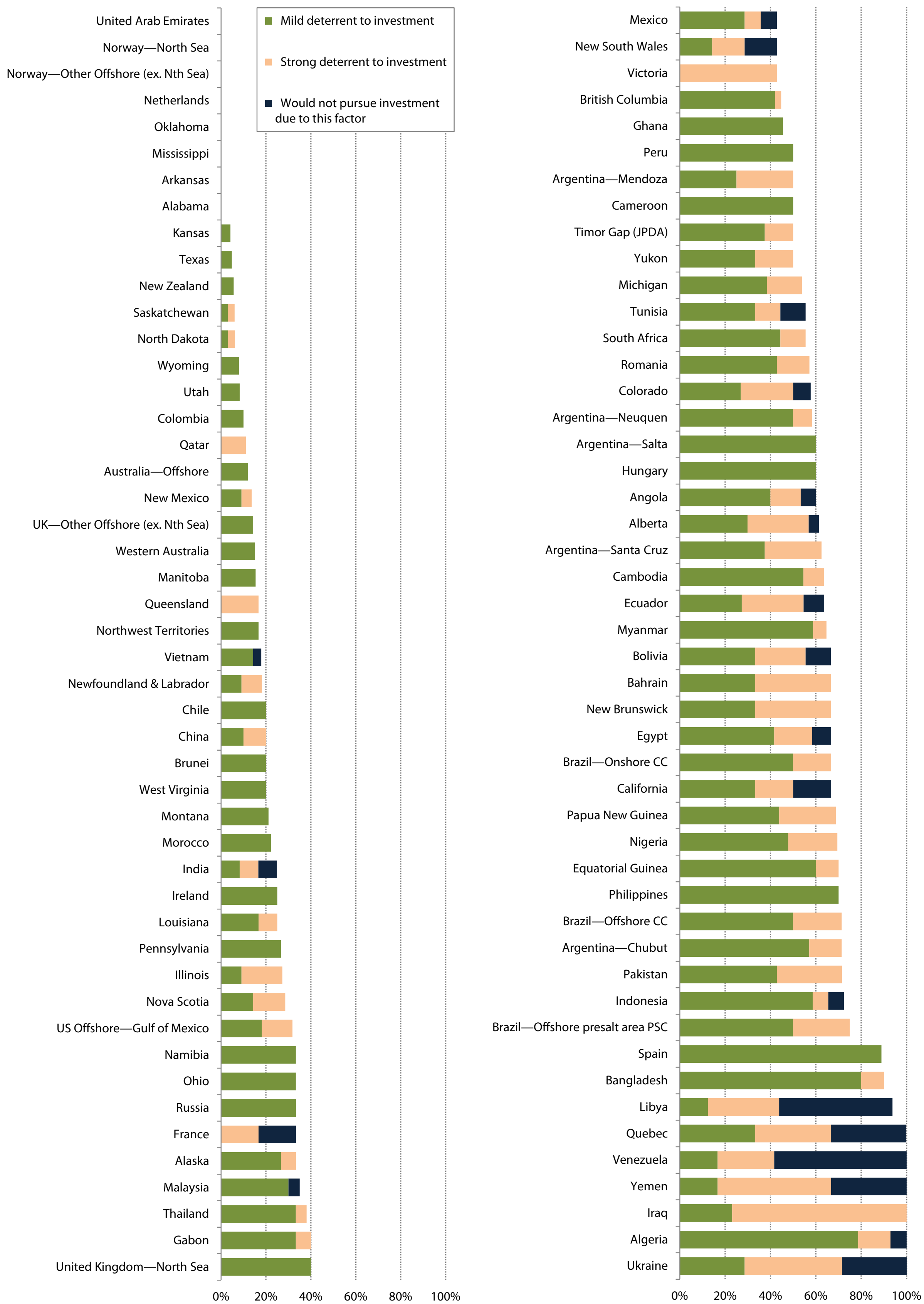


Figure 27: Security

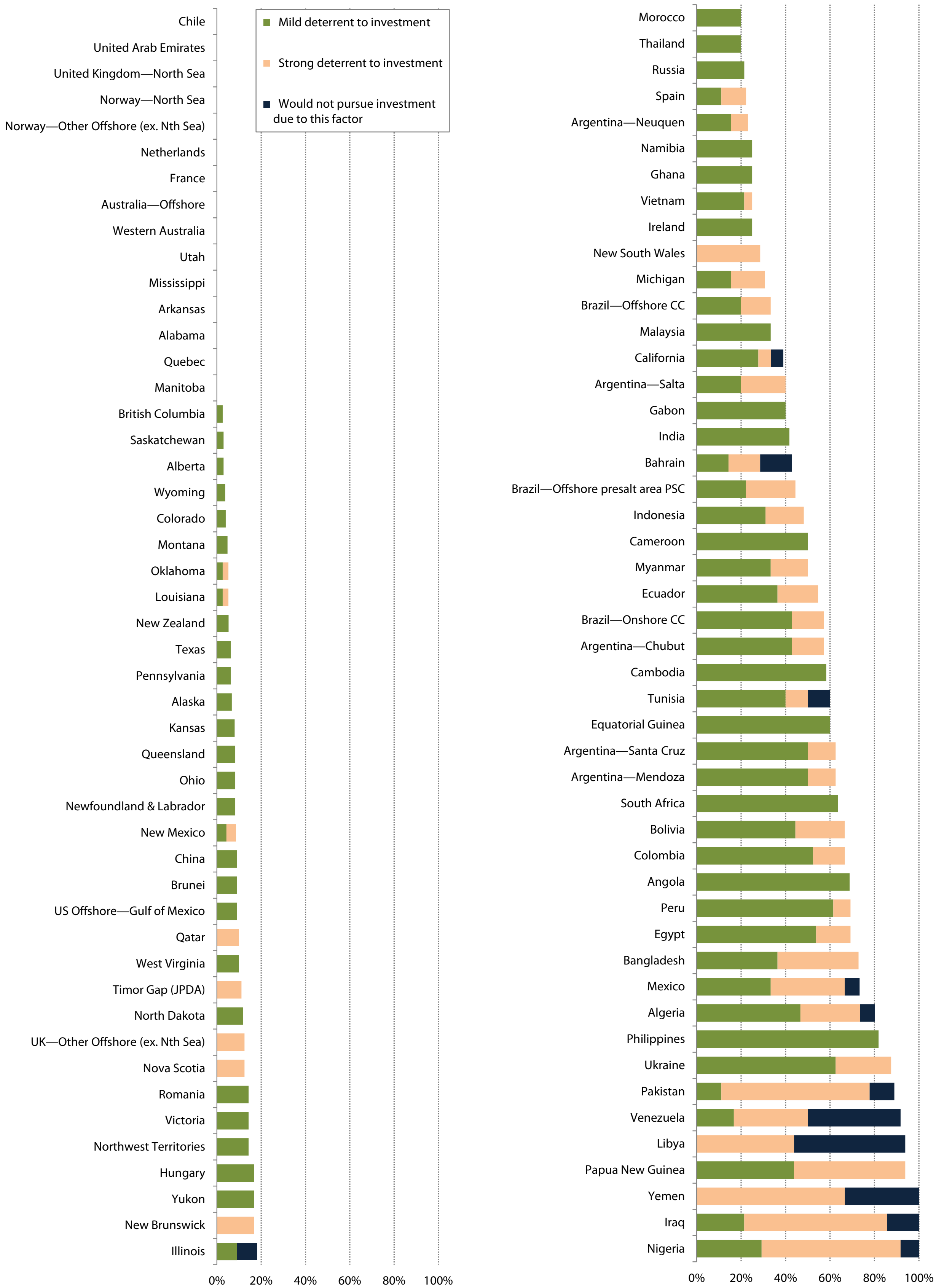


Figure 28: Regulatory duplication and inconsistencies

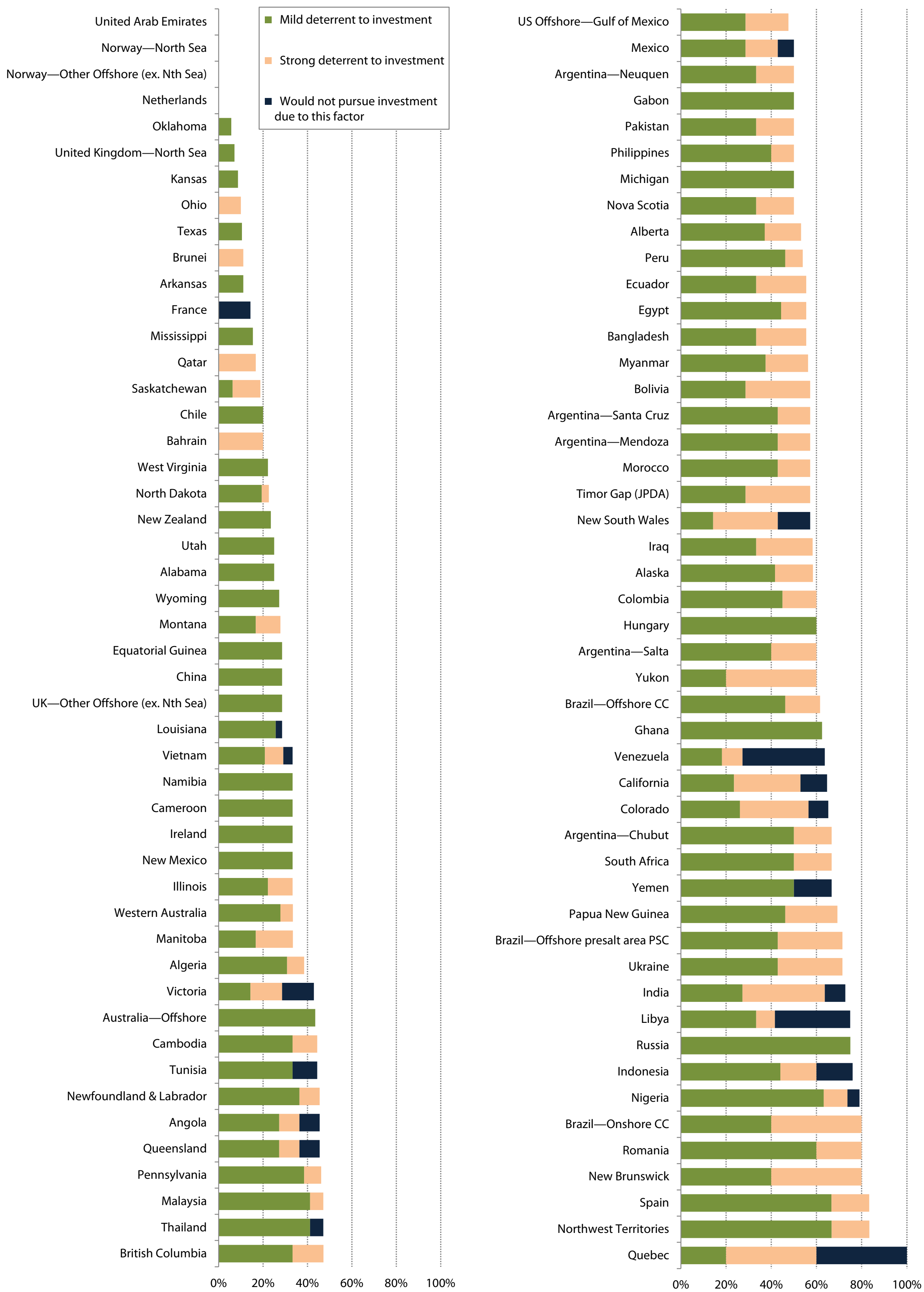
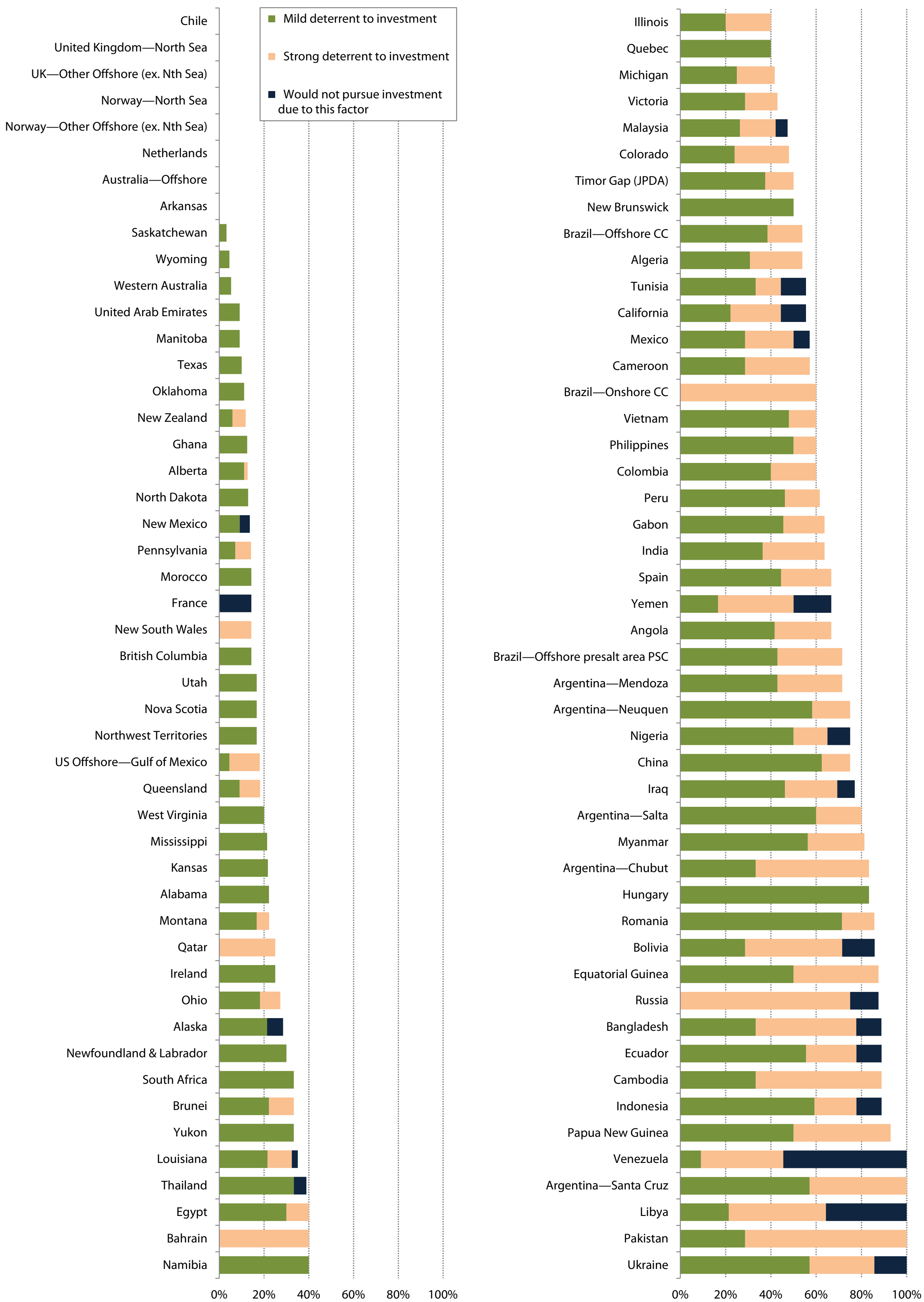


Figure 29: Legal system processes



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