

Global Petroleum Survey 2018

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Executive Summary

This report presents the results of the Fraser Institute's 12th 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, countries, and other geographical regions (e.g., offshore areas) 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, as well as concerns over political stability and security of personnel and equipment.

A total of 256 respondents participated in the survey this year, providing sufficient data to evaluate 80 jurisdictions that hold 53 percent of proved global oil and gas reserves and account for 68 percent of global oil and gas production.

The jurisdictions that are evaluated 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 comparison of the respondents’ policy perceptions of the resources that are available for commercialization.

Of the 11 jurisdictions with the largest petroleum reserves, the five that rank as most attractive or least likely to deter investment are Texas, Russia, Alberta, Egypt, and Mozambique. Alberta is the only Canadian jurisdiction in the group of jurisdictions with large reserve holdings. Venezuela is the least attractive jurisdiction for investment globally.

In the group of 36 jurisdictions with medium-sized reserves, the 10 most attractive for investment are Oklahoma, Wyoming, North Dakota, US Offshore—Gulf of Mexico, United Kingdom—North Sea, Louisiana, Oman, Norway—North Sea, Norway—Other Offshore (except North Sea), and New Mexico. The only Canadian jurisdictions in this group are Newfoundland & Labrador (14th of 36), and British Columbia (27th of 36). For the second straight year, British Columbia is Canada’s least attractive jurisdiction for oil and gas investment.

Of the 29 jurisdictions with relatively small proved oil and gas reserves, the top 10 performers are Kansas, Alabama, Montana, Mississippi, United

Kingdom—Other Offshore (except North Sea), Manitoba, Saskatchewan, Utah, South Australia, and Nova Scotia.

When the attractiveness for investment is considered independently from the reserve size of jurisdictions, we find that the jurisdictions with Policy Perception Index scores in the first quintile (suggesting that obstacles to investment are lower than in all other jurisdictions assessed by the survey) are almost all located in Canada (though Canada doesn't have a jurisdiction in the top 10 ranking), the United States, and Europe. According to this year's survey, the 10 most attractive jurisdictions for investment worldwide are Texas, Oklahoma, Kansas, Wyoming, North Dakota, Alabama, Montana, US Offshore – Gulf of Mexico, United Kingdom – North Sea, and Louisiana. Three of the jurisdictions—Oklahoma, Texas, and North Dakota—consistently rank in the top 10, having been there in the last seven iterations of the survey. Nine of the world's top 10 jurisdictions are located in the United States this year compared to six in the 2017 survey. None of the Canadian jurisdictions ranked in the global top 10 this year.

The 10 least attractive jurisdictions for investment, starting with the worst, are Venezuela, Yemen, Tasmania, Victoria, Libya, Iraq, Ecuador, New South Wales, Bolivia, and Indonesia.

Our analysis of the 2018 petroleum survey results indicates that the extent of positive sentiment regarding key factors driving petroleum investment decisions has increased in many of the world's regions. The United States remains the most attractive region for investment globally, followed by Europe. Canada's score declined this year, causing this region to drop one spot to the fourth most attractive region in the world for investment.

Survey Methodology

Sample design

This annual survey of senior executives in the upstream oil and gas sector 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. Jurisdictions that investors assess as relatively unattractive may use the findings of the survey to consider policy reforms that could improve their rankings either across the board, or in individual policy areas. Petroleum companies can also use the 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 academics interested in international competitiveness in the oil and gas sector, or the media, providing independent evidence as to how particular jurisdictions compare.

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 sources and non-conventional sources, such as coal bed 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 those that are 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 and helped to advertise the survey to their members.

The survey was conducted from May 22, 2018, until August 10, 2018. A total of 256 individuals responded to the survey compared with 333 in 2017. For the fourth consecutive year, the survey response rate has dropped. The main reason for this appears to be the downturn in oil prices and the effect that it has had on the industry. In a number of the jurisdictions that we had previously ranked, investment and production activity has slowed considerably.¹ For example, a 2016 Wood Mackenzie report indicated that

¹ An additional reason for the decline in response rate over previous years 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 distribute it to their members. This allows us to ensure that only

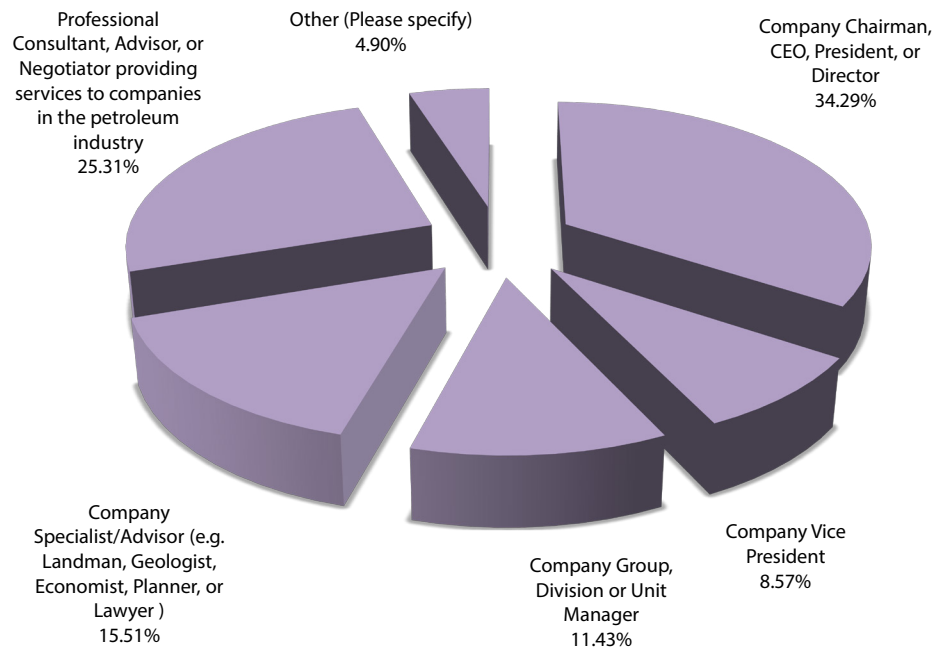
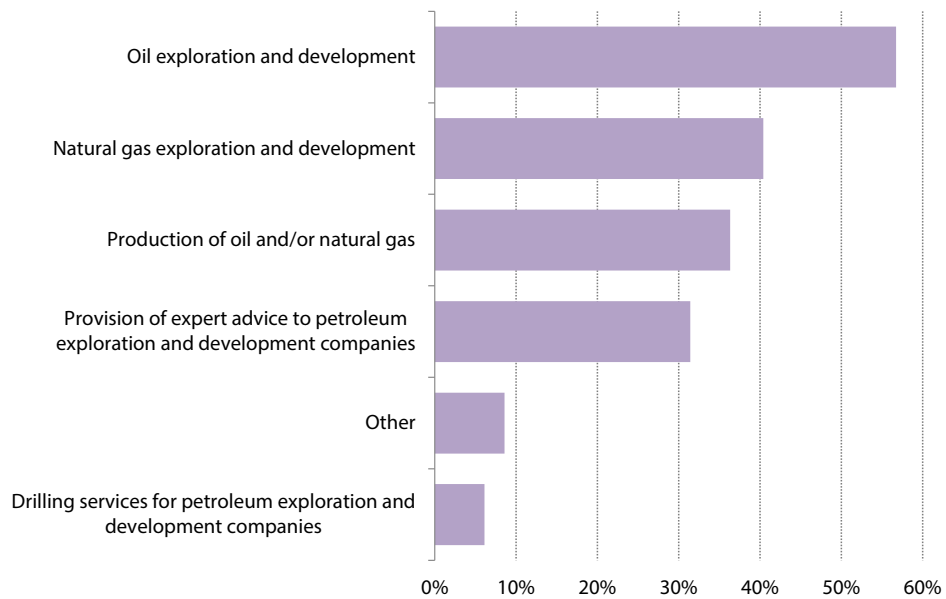
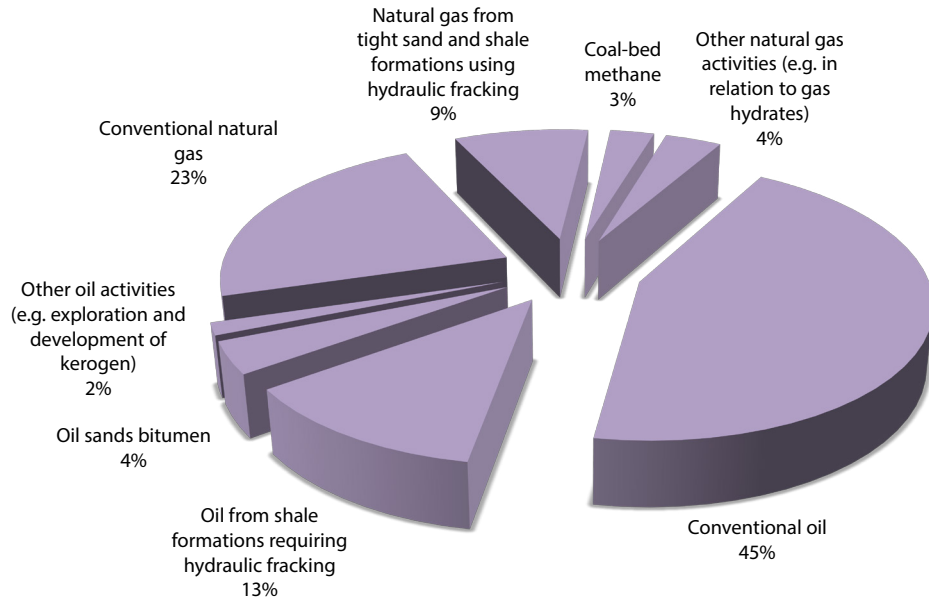
Figure 1: The position survey respondents hold in their company, 2018**Figure 2: Activities performed by firms of survey respondents, 2018**

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



planned upstream spending was expected to be US\$1 trillion lower between 2015 and 2020 and the IEA (2018) recently noted that global oil and gas upstream investment fell by 25 percent in 2015 and another 26 percent in 2016, affecting both large and small oil companies. The IEA report notes that the recovery in investment has “barely started” as investment in 2017 was flat, and data suggests only modest increases will be observed in 2018. While the oil price decline has certainly taken its toll on the upstream industry, the jurisdictions included in this year’s survey still comprise 53 percent of global oil and gas reserves and 68 percent of global oil and gas production.²

As figure 1 illustrates, over half of the respondents (54 percent) identified themselves as either a manager or holding a higher level position. Figure 2 shows that 57 percent of the firms participating in the survey are engaged in the exploration and development of oil, 40 percent are engaged in the exploration and development of natural gas, 36 percent are engaged in the 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 (69 percent) is

those qualified to answer the survey are doing so.

² These estimates are based on country-specific EIA data for the most recent year.

on finding and developing conventional oil and gas reserves. The percentage of companies with this focus has declined in recent years from 82 percent in 2011. Unconventional oil and natural gas exploration and development represented 34 percent of the focus of companies in 2018.

Participants employed by petroleum firms reported that 18 percent of their upstream activity involves unconventional oil resources. The majority of this activity (70 percent) includes the recovery of oil from shale formations using hydraulic fracturing, 22 percent is focused on oil sands bitumen, and 8 percent on other oil activities, such as the exploration or development of oil from kerogen³ found in shale rock.

Participants in the survey also reported that 16 percent of their upstream activity involves unconventional natural gas resources. The majority of this activity (57 percent) involves the recovery of natural gas from tight sand and shale formations using hydraulic fracturing. Twenty-four percent of the petroleum firms responding to the survey reported other unconventional natural gas activities (e.g., related to gas hydrates). Nineteen percent is focused on coal-bed methane.

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. The factors were unchanged from the 2017 survey.

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.

³ Kerogen is a naturally occurring, solid, insoluble organic matter that occurs in source rocks and can yield oil upon heating (Schulumberger, 2018).

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.

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 2018 survey included a list of 160 jurisdictions that respondents could evaluate, including all 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 “presalt” 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.

Scoring the survey responses — Policy Perception Index

This year we replicated the methodology used in 2016, which follows that used in the Fraser Institute’s *Annual Survey of Mining Companies* (see Stedman and Green, 2018). The methodology differs from that used prior to 2016⁴ in that it is based on an average of the responses for all five possible response categories.⁵ 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 Policy Perception Index (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

⁴ See appendix 2 for an overview of the previous methodology.

⁵ Encourages investment, not a deterrent to investment, mild deterrent to investment, strong deterrent to investment, and would not invest due to this factor.

the formula $((V_{\max}-V_i)/((V_{\max}-V_{\min}))\times 100$.⁶ 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.

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 as a result of the recent downturn in upstream investment. We were able to rank 80 of the jurisdictions listed in the questionnaire.

⁶ Where V_{\max} is the maximum value, V_{\min} is the minimum value, and V_i represents the summed score of a jurisdiction.

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 that 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 and Russia. 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

	Jurisdiction	Policy Perception Index Score	Proved reserves (bboe)
1	Texas	100.00	28.43
2	Russia	75.38	395.53
3	Alberta	67.83	172.99
4	Egypt	59.11	18.83
5	Mozambique	57.92	18.69
6	Algeria	57.73	41.93
7	Nigeria	53.15	71.94
8	Indonesia	47.16	21.92
9	Iraq	38.48	163.35
10	Libya	35.09	58.30
11	Venezuela	0.00	338.51

Large Reserve Holders

Table 1 provides Policy Perception Index (PPI) values for 11 jurisdictions that each hold at least 1 percent (when rounded to the nearest decimal) of the sum of the proved petroleum reserves of the 76 (of 80) jurisdictions ranked by the survey that have at least some proved oil and/or gas reserves.⁷ Proved reserves holdings in this group range from Mozambique's 18.7 billion barrels of oil equivalent (Bboe) to Russia's 395.5 Bboe. As a whole, the proved reserves of these 11 large reserve holders constitute 85 percent of the reserves held by the 76 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, Russia, Alberta, Egypt, and Mozambique. 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) to 4th (of 12) in 2016. Alberta ranked 3rd

⁷ The four jurisdictions ranked in the survey this year that have no proved reserves are Cambodia, Guyana, New South Wales, and Tasmania.

(of 15) in 2017, and it maintained its rank as the 3rd most attractive (of 11) large reserve holder in 2018. All five most attractive large reserves holders have PPI scores in the top three quintiles.⁸

Top five large reserve holder jurisdictions

1. Texas
2. Russia
3. Alberta
4. Egypt
5. Mozambique

One of the 11 large reserve holders has a highly undesirable (i.e., fifth quintile) score on the Policy Perception Index. That jurisdiction is Venezuela. Two of the jurisdictions with large reserves—Iraq and Libya—lie in the unattractive fourth quintile. Combined, the three large reserve holder jurisdictions with 4th or 5th quintile PPI scores hold 36 percent of the proved reserves of the 76 jurisdictions ranked in the 2018 survey that have proved reserves.

Bottom five large reserve holder jurisdictions

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

⁸ 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 76 reserve holders. As a whole, these jurisdictions with modest reserves have 14 percent of total proved reserves. Their reserve holdings range in size from Thailand's 1.8 Bboe to Australia – Offshore's 14.6 Bboe.

Ten jurisdictions in this group—six US jurisdictions, three European, and Oman—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 157.3 Bboe, or approximately 71 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. US Offshore – Gulf of Mexico
5. United Kingdom – North Sea

Two jurisdictions in the group of 36—Ecuador and Yemen—have index values in the unattractive fourth and fifth quintiles. Combined, these jurisdictions have proved reserves of 14.5 Bboe, or 7 percent of holdings of all 36 jurisdictions. By way of comparison, the combined reserves of the twelve jurisdictions in the group of modest reserve holders that achieved 3rd quintile Index scores, including British Columbia, Mexico, and Peru, constitute 23 percent of the group's reserves.

Bottom five medium reserve holder jurisdictions

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

Table 2: Medium Reserve Holder Comparisons

	Jurisdiction	Policy Perception Index Score	Proved reserves (bboe)
1	Oklahoma	96.35	7.69
2	Wyoming	91.67	4.81
3	North Dakota	91.35	6.54
4	US Offshore—Gulf of Mexico	86.49	5.43
5	United Kingdom—North Sea	84.84	2.85
6	Louisiana	84.76	3.90
7	Oman	82.34	9.67
8	Norway—North Sea*	82.17	12.41
9	Norway—Other Offshore (except North Sea)*	82.01	4.98
10	New Mexico	80.41	4.14
11	Netherlands	77.96	5.31
12	Pennsylvania	77.60	11.77
13	Trinidad and Tobago	77.60	2.22
14	Newfoundland & Labrador	76.44	2.16
15	Alaska	74.20	2.73
16	Ohio	73.06	3.04
17	Thailand	72.28	1.76
18	Brazil – Offshore presalt area profit sharing contracts	71.70	14.44
19	Angola	70.53	10.31
20	Australia-Offshore	69.86	14.61
21	Republic of the Congo (Brazzaville)	69.13	2.20
22	Pakistan	67.02	3.93
23	Vietnam	64.63	9.02
24	Malaysia	64.52	11.41
25	Mexico	59.66	9.51
26	Colombia	58.09	2.82
27	British Columbia	56.40	7.02
28	Colorado	56.35	4.77
29	Myanmar	56.16	4.34
30	India	54.45	12.72
31	Peru	53.28	3.11
32	Gabon	52.95	2.19
33	California	52.09	2.34
34	Bolivia	45.03	2.17
35	Ecuador	39.35	8.35
36	Yemen	13.23	6.16

Small Reserve Holders

Table 3 provides Policy Perception Index scores and rankings for the 29 jurisdictions with the smallest proved petroleum reserves. Each of these jurisdictions has less than 0.1 percent of the proved reserves of the 76 jurisdictions addressed in this section, ranging from 0.01 Bboe in US Offshore – Alaska to Saskatchewan’s 1.5 Bboe. Together, the group of 29 jurisdictions represents just under 1 percent of the reserve holdings of the 76 jurisdictions ranked in the survey that have at least some proved reserves.

The seven small reserve holder jurisdictions with first quintile scores are Kansas, Alabama, Montana, Mississippi, United Kingdom – Other Offshore (except North Sea), Manitoba, and Saskatchewan. Together these 7 jurisdictions comprise almost 30 percent of the reserves in this group. If one includes the 16 reserve holders with second quintile scores, the 23 jurisdictions hold over 83 percent of this group’s reserves.

Top five small reserve holder jurisdictions

1. Kansas
2. Alabama
3. Montana
4. Mississippi
5. United Kingdom – Other Offshore (except North Sea)

Another five 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. Victoria
2. France
3. Papua New Guinea
4. Northern Territory
5. US – Offshore Alaska

Table 3: Small Reserve Holder Comparisons

	Jurisdiction	Policy Perception Index Score	Proved reserves (bboe)
1	Kansas	92.04	0.90
2	Alabama	89.92	0.42
3	Montana	86.98	0.43
4	Mississippi	84.61	0.24
5	United Kingdom—Other Offshore (except North Sea)	82.20	1.08
6	Manitoba	81.75	0.06
7	Saskatchewan	80.04	1.51
8	Utah	78.22	1.07
9	South Australia	78.17	0.11
10	Nova Scotia	78.11	0.03
11	Ireland	74.08	0.07
12	Argentina—Neuquen	73.55	1.06
13	Michigan	72.93	0.29
14	Brazil – Onshore concession contracts	72.42	1.11
15	Western Australia	71.96	0.06
16	Argentina—Mendoza	70.40	0.26
17	Bangladesh	67.96	1.38
18	Ivory Coast	67.85	0.29
19	Tunisia	67.29	0.86
20	New Zealand	65.89	0.29
21	Brazil – Offshore concession contracts	65.75	0.29
22	Queensland	62.60	0.12
23	Cameroon	62.01	1.09
24	Equatorial Guinea	57.23	1.34
25	US Offshore—Alaska	54.15	0.01
26	Northern Territory	51.35	0.04
27	Papua New Guinea	48.95	1.09
28	France	48.18	0.13
29	Victoria	31.52	0.02

Policy Perception Index Rankings Without Regard to Reserve Holdings

Table 4 compares the scores and rankings on the Policy Perception Index (PPI) from 2018 back through 2014. 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, 80 jurisdictions are ranked. This compares with 97 in 2017, 96 in 2016, 126 jurisdictions in 2015, and 156 in 2014. The jurisdictions that were ranked in 2017 that we were unable to rank this year due to lack of sufficient responses are: Arkansas, Illinois, West Virginia, Brunei, Hungary, Poland, Romania, Spain—Onshore, Spain—Offshore, China, Kazakhstan, Ghana, Kenya, Namibia, South Africa, Tanzania, Uganda, Kuwait, Morocco, United Arab Emirates, Argentina—Santa Cruz, and Suriname.⁹

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

1. Venezuela
2. Yemen
3. Tasmania
4. Victoria
5. Libya
6. Iraq
7. Ecuador
8. New South Wales
9. Bolivia
10. Indonesia

As compared to the 2017 results, three of the jurisdictions are new to the group of 10 least attractive jurisdictions: New South Wales, Tasmania, and Victoria. New South Wales experienced a 6-point deterioration in its score this year, dropping from the 17th percentile in 2017 to the 10th percentile in 2018. Tasmania's PPI score deteriorated by over 23 points since 2015 and Victoria saw its score drop by 14 points since 2017. In addition, while Bolivia

⁹ Responses for the two jurisdictions in the Netherlands and four jurisdictions in Russia were combined to produce rankings for each country.

Table 4: Policy Perception Index

		Score					Rank				
		2018	2017	2016	2015	2014	2018	2017	2016	2015	2014
CANADA	Alberta	67.83	68.73	66.87	77.71	85.90	43/80	33/97	43/96	26/126	14/156
	British Columbia	56.40	54.52	68.13	67.99	64.47	58/80	76/97	39/96	46/126	60/156
	Manitoba	81.75	85.06	87.01	85.69	96.82	16/80	12/97	14/96	11/126	6/156
	Newfoundland & Labrador*	76.44	91.25	78.66	78.76	77.53	26/80	4/97	25/96	22/126	28/156
	Nova Scotia*	78.11	70.41	59.12	60.99	68.52	21/80	26/97	56/96	64/126	49/156
	Saskatchewan	80.04	88.47	94.18	89.69	97.48	18/80	7/97	4/96	6/126	4/156
UNITED STATES	Alabama*	89.92	72.23	87.85	93.63	95.22	6/80	24/97	11/96	3/126	8/156
	Alaska	74.20	58.74	63.49	65.37	60.17	28/80	62/97	49/96	56/126	70/156
	California	52.09	35.63	33.02	49.05	41.29	67/80	91/97	91/96	98/126	115/156
	Colorado	56.35	61.49	57.44	64.45	59.43	59/80	55/97	61/96	58/126	72/156
	Kansas	92.04	90.02	94.47	90.51	96.14	3/80	6/97	3/96	5/126	7/156
	Louisiana	84.76	78.56	83.24	82.63	87.62	10/80	20/97	18/96	14/126	12/156
	Michigan*	72.93	57.30	61.14	57.87	76.36	32/80	68/97	54/96	74/126	30/156
	Mississippi	84.61	80.93	91.63	87.11	100.00	11/80	15/97	8/96	9/126	1/156
	Montana	86.98	79.19	88.98	82.10	81.55	7/80	18/97	10/96	17/126	23/156
	New Mexico	80.41	75.54	79.19	68.15	78.82	17/80	23/97	24/96	45/126	26/156
	North Dakota	91.35	91.53	93.16	89.51	97.35	5/80	3/97	6/96	7/126	5/156
	Ohio*	73.06	61.74	74.95	80.52	82.55	31/80	54/97	30/96	20/126	20/156
	Oklahoma	96.35	94.14	100.00	92.64	99.38	2/80	2/97	1/96	4/126	2/156
	Pennsylvania*	77.60	68.77	71.19	77.57	67.04	23/80	32/97	36/96	27/126	53/156
	Texas	100.00	100.00	97.65	95.67	98.19	1/80	1/97	2/96	2/126	3/156
	Utah*	78.22	69.96	89.76	77.13	83.10	19/80	28/97	9/96	28/126	18/156
	Wyoming	91.67	85.79	93.26	80.88	88.83	4/80	9/97	5/96	19/126	11/156
	US Offshore—Gulf of Mexico	86.49	69.14	76.24	82.18	72.67	8/80	31/97	28/96	16/126	38/156
	US Offshore—Alaska*	54.15	N/A	N/A	57.04	59.39	62/80	N/A	N/A	78/156	82/157
AUSTRALIA	New South Wales*	40.37	46.83	37.27	36.64	47.12	73/80	85/97	90/96	116/126	98/156
	Northern Territory*	51.35	46.45	N/A	76.02	69.95	68/80	86/97	N/A	30/126	44/156
	Queensland*	62.60	60.09	63.99	71.34	65.95	50/80	60/97	47/96	40/126	55/156
	South Australia	78.17	85.70	N/A	85.71	81.57	20/80	10/97	N/A	10/126	22/156
	Tasmania*	26.11	N/A	N/A	48.70	55.62	78/80	N/A	N/A	101/126	80/156
	Victoria*	31.52	45.90	51.79	57.13	67.78	77/80	87/97	71/96	76/126	51/156
	Western Australia	71.96	67.95	71.63	73.23	68.81	35/80	37/97	35/96	37/126	47/156
	Australia—Offshore	69.86	67.82	77.59	74.77	73.97	39/80	38/97	26/96	32/126	34/156
OCEANIA	Indonesia*	47.16	35.02	45.83	44.34	30.90	71/80	92/97	79/96	108/126	142/156
	Malaysia*	64.52	60.41	67.44	66.53	59.08	49/80	57/97	41/96	53/126	73/156
	New Zealand	65.89	82.61	83.61	83.72	86.44	46/80	14/97	17/96	13/126	13/156
	Papua New Guinea*	48.95	47.61	49.13	52.47	45.45	69/80	84/97	76/96	88/126	105/156

* Between 5 and 9 responses

Table 4 continues on page 19

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

	Score					Rank					
	2018	2017	2016	2015	2014	2018	2017	2016	2015	2014	
EUROPE	France*	48.18	45.64	76.33	41.63	44.01	70/80	89/97	27/96	112/126	106/156
	Ireland*	74.08	69.60	79.57	76.25	71.98	29/80	29/97	23/96	29/126	40/156
	Netherlands* †	77.96	79.09	87.21	N/A	N/A	22/80	19/97	13/96	N/A	N/A
	Norway—Other Offshore (except North Sea)*	82.01	87.03	85.83	78.87	83.69	15/80	8/97	16/96	21/126	17/156
	Norway—North Sea*	82.17	85.49	91.67	88.72	82.54	14/80	11/97	7/96	8/126	21/156
	Russia* †	75.38	N/A	39.21	N/A	N/A	27/80	N/A	87/96	N/A	N/A
	United Kingdom—Other Offshore (except North Sea)*	82.20	75.90	87.65	78.43	77.43	13/80	22/97	12/96	24/126	29/156
	United Kingdom—North Sea	84.84	82.90	82.42	81.84	77.76	9/80	13/97	20/96	18/126	27/156
ASIA	Bangladesh*	67.96	50.87	42.53	38.66	39.38	41/80	79/97	85/96	115/126	124/156
	Cambodia*	52.32	41.35	50.83	48.22	40.62	66/80	90/97	72/96	102/126	117/156
	India*	54.45	56.37	49.77	46.58	41.18	61/80	72/97	75/96	105/126	116/156
	Myanmar	56.16	56.05	53.37	48.76	41.32	60/80	73/97	67/96	100/126	114/156
	Pakistan*	67.02	N/A	57.85	55.17	54.59	45/80	N/A	58/96	79/126	85/156
	Thailand	72.28	68.07	67.01	67.27	57.60	34/80	36/97	42/96	48/126	77/156
	Vietnam	64.63	59.79	68.59	66.03	58.97	48/80	61/97	38/96	54/126	74/156
AFRICA	Angola*	70.53	50.02	56.69	59.83	48.37	37/80	80/97	62/96	69/126	93/156
	Cameroon*	62.01	N/A	64.47	58.53	49.23	51/80	N/A	46/96	72/126	91/156
	Equatorial Guinea*	57.23	66.76	57.75	51.71	46.56	57/80	42/97	60/96	90/126	101/156
	Gabon	52.95	62.41	62.84	58.41	47.41	65/80	52/97	50/96	73/126	97/156
	Ivory Coast*	67.85	63.80	N/A	58.61	61.88	42/80	49/97	N/A	71/126	65/156
	Mozambique*	57.92	57.47	N/A	52.59	50.40	55/80	66/97	N/A	86/126	90/156
	Nigeria	53.15	48.07	46.69	43.13	37.33	64/80	83/97	78/96	110/126	130/156
	Republic of the Congo (Brazzaville)*	69.13	57.00	N/A	52.58	48.26	40/80	69/97	N/A	87/126	94/156
MENA	Algeria*	57.73	48.08	56.57	54.76	40.45	56/80	82/97	63/96	80/126	120/156
	Egypt*	59.11	65.45	62.57	52.98	33.50	53/80	46/97	51/96	83/126	135/156
	Iraq*	38.48	30.39	47.26	40.12	28.17	75/80	94/97	77/96	114/126	144/156
	Libya	35.09	21.62	15.24	0.00	22.29	76/80	95/97	94/96	126/126	151/156
	Oman*	82.34	69.27	N/A	72.61	75.96	12/80	30/97	N/A	38/126	31/156
	Tunisia*	67.29	66.27	52.71	54.76	50.64	44/80	44/97	69/96	81/126	89/156
	Yemen*	13.23	45.82	42.74	34.53	39.70	79/80	88/97	84/96	118/126	123/156

* Between 5 and 9 responses.

† Notes: Due to a low response rate, Netherlands – Onshore and Netherlands – Offshore were combined to this year into Netherlands 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				
		2018	2017	2016	2015	2014	2018	2017	2016	2015	2014
ARGENTINA	Mendoza*	70.40	61.11	49.88	48.07	42.45	38/80	56/97	74/96	103/126	108/156
	Neuquen	73.55	65.78	57.82	51.53	46.87	30/80	45/97	59/96	91/126	99/156
LATIN AMERICA & CARIBBEAN	Bolivia*	45.03	17.68	26.64	34.91	17.40	72/80	96/97	93/96	117/126	153/156
	Brazil—Onshore concession contracts*	72.42	67.10	44.47	60.84	54.08	33/80	41/97	82/96	66/126	87/156
	Brazil—Offshore concession contracts	65.75	61.77	53.60	67.82	60.20	47/80	53/97	65/96	47/126	69/156
	Brazil—Offshore presalt area profit sharing contracts*	71.70	58.00	44.50	60.38	46.39	36/80	65/97	81/96	68/126	102/156
	Colombia	58.09	64.78	61.84	63.70	64.54	54/80	47/97	53/96	60/126	59/156
	Ecuador*	39.35	33.78	37.47	26.92	11.07	74/80	93/97	89/96	121/126	155/156
	Guyana*	76.87	64.17	N/A	N/A	67.15	25/80	48/97	N/A	N/A	52/156
	Mexico	59.66	52.97	52.78	54.63	37.58	52/80	77/97	68/96	82/126	126/156
	Peru	53.28	60.38	56.04	51.96	55.68	63/80	58/97	64/96	89/126	79/156
	Trinidad and Tobago*	77.60	57.33	N/A	72.38	71.49	24/80	67/97	N/A	39/126	42/156
	Venezuela	0.00	0.00	0.00	2.22	0.00	80/80	97/97	96/96	125/126	156/156

* Between 5 and 9 responses

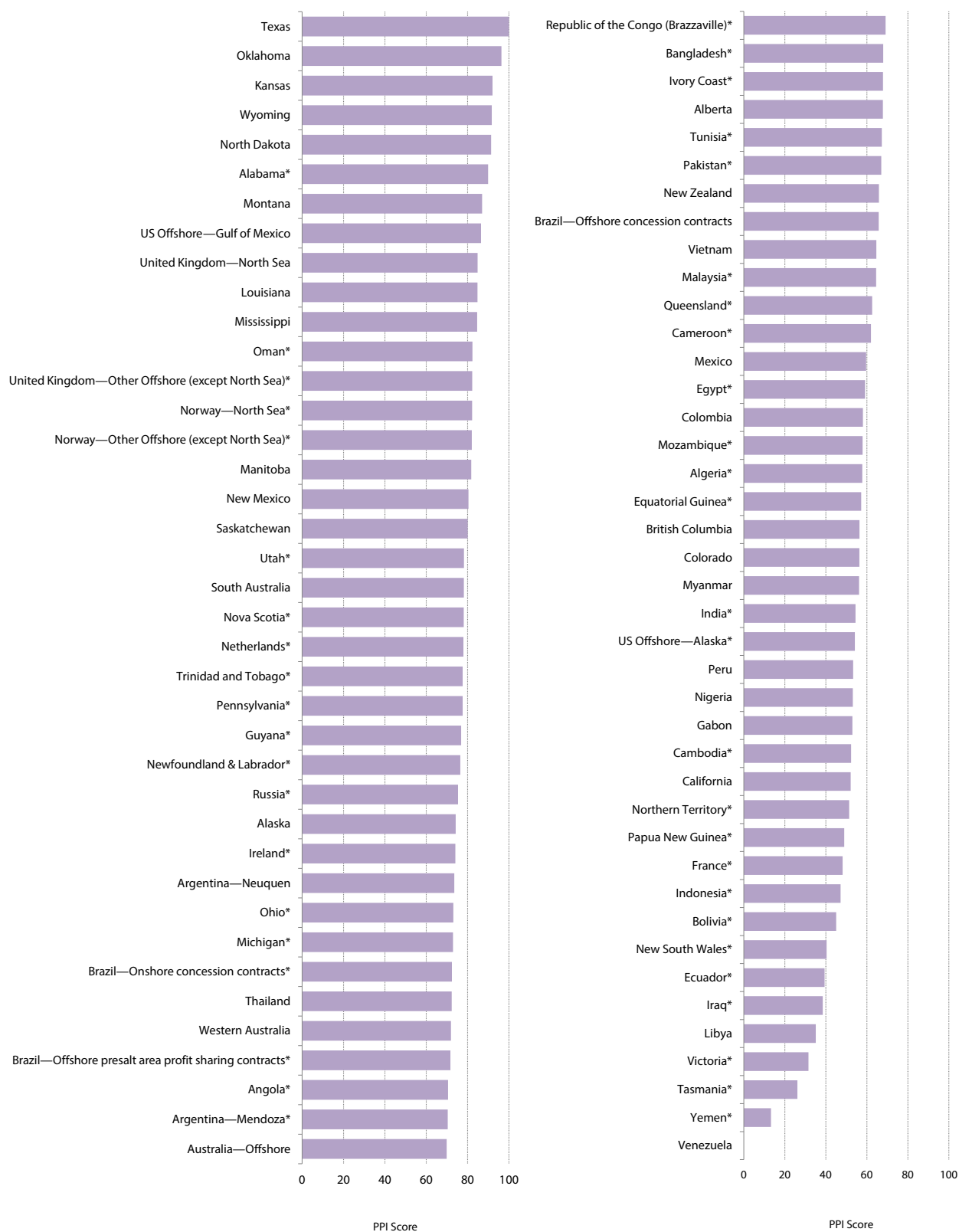
saw its score improve this year, that jurisdiction's score was still low enough in 2018 to place it among the bottom 10.

Figure 4 presents the Policy Perception Index rankings for the 80 jurisdictions ranked this year. Among the three Brazilian jurisdictions, “CC” and “PSC” refer to “concession contracts” and “production sharing contracts,” respectively.

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

1. Texas
2. Oklahoma
3. Kansas
4. Wyoming
5. North Dakota
6. Alabama
7. Montana

Figure 4: Policy Perception Index



8. US Offshore – Gulf of Mexico
9. United Kingdom – North Sea
10. Louisiana

All but five of these jurisdictions—Alabama, Montana, US Offshore – Gulf of Mexico, United Kingdom – North Sea, and Louisiana—ranked in the top 10 jurisdictions worldwide in the 2017 survey. Three of the jurisdictions—Oklahoma, Texas, and North Dakota—consistently rank in the top 10, having been there in the last seven iterations of the survey.

For the second straight year, Texas held the top spot and Oklahoma placed second in the survey. Kansas moved up into the third position in 2018 from 6th in the previous year. Wyoming moved up to the fourth position from 9th (of 97) place in 2017. North Dakota fell to the fifth spot this year, after placing 3rd (of 97) last year. Alabama’s rank increased from 24th (of 97) in 2017 to 6th in this year’s survey. Montana moved up ten spots to 7th this year from 17th (of 97) last year. Both the US Offshore – Gulf of Mexico (8th) and United Kingdom – North Sea (9th) were added to the top ten in 2018, after ranking 31st (of 97) and 13th (of 97) last year, respectively. Louisiana’s rank also improved from 20th (of 97) to 10th (out of 80) this year.

The four jurisdictions displaced from the top 10 were Newfoundland & Labrador (26th), Saskatchewan (18th), Norway – Other Offshore (except North Sea) (15th), and South Australia (20th). Of these jurisdictions, Newfoundland & Labrador experienced the most significant drop, falling from 4th (out of 97) in 2017 to 26th (out of 80) this year; this jurisdiction fell from the top 95th percentile to the 68th.

Seventeen jurisdictions achieved much higher Policy Perception Index scores this year (by at least 10 points) than in 2017, compared to only seven jurisdictions in last year’s report. These included Alabama, Alaska, California, Michigan, Ohio, US Offshore—Gulf of Mexico, Indonesia, Bangladesh, Cambodia, Angola, Republic of the Congo (Brazzaville), Libya, Oman, Bolivia, Brazil—Offshore presalt area PSC, Guyana, and Trinidad & Tobago. 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 2017. For example, Alaska now ranks as the 28th (of 80) most attractive jurisdictions among those ranked compared with 62th (of 97) in 2017. This jurisdiction also improved from the 37th percentile last year to the 65th percentile this year. The reasons underlying these and other significant improvements are examined in the regional analysis presented later in this report.

Survey respondents awarded lower (i.e., less favorable) overall scores to a number of jurisdictions this year, indicating that their barriers to investment appear to have increased considerably since the 2017 survey was

undertaken. Four jurisdictions (of 80), or 5 percent of the total, experienced score deteriorations of 10 points or more: Newfoundland & Labrador, Victoria, New Zealand, and Yemen. This compares with ten jurisdictions (of 97) or 10.3 percent in 2017.¹⁰

Readers are reminded that these rankings are driven purely by responses to the survey questions and do not take into account the extent of the jurisdictions' proved oil and gas reserves, 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.

An arrow next to the name of the jurisdiction indicates whether it has moved into a higher (↑) or lower (↓) quintile compared to 2017. Those without an arrow scored in the same quintile as last year.

First Quintile

Eighteen jurisdictions (23 percent) have scores in the top range (first quintile) in 2018. These are:

- Texas
- Oklahoma
- Kansas
- Wyoming
- North Dakota
- Alabama ↑
- Montana ↑
- US Offshore—Gulf of Mexico ↑
- United Kingdom—North Sea
- Louisiana ↑
- Mississippi
- Oman ↑
- United Kingdom—Other Offshore (except North Sea) ↑
- Norway—North Sea
- Norway—Other Offshore (except North Sea)
- Manitoba
- New Mexico ↑
- Saskatchewan

¹⁰ Note that only the jurisdictions that were included in both the 2017 and 2018 surveys were examined in this section. As a result, 75 jurisdictions were included in this analysis, based on low response rates.

This compares with 17 (18 percent) with first quintile scores in 2017, 22 (23 percent) jurisdictions in 2016, 20 (16 percent) in 2015, and 24 (15 percent) in 2014. There are seven jurisdictions in the first quintile this year that were not in the first quintile in 2017. The following jurisdictions slipped from the first quintile this year: Newfoundland & Labrador, South Australia, and New Zealand.

US jurisdictions account for 11 of the 18 jurisdictions with first quintile scores this year. Two jurisdictions (Manitoba and Saskatchewan) are in Canada and four are in Europe.

Second Quintile

There are 33 jurisdictions (41 percent) with scores from 60 to 79.99 (second quintile) according to the Policy Perception Index. This compares with 43 second-quintile jurisdictions in 2017, 32 in 2016 (33 percent of the total number ranked) and 48 (38 percent of the total number ranked) in 2015. Geographically, this year this group is diverse and 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-two jurisdictions in the second quintile group were also in this group in 2017. Eight jurisdictions moved up into the group this year as the result of improved survey results and three jurisdictions, Russia, Pakistan, and Cameroon, were once again include in this year's analysis after receiving insufficient responses in 2017.

- Utah
- South Australia ↓
- Nova Scotia
- Netherlands
- Pennsylvania
- Trinidad & Tobago ↑
- Guyana
- Newfoundland & Labrador ↓
- Russia
- Alaska ↑
- Ireland
- Argentina—Neuquen
- Ohio
- Michigan ↑
- Brazil—Onshore concession contracts
- Thailand
- Western Australia

- Brazil—Offshore presalt area PSC ↑
- Angola
- Argentina—Mendoza
- Australia—Offshore
- Republic of the Congo (Brazzaville) ↑
- Bangladesh ↑
- Ivory Coast
- Alberta
- Tunisia
- Pakistan
- New Zealand ↓
- Brazil—Offshore concession contracts
- Vietnam ↑
- Malaysia
- Queensland
- Cameroon

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 22 jurisdictions that achieved third quintile scores this year are listed below in order of their rank (best to worst).

This year 22 of the jurisdictions ranked in the third quintile. This compares with 30 jurisdictions in 2017, 32 jurisdictions (33 percent) in 2016 and 22 jurisdictions (37 percent) in 2015. Of the 22 jurisdictions with scores in the third quintile this year, six dropped from the second quintile in 2017. Twelve jurisdictions were also present in the third quintile in 2016. One jurisdiction, US Offshore-Alaska, was included for the first time since 2015.

- Mexico
- Egypt ↓
- Colombia ↓
- Mozambique
- Algeria
- Equatorial Guinea ↓
- British Columbia
- Colorado ↓
- Myanmar
- India
- US Offshore—Alaska
- Peru ↓

- Nigeria
- Gabon ↓
- Cambodia
- California ↑
- Northern Territory
- Papua New Guinea
- France
- Indonesia ↑
- Bolivia ↑
- New South Wales

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. Just over six percent of jurisdictions had fourth quintile scores in 2018, compared to five percent of jurisdictions in 2017.

This year's fourth quintile jurisdictions are listed below in order of rank. One jurisdiction—Victoria—dropped from the third quintile last year to the fourth quintile this year. Tasmania was included in the survey for the first time since 2015. The other jurisdictions in the fourth quintile this year also had scores in this range in 2017.

- Ecuador
- Iraq
- Libya
- Victoria ↓
- Tasmania

Fifth Quintile

Survey participants regard jurisdictions in with fifth quintile PPI scores as least attractive for upstream investment. This year there are two jurisdictions (about three percent of the total of 80) in this category.

Yemen fell into the fifth quintile in 2018 from the third in 2017.

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

- Yemen ↓
- Venezuela

The fact that a significant share of global proved oil and gas reserves are located in jurisdictions with fourth and fifth quintile ratings suggests room for considerable improvement in public policies influencing investment in those jurisdictions.

Results over time

The decline in number of jurisdictions we have been able to rank over the past three years presents a challenge for analyzing trends in the ranks of jurisdictions over time. For this reason we have used the PPI scores for the four previous years to calculate the percentile rank for each jurisdiction. The percentile rank function can be used to evaluate the relative standing of a value over time within a data set. Therefore, the data from **table 5** presents changes in the relative PPI scores of jurisdictions over the past few years. A low 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. For example, British Columbia's overall survey rank was 58th out of 80 jurisdictions in 2018. BC's performance remains poor as this jurisdiction moved from the top 50 percent of jurisdictions in 2016 to the bottom 30 percent of jurisdictions in 2017 and 2018.

Table 5: Policy Perception Index - Percentile Change (80 Jurisdictions)

		Percentile change					Rank				
		2018	2017	2016	2015	2014	2018	2017	2016	2015	2014
CANADA	Alberta	47%	64%	55%	73%	85%	43/80	33/97	43/96	26/126	14/156
	British Columbia	28%	26%	59%	59%	53%	58/80	76/97	39/96	46/126	60/156
	Manitoba	80%	86%	80%	87%	92%	16/80	12/97	14/96	11/126	6/156
	Newfoundland & Labrador*	68%	95%	70%	76%	73%	26/80	4/97	25/96	22/126	28/156
	Nova Scotia*	74%	72%	44%	49%	61%	21/80	26/97	56/96	64/126	49/156
	Saskatchewan	78%	92%	94%	94%	95%	18/80	7/97	4/96	6/126	4/156
UNITED STATES	Alabama*	93%	74%	85%	97%	90%	6/80	24/97	11/96	3/126	8/156
	Alaska	65%	37%	51%	53%	49%	28/80	62/97	49/96	56/126	70/156
	California	17%	9%	6%	22%	19%	67/80	91/97	91/96	98/126	115/156
	Colorado	27%	45%	38%	51%	48%	59/80	55/97	61/96	58/126	72/156
	Kansas	96%	93%	96%	95%	91%	3/80	6/97	3/96	5/126	7/156
	Louisiana	88%	78%	76%	85%	87%	10/80	20/97	18/96	14/126	12/156
	Michigan*	60%	32%	45%	40%	71%	32/80	68/97	54/96	74/126	30/156
	Mississippi	86%	82%	89%	90%	99%	11/80	15/97	8/96	9/126	1/156
	Montana	91%	80%	86%	82%	77%	7/80	18/97	10/96	17/126	23/156
	New Mexico	79%	75%	72%	60%	76%	17/80	23/97	24/96	45/126	26/156
	North Dakota	94%	96%	92%	92%	94%	5/80	3/97	6/96	7/126	5/156
	Ohio*	62%	46%	65%	78%	81%	31/80	54/97	30/96	20/126	20/156
	Oklahoma	98%	97%	99%	96%	97%	2/80	2/97	1/96	4/126	2/156
	Pennsylvania*	72%	66%	62%	72%	57%	23/80	32/97	36/96	27/126	53/156
	Texas	99%	99%	97%	99%	96%	1/80	1/97	2/96	2/126	3/156
	Utah*	77%	71%	87%	71%	82%	19/80	28/97	9/96	28/126	18/156
	Wyoming	95%	89%	93%	79%	89%	4/80	9/97	5/96	19/126	11/156
	US Offshore—Gulf of Mexico	90%	67%	66%	83%	67%	8/80	31/97	28/96	16/126	38/156
	US Offshore—Alaska*	23%	N/A	N/A	37%	47%	62/80	N/A	N/A	78/156	82/157
AUSTRALIA	New South Wales*	10%	17%	7%	8%	29%	73/80	85/97	90/96	116/126	98/156
	Northern Territory*	16%	16%	N/A	68%	63%	68/80	86/97	N/A	30/126	44/156
	Queensland*	38%	39%	52%	62%	56%	50/80	60/97	47/96	40/126	55/156
	South Australia	75%	88%	N/A	88%	78%	20/80	10/97	N/A	10/126	22/156
	Tasmania*	4%	N/A	N/A	19%	41%	78/80	N/A	N/A	101/126	80/156
	Victoria*	5%	14%	27%	38%	59%	77/80	87/97	71/96	76/126	51/156
	Western Australia	57%	62%	63%	65%	62%	35/80	37/97	35/96	37/126	47/156
	Australia—Offshore	52%	61%	69%	67%	68%	39/80	38/97	26/96	32/126	34/156
OCEANIA	Indonesia*	12%	8%	17%	14%	8%	71/80	92/97	79/96	108/126	142/156
	Malaysia*	40%	42%	58%	55%	46%	49/80	57/97	41/96	53/126	73/156
	New Zealand	43%	83%	77%	86%	86%	46/80	14/97	17/96	13/126	13/156
	Papua New Guinea*	15%	18%	21%	27%	24%	69/80	84/97	76/96	88/126	105/156

* Between 5 and 9 responses

Table 5 continues on page 29

Table 5: Policy Perception Index - Percentile Change (80 Jurisdictions) (continued from page 28)

		Percentile change					Rank				
		2018	2017	2016	2015	2014	2018	2017	2016	2015	2014
EUROPE	France*	14%	12%	68%	12%	23%	70/80	89/97	27/96	112/126	106/156
	Ireland*	64%	70%	73%	69%	66%	29/80	29/97	23/96	29/126	40/156
	Netherlands* †	73%	79%	82%	N/A	N/A	22/80	19/97	13/96	N/A	N/A
	Norway—Other Offshore (except North Sea)*	81%	91%	79%	77%	84%	15/80	8/97	16/96	21/126	17/156
	Norway—North Sea*	83%	87%	90%	91%	80%	14/80	11/97	7/96	8/126	21/156
	Russia* †	67%	N/A	10%	N/A	N/A	27/80	N/A	87/96	N/A	N/A
	United Kingdom—Other Offshore (except North Sea)*	84%	76%	83%	74%	72%	13/80	22/97	12/96	24/126	29/156
	United Kingdom—North Sea	89%	84%	75%	81%	75%	9/80	13/97	20/96	18/126	27/156
ASIA	Bangladesh*	49%	24%	11%	9%	13%	41/80	79/97	85/96	115/126	124/156
	Cambodia*	19%	11%	25%	18%	16%	66/80	90/97	72/96	102/126	117/156
	India*	25%	29%	23%	15%	18%	61/80	72/97	75/96	105/126	116/156
	Myanmar	26%	28%	31%	21%	20%	60/80	73/97	67/96	100/126	114/156
	Pakistan*	44%	N/A	42%	36%	39%	45/80	N/A	58/96	79/126	85/156
	Thailand	58%	63%	56%	56%	43%	34/80	36/97	42/96	48/126	77/156
	Vietnam	41%	38%	61%	54%	44%	48/80	61/97	38/96	54/126	74/156
AFRICA	Angola*	54%	22%	37%	45%	33%	37/80	80/97	62/96	69/126	93/156
	Cameroon*	37%	N/A	54%	42%	34%	51/80	N/A	46/96	72/126	91/156
	Equatorial Guinea*	30%	58%	39%	24%	27%	57/80	42/97	60/96	90/126	101/156
	Gabon	20%	49%	49%	41%	30%	65/80	52/97	50/96	73/126	97/156
	Ivory Coast*	48%	50%	N/A	44%	52%	42/80	49/97	N/A	71/126	65/156
	Mozambique*	32%	34%	N/A	29%	35%	55/80	66/97	N/A	86/126	90/156
	Nigeria	21%	20%	18%	13%	10%	64/80	83/97	78/96	110/126	130/156
	Republic of the Congo (Brazzaville)*	51%	30%	N/A	28%	32%	40/80	69/97	N/A	87/126	94/156
MENA	Algeria*	31%	21%	35%	35%	15%	56/80	82/97	63/96	80/126	120/156
	Egypt*	35%	54%	48%	31%	9%	53/80	46/97	51/96	83/126	135/156
	Iraq*	7%	5%	20%	10%	6%	75/80	94/97	77/96	114/126	144/156
	Libya	6%	4%	3%	1%	5%	76/80	95/97	94/96	126/126	151/156
	Oman*	85%	68%	N/A	64%	70%	12/80	30/97	N/A	38/126	31/156
	Tunisia*	46%	57%	28%	33%	37%	44/80	44/97	69/96	81/126	89/156
	Yemen*	2%	13%	13%	5%	14%	79/80	88/97	84/96	118/126	123/156

* Between 5 and 9 responses.

† Notes: Due to a low response rate, Netherlands – Onshore and Netherlands – Offshore were combined to this year into Netherlands 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 - Percentile Change (80 Jurisdictions) (continued from page 29)

		Percentile change					Rank				
		2018	2017	2016	2015	2014	2018	2017	2016	2015	2014
ARGENTINA	Mendoza*	53%	43%	24%	17%	22%	38/80	56/97	74/96	103/126	108/156
	Neuquen	63%	55%	41%	23%	28%	30/80	45/97	59/96	91/126	99/156
LATIN AMERICA & CARIBBEAN	Bolivia*	11%	3%	4%	6%	4%	72/80	96/97	93/96	117/126	153/156
	Brazil—Onshore concession contracts*	59%	59%	14%	47%	38%	33/80	41/97	82/96	66/126	87/156
	Brazil—Offshore concession contracts	42%	47%	32%	58%	51%	47/80	53/97	65/96	47/126	69/156
	Brazil—Offshore presalt area profit sharing contracts*	56%	36%	15%	46%	25%	36/80	65/97	81/96	68/126	102/156
	Colombia	33%	53%	46%	50%	54%	54/80	47/97	53/96	60/126	59/156
	Ecuador*	9%	7%	8%	4%	3%	74/80	93/97	89/96	121/126	155/156
	Guyana*	69%	51%	N/A	N/A	58%	25/80	48/97	N/A	N/A	52/156
	Mexico	36%	25%	30%	32%	11%	52/80	77/97	68/96	82/126	126/156
	Peru	22%	41%	34%	26%	42%	63/80	58/97	64/96	89/126	79/156
	Trinidad and Tobago*	70%	33%	N/A	63%	65%	24/80	67/97	N/A	39/126	42/156
	Venezuela	1%	1%	1%	3%	1%	80/80	97/97	96/96	125/126	156/156

* 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 2017. Readers are reminded that these rankings are based on the factors in the Policy Perception Index only, and do not factor in the respective jurisdictions' proved oil and gas reserves or their petroleum resource potential. This year Manitoba emerged as Canada's top performer while Saskatchewan and Nova Scotia are ranked 2nd and 3rd among Canadian jurisdictions. Alberta's PPI score dropped this year, and Alberta and British Columbia are once again Canada's least attractive jurisdictions for upstream investment. Most Canadian jurisdictions saw their PPI scores decline in 2018.

Two out of six Canadian jurisdictions improved their PPI scores this year—Nova Scotia and British Columbia. This means that 67 percent of Canadian jurisdictions saw their scores decline in 2018—Manitoba, Saskatchewan, Newfoundland & Labrador, and Alberta. This resulted in Saskatchewan moving down on the Policy Perception Index scale from a rank of 7th (out of 97) in 2017 to 18th (of 80) this year. Based on Saskatchewan's drop, none of the Canadian jurisdictions ranked in the top ten this year. However, Nova Scotia's rank improved from 26th (out of 97) in 2017 to 21st (out of 80) in 2018.

Newfoundland & Labrador's score dropped by almost 15 points this year, decreasing its overall ranking from 4th (of 97) in 2017 to 26th (of 80) in 2018. Specifically, the percentage of negative responses increased the most in the areas of regulatory duplication and inconsistencies (50 percentage points), fiscal terms (40 points), and political stability (30 points).

Figure 5 illustrates the relative performance of the Canadian jurisdictions in the 2018 survey. According to the Policy Perception Index measure, Manitoba is the most attractive Canadian jurisdiction for upstream petroleum investment. At the other end of the scale, British Columbia stands out as the Canadian jurisdiction posing the greatest barriers to investment.

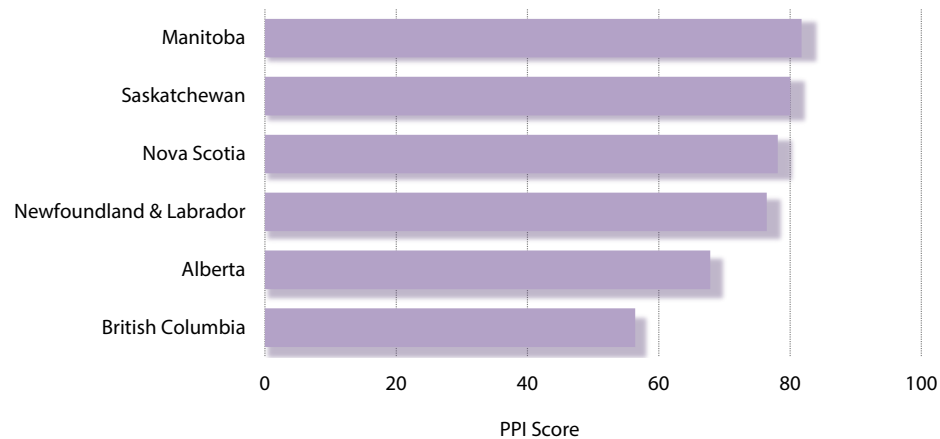
Canada had six jurisdictions ranked in the 2018 survey and two, Manitoba and Saskatchewan, achieved commendable first quintile rankings. This year Alberta and Nova Scotia remained in the second quintile, where they are joined by Newfoundland & Labrador. British Columbia remained in the less

Table 6: Rankings of Canadian Jurisdictions for 2017 and their Policy Perception Index Scores

Jurisdiction	2017		2016	
	Rank	Score	Rank	Score
Manitoba	1	81.75	3	85.06
Saskatchewan	2	80.04	2	88.47
Nova Scotia	3	78.11	4	70.41
Newfoundland & Labrador	4	76.44	1	91.25
Alberta	5	67.83	5	68.73
British Columbia	6	56.40	6	54.52

*Between 5 and 9 responses.

Note: 2018 data were not available for New Brunswick, Quebec, Ontario, Yukon, and Northwest Territories.

Figure 5: Policy Perception Index—Canada

attractive third quintile. Due to low response rates, results for the other Canadian provinces and territories were not ranked in 2018.

Focus on Western Canada

Alberta experienced a decline in its score this year. Oil and gas executives continue to indicate that there is considerable uncertainty and barriers to investment compared to 2014 results. This year Alberta was once again

unable to return to the top 20 ranked jurisdictions, which it achieved from 2012 to 2014. Since 2015, the Alberta government has implemented a number of changes in policies that affect the oil and gas industry, including higher corporate and personal income taxes, a cap on GHG emissions from oil sands production, a new carbon tax, and a review of royalties that created some uncertainty 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 higher global prices. The discounted price for Canadian heavy crude remains high, meaning that Canadian heavy oil producers are receiving less revenue than what other producers receive. In fact, according to a recent study, Canadian heavy oil producers will lose \$15.8 billion in foregone revenues due to insufficient pipeline capacity in 2018 (Aliakbari and Stedman, 2018).

Alberta's score continues to rank in the second quintile and its rank dropped from 33rd (out of 97) in 2017 to 43rd (out of 80) in 2018. Alberta's PPI score is lower compared to last year's and the province is still the second least attractive jurisdiction to invest in Canada. Moreover, Alberta also fell from the 64th percentile last year to the 47th percentile this year. The province's overall rank has deteriorated in recent years—from 14th (out of 156) in 2014 and the third most attractive jurisdiction in Canada, to 43rd (out of 80) in 2018 and the fifth most attractive jurisdiction in Canada. Much of the change since 2014 has been driven by poorer perceptions of the province's regulation and taxation regimes. In particular, over 50 percent of respondents in 2018 see fiscal terms and taxation as deterrents to investment. In addition, 73 percent of respondents cited the cost of regulatory compliance as a deterrent to investment this year. Overall, Alberta's scores dropped on all of the survey questions when compared to last year's results. The province's scores declined the most on the survey questions pertaining to disputed land claims (22 points), regulatory enforcement (21 points), and quality of infrastructure (16 points).

British Columbia's score remained low this year, and its overall ranking is still far below 2016 levels as this province ranked 58th (out of 80) this year compared to 39th (out of 96) in 2016. Despite an increase in its PPI score since 2017, British Columbia is still the least attractive jurisdiction in Canada (of the provinces included this year), and the province declined from the top 50 percent of jurisdictions in 2016 to the bottom 30 percent of jurisdictions this year (**Table 5**). This year, the percentage of negative responses increased the most in the areas of the legal system (18 points),¹¹ regulatory

¹¹ These numbers refer to the percentage point increases from 2016 to 2017 in 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. Only the 75 jurisdictions that were included in both the 2016 and 2017 survey were analyzed in this section.

enforcement (15 points), and regulatory duplication and inconsistencies (14 points). The cost of regulatory compliance and political instability remain major deterrents, as 81 and 80 percent of respondents are deterred by these factors, respectively.

On May 29, 2017, British Columbia's NDP and Green parties announced that they had signed an agreement to form the next government. The new BC government abandoned the idea of a revenue neutral carbon tax and instead has increased various taxes, including the carbon tax rate and the general business income tax rate (Veldhuis and Palacios, 2018). Both the NDP and Green parties have stated that they oppose the Kinder Morgan Trans Mountain pipeline expansion, and the Green Party continues to oppose LNG production despite a recent announcement that LNG Canada's \$40-billion project will proceed (Schmunk, 2018). Such policy positions have contributed to the lack of political stability in the province, and continue to be a deterrent to oil and gas investment in British Columbia.

The percentage of negative responses for protected areas and disputed land claims in British Columbia also remains high. In fact, survey respondents have indicated that disputed land claims (76 percent) and protected areas (71 percent) are deterrents to investment in BC. Disputed land claims and protected areas are also the chief concerns of mining investors in the province (Jackson and Green, 2017).

Manitoba's score and rank declined this year; its rank dropped from 12th (of 97) in 2017 to 16th (of 80) in 2018. Manitoba also fell from the 86th percentile last year to the 80th percentile this year. Driving this shift were negative responses concerning quality of infrastructure (27 points), disputed land claims (19 points), and the legal system (18 points). Despite Manitoba's drop this year, it is the most attractive Canadian jurisdiction for upstream petroleum investment.

Saskatchewan's global attractiveness for investment declined this year, moving from 7th place in 2017 to 18th in 2018. Saskatchewan's PPI score also dropped by 8 points over the same period. This was a result of negative responses for environmental regulations (21 points), regulatory enforcement (20 points), and the cost of regulatory compliance (16 points).

Comments from respondents about various Canadian provinces and territories ranged from complimentary to critical. The comments in the following section have been edited for length, grammar and spelling, to retain confidentiality, and to clarify meaning.

Canada—General

“Canada’s investment climate is increasingly uncompetitive as a result of the recent regulatory and tax changes in the United States. The federal government is creating more regulatory uncertainty [with Bill C-69] and is increasing costs with the carbon tax. The investment climate can only improve if we show that we are capable of letting private industry thrive.”

“Bill C-69 is devastating for the energy sector. This Bill will negatively impact large investment decisions. Its subjective criteria will result in years of hearings and will mean companies will spend money elsewhere.”

“Canada is not a politically stable country for petroleum resource development. In fact, it’s quite hostile towards resource development. The carbon tax and proposed methane regulations will kill investment. Investors need stability and reassurance that past agreements will be honored and that is not the case in Canada at this time.”

Alberta

“The carbon tax along with insufficient pipeline capacity is causing investment to relocate elsewhere.”

“There is no point in developing energy resources in Alberta if companies are unable to secure a fair price and reliable transportation for oil and/or gas.”

“Energy investment will remain flat until there is absolute certainty that pipeline capacity will improve.”

British Columbia

“The province’s obstructionism related to the Trans Mountain pipeline is a major deterrent to investment.”

“The province is openly hostile towards the Trans Mountain pipeline and is enacting various anti-energy policies. Jurisdictions south of the border are far more attractive.”

Saskatchewan

““This province’s opposition to a carbon tax is positive.”

“Saskatchewan’s horizontal drilling royalty structure is attractive for investors.”

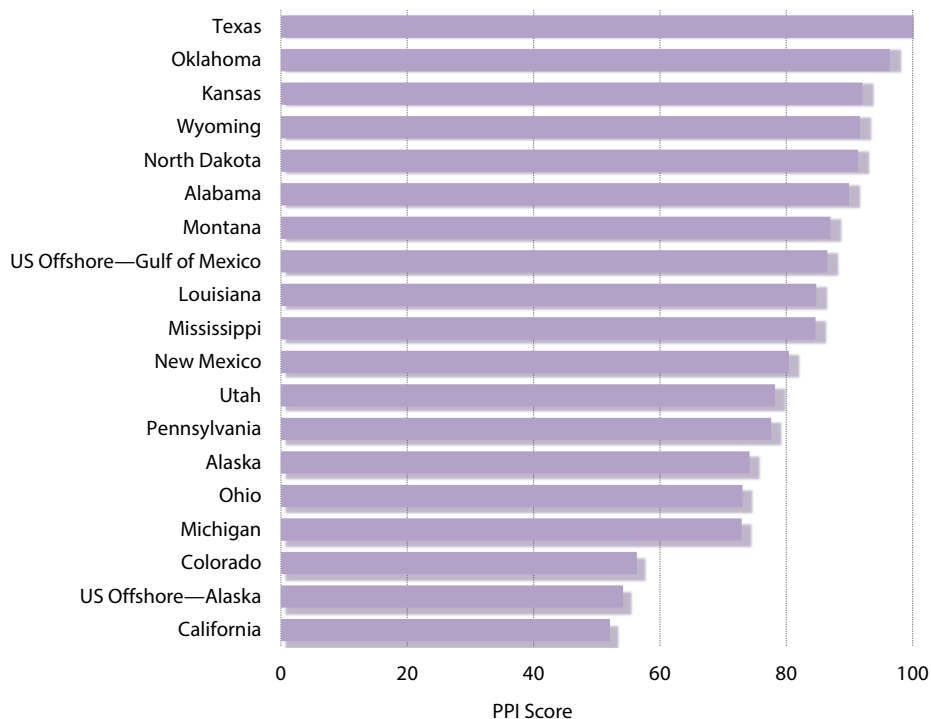
The United States

Sufficient responses were received in 2018 to allow us to rank 19 US jurisdictions, compared to 21 in the 2017 and 2016 surveys.

Texas is the most attractive jurisdiction in the United States—and the most attractive jurisdiction in the world. This is the second straight year that Texas displaced Oklahoma from the global top spot: Oklahoma is the second most attractive jurisdiction in the US and the second most attractive in the world. Nine other US jurisdictions also received scores in the first quintile this year: Kansas, Wyoming, North Dakota, Alabama, Montana, US Offshore – Gulf of Mexico, Louisiana, Mississippi, and New Mexico (figure 6). Nine of the world’s top 10 jurisdictions are located in the United States compared to six in the 2017 survey.

Most US jurisdictions saw their PPI scores increase in 2018. In particular, US Offshore – Gulf of Mexico saw an increase in its score of 17 points. This increase enabled this jurisdiction to rank 8th overall, and place in the global top 10. The improvement in US – Gulf of Mexico’s rank was driven in large part by lower percentages of respondents indicating that issues pertaining to labor regulations and employment agreements (-33 points), the legal system (-29 points), political stability and regulatory duplication and

Figure 6: Policy Perception Index—United States



inconsistencies (both -28 points) were deterrents to investment. Montana is another state that increased in rank this year into the global top 10. It moved from 18th (out of 97) last year to 7th (out of 80) this year. Driving the shift in this year's ranking for Montana was decreased concern over regulatory duplication and inconsistencies (-23 points), the legal system (-18 points), and political stability (-14 points).

Five US jurisdictions are in the second quintile group this year compared with ten in 2017. States in the second quintile this year include Utah, Pennsylvania, Alaska, Ohio, and Michigan. Two jurisdictions—Alaska and Michigan—improved from the third quintile last year to the second this year. Alaska's score improved considerably this year from 58.7 in 2017 to 74.2 in 2018, an increase of over 15 points. Investors expressed decreased concern this year over that state's regulatory duplication and inconsistencies (-36 points), disputed land claims (-32 points), and labor regulations and employment agreements (-31 points).

This year, 63 percent of US jurisdictions (12 out of 19) saw significant improvement in the area of labor regulations and employment agreements. Eleven out of 19 US jurisdictions (58 percent) improved significantly in the area of regulatory duplication and inconsistencies.

Three US jurisdictions had third quintile PPI scores this year—Colorado, US Offshore – Alaska, and California. Colorado dropped from a second quintile place in 2017. This year, US Offshore – Alaska was included for the first time since 2015. California improved its overall ranking from 91st (out of 97) in 2017 to 67th (out of 80) in 2018. Its improvement can be attributed to decreased concern over labor regulations and employment agreements (-69 points), protected areas (-32 points) and political stability (-28 points). Despite California's improvement this year, it still ranked as the worst jurisdiction in the United States—67th out of 80 jurisdictions this year.

This year, none of the US jurisdictions had unattractive fourth quintile scores.

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

United States—General

“The US tax reforms and relaxation of various regulations are encouraging for investors.”

“As long as the current administration maintains its tax and regulatory policies new capital will continue to flow to the

United States. It's positive that onerous regulations are being rolled back."

Alaska

"In recent years the government has instituted tax changes that negatively impact how companies explore and develop new reserves."

Colorado

"Colorado is becoming more difficult to operate in as political activism directed towards the oil and gas industry increases."

Louisiana

"Legacy lawsuits against oil and gas companies are problematic for investment in the region."

North Dakota

"The North Dakota Department of Health (NDDoH) creates positive partnerships with industry. The NDDoH slowly stepped up its environmental compliance requirements with industry feedback. The NDDoH worked with industry to resolve technology issues so compliance could be achieved. Partnerships with industry are far better than pure enforcement."

"Elected officials publicly set production targets and encourage industry to achieve them by offering assistance."

Oklahoma

"Oklahoma encourages operators to work together to get product to market and this encourages investment."

Oceania

We were able to rank 12 jurisdictions in Oceania this year. Six Australian states are included (New South Wales, Queensland, South Australia, Tasmania, Victoria, and Western Australia), Australia – Offshore and the Northern Territory (which fall under Australian federal jurisdiction), Indonesia, Malaysia, New Zealand, and Papua New Guinea.

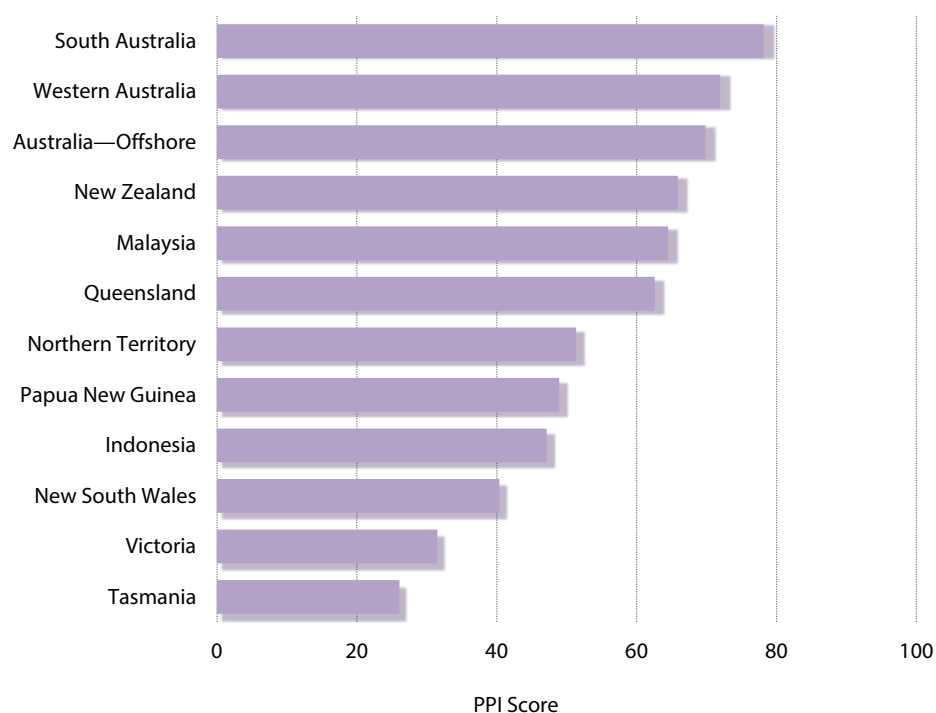
As **figure 7** illustrates, the results for this region range from the second quintile to the fourth. This year South Australia achieved the highest score in the region, ranking 20th overall. This year, none of the Oceania jurisdictions were in the first quintile.

Six jurisdictions in the region have second quintile scores: South Australia, Western Australia, Australia – Offshore, New Zealand, Malaysia, and Queensland. New Zealand achieved a score of 65.89 (46th overall) on the Policy Perception Index this year, dropping from 14th overall (out of 97) in the 2017 survey. This drop is based on poorer scores with respect to political stability (75 points), environmental regulations (32 points), and protected areas and taxation in general (both 27 points). Among the second quintile jurisdictions, South Australia also ranked lower this year, moving from 10th (out of 97) last year to 20th (out of 80) in global ranking this year due to increased concerns over regulatory enforcement (38 points), protected areas (30 points), and labor regulations and employment agreements (27 points). South Australia also dropped from the 88th percentile in 2017 to the 75th percentile in 2018.

Northern Territory, Papua New Guinea, Indonesia, and New South Wales are the four Oceania jurisdictions with third quintile scores this year. Indonesia ranked higher this year (71st out of 80) than it did in 2017 (92nd out of 97), moving the jurisdiction from the fourth quintile to the third. The improvement in Indonesia is a result of lower negative perceptions over disputed land claims and the legal system (both -43 points), and environmental regulations (-27 points).

Two jurisdictions in the region, Victoria and Tasmania, achieved a poor fourth quintile PPI score this year. Victoria dropped from a third quintile placement in 2017 as its PPI score declined by 14 points from 45.9 in 2017 to 31.5 in 2018. Victoria's decline this year can be attributed to increased concern over the quality of infrastructure (50 points), legal system (29 points), and labor availability and skills (25 points). Tasmania was included in the survey for the first time since 2015.

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

Figure 7: Policy Perception Index—Oceania**Indonesia**

“Indonesia regularly flip-flops on government and ministerial regulations regarding the oil and gas industry, which deters investment. Recent actions related to signature bonuses on PSC extensions is one example.”

“Indonesia’s gross split production sharing contract (PSC) system is poorly designed and is discouraging for investors.”

“Regulatory processes are uncertain and biased.”

New South Wales

“Regulatory processes are unpredictable and subject to uncertainties surrounding the term ‘social license.’”

New Zealand

“New Zealand’s move to ban new offshore exploration is a deterrent for investors.”

“The decision to ban offshore exploration and no longer issue permits was done without proper consideration or consultation.”

“Jurisdictions that are openly hostile towards resource development, like New Zealand, cause investors to take their investment dollars elsewhere.”

Papua New Guinea

“After successfully launching the first major development of gas with the PNG LNG Project, the government has pursued legislative changes to the fiscal regime, which is concerning for investors.”

South Australia

“This jurisdiction is proactive with companies at the exploration stage, which is positive for investors.”

Victoria

“The government’s ban on onshore unconventional gas exploration and development is a major deterrent to investment.”

Europe

Figure 8 shows the rankings for European jurisdictions based on this year's Policy Perception Index scores. We were able to evaluate 8 jurisdictions in the region this year, compared to 12 jurisdictions in 2017.¹²

This year, seven out of eight European jurisdictions have PPI scores in the attractive first and second quintiles.

The four European jurisdictions with first quintile scores, beginning with the most attractive, are United Kingdom – North Sea, United Kingdom – Other Offshore (except North Sea), Norway – North Sea, and Norway – Other Offshore (except North Sea).

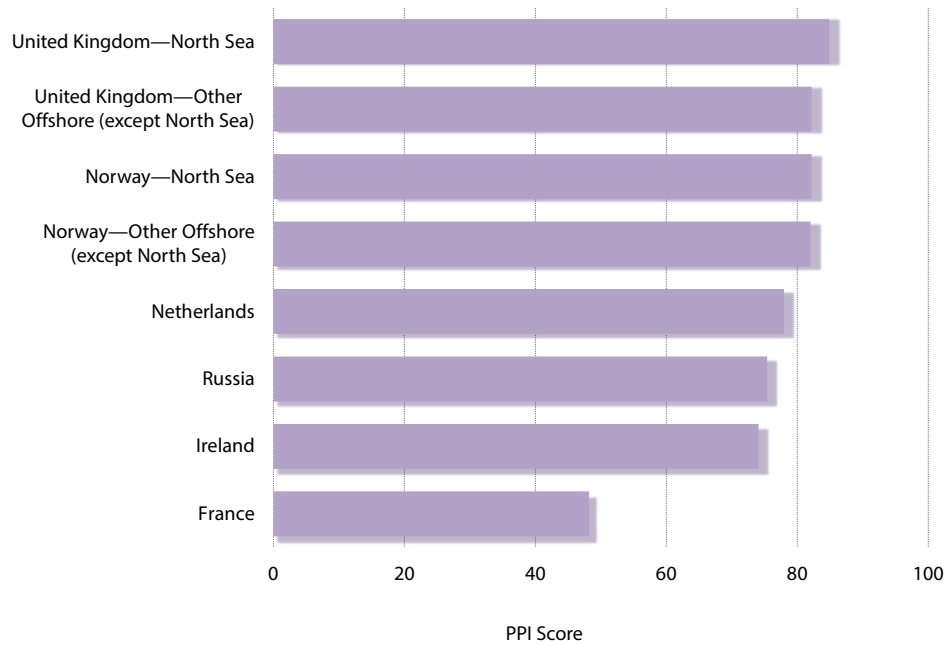
The PPI score for United Kingdom – Other Offshore (except North Sea) improved this year, and its rank increased from 22nd (out of 97) to 13th (out of 80) this year. This jurisdiction's increase is due to decreased concern over taxation (-21 points), disputed land claims (-17 points), and security (-13 points). In contrast, Norway – Other Offshore (except North Sea) dropped from 8th (of 97) last year to 15th (of 80) this year due to increased concern over the cost of regulatory compliance (29 points), labor regulations and employment agreements (17 points), and regulatory duplication and inconsistencies (17 points).

The Netherlands, Russia, and Ireland received attractive second quintile scores this year. Ireland maintained its overall rank at 29th this year, and its score increased slightly, by over 4 points. Ireland's increased PPI score in 2018 is a result of decreased uncertainty over regulatory enforcement (-34 points), labor availability and skills (-30 points), and the quality of the geological database (-25 points). Russia was included in the 2018 survey after not being ranked last year due to insufficient responses.

France ranked in the third quintile again this year and ranked 70th of 80 jurisdictions. France's PPI score increased slightly this year, but this jurisdiction remains far behind 2016 levels, when France ranked 27th (of 96). Respondents in 2018 expressed increased concern over political stability (22 points), and decreased concern over the quality of infrastructure (-22 points) compared to 2017 results.

For the second straight year, no European jurisdictions have fourth or fifth quintile scores this year, which is a positive signal for investment attractiveness in this region.

¹² Note that due to a low response rate for the sub-jurisdictions of the Netherlands and Russia, those sub-jurisdictional responses were aggregated and the Netherlands and Russia were ranked as single jurisdictions.

Figure 8: Policy Perception Index—Europe

The comments received for 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.

France

“France’s decision to ban fossil fuel extraction is a deterrent for investors.”

Netherlands

“Various aspects of the tax system are encouraging for investors, including the advance tax ruling.”

“Lowering the Dutch corporate income tax rate is encouraging for investors.”

Norway

“Norway applies consistent and transparent processes during business transactions. Such certainty is positive for investors.”

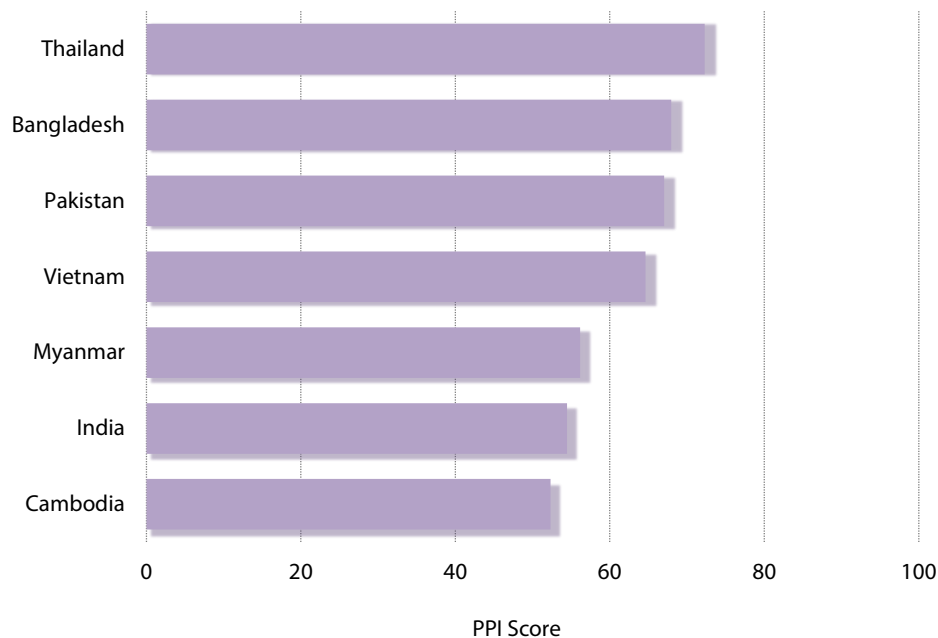
Asia

Figure 9 presents the seven Asian jurisdictions that were ranked this year according to their respective Policy Perception Index values. Pakistan was included in this year's survey; China was excluded due to a lack of responses.

As has been the case since the survey began in 2007, none of the Asian jurisdictions achieved first quintile status in 2018. Four Asian jurisdictions ranked in the second quintile this year (Thailand, Bangladesh, Pakistan, and Vietnam) compared to two last year. The three remaining Asian jurisdictions ranked this year (Myanmar, India, and Cambodia) all achieved third quintile scores. Most Asian jurisdictions saw their PPI scores increase in 2018.

Bangladesh's PPI score improved by 17 points in 2018, and its rank improved from 79th (out of 97) last year to 41st (out of 80) this year. This improvement was a result of decreased concern over the quality of the geological database (-50 points), trade barriers (-40 points), and labor regulations and employment agreements (-40 points). Thailand also improved in the overall ranking from 36th (of 97) in 2017 to 34th (of 80) in 2018 and saw an increase in its PPI score from 68.07 to 72.28 over the same time period. Thailand experienced decreased concern over trade barriers (-16 points), and increased concern over regulatory enforcement (34 points) in 2018. Vietnam improved from 61st (of 97) in 2017 to 48th (of 80) in 2018 due to

Figure 9: Policy Perception Index—Asia



increased positive perceptions around the quality of the geological database (-19 points), cost of regulatory compliance (-7 points), and environmental regulations (-6 points). Vietnam moved into the second quintile this year from the third in the previous year.

Of the jurisdictions in the third quintile, India saw a slight decrease in its PPI score, but its overall rank increased from 72nd (of 97) to 61st (of 80) this year. This year India was perceived to have decreased concern over trade barriers (-25 points), but increased concern over protected areas (42 points). India is the only Asian jurisdiction that experienced a drop in its PPI score in 2018. Cambodia's score increased by over 10 points this year and its rank improved from 90th (of 97) last year to 66th of (of 80) this year. Cambodia's higher score reflects decreased concern over disputed land claims (-47 points), cost of regulatory compliance (-30 points), and the quality of infrastructure (-20 points).

Below are some of the comments received about the petroleum industry investment environment 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

"The government is making unilateral policy decisions that negatively impact the oil and gas sector. In addition, government processes are lengthy and uncertain."

"Efforts by the government of India to reduce the regulatory burden for the oil and gas sector are positive."

Thailand

"Government actions are often unpredictable and delayed, creating uncertainty for investors."

Vietnam

"The decision to cancel projects based on pressure from China is concerning for investors."

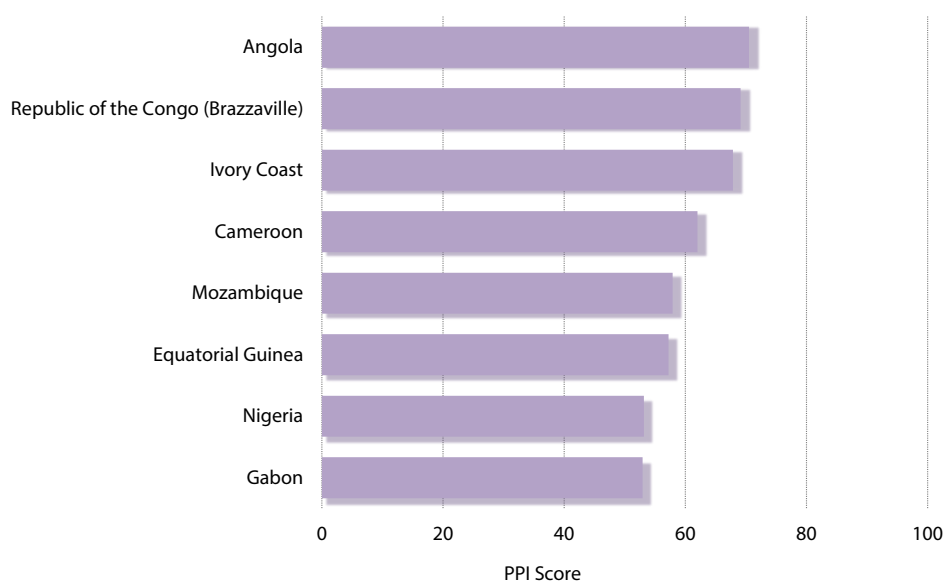
Africa

This year, as we have 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 a simpler Middle East /All of Africa split) 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 8 African jurisdictions that were assessed this year, a decrease from thirteen in 2017. This year we were unable to rank many of the African countries included in 2017, including Ghana, Kenya, Namibia, South Africa, Tanzania, and Uganda.

Angola, the top ranked African jurisdiction, is in the second quintile along with the Republic of the Congo (Brazzaville), Ivory Coast, and Cameroon. Angola saw its score move up by over 20 points from the previous year and now ranks as the 37th most attractive jurisdiction in the world for oil and gas investment. Angola achieved a second quintile score this year because its Policy Perception Index score increased dramatically compared to last year (50.0 in 2017 to 70.5 in 2018). Angola's improvement is the result of decreased concern regarding security (-52 points), regulatory enforcement (-41 points), and the cost of regulatory compliance (-34 points). The Republic of Congo (Brazzaville) also saw an increase in its score and rank (from 69th

Figure 10: Policy Perception Index—Africa



last year to 40th this year). Respondents expressed decreased concern over protected areas (-50 points), regulatory duplication and inconsistencies (-40 points), and the quality of infrastructure (-38 points).

The lowest ranked African jurisdiction, Gabon, saw its score drop by nearly 10 points this year from 62.41 last year to 52.95 this year. The decline is due to respondents having increased negative perceptions of trade barriers (47 points), protected areas (35 points), and the quality of infrastructure (34 points).

Nigeria, the largest reserve holder in the region, experienced an increase in its score and rank this year. Nigeria was the least attractive region for investment last year, but this jurisdiction improved in 2018. Its increase in rank from 83rd (of 97) last year to 64th (of 80) this year can be attributed to decreased concern over the legal system (-32 points), regulatory duplication and inconsistencies (-27 points), and security (-19 points). However, Nigeria still receives many negative responses in the security and quality of infrastructure categories, which suggests that there could be considerably more investment if the barriers to upstream development were reduced.

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.

Gabon

"Political instability and corruption are major deterrents for investors."

Nigeria

"Nigeria's regulations related to licensing are onerous and discourage investment."

The Middle East and North Africa (MENA)

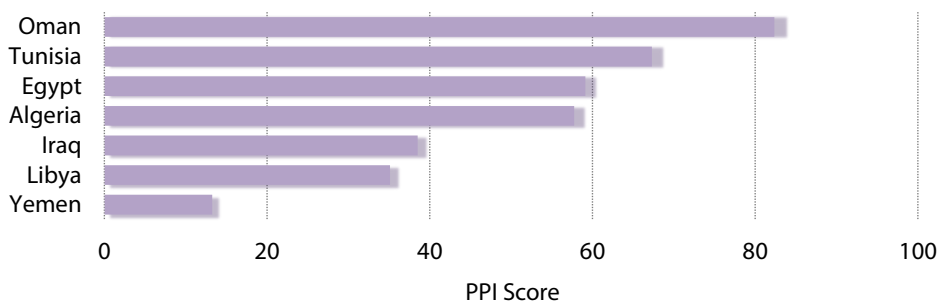
The 7 Middle East and North African countries evaluated in this year's survey are presented in **figure 11**, ranked according to their relative attractiveness for investment as measured by the Policy Perception Index. Kuwait, Morocco, and the United Arab Emirates could not be ranked this year due to low response rates.

Only one MENA country (Oman) achieved first quintile rankings in the 2018 survey, which is consistent with one (United Arab Emirates) in 2017. The first quintile score for Oman (12th overall rank) is a result of a significant 13-point increase in its score between 2017 and 2018. In particular, in 2018 Oman improved investor perceptions surrounding political stability (-71 points), regulatory duplication and inconsistencies (-33 points), and labor availability and skills (-30 points).

Tunisia ranked in the second quintile, with Algeria and Egypt following in the third quintile. Egypt dropped from the second quintile last year to the third quintile this year. Egypt's decline this year can be attributed to increased concern over the cost of regulatory compliance (45 points), legal system (38 points), and regulatory enforcement (24 points). Iraq and Libya received scores in the fourth quintile and Yemen dropped to the fifth quintile from the third last year.

This year Yemen saw a large decline in its PPI score, which changed its overall rankings. Yemen saw a 33-point decrease in its score from last year, dropping from 45.8 in 2017 to 13.2 in 2018. As a result, Yemen dropped to the bottom of the survey, ranking 79th (out of 80) this year compared to 88th (out of 97) last year. The decline is due in part to negative responses regarding disputed land claims (80 points), trade barriers (67 points), and labor availability and skills (60 points). Yemen's performance is affected by ongoing conflict in the region, which is a serious concern for investors. For example, 100 percent of those responding about Yemen indicated that political stability, security, and the legal system in the jurisdiction were deterrents to investment.

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

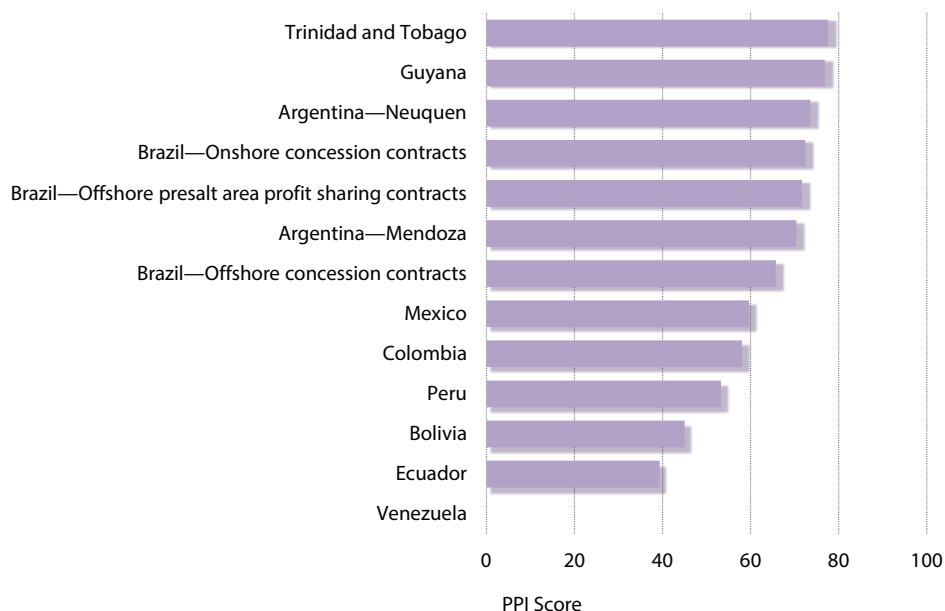


Latin America and the Caribbean

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 Presalt Area Profit Sharing Contracts (PSCs). Argentina was broken down into six petroleum-producing provinces: Chubut, Mendoza, Neuquen, Salta, Santa Cruz, and Tierra del Fuego. However, due to a low response rate, only Mendoza and Neuquen were ranked this year. Thirteen Latin American and Caribbean jurisdictions were ranked this year. Suriname was not included this year due to insufficient responses.

None of the region's jurisdictions achieved first quintile rankings this year. Seven jurisdictions—Trinidad & Tobago, Guyana, Argentina – Neuquen, Brazil – Onshore concession contracts, Brazil Offshore presalt area profit sharing contracts, Argentina – Mendoza, and Brazil – Offshore concession contracts—rank in the second quintile. Brazil – Offshore PSC improved in rank from 65th (of 97) in 2017 to 36th (of 80) this year with a corresponding increase in PPI of 13.7 points from 58.0 in 2017 to 71.7 in 2018. The higher score and rank comes as a result of more positive perceptions about the jurisdiction's trade barriers (-71 points), cost of regulatory compliance (-46 points), and labor availability and skills (-38 points).

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



Four Latin American and Caribbean jurisdictions are in the third quintile this year, including Mexico (ranked 52nd), Colombia (ranked 54th), Peru (ranked 63rd), and Bolivia (ranked 72nd). Mexico's PPI score increased by almost 7 points since last year (53.0 in 2017 to 59.7 in 2018), and its rank improved from 77th (of 97) in 2017 to 52nd (of 80) in 2018. Mexico's improvement this year can be attributed to decreased concern over taxation (-20 points), quality of the geological database (-20 points), and labor regulations and employment agreements (-16 points). In contrast, Peru saw a 7 point decline in its score this year, and its rank dropped from 58th (of 97) to 63rd (of 80) in 2018. This decline is attributable to an increase in concern over political stability (43 points), regulatory enforcement (32 points), and labor regulations and employment agreements (27 points).

Ecuador is in the fourth quintile this year, while Venezuela ranks in the fifth quintile. They are the region's lowest-ranked jurisdictions this year. In fact, Venezuela is the lowest ranked jurisdiction the world. It has received a PPI score of zero for seven of the past eight years, ranking higher than only Libya in 2015. This year, Venezuela had (or shared) the highest percentage of negative responses (100%) on survey questions about political stability and its legal system. Moreover, this year, an increase in investor concerns over the cost of regulatory compliance (36 points), protected areas (31 points), and regulatory enforcement (29 points) pushed survey respondents to give Venezuela highly negative scores on those factors.

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

"Bidding rounds for acquiring onshore blocks are positive, as long as the bidding process goes smoothly."

"The extended amount of time it takes to obtain environmental licenses is a deterrent to investment."

Colombia

"Investors have concerns about the environmental permitting process in Colombia. Permits can be issued and then revoked days later. Corruption and unethical practices continue to plague this jurisdiction."

"There is tension pertaining to how local officials interpret and enforce federal laws, which creates uncertainty for investors."

“Taking steps to expedite work visas for seismic and drilling personnel is helpful.”

Mexico

“Mexico’s energy reforms have been quite a success. Some tweaks to the legislation are still required, but overall the changes have been exemplary.”

Venezuela

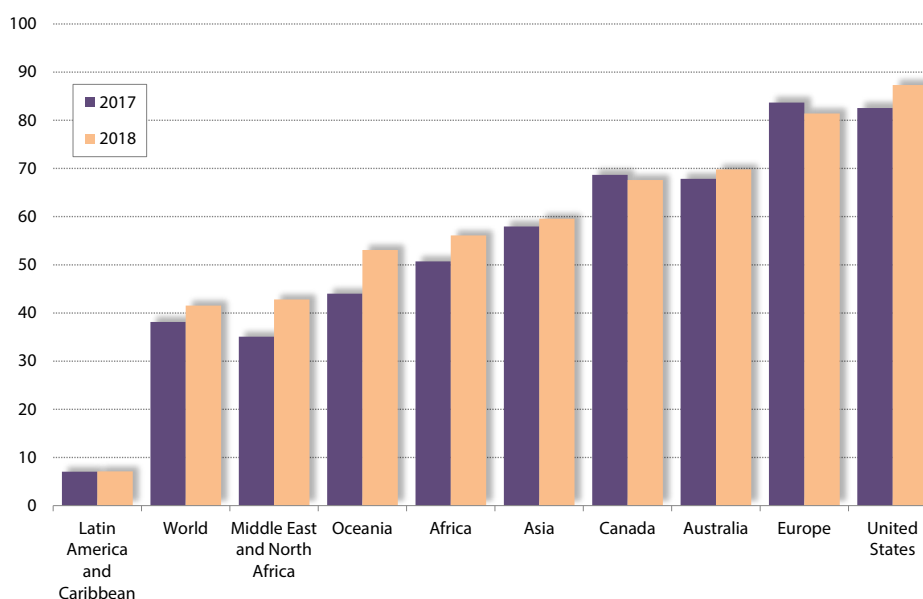
“Venezuela is a jurisdiction with numerous concerns for investors. Corruption, security, and economic concerns are serious and problematic, which may explain why so many companies have abandoned their operations in this jurisdiction.”

Overview

Our analysis of the 2018 petroleum survey results indicates that the extent of positive sentiment regarding key factors driving petroleum investment decisions has increased in most of the world's regions. In fact, as **figure 13** illustrates, this year the average regional PPI scores, weighted by reserves, have increased in eight out of 10 regions from where they were in 2017.¹³ Canada and Europe were the only jurisdictions that saw their weighted scores decline this year. Europe still has the second most attractive policy environment and Australia's weighed score is now ahead of Canada's. The region with the greatest deterioration is Europe, which experienced a 2-point decline in its weighted score. This year the United States experienced a 4.8 point increase in its weighted score. The United States remains the region with the most attractive policy environment for investment in upstream oil and gas.

The improvements in certain world regions should be taken with caution because lower response rates prevented us from ranking a considerable number of jurisdictions that were indicated to be among the least attractive for investment in the 2016 and 2017 surveys.

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



¹³ Note that only the jurisdictions that were included in both the 2017 and 2018 surveys were examined in this section. As a result, 72 jurisdictions were included in this analysis, based on low response rates. Europe results last year did not include Russia, the top reserve holder and therefore it was not included in this analysis. As previously mentioned, New South Wales, Cambodia, and Guyana were not included in this analysis as they have no proved reserves.

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, 2017a). This year publication data for 2017 reserve 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, 2016* (EIA, 2017b). 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, 2016).

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 of July 2016. 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 seven Australian jurisdictions.

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, 2017). 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, 2016, by province were obtained from the Ministerio de Energía y Minería (Ministry of Energy and Mining) website (Ministerio de Energía y Minería, 2016).

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* as of June 26, 2018 that was available on the website of the Agência Nacional do Petróleo (National Petroleum Agency) (Agência Nacional do Petróleo, Gás Natural e Biocombustíveis, 2017). 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 in 2015 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 did not calculate these separate indices last year or 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.

Single Factor Barriers: Full Survey Responses

Figure 14: Fiscal terms

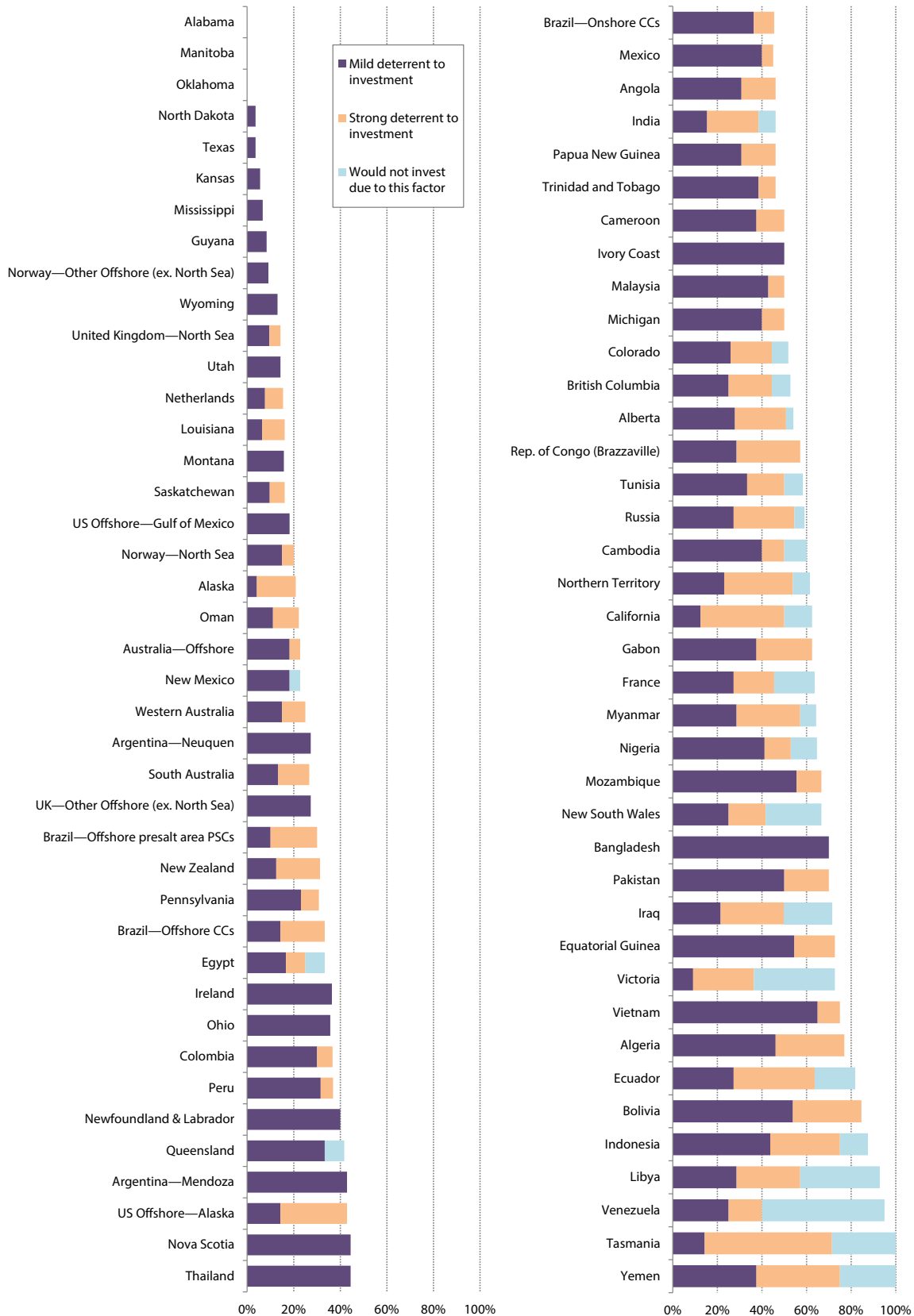


Figure 15: Taxation in general

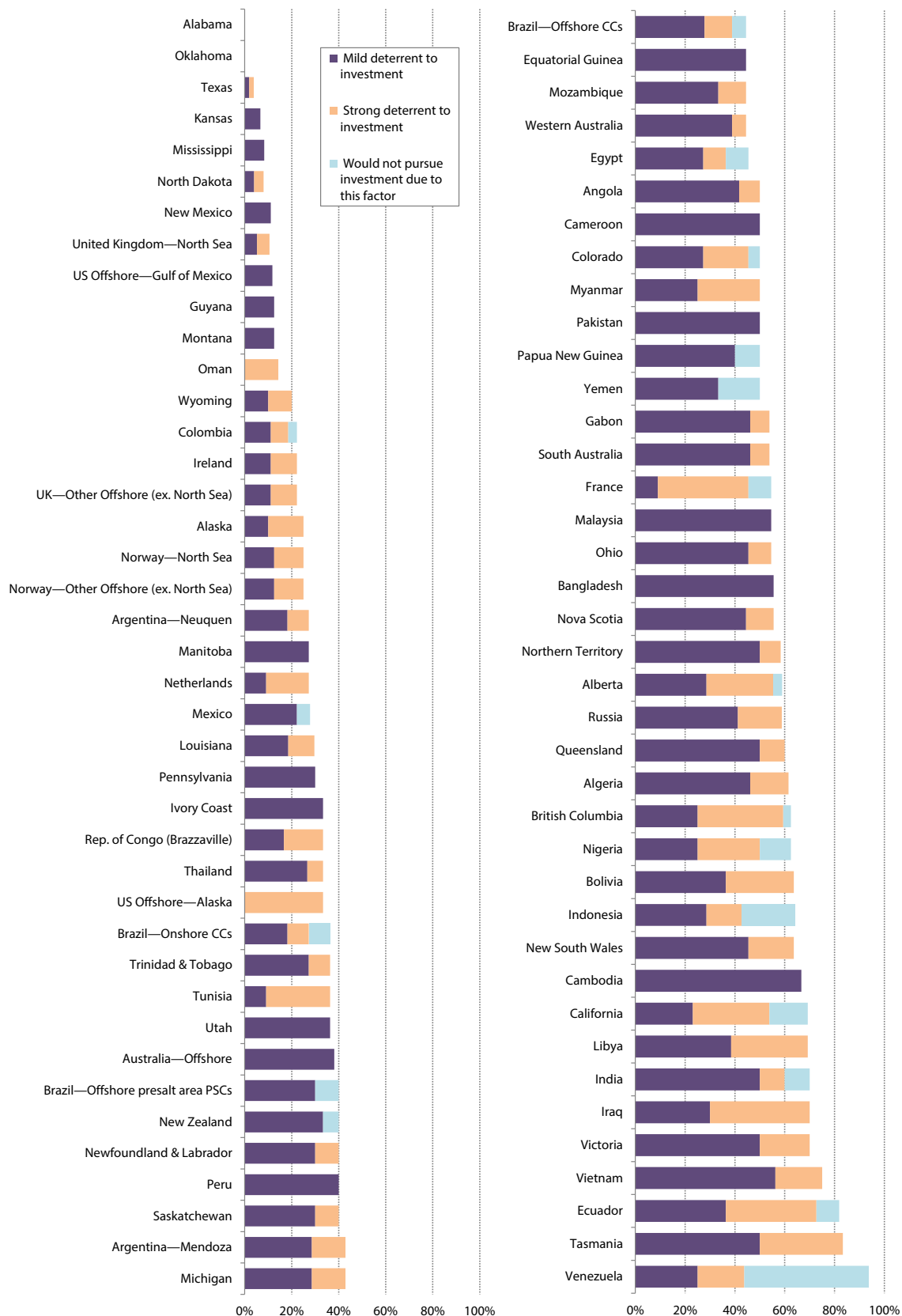


Figure 16: Environmental regulations

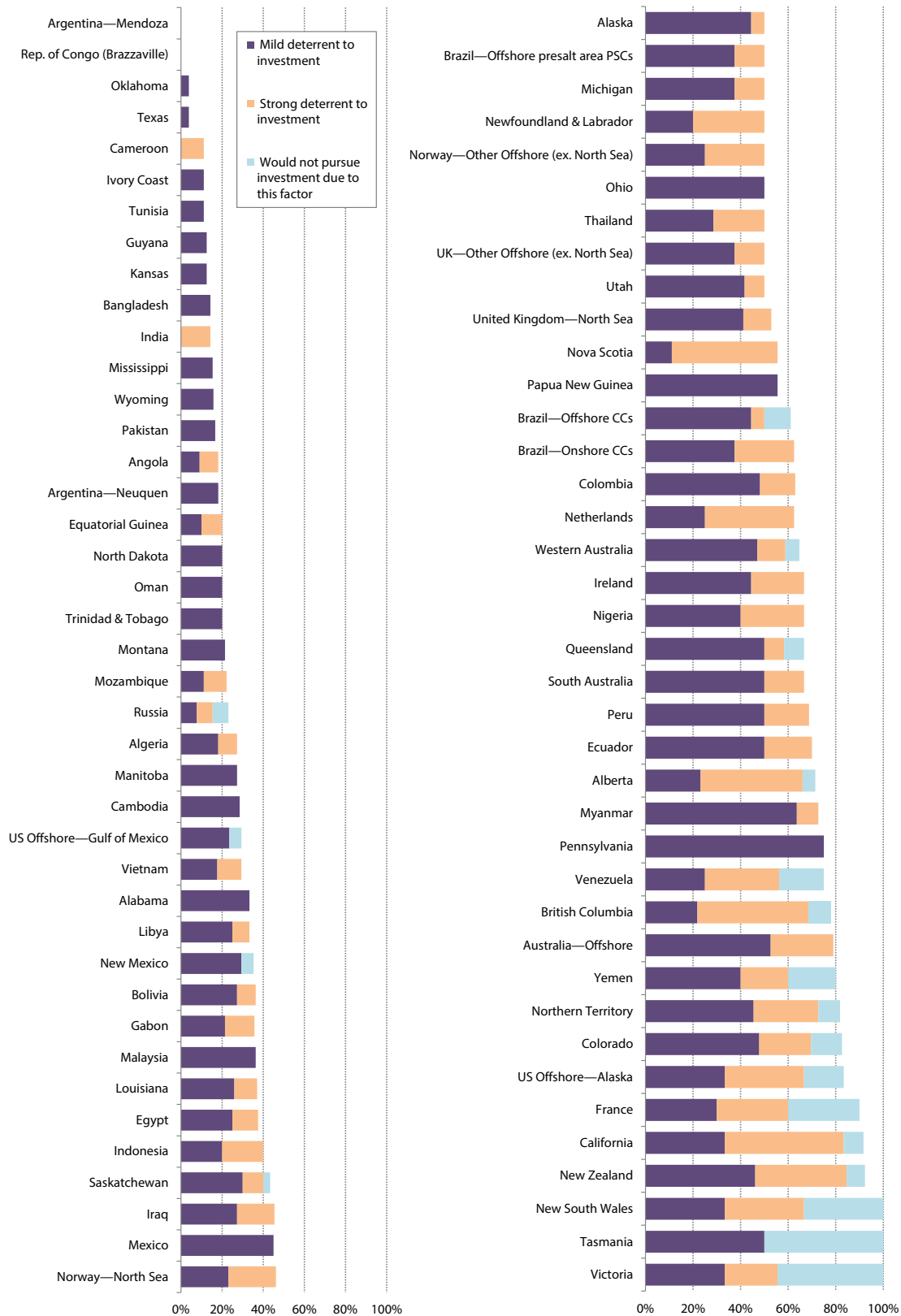


Figure 17: Uncertainty concerning the administration, interpretation, and enforcement of regulations

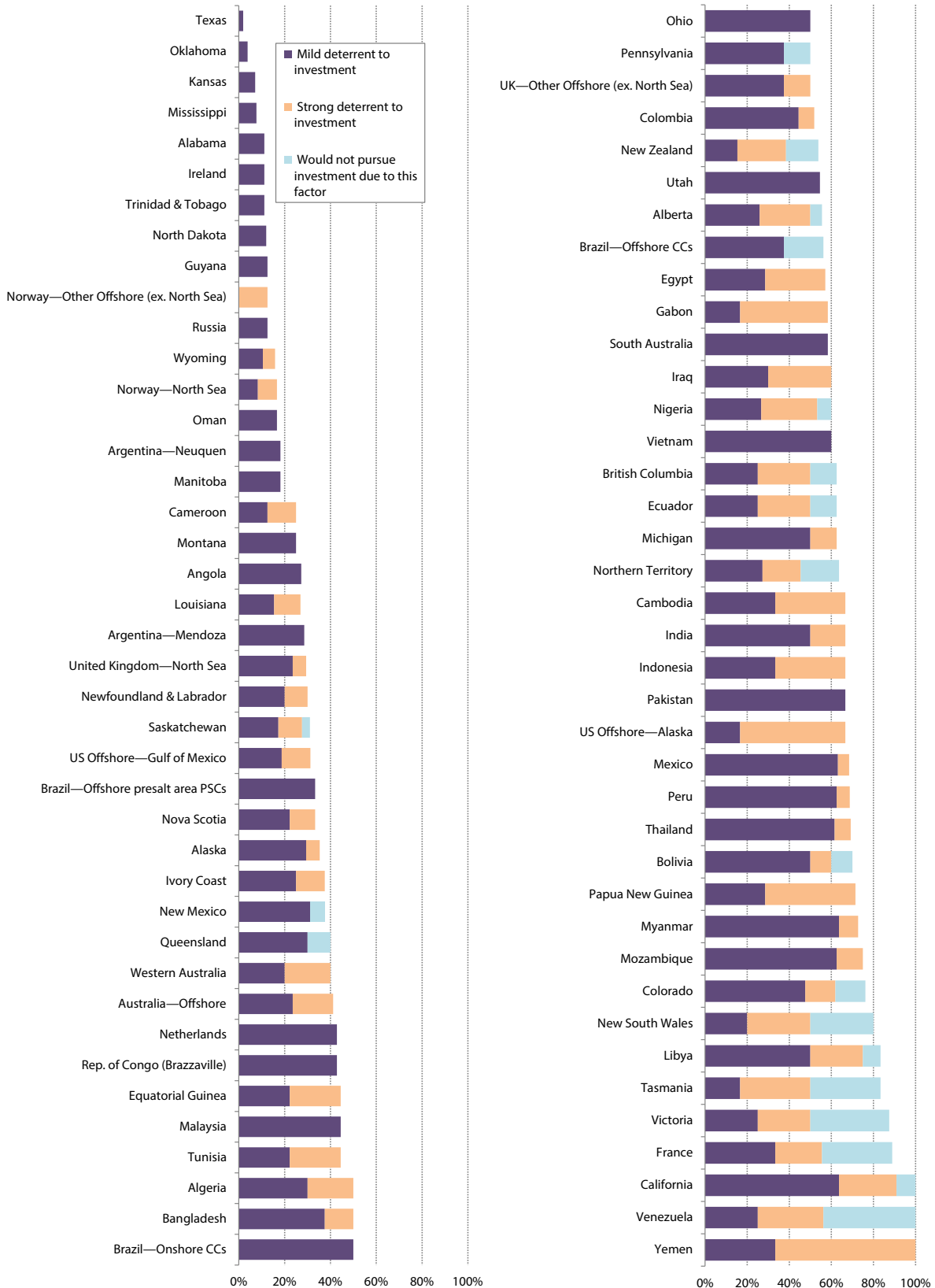


Figure 18: Cost of regulatory compliance

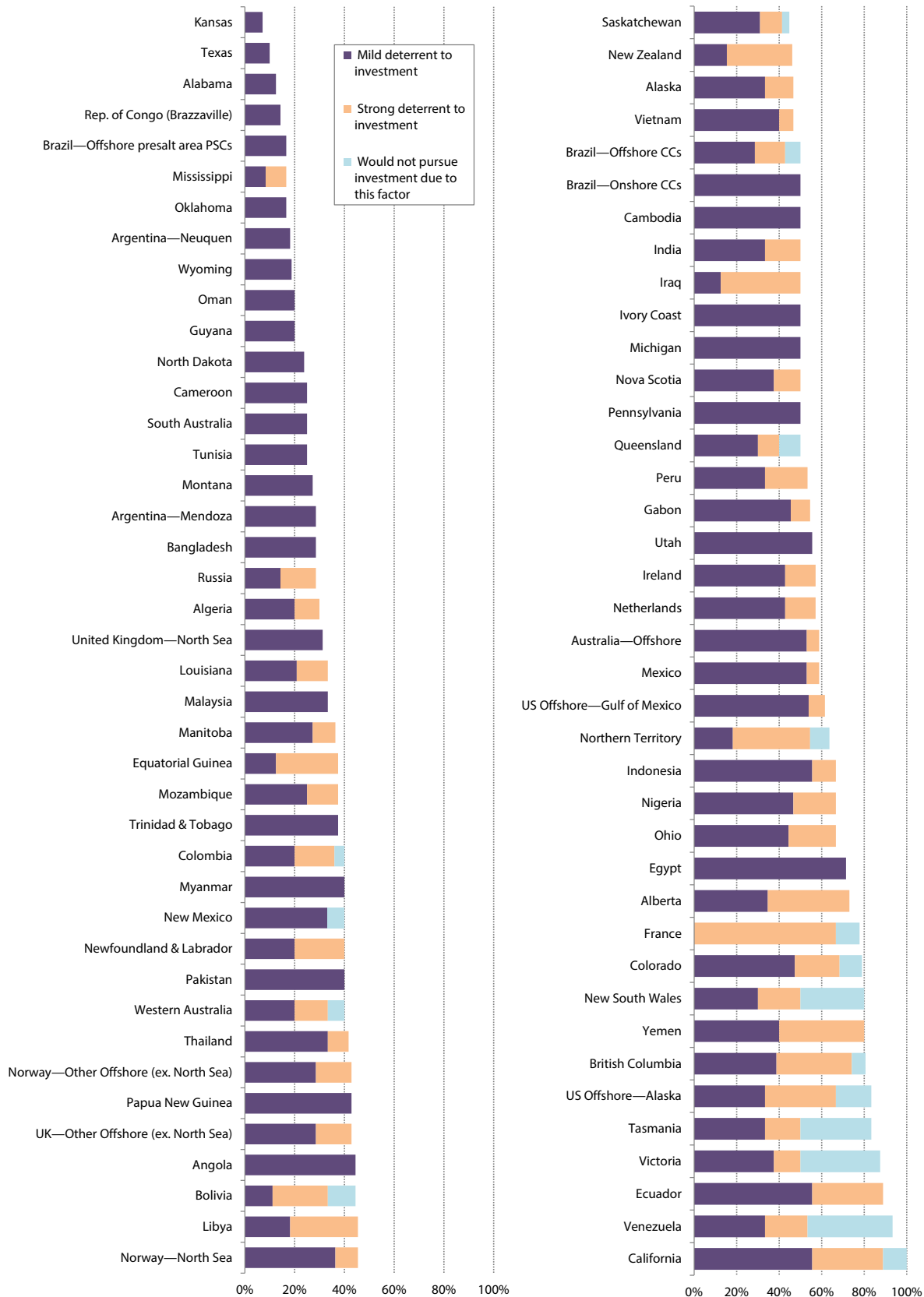


Figure 19: Uncertainty regarding protected areas

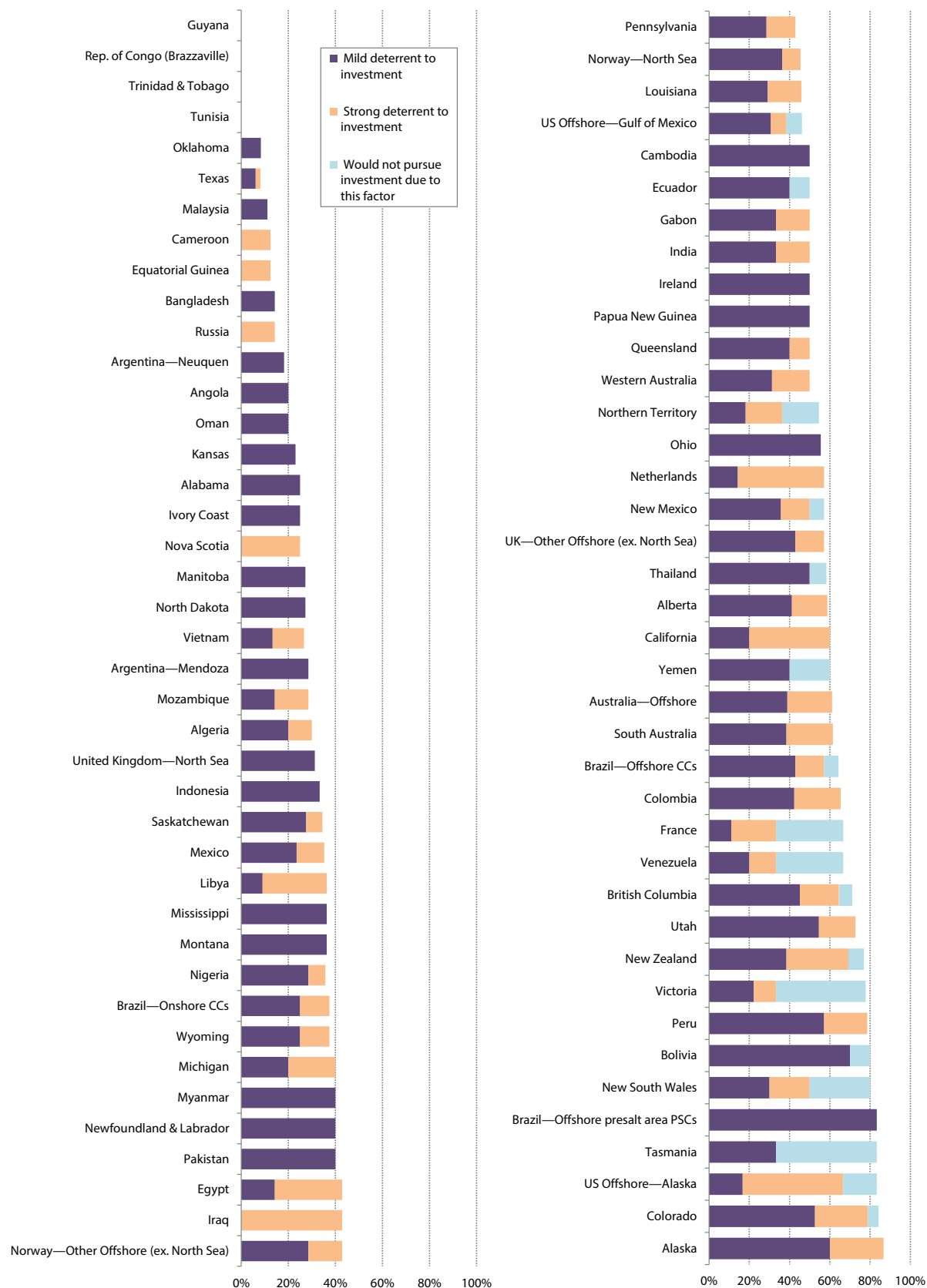


Figure 20: Trade barriers

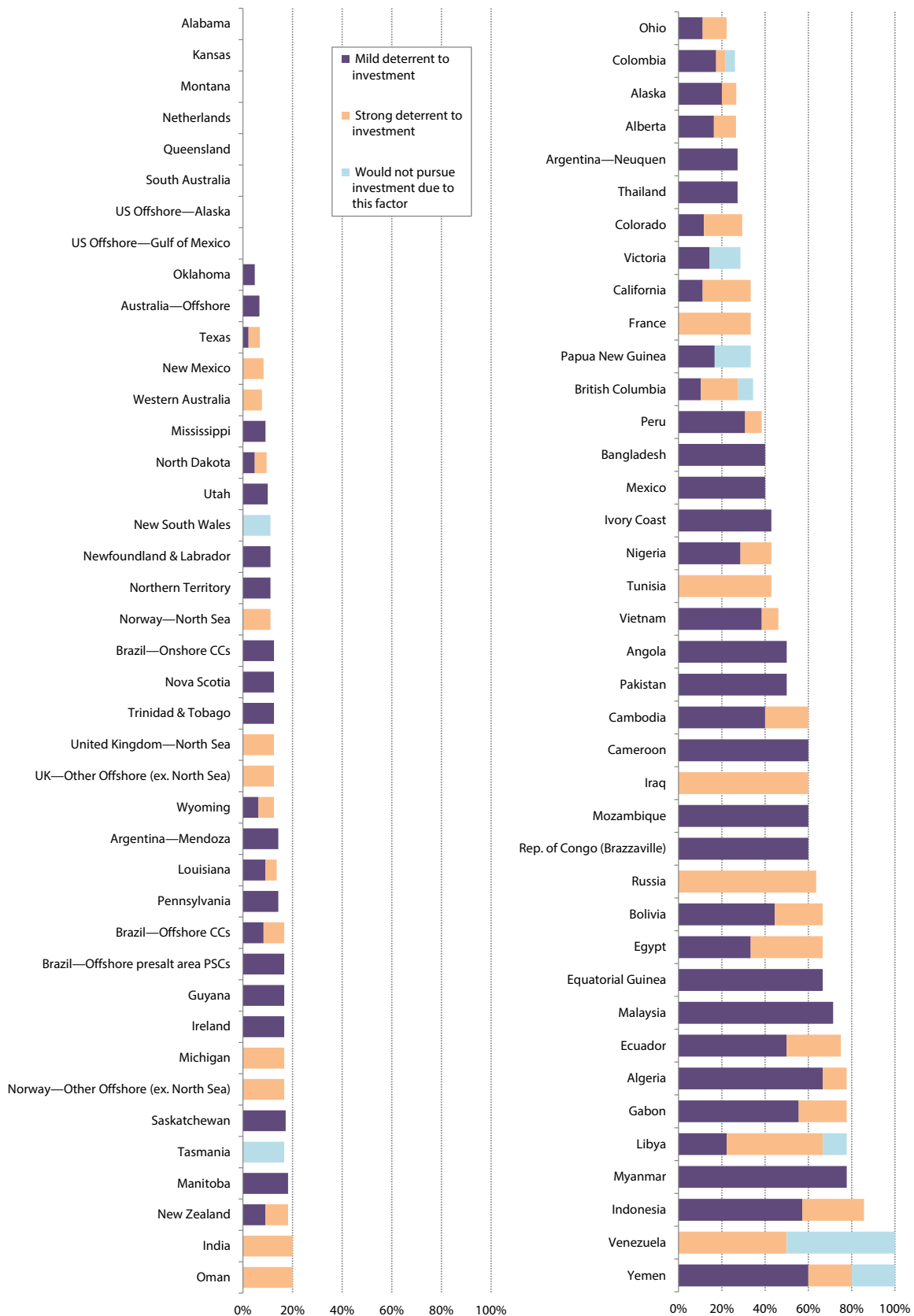


Figure 21: Labour regulations and employment agreements

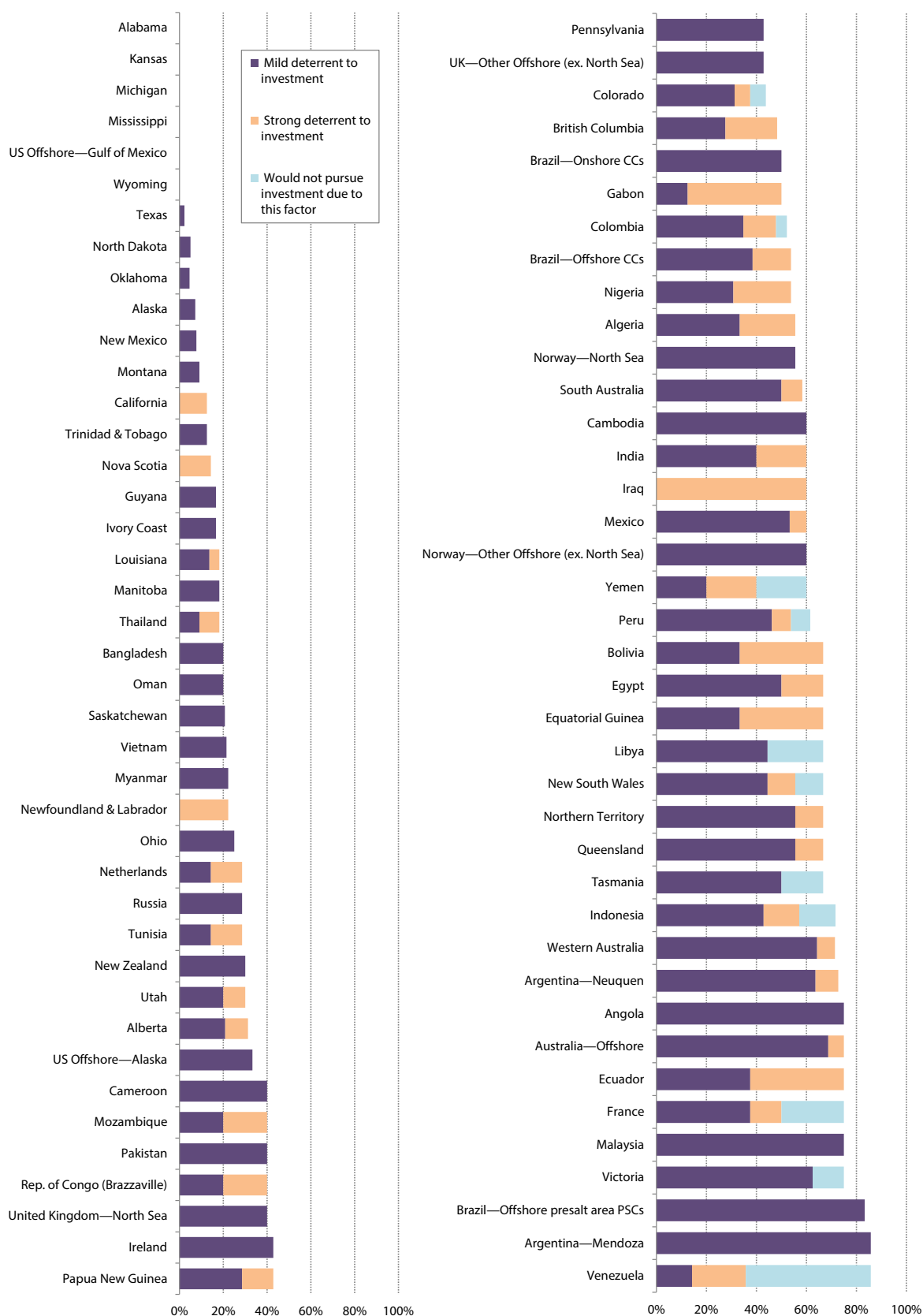


Figure 22: Quality of infrastructure

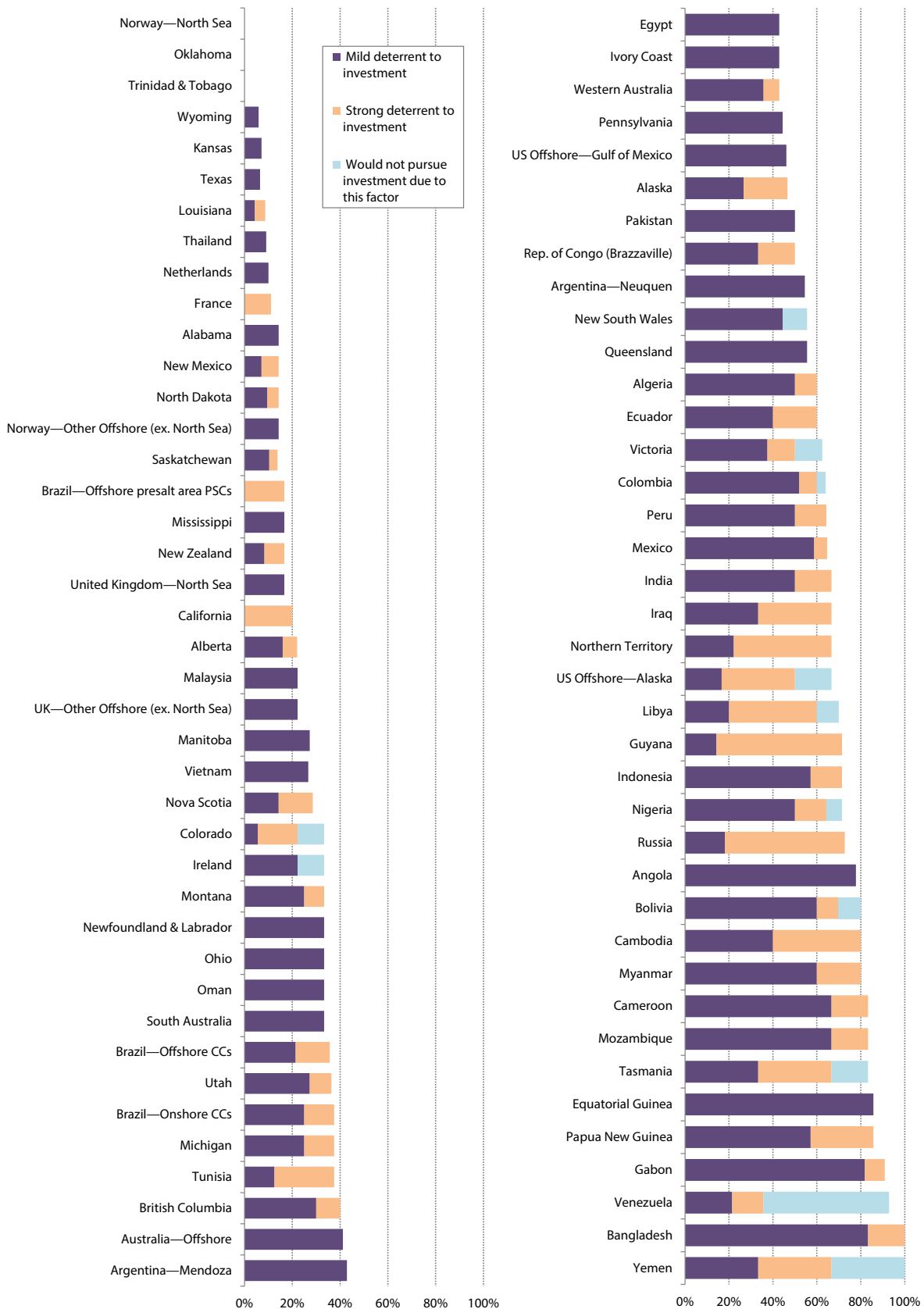


Figure 23: Geological database

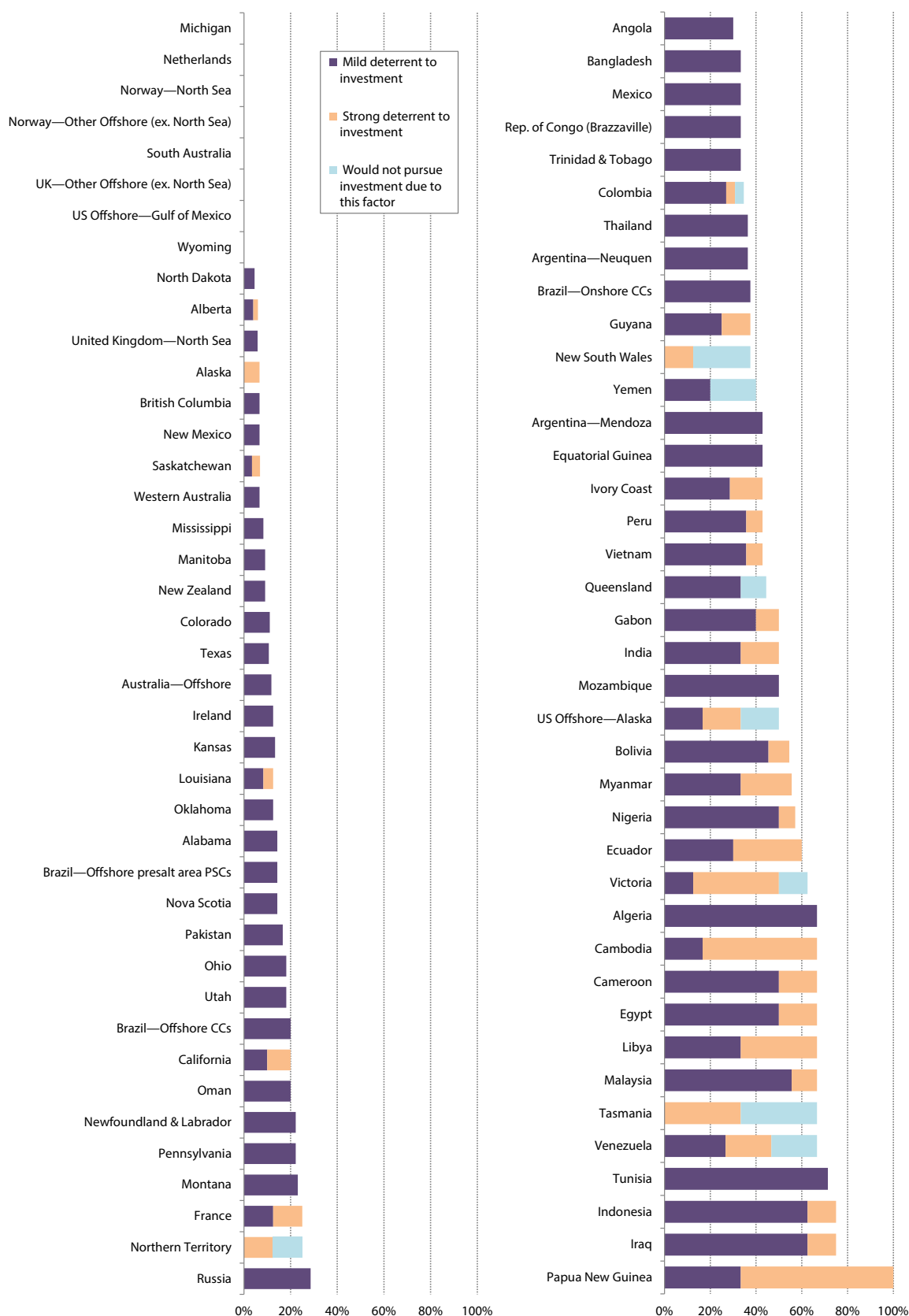


Figure 24: Labour availability and skills

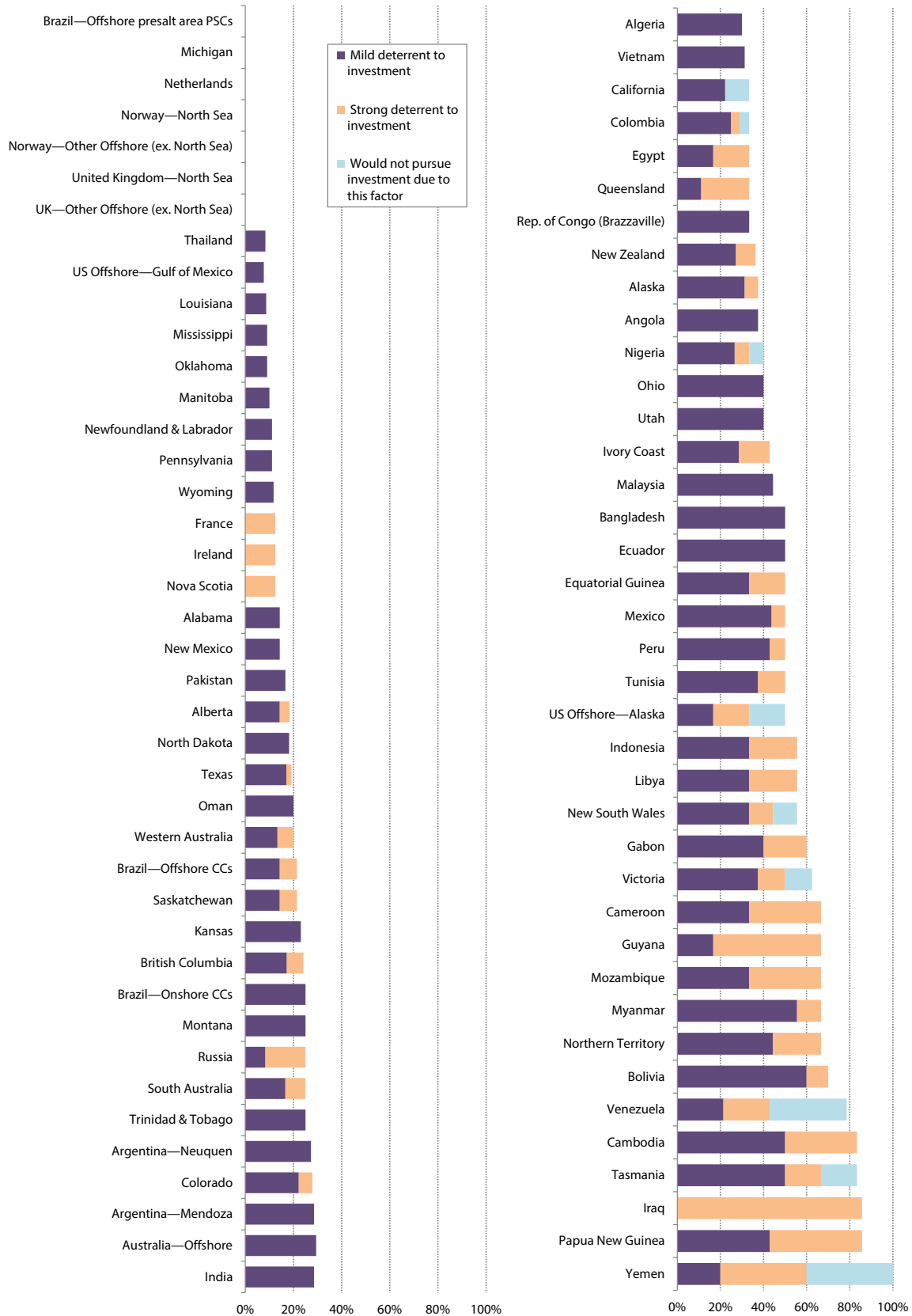


Figure 25: Disputed land claims

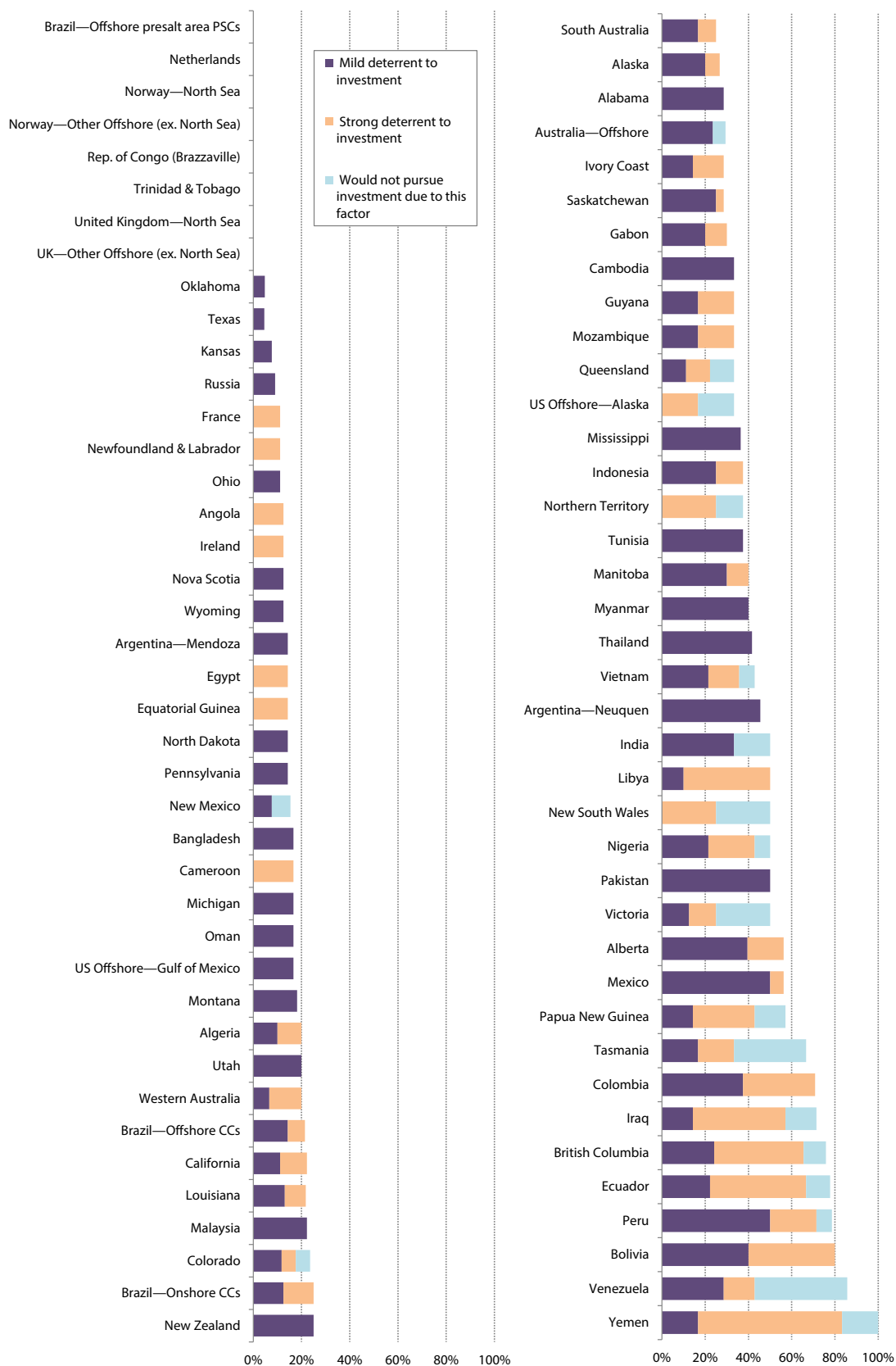


Figure 26: Political stability

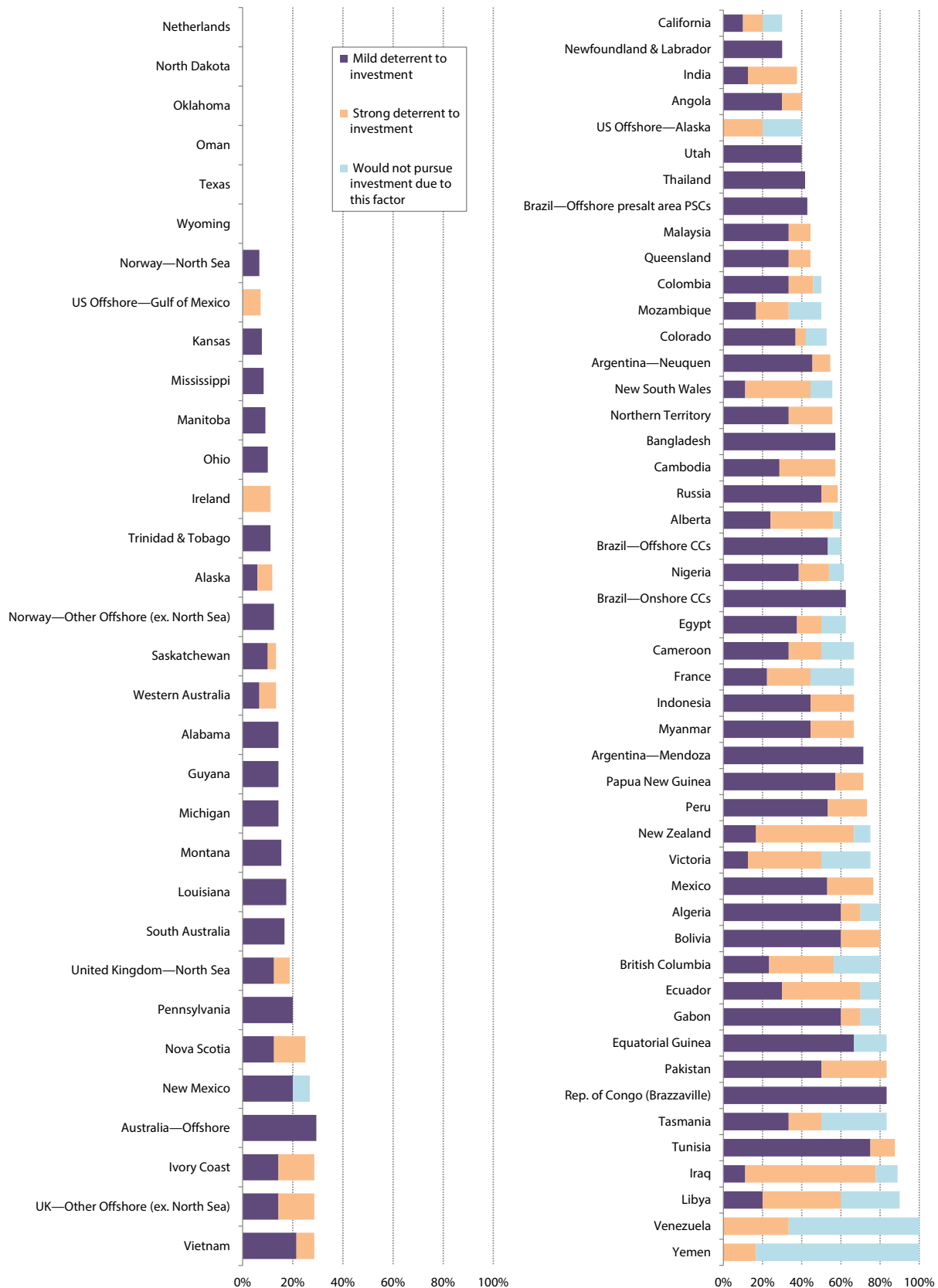


Figure 27: Security

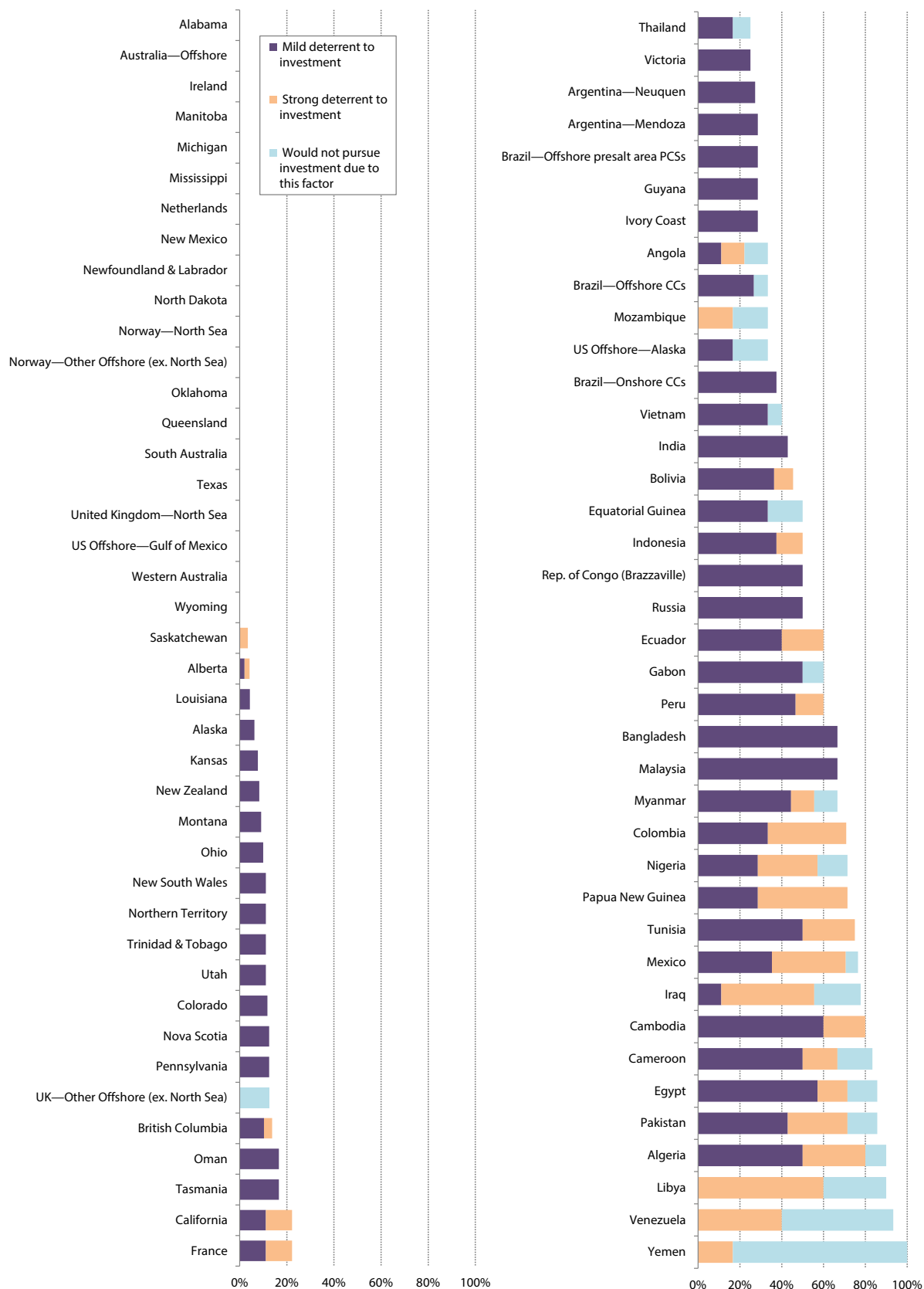


Figure 28: Regulatory duplication and inconsistencies

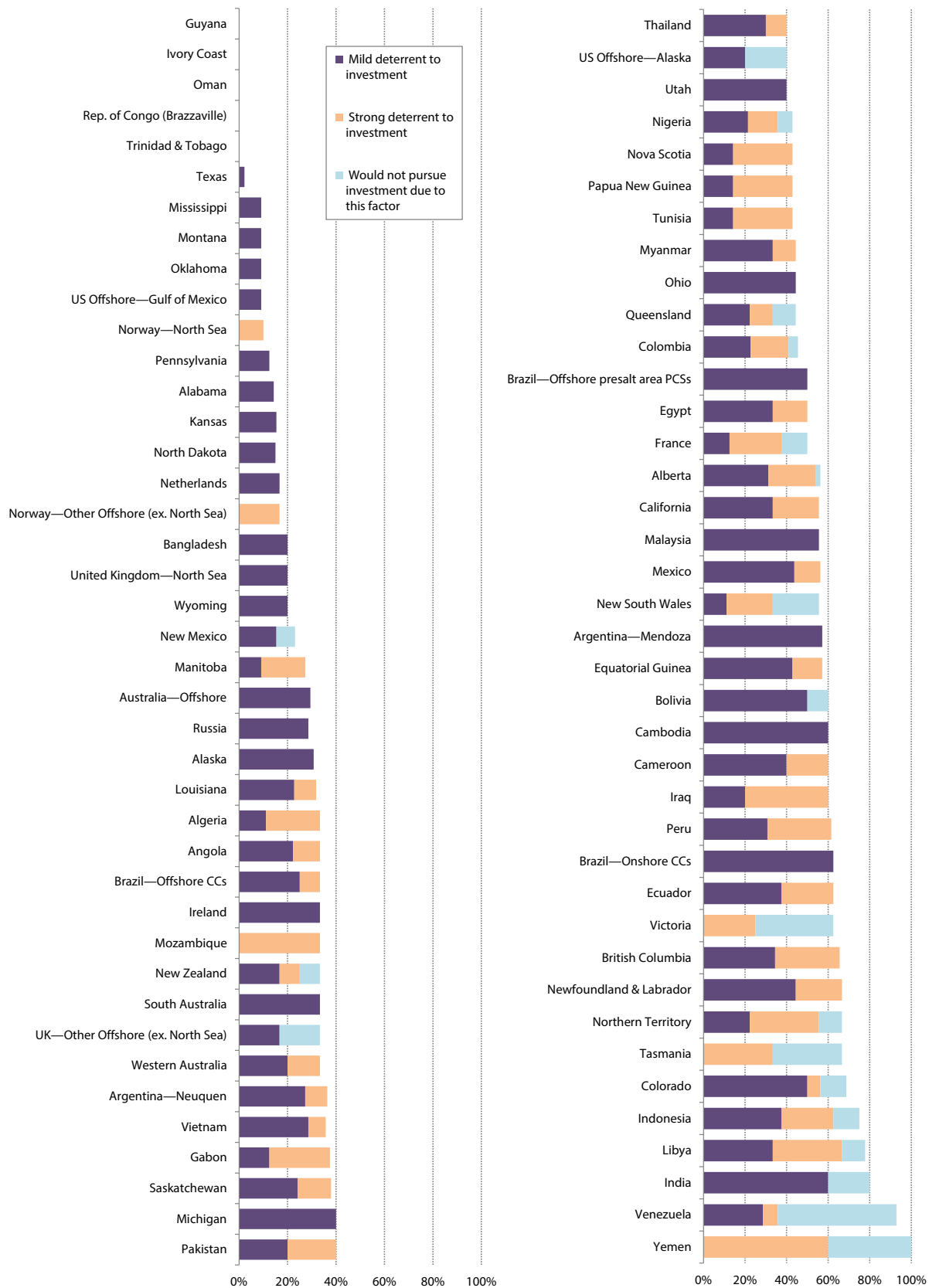
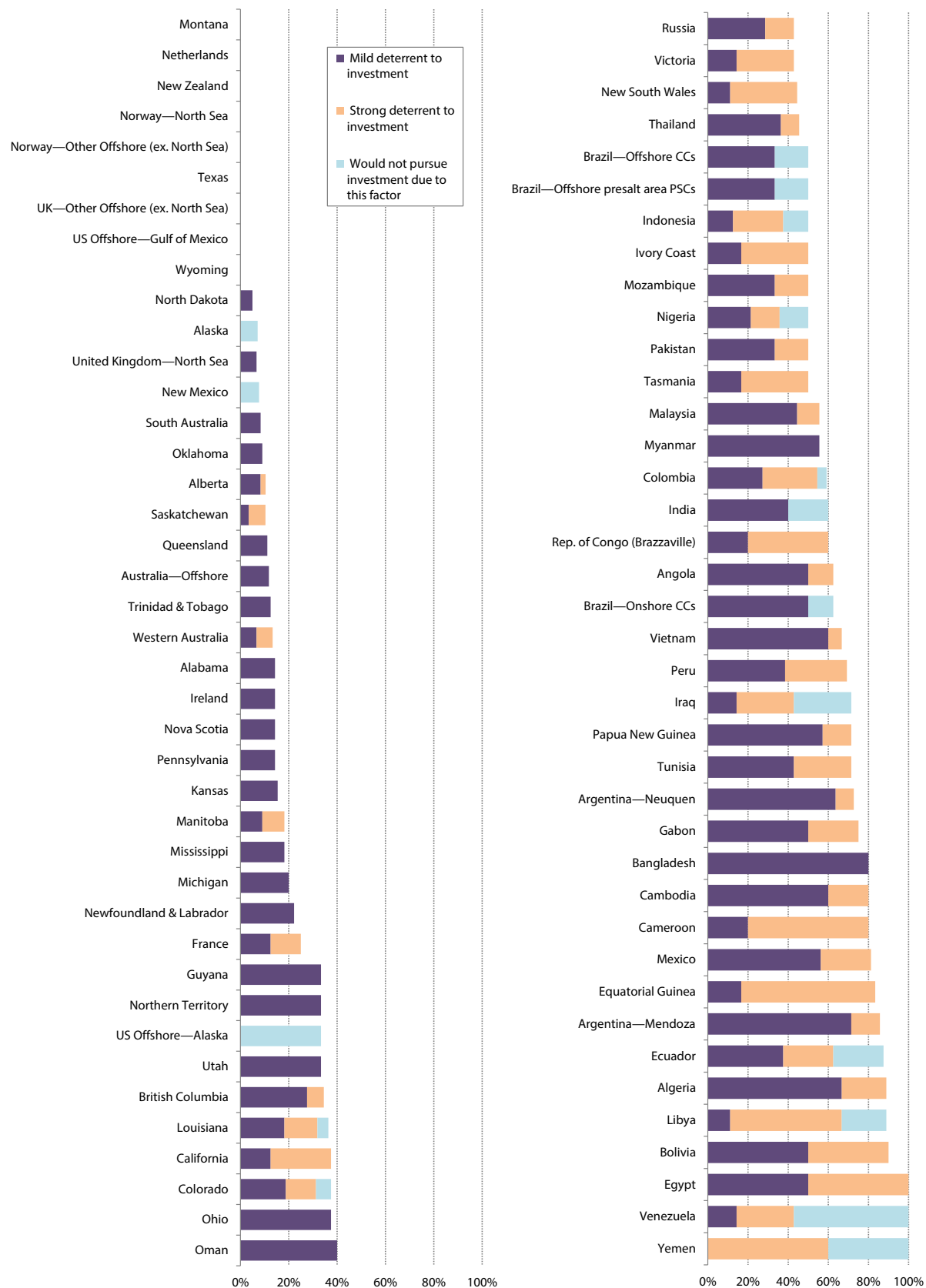


Figure 29: Legal system processes



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