GLOBAL PETROLEUM SURVEY 2017

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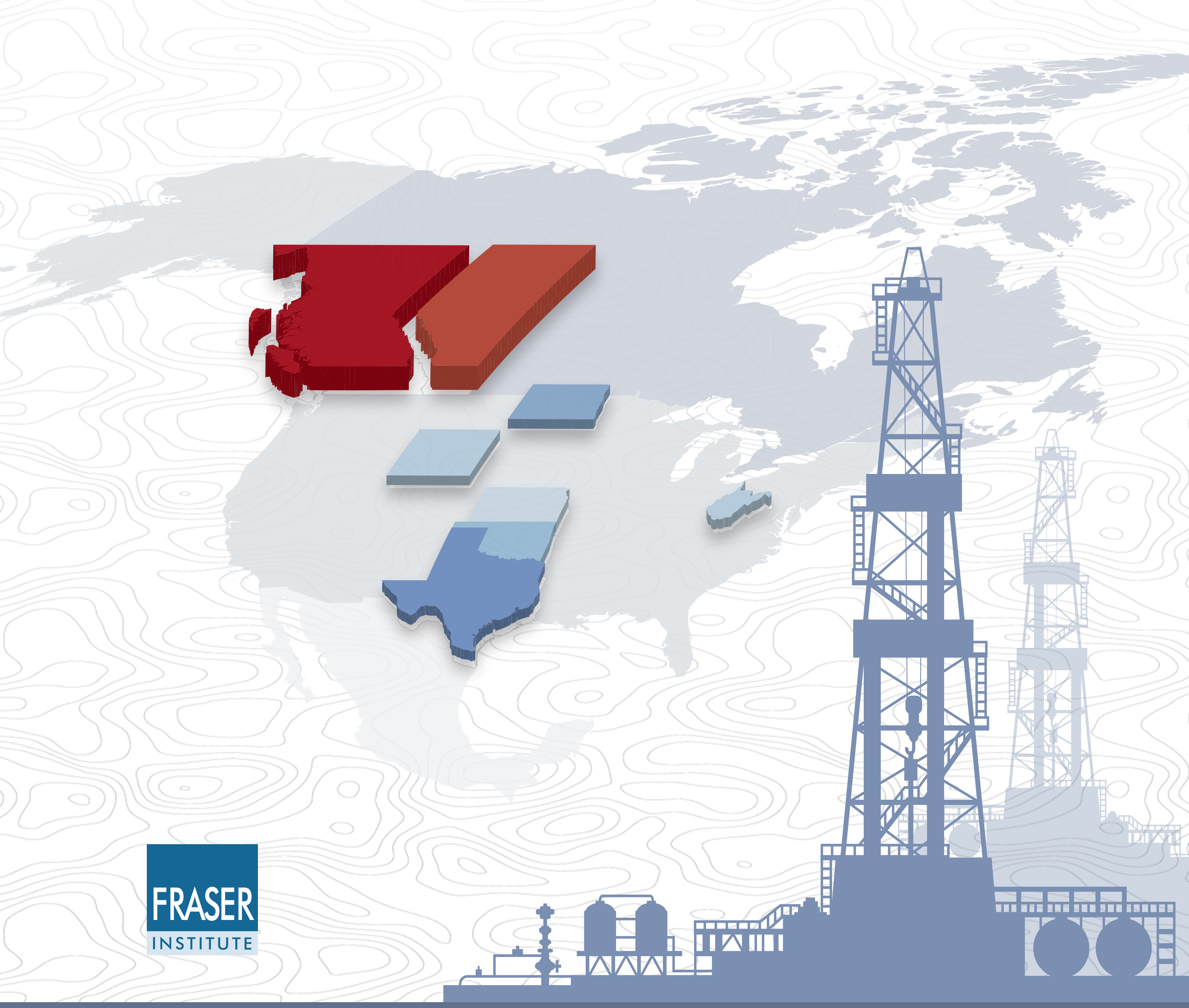

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Contents

Executive Summary / 1

Survey Methodology / 3

Global Results / 10

Results by Continental Region / 32

Overview / 53

Appendix 1: Calculating Proved Oil and Natural Gas Reserves / 54

Appendix 2: Previous Methodology and Additional Sub-Indices / 56

Single Factor Barriers: Full Survey Responses / 59

References / 76

About the Authors / 78

Acknowledgements / 79

About the Fraser Institute / 79

Publication Information / 80

Supporting the Fraser Institute / 81

Purpose, Funding, and Independence / 81

Editorial Advisory Board / 82

Executive Summary

This report presents the results of the Fraser Institute's 11th annual survey of petroleum industry executives and managers regarding barriers to investment in oil and gas exploration and production facilities in various jurisdictions around the globe. The survey responses have been tallied to rank provinces, states, other geographical regions (e.g., offshore areas), and countries according to the extent of such barriers. Those barriers, as assessed by the survey respondents, include high tax rates, costly regulatory obligations, uncertainty over environmental regulations and the interpretation and administration of regulations governing the "upstream" petroleum industry, and concerns over political stability and security of personnel and equipment.

A total of 333 respondents participated in the survey this year, providing sufficient data to evaluate 97 jurisdictions that hold 52 percent of proved global oil and gas reserves and account for 66 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 policy perception in the context of the resources that are available for commercialization.

Of the 15 jurisdictions with the largest petroleum reserves, the five that rank as most attractive or least likely to deter investment are Texas, United Arab Emirates, Alberta, Kuwait, and Egypt. The five least attractive of the large-reserve jurisdictions for investment on the basis of their Policy Perception Index scores (Venezuela, Libya, Iraq, Indonesia, and Nigeria) account for 41 percent of the proved oil and gas reserves of all the jurisdictions included in the survey. Alberta is the only Canadian jurisdiction in the group of jurisdictions with large reserve holdings.

In the group of 39 jurisdictions with medium-sized reserves, the 10 most attractive for investment are Oklahoma, North Dakota, Newfoundland & Labrador, West Virginia, Norway – Other, Wyoming, Norway – North Sea, United Kingdom – North Sea Offshore, Arkansas, and the Netherlands. The only Canadian jurisdictions in this group are Newfoundland & Labrador (3rd of 39), and British Columbia (31st of 39). British Columbia's score dropped significantly this year and investors now view this province as Canada's least attractive jurisdiction for investment.

Of the 39 jurisdictions with relatively small proved oil and gas reserves, the top 10 performers are Kansas, Saskatchewan, South Australia, Manitoba, New Zealand, Mississippi, Montana, Namibia, United Kingdom – Other, and Alabama. Nova Scotia also ranks near the top of the small reserve holder group.

When the attractiveness for investment is considered independently from the reserve size of jurisdictions (historically the primary focus of this survey), 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, the United States, and Europe. According to this year's survey, the 10 most attractive jurisdictions for investment worldwide are Texas, Oklahoma, North Dakota, Newfoundland & Labrador, West Virginia, Kansas, Saskatchewan, Norway – Offshore (except North Sea), Wyoming and South Australia. Four of the jurisdictions—Oklahoma, Texas, Saskatchewan, and North Dakota—consistently rank in the top 10, having been there in the last six iterations of the survey.

The 10 least attractive jurisdictions for investment, starting with the worst, are Venezuela, Bolivia, Libya, Iraq, Ecuador, Indonesia, California, Cambodia, France, and Yemen.

Our analysis of the 2017 petroleum survey results indicates that the extent of negative sentiment regarding key factors driving petroleum investment decisions has increased in many of the world's regions. The United States continues to remain as the most attractive region for investment, followed by Europe. Canada's score improved slightly this year, allowing this jurisdiction to maintain its spot as the third 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, 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 coalbed methane and gas embedded in shale formations. It does not include companies that are refining, upgrading, or processing crude oil, bitumen, and raw natural gas, or 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.

The survey was conducted from May 23, 2017, until July 28, 2017. A total of 333 individuals responded to the survey compared with 381 in 2016. For the third consecutive year our 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

[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 those qualified to answer the survey are doing so.

Figure 1: The position survey respondents hold in their company, 2017

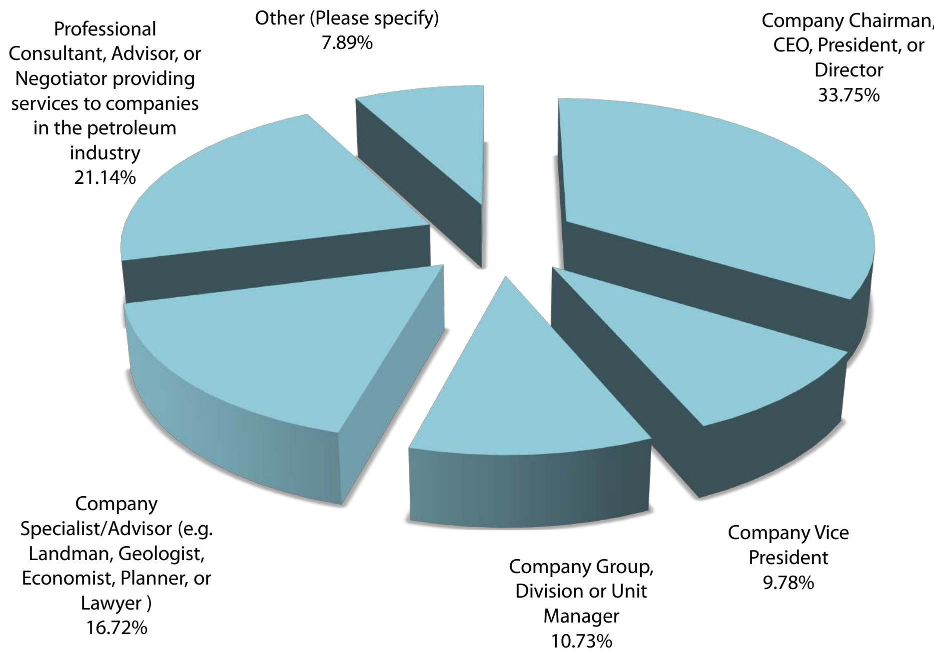


Figure 2: Activities performed by firms of survey respondents, 2017

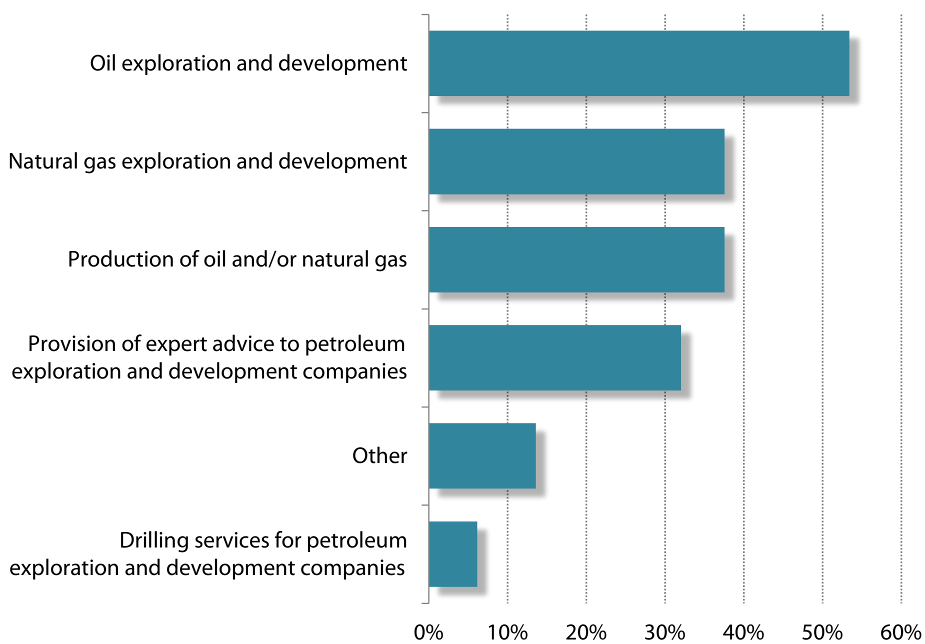
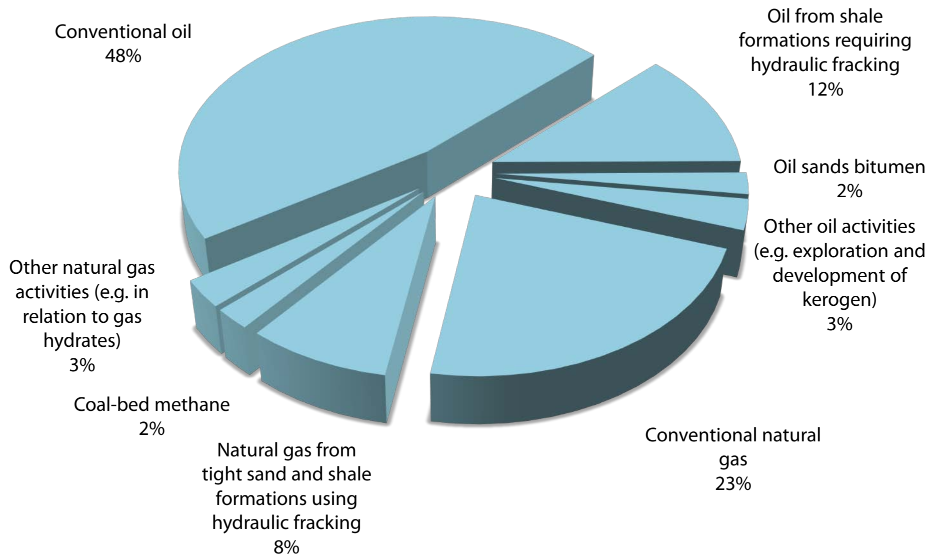


Figure 3: Company focus in petroleum exploration and development business, as indicated by respondents



example, a recent Wood Mackenzie report indicated that planned upstream spending was expected to be US$1 trillion lower between 2015 and 2020 and the IEA (2017) 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. While the oil price decline has certainly taken its toll on the upstream industry, the jurisdictions included in this year's survey still comprise 52 percent of global oil and gas reserves and 66 percent of global oil and gas production.[2]

As figure 1 illustrates, just over half of the respondents (54 percent) identified themselves as either a manager or holding a higher level position. Figure 2 shows that 53 percent of the firms participating in the survey are engaged in the exploration and development of oil, 38 percent are engaged in the exploration and development of natural gas, 38 percent are engaged in production of oil and/or natural gas, and 32 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 (71 percent) is on finding and developing conventional oil and gas reserves. The percentage of companies with this focus has declined in recent years from

[2] These estimates are based on country-specific EIA data.

82 percent in 2011. Unconventional oil and natural gas exploration and development represented 31 percent of the focus of companies in 2017.

Participants employed by petroleum firms reported that 18 percent of their upstream activity involves unconventional oil resources. The majority of this activity (69 percent) includes the recovery of oil from shale formations using hydraulic fracturing, 18 percent is focused on oil sands bitumen, and 13 percent on other oil activities, such as the exploration or development of oil from kerogen found in shale rock.

Participants in the survey also reported that 13 percent of their upstream activity involves unconventional natural gas resources. The majority of this activity (62 percent) involves the recovery of natural gas from tight sand and shale formations using hydraulic fracturing. Twenty-two percent of the petroleum firms responding to the survey reported other unconventional natural gas activities (e.g., related to gas hydrates). Sixteen 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 2016 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.
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 2017 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 Jackson and Green, 2017). The methodology differs from that used prior to 2016[3] in that it is it is based on an average of the responses for all five possible response categories,[4] which are weighted equally. In previous years, the index was based only on the prevalence of responses in the "deters investment" categories. The measure also takes into consideration how far a jurisdiction's score is from the average in each of the policy areas. To calculate the 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 the formula ((Vmax-Vi))/((Vmax-Vmin))×100.[5] 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

[3] See appendix 2 for an overview of the previous methodology.

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

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

to indicate that the results for these jurisdictions may not be as robust as others. We excluded a number of jurisdictions from our analysis because they received an insufficient number of responses. Most of the countries excluded had little or no reserves, likely explaining the limited response rate, particularly in the midst of a downturn in upstream investment. We were able to rank 97 of the jurisdictions listed in the questionnaire.

Global Results

Policy Perception Index Rankings Segmented According to Jurisdictions' Proved Reserves

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

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

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

Table 1: Large Reserve Holder Comparisons

	Jurisdiction	Policy Perception Index Score	Proved reserves (bboe)
1	**Texas**	100.00	27.83
2	**United Arab Emirates**	80.91	138.00
3	**Alberta**	68.73	173.60
4	**Kuwait**	66.71	113.37
5	**Egypt**	65.45	18.83
6	**China**	60.12	57.77
7	**Kazakhstan**	58.72	45.89
8	**Brazil – Offshore presalt area profit sharing contracts**	58.00	16.77
9	**Mozambique**	57.47	18.69
10	**Algeria**	48.08	41.93
11	**Nigeria**	48.07	70.80
12	**Indonesia**	35.02	22.67
13	**Iraq**	30.39	163.91
14	**Libya**	21.62	58.30
15	**Venezuela**	0.00	337.03

Large Reserve Holders

Table 1 provides Policy Perception Index (PPI) values for 15 jurisdictions that each hold at least 1 percent (when rounded to the nearest decimal) of the sum of the proved petroleum reserves of the 93 (of 97) jurisdictions ranked by the survey that have at least some proved oil and/or gas reserves.[6] Proved reserves holdings in this group range from Brazil's offshore presalt area's 16.77 billion barrels of oil equivalent (Bboe) to Venezuela's 337.03 Bboe. As a whole, the proved reserves of these 15 large reserve holders constitute 85 percent of the reserves held by the 93 jurisdictions with at least some proved reserves.

Of the large reserve holders, the five with the highest degrees of attractiveness on the Policy Perception Index (in that they were the five that received the highest PPI scores) are Texas, United Arab Emirates, Alberta, Kuwait,

[6] The four jurisdictions ranked in the survey this year that have no proved reserves are Cambodia, Guyana, Kenya, New South Wales.

and Egypt. 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, and this year ranks as the 3rd most attractive (of 15) reserve holders. All five most attractive large reserves holders have PPI scores in the top two quintiles.[7]

Top five large reserve holder jurisdictions

1. Texas
2. United Arab Emirates
3. Alberta
4. Kuwait
5. Egypt

One of the 15 large reserve holders has a highly undesirable (i.e., fifth quintile) score on the Policy Perception Index. That jurisdiction is Venezuela. Venezuela's proved reserves comprise 22 percent of the reserves of the 93 jurisdictions with proved reserves. Three of the jurisdictions with large reserves—Indonesia, Iraq, and Libya —lie in the unattractive fourth quintile. Combined, the four large reserve holder jurisdictions with 4th or 5th quintile PPI scores hold 38 percent of the proved reserves of the 93 jurisdictions ranked in the 2017 survey that have proved reserves.

Bottom five large reserve holder jurisdictions

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

[7] 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 39 jurisdictions with at least 0.1 percent but less than 1 percent of the proved reserves of the group of 93 reserve holders. As a whole, these jurisdictions with modest reserves have 14 percent of total proved reserves. Their reserve holdings range in size from Bangladesh's 1.57 Bboe to India's 12.99 Bboe.

Nine jurisdictions in this group, five US states, three European, and one Canadian jurisdiction, achieved first quintile (most attractive) Policy Perception Index scores. Fifteen 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 125.4 Bboe, or approximately 59 percent of the combined reserves of the 39 jurisdictions in this group.

Top five medium reserve holder jurisdictions

1. Oklahoma
2. North Dakota
3. Newfoundland & Labrador
4. West Virginia
5. Norway – Other

Three jurisdictions in the group of 39—Ecuador, California, and Bolivia—have index values in the unattractive fourth and fifth quintiles. Combined, these jurisdictions have proved reserves of 13.1 Bboe, or 6 percent of holdings of all 39 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, India, and Mexico constitute 34 percent of the group's reserves.

Bottom five medium reserve holder jurisdictions

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

Table 2: Medium Reserve Holder Comparisons

	Jurisdiction	Policy Perception Index Score	Proved reserves (bboe)
1	**Oklahoma**	94.14	6.97
2	**North Dakota**	91.53	6.72
3	**Newfoundland & Labrador**	91.25	2.11
4	**West Virginia**	90.88	4.06
5	**Norway – Other**	87.03	5.93
6	**Wyoming**	85.79	4.91
7	**Norway – North Sea**	85.49	11.90
8	**United Kingdom – North Sea Offshore**	82.90	3.12
9	**Arkansas**	80.47	1.64
10	**Netherlands**	79.09	5.16
11	**Louisiana**	78.56	3.64
12	**New Mexico**	75.54	4.15
13	**Oman**	69.27	9.85
14	**US Offshore – Gulf of Mexico**	69.14	5.65
15	**Pennsylvania**	68.77	10.66
16	**Thailand**	68.07	1.85
17	**Australia – Offshore**	67.82	6.71
18	**Brunei**	67.21	3.16
19	**Colombia**	64.78	3.20
20	**Gabon**	62.41	2.19
21	**Ohio**	61.74	2.44
22	**Colorado**	61.49	4.58
23	**Malaysia**	60.41	11.41
24	**Peru**	60.38	3.42
25	**Vietnam**	59.79	9.02
26	**Alaska**	58.74	3.49
27	**Trinidad and Tobago**	57.33	2.88
28	**Republic of the Congo (Brazzaville)**	57.00	2.20
29	**India**	56.37	12.99
30	**Myanmar**	56.05	1.92
31	**British Columbia**	54.52	6.42
32	**Mexico**	52.97	12.57
33	**Bangladesh**	50.87	1.57
34	**Angola**	50.02	10.46
35	**Uganda**	49.81	2.59
36	**Yemen**	45.82	6.16
37	**California**	35.63	2.64
38	**Ecuador**	33.78	8.35
39	**Bolivia**	17.68	2.16

Small Reserve Holders

Table 3 provides Policy Perception Index scores and rankings for the 39 jurisdictions with the smallest proved petroleum reserves. Each of these jurisdictions has less than 0.1 percent of the proved reserves of the 93 jurisdictions addressed in this section, ranging from 0.01 Bboe in Victoria to Saskatchewan's 1.49 Bboe. Together, the group of 39 jurisdictions represents just over 1 percent of the reserve holdings of the 93 jurisdictions ranked in the survey that have at least some proved reserves.

The six small reserve holder jurisdictions with first quintile scores are Kansas, Saskatchewan, South Australia, Manitoba, New Zealand, and Mississippi. Together these 6 jurisdictions comprise 18 percent of the reserves in this group. If one includes the 23 reserve holders with second quintile scores, the 29 jurisdictions hold over 75 percent of this group's reserves.

Top five small reserve holder jurisdictions

1. Kansas
2. Saskatchewan
3. South Australia
4. Manitoba
5. New Zealand

Another 10 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. France
2. Victoria
3. Northern Territory
4. Papua New Guinea
5. Spain – Onshore

Table 3: Small Reserve Holder Comparisons

	Jurisdiction	Policy Perception Index Score	Proved reserves (bboe)
1	Kansas	90.02	1.02
2	Saskatchewan	88.47	1.49
3	South Australia	85.70	0.06
4	Manitoba	85.06	0.06
5	New Zealand	82.61	0.31
6	Mississippi	80.93	0.31
7	Montana	79.19	0.54
8	Namibia	77.79	0.41
9	United Kingdom - Other	75.90	1.22
10	Alabama	72.23	0.49
11	South Africa	71.03	0.02
12	Nova Scotia	70.41	0.03
13	Hungary	70.07	0.08
14	Utah	69.96	1.23
15	Ireland	69.60	0.07
16	Ghana	68.59	0.81
17	Illinois	68.12	0.04
18	Western Australia	67.95	0.03
19	Suriname	67.21	0.10
20	Brazil – Onshore concession contracts	67.10	1.29
21	Equatorial Guinea	66.76	1.34
22	Tunisia	66.27	0.85
23	Neuquen	65.78	1.11
24	Ivory Coast	63.80	0.29
25	Spain – Offshore	62.67	0.15
26	Morocco	62.45	0.01
27	Brazil – Offshore concession contracts	61.77	0.36
28	Mendoza	61.11	0.28
29	Queensland	60.09	0.05
30	Poland	58.26	0.68
31	Michigan	57.30	0.31
32	Santa Cruz	56.55	0.78
33	Tanzania	55.43	0.04
34	Romania	54.64	1.30
35	Spain – Onshore	52.18	0.02
36	Papua New Guinea	47.61	1.18
37	Northern Territory	46.45	0.02
38	Victoria	45.90	0.01
39	France	45.64	0.14

Policy Perception Index Rankings Without Regard to Reserve Holdings

Table 4 compares the scores and rankings on the Policy Perception Index (PPI) from 2017 back through 2013. 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 97 jurisdictions are ranked. This compares with 96 in 2016, 126 jurisdictions in 2015, 156 in 2014, and 157 in 2013. The jurisdictions that were ranked in 2016 that we were unable to rank this year due to lack of sufficient responses are: Argentina – Chubut, Argentina – Salta, Bahrain, Cameroon, Chile, New Brunswick, Northwest Territories, Pakistan, Philippines, Qatar, Quebec, Russia – Combined, Timor Gap (JPDA), Ukraine, and Yukon. The jurisdictions that we were unable to rank in 2016 but appear in the 2017 survey are: Australia – Northern Territory, Australia – South Australia, Guyana, Ivory Coast, Kazakhstan, Kenya, Kuwait, Mozambique, Oman, Poland, Republic of the Congo (Brazzaville), Spain – Offshore, Spain – Onshore, Suriname, Tanzania, Trinidad and Tobago, and Uganda.[8]

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

1. Yemen
2. France
3. Cambodia
4. California
5. Indonesia
6. Ecuador
7. Iraq
8. Libya
9. Bolivia
10. Venezuela

As compared to the 2016 results, five of the jurisdictions are new to the group of 10 least attractive jurisdictions—Iraq, Indonesia, Cambodia,

[8] Responses for the two jurisdictions in the Netherlands were combined to produce one ranking for this country. This year's survey received enough responses to include both Spain – Offshore and Spain – Onshore, whereas responses were combined in 2016.

Table 4: Policy Perception Index

		Score					Rank				
		2017	2016	2015	2014	2013	2017	2016	2015	2014	2013
CANADA	**Alberta**	68.73	66.87	77.71	85.90	85.64	33/97	43/96	26/126	14/156	17/157
	British Columbia	54.52	68.13	67.99	64.47	73.05	76/97	39/96	46/126	60/156	49/157
	Manitoba	85.06	87.01	85.69	96.82	87.90	12/97	14/96	11/126	6/156	13/157
	Newfoundland & Labrador*	91.25	78.66	78.76	77.53	82.51	4/97	25/96	22/126	28/156	24/157
	Nova Scotia*	70.41	59.12	60.99	68.52	77.64	26/97	56/96	64/126	49/156	41/157
	Saskatchewan	88.47	94.18	89.69	97.48	96.87	7/97	4/96	6/126	4/156	3/157
UNITED STATES	Alabama*	72.23	87.85	93.63	95.22	82.70	24/97	11/96	3/126	8/156	23/157
	Alaska	58.74	63.49	65.37	60.17	58.33	62/97	49/96	56/126	70/156	91/157
	Arkansas	80.47	86.40	85.37	90.88	91.95	17/97	15/96	12/126	9/156	9/157
	California	35.63	33.02	49.05	41.29	56.17	91/97	91/96	98/126	115/156	97/157
	Colorado	61.49	57.44	64.45	59.43	65.84	55/97	61/96	58/126	72/156	65/157
	Illinois*	68.12	66.34	67.19	72.99	73.35	35/97	44/96	49/126	37/156	48/157
	Kansas	90.02	94.47	90.51	96.14	94.48	6/97	3/96	5/126	7/156	6/157
	Louisiana	78.56	83.24	82.63	87.62	86.35	20/97	18/96	14/126	12/156	16/157
	Michigan*	57.30	61.14	57.87	76.36	61.53	68/97	54/96	74/126	30/156	75/157
	Mississippi	80.93	91.63	87.11	100.00	88.50	15/97	8/96	9/126	1/156	10/157
	Montana	79.19	88.98	82.10	81.55	78.68	18/97	10/96	17/126	23/156	35/157
	New Mexico	75.54	79.19	68.15	78.82	78.31	23/97	24/96	45/126	26/156	39/157
	North Dakota	91.53	93.16	89.51	97.35	95.67	3/97	6/96	7/126	5/156	4/157
	Ohio*	61.74	74.95	80.52	82.55	76.94	54/97	30/96	20/126	20/156	43/157
	Oklahoma	94.14	100.00	92.64	99.38	100.00	2/97	1/96	4/126	2/156	1/157
	Pennsylvania	68.77	71.19	77.57	67.04	66.61	32/97	36/96	27/126	53/156	64/157
	Texas	100.00	97.65	95.67	98.19	98.46	1/97	2/96	2/126	3/156	2/157
	Utah*	69.96	89.76	77.13	83.10	81.76	28/97	9/96	28/126	18/156	28/157
	West Virginia*	90.88	81.13	82.50	72.51	78.62	5/97	22/96	15/126	39/156	37/157
	Wyoming	85.79	93.26	80.88	88.83	87.43	9/97	5/96	19/126	11/156	14/157
	US Offshore – Gulf of Mexico	69.14	76.24	82.18	72.67	76.92	31/97	28/96	16/126	38/156	44/157
AUSTRALIA	New South Wales	46.83	37.27	36.64	47.12	55.01	85/97	90/96	116/126	98/156	100/157
	Northern Territory*	46.45	N/A	76.02	69.95	80.76	86/97	N/A	30/126	44/156	32/157
	Queensland	60.09	63.99	71.34	65.95	61.46	60/97	47/96	40/126	55/156	76/157
	South Australia	85.70	N/A	85.71	81.57	82.43	10/97	N/A	10/126	22/156	25/157
	Victoria*	45.90	51.79	57.13	67.78	64.31	87/97	71/96	76/126	51/156	68/157
	Western Australia	67.95	71.63	73.23	68.81	73.51	37/97	35/96	37/126	47/156	47/157
	Australia – Offshore	67.82	77.59	74.77	73.97	71.17	38/97	26/96	32/126	34/156	54/157
OCEANIA	Brunei*	67.21	74.70	69.31	65.59	79.76	40/97	31/96	43/126	56/156	33/157
	Indonesia	35.02	45.83	44.34	30.90	39.48	92/97	79/96	108/126	142/156	130/157
	Malaysia	60.41	67.44	66.53	59.08	68.08	57/97	41/96	53/126	73/156	60/157
	New Zealand	82.61	83.61	83.72	86.44	78.51	14/97	17/96	13/126	13/156	38/157
	Papua New Guinea*	47.61	49.13	52.47	45.45	44.63	84/97	76/96	88/126	105/156	123/157

* Between 5 and 9 responses

Table 4 continues on page 19

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

		Score					Rank				
		2017	2016	2015	2014	2013	2017	2016	2015	2014	2013
EUROPE	France*	45.64	76.33	41.63	44.01	84.37	89/97	27/96	112/126	106/156	20/157
	Hungary*	70.07	68.87	66.54	55.19	59.32	27/97	37/96	52/126	81/156	83/157
	Ireland*	69.60	79.57	76.25	71.98	65.40	29/97	23/96	29/126	40/156	66/157
	Netherlands* †	79.09	87.21	N/A	N/A	N/A	19/97	13/96	N/A	N/A	N/A
	Norway – Other Offshore except North Sea)*	87.03	85.83	78.87	83.69	95.53	8/97	16/96	21/126	17/156	5/157
	Norway – North Sea	85.49	91.67	88.72	82.54	88.48	11/97	7/96	8/126	21/156	11/157
	Poland*	58.26	N/A	N/A	64.12	85.09	64/97	N/A	N/A	61/156	19/157
	Romania*	54.64	53.38	63.33	65.41	72.19	75/97	66/96	61/126	57/156	50/157
	Spain – Onshore	52.18	N/A	51.27	37.48	36.82	78/97	N/A	93/126	128/156	134/157
	Spain – Offshore	62.67	N/A	47.15	42.14	67.63	50/97	N/A	104/126	109/156	61/157
	United Kingdom – Other Offshore (except North Sea)*	75.90	87.65	78.43	77.43	34.03	22/97	12/96	24/126	29/156	138/157
	United Kingdom – North Sea	82.90	82.42	81.84	77.76	83.62	13/97	20/96	18/126	27/156	22/157
ASIA	Bangladesh*	50.87	42.53	38.66	39.38	58.81	79/97	85/96	115/126	124/156	85/157
	Cambodia*	41.35	50.83	48.22	40.62	38.26	90/97	72/96	102/126	117/156	131/157
	China*	60.12	65.80	62.60	40.58	37.09	59/97	45/96	62/126	119/156	133/157
	India	56.37	49.77	46.58	41.18	59.95	72/97	75/96	105/126	116/156	80/157
	Kazakhstan*	58.72	N/A	52.98	40.27	68.98	63/97	N/A	84/126	121/156	58/157
	Myanmar*	56.05	53.37	48.76	41.32	34.97	73/97	67/96	100/126	114/156	137/157
	Thailand	68.07	67.01	67.27	57.60	57.29	36/97	42/96	48/126	77/156	96/157
	Vietnam	59.79	68.59	66.03	58.97	21.03	61/97	38/96	54/126	74/156	153/157
AFRICA	Angola	50.02	56.69	59.83	48.37	55.04	80/97	62/96	69/126	93/156	99/157
	Equatorial Guinea	66.76	57.75	51.71	46.56	48.36	42/97	60/96	90/126	101/156	117/157
	Gabon	62.41	62.84	58.41	47.41	53.26	52/97	50/96	73/126	97/156	104/157
	Ghana	68.59	63.51	65.29	61.06	53.98	34/97	48/96	57/126	67/156	101/157
	Ivory Coast*	63.80	N/A	58.61	61.88	59.73	49/97	N/A	71/126	65/156	81/157
	Kenya*	56.72	N/A	64.11	54.66	63.72	70/97	N/A	59/126	83/156	69/157
	Mozambique*	57.47	N/A	52.59	50.40	61.28	66/97	N/A	86/126	90/156	78/157
	Namibia*	77.79	74.55	74.43	69.44	57.90	21/97	32/96	35/126	45/156	94/157
	Nigeria	48.07	46.69	43.13	37.33	53.74	83/97	78/96	110/126	130/156	103/157
	Republic of the Congo (Brazzaville)*	57.00	N/A	52.58	48.26	36.29	69/97	N/A	87/126	94/156	136/157
	South Africa*	71.03	67.92	52.76	41.78	36.59	25/97	40/96	85/126	111/156	135/157
	Tanzania*	55.43	N/A	55.87	37.14	30.26	74/97	N/A	77/126	131/156	146/157
	Uganda*	49.81	N/A	N/A	38.58	61.33	81/97	N/A	N/A	125/156	77/157

* Between 5 and 9 responses.

† Due to a low response rate, Netherlands – Onshore and Netherlands – Offshore were combined to this year into Netherlands.

Table 4 continues on page 20

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

		Score					Rank				
		2017	2016	2015	2014	2013	2017	2016	2015	2014	2013
MENA	Algeria	48.08	56.57	54.76	40.45	47.99	82/97	63/96	80/126	120/156	118/157
	Egypt	65.45	62.57	52.98	33.50	78.67	46/97	51/96	83/126	135/156	36/157
	Iraq	30.39	47.26	40.12	28.17	8.23	94/97	77/96	114/126	144/156	155/157
	Kuwait*	66.71	N/A	60.99	54.98	71.52	43/97	N/A	65/126	82/156	52/157
	Libya	21.62	15.24	0.00	22.29	57.48	95/97	94/96	126/126	151/156	95/157
	Morocco*	62.45	81.31	61.70	66.32	58.43	51/97	21/96	63/126	54/156	90/157
	Oman*	69.27	N/A	72.61	75.96	75.84	30/97	N/A	38/126	31/156	46/157
	Tunisia	66.27	52.71	54.76	50.64	29.86	44/97	69/96	81/126	89/156	148/157
	United Arab Emirates	80.91	83.00	78.09	79.41	60.93	16/97	19/96	25/126	25/156	79/157
	Yemen*	45.82	42.74	34.53	39.70	83.84	88/97	84/96	118/126	123/156	21/157
ARGENTINA	Mendoza*	61.11	49.88	48.07	42.45	26.58	56/97	74/96	103/126	108/156	150/157
	Neuquen	65.78	57.82	51.53	46.87	32.04	45/97	59/96	91/126	99/156	142/157
	Santa Cruz*	56.55	42.28	44.73	31.87	30.55	71/97	86/96	107/126	140/156	143/157
LATIN AMERICA & CARRIBEAN	Bolivia*	17.68	26.64	34.91	17.40	30.30	96/97	93/96	117/126	153/156	145/157
	Brazil – Onshore CC*	67.10	44.47	60.84	54.08	14.40	41/97	82/96	66/126	87/156	154/157
	Brazil – Offshore CC	61.77	53.60	67.82	60.20	48.96	53/97	65/96	47/126	69/156	114/157
	Brazil – Offshore presalt area PSC*	58.00	44.50	60.38	46.39	49.29	65/97	81/96	68/126	102/156	113/157
	Colombia	64.78	61.84	63.70	64.54	80.83	47/97	53/96	60/126	59/156	31/157
	Ecuador	33.78	37.47	26.92	11.07	62.40	93/97	89/96	121/126	155/156	74/157
	Guyana*	64.17	N/A	N/A	67.15	40.20	48/97	N/A	N/A	52/156	128/157
	Mexico	52.97	52.78	54.63	37.58	58.57	77/97	68/96	82/126	126/156	87/157
	Peru	60.38	56.04	51.96	55.68	48.92	58/97	64/96	89/126	79/156	115/157
	Suriname*	67.21	N/A	N/A	71.44	58.21	39/97	N/A	N/A	43/156	93/157
	Trinidad and Tobago*	57.33	N/A	72.38	71.49	67.48	67/97	N/A	39/126	42/156	62/157
	Venezuela	0.00	0.00	2.22	0.00	0.00	97/97	96/96	125/126	156/156	157/157

* Between 5 and 9 responses

France, and Yemen. France experienced a large deterioration in its score this year falling more than 30 points, and dropping from the 67th percentile in 2016 to the 9th percentile in 2017. Iraq's PPI score deteriorated by over 16 points, and Indonesia and Cambodia saw their scores drop by 11 and 9 points since 2016, respectively. In addition, while Yemen saw its score improve slightly, that jurisdiction's score was still low enough in 2017 to place it among the bottom 10.

Figure 4 presents the Policy Perception Index rankings for the 97 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:

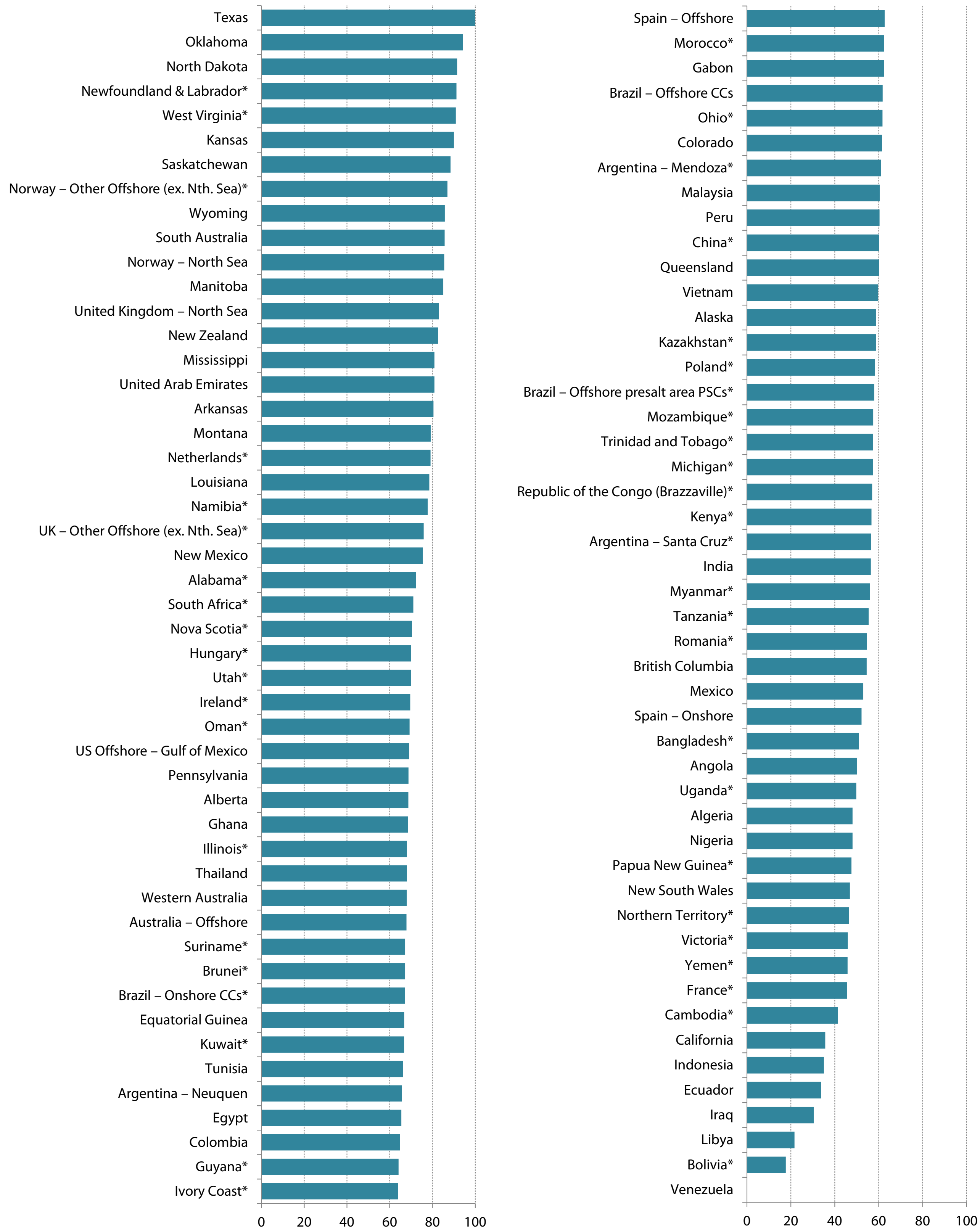
1. Texas
2. Oklahoma
3. North Dakota
4. Newfoundland & Labrador
5. West Virginia
6. Kansas
7. Saskatchewan
8. Norway – Offshore (except North Sea)
9. Wyoming
10. South Australia

All but four of these jurisdictions—Newfoundland & Labrador, West Virginia, Norway – Offshore (except North Sea) and South Australia—ranked in the top 10 jurisdictions worldwide in the 2016 survey. Four of the jurisdictions—Oklahoma, Texas, Saskatchewan, and North Dakota—consistently rank in the top 10, having been there in the last six iterations of the survey.

Texas moved into the first spot this year after ranking 2nd (of 96) in 2016. Oklahoma fell by one spot to the second position this year after moving up to the top spot in 2016. North Dakota moved up into the third position in 2017 from 6th in the previous year. Newfoundland & Labrador moved up to the fourth position from 25th (of 96) place in 2016. West Virginia jumped 17 spots this year into 5th (of 97), after placing 22nd (of 96) in 2016. This marks the first time West Virginia has been in the global top 10 in the last five years. Kansas dropped from 3rd (of 97) in 2016 to 6th in this year's survey. Saskatchewan also saw its rank decline by 3 spots from 4th (out of 96) in 2016 to 7th (out of 97) this year. However, Saskatchewan has consistently ranked in the top 10 for the past five years. Norway – Other Offshore (except North Sea) moved up eight spots this year from 16th last year. Wyoming maintained its spot in the global top 10, but fell four spots from 5th (out of 96) in 2016 to 9th (out of 97) in 2017. South Australia was not ranked in 2016 due to insufficient responses but rebounded to 10th (out of 97) this year.

The four jurisdictions displaced from the top 10 were Norway – North Sea (11th), Mississippi (15th), Utah (28th), and Montana (18th). Of these jurisdictions, Utah experienced the most significant drop of 19 spots, falling from

Figure 4: Policy Perception Index



* Between 5 and 9 responses

9th (out of 96) in 2016 to 28th (out of 97) this year; this jurisdiction fell from the top 89th percentile to the 71st.

Seven jurisdictions achieved much higher Policy Perception Index scores this year (by at least 10 points) than in 2016. These included Newfoundland & Labrador, Nova Scotia, Tunisia, Argentina – Mendoza, Argentina – Santa Cruz, Brazil – Onshore CC, and Brazil – Offshore presalt area PSC. 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 2016. For example, Argentina – Mendoza now ranks as the 56th (of 96) most attractive jurisdictions among those ranked compared with 74th (of 97) in 2016. This jurisdiction also improved from the 21st percentile last year to the 43rd 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 2016 survey was undertaken. Ten jurisdictions (of 97), or 10.3 percent of the total, experienced score deteriorations of 10 points or more: British Columbia, Alabama, Mississippi, Ohio, Utah, Indonesia, France, United Kingdom – Other Offshore (except North Sea), Iraq, and Morocco. This compares with nine jurisdictions (of 96) or 9.3 percent in 2016.[9]

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 2016. Those without an arrow scored in the same – quintile.

[9] Note that only the jurisdictions that were included in both the 2016 and 2017 surveys were examined in this section. As a result, 80 jurisdictions were included in this analysis, based on low response rates. Both of the jurisdictions in Spain were not analyzed in the 2017-2016 comparison as its results were combined in 2016.

First Quintile

Seventeen jurisdictions (18 percent) have scores in the top range (first quintile) in 2017. These are:

- Texas
- Oklahoma
- North Dakota
- Newfoundland & Labrador ↑
- West Virginia
- Kansas
- Saskatchewan
- Norway – Other Offshore (except North Sea)
- Wyoming
- South Australia
- Norway – North Sea
- Manitoba
- United Kingdom – North Sea
- New Zealand
- Mississippi
- United Arab Emirates
- Arkansas

This compares with 22 (23 percent) jurisdictions with first quintile scores in 2016, 20 (16 percent) in 2015, 24 (15 percent) in 2014, and 32 (20 percent) in 2013. Except for Newfoundland & Labrador and South Australia, all jurisdictions in the first quintile this year were in the first quintile in 2016. The following jurisdictions slipped from the first quintile this year: Alabama, Louisiana, Netherlands, Utah, United Kingdom – Other Offshore (except North Sea), Montana, and Morocco.

US jurisdictions account for 8 of the 17 jurisdictions with first quintile scores this year. Three jurisdictions (Newfoundland & Labrador, Saskatchewan, and Manitoba) are in Canada and three are in Europe.

Second Quintile

There are 43 jurisdictions (44 percent) with scores from 60 to 79.99 (second quintile) according to the Policy Perception Index. This compares with 32 second-quintile jurisdictions 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 American 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-one jurisdictions in the second quintile group were also in this group in 2016. Nine jurisdictions moved up into the group this year as the result of improved survey results and two jurisdictions, Suriname and Guyana, were included for the first time since 2014.

- Montana ↓
- Netherlands ↓
- Louisiana ↓
- Namibia
- United Kingdom – Other Offshore (except North Sea) ↓
- New Mexico
- Alabama ↓
- South Africa
- Nova Scotia ↑
- Hungary
- Utah ↓
- Ireland
- Oman
- US Offshore – Gulf of Mexico
- Pennsylvania
- Alberta
- Ghana
- Illinois
- Thailand
- Western Australia
- Australia – Offshore
- Suriname
- Brunei
- Brazil – Onshore Concession Contracts ↑
- Equatorial Guinea ↑
- Kuwait
- Tunisia ↑
- Neuquen ↑
- Egypt
- Colombia
- Guyana
- Ivory Coast
- Spain – Offshore
- Morocco ↓
- Gabon
- Brazil – Offshore Concession Contracts ↑
- Ohio
- Colorado ↑

- Mendoza ↑
- Malaysia
- Peru ↑
- China
- Queensland

Third Quintile

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

This year 30 of the jurisdictions ranked in the third quintile. This compares with 32 jurisdictions (33 percent) in 2016 and 22 jurisdictions (37 percent) in 2015. Of the 30 jurisdictions with scores in the third quintile this year, five dropped from the second quintile in 2016. Fourteen jurisdictions were also present in the third quintile in 2016. Two jurisdictions, Poland and Uganda, were included for the first time since 2014.

- Vietnam ↓
- Alaska ↓
- Kazakhstan
- Poland
- Brazil– Offshore presalt area PSC
- Mozambique
- Trinidad and Tobago
- Michigan ↓
- Republic of the Congo (Brazzaville)
- Kenya
- Santa Cruz
- India
- Myanmar
- Tanzania
- Romania
- British Columbia ↓
- Mexico
- Spain – Onshore
- Bangladesh
- Angola
- Uganda
- Algeria
- Nigeria
- Papua New Guinea

- New South Wales ↑
- Northern Territory
- Victoria
- Yemen
- France ↓
- Cambodia

Fourth Quintile

Jurisdictions with Policy Perception Index scores from 20 to 39.99 (i.e., in the fourth quintile) all have relatively high percentages of negative responses to the survey questions. This indicates that investors regard them as less attractive than jurisdictions with higher scores, i.e., those in the first, second, or third quintiles. About five percent of jurisdictions had fourth quintile scores in 2017; down from about seven percent in 2016.

This year's fourth quintile jurisdictions are listed below in order of rank. Two jurisdictions slipped from the third quintile last year to the fourth quintile this year. Libya moved from the fifth quintile in 2016 to the fourth in 2017. The other two jurisdictions in the fourth quintile this year also had scores in this range in 2016.

- California
- Indonesia ↓
- Ecuador
- Iraq ↓
- Libya ↑

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 two percent of the total of 97) in this category. This compares with three jurisdictions (of 96) in 2016.

Bolivia fell into the fifth quintile in 2017 from the fourth.

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

- Bolivia ↓
- 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.

Table 5: Policy Perception Index - Percentile Rank, 2013-2017 (97 Jurisdictions)

		Percentile Rank					Survey Rank				
		2017	2016	2015	2014	2013	2017	2016	2015	2014	2013
CANADA	Alberta	66%	51%	74%	87%	87%	33/97	43/96	26/126	14/156	17/157
	British Columbia	22%	56%	60%	53%	63%	76/97	39/96	46/126	60/156	49/157
	Manitoba	88%	83%	89%	94%	90%	12/97	14/96	11/126	6/156	13/157
	Newfoundland & Labrador*	96%	69%	77%	76%	80%	4/97	25/96	22/126	28/156	24/157
	Nova Scotia*	73%	38%	44%	62%	69%	26/97	56/96	64/126	49/156	41/157
	Saskatchewan	93%	95%	95%	96%	97%	7/97	4/96	6/126	4/156	3/157
UNITED STATES	Alabama*	76%	86%	98%	92%	81%	24/97	11/96	3/126	8/156	23/157
	Alaska	37%	44%	53%	47%	37%	62/97	49/96	56/126	70/156	91/157
	Arkansas	83%	81%	88%	91%	93%	17/97	15/96	12/126	9/156	9/157
	California	7%	5%	19%	22%	32%	91/97	91/96	98/126	115/156	97/157
	Colorado	44%	35%	51%	46%	54%	55/97	61/96	58/126	72/156	65/157
	Illinois*	64%	49%	57%	71%	64%	35/97	44/96	49/126	37/156	48/157
	Kansas	94%	96%	96%	93%	94%	6/97	3/96	5/126	7/156	6/157
	Louisiana	80%	78%	86%	89%	88%	20/97	18/96	14/126	12/156	16/157
	Michigan*	31%	40%	37%	74%	48%	68/97	54/96	74/126	30/156	75/157
	Mississippi	85%	90%	91%	99%	92%	15/97	8/96	9/126	1/156	10/157
	Montana	82%	88%	83%	80%	74%	18/97	10/96	17/126	23/156	35/157
	New Mexico	77%	70%	61%	78%	70%	23/97	24/96	45/126	26/156	39/157
	North Dakota	97%	93%	94%	95%	96%	3/97	6/96	7/126	5/156	4/157
	Ohio*	45%	64%	80%	84%	68%	54/97	30/96	20/126	20/156	43/157
	Oklahoma	98%	99%	97%	98%	99%	2/97	1/96	4/126	2/156	1/157
	Pennsylvania	67%	59%	73%	59%	55%	32/97	36/96	27/126	53/156	64/157
	Texas	99%	98%	99%	97%	98%	1/97	2/96	2/126	3/156	2/157
	Utah*	71%	89%	72%	85%	78%	28/97	9/96	28/126	18/156	28/157
	West Virginia*	95%	73%	85%	69%	72%	5/97	22/96	15/126	39/156	37/157
	Wyoming	91%	94%	81%	90%	89%	9/97	5/96	19/126	11/156	14/157
	US Offshore – Gulf of Mexico	68%	65%	84%	70%	67%	31/97	28/96	16/126	38/156	44/157
AUSTRALIA	New South Wales	13%	6%	6%	32%	30%	85/97	90/96	116/126	98/156	100/157
	Northern Territory*	12%	N/A	70%	65%	76%	86/97	N/A	30/126	44/156	32/157
	Queensland	39%	47%	63%	57%	47%	60/97	47/96	40/126	55/156	76/157
	South Australia	90%	N/A	90%	81%	79%	10/97	N/A	10/126	22/156	25/157
	Victoria*	11%	23%	35%	61%	52%	87/97	71/96	76/126	51/156	68/157
	Western Australia	62%	60%	67%	63%	65%	37/97	35/96	37/126	47/156	47/157
	Australia – Offshore	61%	68%	69%	72%	60%	38/97	26/96	32/126	34/156	54/157
OCEANIA	Brunei*	59%	63%	62%	56%	75%	40/97	31/96	43/126	56/156	33/157
	Indonesia	6%	15%	12%	6%	19%	92/97	79/96	108/126	142/156	130/157
	Malaysia	42%	53%	55%	45%	58%	57/97	41/96	53/126	73/156	60/157
	New Zealand	86%	79%	87%	88%	71%	14/97	17/96	13/126	13/156	38/157
	Papua New Guinea*	14%	19%	25%	28%	21%	84/97	76/96	88/126	105/156	123/157

* Between 5 and 9 responses

Table 5 continues on page 29

Table 5: Policy Perception Index - Percentile Rank, 2013-2017 (97 Jurisdictions) *(continued from page 28)*

		Percentile Rank					Survey Rank				
		2017	2016	2015	2014	2013	2017	2016	2015	2014	2013
EUROPE	France*	9%	67%	10%	27%	85%	89/97	27/96	112/126	106/156	20/157
	Hungary*	72%	58%	56%	41%	41%	27/97	37/96	52/126	81/156	83/157
	Ireland*	70%	72%	71%	68%	53%	29/97	23/96	29/126	40/156	66/157
	Netherlands*	81%	84%	N/A	N/A	N/A	19/97	13/96	N/A	N/A	N/A
	Norway – Other Offshore (except North Sea)*	92%	80%	78%	86%	95%	8/97	16/96	21/126	17/156	5/157
	Norway – North Sea	89%	91%	92%	82%	91%	11/97	7/96	8/126	21/156	11/157
	Poland*	35%	N/A	N/A	52%	86%	64/97	N/A	N/A	61/156	19/157
	Romania*	23%	28%	47%	55%	62%	75/97	66/96	61/126	57/156	50/157
	Spain – Onshore	20%	N/A	20%	11%	15%	78/97	N/A	93/126	128/156	134/157
	Spain – Offshore	49%	N/A	15%	25%	57%	50/97	N/A	104/126	109/156	61/157
	United Kingdom – Other Offshore (except North Sea)*	78%	85%	76%	75%	11%	22/97	12/96	24/126	29/156	138/157
	United Kingdom – North Sea	87%	75%	82%	77%	82%	13/97	20/96	18/126	27/156	22/157
ASIA	Bangladesh*	19%	10%	8%	14%	40%	79/97	85/96	115/126	124/156	85/157
	Cambodia*	8%	22%	17%	20%	18%	90/97	72/96	102/126	117/156	131/157
	China*	40%	48%	46%	19%	16%	59/97	45/96	62/126	119/156	133/157
	India	27%	20%	14%	21%	43%	72/97	75/96	105/126	116/156	80/157
	Kazakhstan*	36%	N/A	29%	16%	59%	63/97	N/A	84/126	121/156	58/157
	Myanmar*	26%	27%	18%	23%	12%	73/97	67/96	100/126	114/156	137/157
	Thailand	63%	52%	58%	43%	33%	36/97	42/96	48/126	77/156	96/157
	Vietnam	38%	57%	54%	44%	4%	61/97	38/96	54/126	74/156	153/157
AFRICA	Angola	18%	33%	40%	35%	31%	80/97	62/96	69/126	93/156	99/157
	Equatorial Guinea	57%	36%	23%	30%	23%	42/97	60/96	90/126	101/156	117/157
	Gabon	47%	43%	38%	33%	27%	52/97	50/96	73/126	97/156	104/157
	Ghana	65%	46%	52%	49%	29%	34/97	48/96	57/126	67/156	101/157
	Ivory Coast*	50%	N/A	39%	51%	42%	49/97	N/A	71/126	65/156	81/157
	Kenya*	29%	N/A	49%	39%	51%	70/97	N/A	59/126	83/156	69/157
	Mozambique*	33%	N/A	27%	36%	45%	66/97	N/A	86/126	90/156	78/157
	Namibia*	79%	62%	68%	64%	35%	21/97	32/96	35/126	45/156	94/157
	Nigeria	15%	16%	11%	10%	28%	83/97	78/96	110/126	130/156	103/157
	Republic of the Congo (Brazzaville)*	30%	N/A	26%	34%	13%	69/97	N/A	87/126	94/156	136/157
	South Africa*	74%	54%	28%	24%	14%	25/97	40/96	85/126	111/156	135/157
	Tanzania*	24%	N/A	34%	9%	7%	74/97	N/A	77/126	131/156	146/157
	Uganda*	17%	N/A	N/A	13%	46%	81/97	N/A	N/A	125/156	77/157

* Between 5 and 9 responses.

† Due to a low response rate, Netherlands – Onshore and Netherlands – Offshore were combined to this year into Netherlands.

Table 5 continues on page 30

Table 5: Policy Perception Index - Percentile Rank, 2013-2017 (97 Jurisdictions) *(continued from page 29)*

		Percentile Rank					Survey Rank				
		2017	2016	2015	2014	2013	2017	2016	2015	2014	2013
MENA	Algeria	16%	32%	33%	18%	22%	82/97	63/96	80/126	120/156	118/157
	Egypt	53%	42%	30%	8%	73%	46/97	51/96	83/126	135/156	36/157
	Iraq	4%	17%	9%	5%	2%	94/97	77/96	114/126	144/156	155/157
	Kuwait*	56%	N/A	43%	40%	61%	43/97	N/A	65/126	82/156	52/157
	Libya	3%	2%	1%	4%	34%	95/97	94/96	126/126	151/156	95/157
	Morocco*	48%	74%	45%	58%	38%	51/97	21/96	63/126	54/156	90/157
	Oman*	69%	N/A	66%	73%	66%	30/97	N/A	38/126	31/156	46/157
	Tunisia	55%	25%	32%	37%	6%	44/97	69/96	81/126	89/156	148/157
	United Arab Emirates	84%	77%	75%	79%	44%	16/97	19/96	25/126	25/156	79/157
	Yemen*	10%	11%	4%	15%	84%	88/97	84/96	118/126	123/156	21/157
ARGENTINA	Mendoza*	43%	21%	16%	26%	5%	56/97	74/96	103/126	108/156	150/157
	Neuquen	54%	37%	22%	31%	10%	45/97	59/96	91/126	99/156	142/157
	Santa Cruz*	28%	9%	13%	7%	9%	71/97	86/96	107/126	140/156	143/157
LATIN AMERICA & CARRIBEAN	Bolivia*	2%	4%	5%	3%	8%	96/97	93/96	117/126	153/156	145/157
	Brazil – Onshore CC*	58%	12%	42%	38%	3%	41/97	82/96	66/126	87/156	154/157
	Brazil – Offshore CC	46%	30%	59%	48%	25%	53/97	65/96	47/126	69/156	114/157
	Brazil – Offshore presalt area PSC*	34%	14%	41%	29%	26%	65/97	81/96	68/126	102/156	113/157
	Colombia	52%	41%	48%	54%	77%	47/97	53/96	60/126	59/156	31/157
	Ecuador	5%	7%	3%	2%	49%	93/97	89/96	121/126	155/156	74/157
	Guyana*	51%	N/A	N/A	60%	20%	48/97	N/A	N/A	52/156	128/157
	Mexico	21%	26%	31%	12%	39%	77/97	68/96	82/126	126/156	87/157
	Peru	41%	31%	24%	42%	24%	58/97	64/96	89/126	79/156	115/157
	Suriname*	60%	N/A	N/A	66%	36%	39/97	N/A	N/A	43/156	93/157
	Trinidad and Tobago*	32%	N/A	65%	67%	56%	67/97	N/A	39/126	42/156	62/157
	Venezuela	1%	1%	2%	1%	1%	97/97	96/96	125/126	156/156	157/157

* Between 5 and 9 responses

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 fell to 76 out of 97 jurisdictions in 2017. BC's drop saw this jurisdiction move from the top 50 percent of jurisdictions in 2016 to the bottom 25 percent of jurisdictions in 2017.

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 2016. 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 Newfoundland & Labrador emerged as Canada's top performer while Saskatchewan and Manitoba are ranked 2nd and 3rd among Canadian jurisdictions. Despite a slight improvement in Alberta's PPI score since 2016, Alberta and British Columbia are Canada's least attractive jurisdictions for upstream investment.

Three out of six Canadian jurisdictions improved their PPI scores this year—Newfoundland & Labrador, Nova Scotia, and Alberta. This means that 50 percent of Canadian jurisdictions saw their scores decline in 2017—Saskatchewan, Manitoba, and British Columbia. This resulted in Saskatchewan moving down on the Policy Perception Index scale from a rank of 4th (out of 96) in 2016 to 7th this year. This year Newfoundland & Labrador took Saskatchewan's 4th rank spot, improving from 25th (out of 96) in 2016.

Newfoundland & Labrador's score improved by 13 points this year, increasing its overall ranking from 25th (of 96) in 2016 to 4th (of 97) in 2017. The province's scores improved on most of the survey questions. Specifically, the percentage of positive responses increased the most in the areas of the legal system (-30 points), fiscal terms (-29 points), and regulatory duplication and inconsistencies (-29 points).

Figure 5 illustrates the relative performance of the Canadian jurisdictions in the 2017 survey. According to the Policy Perception Index measure, Newfoundland & Labrador 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 2017 survey and three, Newfoundland & Labrador, Saskatchewan, and Manitoba, achieved commendable first quintile rankings. This year Alberta remained in the second quintile, where it is joined by Nova Scotia. British Columbia dropped from

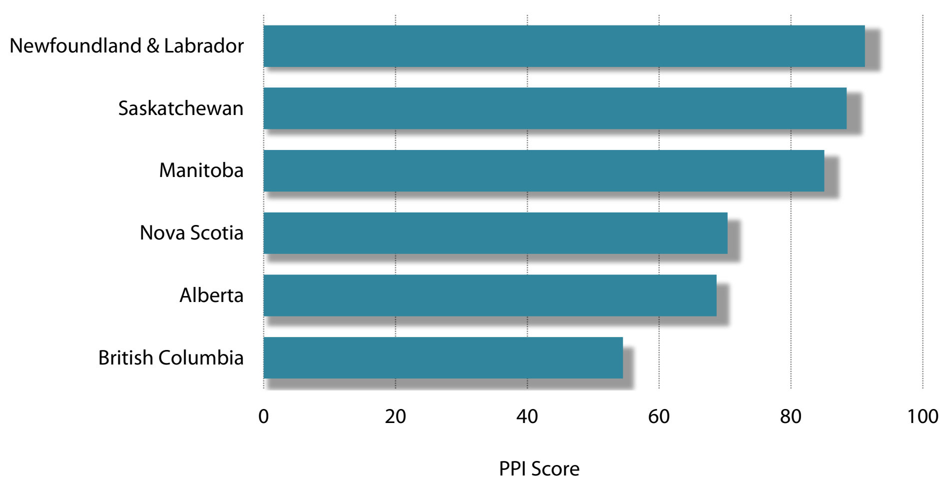
Table 6: Rankings of Canadian Jurisdictions for 2017 and their Policy Perception Index Scores

	2017		2016	
Jurisdiction	Rank	Score	Rank	Score
Newfoundland & Labrador*	1	91.25	3	78.66
Saskatchewan	2	88.47	1	94.18
Manitoba	3	85.06	2	87.01
Nova Scotia*	4	70.41	6	59.12
Alberta	5	68.73	5	66.87
British Columbia	6	54.52	4	68.13

*Between 5 and 9 responses.

Note: 2017 data were not available for New Brunswick, Quebec, Ontario, Yukon, and Northwest Territories.

Figure 5: Policy Perception Index—Canada



the second quintile last year to the third this year. Due to low response rates, results for the other Canadian provinces and territories were not ranked in 2017.

Focus on Western Canada

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

Alberta's score continues to rank in the second quintile despite the province's overall improvement in rank from 43rd (out of 96) in 2016 to 33rd (out of 97) in 2017. Alberta's PPI score is similar to last year's and the province is the second least attractive jurisdiction to invest in Canada. This means that despite its improvement in the rankings, Alberta is still performing poorly relative to its Canadian counterparts. 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 in 2016 and the fifth most attractive jurisdiction in Canada. Much of the change since 2014 has been driven by poorer perceptions of regulation and taxation regimes. In particular, over 50 percent of respondents in 2017 see fiscal terms and taxation as deterrents to investment. The province's scores improved on the survey questions pertaining to regulatory enforcement (-22 points), disputed land claims (-11 points), and protected areas (-10 points).

British Columbia's score dropped significantly this year, as its overall ranking deteriorated from 39th (out of 96) in 2016 to 76th (out of 97) in 2017. British Columbia is now the least attractive jurisdiction in Canada (of the provinces and territories included this year), and the province declined from the top 50 percent of jurisdictions last year to the bottom 25 percent of jurisdictions this year (**Table 5**). BC's scores declined on most of the survey questions. Specifically, the percentage of negative responses increased the most in the areas of political stability (27 points),[10] fiscal terms (25 points), and cost of regulatory compliance (21 points).

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 committed that it will raise the carbon tax rate by 66 percent

[10] 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 80 jurisdictions that were included in both the 2016 and 2017 survey were analyzed in this section.

over the next four years (Green et al., 2017). Both the NDP and Green parties have stated that they oppose the Kinder Morgan Trans Mountain pipeline expansion, oppose (or want to re-examine) the proposed Site C dam, and the Green Party opposes the idea of LNG production (Green, 2017, May. 30). Such policy positions have contributed to the lack of political stability in the province, which is 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 (nearly 80 percent) and protected areas (65 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 remained consistent and the province was able to improve its overall rank from 14th (of 96) in 2016 to 12th (of 97) in 2017. Driving this shift were positive responses with regard to disputed land claims (-17 points), the legal system (-9 points), and its quality of infrastructure (-8 points). Manitoba is the 3rd most attractive Canadian jurisdiction for upstream petroleum investment.

Saskatchewan's global attractiveness for investment declined slightly this year, moving from 4th place in 2016 to 7th in 2017. This resulted from negative responses for labour availability and skills (20 points), taxation in general (19 points), and trade barriers (18 points). However, Saskatchewan is still the second most attractive jurisdiction in Canada.

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 is plagued by regulatory uncertainty and legal disputes, which is preventing our resources from accessing new markets. The window of opportunity for Canada's LNG industry is closing and major energy opportunities are being lost. Disputes between the provinces and the federal government are causing excessive delays and will result in fewer economic opportunities for Canada."

Alberta

"The carbon tax has added costs and ultimately decreased the competitiveness of this province, causing investment to relocate elsewhere."

"Fiscal, regulatory, and environmental uncertainty continue to hurt the investment environment in Alberta."

"Alberta's royalty structure for oil sands was unchanged, creating clarity for investors."

British Columbia

"Regulatory uncertainty and prohibitive timelines are detrimental to the approval processes for major energy projects such as Kinder Morgan's Trans Mountain Pipeline and Northern Gateway."

"Not only has BC been unable to build pipelines, but it has also failed to develop its LNG industry, and this is a major deterrent to investment."

Saskatchewan

"This province remains opposed to a carbon tax, which is positive sign for investors."

"Drilling applications are processed quickly. Efficient regulations encourage investment."

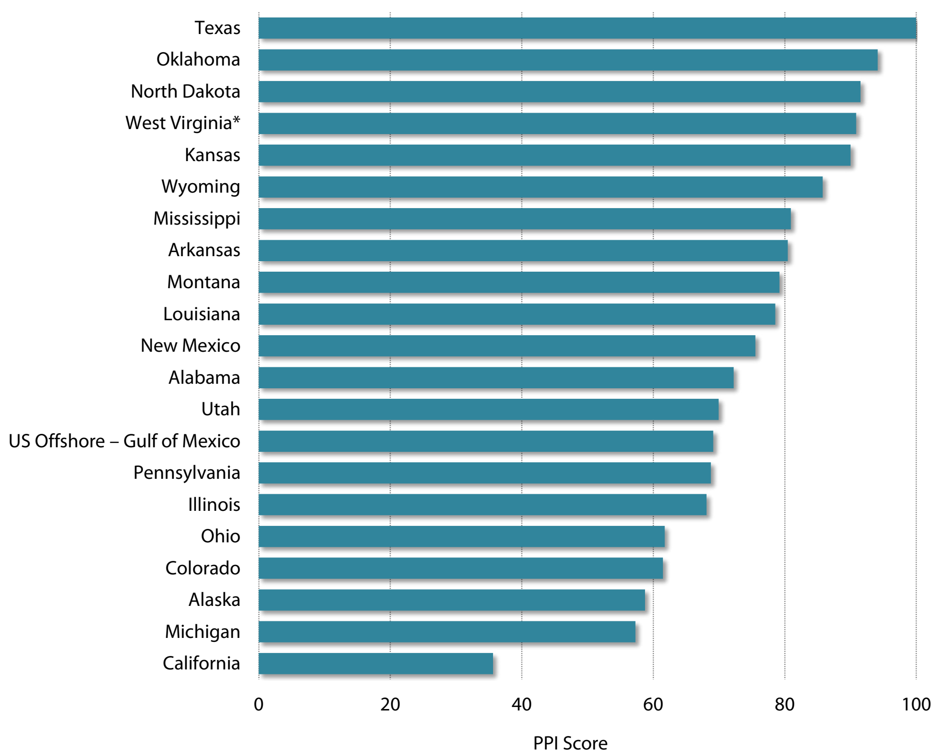
The United States

Sufficient responses were received in 2017 to allow us to rank 21 US jurisdictions, which is consistent with the 2016 survey.

Texas is the most attractive jurisdiction in the United States—and the most attractive jurisdiction in the world. Texas displaced Oklahoma from the global top spot this year: Oklahoma is now the second most attractive jurisdiction in the US and the second most attractive in the world. Six other US jurisdictions also received scores in the first quintile this year: North Dakota, West Virginia, Kansas, Wyoming, Mississippi, and Arkansas (**figure 6**). Six of the world's top 10 jurisdictions are located in the United States compared to eight in the 2016 survey.

Many US jurisdictions saw their PPI scores drop slightly in 2017. However, West Virginia saw an increase in its score of about 10 points. This increase enabled West Virginia to maintain its spot in the global top 10. West Virginia's improvement was driven in large part by lower percentages of respondents indicating that issues pertaining to the quality of the geological database (-27 points), labour availability and skills (-20 points), and fiscal

Figure 6: Policy Perception Index—United States



terms (-18 points) were deterrents to investment. North Dakota improved from 6th (out of 96) in 2016 to 3rd (out of 97) in 2017.

Ten US jurisdictions are in the second quintile group this year compared with seven in 2016. States in the second quintile this year include New Mexico, US Offshore – Gulf of Mexico, Pennsylvania, Illinois, Ohio, and Colorado. The other four states—Montana, Louisiana, Alabama, and Utah—dropped from the first quintile last year to the second this year. Alabama's score dropped considerably this year from 87.85 in 2016 to 72.23 in 2017. Investors had a more negative perceptions of that state's cost of regulatory compliance (41 points), political stability (29 points) and labour regulations and employment agreements (25 points) than previously. Utah is another US state that dropped out of the first quintile in 2017. Utah saw its PPI score drop by nearly 20 points, resulting in its overall ranking declining from the 9th position in 2016 to 28th in 2017. Investors expressed more concern over its political stability (35 points), the cost of regulatory compliance (32 points), and regulatory duplication and inconsistencies (32 points) than they did in 2016. Pennsylvania is another state that increased in rank this year but remained in the second quintile. It moved from 36th to 33rd place. Driving this shift in Pennsylvania's ranking were positive responses with regard to the quality of the geological database (-23 points), labour availability and skills (-13 points), and the quality of infrastructure (-13 points).

Two US jurisdictions had third quintile PPI scores this year—Michigan and Alaska. Both of these jurisdictions dropped from their second quintile place in 2016. Michigan fell in the overall ranking from 54th in 2016 to 68th in 2017. Its decline can be attributed to negative perceptions of regulatory enforcement (15 points) and fiscal terms (8 points). Alaska's overall rank dropped from 49th in 2016 to 62nd in 2017. Contributing to Alaska's decline are worse scores on disputed land claims (33 points), trade barriers (24 points), and security (18 points).

This year's only US jurisdiction with an unattractive fourth quintile score is California. The state's score was similar to last year's, causing California to rank 91st overall for the second straight year, and solidify its spot in the fourth quintile range. California continues to be plagued by concerns regarding regulations, taxation, and fiscal terms.

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.

Alaska

> "Alaska's aggressive tax changes are having a negative impact on investor perceptions and are increasing risk."

Colorado

> "Environmentalists' lawsuits to block oil drilling in Colorado are creating roadblocks for the oil and gas industry. Initiatives to ban hydraulic fracturing and excessive regulations for drilling create limitations and ultimately deter investment."

Gulf of Mexico

> "The US Bureau of Ocean Energy Management lowered the shallow-water royalty rate for proposed Outer Continental Shelf Lease Sale 249 in the Gulf of Mexico to 12.5 percent from 18.75 percent. Royalty relief provisions have encouraged a tremendous uptick in leasing in the region."

Louisiana

> "Legacy lawsuits against oil and gas companies discourage investment in the region."

Mississippi

> "Mississippi's reduction in the severance tax on hydrocarbons produced from horizontal wells was positive for investment in the region. However, this jurisdiction has been hit hard by low crude oil prices."

North Dakota

> "The North Dakota Department of Health is working collaboratively with industry to get this jurisdiction to meet air quality standards. This department is much more cooperative than the EPA."

Oklahoma

> "The Oklahoma Corporation Commission encourages operators to work together in unconventional development and this encourages investment."

> "Forced pooling in Oklahoma creates upstream activity which ultimately benefits industry and government."

Oceania

We were able to rank 12 jurisdictions in Oceania this year. These are five of the six Australian states (New South Wales, Queensland, South Australia, Victoria, and Western Australia), Australia – Offshore and the Northern Territory (which fall under Australian federal jurisdiction), Brunei, Indonesia, Malaysia, New Zealand, and Papua New Guinea.[11]

As **figure 7** illustrates, the results for this region range across all quintiles but the fifth. This year South Australia achieved the highest score in the region, ranking 10th overall. South Australia and New Zealand are the two Oceania jurisdictions in the first quintile.

Five jurisdictions in the region have second quintile scores: Australia – Offshore, Brunei, Malaysia, Queensland, and Western Australia. Queensland achieved a score of 60.09 (60th overall) on the Policy Perception Index this year, dropping from 47th overall in the 2016 survey. This drop is based on poorer scores with respect to trade barriers (51 points), regulatory enforcement (21 points), and labour regulations and employment agreements (16 points). Among the second quintile jurisdictions, Brunei also ranked lower this year, moving from 31st to 40th in global ranking due to increased concerns surrounding regulatory duplication and inconsistencies (32 points), quality of the geological database (29 points), and labour availability and skills (28 points).

New South Wales, Northern Territory, Papua New Guinea, and Victoria are the four Oceania jurisdictions with third quintile scores this year. New South Wales ranked higher this year (85th) than it did in 2016 (90th), moving the jurisdiction from the fourth quintile to the third. The improvement in New South Wales is a result of lower negative perceptions on taxation in general (-30 points), labour regulations and employment agreements (-27 points), and quality of the geological database (-23 points). Papua New Guinea dropped in the rankings from 76th (of 96) last year to 84th (of 97) this year. This decline is due to an increase in negative perceptions on the cost of regulatory compliance (49 points), disputed land claims (31 points), and taxation (27 points).

Only one jurisdiction in the region, Indonesia, achieved a poor fourth quintile PPI score this year. It dropped from a third quintile placement in 2016 as its PPI score declined by over 10 points from 45.83 in 2016 to 35.02 in 2017.

Respondents offered both positive and negative comments about conditions in the jurisdictions that we surveyed in the Oceania region. The comments

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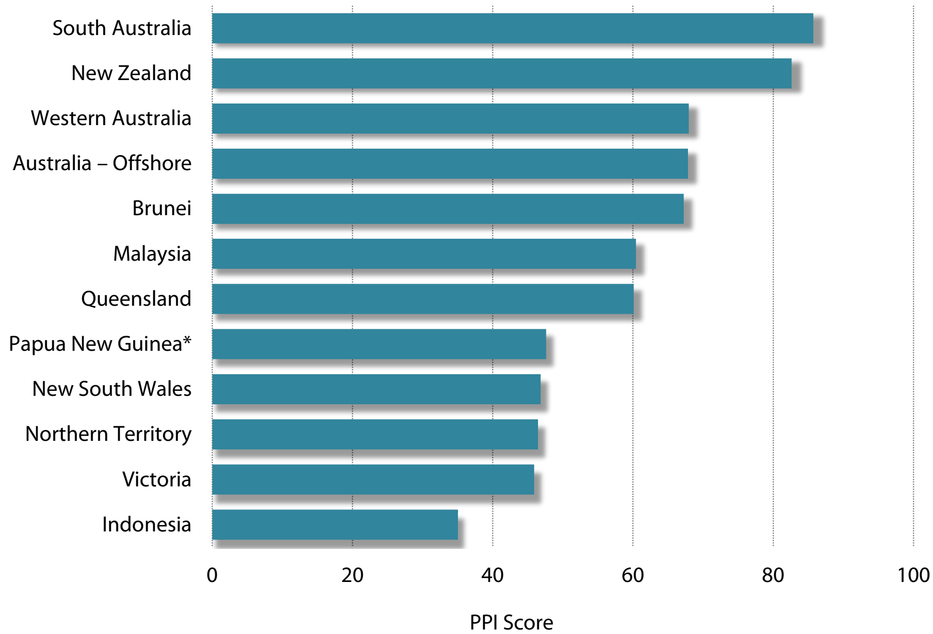
11 This year one Australian state, Tasmania, did not receive sufficient responses to be ranked.

Figure 7: Policy Perception Index—Oceania



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

Indonesia

> "Excessive taxation is an issue during the exploration phase."

> "Indonesia's Gross Split contracts discourage investment at a time of constrained capital and exploration."

Malaysia

> "Strong leadership by Petronas as regulator and partner in framing PSC terms, access to new areas, protection of existing terms, fairness, and certainty on investment. Stability in Malaysia is still fragile; however, many processes have been streamlined and will encourage investment."

> "Data confidentiality in Malaysia is far too stringent. Unreasonable confidentiality requests discourage investment in this jurisdiction."

New Zealand

"The royalty system in New Zealand is easy to understand and administer. Data is easy to access and this signifies strong government support for the industry."

"Ministries in New Zealand are very hands-on and make data readily available to the public."

"New Zealand has adopted numerous regulatory reforms since 2012 and the implementation of 'Block Offers' is an example of an exemplary policy."

South Australia

"South Australia has a 'one stop shop' for many approvals through the Department for Manufacturing, Innovation, Trade, Resources & Energy. Such streamlined processes are exemplary."

"Providing fiscal, regulatory, and other incentives through its Plan for Accelerating Exploration (PACE) scheme to explore and develop gas (whether conventional or unconventional) is an exemplary policy. In addition, the government maintains a high quality online data facility. South Australia successfully ensures that government is accessible and willing to respond to issues in a practical manner."

Europe

Figure 8 shows the rankings for European jurisdictions based on this year's Policy Perception Index scores. We were able to evaluate 12 jurisdictions in the region this year, which is consistent with our results in 2016.[12]

This year eight European jurisdictions have PPI scores in the attractive first and second quintiles, the same number as last year.

The three European jurisdictions with first quintile sores, beginning with the most attractive, are Norway – Other Offshore (except North Sea), Norway – North Sea, and UK – North Sea. The PPI score for Norway – North Sea declined this year, meaning that its rank in the 2017 survey is lower. Norway – North Sea dropped from an overall rank of 7th (of 96) last year to 11th (of 97) due to increased uncertainty over environmental regulations (30 points), labour regulations and employment agreements (30 points), and protected areas (13 points). However, Norway – Other Offshore (except North Sea) improved from 16th (of 96) last year to 8th (of 97) this year due to positive scores on the cost of regulatory compliance (-26 points), trade barriers (-20 points), and the quality of infrastructure (-17 points).

The Netherlands, UK – Other Offshore (except North Sea), Hungary, Ireland, and Spain – Offshore received attractive second quintile scores this year. The Netherlands dropped from an overall rank of 13th (of 96) last year to 19th (of 97) this year due to increased uncertainty over environmental regulations (48 points), labour regulations and employment agreements (46 points), and regulatory enforcement (27 points).

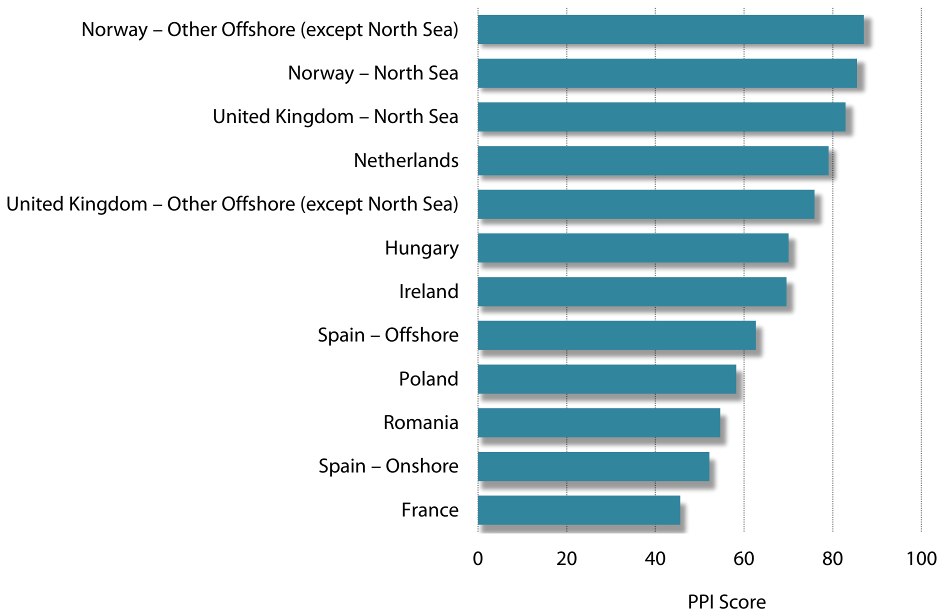
Poland, Romania, Spain – Onshore, and France ranked in the third quintile this year. France's PPI score declined by more than 30 points this year, which contributed to its drop in ranking from 27th (of 96) in 2016 to 89th (of 97) this year. France's drop is due to increased uncertainty over regulatory duplication and inconsistencies (41 points), the quality of the geological database (38 points), and the quality of infrastructure (33 points).

Last year, Russia and Ukraine were two European jurisdictions with PPI scores in the fourth quintile. However, we were unable to rank either jurisdiction this year. No European jurisdictions have fourth or fifth quintile scores this year, which is a positive signal for investment attractiveness in this region.

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.

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

Figure 8: Policy Perception Index—Europe



Hungary

> "Royalty rates in this jurisdiction encourage investment."

Ireland

> "The 2015 Atlantic Margin Licensing Round was conducted in a timely, fair, and transparent manner."

Norway

> "Norway has a consistent policy environment that is a model for other jurisdictions."

> "Exploration refunds are seen as exemplary policy. Such fiscal policies are an encouraging step that shows the government is willing to share the risk associated with oil and gas explorations."

Spain – Offshore

> "Offshore exploration licenses are still pending nearly five years after application was first submitted. Excessive timelines discourage investment."

Asia

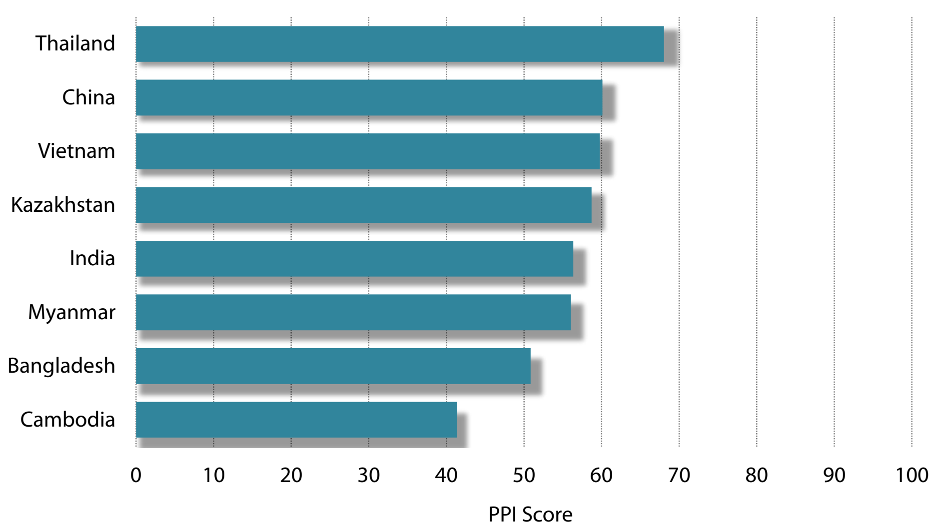
Figure 9 presents the eight Asian jurisdictions that were ranked this year according to their respective Policy Perception Index values. Kazakhstan was included in this year's survey; Pakistan was excluded due to a lack of responses.

As has been the case since the survey began in 2007, none of the Asian jurisdictions achieved first quintile status in 2017. Only two Asian jurisdictions ranked in the second quintile this year (Thailand and China) compared to three last year. The six remaining Asian jurisdictions ranked this year (Vietnam, Kazakhstan, India, Myanmar, Bangladesh, and Cambodia) all achieved third quintile scores.

Thailand's PPI score improved slightly in 2017, while China's declined. Thailand changed in the overall ranking from 42nd (of 96) to 36th (of 97) and China's rank dropped from 45th to 59th. Thailand experienced a negligible increase in its PPI score from 67.01 to 68.07 while China's score dropped by nearly 6 points from 65.80 to 60.12. The lower score in China reflects an increase in uncertainty over labour availability and skills (52 points), infrastructure (27 points), and quality of the geological database (22 points).

Of the jurisdictions in the third quintile, India saw slight improvements, which moved it from 75th to 72nd in rank. This year India was perceived to have fewer barriers regarding protected areas (-58 points), environmental regulations (-39 points), and the cost of regulatory compliance (-25 points).

Figure 9: Policy Perception Index—Asia



Cambodia's score fell by nearly 10 points this year and its rank dropped from 72nd (of 96) last year to 90th (of 97) this year. Cambodia's lower score reflects an increase in concern over disputed land claims (44 points), cost of regulatory compliance (38 points), and trade barriers (35 points). Vietnam dropped even more dramatically—from 38th (of 96) in 2016 to 61st (of 97) in 2017—due to increased uncertainty around environmental regulations (24 points), quality of the geological database (22 points), and the cost of regulatory compliance (21 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.

Cambodia

> "Cambodia has been plagued by ambiguous fiscal terms and the government of Cambodia took steps to make the terms more demanding—effectively dispelling further sector investment. Export duties, in particular, are hurting investment opportunities."

Myanmar

> "Data packages for bid rounds included very selective data in them; openness and transparency is lacking."

Thailand

> "Thailand's changes to its concession form will now include future bid rounds where there is no experience, no basis, misperceptions on state take, and ultimately no investment due to uncertainty and restricted access."

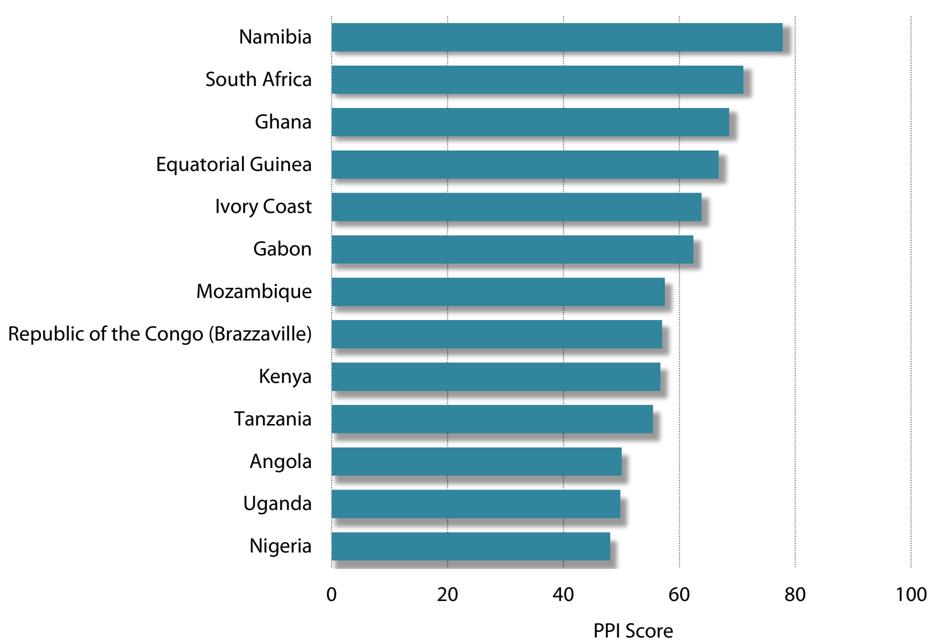
Africa

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 13 African jurisdictions that were assessed this year, an increase from eight in 2016. Last year we were unable to rank many of the African countries included in 2017, including Uganda, Tasmania, Kenya, Republic of Congo (Brazzaville), Mozambique, and Ivory Coast.

Namibia, the top ranked African jurisdiction, is in the second quintile along with South Africa, Ghana, Equatorial Guinea, Ivory Coast, and Gabon. Africa's southernmost country saw its score move up by over 3 points from the previous year and South Africa now ranks as the 25th most attractive jurisdiction in the world for oil and gas investment. Equatorial Guinea moved into the second quintile this year from the third in the previous year. Angola achieved a third quintile score this year because of a 6.67 point decrease in its Policy Perception Index score (56.69 in 2016 to 50.02 in 2017). As a

Figure 10: Policy Perception Index—Africa



consequence, Angola has dropped in rank from 62nd (of 96) to 80th (of 97). Angola's drop is the result of significant increases in the percentages of negative perceptions with regard to the cost of regulatory compliance (29 points), legal system (26 points), and regulatory duplication and inconsistencies (18 points). Another issue of growing concern for investors in Angola is fiscal terms, which is reflected by an 18-point increase in the percentage of responses indicating that this matter is a deterrent to investment.

The lowest ranked African jurisdiction, Nigeria, improved its score by 1.37 points from 46.69 last year to 48.07 this year. The improvement is due to respondents having fewer negative perceptions of the quality of the infrastructure (-27 points), the cost of regulatory compliance (-21 points), and trade barriers (-16 points). However, Nigeria still receives many negative responses in the security and legal system categories. Although the jurisdiction is the least attractive in Africa for investment based on its policy environment, Nigeria has the largest reserves in the region, which suggests that there could be considerably more investment if the barriers to upstream development were 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.

Nigeria

> "Bidding processes are unclear and inconsistent, which deters investment."

> "Nigeria's Petroleum Industry Bill has taken way longer than necessary to be passed into law, which is a major deterrent to investment. This issue kicked off in 2007 (although it was actually started in 2000) and there is still no clarity about what direction the government will take with respect to future investments in the oil and gas industry."

> "Nigeria's inability to pass their Petroleum Industry Bill is a nightmare for the country and investors. The initial bill included unrealistic fiscal terms (the 2009 version). The 2012 version of the bill didn't include fiscal terms—apparently to be determined at a later date."

The Middle East and North Africa (MENA)

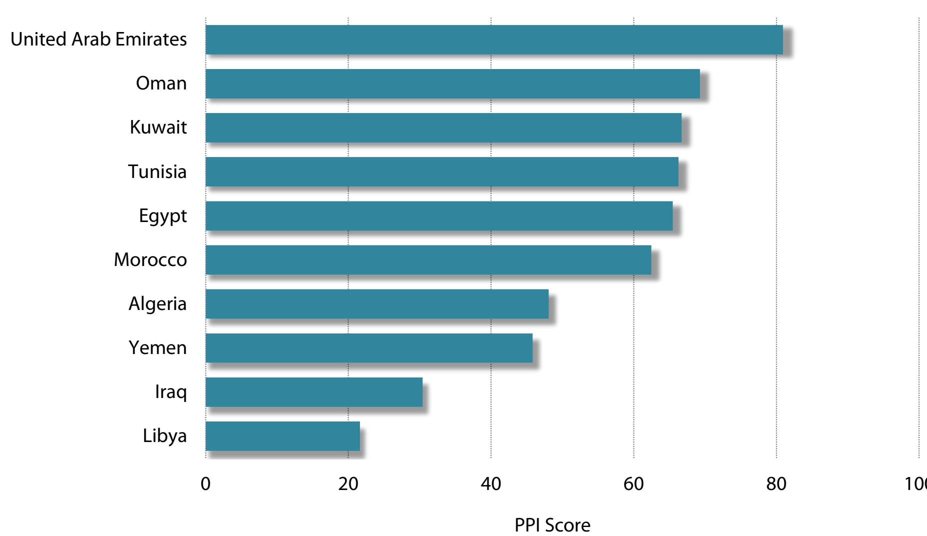
The 10 Middle East and North African countries evaluated in this year's survey are presented in **figure 11**, ranked according to their relative attractiveness for investment as measured by the Policy Perception Index. Iran, Israel, Jordan, and Syria could not be ranked this year due to low response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

Only one MENA country (United Arab Emirates) achieved first quintile rankings in the 2017 survey, down from two (United Arab Emirates and Morocco) in 2016. The first quintile score for United Arab Emirates (UAE) is similar to its 2016 score. Again this year this jurisdiction benefitted from above average responses on many policy factors. For example, in 2017 UAE improved investor perceptions surrounding protected areas (-27 points), environmental regulations (-15 points), and labour regulations and employment agreements (-13 points).

Oman, Kuwait, Tunisia, Egypt, and Morocco ranked in the second quintile, with Algeria and Yemen following in the third quintile. Tunisia improved its score from the third quintile last year. Iraq and Libya received scores in the fourth quintile.

This year Iraq and Morocco saw large declines in their Policy Perception Index scores, which changed their overall rankings. Iraq saw a 17-point decrease in its score from last year, dropping from 47.26 in 2016 to 30.39 in 2017. As a result, Iraq's ranking declined from 77th (of 96) last year to 94th (of 97) this year. The decline is due in part to negative responses regarding

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



environmental regulations (33 points), taxation (27 points), and protected areas (27 points). Iraq'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 Iraq indicated that security and the legal system in the jurisdiction were deterrents to investment.

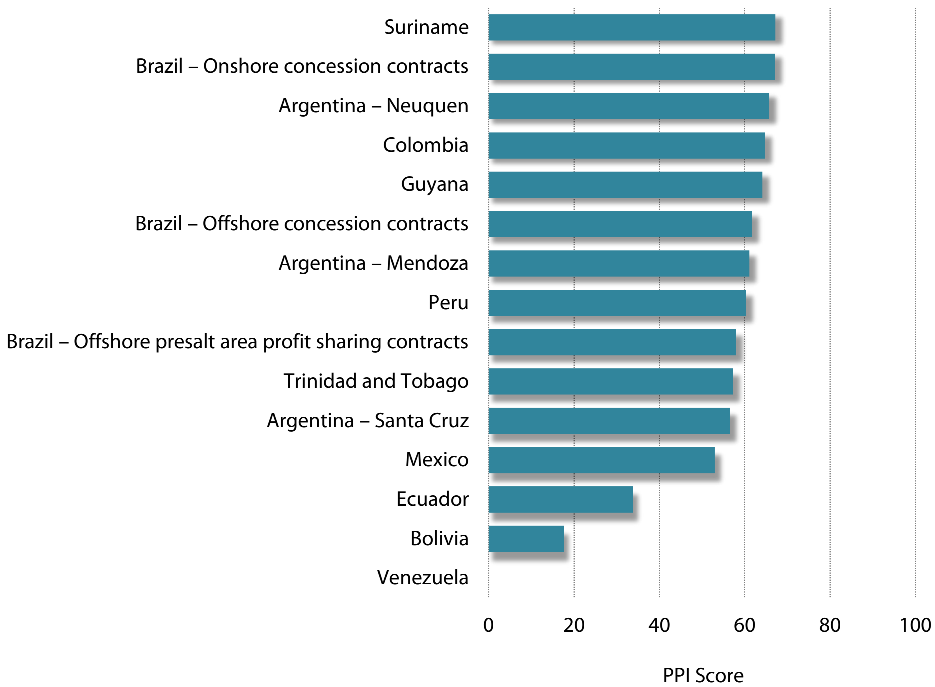
Latin America and the Caribbean

Figure 12 presents the Latin American and Caribbean jurisdictions that were evaluated this year on the Policy Perception Index. Again this year, Brazil was broken into three distinct regions: Onshore Concession Contracts (CCs), Offshore Concession Contracts (CCs), and Offshore 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, Neuquen, and Salta were ranked this year. Fifteen Latin American and Caribbean jurisdictions were ranked this year. Guyana, Suriname, and Trinidad and Tobago were included this year, but not ranked in 2016.

None of the region's jurisdictions achieved first quintile rankings this year. Eight jurisdictions—Suriname, Brazil – Onshore concession contracts, Argentina – Neuquen, Colombia, Guyana, Brazil – Offshore concession contracts, Argentina – Mendoza, and Peru—rank in the second quintile. Brazil – Onshore concession contracts improved in rank from 82nd (of 96) in 2016 to 41st (of 97) this year with a corresponding increase in PPI of 22.63 points from 44.47 to 67.10. The higher score and rank comes as a result of more positive perceptions about the jurisdiction's security (-57 points), labour regulations and employment agreements (-55 points), and environmental regulations (-40 points). Brazil – Offshore CC was in the third quintile in 2016, but moved to the second quintile this year after an increase of 8.17 points on the Policy Perception Index from 53.60 to 61.77 (moving its rank from 65th to 53rd). The improvement is attributable to a decrease in uncertainty over disputed land claims (-33 points), regulatory enforcement (-21 points), and labour regulations and employment agreements (-19 points).

Four Latin American and Caribbean jurisdictions are in the third quintile this year, including Brazil – Offshore presalt area PSC (ranked 65th), Trinidad and Tobago (ranked 67th), Argentina – Santa Cruz (ranked 71st), and Mexico (ranked 77th). Mexico's PPI score was virtually unchanged from last year (52.78 in 2016, 52.97 in 2017), but its rank dropped from 68th (of 96) in

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



2016 to 77th (of 97) in 2017, due to its score relative to those of the other ranked jurisdictions.

Ecuador is in the fourth quintile this year, while Bolivia and Venezuela rank 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 0 for six of the past seven years, ranking higher than only Libya in 2015. As in 2016, Venezuela had (or shared) the highest percentage of negative responses (100%) on survey questions about security and its legal system. Moreover, this year, an increase in uncertainty (8 points) about fiscal terms, security, and regulatory duplication and inconsistencies 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

> "Providing information about bid rounds several years in advance allows for much better investment decisions and project planning."

"Local content laws deter foreign investment in the upstream sector."

"Some companies bought exploratory blocks in a bidding round held in 2015 and still haven't obtained environmental licensing."

Colombia

"The recent issuance by the Colombian National Hydrocarbon Agency of new rules for the award of areas is a recognition that the oil and gas industry has dramatically changed, and that it is necessary for governments to keep pushing to be competitive in a global industry."

"Concerns about unethical practices from land barons and politicians are a deterrent to investment."

Mexico

"In general, Mexico's energy reforms have been perceived as a good and serious attempt to open the energy market to the private sector and have provided the legal framework and institutional support required."

"Mexico's energy reforms are a good example of a serious and professional effort to do things right and create investor confidence—such reforms should be replicated in the Latin American region."

Peru

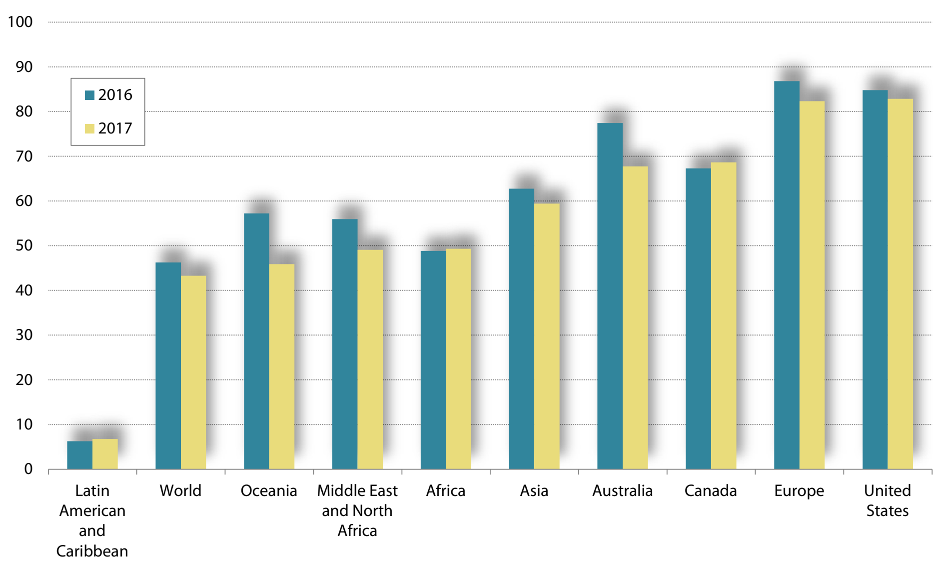
"Reforming the Peruvian oil laws to foster investment for developing new oil assets (inland, offshore) is exemplary."

Overview

Our analysis of the 2017 petroleum survey results indicates that the extent of negative 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 decreased in six out of 10 regions from where they were in 2016.[13] Canada, Latin America and the Caribbean, and Africa improved slightly this year. Europe has the second most attractive policy environment and Australia's weighed score is now slightly inferior to Canada's. The region with the greatest deterioration is Oceania, which experienced an 11-point decline in its weighted score. This year the United States experienced a two-point decline in its weighted score. Despite this, the United States remains the region with the most attractive policy environment for investment in upstream oil and gas.

The declines in certain world regions should be taken with caution because low response rates prevented us from ranking a considerable number of jurisdictions that were indicated to be among the least attractive for investment in the 2015 and 2016 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 2016 and 2017 surveys were examined in this section. As a result, 80 jurisdictions were included in this analysis, based on low response rates. Both of the jurisdictions in Spain were not analyzed in the 2017-2016 comparison as its results were combined in 2016. Europe results this year did not include Russia, the top reserve holder in the 2016 survey.

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, 2016a). This year publication data for 2016 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, 2015* (EIA, 2016b). 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, 2015).

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

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

Like the UK, the government of Australia only publishes data for P2 reserves. Data for combined proved and probable reserves in the respective states and territories, and in the offshore (like the Northern Territory, under federal jurisdiction), were provided by *Geoscience Australia* (2012). This information was used to allocate the EIA's estimate of proved reserves among the 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, 2016). The Norwegian Sea and the Barents Sea were combined in the Norway – Other Offshore jurisdiction due to less exploration and production activity in these regions than in the North Sea.

For Argentina, estimates of proved oil and gas reserves as at December 31, 2015, 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 at March 3, 2017 that was available on the website of the Agência Nacional do Petróleo (National Petroleum Agency) (Agência Nacional do Petróleo, Gás Natural e Biocombustíveis, 2016). We assumed that all offshore oil reserves in the Campos and Santos basins were part of the pre-salt reserves.

Appendix 2: Previous Methodology and Additional Sub-Indices

The methodology previously used to calculate the PPI 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

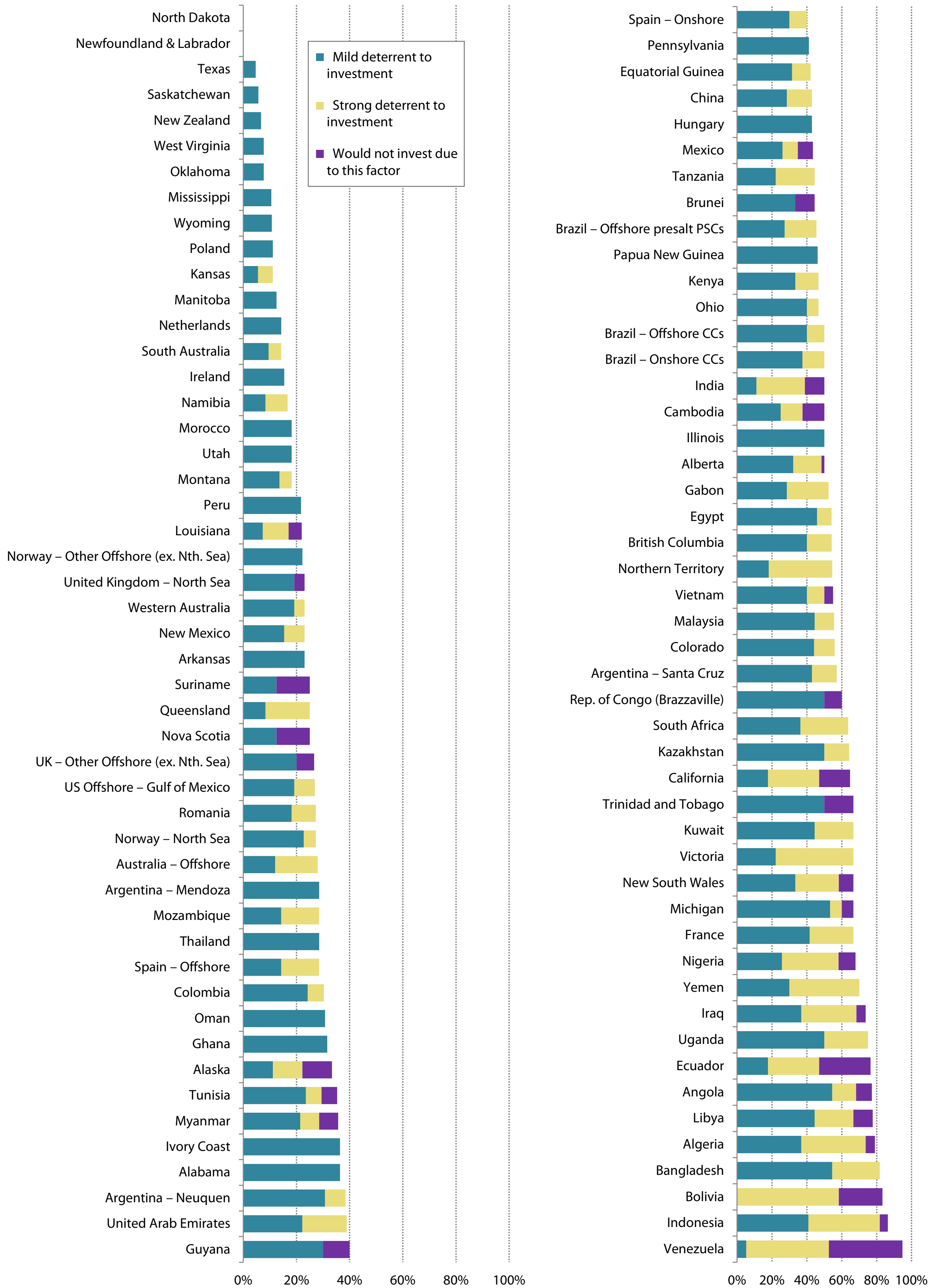


Figure 15: Taxation in general

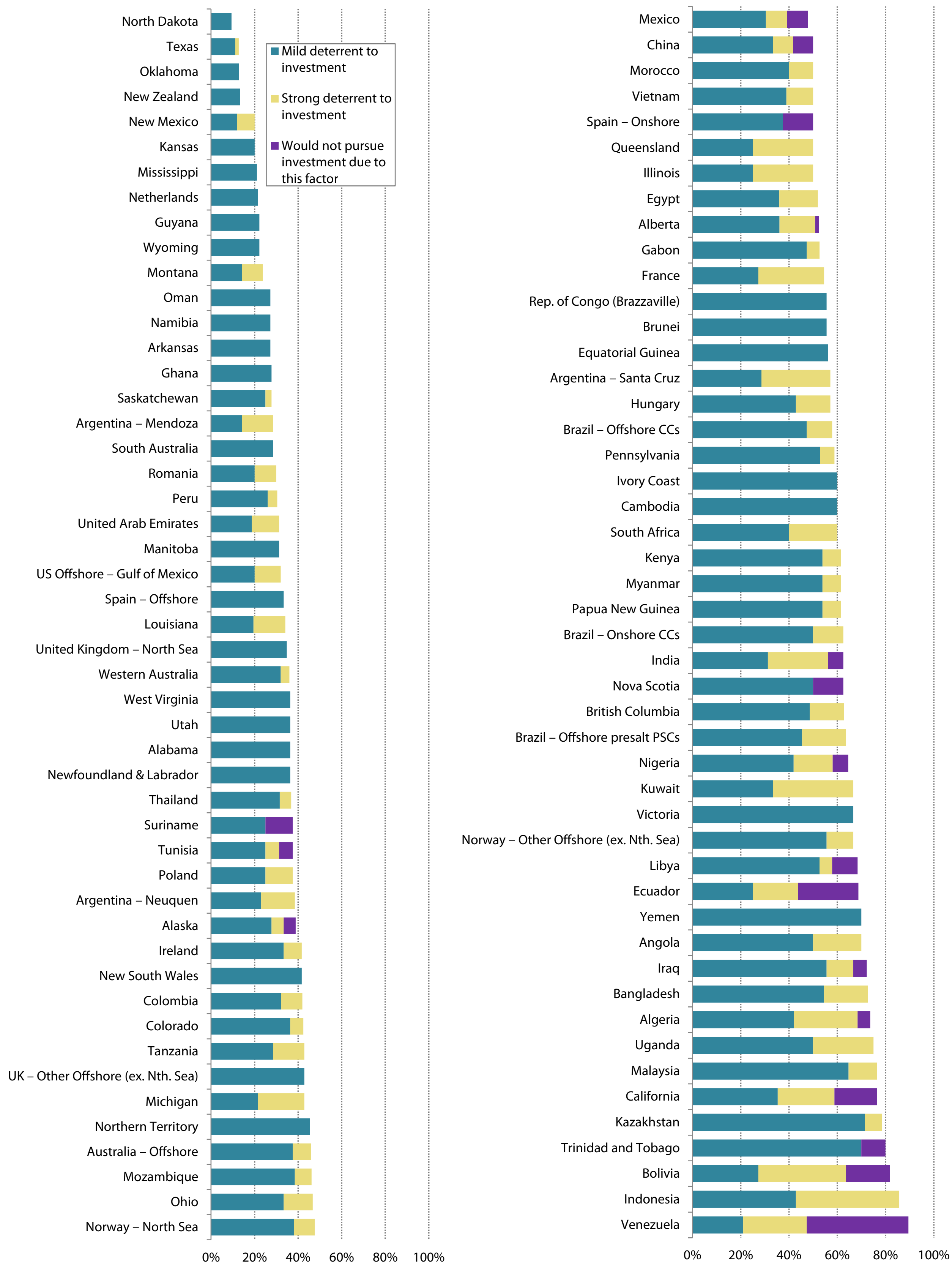


Figure 16: Environmental regulations

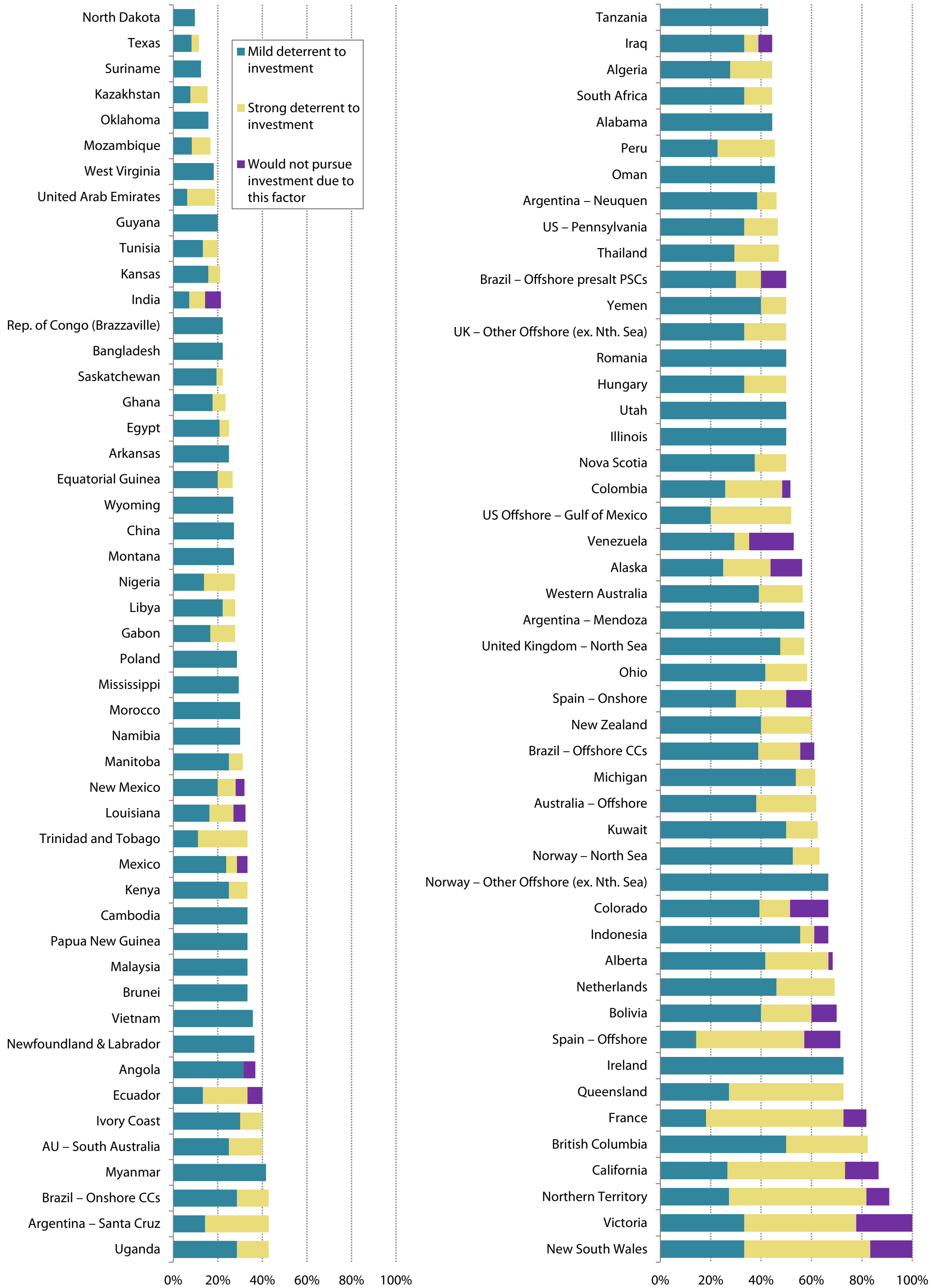


Figure 17: Uncertainty concerning the administration, interpretation, and enforcement of regulations

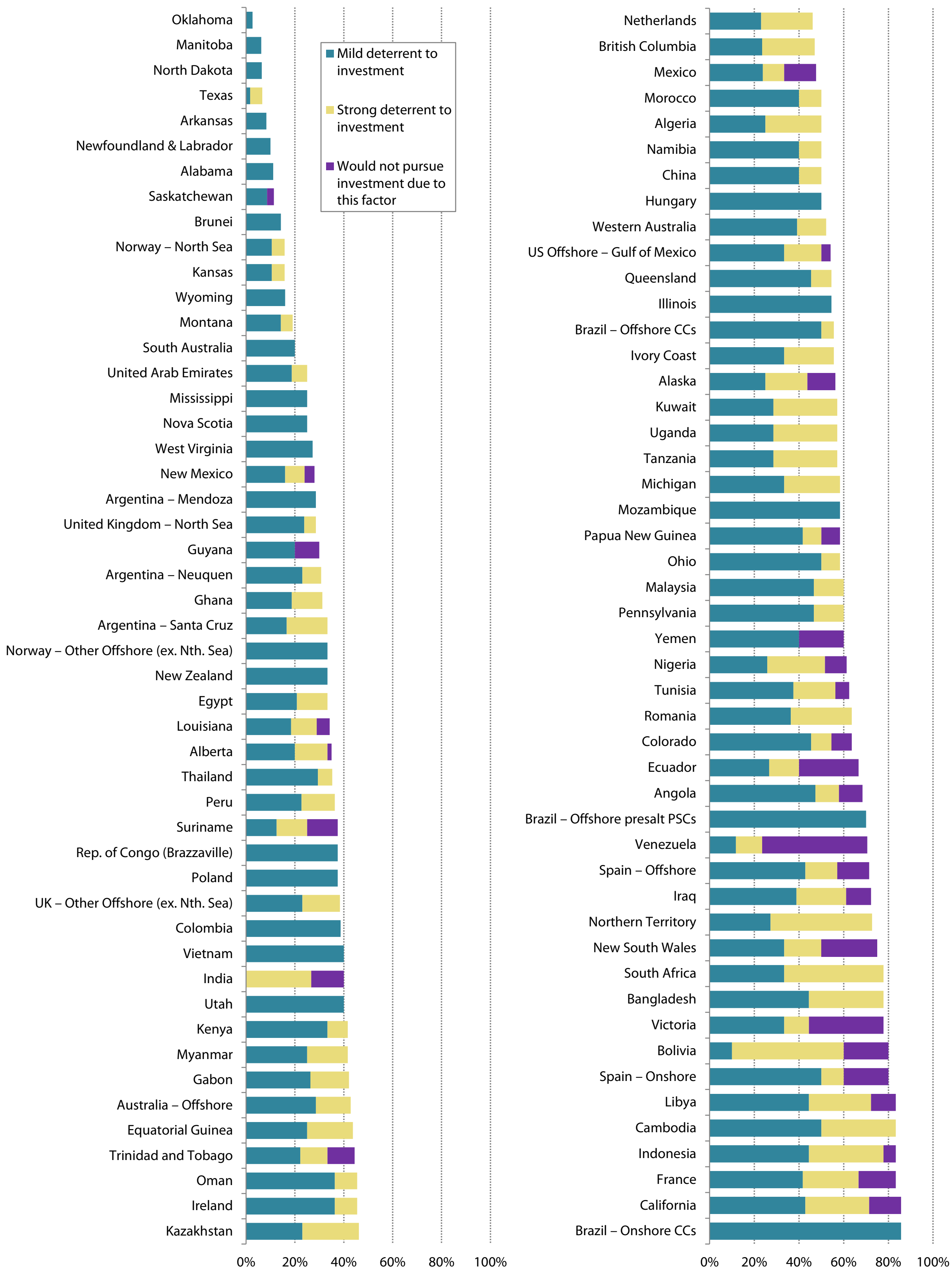


Figure 18: Cost of regulatory compliance

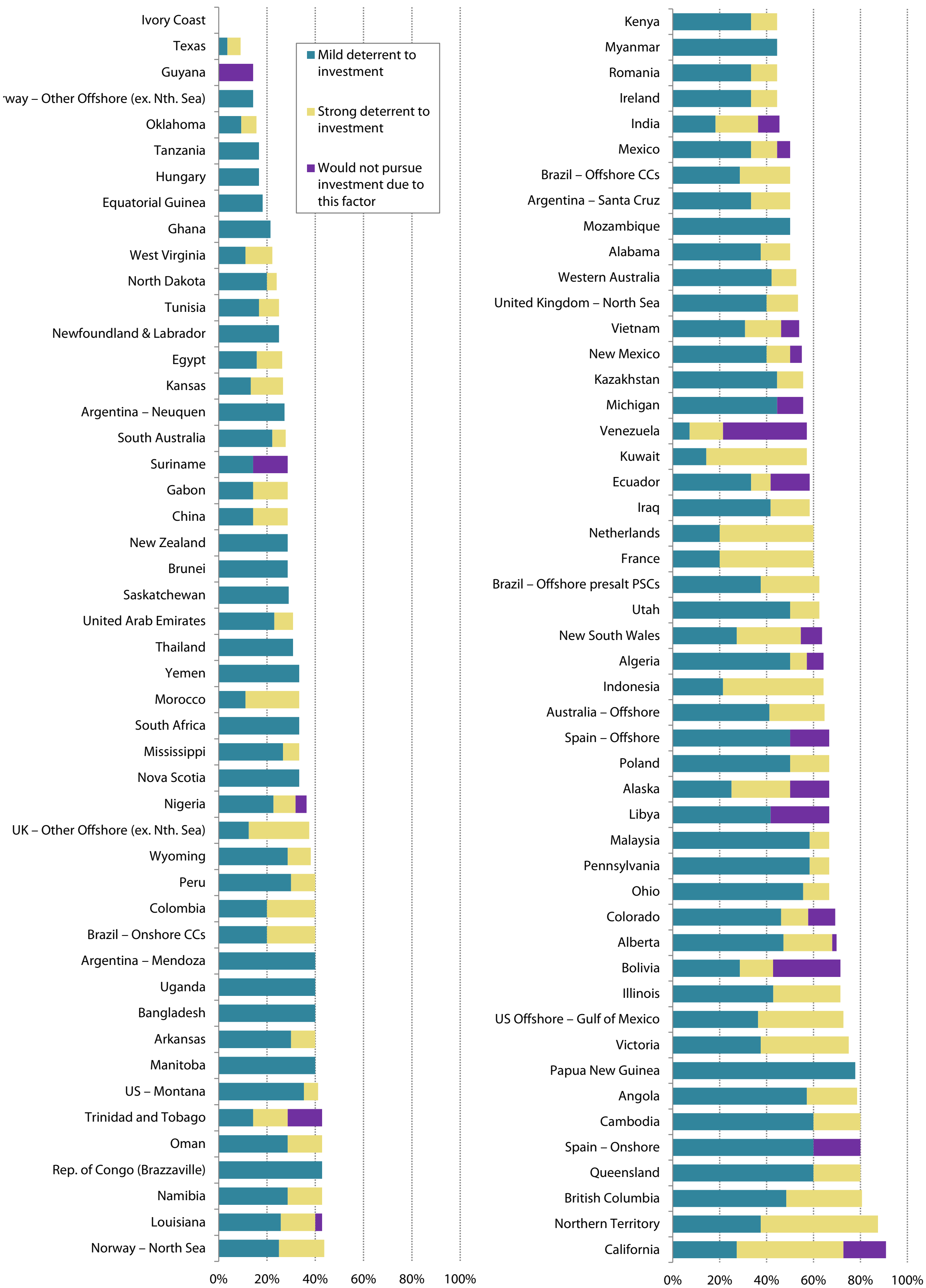


Figure 19: Uncertainty regarding protected areas

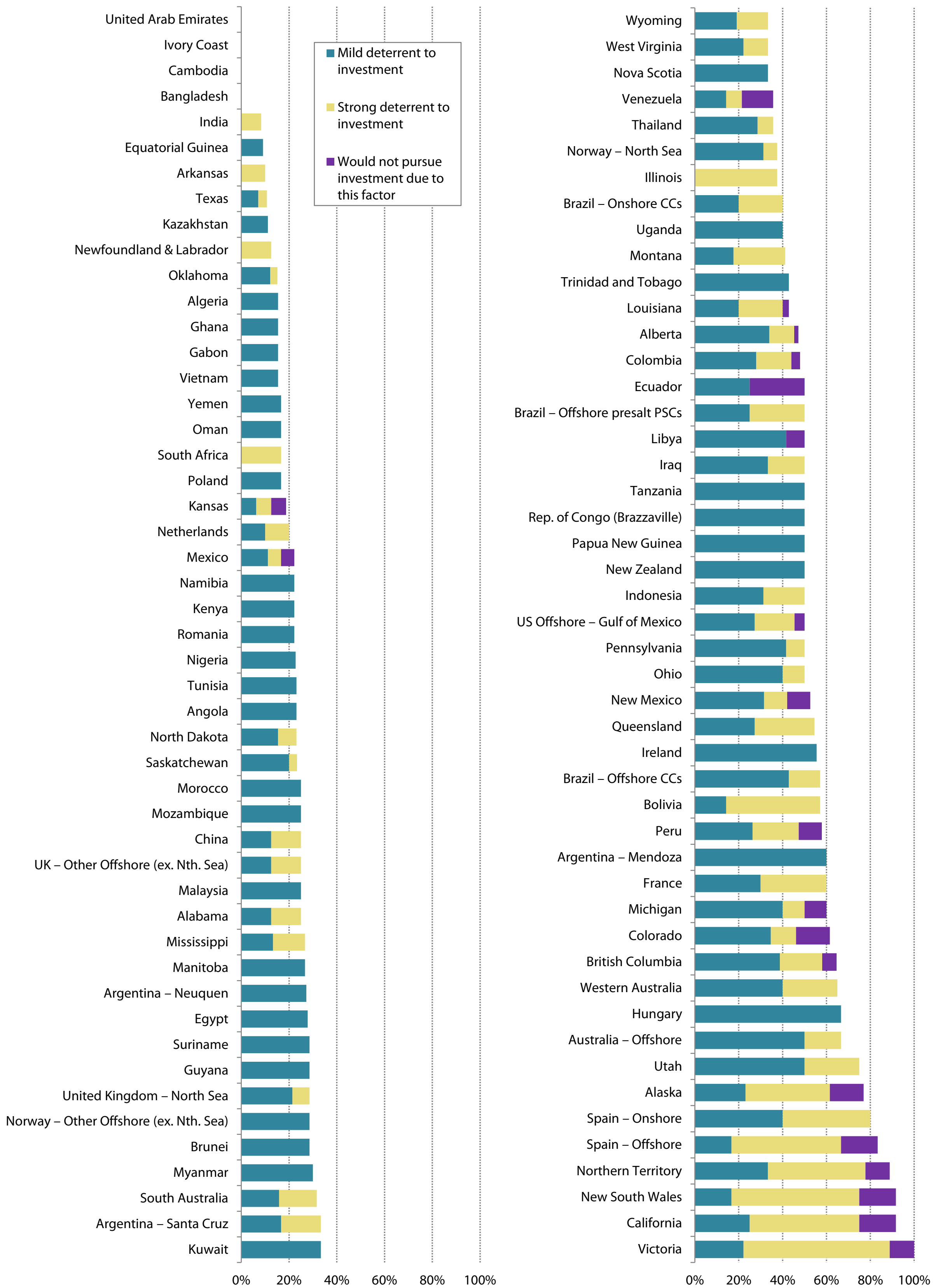


Figure 20: Trade barriers

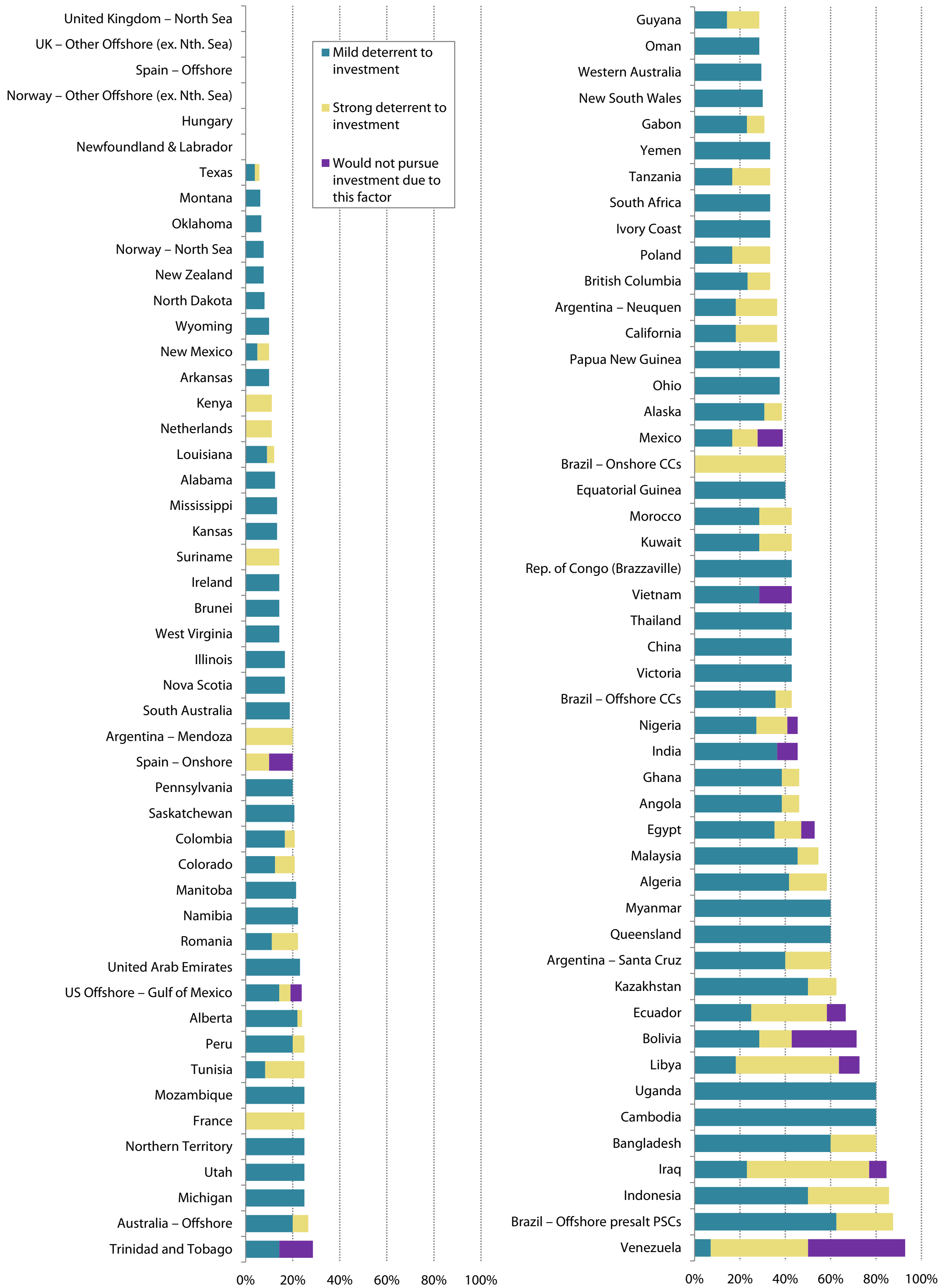


Figure 21: Labour regulations and employment agreements

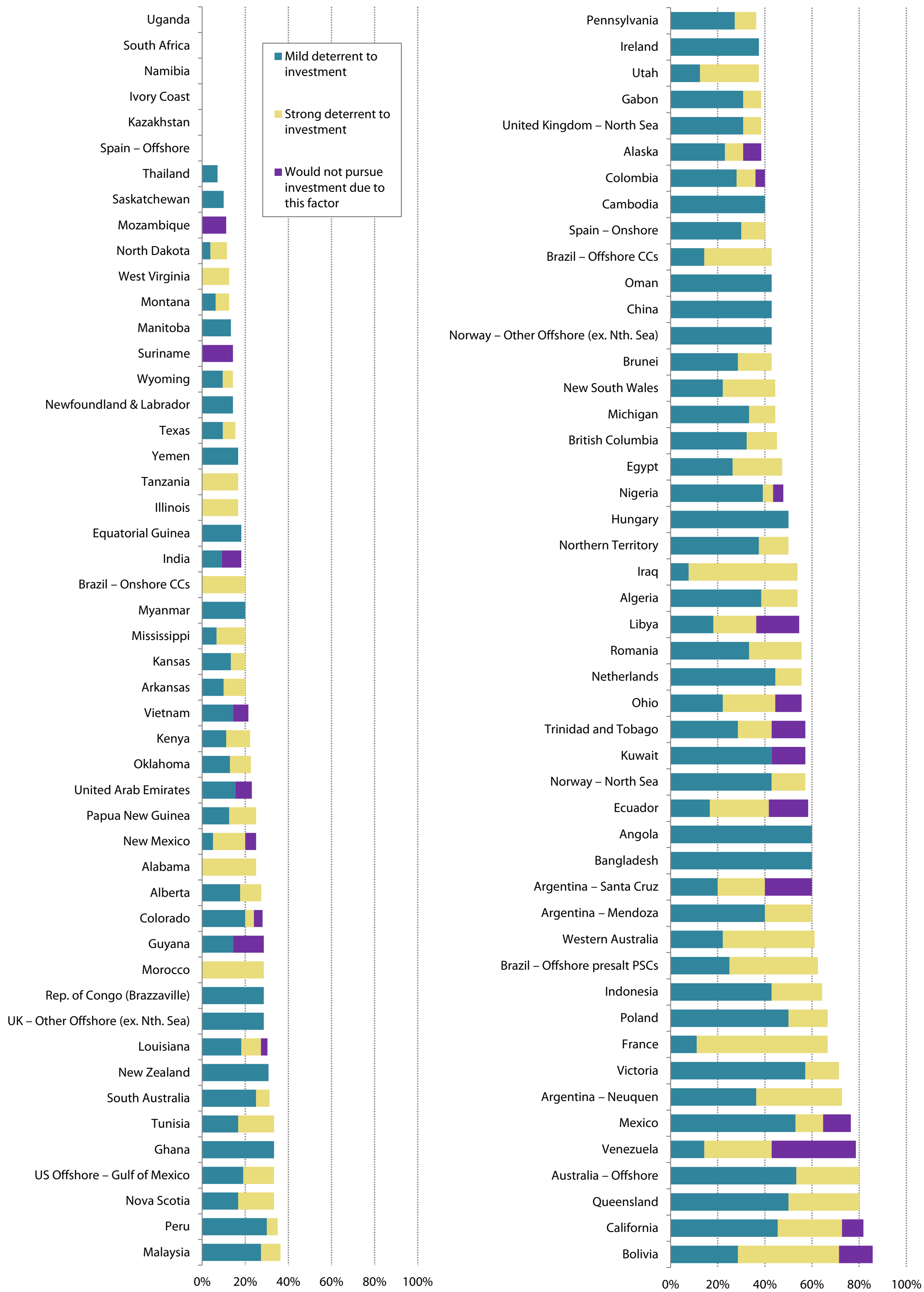


Figure 22: Quality of infrastructure

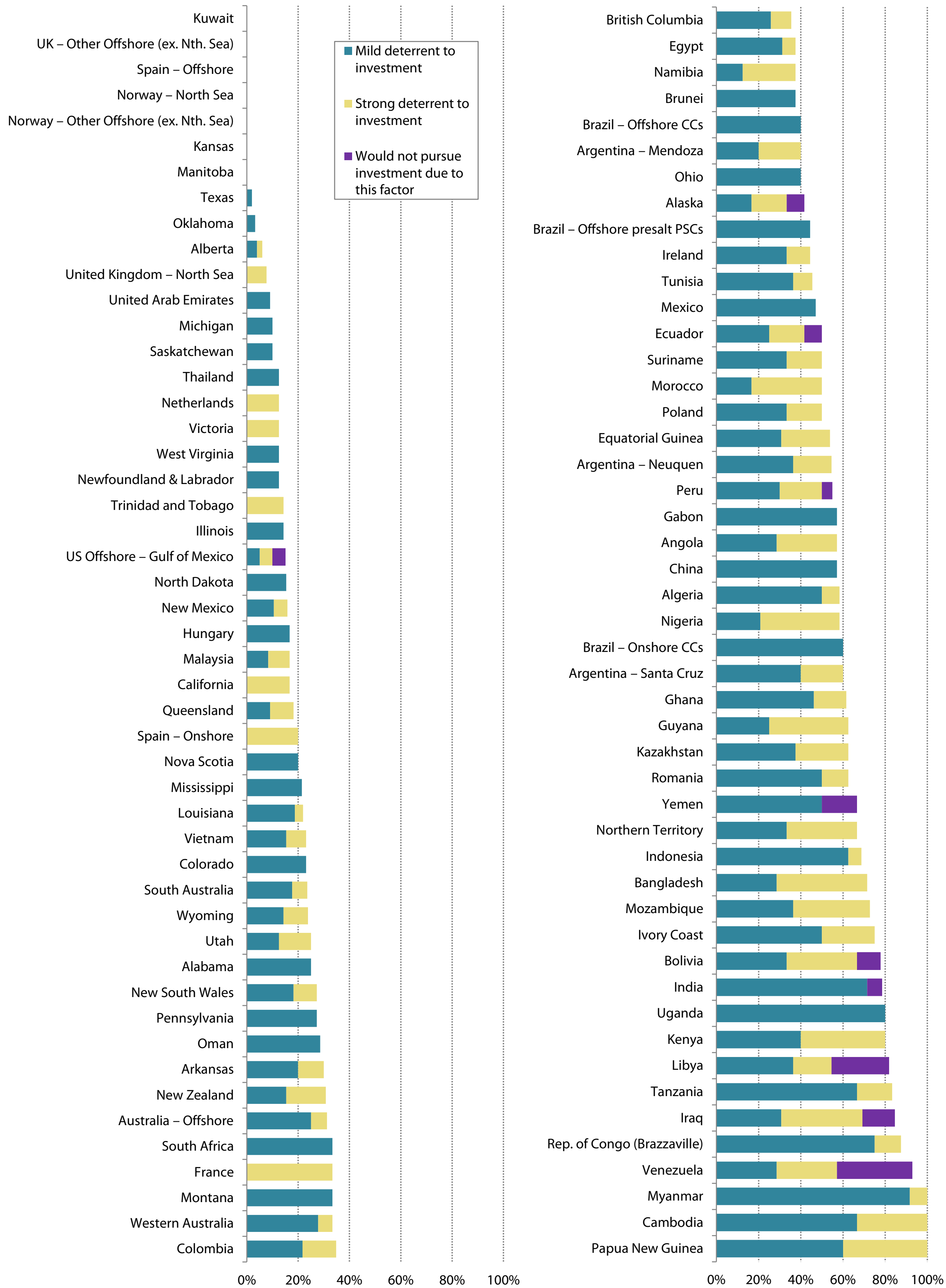


Figure 23: Geological database

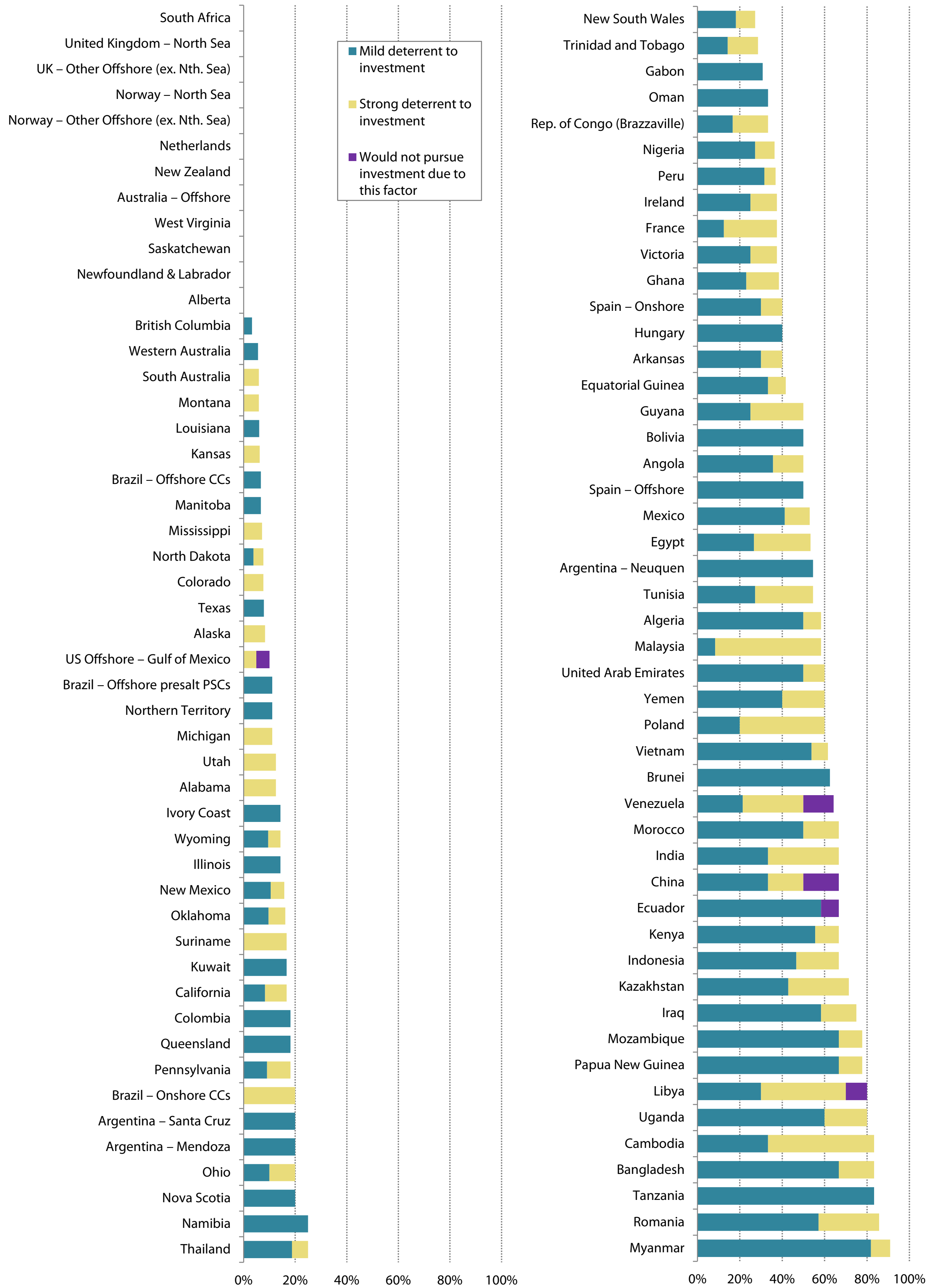


Figure 24: Labour availability and skills

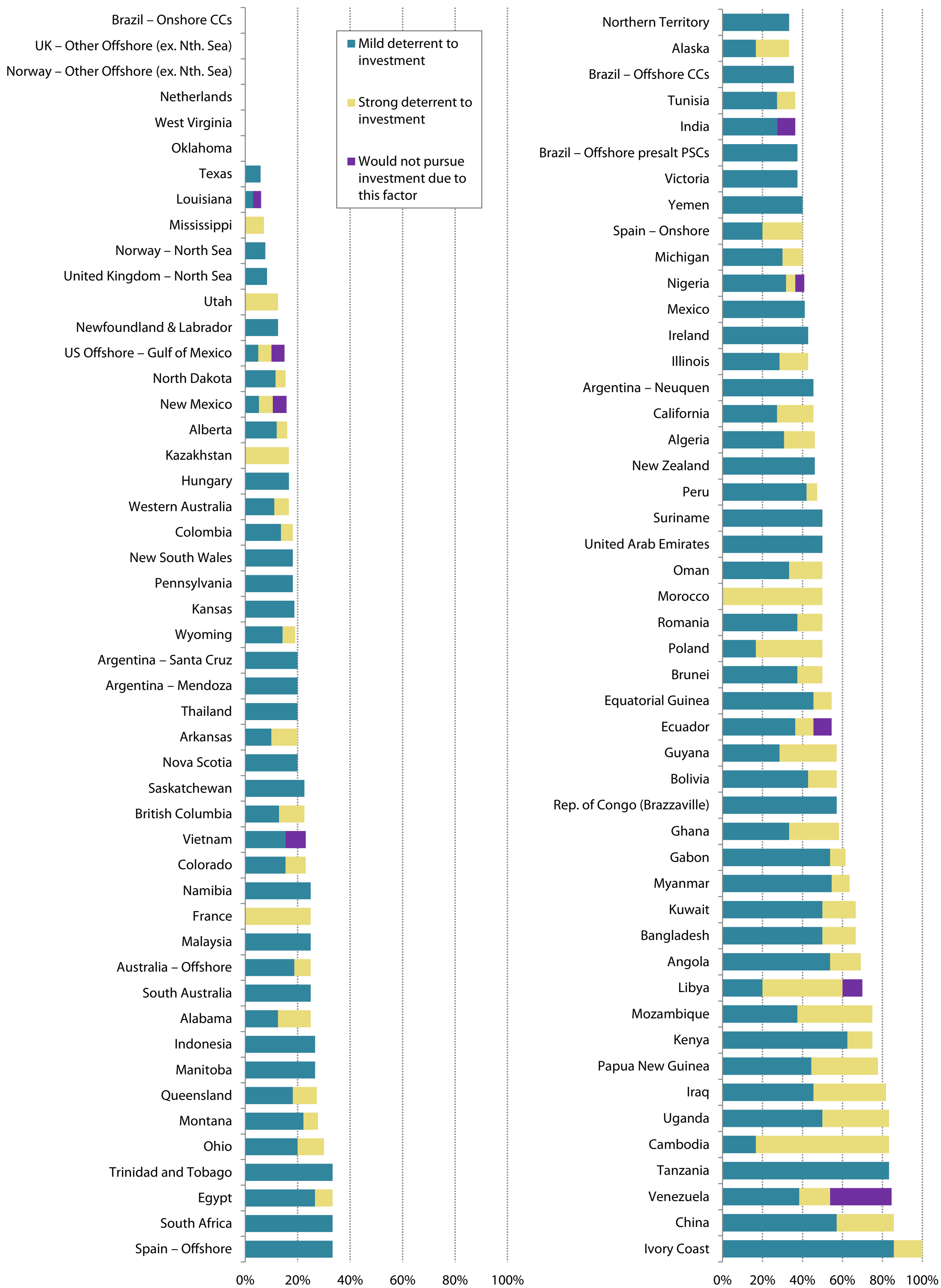


Figure 25: Disputed land claims

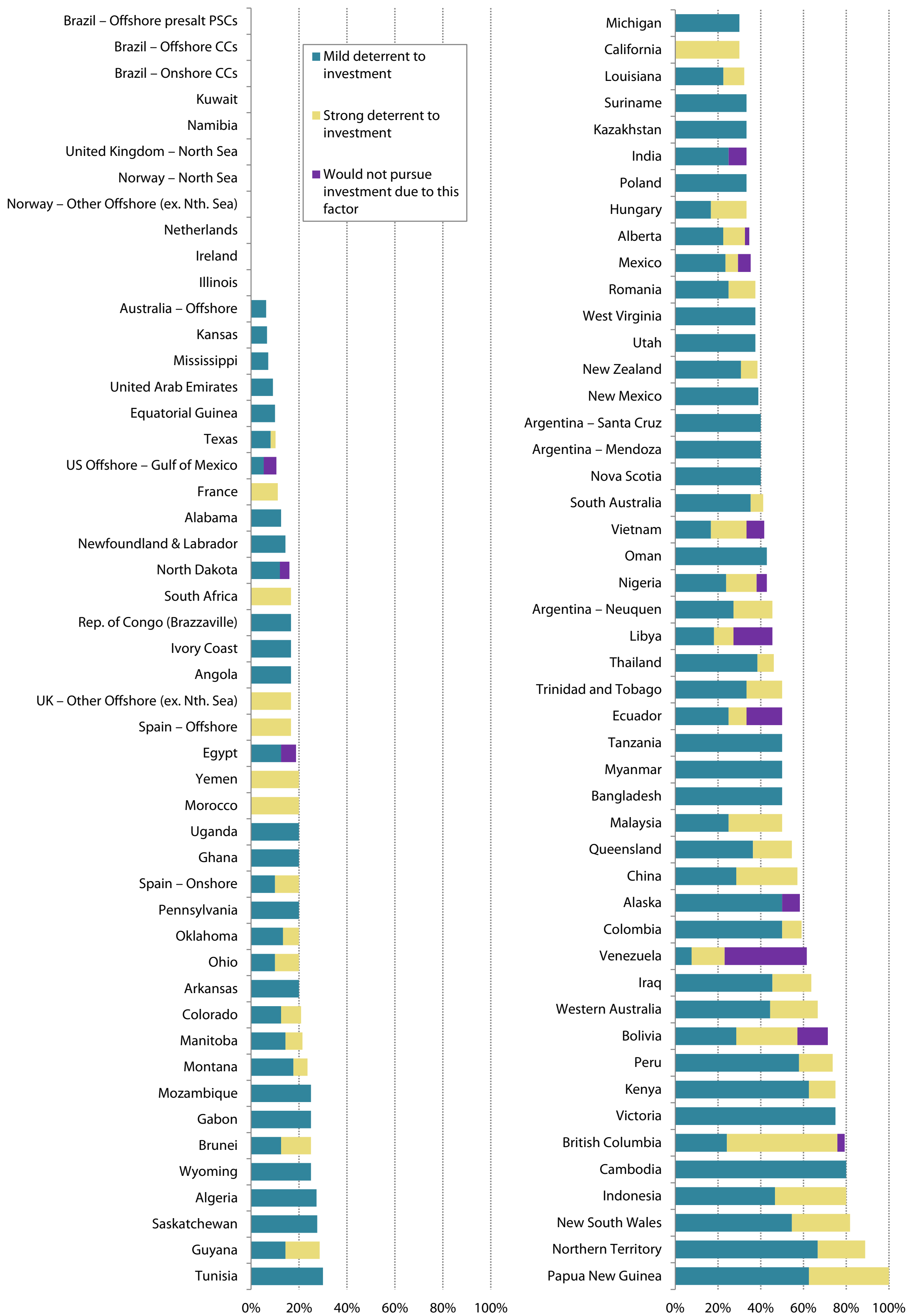


Figure 26: Political stability

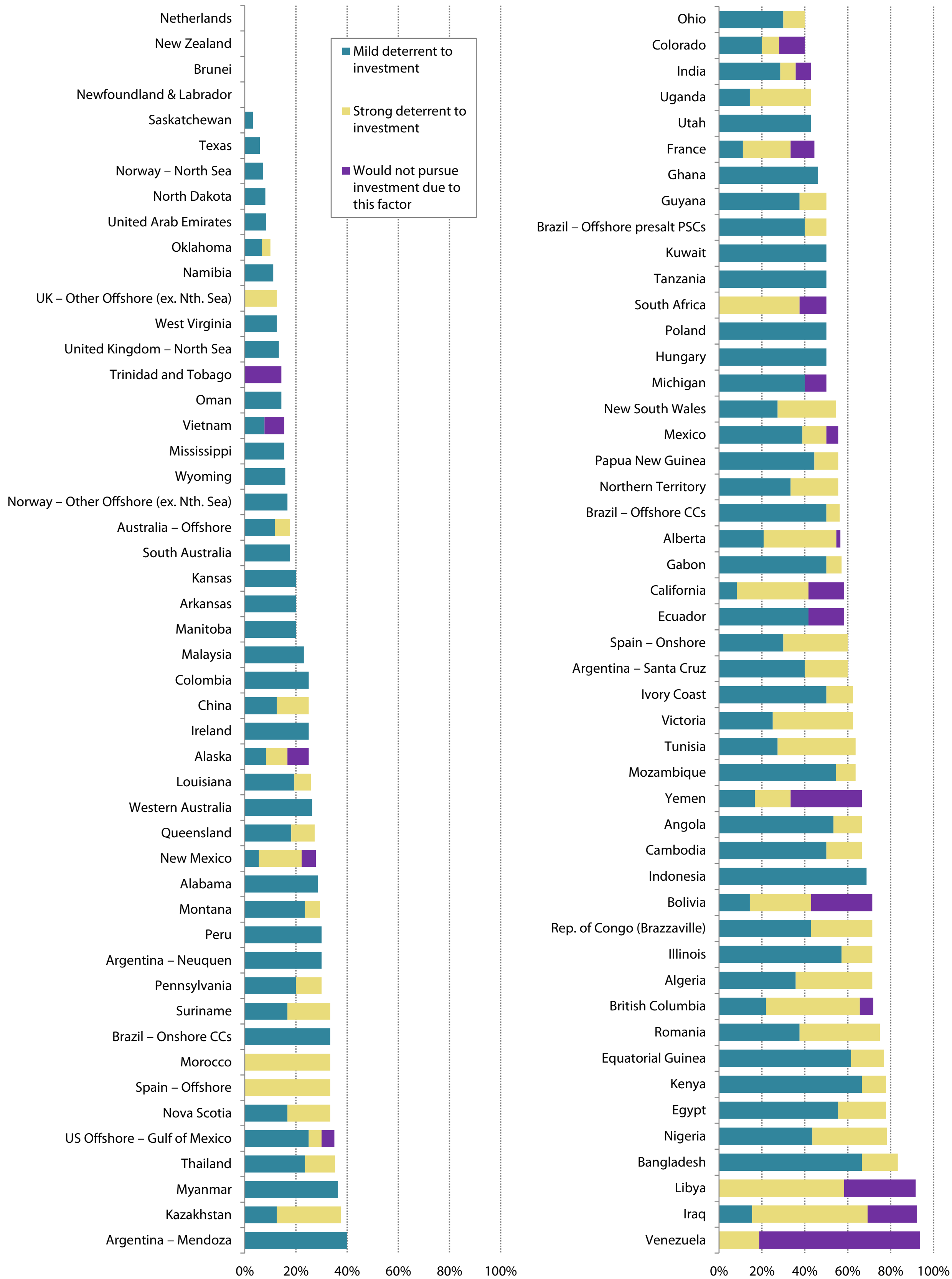


Figure 27: Security

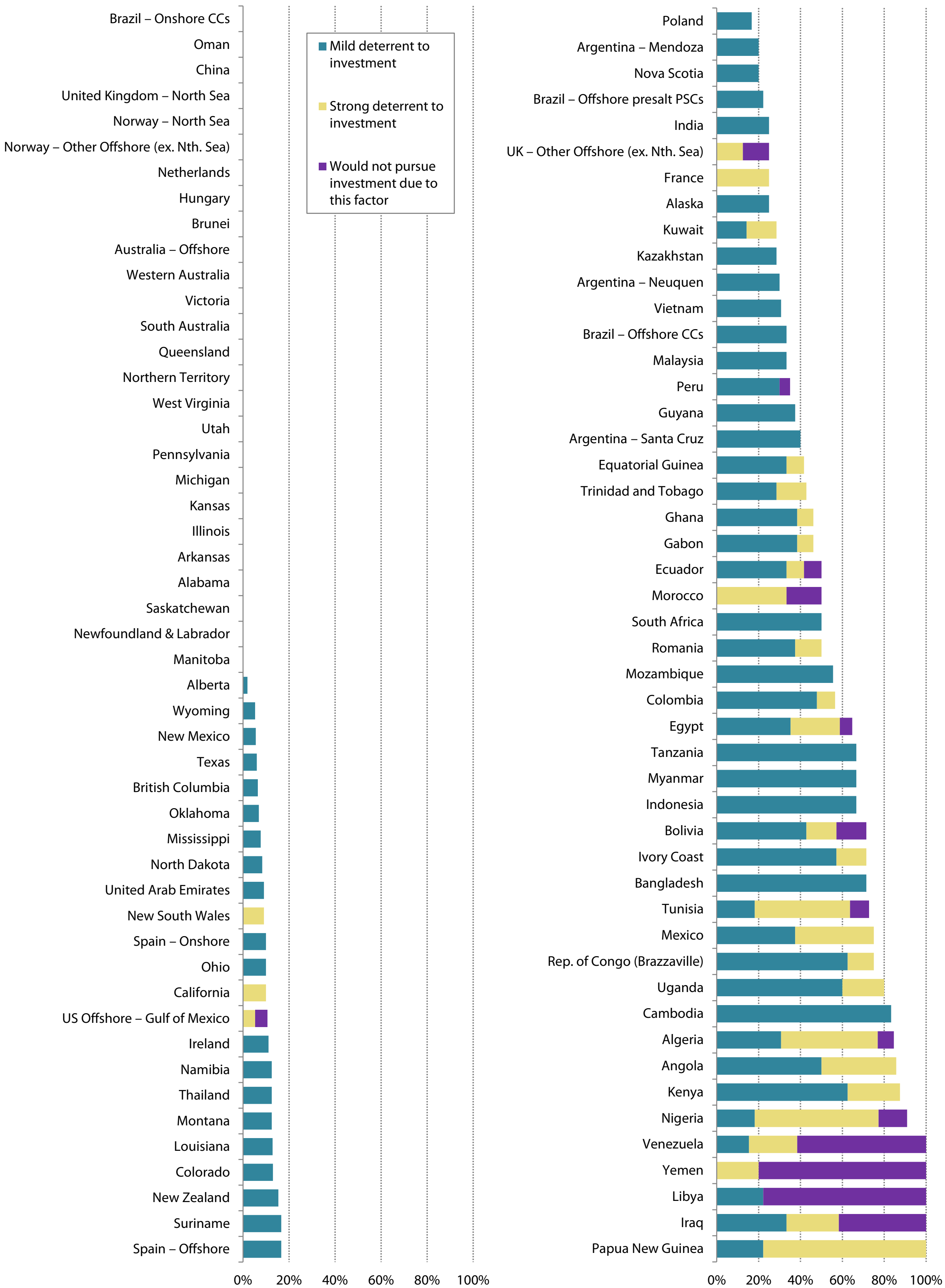


Figure 28: Regulatory duplication and inconsistencies

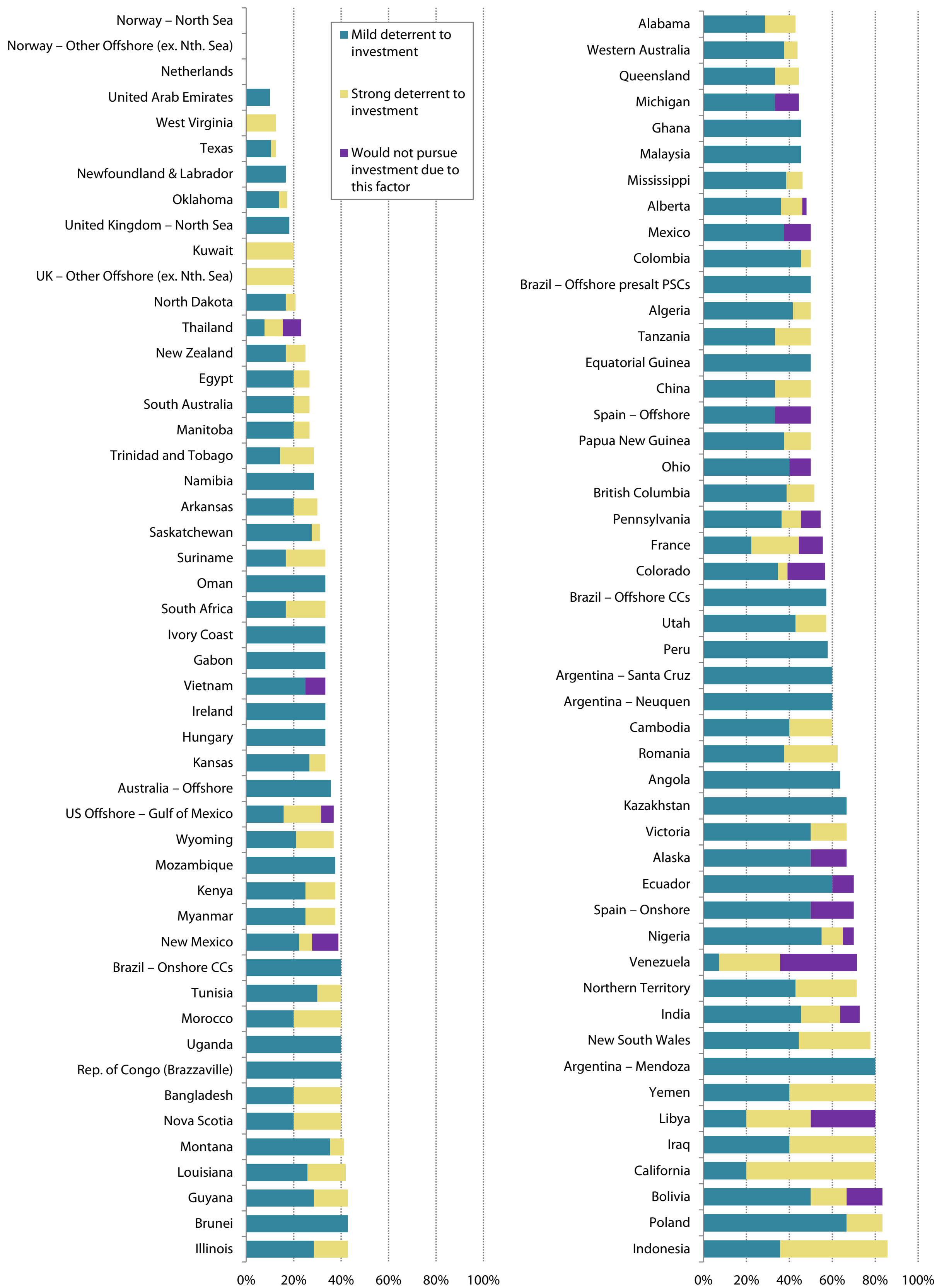
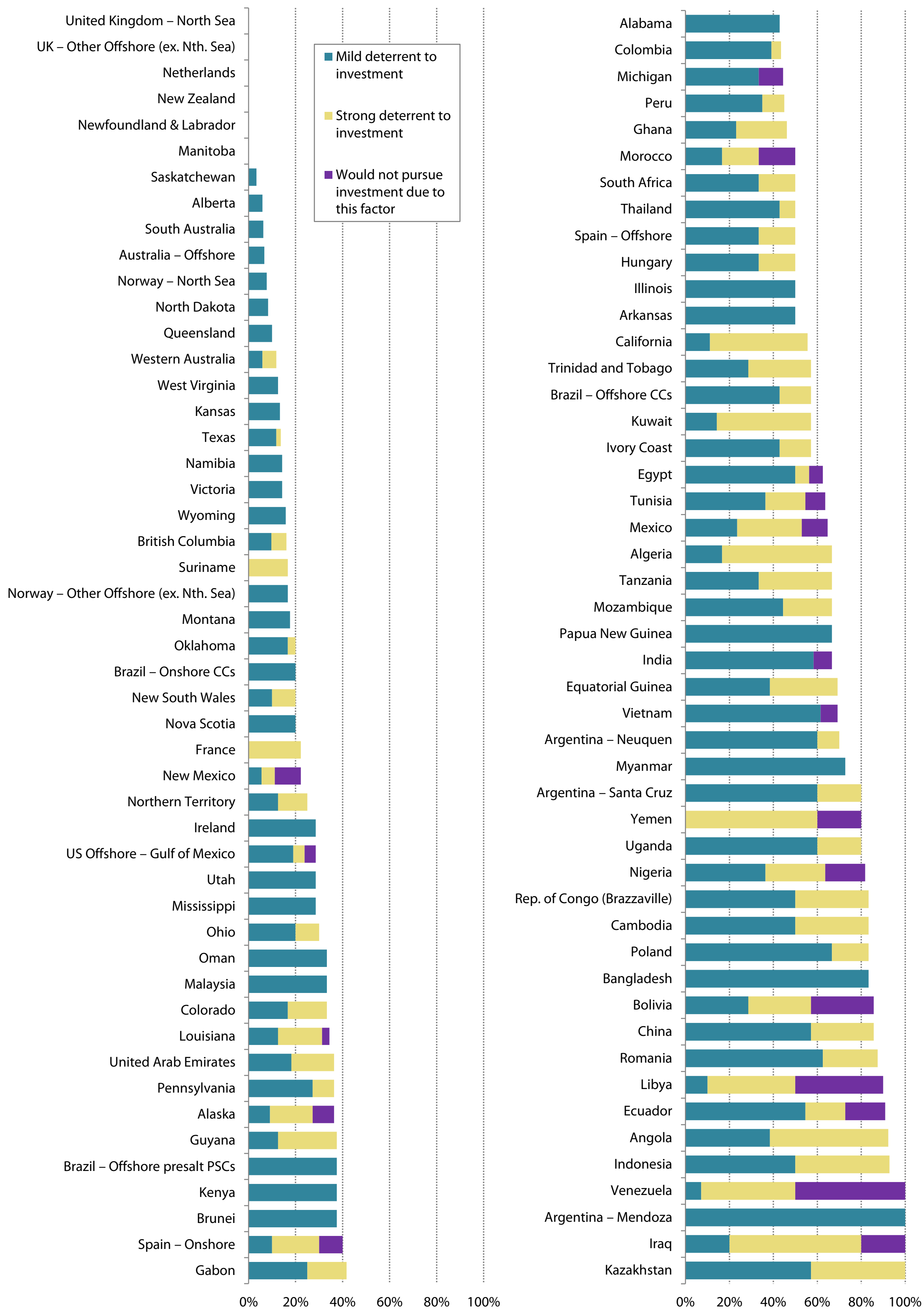


Figure 29: Legal system processes



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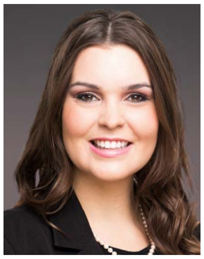

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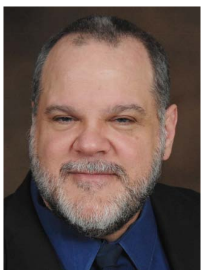

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