

Special Issues in Energy Financing & Risk Management

Geopolitical Risk Analysis

TUFTS PAPER



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October 2020

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The Sovereign Wealth Fund Initiative Summer 2012

Building Capacity for Geopolitical Risk Analysis

Dr. David A. Glancy¹

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How is risk **defined**?

- Geopolitical risk.

How is risk **perceived**?

- Psychology
- Game theory:
 - ✓ Payoff dominant (risk prone)
 - ✓ risk dominant (risk averse).

How is risk **managed**?

- Game theoretic approach (simulation).

Perception of Risk Posed by Extreme Events

**To be
studied**

Paul Slovic
Decision Research and University of Oregon

Elke U. Weber

Columbia University and
Wissenschaftskolleg zu Berlin

This paper was prepared for discussion at the conference “Risk Management strategies in an Uncertain World,” Palisades, New York, April 12-13, 2002.

Jim

push

don't
push

push

5,5

-10,0

Karl

don't

0,-10

1,1

push

Jim

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5, 5

-10, 0

Karl

don't

0, -10

1, 1

push

Schelling or focal point equilibrium?

Jim

push

don't
push

Karl

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don't
push

<u>5</u> , <u>5</u>	-10, 0
0, -10	<u>1</u> , <u>1</u>

payoff dominant
Nash equilibrium

Jim

push don't push

Karl

push don't push

push	<u>5</u> , <u>5</u>	-10, 0
don't push	0, -10	<u>1</u> , <u>1</u>

risk dominant
Nash equilibrium

Types of risk:

- **market** risk
 - **liquidity** risk
- **credit** (or default) risk
- **operational** risk
- **political** risk
 - **regulatory** risk.

Other types of risk:

- environmental disasters
- terrorist acts (*more on this later*).

Market risk:

- ✓ loss due to changes in market prices
 - constantly changing in the case of oil and gas

Liquidity risk (part of market risk):

- ✓ unable to meet financial obligations (traditional approach)
- ✓ unable to trade in the market
 - e.g. lack of counterparties

Credit or default risk:

- ✓ counterparty unable to make agreed payments for provided goods or services

Operational risk:

- ✓ loss resulting from failed or inadequate business processes
 - ❑ systems
 - ❑ operational characteristics
 - ❑ people
 - ❑ external events

Operational risks:

- Quality risk
 - ✓ product does not meet specifications
- Storage risk
 - ✓ commodity cannot be stored (appropriately)
- Model risk
 - ✓ incorrectly specified models
 - ✓ Professor Dagoumas: “*robust*” models
- Legal risk
 - ✓ failure to comply with law or regulatory events
- Headline risk
 - negative publicity.

Political or **regulatory** risks:

- ❑ nationalization (or expropriation) of a company (or some of its assets)
- ❑ unexpected changes in regulation.

Political decisions have a significant impact on asset prices and business performance.

Understanding **geopolitical risk** can help investors recognize and take advantage of opportunities.

How do financial firms and investors deal with geopolitical risk?

- Diversify investments across (more) **countries** (59%)
- carry out more **research** before new investments (47%)
- avoid investments in **certain countries** (45%)
- decrease (the size of) investments in **risky countries** (39%)
- diversify investments across (more) **industries** (27%)
- use more **political risk analysis** (26%).

Geopolitical risk is **complex**.

- ✓ **Causal relationships** are difficult to determine.
- ✓ Many **factors** affect political decisions.
- ✓ Many **variables** interact and influence political outcomes.

Due to the **complexity** of geopolitical risk, managers resort to familiar tools:

- diversification
- purchasing (political) **risk insurance**
 - offered by e.g. the **World Bank** through its Multilateral Investment Guarantee Agency (MIGA) since 1988
- adding a **risk premium** to the (required) rate of return.

Quantifying risk by traditional (business) methods:

- **Payback Period**

- ✓ too simple

- **Return on Investment (ROI)**

- ✓ used occasionally

- **Net Present Value (NPV)**

- ✓ often used

- **Internal Rate of Return (IRR)**

- ✓ used most of the time

- ✓ requires use of Excel.

These methods traditionally ignore geopolitical risk.

Year	Cashflow	Rate (%)	Discount Rate	Present Value
0	-5	10	1.000	-5.000
1	1.9	10	0.909	1.727
2	1.7	10	0.826	1.405
3	1.5	10	0.751	1.127
4	1.1	10	0.683	0.751
5	0.7	10	0.621	0.435
				0.445

Year	Cashflow	Rate (%)	Discount Rate	Present Value
0	-5	14.019	1.000	-5.000
1	1.9		0.877	1.666
2	1.7		0.769	1.308
3	1.5		0.675	1.012
4	1.1		0.592	0.651
5	0.7		0.519	0.363
				0.000

Geopolitical risk analysis has issues:

- It is **subjective**.
- It is (considered) **qualitative**.
- Political risk analysts lack proper scientific (business) background.
- There are no (standard) **methodologies** or established industry **practices** for assessing geopolitical risk.

Geopolitical risk analysis:

- Supports **scenarios**
 - ✓ how political crises affect asset prices.
- Helps with asset selection
 - ✓ determine safest access (points) to region or asset.
- Highlights issues and events that have been ignored (through other risk management techniques).
- Helps price risk properly.

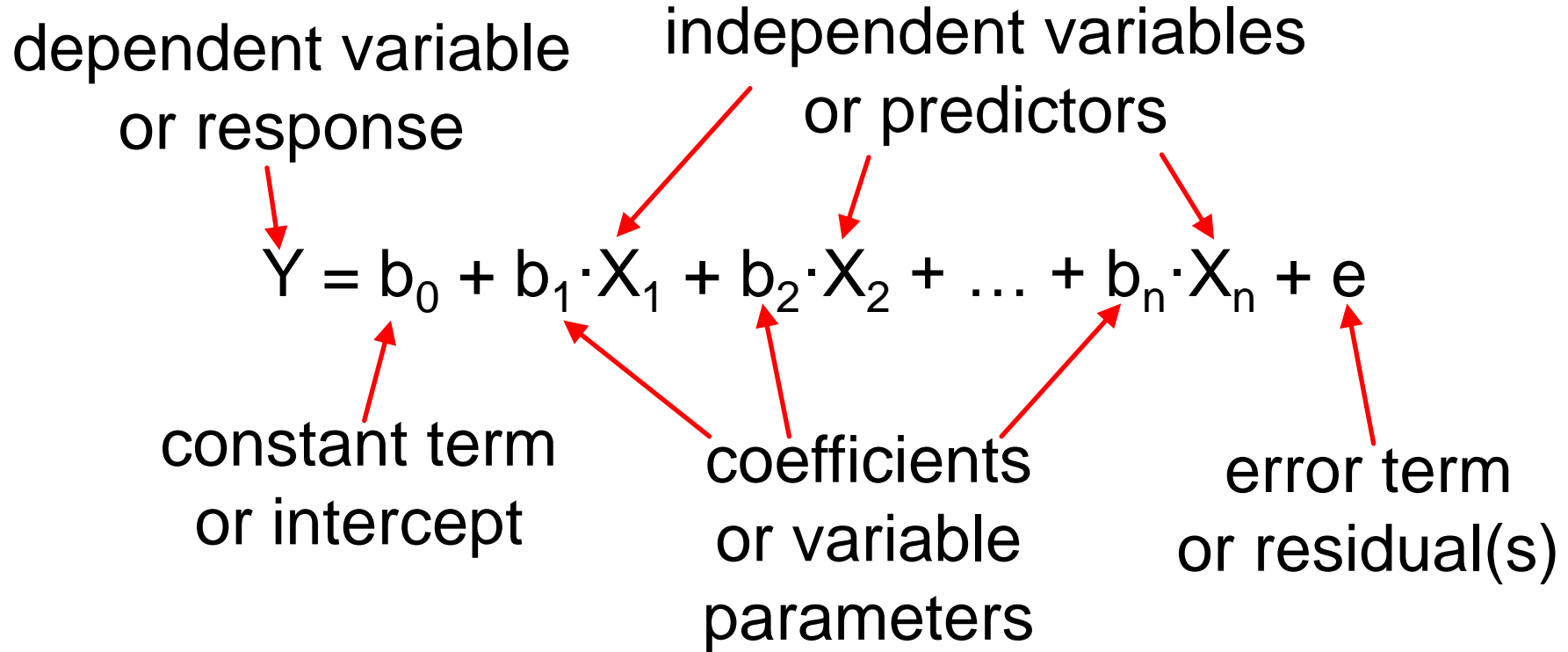
With geopolitical risk analysis, (political) analysts:

- gain more accurate understanding of **amount of risk in portfolio**
- understand **where** (geopolitical) risk is located
- adjust investments for desired risk tolerance
 - ✓ **risk prone** (payoff dominant)
 - ✓ **risk averse** (risk dominant).

Geopolitical risks:

- **government** actions
 - ✓ expropriations
 - ✓ breaches of contract
 - ✓ discriminatory taxation
- **geopolitical** events
 - ✓ (international) wars
 - ✓ terrorism
- **socioeconomic** changes
 - ✓ social unrest.

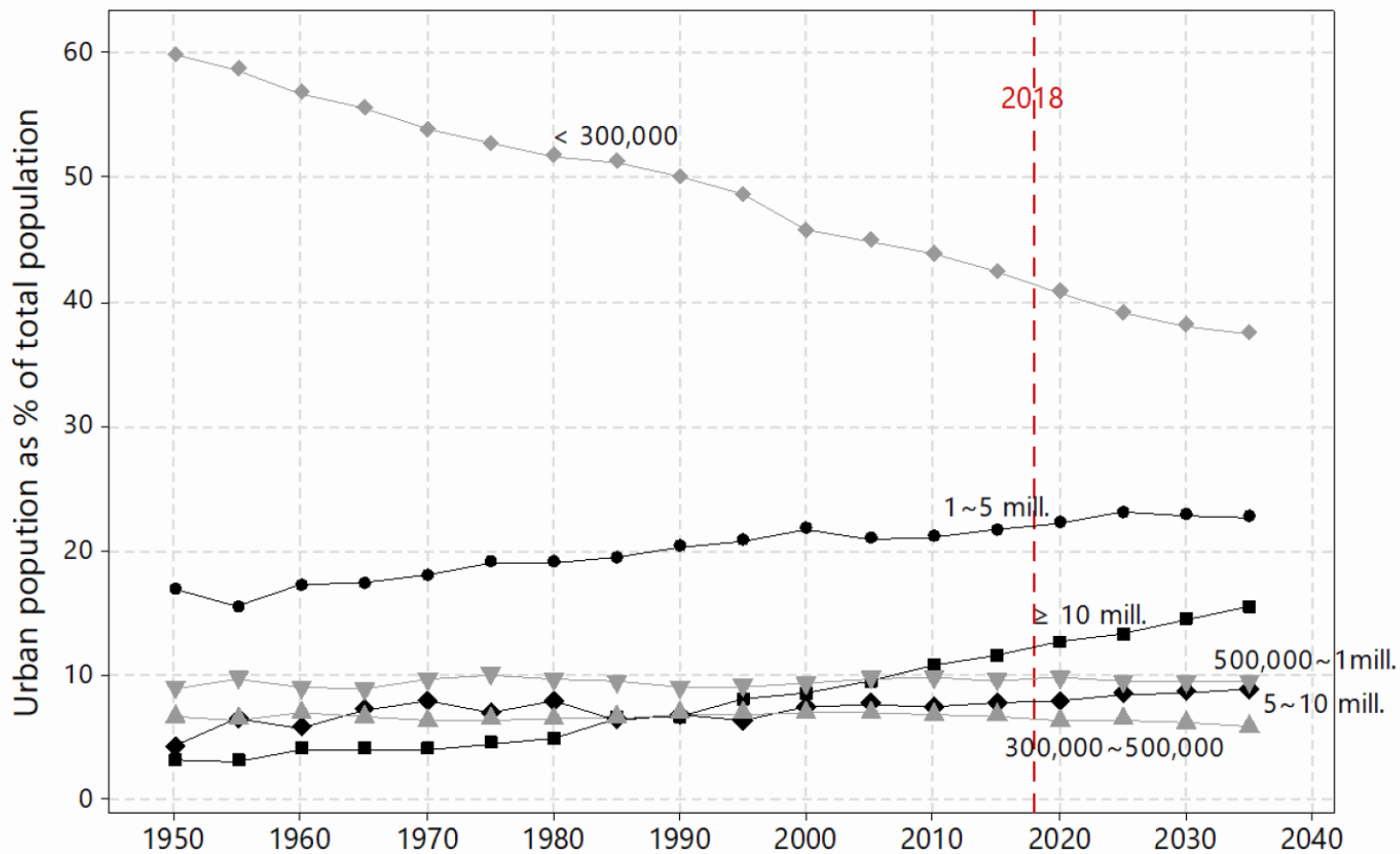
Multiple Linear Regression

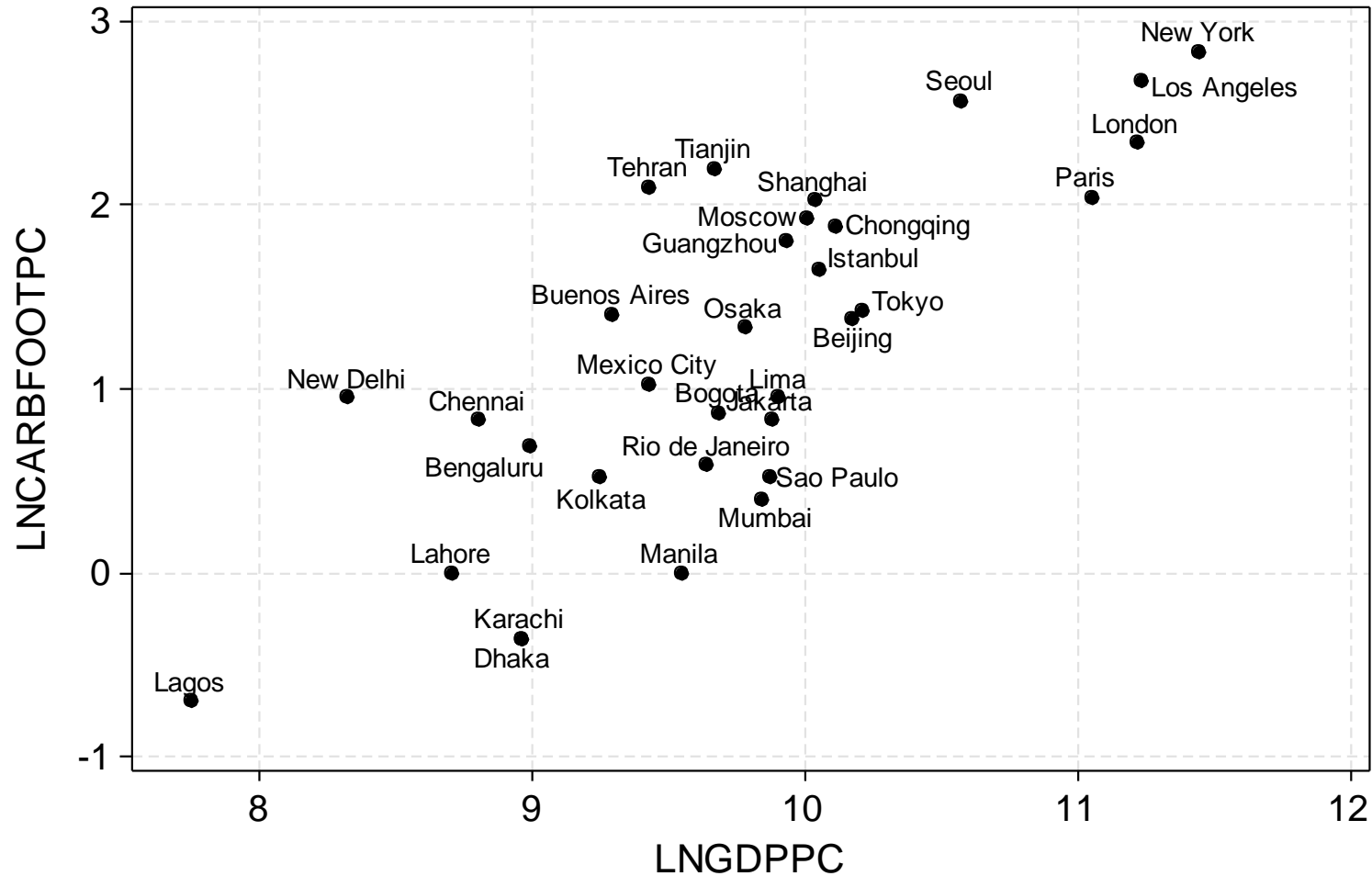


Key issues in Multiple Regression

- Assumptions
- Coefficient of determination (R^2)
- Residual plots
- Statistical significance of variable coefficients
 - ✓ T-tests
- Testing for multicollinearity
 - ✓ Variable Inflation Factors (VIF)
- Mind over matter: driven by theory rather than sample specifics

Figure 1. Urban population as percentage of total population for different city sizes (data after 2018 are projections; UN, 2019)





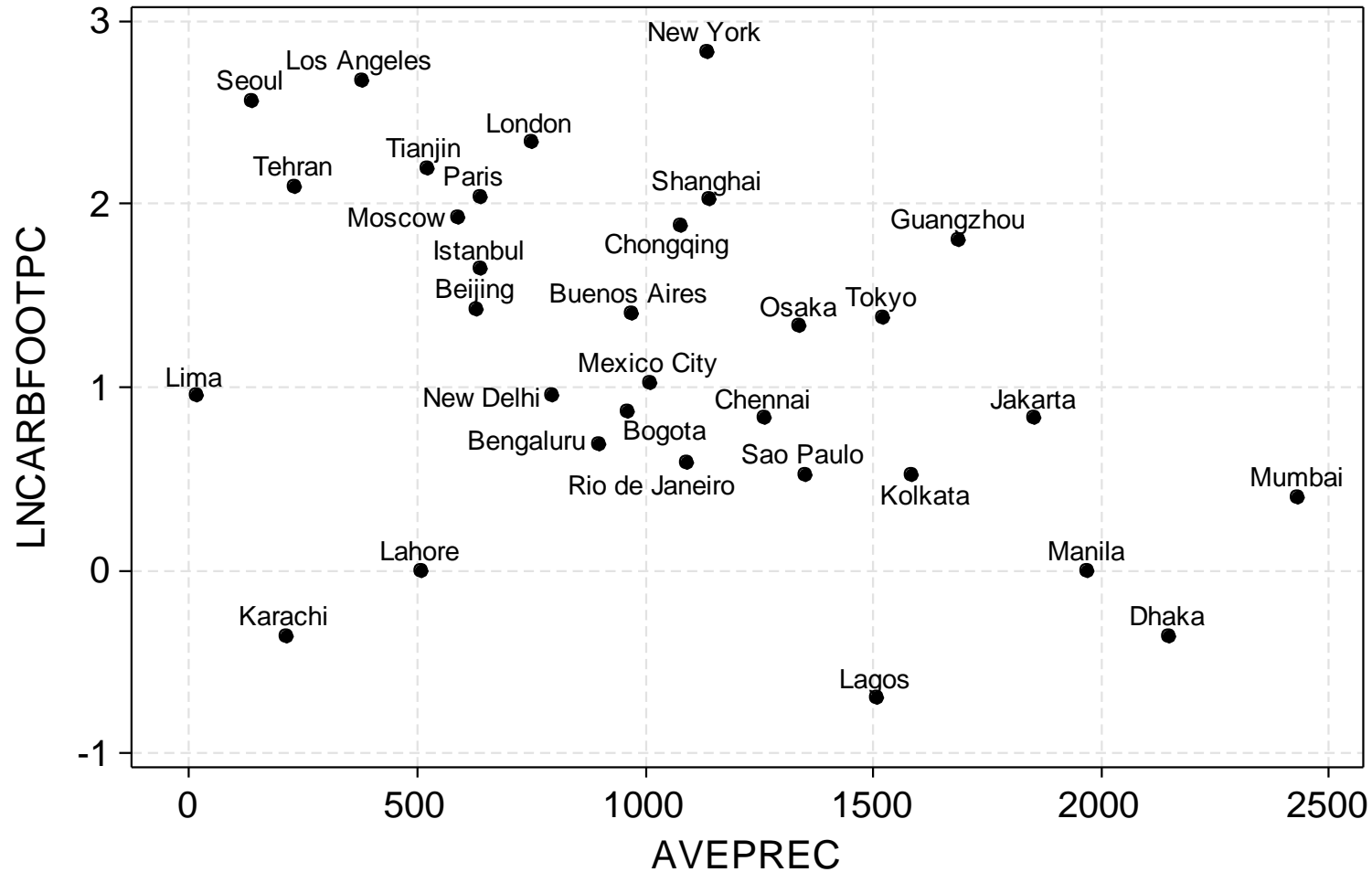


Table 3. Multiple regression models of log(CARBFOOTPC) (with HC1 heteroskedasticity-robust standard errors)

<i>Model Statistic</i>	M1			M2			M3			M4		
	<i>Value</i>	<i>p-value</i>		<i>Value</i>	<i>p-value</i>		<i>Value</i>	<i>p-value</i>		<i>Value</i>	<i>p-value</i>	
<i>Number of cases</i>	32			32			32			32		
<i>R²</i>	0.772			0.832			0.926			0.892		
<i>adjusted R²</i>	0.738			0.8			0.908			0.865		
<i>F statistic</i>	23.788	0.000		21.565	0.000		98.24	0.000		36.459	0.000	
<i>Breusch-Pagan test</i>	1.209	0.877		1.146	0.950		3.022	0.806		1.833	0.9343	
<i>Akaike criterion</i>	48.07			40.207			16.199			28.251		
<i>Schwarz criterion</i>	55.398			49.001			26.459			38.511		
<i>Hannan–Quinn criterion</i>	50.499			43.122			19.599			31.652		
<i>Variable</i>	<i>Coefficient</i>	<i>t-test p-value</i>	<i>VIF</i>	<i>Coefficient</i>	<i>t-test p-value</i>	<i>VIF</i>	<i>Coefficient</i>	<i>t-test p-value</i>	<i>VIF</i>	<i>Coefficient</i>	<i>t-test p-value</i>	<i>VIF</i>
Constant	-7.271			-5.389			-1.807			-5.874		
log(GDPPC)	0.827	0.0000	1.984	0.705	0.0000	2.096	0.247	0.0694	3.544	0.493	0.0001	2.654
log(PALMA)	-0.491	0.0273	1.040	-0.529	0.0041	1.040	-0.623	0.0010	1.057	-0.526	0.0109	1.040
LOWINCOUN	-0.956	0.0040	1.687	-1.036	0.0021	1.690	-0.65	0.0017	1.860	-0.826	0.0026	1.796
log(ELECPRIC)	-0.351	0.0000	1.254	-0.248	0.0052	1.365	-0.223	0.0040	1.368	-0.271	0.0002	1.383
log(ECOFOOT)										0.416	0.0011	2.126
log(COUNECOFOOTPC)							0.829	0.000	3.551			
AVEPREC				-0.000408	0.0218	1.112	-0.000228	0.0176	1.226	-0.000396	0.0025	1.122

Geopolitical events:

- must not focus only on events in the **news**
- important events are **ignored** or overlooked
 - ✓ regulatory changes
- some are **hidden** (but may be discovered)
 - ✓ supply chain and sourcing issues
(multinational corporations)
- some are truly unexpected
 - ✓ **black swans**
(extremely unlikely events).



Steps of geopolitical analysis:

1. identification of political risks that could affect an investment
 - **risk mapping** with event probabilities
 - ✓ may be done with **game theory**
2. assessment (with forecasts) of likely outcomes
3. recommendations for **mitigation** of risks
 - strategies to benefit from geopolitical opportunities
4. and **monitoring**
 - identify changes in the geopolitical environment.

Levels of geopolitical risks:

- **global** level
 - ✓ international terrorism events or violent acts
 - Israeli attack on nuclear facilities of Iran (Operation Babylon, June 7, 1981)
 - ✓ major impact on asset prices and economic growth globally
- **country** level
 - ✓ exposure in specific countries
 - ✓ government stability
 - ✓ socio-cultural factors
- **operational** level (*next slide*).

Levels of geopolitical risks (*continued*):

- operational level
 - ✓ specific **industry**
 - even specific **firm**
 - Argentina's 2012 decision to renationalize its oil industry (YPF) (*next slide*)
 - ✓ harder to **identify**
 - ✓ requires thorough understanding of **politics** at the following levels
 - national
 - regional
 - local.

Example of operational geopolitical risk:

- Argentina's 2012 decision to renationalize its oil industry (YPF)
- Where do you get your news from?
 - ❑ **BBC**
 - ✓ *“YPF nationalisation: Is Argentina playing with fire?”* (April 17, 2012)
 - ❑ **Guardian**
 - ✓ *“Argentina's critics are wrong again about renationalising oil”* (April 18, 2012)

Analyzing identified risks and forecasting outcomes:

- Geopolitical risks with few outcomes and short duration
 - easiest to analyze.
- Geopolitical risks with **high uncertainty** and **long timeframe** are the hardest to predict.

Most common frameworks for analyzing geopolitical risk:

- **scenario** development
 - ✓ identify outcomes and indicators
- Country Stability Analysis (also called **Country Risk Reports**)
 - ✓ quantify social and political factors
- **expert** analysis based on
 - ✓ history (path dependence)
 - ✓ theory.

Brazil Economic Outlook. Third quarter 2018



By Enestor Dos Santos

Growth prospects deteriorate due to the financial volatility, the negative effects of exchange rate depreciation, doubts about whether the next government will face fiscal problems and the consequences of the recent truckers' strike, among other factors. Thus the recovery process will be more gradual than expected

Units: [South America](#)

Geographies: [Latin America](#) | [Brazil](#)

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Euromoney Country Risk



Data

All analyses

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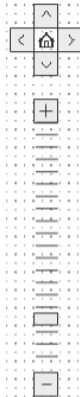
FAQ

Home »

World risk average [Click here](#) to see today's score

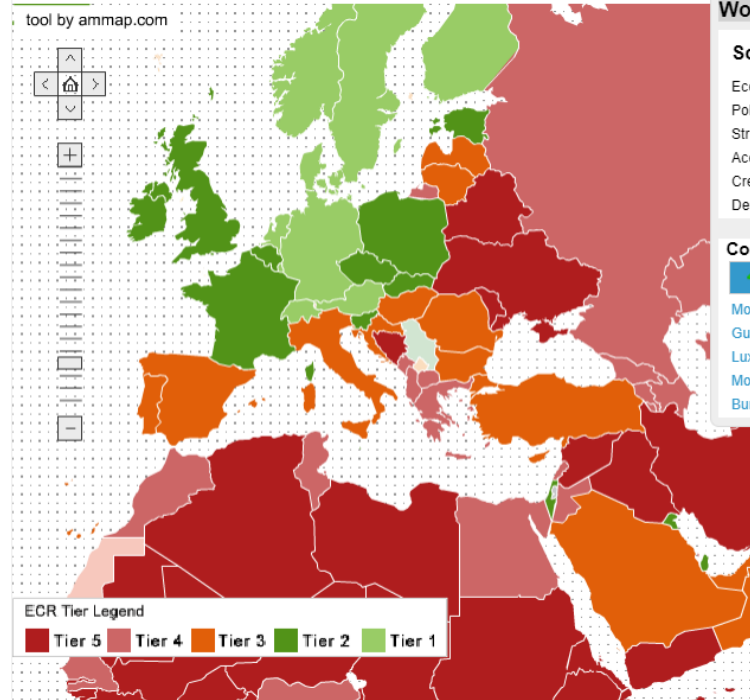
Snapshot created on 02 Oct 2018

tool by ammap.com









ECR Tier Legend

 Tier 5  Tier 4  Tier 3  Tier 2  Tier 1



World risk average






Score **43.23**  -0.01 

Economic assessment	44.76	-0.01 
Political assessment	45.77	-0.02 
Structural assessment	40.84	+0.01 
Access to capital	42.54	0.00 
Credit ratings	30.58	+0.02 
Debt indicators	46.67	0.00 

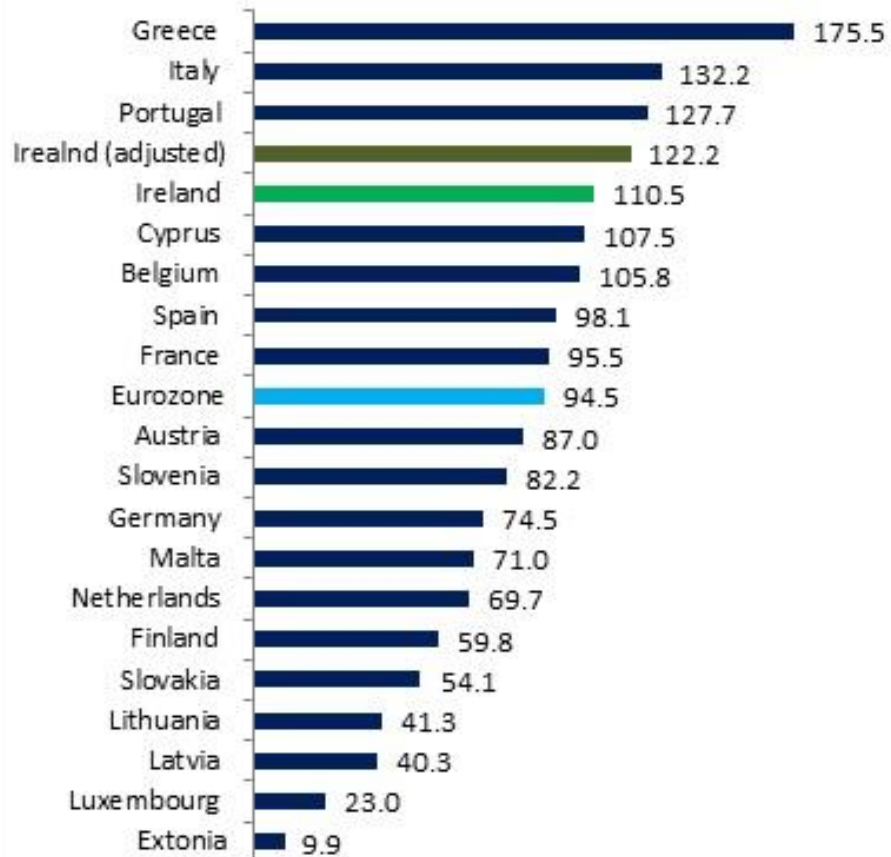
Country movers

 Less risk

 More risk

Moldova	33.07	+0.77 
Guyana	35.09	+0.74 
Luxembourg	85.45	+0.74 
Montenegro	36.45	+0.63 
Burundi	13.64	+0.61 

General Government Debt as a % of GDP: 2014



South Africa

SEB – COUNTRY RISK ANALYSIS

5 April 2017

Analyst: Martin Carlens. Tel: +46 8-763 96 05. E-mail: martin.carlens@seb.se

High political and policy uncertainty has weighed on economic activity leading to sub-par GDP growth. Despite an expected cyclical upswing in 2017, the relatively low growth environment is making it increasingly challenging to rein in a rising government debt. Political infighting is also taking attention away from implementing structural reforms to improve medium-term growth.

Country Risk Analysis

Summary

Growth in the South African economy has decelerated markedly since 2011 which clearly contrasts to developments in regional peers and its main trading partners. Many observers have noted that this decoupling is not merely of a cyclical character. Although the weak commodity price cycle has been important, and although a severe drought has weighed on economic activity, the slowdown mainly reflects political and policy uncertainty. Infighting within the ruling ANC party has led to an environment where businesses and households are reluctant to invest and spend. In addition, and perhaps more importantly, the infighting has taken the focus away from implementing structural reforms which are crucial in order to get economic growth back on a higher and more stable path.

The political uncertainty escalated recently in an extensive make-over of the cabinet of ministers, including the ousting of a much respected finance minister. We conclude that the probability of meaningful economic reforms being implemented in the near-term has declined.

Meanwhile, fiscal policy, which is governed by a sound framework, is targeting a continued gradual reduction of the budget deficit. This is important as government debt is on a rising trend. Recent changes to the cabinet of ministers are putting the government's commitment to the fiscal targets in doubt.

Risks are mainly related to slower economic growth and the complications this would have in reducing the public sector deficit and stabilising government debt. Slower than expected growth could be due to weaker than expected demand among trading partners or from weaknesses in global commodity prices. A more protracted period of political and policy uncertainty would also depress growth.

Mitigation of geopolitical risk:

- Develop appropriate mitigation strategies.
 - ✓ Consider level of risk that is acceptable for investment under consideration.
 - ✓ Take advantage of politically driven opportunities.

Methods of mitigating geopolitical risk:

- Diversifying investments across **countries**.
- Diversifying investments across **industries** (or types of assets).
- Increasing the **hurdle rate** value (for certain projects).
- Developing warning systems.
- Be agile: make tactical investments in response to political changes.
- Develop **alliances** that spread risk across partners. *(next slide)*

Methods of mitigating geopolitical risk (*continued*):

- Engage in **corporate diplomacy**.
- Purchase **political insurance**.
- Hedge (currencies and commodities).
 - ✓ Use financial instruments (such as derivatives) as hedging vehicles.

Monitoring:

- geopolitical risks
- factors that could change the analysis and the forecasts.

Political situations may evolve (within hours)!

- Limit likelihood that managers and analysts are **caught off guard** by unanticipated events.

Geopolitical risk analysis is carried out by:

- in-house staff
- **external consultants**
 - ✓ this could be **YOU!**

Geopolitical risk analysis will be incorporated into

- (regular) risk analysis
- investment decision-making process.

The End