The Natural Resource Curse: from Econometrics to Policy

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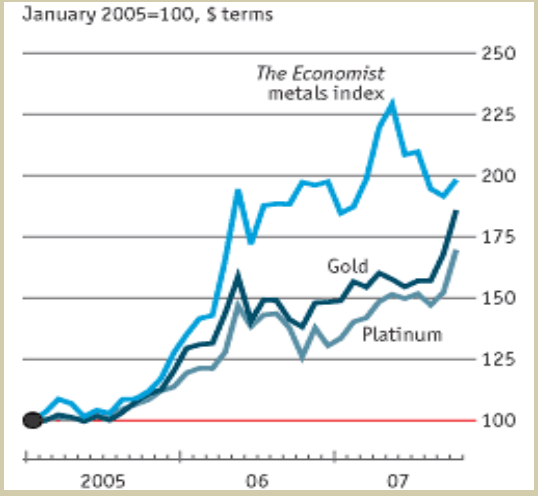
Oxford Policy Management

- More than 50 countries with significant dependence on mineral exports* e.g.: South Africa, Australia, Democratic Republic of Congo, Philippines, Ghana, Chile, …

- $ billions of extra revenues for mineral-rich countries from soaring commodity prices



?

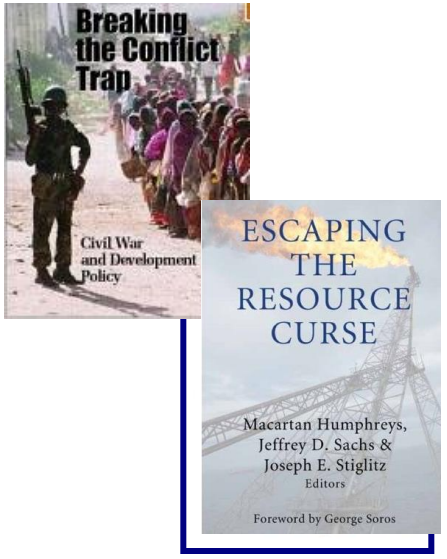
Resource blessing?

The REI case studies show that Mineral exploitation CAN drive growth, poverty reduction & help achieve major socio-economic gains

BUT – against this

Resource curse?

- *Conflict* (read Ross, Collier, Humphreys etc)
- Poverty
- Economic stagnation
- Corruption
- Political instability



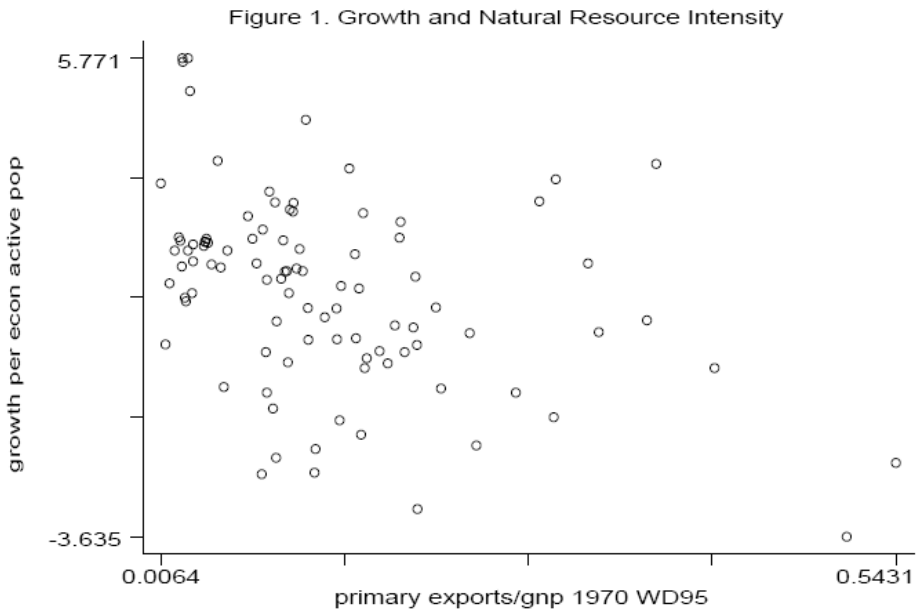
* Ratio of exports of metals and ores to total exports > 20% over time. Source: ICMM Resource Endowment "Analytical Framework" p25; Source for graph data:*The Economist*

1. A Quick Look at the Econometrics

Sachs and Warner (NBER1997)

- They use a sample of 95 developing countries and examine each country's annual growth rate between 1970-90 in relation to the country's natural resource-based exports in 1970, as a %age of GDP

- and suggest that on average, countries which started the period with a high value of resource-based exports to GDP tended to experience slower growth during the following 20 years



Typical Regression

Dependent Variable: GEA7089

	(3.1)	(3.2)	(3.3)	(3.4)
SXP	-8.28 (-6.67)	-	-	-
SNR	-	-6.45 (-3.95)	-	-
PXI70	-	-	-2.50 (-3.89)	-
LAND	-	-	-	-0.39 (-3.78)
Adjusted R^2	0.73	0.63	0.63	0.64
Sample size	74	74	73	74
Standard error	0.97	1.12	1.14	1.12

The numbers in parentheses are t-statistics. The natural resource intensity variables are first, the SXP variable used in table 1, which measures natural resource exports divided by GDP in 1970; second, SNR (mineral production divided by GNP in 1970); third, PXI70 (natural resource exports divided by total exports in 1970), and LAND (the log of arable land area divided by population). The other explanatory variables in the regressions are LGDPEA70, SOPEN, RL, DTT7090 and LINV7089.

Comment on Method

- Short data periods (20-25 years). Most well-known studies are based upon relatively short time periods of around 20-25 years. This is not long enough to identify the propulsion to longer-term structural and institutional change that historically has come from mining (cf California and Victoria/Australia)
- Mainstream econometric approaches are inherently numerical in approach. They find it difficult to do full justice to some of the qualitative/less easily measured dimensions of the development process. This is particularly important given that political economy and governance issues can account for a large part of the differences in outcomes.
- Small “n” problem. Relatively small samples to start with reduced further by inherent differences in scale and nature of mineral dependence and date of entry into modern mining (e.g. Ghana 1986, Tanzania 1999). Econometric methods mix up countries with these types of differences.

Note the failure of some exponents to draw the really important conclusions from their own data – see next slide.

See **C. N. Brunnschweiler and E. H. Bulte in *Science*, May 2008)**

Regression fits of natural resources and economic growth 1970–2000. Growth rate 1970 - 2000

(Top) Natural resource dependence in 1970 based on export data.
(Bottom) World Bank total “natural wealth” data (log values) measured in USD per capita in 1994.

Note also the time-series periods encompass periods of fundamentally different political economy in most countries.

2. How did the OPM Project Arise?

The "Resource Endowments Initiative (REI)" commissioned by the International Council Mining & Metals (ICMM)

Mainly from the dramatic policy recommendations of the EIR - 2002

•*Extractive Industry Review (EIR*) of 2002 - commissioned by President of the World Bank – James Wolfensohn – assessed whether the Bank's involvement in oil, gas and mining projects in low-income countries is consistent with its overall objective of achieving poverty alleviation

•Among other things the *EIR* concluded that World Bank engagement in the sector should only continue when countries can meet certain enabling preconditions. These include the presence of pro-poor and effective public and corporate governance, effective social and environmental policies.

•These recommendations really upset the mining industry reps who felt:

- That it would deny low-income mining dependent countries the help they needed to capture the full benefits of mining
- Disputed the empirical evidence on which the recommendation was partly based
- That is flew in the face of history where "good governance" often followed development rather than preceded it !

We worked initially on the data and confirmed that MANY low income countries would indeed be affected – see next two slides which update our initial 2004 work.

Main Mineral Export Dependent Economies 2006

Rank	Country	Ore, Matal and Other Export as % Total Export*	Ore and Metal Export as % Total Export**
1	Botswana	89.8%	16.6%
2	American Samoa	84.1%	83.7%
3	Zambia	81.5%	81.0%
4	Suriname	80.5%	48.5%
5	Sierra Leone	80.4%	27.9%
6	Guinea	78.0%	73.6%
7	Tajikistan	74.3%	74.3%
8	Mali	74.2%	0.0%
9	Congo, DEM R	73.0%	38.6%
10	Mongolia	72.2%	54.7%
11	Mauritania	64.7%	64.7%
12	Chile	64.7%	63.8%
13	Peru	64.3%	47.5%
14	Jamaica	63.2%	63.2%
15	Central African Republic	60.7%	25.9%
16	Niger	60.1%	45.5%
17	Mozambique	60.0%	59.9%
18	French Polynesia	59.7%	0.1%
19	Montserrat	57.9%	57.9%
20	Namibia	53.7%	25.7%
21	Burundi	50.8%	1.1%
22	Armenia	48.7%	20.5%
23	United Republic of Tanzania	48.4%	11.4%
24	Cuba	47.8%	47.8%
25	Papua New Guinea	41.9%	20.6%
26	Lao People's Democratic Republic	41.3%	37.9%
27	Bhutan	37.5%	37.5%
28	Israel	35.8%	1.2%
29	Christmas Island	35.8%	35.8%
30	British Virgin Islands	35.4%	1.4%
31	New Caledonia	35.3%	35.3%
32	Ghana	34.1%	2.2%
33	Rwanda	34.0%	33.9%
34	South Africa	33.6%	28.5%
35	Australia	33.2%	27.3%
36	Kyrgyzstan	29.7%	3.7%
37	Zimbabwe	29.5%	21.5%
38	Guyana	29.2%	8.4%
39	Cook Islands	26.5%	0.0%
40	Georgia	25.3%	20.5%
41	Bolivia	25.1%	22.0%

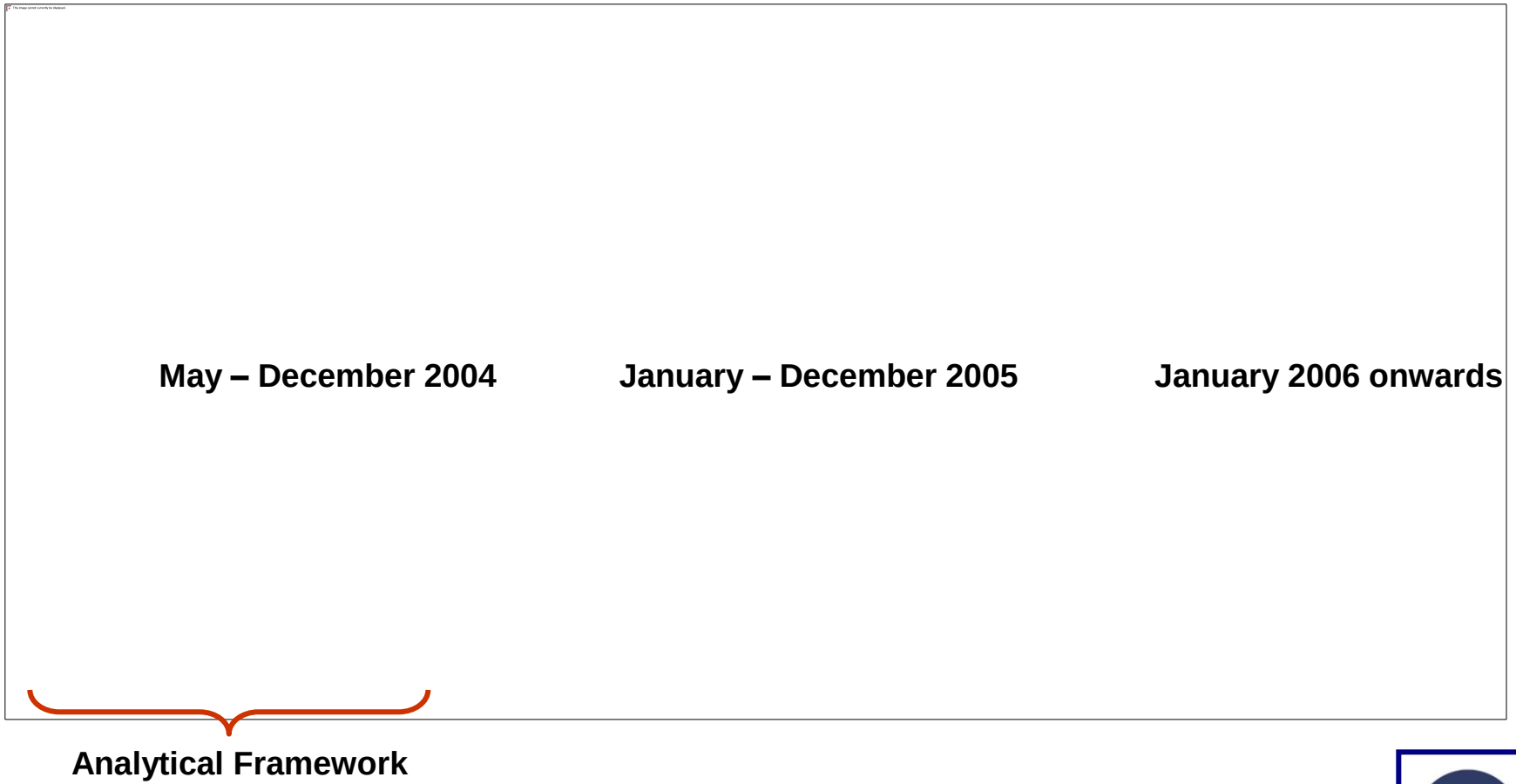
Source: UNCTAD Handbook of Statistics, 2008
*SITC 27,28, 68, 667, 971
**SITC 27,28, 68

Main Fuel Export-Dependent Countries, Average (2002-2006)

Rank	Country	Fuel* Export as % of Total Export	Ore, Matal and Other Export as % Total Export**
1	Algeria	97.9%	0.5%
2	Iraq	96.7%	0.6%
3	Nigeria	96.2%	0.1%
4	Angola	95.9%	3.4%
5	Libyan Arab Jamahiriya	94.2%	0.4%
6	Kuwait	92.7%	0.5%
7	Equatorial Guinea	92.2%	0.0%
8	Yemen	91.9%	0.4%
9	Brunei Darussalam	90.6%	0.1%
10	Saudi Arabia	88.2%	0.5%
11	Qatar	87.6%	0.1%
12	Congo	85.8%	4.8%
13	Venezuela (Bolivarian Republic of)	85.7%	3.4%
14	Turkmenistan	85.5%	0.4%
15	Oman	83.9%	0.7%
16	Azerbaijan	83.7%	2.7%
17	Netherlands Antilles	81.3%	1.8%
18	Gabon	81.2%	3.9%
19	Iran (Islamic Republic of)	79.0%	1.3%
20	Sudan	76.6%	3.0%
21	Bahrain	73.6%	***15.5%***
22	Trinidad and Tobago	66.7%	0.3%
23	Kazakhstan	65.2%	***15.6%***
24	Norway	64.2%	6.6%
25	Syrian Arab Republic	63.9%	1.0%
26	Chad	59.5%	0.2%
27	Russian Federation	57.3%	7.8%
28	United Arab Emirates	53.6%	7.8%
29	Ecuador	51.7%	0.6%
30	Cameroon	51.2%	4.8%
31	Egypt	45.3%	4.1%
32	Bolivia	37.9%	***22.4%***
33	Colombia	37.5%	4.9%
34	Myanmar	34.3%	3.8%
35	Seychelles	29.7%	0.1%
36	Belarus	28.5%	0.8%
37	Papua New Guinea	25.1%	***46.5%***

Source: UNCTAD Handbook of Statistics, 2008
*SITC 3
**SITC 27,28, 68, 667, 971

The REI Project – Stages of Work and Reporting



Key Questions to Address

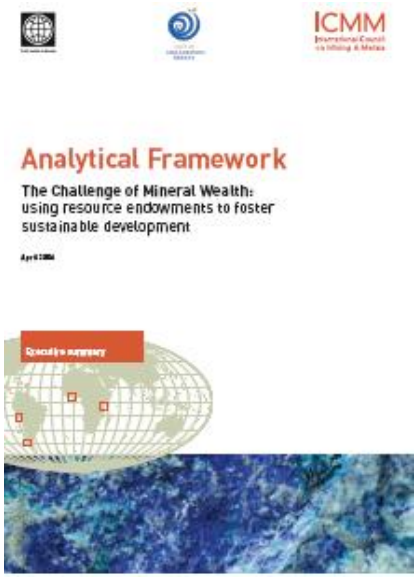
• Why have some countries not suffered the predatory government behavior and internal conflict that can be associated with the exploitation of natural resources in some cases (e.g. most notably in countries such as the Congo)?

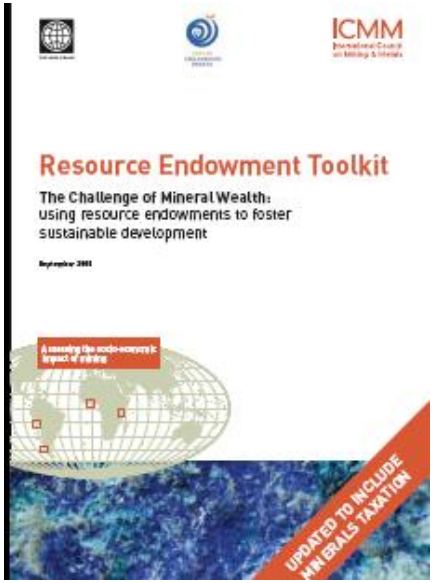
• What are the critical factors that have allowed some countries to benefit from their substantial resource endowments and avoid the so-called resource curse while others have seen relatively disappointing outcomes?

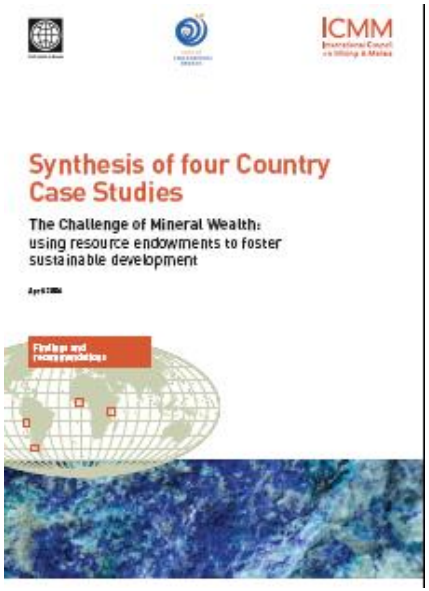
• What practical steps might be taken by the industry and other stakeholders such as governments, local communities and aid agencies to build these propitious factors where they are lacking?

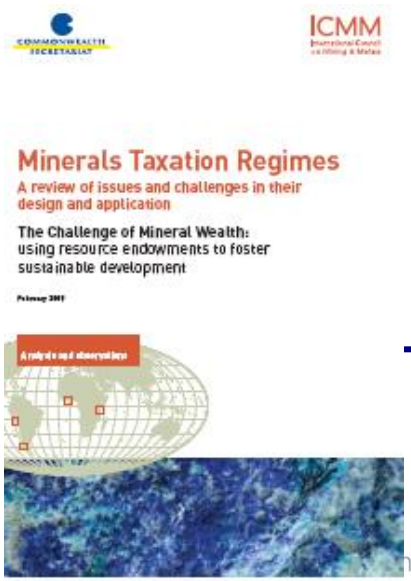
3. Main Outputs to Date

(all published output is available at www.icmm.org)









Main Outputs

1. Statistical identification of all “mining dependent” countries world-wide – see earlier tables
2. Scoring of these countries in terms of their economic and socio-economic based partly on GDP growth (as in the mainstream econometric literature) but also on a wide range of other variables
3. Identification of the relatively “more successful” mining-dependent countries
4. In-depth case studies in FOUR of these so far with both mine-level (micro) and macro elements
5. Assessment of the main success factors in a Synthesis Report published in 2006
6. Further work with key stakeholders in three of the case-study countries – Ghana, Tanzania and Peru to identify and then further develop various partnership arrangements to further deepen the benefits from mining activity.

Profiles of the Case Study Countries

There have been TWO detailed studies (Peru and Ghana) and TWO more comparator studies (Chile and Tanzania)

Some fundamental differences:

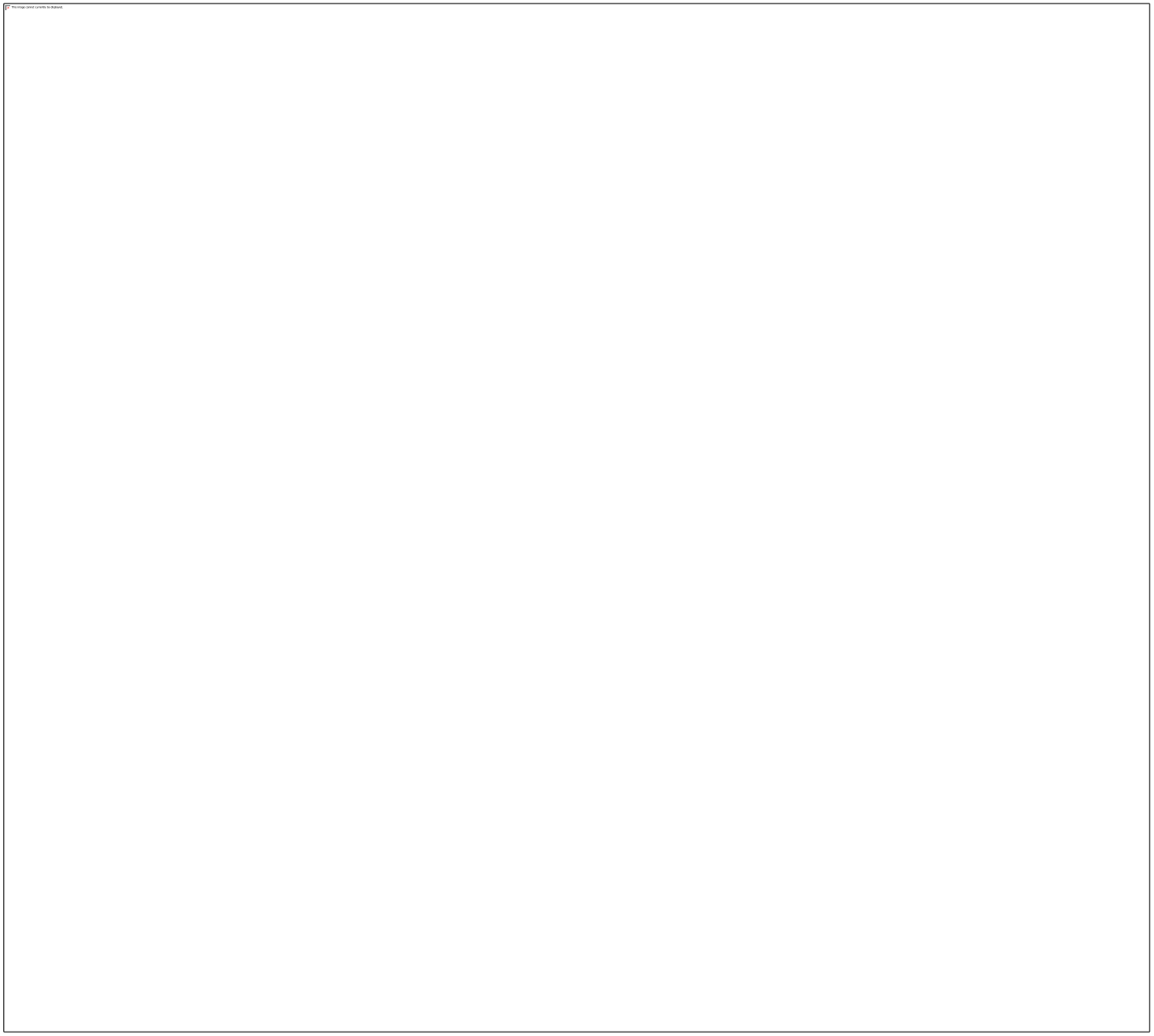
- Peru - middle income country (GDP ppp>$4,500) with medium HDI rank of 85/177 countries
- Chile – more advanced middles income country (GDP- ppp around $10,000) and “high” HDI rank 43/177 countries
- Ghana - poor country (GDP ppp>$2,000) and low HDI rank 131/177 countries – also agrarian dependent
- Tanzania - extremely poor (GDP – ppp >$600) and low HDI rank 162/177 countries – large agrarian dependence

…… Continued

- All four have faced severe economic instabilities – macro instability and structural distortions in 1970s and/or 1980s
- Three (Chile, Peru, Ghana) have emerged from periods of autocratic (often military) government (e.g. Pinochet in Chile) only in the past 15-20 years. (Tanzania's autocracy was arguably more benign)
- Peru (1980s) and Ghana (1970s) were almost 'failed states'
- All have seen a visibly strong resurgence of commercial mining in the past 10-20 years, but also have a longer mining history

Overall the four countries provide an interesting set of differentiated cases to assess how mining inter-relates with general economic and political reform

The Types of Effects that were examined



4. Selected Results

What Happened to Growth?

- The substantial recovery in mining investment has been a PART OF improved growth performance in all four countries (see graphics)
- IF the counterfactual is the perpetuation of the *pre-reform economic performance*, then the post-mining period demonstrates an improved record in all cases
- This most evident is Ghana (since 1987) and Tanzania (since 1997) - mining has added statistically 0.3% to 0.4% extra growth each year
- A similar connection is found in Peru and Chile
- Non-mineral GDP growth has also been positive in all four cases and higher than that of regional comparators except in Peru
- In the African cases the resurgence of large scale mining has been the single most important PRIVATE sector element in the recovery

High Level Conditions for "Success"

- The contribution of mining investments to socio-economic development and poverty reduction can be significant
- The performance of different mineral dependent countries varies greatly, but apparent success factors include:
  - A stable macroeconomic climate – and especially the avoidance of the Dutch Disease syndrome.
  - Mineral legislation supportive of inward investment ((e.g. in Ghana $5< billion between 1986 and 2001, and $1.3 billion between 2000-2003 in Tanzania)
  - Some basic governance and institutional capacity are important – especially at local and regional levels

Source: Angus Maddison and the University of Groningen Growth and Development Centre

Mining's Impacts on Poverty Reduction

- Reduction in poverty levels were found to be significant at both national and local (project area) levels in Ghana and Chile (see Chile example in next graphic)
- But in Peru, poverty was found not to have changed significantly due we hypothesise to governance and policy constraints
- In Tanzania, insufficient poverty data to analyze poverty effects of a mining boom that began only in the late 1990s

BUT

- Local level analysis at North Mara mine in Tanzania shows important mining company contributions to business development and employment

* *A mining resurgence CAN be associated with significant poverty reduction but this is certainly not assured even in the success cases*

Regional Poverty Reduction in Chile

Critical Elements in generating Benefits

- Broad-based income and employment generation – via largely market-dependent mechanisms was the route to effective absorption of mining into the broader national economy in Chile.
- But this type of spill-over is unlikely to occur naturally (i.e. without some explicit policy interventions in less-diversified economic systems such as found in Tanzania
- Deepening governance reforms (i.e. moving beyond the threshold improvements of basic competencies) particularly at the local level is critical to (a) help limit the negative effects and (b) capitalize on positive growth opportunities
- In particular, greater fiscal decentralization and empowerment of local and regional authorities is needed – but capacity, checks and balances and accountability must be built in parallel. It is no good just shipping more money to the local areas.
- There are many ways in which imaginative partnerships (companies, governments, aid-donors etc) can enhance the benefits

What role has "Governance" played?

Indicator	Peru (96)	Peru (04)	Chile (96)	Chile (04)	Tanzania (96)	Tanzania (04)	Ghana (96)	Ghana (04)
Voice and Accountability	**-0.73**	**-0.04**	**0.93**	**1.09**	**-0.77**	**-0.35**	**-0.35**	**0.39**
Political Stability[(1)]	**-0.90**	**-0.68**	**0.75**	**0.89**	**0.02**	**-0.38**	**-0.10**	**-0.06**
Government Effectiveness	**-0.18**	**-0.58**	**1.20**	**1.27**	**-1.18**	**-0.37**	**-0.07**	**0.17**
Regulatory Quality	**0.65**	**0.17**	**1.52**	**1.62**	**-0.52**	**-0.55**	**-0.14**	**-0.28**
Rule of Law	**-0.35**	**-0.63**	**1.26**	**1.16**	**-0.70**	**-0.49**	**-0.12**	**-0.16**
Control of Corruption	**-0.10**	**-0.35**	**1.28**	**1.44**	**-1.03**	**-0.57**	**-0.47**	**-0.17**

Source World Bank Indicators. Key: a score of -2.5 is the worst, with a score of +2.5 being the best.

The scores are quite weak for 3 of the 4 countries with improvements seen in some but not all dimensions. Chile is a better performer than the others.

Why can Countries "succeed" even with Modest Governance?

Possible Answers.

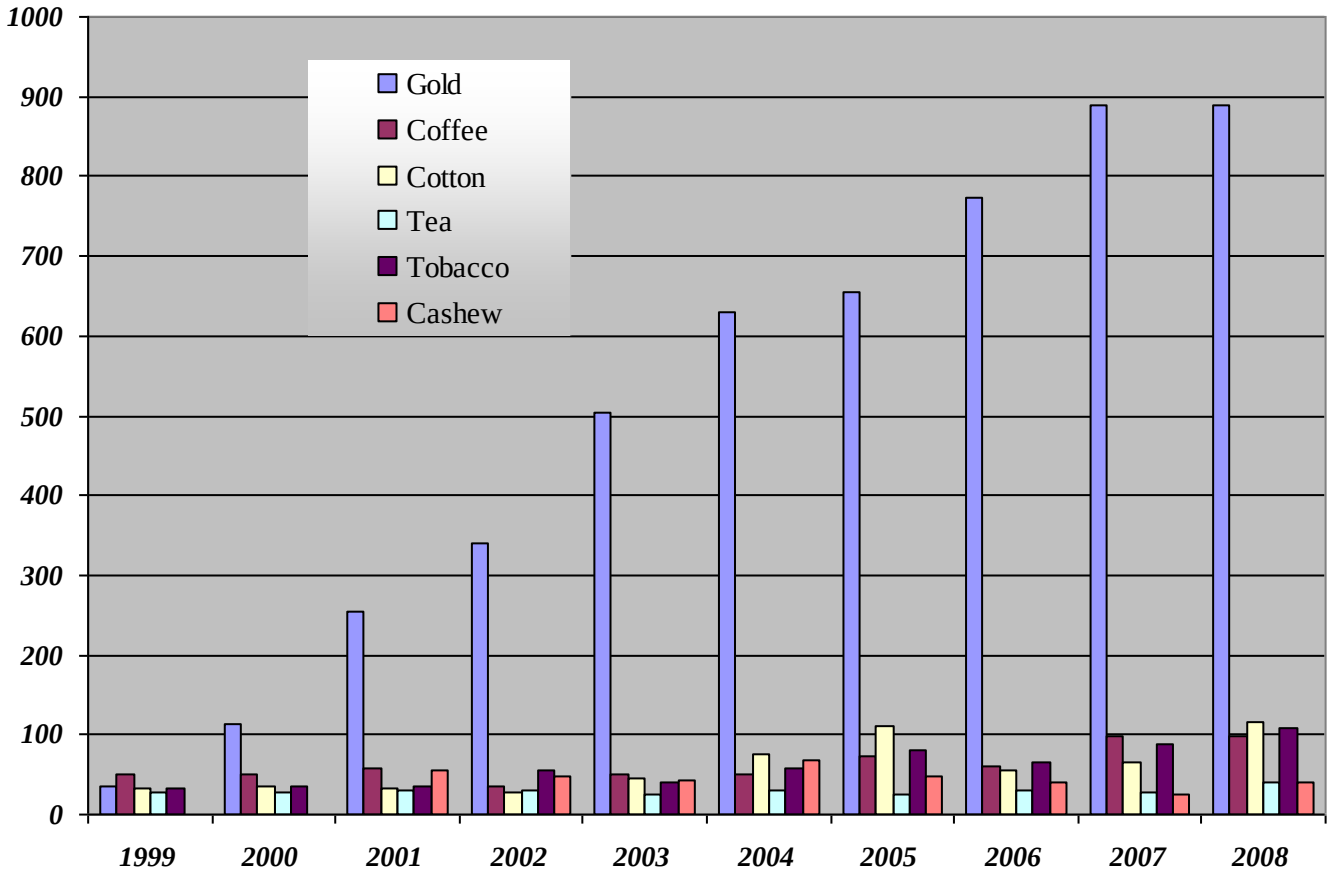
- Previously failing economies (e.g. Ghana in the 1970s and Peru and Tanzania in the 1980s) do not have a wide choice about where they will find new foreign private investment to jump start economic recovery
- Even "basket case" economies that fail most of the FIAS-type tests for attracting FDI can and do attract mineral investments (Sudan, DRC etc)

- But "managing" this does not strain systems that much:

  Mining (especially high value metals such as gold) offers many advantages:
  - Requires limited institutional basis of good institutions
  - Modest demands on a weak or damaged physical infrastructure
  - Large domestic market for sales not required
  - Is relatively easily taxed by moderately well-organized governments

Exports in Tanzania: Gold has overtaken Traditional Exports in relative importance

($ million)



Note:

The radical differences between 1999 and 2008

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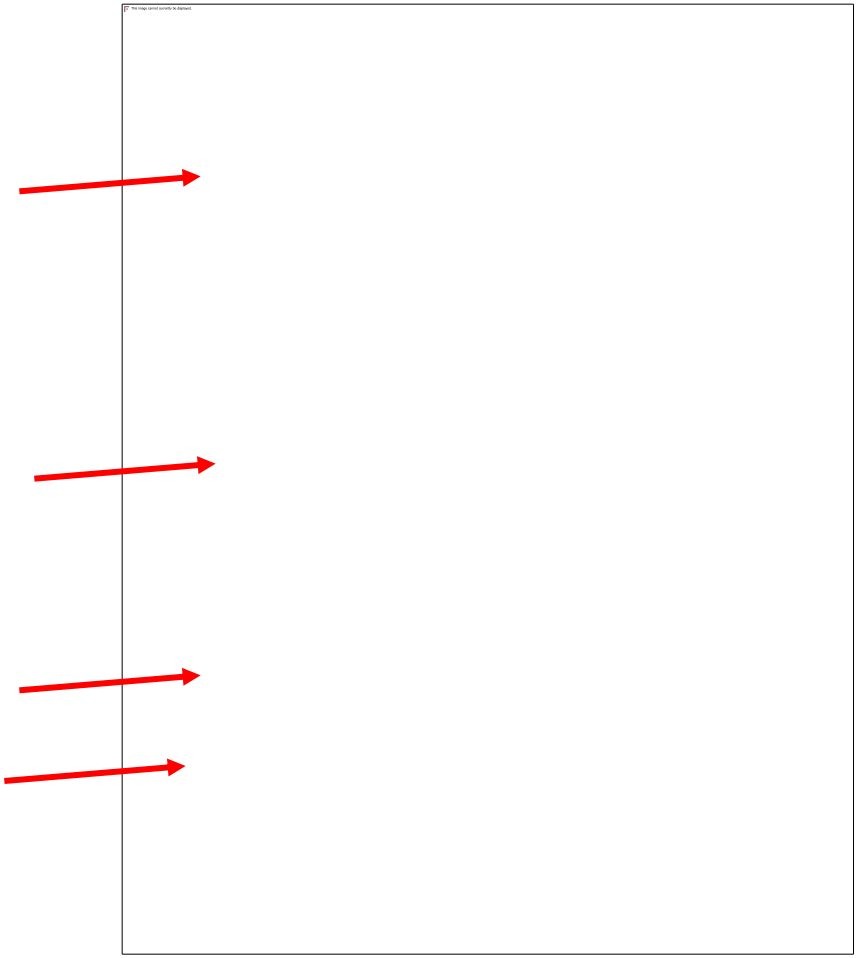
International Perceptions indicate still-weak investment environments



5. The OPM/ICMM agenda to Enhance the Benefits of Mining

Guiding Propositions

- Large scale commercial mining CAN and HAS been an important element in successful economic development and poverty reduction

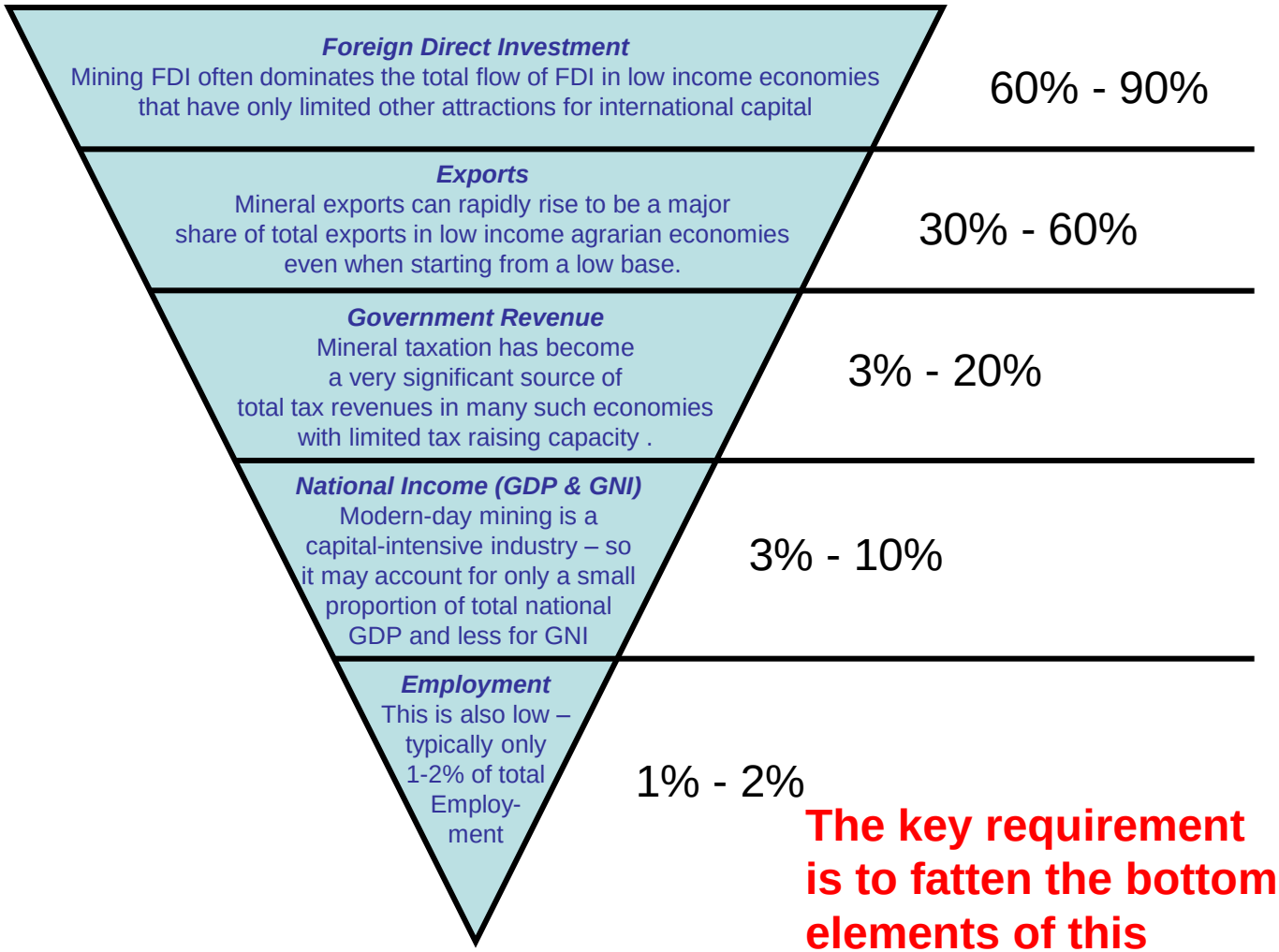
- In low-income and previously weakly governed countries, commercial mining has features that make it one of the few ***feasible*** early contributors to private development (see the earlier data)

- The governance improvements to achieve recovery based partly on mining are "threshold" improvements and not necessarily deeply rooted ones. The EIR was wrong to insist on the latter UP-FRONT

- The remaining failings in governance arrangements explain much of the difference in performance and the poor outcomes in relation to some aspects of the mining industry's net contribution to the economy.

So let's to understand this last proposition more completely – and then build additional arrangements to address specific gaps.

Mining's macroeconomic contribution? – A stylised view



The key requirement is to fatten the bottom elements of this inverted pyramid

ICMM's new Mining: Partnerships for Development Initiative

• This initiative was launched in December 2009. It is a global initiative that seeks to enhance mining's contribution to development and poverty reduction through new and existing multi-stakeholder partnerships.

• ICMM member companies have committed to identify and then help to build partnership across six priority areas:

- poverty reduction,
- revenue management,
- regional development planning,
- local content,
- social investment and
- dispute resolution

• This will involve a wide variety of stakeholders and will build explicitly on the lessons and methodology of the 5 year REI.

Some General Hypotheses/Approach thus Far?

The framework and implementation around these areas is ineffective.....

Management and use of mineral revenues (EM)

Regional development planning (RD)

...creating significant constraints to the success of initiatives in these areas.....

Social and Economic Development (SD)

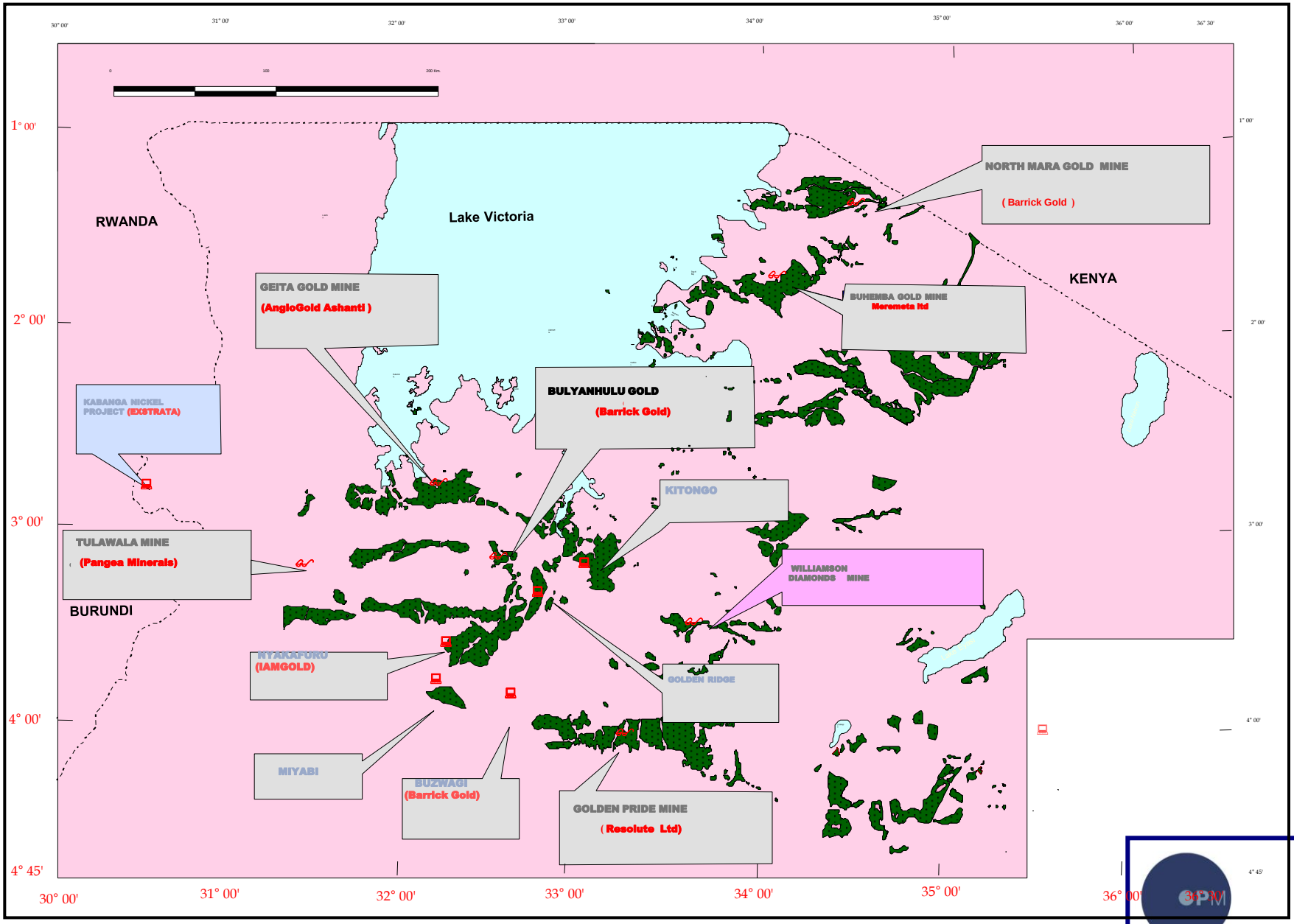
Poverty reduction and improved livelihoods (PR)

Increased local content (LC)

..... leading to the potential for grievances and disputes.

Improved mechanisms for dispute resolution (DR)

Specific Interventions to fill gaps


RWANDA
Lake Victoria
KENYA
BURUNDI
NORTH MARA GOLD MINE
(Barrick Gold)
GEITA GOLD MINE
(AngloGold Ashanti)
BUHEMBA GOLD MINE
Meremeta ltd
BULYANHULU GOLD
(Barrick Gold)
KABANGA NICKEL PROJECT (EXSTRATA)
KITONGO
TULAWALA MINE
(Pangea Minerals)
WILLIAMSON DIAMONDS MINE
KIYAKAFORO (IAMGOLD)
GOLDEN RIDGE
MIYABI
BUZWAGI (Barrick Gold)
GOLDEN PRIDE MINE
(Resolute Ltd)
1° 00'
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4° 00'
4° 45'
30° 00'
31° 00'
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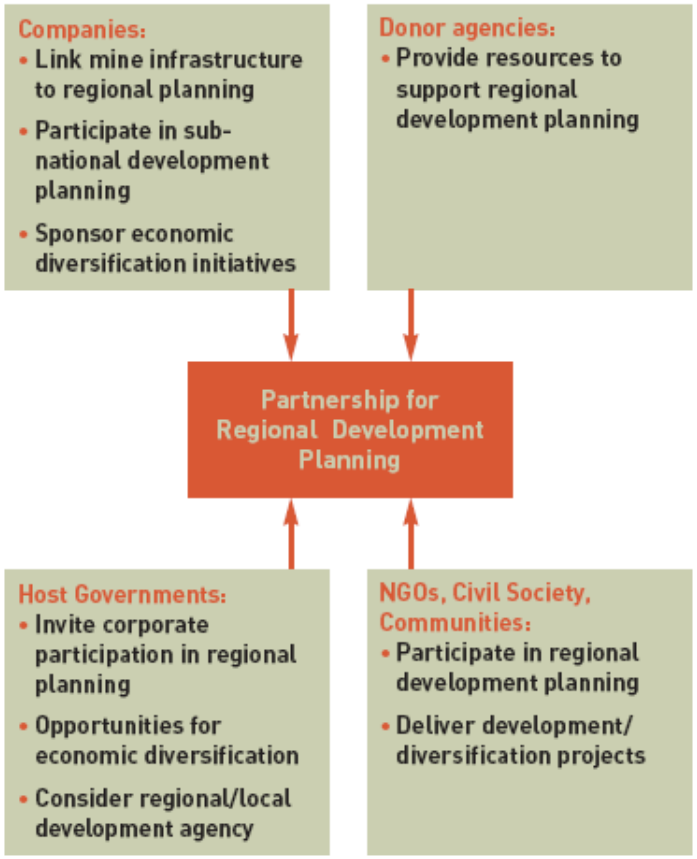
Example of recommendations: Local and regional planning – Phase II Conceptual

Figure 3: Mining and Economic Development – Regional Development Planning



From recommendations to reality

The REI Phase III Stakeholder Workshop in Accra – February 2008

1.recognised that the new District Development Fund in Ghana is a sound example of harmonisation with

- Government committed to a systematic District Assembly review process and new budget support for districts both for capacity building and projects
- Donors committed to a far more harmonised use of their large donor funds at local level (led by CIDA) to support government efforts

2.agreed that there was no obvious practical impediment to the large local socio-economic spending of mining companies being embraced as a **third** element in this partnership in the mining-affected districts of Ghana

3.committed publicly to support company, Ministry of Finance and donor efforts to establish this enhanced partnership

NB This was one of FIVE priority partnership actions agreed at the Workshop (from a much longer list that the REI research had identified).

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6. Final Thoughts

Final Thoughts

- Econometric results give us some ideas of broad tendencies but the outlier cases are more interesting than the regression fits themselves. Many econometricians fail to recognise this!

- The blind adoption of the broad-brush EIR recommendations of 2004 would have been a huge mistake in policy terms

- Careful study of the outlier countries ("success" cases) can and has helped to identify a wide range of practical approaches to enhancing the overall socio-economic impact of mining activity – an activity which is increasingly critical to the livelihoods of more and more low-income countries.