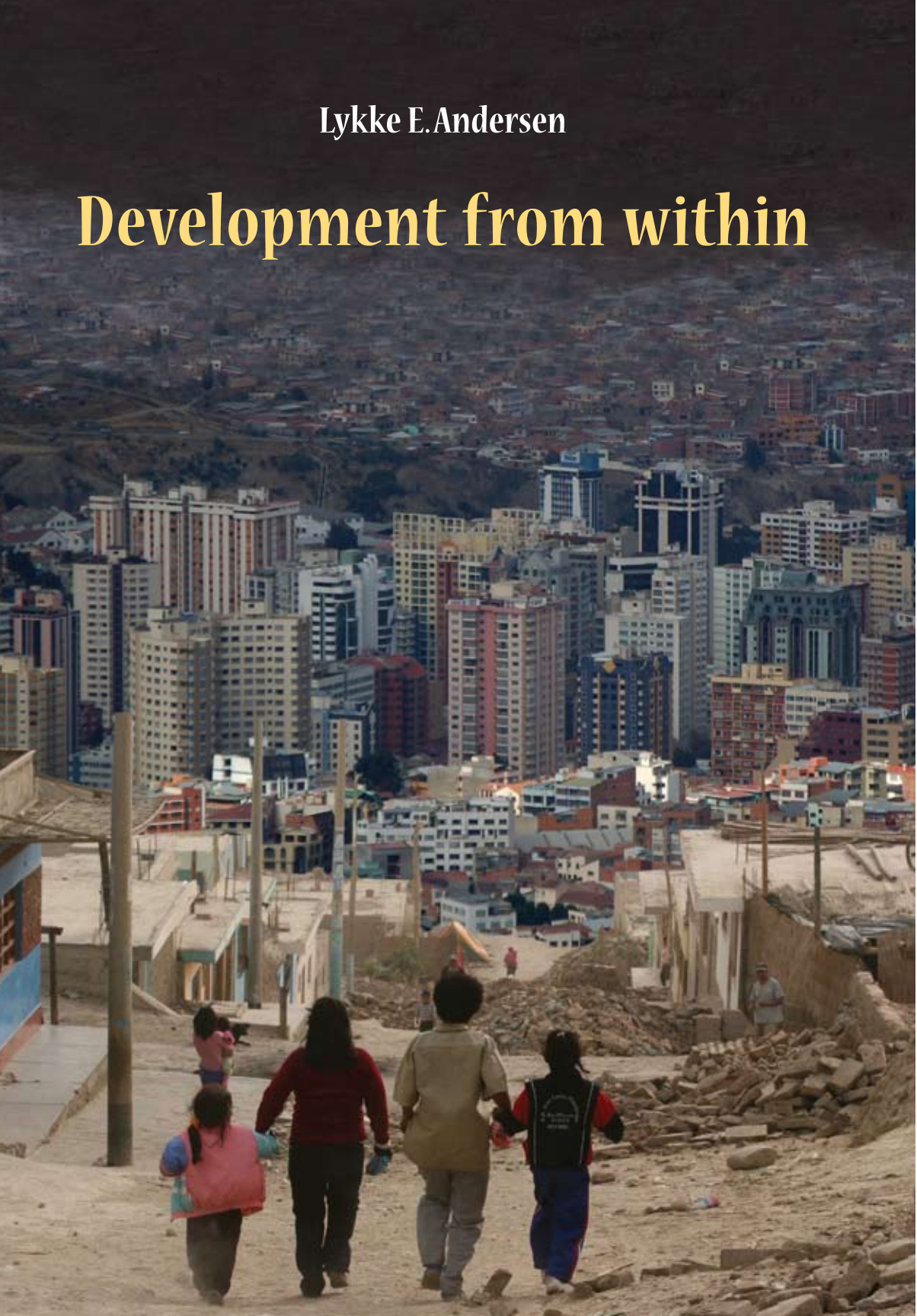
Lykke E. Andersen

Development from within



In these columns, Lykke Andersen casts an economist's often skeptical, sometimes technical, sometimes irreverent, but always insightful eye on Development topics. The collection provides enjoyable and provocative material for students of Bolivia and any developing country, on topics ranging from climate change and eco-tourism to aid and social mobility. The more Lykke's fellow Bolivians adopt her way of questioning and analyzing, the quicker will we achieve Development from within.

Miguel Urquiola
Associate Professor of Economics
Columbia University

Development from Within is a collection of excellent essays which offer critical thoughts on major issues, interesting ideas and common misconceptions facing development policy makers in Bolivia, Latin America and beyond. Always engaging, frequently entertaining and highly educational, they are the culmination of the last five years of Lykke Andersen's brilliant imagination and ability to transform all she sees around her into easily digestible 'snacks of thought', whilst at the same time, her ideas are backed by convincing evidence. Through her writings you cannot help but be infected by her enthusiasm and passion for development, whilst catching a glimpse of her energetic personality. This book is a mental treat for readers of all circles and will pique anyone's thirst for knowledge whether you agree with the ideas or not.

Ioulia Fenton
Regional Editor - Latin America
Global South Development Magazine

Every week the Monday Morning Development Newsletter focuses on a key area of development, drawing out the relevance of recent insights from the greater development community for the local Bolivian reality. Not for the timid, in a field too often characterized by risk-averse followers, Dr. Andersen is engaging, provocative, and fearless. You may not agree with everything she writes, but Dr. Andersen will always give you something new to think about.

Diana Weinhold
Reader of Development Economics
Department of International Development
London School of Economics

So thought challenging and inspiring, that you want to rethink your own points-of-views, if not right out prejudices. Lykke E. Andersen reminds us that we need open minds in the field of development.

Morten Elkjær
Danish Ambassador to Bolivia

ISBN: 978-99954-1-373-6

Photo by: Henrik Bjerg

Lykke E. Andersen was born in Denmark, but became Bolivian by marriage in 1998, and has been conducting development research in Latin America ever since.

She currently works as Scientific Manager at Conservation International - Bolivia. She also serves as President of the Board of Directors of the Institute for Advanced Development Studies, as Vice President of the Bolivian Academy of Economic Sciences, and as Secretary General of the Bolivian Society of Economists. She is an atheist and spends most of her Sundays writing Monday Morning Development Newsletters.

She lives in La Paz with her husband and three daughters.

The following institutions have kindly supported the publication of this book:

Lykke E. Andersen

Development from within

INESAD / ABCE / THINKTANK-INITIATIVE / IDRC

© Lykke E. Andersen & INESAD

First Bolivian edition: April 2011

DL: 4-1-875-11
ISBN: 978-99954-1-373-6

Production:
Plural editores
Av. Ecuador 2337 esq. c. Rosendo Gutiérrez
Phone: 2411018 La Paz, Bolivia
e-mail: plural@plural.bo / www.plural.bo

Printed in Bolivia

Praise for Lykke E. Andersen's "Development from within"

"*I am declaring myself a fanatic of the Monday Morning Development Newsletter.*"
Günther Schulz-Heiss, La Paz

"*I think you should be Minister of Economics! I really love your articles, they just make sense.*"
Percy Prieto, La Paz

"*Great!!! You are definitely one of my heroines.*"
José Santa Cruz, La Paz

"*When I grow up I want to be just like you.*"
Ioulia Fenton, Bangkok

"*I always enjoy your articles, even when I am not sure whether I agree or not.*"
Ricardo Sanchez de Lozada, La Paz

Foreword

Juan Antonio Morales

Underdevelopment and poverty are complex phenomena. While there is no lack of studies on the subjects and of money spent in the effort to overcome them, the results to date have been dismal. Bolivia has been almost a display case of the failure of development and we need a fresh approach to understand why and better if the approach comes from people from within. Moreover our understanding of poverty will improve from listening to the voices of the poor themselves.

The book by Lykke Andersen, written as free of jargon as possible, addresses in depth a wide range of development topics. Yet, the light, sometimes colloquial style makes the reading of the articles in the book a pleasant experience. Not the least, the citations on top of each article are well chosen and witty.

The author is not only a well recognized economist, with impressive credentials in statistics and econometrics, but she also has first-hand knowledge of development problems, with a specialty on Bolivia. With a subtle sense of humor she makes fun of the development community, which is well-meaning but frequently wrong in its advice. She warns us about the perils of aid dependency and the distortions in the allocation of qualified labor caused by foreign aid.

Like a surgeon, the author goes to the bone of development problems with a very sharp microeconomic and institutional approach. She does not disdain macroeconomics but her strength is in the analysis of incentives, institutions, social policy and even social psychology. Her analyses are of partial equilibrium but always with references to general equilibrium impacts.

The poor are often, but not always, in the informal sector and in the rural areas. Her treatment of the informal sector is very careful and she

insists on the very high costs of formality that frequently make the informal labor market a deliberate choice (and not only a refuge). In passing, she debunks some well established myths.

The author has had a long-time concern with social mobility and the intergenerational perpetuation of inequality. Inequality is not only a problem of social justice but it is also a hindrance to GDP growth. Fortunately for Bolivia, social mobility seems to be improving. In line with her concerns on social mobility, the author reflects on education, its efficiency and its fairness. Attention to children should be a top priority of public spending. Now that Bolivia has reached almost full universal coverage of primary education, it is time to look at issues of quality. Also, we have to look at ways in which the more educated people can be employed productively.

The articles on international migration have a novel and courageous approach. The immigration policies of the advanced economies, and sadly also of many developing countries, are to a great extent misguided. Placing barriers to labor mobility lowers the welfare of both sending and receiving countries. Especially in Europe, where the population is rapidly getting older, receiving immigrants, who are generally employed in jobs that the natives shun, will do much to increase the availability of goods and services, once the current financial crisis is over. In addition, it has been observed in the histories of immigration than immigrants are more courageous, tend to be more motivated and work harder than the median citizen of both the countries from which they come and from where they go. Also, immigration will help relieve the (structural) fiscal deficits that are largely caused by the ageing of the populations in the advanced economies.

Several articles are devoted to countries that depend on natural resources. This discussion is very timely. Countries endowed with natural wealth, especially mineral and oil resources, have in many cases fared less well than countries that lack them. In fact, only a handful of countries have not mismanaged the income produced by their natural resources. The vast majority has been plagued with ills like real overvaluation of their currency and destructive distributive struggles for the appropriation of the rents. Estimates of the author (and her coauthors) with a computable general equilibrium model predict not only a worsening of the income distribution but also an increase of poverty with the current export boom. In addition, Dutch Disease effects will lower the long run rate of growth of GDP. Also, the export boom has led to a construction boom whose sustainability is doubtful. The author points out that building permits are growing at a substantially higher pace than the population in cities like La Paz.

How could the curse of natural resources be reverted into a blessing? One of the proposed solutions is to distribute directly a large fraction of the rents to the citizens. This is an appealing solution, but it is not free of shortcomings. The main one would be that it will reduce the work effort of the beneficiaries, especially the poor.

The final chapters of the book are on climate change, a hot topic for the media. The author shows there a healthy skepticism. With a wealth of data, which in passing shows her extraordinary command of statistical techniques, and many references to the main scientific research, she criticizes the political hype that surrounds this issue. It is too sad that nationally the "rights" of Mother Earth have been so politicized. The international bureaucrats and the fake scientists that predict that the end of the world is near because of global warming are rightfully the object of the author's criticisms. Yet she warns us of the dangers of deforestation. Also, she has very strong words and opinions on market mechanisms to control carbon emissions. The neoliberal recipe to issue tradable permits to offset carbon emissions has been to date both ineffective and unfair.

Presentation

This book presents a selection of the short articles I have been writing for the Monday Morning Development Newsletter over the last 5 years. It is my hope that the readers will enjoy reading/revisiting the articles in a more comfortable setting than in front of a computer screen.

The articles treat a wide variety of topics relevant for Bolivia's development. Some of the articles are also relevant for the remaining 99.8% of the world population, but all of them are inspired by this spectacular, friendly, puzzling and sometimes challenging place, which, through a chain of unlikely coincidences, has become my home.

The intention of each article is to present a piece of information in a slightly unusual and thought-provoking way. I have been blessed with the opportunities to live in extremely different places, with political systems ranging from capitalist to communist, with economies ranging from rich to poor, with climates ranging from cold to hot, with ecosystems ranging from desert to rainforest, and with cultures ranging from Aymara to Uygur (no encounters with the Zulu culture, so far). All these experiences have allowed me to gain unusual perspectives on just about everything, which helps explain why the articles are always a bit contrary to mainstream thinking.

Another factor that has been very influential in shaping this book is my training in math, physics, statistics and econometrics in the Danish style of questioning everything instead of memorizing what the teacher says. I tend to be skeptical of every statement and allegation, until I have verified it for myself with independent data, and I have been repeatedly surprised by the contradictions between popular perception, conventional wisdom and hard data. Indeed, these contradictions have formed the inspiration for many of the articles in this book.

Anybody who has tried to write on a regular basis knows that it is a lot harder than it looks. But to me the Monday Morning Development Newsletter has provided a welcome opportunity to study new topics, practice critical thinking and sharpen my writing skills. I think this is something that everybody should practice regularly and thus invite interested readers/writers to contribute to the Monday Morning Development Newsletter in the future.

Acknowledgements

This book would not have been possible without the regular feedback and encouragements received from the faithful readers of the Monday Morning Development Newsletter. Even if each is only a page or two long, it usually takes an entire Sunday to do the research, writing, editing, and publishing necessary, and if it wasn't for those small expressions of appreciation and inspiration, I am sure this work would have yielded to more immediately gratifying weekend activities. Because of the importance of those snippets of feedback to me, I have decided to include some of them to spice up the book. I hope the sources don't mind that I haven't asked permission from them first.

I have been waiting for some time for an opportunity to put together and publish this book. When it was announced that the Institute for Advanced Development Studies (INESAD) had been granted an extremely generous award from the Canadian Think Tank Initiative, I could anticipate that the Institute would soon move into much larger offices, and I thought the inauguration party would be the perfect opportunity to present this book. This is particularly appropriate, since our systematic outreach activities through the Monday Morning Development Newsletter was likely one of the reasons INESAD won the Think Tank Initiative Award. In addition, the Think Tank Initiative is founded on the idea that development has to come from within, and, as the very first article in the book explains, this is what I consider the First Principle of Development.

Finally, I am grateful to a group of people who helped disseminate the Monday Morning Development Newsletter through modern on-line channels. Jørgen Christian Andersen generously sponsored the services of Relationwise A/S for the professional distribution of the Newsletter; Nashira Calvo made sure it was published every week on Facebook; and Ioulia Fenton brought the articles to LinkedIn and helped put everything together in book-format.

Table of contents

Foreword
Juan Antonio Morales 7
Presentation 11
Acknowledgements 13

CHAPTER 1
The Aid Industry

The First Principle of Development: It has to come from within 19
Do your aid projects hurt the poor? 21
The cynical economist: Getting our priorities straight 23
Should the Aid Industry feel threatened by the increase in remittances? 25
How to aid? – Guidelines for the generous 26
Doing well by doing good and doing good well 28

CHAPTER 2
Poverty

Poverty on a 62-foot yacht in the Pacific Ocean 31
Poor women? 34
Save first – consume later 36
Gross National Happiness 38
Bolivians feel poor, but not that poor 40
Maximizing or satisfying? The paradox of choice 42
A new development compass 44

CHAPTER 3
Inequality

Envy, black magic, growth and inequality 49
The dynamics behind income inequality 52
How unequal is Bolivia really? 56
Inequality in Bolivia: Second opinion 58

CHAPTER 4
Social mobility

Marriage markets in Bolivia 61
Social mobility in Bolivia is finally improving! 63
Social mobility in Bolivia is finally improving - and now I can prove it! 64

CHAPTER 5
Human capital & education

Steel versus gold: Higher education mis-match 69
Education reform: Second opinion 71
Pro-poor globalization 73
What do we really know about education quality in Bolivia? 75
Crisis and education 78
The use and misuse of human talent 80
Early childhood development: Investing in our most valuable natural resource 82
On road blocks and parenting 84
2008 Year of Languages 85

CHAPTER 6
Labour markets

Salary versus productivity 87
What is a good job? 89
How productive is the informal sector? 91
What's the story on gender and informality? 93

CHAPTER 7
Migration

Treat your migrants better! 97
Is international migration increasing? 99
Reverse psychology in migration policy 101
Migration and the 80/20 rule 103

CHAPTER 8
Public policies

Urbanization is a blessing – why fight it? 105
How crowded is the World? 108

Why don't all countries adopt good institutions? 110
If I were the mayor… 113

CHAPTER 9
Public health

Cost-free policies to improve public health 115
Vaccination controversy: What is fact and what is myth? 117
C-sections for convenience? 120
Vaccination failure in La Paz 122
The world of drugs 124

CHAPTER 10
Ecotourism in Bolivia

Bolivia in the flat World 127
Believe it or not: Bolivia is one of the World's
Top Emerging Tourism Destinations! 129

CHAPTER 11
Bolivia's natural resource boom

True public goods, local consumption or imported goods 131
Governments giving gifts-populations acquiring rights 134
How can $700 million in hydrocarbon revenues be bad for the poor? 136
Natural resources: Curse, disease or trap? 138
The worst way to use the hydrocarbon revenues 142
How to explain a building boom in a stagnant city 143
What to do about YPFB? 145

CHAPTER 12
Environment

Aesop, golden eggs and ecosystem services 149
Environment versus development 151
China's impressive forest regrowth 153
Saving REDD after Cochabamba 156

CHAPTER 13
Climate change

Managing change 159
WARNING! Excessive use of the Precautionary Principle may be bad for you... 162

Now you can off-set both carbon emissions and infidelity! 163
Climate change in Bolivia - expect surprises 165
Fighting climate change: Cures worse than the disease? 168
Living on the edge: The perils of climate change 170
Climate variability versus climate change 173
Reducing vulnerability to climate change: Mitigation, development or migration 177
Climate alarmists versus science 181
NASA still reluctant to admit that the Sun might affect Earth's climate 183
Tipping Points 187
The World is cooling so the WWF is turning the heat on 190
Does the World benefit from being deceived? 194
How we know what isn't so 196
Climate feedbacks: Positive or negative 199
Bolivia's high CO_2 emissions 202
Reconciling melting glaciers and falling temperatures in the Bolivian highlands 203
The runaway climate train 207
Happiness and climate change 210

Endnotes: 213

Chapter 1
The Aid Industry

The First Principle of Development: It has to come from within

4 September 2006

There are many ways for a country to develop, but there is no way to develop a country: *Development has to come from within*.

Just as you cannot help a child develop by doing his homework, giving him all the toys and candy he wants, and protecting him from all potential dangers, you cannot help a country to develop by giving it money, writing its poverty reduction strategies, or protecting it against basic market forces.

You don't help a child develop by constantly telling him that he is stupid, ignorant, retarded and helpless, just as you don't help a country by labeling it poor, underdeveloped, indigenous, and hopelessly indebted.

The country has to find its own way to make money in the globalized world; otherwise it will end up on international aid forever. It doesn't matter if it takes time and the country makes a lot of mistakes on the way, as long as it is its own mistakes and it learns from them.

Just as it is difficult, and usually undesirable, to speed up the development of a child, the development of a country takes time and patience. With an extraordinary parental effort you can sometimes speed up the development of some specific skills in the child (for example gymnastics or chess), but it will usually be at the expense of other skills and a balanced development. The same holds for a country. With an enormous international effort, you can get all kids in primary school, but that may not help those kids - or the country - if the demand for primary school qualifications does not increase correspondingly.

So, is there anything you can do from the outside to help a poor country develop? Plenty.

First of all, you can be a good role model, showing how to develop good incentives and prosperity for all inhabitants without violence and environmental destruction. Good role models are as important for countries as they are for children. And they are in short supply. In order to be a really good role model you would have to be open to visits from students and workers from poor countries, because how else could they learn from your excellent example?

Second, you can remove some serious external obstacles to development, such as trade barriers (especially agricultural subsidies in rich countries) and transmittable diseases. Just as a sick child needs extra care, those transmittable killer diseases deserve special attention from the international development community.

Finally, you could help correct the highly misleading image of widespread desperation, starvation, hopelessness, helplessness, backwardness, danger and ignorance in poor countries, which prompts rich people immediately to discard these countries as travel destinations and instead send food aid (which ruins the profitability of local agriculture, making the poor even poorer). If the inhabitants of rich countries knew more about all the positive aspects, the hospitality and the spectacular features of poor countries, these might attract more tourists and international business, which would stimulate the creation of a large variety of local jobs, thus alleviating poverty rather than reinforcing it.

"Me alegra que alguien que llego a Bolivia, estuvo unos pocos años y tiene el diagnostico claro, mejor que muchos que han vivido toda su vida."
German Huanca Luna, California

"Very interesting! You nailed it. I agree completely."
Antonio Saravia, Dubai

Do your aid projects hurt the poor?

5 June 2006

There are many aid pessimists, like me, who would much rather be aid optimists. However, the empirical evidence on the effectiveness of foreign aid is depressing, especially in poor countries where aid constitutes a significant share of GDP, as in Bolivia and Nicaragua[1].

Any particular aid project is unlikely to actually hurt the poor – at worst it may be ineffective and a waste of time and money. However, a continuous series of thousands of aid projects has the capacity to change the behavior of both individuals and government, and often in unanticipated and undesirable ways.

A government artificially inflated by foreign aid has the resources to hire more skilled people and pay them relatively attractive salaries, which in itself may be good, since the country needs good doctors, inspiring teachers, and non-corrupt public administrators. However, the unintended side-effects are *more inequality* (because the relatively rich skilled workers benefit much more than the uneducated poor who are mostly self-employed) as well as a *brain drain* from the private productive sector.

If the public sector, including the foreign aid sector, pays far more attractive salaries, provides better benefits, and requires shorter working hours, then the private productive sector will be systematically starved of critical skilled workers. Skilled people will spend their efforts chasing coveted public sector positions and short term consulting contracts rather than setting up sustainable, productive enterprises that could help the country grow[2].

Once the skilled people have fallen into that trap, it is difficult to get out of again, as both their education and their work experience are targeted at managing aid projects and writing reports, rather than producing actual goods and services.

The poor are unlikely to fall into the same trap, as they don't have the skills to get hired by the public sector/aid community. However, in areas with a heavy presence of aid projects, the poor have an incentive to lay back and just participate in whatever project comes along, instead of actively looking for ways to improve their lives.

Even the projects designed to empower the poor often have the opposite effect. Due to the promise of a free lunch (literally), the poor attend a lot of workshops where they are told everything from how to shit to how dangerous it is for the planet if they fell a few trees to grow crops to feed their family.

They are also told a lot about their rights, but little about the corresponding responsibilities. They get the impression that they have a right to receive free education, health services, electricity, water, land titles, roads, and safe jobs without having to contribute anything in return because there are plenty of "free" resources available from rich countries and from the sale of natural gas.

The usual responsibility, creativity, cooperation and mature behavior generally necessary to live and progress may easily be suppressed if there is an easier route of a life in a child-like state, where everything is provided for you and nothing is expected of you. If people are treated like ignorant children they start behaving like ignorant children. If bad, irresponsible behavior is tolerated, such behavior will continue. Bolivia, it seems, is full of spoiled children – most of them adults – who have not overcome the stage of stubborn demands on their over-pampering, overprotective, rich parents (the aid community as well as mother nature).

Of course, real children should be treated as children, receiving adequate nourishment, stimulating education, treatment when sick, and an ample spectrum of challenges and opportunities to help develop responsibility, creativity, and social behavior. Aid projects targeted at children generally do not have the same adverse and distorting effects as aid projects targeted at adults, since children have the right to a child-like life without having to work hard to cover basic necessities.

So, back to the title question: Does your aid help the children in Bolivia grow up to be healthy, responsible, creative, dynamic and socially responsible individuals? Or does it degrade the adults to the state of a spoiled child who only demands and receives and never contributes to the sustainable development of the country?

The cynical economist: Getting our priorities straight

20 November 2006

There are many gigantic problems in the world (hunger, diseases, wars, corruption, lack of safe water, pollution, climate change, etc.), but there are also a great many efforts to solve these problems (hundreds of professional development organizations, thousands of NGOs, millions of volunteers, billions of dollars of foreign aid).

So, why is progress towards solving these problems so painfully slow?

One possibility may be that we haven't gotten our priorities straight. Clearly we can't fix everything at once (if we could, all the problems would already have been solved), so we should try to apply the limited funds available for fixing global problems to the areas where they can do the most good.

Setting priorities was exactly the purpose of the Copenhagen Consensus, arranged by Bjørn Lomborg (author of the The Skeptical Environmentalist) in 2004. A panel of highly regarded economists (several of them Nobel Prize laureates) listened to experts from each field about the magnitude and urgency of each problem, possible solutions, and the estimated costs of implementing these solutions[3]. Then each of the 8 panelists ranked the problems independently and finally they reached a consensus ranking to which they all agreed.

The top four priorities in the final ranking were the following: Control AIDS, reduce malnutrition, liberalize trade, and fight malaria. The benefit-cost ratios for treating these problems would be enormous (40 or more) and $50 billion would go a long way towards solving these problems.

At the very bottom of the list of priorities were the efforts to reduce global warming. Not because global warming was not considered a serious problem, but because the solutions proposed so far are not effective, and because compared to the other problems, it is not very urgent.

The meeting's expert in the climate change area, William Cline[4], estimated that it would cost $128 trillion (in net present value terms using a discount rate of 1.5%) to reduce the rise in temperatures by the year 2300 from the baseline of 7.3°C to 5.4°C. He also estimated that the benefits would be twice as high (due to the low discount rate and extremely long time frame), but since nobody can predict what the world is going to look like 300 years into the future, the latter number has a lot of uncertainty associated with it (a standard deviation of at least $200 trillion, I would guess).

From the cynical economist's viewpoint, it therefore looks a whole lot better to spend $50 billion to tackle some very serious and urgent problems in poor countries rather than wasting $128 trillion trying to reduce the average global temperature by a couple of degrees, with unknown, distant benefits. Just to be on the safe side, we might want to invest a $1 billion in climate change research, in order better to understand our climate, and perhaps $2 billion in research on how to manage change and improve our capacity to adapt not only to climate change, but also to all the other kinds of change that we are sure to experience in the coming centuries.

If we get our priorities straight now, the costs of climate change in the future may turn out to be quite limited as people have long since moved out of the most vulnerable activities (tropical agriculture), or because a big volcano erupted and sent temperatures downwards instead of upwards, or because the present interglacial period ends (as it is scheduled to this millennium), or because of any number of unforeseeable developments.

So if you really want to help make the world a better place, especially for those who are seriously disadvantaged, it would probably be a good idea to stop contributing to the global warming hype and instead concentrate on fighting the killer diseases that wreak so much havoc in developing countries.

"As always a very interesting article and as a matter of fact the Bill Gates' foundation is investing most of its funds in 2 of those 4 issues (Malaria and AIDS). It seems they did their homework too."
Percy Prieto, La Paz

Should the Aid Industry feel threatened by the increase in remittances?

14 May 2007

"The Aid Industry is completely out of control."
Simon Maxwell

The last decade has seen a tremendous increase in remittances from migrant workers in developed countries to left-behind relatives in developing countries. So much so that global remittances are now at least the double that of official development aid[5].

This has made the global Aid Industry a bit nervous, as remittances are potentially much better at helping the poor. Not only do the migrants have much more knowledge about the specific needs of their poorer relatives, but the transaction costs are also much smaller. For example, recipients don't have to write endless reports to qualify for help, and they don't get a toilet or an injection if what they really needed were school books or money for grandma's funeral.

I recently came back from a conference in Copenhagen ("Financing Development"), where we were discussing whether remittances compete with or complement official aid. I think Peter Adebayo from Nigeria hit the nail on the head when he bluntly said that there was nothing to worry about: Governments much prefer official aid due to the possibilities for corruption, whereas they have no control over remittances.

So, don't worry. Not even $200 billion in remittances are likely to discipline the out-of-control Aid Industry.

How to aid? – Guidelines for the generous

28 January 2008

> "Sometimes when we are generous in small, barely detectable ways it can change someone else's life forever."
> *Margaret Cho*

Generosity is a very admirable trait, but sometimes generosity backfires. The most horrific example I can think of is poor parents chopping off the hands of their children in order to make them more effective beggars.

Each individual donation is rarely harmful, and probably much needed, but when millions of such donations are made every day over decades, it can change incentives in undesirable ways, as in the example above.

When considering which charity to support, it is important to think through the potential negative side-effects. Since each individual project is unlikely to have serious negative side-effects, the charities themselves will not present such information. They will naturally and rightfully stress all the positive impacts of their projects.

Lacking a good, thoughtful guide for donors, here are a few recommendations:

Think big:

Instead of imagining the impacts of the one project you are considering, scale it up and imagine the impacts of hundreds of similar projects or millions of similar donations. This is not unrealistic, as most poor countries (and rich ones too) have thousands of active NGOs receiving donations from millions of people.

As an example, consider shelters for pregnant teenage girls. Having a baby when you are 14 can be very bad news for both mother and child, and help is clearly warranted. The girls can stay for free at the shelter for 18 months, and they will get food, clothing, baby supplies, and training. Sounds great! Just be sure that it does not sound so great that young girls think it is worth becoming pregnant just to escape annoying parents or a lousy job. Such shelters should never become the easiest alternative for the girls.

In general, if aid is conditioned on some undesirable characteristic (like poverty or teenage pregnancy), it has a tendency to promote those undesirable characteristics, as people try to qualify for the aid. As far as possible,

you should try to condition on something desirable, like school attendance or work. Creating jobs is much better than giving gifts.

Think small:

You don't have to try to save the World. Just take time to talk with your children, colleagues, friends, students, neighbors, a passing traveler and anybody else who might benefit from your experience. Take on an exchange student or an apprentice, or go working abroad for some time. Learn a new language. Treat foreigners in your own country with hospitality and respect, and be open-minded and friendly when you travel. Organize unusual events with an unusual mix of people in order to help expand their minds. Read ferociously in order to expand your own.

Most likely, your everyday actions and attitudes will have a much larger impact on the World than a few thousand dollars sent to a charity. Especially if those actions and attitudes inspire others.

"Brilliant, as usual, Lykke ! Congrats."
Günther Schulz-Heiss, La Paz

Doing well by doing good and doing good well

3 May 2010

> "We would like to believe that we are not in the business of surviving but in being good, and we do not like to admit to ourselves that we are good in order to survive."
> *Dorothy Rowe*

> "But goodness alone is never enough. A hard cold wisdom is required too, for goodness to accomplish good. Goodness without wisdom invariably accomplishes evil."
> *Robert Heinlein*

> "Never let your sense of morals get in the way of doing what's right."
> *Isaac Asimov*

In my experience, doing well by doing good is a whole lot easier than doing good well. If you are providing good and useful goods and services to society, you are highly likely to do well, simply because the need and demand for your goods or services is high. One of my favorite examples is the founders of –and contributors to– Google, who all deserve to be millionaires for providing such an incredibly useful service to humankind, and making it free too. Everybody who ever contributed significantly to the development of the Internet also deserves that, even if they did it for evil, military purposes. There are of course millions of more modest examples of incredibly useful goods and services. Condom and tampon manufacturers, for example, never really get any do-good credit, but they make life so much better for billions of women and deserve whatever money they make on it.

It is much more difficult to do good well. There are so many institutions constructed for the specific purpose of doing good and saving the planet – usually with other people's money. But they are often shockingly ineffective and sometimes even do more harm than good. This is mainly because they are based on a distorted view of the world, an exaggerated impression of imminent environmental collapse, and/or a lack of understanding of indirect and dynamic effects of their actions (i.e. what Heinlein sums up as "lack of wisdom"). I don't really want to point fingers here, but the hugely expensive and completely inefficient institutions set up in a futile attempt to prevent the ever changing climate from changing does stand out as a sore thumb.

Fortunately, there are exceptions to the dismal picture of aid effectiveness. I personally adore Hans Rosling and his Gapminder Foundation, which unveils "**the beauty of statistics for a fact based world view.**" Knowing the facts is a necessary condition for developing the wisdom needed to do good well, and Gapminder presents huge amounts of data in a very simple and appealing way, and has helped convince institutions like the World Bank that access to data needs to be free[6].

By simply presenting the evolution of a few simple indicators (like birth rates and child mortality), Rosling helps tear down the very damaging, imaginary wall between so-called developed and developing countries (see for example his short Lego video on population growth or his slightly longer talk "Debunking myths about the Third World", or the famous talk "The Seemingly Impossible is Possible" where he shows how developing countries are catching up with developed countries, and he even swallows a sword during the presentation!)[7].

Perhaps Rosling is doing good so well because he didn't set out to do good –just to do the right thing.

"I loved your brief and well-done piece on good-doing, Lykke"
Günther Schulz-Heiss, La Paz

Chapter 2
Poverty

Poverty on a 62-foot yacht in the Pacific Ocean

22 January 2007

Most of the people who write about poverty have never themselves been poor (including myself). This is not so strange, since the poor are too poor to write, even if some of them have the ability. They do not have the surplus of energy and time alone that is required to sit down and write to record or transmit their feelings, thoughts and ideas. They do not write blogs or diaries and they virtually never get hired as consultants to study poverty.

Might it be the case that the ones writing about poverty don't really understand it?

In the unlikeliest of places, as a guest on a 12-person sailboat touring the World, I got to experience some of the problems that poor people face every day: The whole family cramped in a tiny room with no privacy whatsoever; a hot shower a rare luxury; trying to keep the children's clothes clean a struggle against all odds; fish biting at much too irregular intervals; and daily chores taking up all ones time and energy.

It is surprising how quickly you can get used to that lifestyle though. You don't really need a bath every day, and there are always some clothes that are cleaner than others. The uncomfortable sleeping arrangements get compensated by more hours of sleep, and the lack of privacy is a natural contraceptive. The lack of TV is simply a blessing and the free pleasures of playing on the beach, hiking in the mountains, cooking a self-caught fish and chatting under the stars seems to be enjoyed so much more than the expensive trips to museums and fancy restaurants. Nine-to-five work gets distinctly unattractive: It is physically impossible, and who would want it anyway?

There seems to me to be four main situations in the world:

1) You are poor in a rural area, living off the land with plenty of time to spend with family and friends. You don't have to worry about somebody stealing your stuff and you don't feel any pressure to "keep up with the Joneses." Neighbors and family members usually share generously if some are more fortunate than others. You know little and therefore worry little about the rest of the world. Your main problems are likely to be health related, but, as there is little you can do about them, death is accepted without much fuss as a natural event.
2) You are poor in an urban area and have to work very hard to earn enough money just to shelter, feed and clothe your family. You likely work in a small family business, still spending lots of time with the family, but you may also have to do some stints of long, arduous hours in larger factories. You are likely to have access to public goods such as education, piped water, sanitation, hospitals, roads, TV and Internet, and through this you learn how unequal the world really is, and how relatively unattractive your current situation is.
3) You are well-off, but have to work hard to maintain the image expected of somebody with your level of wealth. This implies too little time to enjoy with family and friends, so you are at risk of dying lonely and unhappy of some stress-induced illness. You are insured against theft, fire, unemployment, accidents, disease, death, etc, but that does not prevent bad things from happening.
4) You are rich without having to work too hard for it. This is a quite heterogeneous group including those who inherited wealth, those who won it, those who married into it, those who have some special talents and worked hard to develop them, and those who exploit their fellow citizens. Almost by definition, only a minority can be rich without hard work[8]. This condition could theoretically keep you comfortable for a very long time, but I am not sure it will make you happy. It seems that most rich people have plenty of problems in their lives, and if not, they create artificial problems and worries, for example by climbing mountains, crossing oceans in small sailboats, or trying to look like Barbie.

This is obviously an oversimplification[9], but if 1 to 3 roughly outline the road from poverty to richness (and 4 is reserved for a small lucky minority), then it is not so strange that increased wealth has not been accompanied by increased happiness, as recent research suggests it hasn't[10].

And perhaps it is not so strange either that it is difficult to get people out of poverty. Stage 2 and 3 do not exactly look attractive if you are used to a life with independence, flexibility and fresh air, even if you don't have much money.

I am sure most poor people would be happy to jump directly to 4, but maybe they don't think that the money they would earn in 2 and 3 is worth the sacrifices they would have to make.

I think earned income is a really lousy measure of welfare/happiness. Maybe it would be more accurate to measure welfare by how many hours of leisure (family time, hobbies, sports, traveling, studying, reading, art work, gardening, playing, etc) you can afford per year and poverty by how many hours of work you have to do per week. (If you really love your work, it could be considered a profitable hobby, and thus count as leisure).

Studies that use earnings per hour worked as a measure of welfare do indirectly value leisure, so they are probably not too bad. But most studies on poverty do not take into account the value of being your own boss and being able to choose how many hours you want to work and when. They implicitly impose the same set of preferences on all people – a set of preferences that values diamonds and flat screen TVs highly, but attaches no value to personal time, flexibility, independence, nature, exercise, and freedom from worrying about terrorists, global warming and species extinction.

If you are rich enough, you can buy back some time, freedom, nature, exercise, etc (for example by sailing around the world or climbing Himalaya), and you will have come full circle.

"Mucho quisiera discutir tu ensayo contigo
- nuevamente es bien provocativo y para "hacer pensar"."
Martin Thomas, La Paz

Poor women?

26 March 2007

The perception that women are disadvantaged and discriminated against in Bolivia is almost universal. Achieving gender equality is of so high priority that it is very difficult to get a research proposal funded, unless you promise to analyze the gender dimension of whatever topic you are interested in.

But is that perception still true?

According to the latest national household survey in Bolivia (MECOVI 2005), men and women are exactly equally likely to be poor (60% poverty rate for both sexes). This is not so strange as poverty is measured at the household level and households tend to be pretty randomly mixed in terms of gender.

But what about female headed households, aren't they disadvantaged?

Female headed households comprise 23% of all households in Bolivia, and according to the MECOVI 2005, these are actually *less* poor than male headed households (51.7% poverty for female headed households versus 54.2% for male headed households).

But surely single mothers with children must be disadvantaged, right?

Ten percent of all Bolivian households consist of single mothers living with up to eight children. These are indeed more likely to be poor (57.2%) than the average for all households (53.6%), but they are not as poor as the classic nuclear family with father (head), mother (spouse), and one or more children (60.1% poverty rate), which comprise 46% of all households. And this despite the fact that single mothers have substantially lower education levels than the heads from classic nuclear families (6.4 versus 8.3 years).

This result is not due to poverty being badly measured (which it may still be, though). By almost every materialistic measure that could be constructed from the survey information, single mother households are better off than classic nuclear households: Per capita incomes are higher (597 Bs./month versus 459 Bs./month), housing quality is better (Quality of Housing Index of 2.41 versus 2.27), homes are less crowded (1.3 persons/room versus 1.7 persons per room), expenditure on food per person is higher (274 Bs./month versus 236 Bs./month), expenditure on education is higher (221 Bs./month versus 170 Bs./month), etc.

Indeed, according to the MECOVI 2005, the classic nuclear family is the worst possible situation in terms of poverty. It is much better to be

childless, single parent, or live in an extended household with other family members.

So much for conventional wisdom.

Save first – consume later

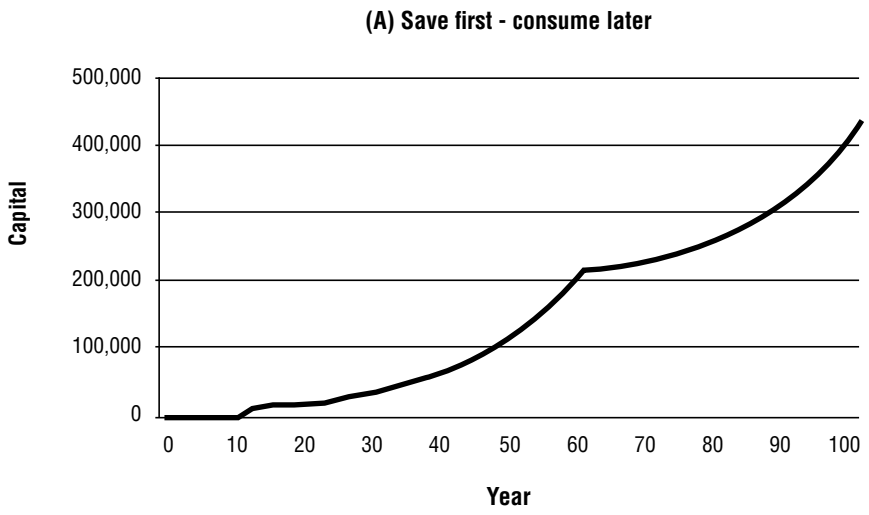
2 April 2007

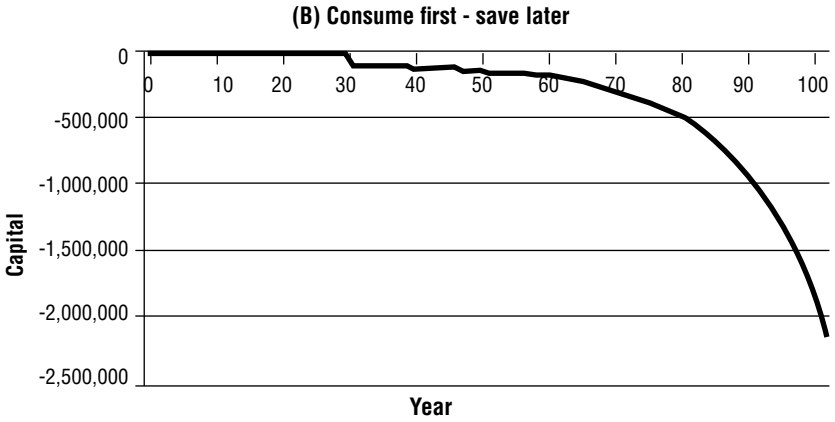
"Money often costs too much."
Ralph Waldo Emerson

If children were to learn just one thing in school, it should be *The Power of Compound Interest*. If everybody understood and applied that simple principle, poverty could be permanently eradicated in one life-time.

Let me explain how it works by comparing two persons, A and B, who, for simplicity, both live for 100 years.

Person A saves 1 boliviano every day for the first 60 years of his life and invests the savings at an average real return of 6% per year. By the time he is 60, he stops saving and instead starts withdrawing 30 bolivianos every day for the rest of his life (40 years). By the time he dies, he will leave his children a nice little nest egg of close to half a million Bolivianos (430.718 to be exact). The total amount he saved was 1 x 365 x 60 = 21.900 bolivianos, whereas the total amount withdrawn for consumption and inheritance was 30 x 365 x 40 + 430.718 = 868.718 bolivianos. Due to the *Power of Compound Interest*, he could consume 40 times as much as he saved, because he did the saving first.





In contrast, person B saved nothing for the first 30 years of his life and then he borrowed 100.000 bolivianos to finance a house (at 8 percent real interest). He immediately started paying back that loan with 20 bolivianos per day, and he kept paying that amount till the day he died 70 years later. In total he withdrew 100.000 bolivianos, but he paid 20 x 365 x 70= 511.000 in debt payments and left a debt of 2 million bolivianos to his children. Due to the *Power of Compound Interest*, he had to save 15 times more than he consumed, because he did it in the wrong order.

Notice that anybody can save 1 boliviano per day, even a shoe shine boy or a beggar. It is just one extra pair of shoes to shine or one less beer Friday night. In contrast, paying 20 bolivianos per day is not nearly as easy, as that is close to the average daily income in Bolivia.

Notice also that the interest rates in the examples above are very conservative. You could easily earn a higher return, or pay a much higher interest on your loan. In that case the difference between the two persons would become even more pronounced.

So timing is everything if you want to be rich. If you save first, you will be richly rewarded. If you consume first, you will pay dearly.

If you think credit is the answer to Bolivia's problems, you might want to think twice.

P.S: If you are not a shoeshine boy and not a very young child, you might want to go for one dollar per day instead of one boliviano per day.

"Simply brillant, estimada Lykke!!! Gracias nuevamente por estos ensayos para empezar la semana pensando y no durmiendo"
Martin Thomas, La Paz

Gross National Happiness

6 July 2007

"Wealth is the ability to fully experience life."
Henry David Thoreau

"Being rich is having money; being wealthy is having time."
Margaret Bonnano

"The problems that exist in the world today cannot be solved by the level of thinking that created them."
Albert Einstein

Economists, especially development economists, almost always measure the level of well-being in a society by per capita income, noticing that this simple economic measure is highly correlated with most other indicators of development they can think of (life expectancy, child mortality, income equality, education levels, etc.).

However, whereas income per capita correlates highly with a large variety of social indicators of development, it does not seem to explain happiness, or subjective well-being, very well. According to Lears' Quality of Life Index[11], for example, people in Nigeria on average feel happier than people in Austria, despite the fact that per capita incomes (adjusted for purchasing power) are about 29 times higher in Austria and child mortality about 40 times higher in Nigeria[12]. Also, despite substantial economic growth in United States, Japan, and France during the post-war period (1946-1992), the level of happiness in all three countries has stayed approximately constant[13].

At the individual level there is also little correlation between subjective well-being (SWB) and objective measures of resources. For example, SWB correlates only 0.12 with income, 0.13 with physical attractiveness, 0.10 with physician-rated health, and 0.17 with intelligence[14].

Why is happiness so difficult to tackle for economists? One reason is that it depends to a large extent on deep personality traits: A generally happy person is only shortly affected by even severe adverse events, such as a spinal cord injury, and a generally miserable person who wins the lottery won't be happy for long. In addition, the human mind has an extraordinary power to adapt to changing circumstances and compensate for specific handicaps, which implies that people usually develop strategies based on the assets and advantages they have, and ignore strategies which would

require assets that they don't have. Finally, love, one of the main causes of happiness, is a complete mystery for economists.

But there are some straightforward contradictions between increasing income and increasing happiness that even economists should be able to understand. For example, maximizing income and consumption is often done at the expense of the environment, and contaminated water and filthy air has an adverse effect on our health and well-being. In addition, increasing your income will almost always require you to sacrifice time - the most binding constraint in the world. Everybody, rich or poor, only has 24 hours per day, and if you spend 12-16 hours per day working, you don't have much time left being happy –unless you really love your work.

Job stress has been labeled the "20th Century Disease" by the United Nations and a "World Wide Epidemic" by the World Health Organization. It is estimated to cost the US industry more than $300 billion annually (about 30 times Bolivia's total GDP) in accidents, absenteeism, employee turnover, diminished productivity and direct medical, legal, and insurance costs[15]. Many of these costs increase GDP, by the way. It is not obvious that this should be a development ideal to inspire to.

People, tricked by TV series and the trillion dollar advertising industry, may spend too much time and money on material things that promise to make them happy, but in reality don't. Poor people, who are not inundated with all that propaganda, may actually be making better choices than rich people in terms of their own happiness, but the development community is desperately trying to get them into the same rat race as the rest, so that they can increase their level of income and consumption.

But a new way of thinking is emerging among economists in a branch called Happiness Economics. Here, researchers are attempting to measure and understand the determinants of happiness, with the intention of getting to the core of the welfare concept economists are always trying to maximize. Bhutan was the first (in 1972), and so far only, country in the World to introduce Gross National Happiness (GNH) instead of GDP and to use it as a unifying vision for its development plans and policy.

The Inter-American Development Bank is currently launching several projects on Quality of Life in Latin America and plans to organize a range of events around this topic on its 50th anniversary in 2009[16]. Hopefully this is just the kind of new thinking needed to solve today's problems of poverty and inequality.

Bolivians feel poor, but not that poor

6 August 2007

"Poverty, like beauty, lies in the eyes of the beholder."
Mollie Orshansky

According to official estimates, there are at least 3 million extremely poor people in Bolivia (about 38% of the total population). Judging from their very low incomes, they shouldn't be able to buy even the minimum basket of subsistence goods. The majority of people in this group don't have electricity in the house, and thus none of the convenient inventions that run on electricity. Still, only a minority of them (18.5%) actually *feel* extremely poor (see Table below).

Table 1: Classification of the Bolivian population by objective and subjective poverty measures

	Objetive data			
Subjetive data	**Extremely poor**	**Moderately poor**	**Not poor**	**Total**
Extremely poor	7%	3%	1%	11%
Moderately poor	27%	22%	16%	65%
Not poor	3%	6%	14%	24%
Total	38%	31%	31%	100%

Source: MECOVI 2003-2004.

In contrast, more than half of the people who are classified as **not** poor, do feel poor.

In total, less than half of the population is classified in the same poverty group (extremely poor, moderately poor, not poor) as they themselves feel they belong to.

This suggests that our usual monetary measure of poverty does not really capture the deprivation concept that we would like it to capture. There are several partial explanations for that:

Income fluctuates a lot from month to month, so last month's income is not necessarily a good indicator of permanent (normal) income. This is particularly true in a country like Bolivia, where less than 5% of the working age population has a steady, formal job with a regular salary.

People may judge their poverty relative to others in the country, rather than in absolute terms. Since Bolivia has astounding levels of inequality,

it is easy to find someone that is definitely much poorer, but it is also easy to find groups that are definitely much better off. As a consequence, the majority of people will consider themselves as belonging to the middle group, which is also what the table above indicates.

People adapt their needs to the available income. Approximately half the Bolivian population say that they can get by on less than 30 dollars per month[17]. Of course it could also be the other way around: people adapt their income to their needs. In any case, there is a very strong correlation between actual income and necessary income.

Especially the last point needs to be understood better. If our policies and interventions stimulate an increase in needs, then people will always struggle to make their income stretch far enough to cover their ever increasing needs. When incomes lack behind needs, people will feel poor, no matter what the level of income.

Do our policies create needs? Probably. The terminology we use suggests so. Poverty measures are completely materialistic, based on a minimum basket of goods or on unsatisfied basic needs. The extreme focus on per capita GDP and GDP growth rates also implicitly weigh the materialistic part of life much more heavily than all the other aspects that make life worth living.

Are there any alternatives? Well, we could listen a bit less to the advertising industry and a bit more to some of the great philosophers of all time (Gandhi: "Earth provides enough to satisfy every man's need, but not every man's greed"; Nietzsche:" Possessions are usually diminished by possession"; Thoreau: "It is preoccupation with possessions, more than anything else, that prevents us from living freely and nobly" and "That man is the richest whose pleasures are the cheapest."

Rather than imposing the materialistic world view indiscriminately on the so-called developing countries, we should find out what makes people happy. Maybe it is freedom, independence, plenty of quality time in large and close-knit families, playing, dancing, singing, seeing animals getting born and plants grow up, or just sitting on the top of a mountain and feel peace settle in every cell. If so, it is difficult to imagine that the TV, couch and designer jeans you could buy if you had more money could possibly compensate for being locked up in an office or factory every day, away from everything that makes you happy.

Maximizing or satisfying? The paradox of choice

9 August 2010

Sanity and happiness are an impossible combination."
Mark Twain

As most economists, I have been thoroughly educated to believe that people maximize utility (well-being). Sometimes people do not appear to do so (at all!), but if you correctly take into account all benefits and costs, and the information set available, a good economist can explain almost every decision as being rational and utility maximizing.

In a world of utility maximizers, more choice is better, as it improves the chances of reaching the highest possible utility: With many options available, we can find just the dish that makes our mouth water, at a nicely decorated restaurant, with really great music, and at a reasonable price, whereas if there were fewer options available, we might have to choose between good food and awful music, or good music and awful food. Even with few options, we would of course be maximizers and choose the option that provides us with higher utility, but our utility could have been much higher, if there were more options available.

However, even a slight brush with the field of psychology (or the real world, for that matter) will tell you that maximizing behavior is quite unusual, and that more choice may actually make us less happy.

According to American psychologist Barry Schwartz, author of "**The Paradox of Choice**," only about 10 percent of the American population are maximizers, in the sense that they will search for and accept only the best. The remaining 90% are satisficers, as they will settle for something that is good enough and not worry about the possibility that there might be something better available. Maximizers will spend hours, days or years investigating and evaluating options, while satisficers will settle for the first option that satisfies the need, and then move on.

One of the problems with being a maximizer is that it requires a tremendous amount of time to investigate all options and evaluate the expected utility of each. With too many choices available, a maximizer may easily experience *analysis paralysis*. But an economist would just include research time as a cost and conclude that satisficers are really optimizers with high opportunity costs.

However, there are other characteristics of optimizers, which economists can't explain away, and one of them is regret. People who have spent an inordinate amount of time picking out just the right restaurant are much more likely

to feel disappointed by any imperfections in the evening, ending up questioning their own choices and wondering whether another choice might have been better, and thus simply not enjoying the evening as much. In contrast, visitors to the Mosquito Bar in Rurrenabaque are guaranteed a great time, simply because there are no other options available in the region (at least not when I was there years ago), and everybody will be there enjoying themselves.

Another problem of maximizers is their high expectations. If there are lots of options, a utility maximizer would expect it to be possible to find a restaurant with just the right combination of features, but if the actual experience does not match those high expectations, he would feel disappointed and somewhat unhappy. In contrast, a satisficer who just picks the first open restaurant probably won't have very high expectations, and thus might end up getting pleasantly surprised.

Yet another problem with being a maximizer in a world of many choices is that if things do not work out as well as expected, the maximizer has only himself to blame, and such self-blame tends to be hard on the self-esteem and reduce happiness. In contrast, satisficers can much more easily shrug off a bad experience, blaming it on bad luck or a bad cook.

There are of course more serious choices to be made in life than picking restaurants, and Schwartz's insights apply to these, even if he tends to focus on shopping[18]. Job choice is one of those serious choices, and with just about as many jobs existing as there are working-age people on the planet, the options are almost infinite (especially if you take into account the option of becoming an entrepreneur). However, if you have a job, but are constantly looking around for better options (maximizing behavior), you are unlikely to do very well in that job and unlikely to be happy with it.

Marriage is another serious choice, and as far as I can see, the institution of marriage is designed for a world of satisficers, not optimizers. Indeed, optimizers would never marry, as marriage reduces choice dramatically (usually from several billion to one). Satisficers, on the other hand, are much more likely to be happy in marriage and rather appreciate not having to go through the hassle of searching for and picking out whom to sleep with each night.

I vaguely remember an economics class teaching the advantages of commitment (the possibility of reducing choices), so these ideas are not entirely new to economists. However, the commonly used utility-maximizing behavior of a representative agent is still too far removed from reality, and there is a serious need for new concepts and theories in economics which recognize these psychological insights as well as real world behavior.

A new development compass

18 October 2010

"If you're a Boy Scout on Mars with a compass, you're lost."
Jack Connerney

A compass is a direction finding instrument. The classic magnetic compass indicates where north is and helps us choose in which direction to walk if we happen to be lost in a wilderness area. However, we need direction in so many more ways than that. Every choice we make implies choosing one direction over another, and the better direction finding instruments we have, the better choices we will make. This holds at all levels from the personal level to the country level, and in all areas of life from driving to choosing where to study. This article is about direction finding at the community or country level.

In Bolivia, the stated goal is "living well in harmony with nature." This is a very sensible goal aiming at securing human well-being without destroying the natural assets on which all life depends. But what exactly do we mean by living well in harmony with nature? How do we know if we are doing it? And, if we are not doing it, how do we know which policies might move us in the right direction? In order to answer these crucial questions, we need indicators that can serve as a compass.

We can split the concept of "living well in harmony with nature" into its two dimensions, which facilitates analysis and measurement. In one dimension, we would have the "living well" aspect, and in the other dimension, we would measure "harmony with nature."

Living well can either be measured objectively (usually by income, basic needs or asset indicators) or subjectively (capturing the level of life-satisfaction or happiness). Subjective and objective indicators are highly correlated in poor countries, but the correlation tends to break down as people become richer. In any case, being happy and healthy seems to be more directly related to the goal of living well, while income, electricity and education may be thought of as means to achieve that goal.

Thus, ideally, our indicator of living well should measure the degree to which we live happy and healthy lives. The Happy Planet Index[19] proposes to use "happiness adjusted life expectancy" as a summary indicator. It is calculated as life expectancy multiplied by subjective well-being (as measured on a scale from 0 to 1), and the units are "Happy Life Years." In the case of Bolivia, life expectancy is about 65 years and life satisfaction is

about 0.65, so the happiness adjusted life expectancy is 42 Happy Life Years. The highest level of human well-being at the country level is achieved in Costa Rica, where life expectancy is 79 years and life satisfaction is 0.85, implying an average human well-being of 76 Happy Life Years. At the other extreme we find Zimbabwe, with a life expectancy of 41 years and life satisfaction of 0.28, implying an average level of human well-being of only 17 Happy Life Years.

As for any indicator, data is needed to construct this one, and while several large surveys have been carried out[20], subjective well-being is not yet a standard question in household surveys and censuses. It should be, though, as it is central to our goal of living well and it takes just one simple question:

All things considered, how satisfied are you with your life as a whole these days?

Responses are recorded on numerical scales, typically from 0 to 10, where 0 is dissatisfied and 10 is satisfied.

I would strongly recommend that this question is included in all future household surveys in Bolivia, as well as in the next census, because if it is not, we are going to have a compass without a needle.

As to the "harmony in nature" dimension, it is easier to measure in the opposite direction, as the amount of "environmental damage." In Bolivia, most people have very low environmental impacts, because they consume few resources, use little energy, and generate modest amounts of waste. Thus, they can be said to live in harmony with nature. However, a small percentage of the population pulls up average environmental impacts. The uncontrolled burning of several hundred thousand hectares of forest every year and the thoughtless contamination of precious water sources cannot possibly be considered "harmony with nature."

The Happy Planet Index proposes to use the concept "Ecological Footprint" as a way of aggregating the many different types of environmental impacts into one simple measure, which indicates how many hectares of bio-productive area a person "uses."

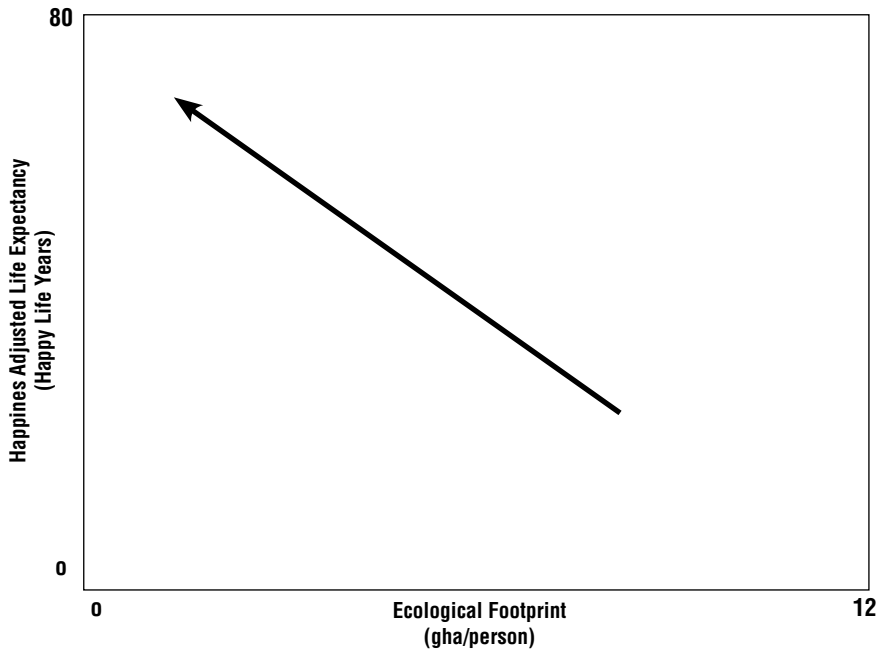
The area of biologically productive land and water on Earth is approximately 11.9 billion hectares. Not all areas are equally productive, but through conversion factors, they can be standardized into average global hectares (gha). With a World population of 6.6 billion people, the available bio-capacity is about 1.8 gha per person. Thus, we might say that people who use less than 1.8 gha live in harmony with nature, while people who use more than their fair share do not.

Currently, Bolivians on average use about 2.1 gha/person, so we use more than our fair share of the World's bio-productive area. However, Bolivia has more bio-productive area per person than any other country in the World, so we are living well within our own bio-productive capacity. Thus, in the "harmony with nature" dimension, we are doing reasonably well (except for the 5% of the population (many of them foreigners) who are causing 95% of the environmental damage).

However, in the "living well" dimension, we are not doing very well. Indeed, according to one of the World Happiness Maps, Bolivia is right at the bottom, much below Zimbabwe and war torn Iraq[21]. This is very disappointing, and hopefully not entirely accurate. However, it is clear that we need to make progress in the well-being dimension, and for that to happen, we need to better understand what makes Bolivians happy.

I suggest that we replace our current, highly misleading GDP growth indicator with the following development compass, which will show us the direction towards "living well in harmony with nature":

Figure 1: A new Development Compass



"Muy interesante. Te comento que el siguiente año se tiene previsto hacer una encuesta continua a los hogares, para medir el uso del tiempo. Veré la posibilidad de que se pueda incorporar algún módulo (muy pequeño) o alguna pregunta acerca del grado de satisfacción subjetiva."
Javier Ibiett, Instituto Nacional de Estadísticas, La Paz

Chapter 3
Inequality

Envy, black magic, growth and inequality

24 July 2006

> "Plato told Aristotle that no one should have more than five times the wealth of the lowest-paid member of society."

It has been reasonably well-established in the literature that not only absolute income levels matter for the level of happiness, but also *relative income levels*. You don't like to see too much poverty around you (thus the case for altruism), but you don't like to see rich, ostentatious people either (causing envy). This article is mostly about the latter.

If you can't increase your own income (for example because of low social mobility), then you can theoretically improve your happiness by reducing other people's incomes. This would explain such unconstructive behavior as vandalism and black magic.

My family is currently constructing a wall around our piece of land in Alto Ovejuyo, La Paz, and a few weeks ago, when the guys were clearing away some bushes, they found a bottle with half a lizard and other weird items that indicated black magic with malicious intention. Hopefully it was not targeted at us. After all, it was found just on the border of our land and it had been there for some years. And how much damage can a severed lizard do, anyway?

After listening to the construction workers' horror stories about black magic and human sacrifices in the Altiplano construction business, however, we decided, just in case, to do some white magic to counter the potential negative effects of the black magic. So, last weekend a perfectly healthy, beautiful, white, blue-eyed llama had his throat cut and his blood poured into

the foundation of our wall. A *mesa blanca* was also burned, and supposedly you can read the future in the ashes when it is burning down. According to the experts present –and there were many of those– it could not have turned out better. In the ashes there was clearly a *puerta del sol* (nice house), a frog (wealth) and an airplane wing (traveling), so presumably we are OK.

According to a few Bolivians surveyed, envy is very strong among the Aymara population (I don't know anything about the rest), and malicious spells are frequently used. The sin that might attract such a spell may simply be to be successful and not share your wealth with those around you. Even if you share with many of them, there may be others who feel ignored, so you can never be safe.

What does such strong envy, backed up by pretty convincing witch doctors, do to a society? First of all, if you risk dying a slow, painful, inexplicable death if you are successful, you might want to keep a low profile, keep your business micro-size, and in general reduce your efforts so as not to risk becoming too successful. This, of course, would tend to put a brake on overall growth.

Second, if you happen to become successful despite of this, you would want to get rid of the money quickly. If you invest the surplus in your business, that might make you even more successful, so that is not a good idea. It seems that the perfect way to get rid of excess wealth is to throw a big party. You make people happy while showing publicly how generous and sharing you are. Nobody objects to a good party. Just be careful not to forget anybody when you send out invitations.

These conjectures would explain several facts about the Bolivian highlands, such as the extremely low investment ratios, the predominance of micro-enterprises that never grow to become small or medium sized enterprises, and the lavish parties held despite the very low incomes. I always found it irresponsible that these relatively poor families spend so much money on parties, instead of investing it in their children's education or in their micro-business. But now I can see why they might consider this too risky.

This is admittedly mostly speculation, based on second or third hand gossip, but there is real empirical evidence on the strength of envy in other countries. For example, an experiment carried out in the UK by Zizzo and Oswald showed that many people are willing to pay in order to reduce the wealth and incomes of others. They organized a series of experiments in which groups of four people were given nearly equal sums of money. The four had to gamble with their new wealth in random, computerized bets;

two came out each time with more cash, and two with less. Each was then given the chance to spend his money to reduce the take of his fellow subjects, but it would cost him 25 cents for every dollar destroyed that belonged to his fellow players.

Was anybody willing to spend money just to hurt others, while leaving himself poorer? The answer is overwhelmingly yes. A shocking 62% of the participants paid for the privilege of impoverishing their peers[22].

Several surveys have shown that many people would prefer lower average incomes if these were more fairly distributed. For example, Alesina, Di Tella & MacCulloch show, using 128,106 answers to a survey question about happiness, that there is a large, significantly negative effect of inequality on happiness in Europe, but not in the US[23]. The authors suggest that this is because social mobility is higher in the US, implying that those who are presently rich frequently go bankrupt, and the poorer may suddenly strike it rich. If inequalities tend to average each other out over time, inequality at a given point in time is not so much of a problem.

Since social mobility is very low in Bolivia[24], envy is likely to be strong, and its negative effects on growth and development may be severe. More research on this issue is clearly necessary, but it does seem to provide yet another argument for improving social mobility.

The dynamics behind income inequality

19 November 2007

By international comparisons, income inequality in Latin America is extremely high. Most Latin American countries have Gini coefficients in the 0.45 –0.65 range, while most European countries fall in the 0.20– 0.40 range together with China and India. United States fall in between the two groups with a Gini coefficient of 0.40 –0.45, depending on the year[25].

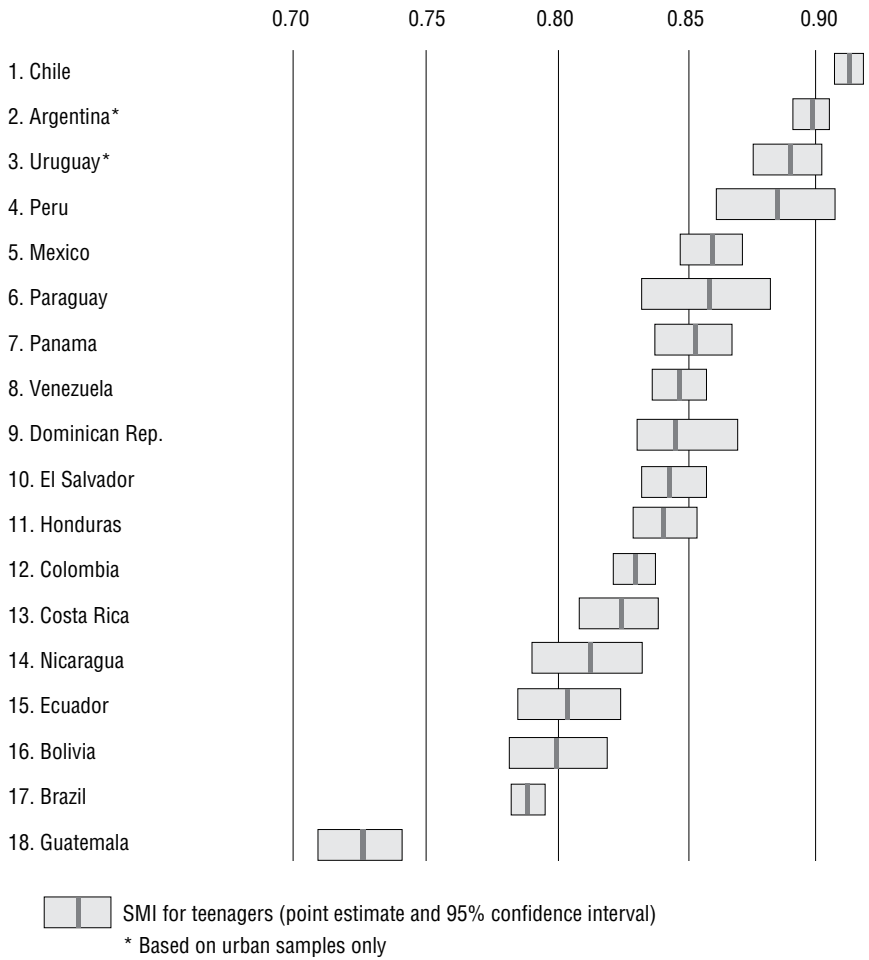
However, inequality measures by themselves say little about fairness. Inequality could be perfectly fair if the rich were rich because they had studied diligently, worked hard, invested wisely and provided valuable services to their community, while the poor were poor because they were lazy, selfish or dishonest.

Most often, however, income levels have little to do with effort and contributions to society. Income levels and living standards of most people in Latin America today were to a large extent determined even before they were born, by the socio-economic status of their parents. Rich parents could give their children good quality education and intellectual stimulation and introduce them to other rich people for business and marriage. In contrast, children of poor parents were stuck with public education, which often was so bad that they opted out even before finishing primary school, thus severely limiting future income generating capacity.

The importance of family background varies widely between countries, though. Chile, for example, has very high levels of inequality, but family background is not very important in explaining this inequality. This means that social mobility in Chile is high, especially compared to countries like Guatemala, Brazil, Bolivia, Ecuador and Nicaragua (see Figure 1).

High inequality is unfair and bad for economic development if it is combined with low levels of social mobility. In this case there is a large gap between poor and rich, and it is very difficult to cross that gap. The low probabilities of successfully crossing over from poor to rich, means that most poor people don't even bother to try. They don't feel it is worth investing in the education of their children, because the chances of them getting a well-paying job would still be slim, and they don't feel it is worth working hard, saving and investing since it makes little difference in the end. Similarly, the rich kids have little incentive to study and work hard, as they were born rich, and their parents have the connections to secure them a well-paying job even with only a modest effort. The returns to effort are small in this set-up, which obviously discourages effort, and thus economic growth.

Figure 1: Social Mobility Index based on teenagers (13 – 19 years), late 1990s.



Source: Andersen, Lykke E. (2003) "Social Mobility in Latin America: Links with Adolescent Schooling" in Duryea, Suzanne, Alejandra Cox Edwards & Manuelita Ureta (eds.) Critical Decisions at a Critical Age: Adolescents and Young Adults in Latin America. Washington D.C.: Inter-American Development Bank. Chapter 6, pp. 219-247.

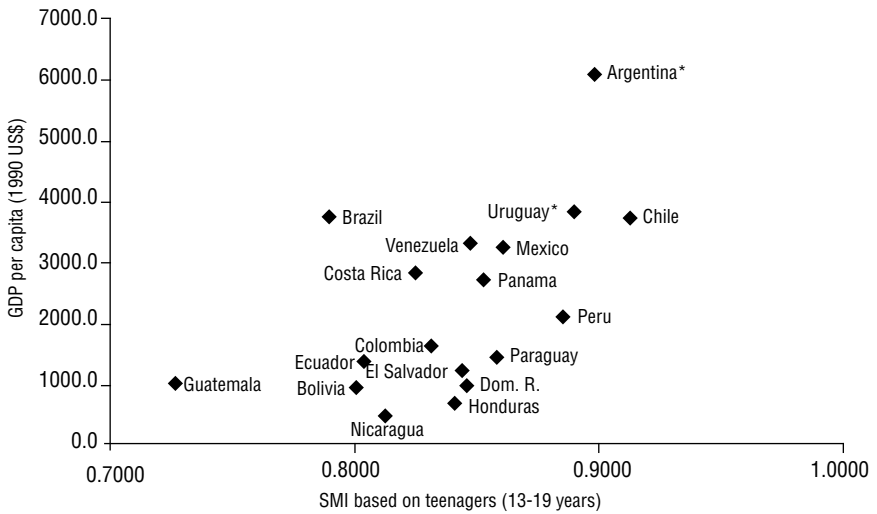
But if high levels of inequality are combined with high levels of social mobility, it is a completely different story. In this case there is still a large gap between rich and poor, but it is easier to cross the gap (in both directions). This implies large returns to effort. A poor family which makes the sacrifice to move to the city and help the children obtain a decent education can expect their off-springs to earn life-time incomes 5-10 times higher

than if they had stayed in a rural village. Rich kids would also have to study seriously and work hard, as they would have to compete fairly with a lot of highly motivated people of poorer backgrounds.

A country where everybody has strong incentives to work hard and invest in higher future incomes is likely to grow much faster than a country where nobody has incentives to work hard or invest. In turn, a country which is growing and changing rapidly is likely to have higher levels of social mobility, as existing strong industries and businesses more quickly become obsolete and have to give way for smaller, cutting edge industries and firms. This means that a country can enter a virtuous circle of high social mobility and high growth, or it can get stuck in a vicious circle of low growth and low social mobility[26].

Figure 2 indicates that Guatemala, Nicaragua, Bolivia, Ecuador, and several other poor Latin American countries may indeed be stuck in a vicious circle of low growth and low social mobility, while Argentina, Chile and Uruguay may have entered a virtuous circle.

Figure 2: Social Mobility and economic development, late 1990s



Source: Andersen, Lykke E. (2003) "Social Mobility in Latin America: Links with Adolescent Schooling" in Duryea, Suzanne, Alejandra Cox Edwards & Manuelita Ureta (eds.) Critical Decisions at a Critical Age: Adolescents and Young Adults in Latin America. Washington D.C.: Inter-American Development Bank. Chapter 6, pp. 219-247.
Note: Data from Argentina and Uruguay are from urban areas only.

In situations of high social mobility, low inequality may actually be worse than high inequality, as the former situation limits the returns to effort. Just as in the situation with low social mobility, outcomes have little to do with effort, which discourages effort and thus growth.

In summary, the dynamics behind inequality are much more important than inequality in itself. Governments should strive to secure equality of opportunity (high social mobility) rather than equality of outcomes. They should secure level playing fields, high returns to socially beneficial activities, and punishment for socially damaging activities, such as crime and corruption.

How unequal is Bolivia really?

11 February 2008

It is difficult to imagine a country more unequal than Bolivia. Some people live in simple one-room dwellings without electricity, piped water, bathroom, or any other basic conveniences, and only get to spend a dollar on special days. Other people live in big mansions with home cinema, swimming pool, fitness room, and plenty of servants.

You don't need to calculate Gini coefficients to see that Bolivia is clearly more unequal than Denmark. But to assess more subtle differences, it is necessary to rely on more than casual observation.

United States also have extremely poor people living under bridges and extremely rich people living in spectacular mansions. It is difficult to immediately judge whether the US is more or less equal than Bolivia. According to the standard Gini coefficients measuring inequality of income, Bolivia is considerably more unequal than the US: Bolivia has a Gini coefficient around 0.60, whereas the US has one around 0.47[27].

But this is to a large extent because few Bolivians receive regular salaries (at most 1/3 of the economically active population), and thus have to make a living in ways that often do not register as income, but which put food on the table nonetheless. By far the main part of the economically active population in Bolivia are subsistence farmers or informally self-employed, who generate hardly any profit (income), but which may generate sufficient goods for auto-consumption.

The Gini coefficient measured on consumption is about 0.44 for Bolivia[28]. That is, about 16 points less than the Gini coefficient based on income. This is a substantial, but entirely understandable, difference, which is mainly due to informal self-employment.

A consumption based Gini coefficient is not available for United States[29], but there is reason to believe that it is not much different from the income based Gini coefficient, as the informal sector is limited. For the few rich countries where both consumption and income Ginis have been calculated simultaneously, they tend to be quite similar (see Table 1). If anything, the consumption based Gini coefficient appears to be higher than the income based Gini coefficient.

Table 1: Consumption and Income based Gini coefficients in rich countries

	Consumption based Gini	Income based Gini
Portugal, 1990	0.37	0.32
Singapore, 1993	0.41	0.38
Poland, 2002	0.34	0.35
Spain, 2002	0.35	0.31

Source: UNU-WIDER Inequality Data Base.

Thus, if we use consumption based Gini coefficients, which much better reflect real differences in standards of living, it seems that Bolivia is probably less unequal than the United States.

There is really no excuse for using income based inequality measures for poor and middle income countries. They are highly biased for all countries with a substantial informal sector, which means that all cross country studies using income based Gini coefficients are highly dubious. And that would include my own.

Inequality in Bolivia: Second opinion

10 March 2008

One of the Newsletters last month "**How unequal is Bolivia really?**" argued that it is better to measure inequality on consumption than on income, as income is very imperfectly measured, especially in poor countries with a large share of self-employment. The newsletter also suggested that when measuring inequality on consumption, United States is probably more unequal than Bolivia. The latter appears to be incorrect, as one careful reader kindly pointed out.

The study by Krueger & Perri (2006) investigates the relationship between income inequality and consumption inequality in United States and finds that the consumption based GINI coefficient is about 11 percentage points lower than the income based GINI coefficient[30], which would bring consumption inequality in the US much below consumption inequality in Bolivia.

Furthermore, an article in *The Economist* "**The new (improved) Gilded Age**" suggests that even consumption based GINI coefficients overstate inequality in the US, as they measure only how much money we have spent, not the value gained in the spending. They give the following example: "Refrigerators are now all but universal in America, even though refrigerator inequality continues to grow. The Sub-Zero PRO 48, which the manufacturer calls "a monument to food preservation", costs about $11,000, compared with a paltry $350 for the IKEA Energisk B18 W. The lived difference, however, is rather smaller than that between having fresh meat and milk and having none."

The same argument can be made for cars, TVs, and many other almost universal household goods in the US. The utility of a fancy $900.000 Ferrari is certainly not 100 times bigger than the utility of a practical $9.000 used car, and you get pretty much the same information out of a $200 TV set as a $20.000 TV set.

Bolivia is very different. Here there is real, lived inequality as only 30% of households have a refrigerator, 12% a car, and 60% a TV. Some 28% of households do not have electricity, and 78% do not have piped water in their house[31].

But then again, if your fresh meat and milk walk around on two or four legs in your garden, you may not derive much utility from a refrigerator, and if there is no road to your house, a car is of little use. The fact that most households choose to buy a TV before a refrigerator, suggests that the

difference between no refrigerator and a cheap refrigerator is very small for them. In Bolivia, public transportation is so cheap and abundant, that having a private car adds little utility (but quite a lot of extra worries and expenses).

So, inequality is a really difficult concept to measure. Mostly because the value of things have little to do with the price of things, and because preferences differ so much. If somebody prefers to lie in a hammock reading a book and drinking river-cold beer rather than to slave in an office or factory from 9 to 5 to be able to buy a car, a refrigerator and a TV, I would not necessarily call the former poorer than the latter, although both consumption and income measures would strongly suggest so.

Chapter 4
Social mobility

Marriage markets in Bolivia

31 March 2008

If people married each other more randomly, poverty levels would be considerably lower than they are now. If we abandoned all current family arrangements and randomly grouped all Bolivians into new families of 5 persons, poverty levels would fall by about 15 percentage points (from the current level of 55% of all households to about 40% of all households). The Gini coefficient measuring inequality would also fall from about 0.70 to 0.55[32].

But Bolivians do not mix much in marriage. The correlation between partners' education levels is extremely high at about 0.77, with no signs of falling[33]. For comparison, the corresponding number for Germany is 0.52 and for Britain it is 0.41[34].

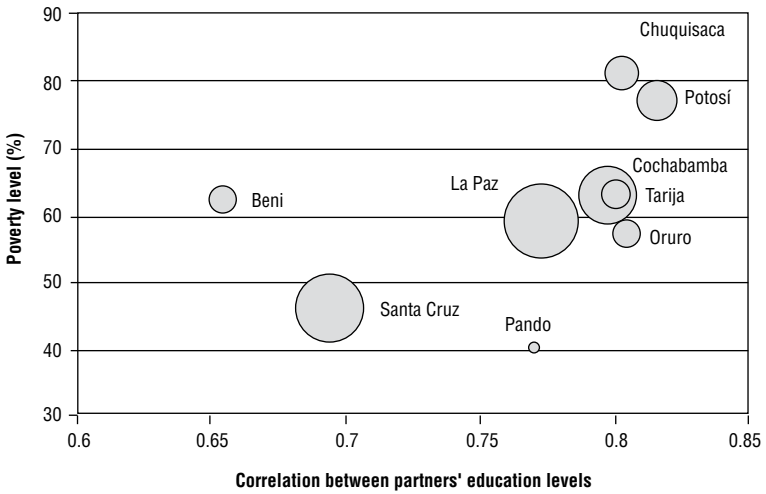
But not all Bolivians are equally restricted in their marriage choices. In the department of Santa Cruz the correlation is only 0.69 while in Potosi it is 0.82, with a corresponding difference in poverty rates (see Figure 1).

Why such differences?

My first guess was that in the warm regions, where people are more scantily clad, people marry more based on good looks than on education levels, whereas in the highlands, people are so covered in clothing that looks matter little, and you have to choose based on some other criteria.

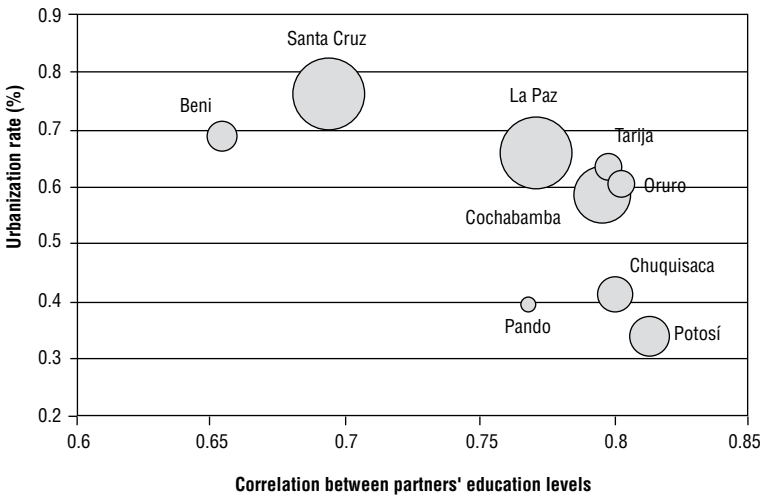
But I think a better explanation is probably urbanization rates. In rural areas, young people tend to marry one of the neighbors' kids, which would likely have pretty much the same level of education. In urban areas, on the other hand, the pool of potential partners is vastly larger, and the likelihood of education differentials is larger. There is certainly a very strong negative correlation (-0.61) between marital sorting and urbanization rates (see Figure 2).

Figure 1: Relationship between marital sorting and poverty, Bolivian departments, 2005



Source: Author's calculation based on MECOVI 2005.

Figure 2: Relationship between marital sorting and poverty, Bolivian departments, 2005



Source: Author's calculation based on MECOVI 2005, and the 2001 Census.

Thus, yet another argument in favor of urbanization.

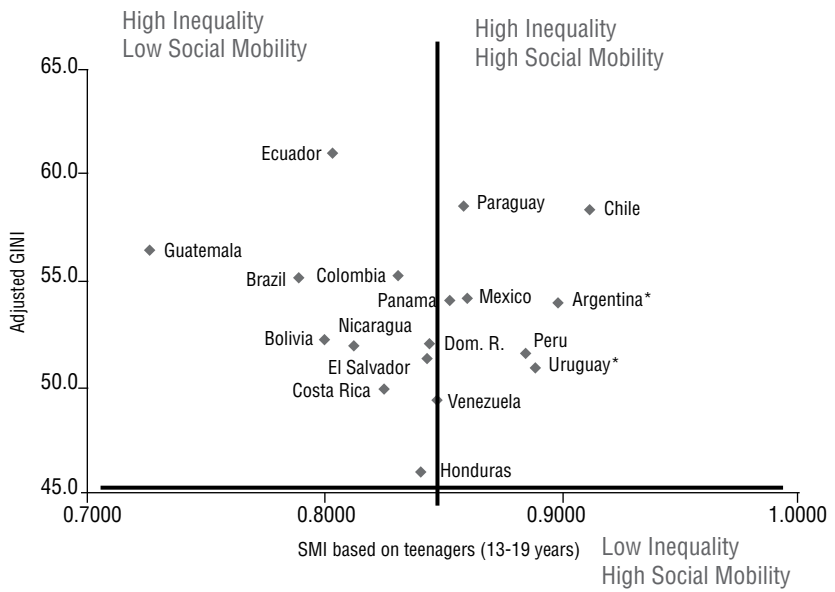
Social mobility in Bolivia is finally improving!

19 June 2006

There is arguably nothing worse for long run growth prospects in an economy than low social mobility. Without the possibility of advancing upwards in society, poor people have little incentive to work hard and invest in human and physical capital. Conversely, without investment and hard work, there is little chance of improving. Thus, the poverty trap.

Maybe the only thing worse than low social mobility, is low social mobility AND high inequality. This situation reflects a country with a large gap between the rich and the poor, and little chance of ever crossing that gap – a situation which by any standards must be considered unfair. Outcomes are mostly determined from birth, by factors entirely outside the control of each individual, whereas subsequent effort and investments make little difference.

Figure 1: Social Mobility and Inequality in Latin America



Source: Andersen, L.E. (2001) "Low Social Mobility in Bolivia: Causes and Consequences for Development." IISEC Working Paper No. 03/2001.

Bolivia has until now been a classic example of low social mobility and high inequality, a fact that may help explain why labor productivity and wages have not improved in real terms over the last 50 years[35].

But finally things seem to be changing. The rise of a poor peasant boy to become the President of the Republic of Bolivia is a sign for all that upward mobility is no longer impossible. Many of his ministers and executives also come from very humble beginnings.

I would imagine that such examples of upward mobility give hope and encourage initiative in many young poor Bolivians, just as the examples of Theodore Roosevelt, Henry Ford, John D. Rockefeller, Thomas A. Edison, Andrew Carnegie, Bill Gates and countless other self-made millionaires inspire the Americans to work hard, be creative, and take risks for the benefit of themselves and their country.

Bolivia needs to see many more examples of upward social mobility – preferably not only in politics but also in business – in order to give people hope and role models. Examples of downward social mobility are also important, in order to show people that there is fairness in Bolivia, that those who are rich and powerful, but corrupt, are getting punished.

The aid community, which did little to help the rise of Evo Morales[36], could very well sponsor a book on social mobility in Bolivia. Not a theoretical, academic piece, but a book full of biographies of Bolivians who have started from scratch but become highly successful, who have done a lot of good for the country and for themselves at the same time.

Bolivia is badly in need of good role models and such a book could give them some. The individual biographies in the book could be published in a national newspaper or read over the radio, week by week, to make sure that people get to know these stories and get to see that anybody can do well in Bolivia, as long as they do not give up before even trying.

Social mobility in Bolivia is finally improving - and now I can prove it!

25 January 2010

Back in 2006, I published a newsletter postulating that "**Social Mobility in Bolivia is Finally Improving!**" The article was based on casual observations (mostly Evo Morales becoming the President of Bolivia and a former maid becoming the Minister of Justice). Recently, however, I have made a formal, quantitative estimation of the changes in social mobility in all of Bolivia between 1997 and 2007, and the results are nothing short of spectacular![37]

Social Mobility is an elusive concept that is difficult to estimate quantitatively, but a convenient methodology has been developed to estimate a Social Mobility Index based on information commonly available in standard household surveys. The methodology is based on the simple idea that social mobility is low if family background is important for a child's future, while social mobility is high if all children have equal opportunities despite different family backgrounds.

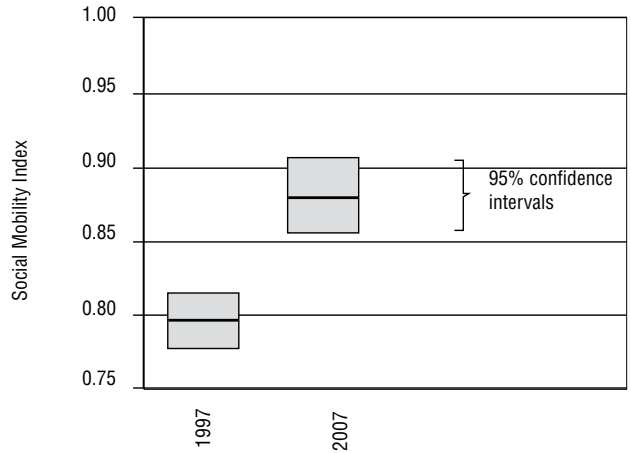
Figure 1 summarizes the changes in the Social Mobility Index between 1997 and 2007 for all teenagers in Bolivia. There is a very important and statistically significant increase in social mobility, which brings us from one of the lowest levels in Latin America in 1997 to a very high level in 2007.

An analysis by sub-groups indicates that it is the improvements in mobility among indigenous and non-indigenous girls that are responsible for this improvement, while the improvements among young males are not statistically significant (see Figure 2).

This improvement is very good news, as low social mobility in Bolivia has for centuries constituted a formidable barrier to development, resulting in high and persistent poverty rates and low economic growth[38].

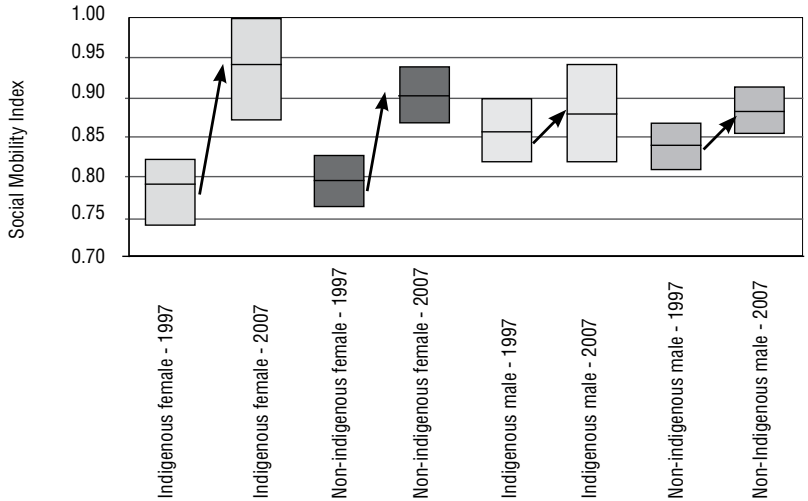
Some of the improvement in social mobility is likely due to a change in perceptions about social mobility. Rural, indigenous teenagers (especially girls) frequently dropped out of school in the past because they did not perceive any opportunities for taking advantage of formal schooling. Now, on the other hand, they see people of similarly modest backgrounds reaching very high and prestigious positions. Such real life examples of social mobility can cause mental barriers to tumble down, and motivate teenagers to study, work and try to improve their lot. And simply by trying, they will dramatically improve their possibilities of succeeding, as well as contribute to the economic development of the country.

Figure 1: Changes in the Social Mobility Index for different groups of teenagers in Bolivia, 1997-2007 (with 95% confidence intervals)



Source: Andersen, Lykke E. (2010) "Social Mobility in Bolivia is finally improving!" Latin American Journal of Economic Development, 13: 117-136.

Figure 2: Changes in the Social Mobility Index for different groups of teenagers in Bolivia, 1997-2007 (with 95% confidence intervals)



Source: Andersen, Lykke E. (2010) "Social Mobility in Bolivia is finally improving!" Latin American Journal of Economic Development, 13: 117-136.

But part of the improvement is also due to the enormous efforts made by both the current and previous governments, with help from the international cooperation, to increase the supply of education facilities and to reduce obstacles against school attendance. The benefits of all these investments in education are finally, thankfully, beginning to show, and it looks like Bolivia may have finally escaped the low mobility – low growth trap and is heading for a high mobility – high growth equilibrium.

This constitutes a profound and very important structural change. Perhaps I am an incurable optimist, but it might just be the change necessary to take Bolivia out of the poverty trap where it has been stuck for so long. It is certainly the biggest and most important step forward I have ever seen in any society in such a short time.

"Lykke, excelente artículo para comenzar la semana con buenas noticias!"
Natasha Morales, Caracas, Venezuela

Chapter 5
Human capital & education

Steel versus gold: Higher education mis-match

23 October 2006

"Everything has its limits – iron ore cannot be educated into gold"
Mark Twain, 1835-1910

Even if you could educate iron ore into gold, it would not necessarily be a good idea to do it. Steel is incredibly versatile and useful and we need a lot of it, whereas gold is mainly a luxury item, which gets its value from scarcity and has little practical use, except for keeping track of who is married and who is not.

The higher education system in Bolivia seems to try to turn a lot of iron ore into gold: 90% of public spending on higher education goes into universities (supposedly producing "gold"), whereas 7% goes to the formation of teachers and only 3% goes to technological institutes (producing "steel")[39].

There are several problems with this approach. First of all, it creates an imbalance between supply and demand of both gold and steel. In 2001, the demand for university graduates was around 8.000 (due to retirement and new job-creation), whereas the supply consisted of 5.000 new graduates plus 48.000 unemployed professionals[40]. This means a 6 to 1 ratio of supply to demand.

Second, the public universities are not very good at turning iron ore into gold. Only about 5% of the students graduate when they are expected to (usually after 5 or 6 years of studying), and the average apparent graduation rate is only a little over 30%[41]. This suggests that large amounts of public money are being wasted on this alchemy experiment.

Third, the market is pretty good at differentiating between "real gold" and "fake gold", which implies significant wage differentials and/or substantial unemployment among fake gold. This means that both individuals and society often would be better off with high-grade steel instead of fake gold.

I think it is time to abandon the unrestricted access to free university education (which mainly benefits the upper middle class, since the poorer students rarely make it through high school) and start thinking about what the country needs instead of automatically funding what students think is most fashionable. Public education spending should provide social benefits, not just private benefits for the upper middle-class.

You are good Lykke!"
José Santa Cruz, La Paz

Education reform: Second opinion

14 August 2006

Last week's post on the **Principles of Education Reform**[42] caused quite some discussion among the readers, and there is indeed much more to be said on this important topic.

Having benefited enormously from 20 years of excellent, free public education in Denmark, I wouldn't dismiss the idea of public education as completely hopeless and in violation of basic economic principles.

Well, to be honest, Denmark is not benefiting much from the investment as I left the country right after finishing my education, and, again to be honest, my own kids are in one of the most expensive private schools in Bolivia (fortunately heavily subsidized by the French government).

Actually, I don't think I know anybody in Bolivia who sends their kids to public school if they have a choice. The most vocal defenders of free public education that I know all send their own offspring to expensive private schools and even my favorite shoe shine boy uses his income to go to private school in the evening.

That does suggest that all is not well with the current public education system in Bolivia.

One of the most important arguments in favor of a free, public education system is that it levels the playing field between rich and poor kids, thus creating equal opportunities and facilitating social mobility. However, in order to fulfill that function, public schools have to be of at least the same quality as private schools, because otherwise the poor children will end up wasting their time on an inferior education that can't compete in the labor market with the private education of richer children.

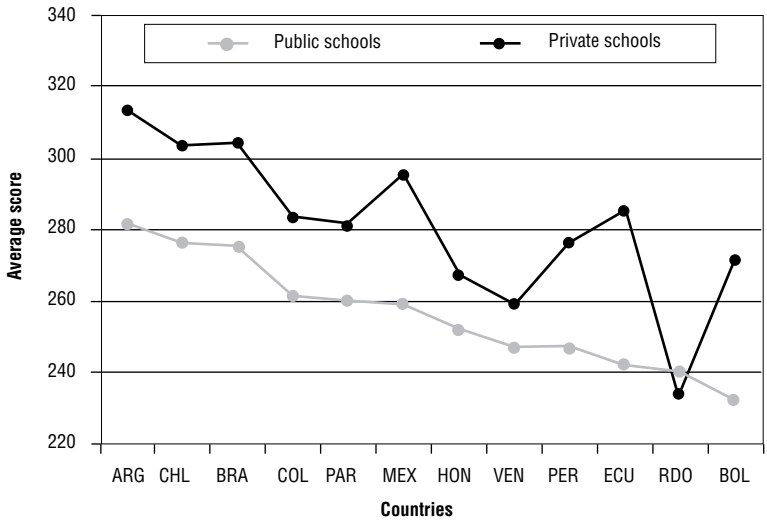
Standardized tests of 4th grade children across Latin America show that not only are public schools in Bolivia among the worst on the continent (in terms of student performance), but they are also farther behind the competing private schools than in any other country (see Figure 1)[43].

If the public education system is really as bad as the test scores indicate, hundreds of thousands of poor kids may be wasting many years of their life on something that does practically nothing to improve their future income earning capacity.

An empirical study by Andersen & Muriel (2002) indicates that almost all of the earnings differential between indigenous and non-indigenous workers in Bolivia can be explained by differences in school quality (after controlling for quantity). That is, there really isn't any ethnic discrimination

in the job market, but the indigenous people are being punished because their schools typically were pretty bad[45].

Figure 1: Average score on 4th grade language tests in several Latin American countries, 1997



Source: CEPAL (2002).[44]

I have to agree with Antonio Saravia, author of last week's Development Newsletter, that education should not be compulsory, especially not if the education is so lousy that it is pretty much a waste of time. However, I also believe that knowledge is a public good, and that the education of one person may benefit society at large. This means that it would be suboptimal to rely on private education investment only.

Actually, I think a society should invest as much as possible in its younger generation, especially a developing country whose future depends completely on the actions and attitudes of its young population.

However, I don't think conventional education, where everybody has to learn the same thing, in the same way, at the same time, and at the same speed, is the best or only way to go. Children are very different, have different learning styles, and different talents, and that diversity should be exploited rather than repressed. Nobody explains this better than George H. Reavis in the short story "The Animal School."[46]

It seems like such a waste to try to get every child to learn a standard curriculum, rather than trying actively to bring out the best in each child and

encouraging excellence and genius wherever it is present. Such stimulation, guidance and mentoring can be done in many other, and probably many better, ways than the traditional class-room. Learning by doing may work a whole lot better than learning from copying a professor's scribbles from the black board and then trying to memorize them until the exam is over.

Kids should learn how to learn, and then keep learning by themselves for the rest of their life. The statistical artifact "years of education" makes little sense in a rapidly changing world, where educational capital quickly becomes obsolete if it is not constantly replenished. Those who keep learning new things every day have a tremendous advantage over those who stopped studying the day they got their degree certificate.

In conclusion, I think we need a whole much more than privatization and market mechanisms in order to improve the education system. We need an education revolution.

Pro-poor globalization

9 October 2006

The potential benefits of a more integrated World are huge, but unevenly distributed.

Globalization requires adjustment, flexibility, mobility and change, but many people are ill-equipped to handle change and unable to turn change into new opportunities.

The ability to take advantage of change is highly correlated with education, which is why well-educated people and countries benefit much more from globalization than poor, un-educated people and countries. In a dynamic and rapidly changing world, the poor are often either left behind or may even suffer reductions in living standards as their skills and jobs get replaced by new technology.

Rather than trying to slow down progress to avoid that people have to adapt to change, we should help people everywhere to become more flexible, mobile, and imaginative, so that they are better able to take advantage of changing opportunities. This includes not only giving them access to modern education and technology, but also reducing obstacles to migration.

Much aid is given with the opposite objective: To improve living conditions for the poor at their place of origin in order to prevent that they move to cities or more developed countries. But fighting the strong forces of change in this way rarely provides permanent solutions. It may provide temporary relief, but it generally just postpones the inevitable adjustment that will have to be made if people are to escape poverty.

What do we really know about education quality in Bolivia?

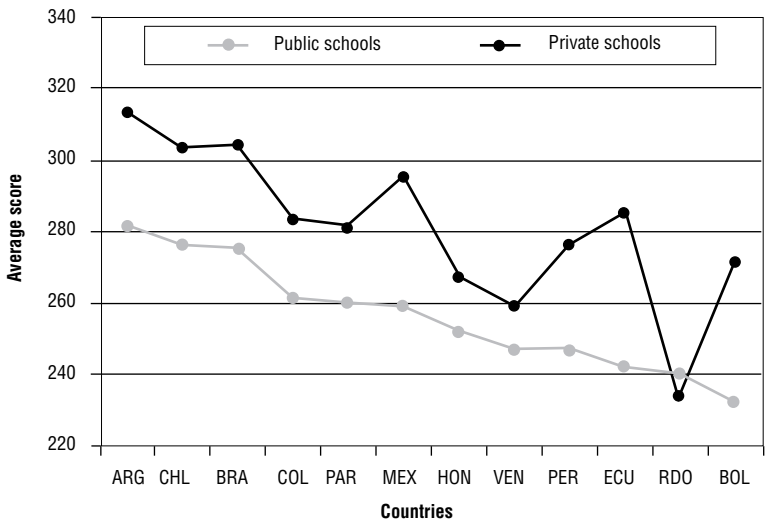
16 October 2006

Since the main purpose of education is to raise the future income generating capacity of the students, it will take several decades before we can truly know how well our present education system is doing.

Past experience is of little help as both the education system and the structure of demand has changed tremendously over the last few decades.

A commonly used shortcut to evaluate current education quality is to use standardized academic aptitude tests. According to the last internationally comparable test that Bolivia participated in, public schools in Bolivia are in really bad shape (see Figure 1).

Figure 1: Average score on 4th grade language tests in several Latin American countries, 1997



Source: CEPAL (2002). Note: Maximum possible score is 400.[47]

But this was before the 1994 Education Reform really had had a chance to affect results, and it is possible that things have improved. We simply don't have much quantitative information to rely on when assessing changes in education quality.

There is some qualitative information which suggests that children in reformed rural schools are happier and more engaged in classroom activities,

both because they are taught in their maternal language instead of Spanish and because teaching methods have been modernized to be more interactive and include less memorization and punishment[48]. More self-confidence and participation would certainly be an improvement, although it does not necessarily improve test scores.

But test scores probably have little to do with future income earning capacity and contributions to society. Test scores do not measure attitudes and values, team-spirit, leadership potential, ability to solve problems in a constructive manner, creativity, open-mindedness, motivation, and many other aspects that are important not only for the future income earning capacity of the individual but also for the smooth functioning of society.

As long as the school system produces well-adjusted, responsible, open-minded, cooperative, creative and productive citizens, I wouldn't worry about those test scores.

But do Bolivian schools really do that?

Last week I saw a bunch of people chasing a taxi driver with the intention of punishing him for not obeying the transportation strike (which, by the way, had no worthwhile foundation). Among the group members were many school kids (schools were closed due to the transportation strike), which suggests to me that school kids are not learning how to communicate and solve problems in a constructive manner nor learning to respect other people's decisions and property.

To be fair, it would be almost impossible for any school system to teach children how to treat other people with respect, how to cooperate, and how to solve problems if the kids constantly get the wrong signals from relatives, neighbors and TV.

As long as the adults routinely break traffic laws, throw garbage in the streets and rivers, block roads, vandalize property, fight, steal and even kill without any apparent consequences, even the best teachers will have a hard time turning their pupils into model citizens.

We *all* have a responsibility for the education of our children, not just the teachers and the schools. We *all* have to be good role models and provide positive examples, because all the important skills and traits in life are learned by example and experience rather than from school books.

In a society as difficult as the Bolivian, with so many negative role models, schools have a particular responsibility and challenge. Teachers have to be so strong positive role models that they counterbalance all the negative examples the kids see after school. The schools have to be outward looking

and forward looking to compensate for the tendency of ethnic fragmentation and the blaming of history.

Do Bolivian public schools live up to that responsibility? I don't think so. Teachers are just average citizens, earning more than average salaries, and striking a whole lot more than average. The new school system is supposedly multi-cultural and bi-lingual, which sounds fabulous, but rather than teaching students about other cultures and other languages, they learn about their own culture and their own indigenous language. With the risk of being politically incorrect, I would say that this is inward- and backward-looking.

I would be delighted to have my kids in a multi-cultural bi-lingual public school if this meant they would become fluent in several important languages and turn into flexible world citizens capable of adjusting to life in any country, without any expense for me. But this is clearly not the case, so I have to fork out substantial amounts of money (about 7 times of per capita GDP) for a private school that gets reasonably close to that ideal.

Obviously, few Bolivians can afford that, so what can the rest do? I would recommend exploring the possibility of boarding schools. These are expensive too, so they would also require international subsidies, but they have the advantage of limiting the adverse outside influence on the children, making it easier to turn the pupils into productive, responsible, creative, open-minded, contributing citizens. At least it is an option that deserves more consideration.

"Allow me to say that I find your article quite interesting. The language used in the article is simple and plain, but its content is important and strong. As a Bolivian citizen, I think each of us has not only to think about "others" (the government, etc) actions but also how do "ourselves" contribute to build a better place with better opportunities. Congratulations!"
Liliana Cano Burgoa, LL.M, Cochabamba

"Estimada Lykke, disfruto mucho de tus artículos…En mi caso, mando a mi nena a una guardería que me cuesta un poco más del PIB per cápita, lo cual es diez veces más de lo que cuesta la universidad estatal! Y al igual que tu voy a mandarla a ella y su hermanito al mejor colegio que pueda pagar, y quiero darle el mejor ejemplo."

José Santa Cruz, La Paz

Crisis and education

10 September 2007

During the crisis of 1999-2003, most economic and social indicators in Bolivia showed significant deteriorations - even the ones you would not expect to. While poverty rates and unemployment rates may go up during a recession and progress in the provision of basic services may stagnate, you would not expect the education levels of adults to go down, nor the share of households who use electricity in their house to decrease.

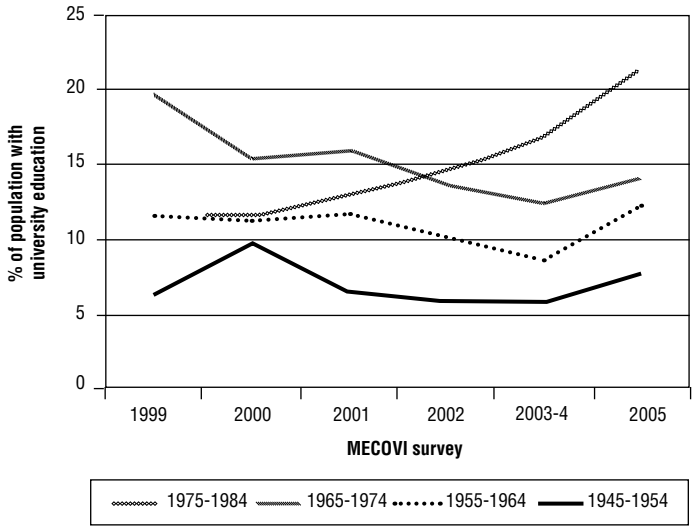
But according to the annual MECOVI household surveys carried out in Bolivia this is exactly what happened. The share of people who use electricity in their house went down from 71.2% in 1999 to 69.1% in 2003/4, and the share of the working age population who has university level education went down from 11.8% in 1999 to 9.9% in 2003/4.

How is this possible?

Most likely because many relatively well-educated people left the country during these difficult years. Figure 1 shows the percentage of each cohort in Bolivia who has university education. This percentage went up for the youngest cohort (born between 1975 and 1984) throughout the recession, whereas it went down for the next two cohorts (born between 1955 and 1974) and stayed more or less constant for the oldest cohort (1945-1954).

This suggests that when there is a lack of employment opportunities, young people keep studying, while many people in their late twenties to mid forties feel forced to emigrate. Fortunately some of them have returned after the recession ended, as education levels for all cohorts went up in 2005.

Figure 1: Education levels in Bolivia, by cohort, 1999 - 2005



Source: Author's calculations based on various MECOVI household surveys.

Such high international mobility among the better educated segments of the population implies that even the most rigid social indicators will tend to fluctuate with the economic cycles, and indeed it may even exacerbate economic cycles, as the richest and most well-educated take their talents and spending elsewhere during downturns.

The use and misuse of human talent

15 October 2007

"It is a miracle that curiosity survives formal education."
Albert Einstein (1879 - 1955)
"I have never let my schooling interfere with my education."
Mark Twain (1835 - 1910)

Every year more than 130 million children are born on this globe[49]. Each of them is endowed with a set of innate talents, which can be cultivated for many different uses. Some manage to use their talents for the benefit of the World, while others use them for privately profitable, but socially damaging, activities. Unfortunately, most talent is simply wasted.

One of the main causes of this waste is the World's education systems.

The number of primary school students in the World has increased by almost half a billion over the last 50 years reaching close to 700 million now[50]. To handle so many students, and such rapid student growth, education systems have to be very efficient –almost factory like. This usually means teaching large numbers of students the same things, in the same way, at the same time, and at the same speed, ignoring the huge differences in innate talents, learning modes, needs, and interests of the students.

Instead of identifying strengths and building on those, school systems typically identify weaknesses and try to re-enforce those areas, so that all students pass the minimum requirements in all topics. Schools thus end up churning out hundreds of millions of almost identical, mediocre primary school graduates.

This makes little sense in a globalized, highly competitive world, where your only chance of success is to be special. You don't need to be outstanding in all areas, but you do need to develop an edge in the area in which you are going to make a living. It is important to avoid getting into that huge pool of identical, unskilled workers, which the World uses as a source of cheap labor. If you do not have any special skills or talents, the only way to distinguish yourself from the rest is to be slightly cheaper. This means that wages in this pool are driven down to the subsistence level.

In developed countries the homogeneous primary education is not so much of a problem, as students continue studying and specializing, thus eventually re-enforcing their innate talents. But in developing countries, where education often stops by the end of primary school (MDG

accomplished!), it is a big problem. These countries just manage to get their youngsters into that huge global pool of cheap labor. Such a pool is great for the World's capitalists, but it is not clear that it is beneficial for the poor.

If we want to insist on universal primary education, this education should be sufficiently flexible to identify each child's strengths and develop those strengths into profitable vocations. We shouldn't make kids waste 8 years in school, memorizing poems, presidents and multiplication tables, just to drop them into the great pool of identical, cheap labor, where they will have to labor at a subsistence wage for the rest of their life.

Early childhood development: Investing in our most valuable natural resource

5 April 2010

"*Give me the children until they are seven and anyone may have them afterward.*"
St. Francis Xavier
"*Having children makes you no more a parent than having a piano makes you a pianist.*"
Michael Levine

Bolivia spends at least ten times as much on each senior citizen as it does on pre-school children. This seems odd to me as the children are our future, and every dollar spent on them represents an investment, whereas spending on old people is just that … spending.

There have been many attempts to create Early Childhood Development programs in Bolivia, but they have never been fully adopted by the government, the coverage has always remained very low (less than 10%) and dependent on foreign aid and a few NGOs working with children. The responsibilities for the Early Childhood programs have constantly shifted around between different ministries. Just during the last 13 years, the Programa de Atención a Niños y Niñas menores de 6 años (PAN), has been under the Ministry of Human Development, the Ministry of the Presidency, the Ministry of Sustainable Development, and is now awkwardly located under the Ministry of Justice.

Given the obvious importance of giving all our children the best possible start in life, as well as decades of failed attempts to increase the coverage and impacts of various Early Childhood programs, it is time to reconsider the strategy.

Last year, the IDB solicited an evaluation of PAN and the results will be presented and discussed in an Early Childhood Development Workshop this Friday at Hotel Europa in La Paz.

Here is a very short summary of the conclusions: While there are some PAN-style centers that work very well and are highly appreciated by the parents and the community, in general they tend to be very expensive places to park and feed the children. None of the program evaluations carried out to date have been able to prove any learning advantage, although that was supposed to be the main purpose of such a program. In addition, the program has had a rural bias, which seems strange since rural households generally do not need parking and feeding services for their children.

I am no expert on Early Childhood Development, and I wouldn't even trust myself to raise and educate my own children without help. Still, I would venture the following recommendations:

To achieve the highly needed education effect, I would expand primary education downwards to include kinder and pre-kinder levels. Primary school has achieved almost universal coverage in Bolivia by now, but the kids are not well prepared for school when they enter, which means that several years are spent on just learning the alphabet, the numbers, the colors, and other basic skills. I would enroll them earlier, and take advantage of the steep learning curve of pre-schoolers to make sure that they are bi-lingual and ready to learn to read and write when they start in first grade.

Bolivia has universal health coverage for pregnant mothers and young children, and I would simply make sure that it continues so. Nutrition is greatly helped by the "school breakfast" program and I would keep and support that too. I would add a school dentist program and a regular health check in the school, but education should still be the priority.

While health is important, I think Early Childhood Development is mostly about education, and I believe the responsibility of young children should rest with the Ministry of Education. I think it is the only ministry who can handle that incredibly important task, and I hope it will receive the support it needs to do so.

I also think that young children need specialized educators, so there needs to be a pre-school specialization in teachers' education. It is not sufficient just to hire any mother from the neighborhood, as has generally been the practice. As Michael Levine said "Having children makes you no more a parent than having a piano makes you a pianist.

"Thank you for writing about this critical subject."
Lenard Pareja, Compassion International Bolivia

"Lykke, I enjoyed your MMDN article. I look forward to reading more about investment in early childhood education. Given the current rather depressing and tragic political landscape of Bolivia, there is little chance that non-voting members of society will be adequately cared for."

Prof. C. Monica Capra, Atlanta

On road blocks and parenting

18 June 2007

Governing a country is a lot like raising children. You have to make sure your subjects are kept safe and healthy and receive a useful education they can live on in the future. You also have to teach them what is right and wrong, and what are their rights and obligations. You should abstain from violence, but still be very clear about what kinds of behaviors are unacceptable.

Good parenting will lead to responsible, independent citizens who contribute to society, whereas bad parenting will lead to spoilt, immature, dependent and/or corrupt citizens who constitute a liability to society.

Everybody hates it when a spoilt child throws a tantrum in the supermarket because his mother won't buy him the box of candy he has put his eyes on. The child has learnt that the tantrum is a very effective way of getting what he wants as the mother gets so embarrassed by his behaviour that she quickly gives in to his demands. She has repeatedly permitted, and even rewarded, bad behavior. If she instead the very first time had made clear that such behavior is unacceptable, she would never again have had that problem.

In Bolivia the adult equivalent of the spoilt child tantrum is blockades. Every time somebody wants something in Bolivia, they block the roads thus causing great inconvenience, economic losses and even danger to other citizens. This has proven a very effective way of achieving things in Bolivia, as the government usually gives in within a day or two.

In the short run it makes sense to give in as the costs to society of a continued blockade are generally much higher than the costs of complying with the specific demand. In the long run, however, it just means a never ending series of blockades and demands.

Unfortunately blockades have been permitted for such a long time that it will be very difficult to suddenly turn around and say that now it will no longer be tolerated. Certainly Evo Morales cannot be expected to be able to do that, as he was the one who perfected the art of road blocking. But hopefully the next government can convince the population that the social costs of blockades are much too high, and that road blocks should not and will not be tolerated.

2008 Year of Languages

31 December 2007

United Nations has named 2008 the International Year of Languages, recognizing that genuine multilingualism promotes unity in diversity and international understanding.

While the first-best solution in terms of international understanding and efficiency would be to have just one universal language, there is so much nostalgia and nationalism in the World that this is not realistic in the near future. The second-best solution for individuals living in the present multilingual world is therefore to acquire fluency in several main languages.

Although it is very hard to master a language perfectly, it is quite easy to get to a level where you can make yourself understood. Consider the following phrase:

It dseno't mtaetr in waht oerdr the ltteres in a wrod are, the olny iproamtnt tihng is taht the frsit and lsat ltteer be in the rghit pclae. The rset can be a taotl mses and you can sitll raed it whotuit a pboerlm. Azanmig huh? And I awlyas tghuhot slpeling was ipmorantt.

Or in Spanish:

No ipmotra el odren en el que las ltears etsan ersciats, la uicna csoa ipormtnate es que la pmrirea y la utlima ltera esten ecsritas en la psiocion cocrrtea. El rsteo peuden estar ttaolmntee mal y aun pordas lerelo sin pobrleams. Etso es pquore no lemeos cada ltera por si msima preo la paalbra es un tdoo.

You don't even have to be very good at French to understand the following:

L'odrre des ltteers dnas un mtos n'a pas d'ipmrotncae, la suele coshe ipmrotnate est que la pmeirère et la drenèire soit à la bnnoe pclae. Le rsete peut êrte dnas un dsérorde ttoal et vuos puoevz tujoruos lrie snas porlblème. C'est prace que le creaveu hmauin ne lit pas chuaqe ltetre elle-mmêe, mias le mot cmome un tuot.

If you haven't yet committed to a New Year resolution for 2008, learning a new language, and thus contributing to international understanding, would be a good option.

Happy New Year to everybody!

Chapter 6
Labour markets

Salary versus productivity
19 March 2007

Economists usually make the simplifying assumption that salary is roughly equal to productivity, but that is at most acceptable for informal and self-employed people who are not exploited by an employer, not subsidized by tax-payer money, do not exploit non-renewable natural resources, and do not pay significant taxes.

A few examples from La Paz will illustrate what I mean. A typical self-employed mini-bus driver who works 12-15 hours per day 7 days per week will typically take home around $100-120 per month, implying an hourly wage of about a quarter of a dollar. A driver formally hired by the public sector, on the other hand, will typically earn at least the double, say $250 per month for working 8 hours per day 5 days a week, implying an hourly wage of about $1.50, i.e. 6 times higher than the mini-bus driver.

But who is most productive? The mini-bus driver gets at least 200 persons to their various destinations every day, while the public sector chauffeur gets maybe one minister to and from work, and possibly to a couple of meetings. The rest of the time he is just sitting in the car waiting. This means that the mini-bus driver is perhaps 50 times more productive than the ministerial chauffeur, but his salary is only one sixths.

The highest salaries in Bolivia are paid in the hydrocarbon sector, but this sector does not actually produce anything (it sells what Mother Nature produced over millions of years). The value added it creates by bringing oil and gas to the consumers currently appears quite high, but if oil prices were to return to their average level over the 1950-2000 period, value added

would turn negative. Thus, profits and salaries in this sector have little to do with productivity.

The Bolivian public sector is full of people whose social productivity is actually negative, since their job essentially is to make life difficult for Bolivian citizens, for no other reason than to keep their own jobs and salaries. For example, in Denmark and Canada it takes about half an hour and no money to formally create a new enterprise, but in Bolivia hordes of bureaucrats and lawyers make sure that it takes an average of 50 days and costs 150% of average annual per capita GDP[51]. No wonder entrepreneurs are so reluctant to go formal.

There is no doubt that large parts of the informal sector in Bolivia suffer from very low productivity, and consequently earn very low incomes, but it is not at all clear that productivity is higher in the formal public sector, even though salaries clearly are.

When studying productivity and informality, it is important to compare apples with apples, and leave out the public sector and the extractive sectors which completely distort the picture. A careful sector-by-sector analysis of productivity in the private sector may give some much needed insights into the factors that limit productivity. I doubt it is informality in itself that causes low productivity. Quite the contrary, by remaining informal you save hundreds of hours in reduced non-productive bureaucracy every year.

There are many well-educated people in Bolivia who command very high salaries, but choose to remain informal (i.e. they mainly work alone, enjoy no job-security, have no health insurance, do not contribute to a pension fund, are not a member of any union, and the tax-authorities have no clue how much they are earning). But in statistical analyses this group is often excluded from the "informals", and instead called "independent professionals", probably in order to preserve the view of the informal sector as backward, unskilled and un-productive.

I challenge that view. I think informality spans the whole range from the poor woman walking around in the street trying to sell a handful of chamomile flowers that she picked somewhere to the international consultant who earns several times the income of the President of Bolivia. And as long as there are tremendous obstacles and no apparent advantages of becoming formal, that is going to continue.

What is a good job?

19 February 2007

"All paid jobs absorb and degrade the mind."
Aristotle (384 BC - 322 BC)

"When a man tells you that he got rich through hard work, ask him: 'Whose?'"
Don Marquis

Most poor people work in the informal sector in precarious, low-paying jobs with no forms of social security. So the key to improving the living standards of the poor seems to be in improving the quality of their jobs.

But what exactly constitutes a good job?

Thankfully, there is absolutely no consensus about that. Some people love being doctors and saving lives whereas others would surely faint in that job. Some people prefer outdoor jobs, whereas others seem perfectly happy in an office environment. Some people prefer jobs where they can express their creativity, whereas others prefer jobs where they don't have to think. Some people prefer working with people, while others prefer to work with numbers or ideas. For many people the salary is more important than whether they like their job at all.

Most people seem to agree that higher salaries, more job-security and more benefits would be attractive, but they often forget that these attributes come at a cost. If higher salaries were the only thing we cared about, we would all be prostitutes or drug dealers (or whatever professions it is that pay best).

In Bolivia, higher salaries, health insurance and job-security are practically only available to people who agree to be locked up in an office all day. (There are a few exceptions - teachers and armed forces, for example - and those jobs are in high demand.) To many people that locking up is either extremely undesirable or outright impossible due to family obligations (5 kids and a sick grandfather to take care of, for example).

Also, in order to receive regular salaries and benefits you have to work for other people. This means that all your hard work benefits somebody else, whose values and objectives do not necessarily coincide with yours.

Not to forget the 12 or 17 years of very inefficient schooling you have to get through before you get access to these kinds of jobs.

Self-employment has considerable advantages, especially in the informal sector where close to 100% of your earnings are for yourself and your family

(not the government and not your bosses). Each person is free to put in as much or as little effort as he chooses whenever he chooses, and virtually no time is wasted on bureaucracy and meetings. The necessary training is often done on the job, thus avoiding many wasted years in an inefficient education system. Pensions are not withheld for several decades, so each person can make individual savings decisions depending on his particular needs, family structure and investment opportunities. The incentive structure seems ideal with no discouraging taxes or conflicts of interest.

Many people thrive in this completely liberal environment, as you would expect.

But most people in the informal sector can barely make a living out of it, which is worrying. If their productivity is so low in the optimal setting (100% returns on your effort and complete decision power and flexibility), it would surely be even lower in a formal job with substantial constraints and disincentives.

So key to improving the lives of the poor is to improve their productivity not to improve their jobs.

"I thought this was quite an interesting and provocative piece. Sounds like you are engaged in some compelling work."
Kathryn Anderson, Rio de Janeiro

How productive is the informal sector?

25 February 2008

"In Bolivia there are informals and there are idiots"
Luis Alberto Quiroga

The informal sector is often perceived as a sector for excluded, un-educated, low productivity workers who cannot get a "real" job. According to last week's seminar on Informality in Bolivia organized by the Superintendencia de Empresas and CAF, this perception is quite misleading.

Fernando Landa from UDAPE presented the following table, which shows that the informal sector in Bolivia generates about 65% of GDP and accounts for about 67% of total employment. These numbers are very high compared to other countries, but what is really interesting about them is that they imply that the informal sector is just as productive as the formal sector: Two-thirds of workers generate two-thirds of GDP.

This is in contrast to countries like Chile, Costa Rica and Ecuador, where workers in the informal sector on average are only half as productive as workers in the formal sector. (In Panamá, however, informal workers are apparently substantially more productive than formal sector workers.)

Table 1: Measures of informality

Country	Size of the informal sector (% of GDP) Loayza (1997)	Size of the informal sector (share of total employment) ILO (2004)
Bolivia	65	67
Panama	62	43
Peru	58	56
Honduras	47	56
Brazil	38	46
Uruguay	35	39
Colombia	35	62
Venezuela	31	52
Mexico	27	41
Argentina	23	44
Ecuador	21	55
Costa Rica	22	45
Chile	18	39

Source: Landa, F. & Yañez, P. (2007) "Informe Especial. Informalidad en el Mercado Laboral Urbano 1996-2006". Documento de Trabajo. Unidad de Análisis de Políticas Sociales y Económicas, La Paz, Bolivia.

The numbers refer to different years, and there may be problems related to differences in definitions, but even if they are only roughly right, they are striking. Workers in the informal sector in Bolivia have much less education and much less capital and natural resources to work with, so it is quite impressive if they are about as productive as workers in the formal sector.

Rolando Morales pointed out that about 90% of all businesses in Bolivia are informal, so it is not exactly a marginal sector. Rather, they constitute the heart of the Bolivian economy, and their decision to be informal is the rational decision given the huge penalties to formality in Bolivia.

Alejandro Mercado of IISEC suggested that we stop using the negatively loaded word "informals" and instead call them entrepreneurs, or even heroes, because they are the ones that make the economy work at all.

So, if the informal sector is so productive and well-functioning, why do the people working there earn only a fraction of what people in the formal sector earn? In urban areas, workers in the informal sector earn only 48% of the average income in the formal sector, despite the fact that they work more hours per week[52].

One explanation is that incomes are not properly measured in the informal sector. A family which runs a little corner shop, for example, can take out all the groceries they need without that counting as income, and a woman that runs an informal lunch/dinner service, makes sure to make enough food to feed the family too.

Once we compare consumption levels instead of income levels, the families of informal workers consume about 64% of the average consumption level for families of formal workers.

This is still a substantial difference, but it can be at least partly explained by the much lower education level of workers in the informal sector (8.2 years, on average) compared to workers in the formal sector (11.7 years). There are also a much larger share of women and indigenous workers in the informal sector, although that shouldn't count.

The remaining difference may be well worth the price to pay if you value flexibility, independence, spending time with your family, being your own boss, and not having to constantly deal with red tape and frustrating bureaucratic procedures.

Thus, we don't have to feel sorry for the informals. Rather we have to feel sorry for the formal productive sector, which has to compete not only with the tax- and bureaucracy free informal sector, but also the completely distorted salaries of the public sector and the international development community.

What's the story on gender and informality?

17 September 2007

Women in the informal sector generate much lower incomes than other population groups in Bolivia, and it is natural for the development community to want to help them through specific policy initiatives targeted at this group. Indeed, I have been hired to study the problem and come up with gender and sector specific policy recommendations on how to help informal business women grow their micro-enterprises and become formal[53].

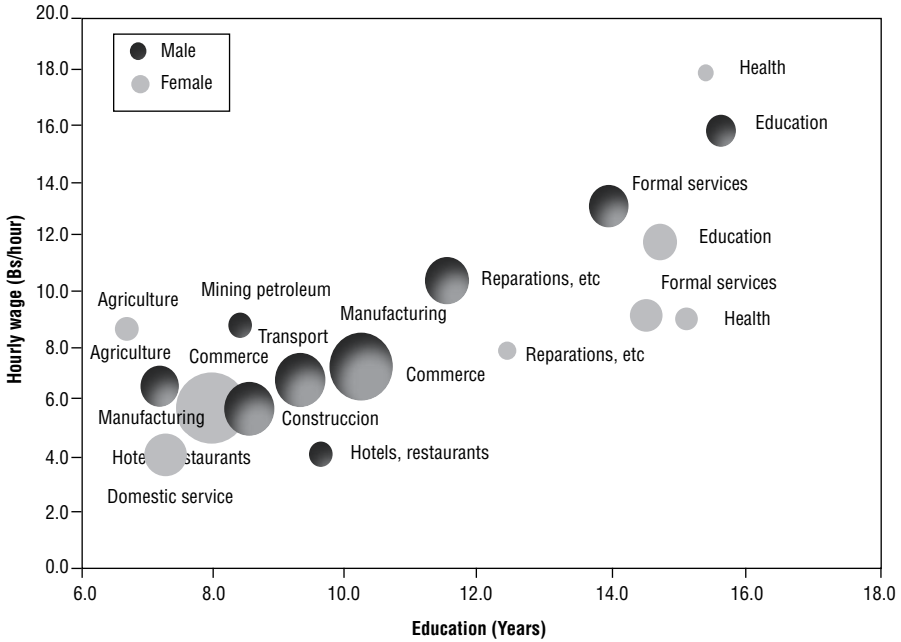
Unfortunately, I have come to the conclusion that most such initiatives would be either wrong, ineffective or counter-productive.

First of all, the high levels of informality in Bolivia are not so much due to exclusion as to avoidance. To become formal and stay formal, firms have to go through a tremendous amount of absurd paperwork and then they get hit with an effective tax rate on profits, which is close to 80%[54]. Few firms find that the benefits of becoming formal would outweigh the costs, and econometric estimations confirm strongly diminishing returns to scale, and often negative effects of becoming formal[55]. This means that it is typically much more profitable to spawn multiple identical informal micro-enterprises than to let one enterprise grow into a medium-sized formal enterprise. This logic obviously applies to both men and women, but it is particularly strong in the sector of commerce (due to the transaction tax imposed on all formally traded goods), which is dominated by women.

In order to reduce informality, it would therefore be necessary to dramatically simplify bureaucratic procedures, reduce effective tax rates, and introduce some benefits of formality. It is the correct long-run solution, but in the short run it would appear to benefit the male dominated formal sector rather than the female dominated informal sector, which is why it is difficult to sell to the development community.

Second problem: The gender wage gaps are much more pronounced in the formal sector than in the informal sector. Indeed, once controlling for differences in inputs (hours worked, education levels, and productive capital) there are no gender differences in productivity among micro-entrepreneurs[56], whereas there is a substantial gender wage gap among the better educated in the formal sector, even after controlling for differences in education (see Figure 1 below).

Figure 1: Education and wages in urban Bolivia, by activity and gender 2005



Source: Andersen & Muriel (2007)[57].

For example, in the health sector, both men and women on average have a bit more than 15 years of education, but women earn only half as much as men. In contrast, men and women in the hotel and restaurant sector earn the same level of incomes despite the fact that women have 2.3 years less education, on average.

For men there is a clear positive relationship between education and earnings. The occupations which require high levels of education also pay correspondingly high salaries. This relationship is much less clear in the case of women. For example, women working in health and formal services with around 15 years of education earn pretty much the same as women working in urban agriculture with half that level of education. This implies that the returns to education are smaller for women than for men. If we were to implement policies that improve the incomes of informal women with low levels of education, we would further undermine the returns to education for women, with likely negative dynamic effects on women's education levels.

My conclusion is therefore that in order to sustainably increase productivity and reduce informality, especially among women, we should avoid

specific policies targeted at the productivity of informal women, since that would further distort incentives. Instead we should focus on removing the obstacles for women in the formal sector. One gender specific obstacle is the generous labor law, which is intended to protect women, but instead acts to make the hiring of women a very risky proposition compared to the hiring of a similarly qualified man. Another formal sector obstacle, which is particularly binding for women, is the rigid working hours, which can be diminished both by making working hours more flexible and by providing free public child care.

Instead of providing more of the cute sector-specific patches, which are so popular with the development community, we should concentrate on true, long-run solutions, which provide the right incentives for all people, no matter what their gender, ethnicity, location or talents.

"Ya sabes que estoy más que de acuerdo contigo en estos temas. ¿Qué tipo de medidas debieran hacerse para incentivar la formalidad? Esto es un tema grande, no veo en ningún lado propuestas concretas."
Ricardo Sánchez de Lozada, *La Paz*

Chapter 7
Migration

Treat your migrants better!

30 April 2007

> "Patriotism is your conviction that your country is superior to all other countries because you were born in it."
> *George Bernard Shaw (1856 - 1950)*

There are surprisingly few international migrants in the world. Only around 3% of the World's population lives in another country than the one where they were born[58].

Considering how many fantastic places there are in this world, it is quite surprising that most people are contented with staying all their lives in the place where they just happened to be born.

A small fraction of the population in each country are more open minded and imaginative that the rest, however. It does not matter how much or how little formal education they have, they are inevitably more dynamic, more resourceful and less prejudiced than the rest. They realize that there is no mechanism at work to secure that people are born in just the right place, which means that they could probably be much more useful and productive somewhere else. They don't just passively accept what life throws at them, they actively try to improve their own lives, and with that the lives of others[59].

Losing these persons to emigration can severely cripple the development opportunities of a country. These people are natural leaders creating jobs and opportunities for the rest. Without them a country's development can grind to a halt, making it almost entirely dependent on foreign aid and remittances from migrants (Nicaragua is an unfortunate example of that).

In contrast, countries that are able to actively attract migrants – not just reluctantly accepting the refugees that they cannot avoid – will benefit greatly from harboring this *crème de la crème* of the World's human capital. Migrants tend to complement rather than compete with the resident population. Many migrants are willing to take on dirty, low prestige jobs that local residents shy away from, but which have to be done. Other migrants have unique skills and experiences which enrich local life (ethnic cuisine being the most obvious example) and yet others are hyper-mobile experts or scientists offering their services to the highest bidder, wherever the bidder might be located.

Even if migrants were just average people, the World would still greatly benefit from a freer movement of labor. Rich countries like Denmark are so short of un-skilled labor that even a Ph.D. has to spend many hours every day on cooking, cleaning, laundry and other trivial tasks that could be performed just as well, or better, by a non-skilled immigrant. In contrast, poor countries like Bolivia are so short of highly skilled labor that the few people with Ph.D.s are treated like nobility, and the abundant unskilled workers are little better off than slaves. If some people could move to even out these abysmal differences, everybody would be better off.

Contrary to popular perception, migrants are not the problem, they are the solution. The problem is the majority of the remaining 97% who tend to be narrow-minded, prejudiced, racist, ignorant, and/or much less productive than they could be if they would just let the migrants help them.

If that sounded a little harsh, it may be because I just had to spend one month's per capita GDP for a visa to visit my own family in my country of birth! Imagine if a Danish person would have to pay US$ 2,500 for a visa to visit Bolivia for a week.

I hope that someday free international mobility will be considered a human right. Discrimination based on birth-place is surely as wrong as discrimination based on gender, ethnicity or any other characteristic over which people have no control. But these days things are definitely going in the wrong direction.

"Wow, thanks a lot for this super provocative
and very necessary newsletter."
Martin Thomas, La Paz

Is international migration increasing?

21 May 2007

Most people would find the answer to that question so obvious that they wouldn't even bother to check the data.

According to UN data, the number of people counted as living outside their country of birth has almost doubled during the last 50 years–increasing to 191 million in 2005, the highest number ever recorded[60]. But the World population has more than doubled during the same period, so international migrants still constitute just a bit less than 3% of the World's population.

The absolute number of new international migrants has actually decreased from 41 million between 1975 and 1990 to 36 million between 1990 and 2005, implying that the growth rate of international migrants has been slowing down recently[61].

In a historical context, the current levels of international migration are not exceptional either. United States, the World's main recipient of migrants, currently receives about 1 million migrants per year[62], which corresponds to 0.33% of its population. One hundred years ago, the corresponding rate was three times higher, around 1.0% per year[63].

So why is there a widespread perception that international migration has increased enormously during the last two decades?

One explanation is that about one third of all migrants are now going to Europe, a region which is not used to receiving migrants, but rather used to be a sending region[64]. Since most migrants to Europe come from sunnier countries they tend to be very visible in the street picture.

Another reason is that current migrants do not make as complete a move as previous migrants. 50 years ago, if a person moved to another continent, he cut most links with his family and country of origin, as communication and travel were much more expensive then. By necessity, he had to integrate as completely as possible into his new country. In contrast, current migrants keep very close connections to their family and country of origin. Many go abroad for just a few years to work and then return with all their savings to their country of origin. The strong loyalty to the country of origin can also be seen from the large amounts of remittances that are sent back by the migrants.

Third, both the popular press and scientific research tend to focus on the cases where "migration has gone bad", whereas the millions of stories of "migration gone good" - of people who leave their country and contribute to both their adopted and home countries through their skills, labour, taxes

and remittances–tend to go largely untold[65]. This gives us a highly biased perception about the magnitude and impacts of migration.

That said, the 191 million international migrants worldwide would together constitute the 5th most populous country in the World (after China, India, United States and Indonesia).

They are thus a force to be reckoned with. And they constitute a tremendous business opportunity for companies who cater to the special needs of migrants and transnational families.

Reverse psychology in migration policy

9 July 2007

Reverse psychology is frequently applied by parents: If you want your kids to do something (like washing the dishes or mowing the lawn), tell them they can't. That is often much more effective than begging or threatening them to do it.

"And mark it 'strictly confidential' - I want everybody to read it."

Source: www.cartoonstock.com.

Maybe that is the explanation why European countries are keeping such a strict immigration policy, despite the fact that they are badly in need of immigrant workers if they want to uphold or increase their living standards during the coming decades[66].

It would be rather embarrassing if they had to beg developing countries to send some migrants to collect the garbage, clean the houses, and take care of the old and the sick. Better to insist for some years that they cannot come, thereby creating some mysterious attraction, and then finally give in and let them come and do all the dirty work, and in addition be perceived as granting a big favor to developing countries.

But that degree of sophisticated collective thinking may be unrealistic to expect, even from well-educated societies. More likely it is just ignorance and plain racism that causes them to have such self-defeating immigration laws.

"Lykke, as usual your articles are very good. Caused me a good laugh and most important opened my mind to new issues."
Dave Gutierrez, La Paz

Migration and the 80/20 rule

5 November 2007

The Italian economist Vilfredo Pareto (1848-1923) observed, in 1906, that twenty percent of the Italian people owned eighty percent of their country's accumulated wealth. This 20/80 ratio has since been observed in a large variety of situations, and the general idea of the "Pareto Principle" or the "80/20 rule" is that roughly 80% of "outputs" or "consequences" is typically caused by 20% of the "inputs" or "causes". For example: 20% of motorists cause 80% of all accidents; 20% of criminals commit 80% of crimes; 20% of beer drinkers drink 80% of all beer; and 20% of clients account for 80% of sales.

The "Pareto Principle" has also been called "the Law of the Vital Few" and it is easy to see why. If 20% of firms produce 80% of value added, 20% of taxpayers pay 80% of the taxes, and 20% of investors are responsible for 80% of all investments, these relatively few persons are indeed vital for the functioning of the economy.

If, for some reason, these 20% chose to emigrate, their country is likely to suffer stagnation and underdevelopment. Average productivity will be low, there will be little investment, and the government will be unable to mobilize sufficient tax revenues to provide even the most basic public services. The lack of job opportunities and decent public services will spur even more emigration which implies a vicious circle of emigration and under-development.

Many poor countries have lost substantial parts of their population to emigration, and there are good reasons to believe that many of the migrants were among the "vital few". For almost all countries on the planet, emigration rates are much higher among the highly educated compared to the less educated. For example, in Haiti only 2.5% of the population with primary education has emigrated while this is the case for 81.6% with university level education. The only five exceptions to this rule are United States, Finland, Norway, Sweden and Bulgaria, which have slightly higher emigration rates for the least educated groups[67].

Nicaragua is currently losing almost 1% of its population to emigration every year. Migrants are generally young and come from the wealthiest and best educated families. But apart from such positive observable characteristics, the migrants are also likely to be more dynamic, entrepreneurial and investment minded than their peers who stayed behind and just accepted their lot in life. The emigration of the "vital 20%" may well explain why

poverty in Nicaragua is staying stubbornly constant, despite massive foreign aid to the government (more than a quarter of GDP!), and large amounts of remittances directly to the households (about 12% of GDP through official channels and possibly as much through unofficial channels)[68].

Governments in poor countries (guided by development cooperation) often focus their efforts almost exclusively on the poorest 80% of the population. This is a natural reflex given that the overarching goal of most poor country governments and all development aid is to reduce poverty. But in the process of helping the poor they often neglect the "vital 20%," which just quietly abandon the country if their needs are not met.

The needs of the "vital 20%" are completely different from the needs of the remaining 80%. It is not free primary education, free health services, free water and sanitation, universal pension payments, or any other gifts from the government and the development community. What they need are institutions and infrastructure that allow them to be as productive as possible, i.e. secure property rights, predictable rules, macroeconomic stability, low taxes, flexible labor markets, advanced education, good infrastructure, and the absence of red tape, corruption, crime and blockades.

For a pro-poor government it is obviously difficult to sit down and think about policies to cater to the privileged few. But in this globalized, highly competitive world, every government – also the poorest ones – has to think carefully about how it is going to attract/keep/create the "vital 20%" that is going to provide for the rest. They just cannot afford to let them slip away.

Chapter 8
Public policies

Urbanization is a blessing – why fight it?

12 June 2006

> "The bourgeoisie has subjected the country to the rule of the towns. It has created enormous cities, has greatly increased the urban population compared to the rural, and has thus rescued a considerable part of the population from the idiocy of rural life."
> *Karl Marx, The Communist Manifesto, 1848*

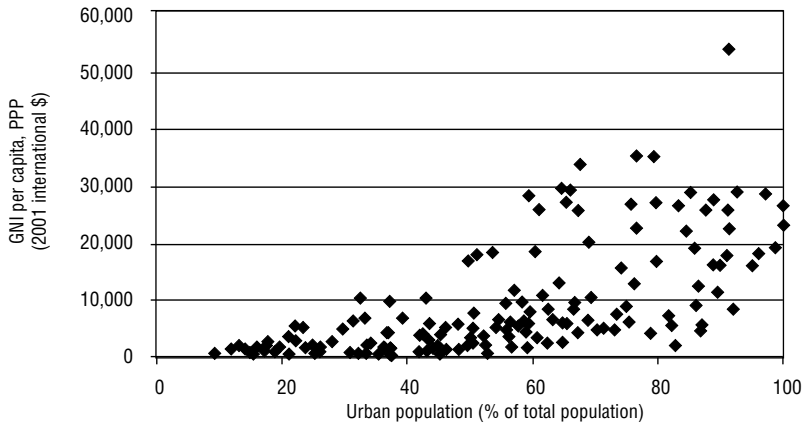
All over the world, development and economic growth has gone hand in hand with increased urbanization. Not a single country in the world has managed to reach middle or high income levels without at least half of the population moving into cities, although quite a lot has managed to urbanize heavily without achieving economic growth – see Figure 1 below. It thus seems that urbanization is a necessary, but not sufficient, condition for development.

Despite the fact that urbanization is a natural process that all developed countries have gone through, the aid community in Bolivia dedicates substantial resources to delaying this process. Between 1998 and 2002, donors spent around 500 million dollars on rural development in Bolivia, with the explicit or implicit objective of reducing rural-urban migration by making rural areas more attractive. This is more than they spent on education, health, and urban infrastructure together during the same period[69].

Rather than having one mega-city that absorbs virtually all rural-urban migration, Bolivia is fortunate to have three important urban centers (La Paz – El Alto, Cochabamba, and Santa Cruz de la Sierra), which makes urban

immigration much more manageable than in most other Latin American Countries. Research shows that the typical urbanization problems of crime, pollution and congestion are quite limited in Bolivia, and that rural-urban migrants do quite well at their destinations[70].

Figure 1: Urbanization rates and income levels for 168 countries in 2001



Source: World Development Indicators of the World Bank.

Donors often assume that rural-urban migrants end up unemployed and miserable in the cities, but this is not confirmed by the data. According to data on rural-urban migrants from the 1999 MECOVI survey, 18% of them moved in order to look for work, and apparently they were very successful at that, since at the time of the survey, less than 5% of them were still looking for work. The average monthly salary for those migrants that did work was Bs. 1080, which is almost the same as the average for all urban workers (Bs. 1092). This is quite impressive, considering that the migrants were considerably less educated than the average urban work force. None of the migrants had a university degree, while 14% of all urban workers did. Even though most of the jobs were informal, they were relatively well paid compared to urban workers in general, and they were more than 4 times better paid than rural workers[71].

Even the least promising types of rural-urban migrants – those who were forced to move for family reasons, are relatively old, have little or no education, and do not have a job – do substantially better than the average

rural dweller, even better than the average Bolivian, in terms of average per capita household income[72].

Current public policy tends to spend more money per person in poor rural areas than in richer urban areas under the philosophy that the former have greater needs. However, it seems to me that the urban centers absorbing tens of thousands of migrants every year have much greater needs for new public infrastructure than remote rural areas that are slowly getting depopulated because they cannot sustain a population above subsistence level.

If the money spent on trying to keep rural populations in the place where they happened to be born were instead spent on improving the cities' capacity to absorb migrants in an orderly fashion, the impact would likely be less poverty, less infant mortality, more education and a much larger variety of opportunities for young people. An additional benefit would be a systematic increase in the tax-base, which would help Bolivia become less dependent on aid.

So, next time you want to help the poor, think about supporting the fringes of the big cities, which are full of people who have shown substantial personal initiative towards improving the lives for themselves and their children, but who tends to get punished by the distorted priorities of public policy and foreign aid.

How crowded is the World?

23 June 2008

> "In the last 200 years the population of our planet has grown exponentially, at a rate of 1.9% per year. If it continued at this rate, with the population doubling every 40 years, by 2600 we would all be standing literally shoulder to shoulder."
>
> *Stephen Hawking*

To most people, the World feels rather crowded, and many people are worried about the impacts that all we humans have on the environment. In this newsletter, however, I will argue that the perceptions of crowdedness are biased – due to crowding.

Here is a thought experiment: Take the entire World population of 6.67 billion people, group people into families of 5, and give each family a nice house on a generous 600 m^2 plot. This would require about 800 thousand square kilometers of land, which means that the entire World population would fit comfortably within the borders of Bolivia, even without encroaching on the 17 million hectares of protected areas, and leaving the rest of the planet free of humans.

So the World is not really crowded yet. And the population bomb has by now been defused. Long range population projections made by the UN[73] suggests that the World population probably will reach its maximum around 9 billion this century, and unless fertility trends are reverted, the human population would start shrinking considerably, as almost all developed countries have fertility rates well below replacement level and fertility rates in developing countries are falling rapidly towards developed country levels[74].

Still, if you live in a big city and rarely get out in the wilderness, which would be the case for most of us, the World does seem crowded.

But we crowd together for very good reasons. Crowding allows us to specialize in what we do best and trade with others, instead of having to make everything we need from scratch in each household. Such specialization creates huge efficiency gains, which is why we have seen such tremendous increases in standards of living during the last few hundred years, during which the worldwide urbanization rate has climbed from just 6% in 1800 to slightly over 50% now. Crowding also promotes technological inventions, like electricity, computers and Internet, which would have been impossible for any of us to invent if we had been living isolated, self-sufficient existences on each of our 10 hectare shares of the World.

Crowding vastly increases our choices and thus our quality of life. Not only is there an incredible variety of goods, services, jobs and leisure activities to choose from in big cities, but the market for potential partners is also vastly larger than it is for youngsters living in sparsely populated rural areas. Indeed, in rural areas girls often marry when they are very, very young, which makes sense if they (or their parents) are afraid that the only halfway decent bachelor in the area will be snatched up before they turn 18.

For those of us who were not ready to get married and have kids at 13, it is certainly nice to have the choices that cities offer.

"Nice and well put it article. Congratulations."
Alberto Bonadona,La Paz

Why don't all countries adopt good institutions?

20 August 2007

> "The only justifiable purpose of political institutions is to ensure the unhindered development of the individual."
> *Albert Einstein*

Having good institutions that guarantee citizens a large degree of economic freedom has been shown to be strongly correlated with the usual development indicators, such as GDP per capita, life expectancy and literacy rates, and negatively correlated with poverty, child labor, child mortality and informality[75].

Why do some countries tangle their citizens in red tape, waste people's time with dozens of national holidays and clog up the streets with patriotic parades? Why does it have to take months and cost a small fortune (150% of average annual per capita GDP) to set up a formal enterprise in Bolivia, when in Denmark and Canada it can be done in half an hour at no cost?[76].

Why don't all countries adopt good institutions?[77]

One reason is that institutions in general cannot be adopted. What we call institutions are not only the physical institutions (such as an independent central bank or a supreme court), but also the more subtle habits, conventions and unwritten rules in a society. Such institutions grow from within, in response to the needs and demands of the inhabitants. If a small minority has the power to create institutions that serve their own interests, inefficient and limiting institutions can grow like a cancer in a society.

If you try to impose some nice, simple institutions that seem to work great elsewhere, on top of the local institutions, you easily end up with contradicting and conflicting institutions, which spawn additional institutions to deal with the inherent conflicts. The result is a mess of institutions which severely limits the productivity of people.

For example, Bolivia has a tax-system, which on the face of it is admirably simple and has low levels of marginal taxation. People are supposed to pay just 13% of their income in either value added tax or income tax, whichever they prefer. A form has to be filled out every month, but it takes less than half an hour, and there are accountants in the streets that will do it for less than a dollar. If that had been the only tax things would have been wonderful.

Unfortunately the taxation of formal firms messes things up. According to the World Development Indicators (confirmed by personal experience)

the effective tax rate on firms' profit is 80% (plus the huge costs of becoming and staying formal). So, if at all possible, firms will stay informal which means that their workers and their products will also be informal, and in the end few taxes will be paid. The following table shows the effective total tax rates in Bolivia, by quintile of consumption.

Table 1: Effective total tax rate in Bolivia, by quintile of consumption

Quintile	Effective tax rate
1- poorest	7.7%
2	9.7%
3	10.9%
4	12.7%
5 - richest	12.8%

Source: Fernando Cossio "Informe de Equidad Fiscal en Bolivia" (http://www.comunidadandina.org/public/libro_EquidadFiscal_bolivia.pdf).

If we deduct the most direct public subsidies received (public education, public health services and pension payments), the table looks like this:

Table 2: Effective tax rate (net of transfers), by quintile of consumption

Quintile	Effective tax rate
1- poorest	-48.0%
2	-22.1%
3	-11.5%
4	-7.8%
5 – richest	2.8%

Source: Fernando Cossio "Informe de Equidad Fiscal en Bolivia" (http://www.comunidadandina.org/public/libro_EquidadFiscal_bolivia.pdf).

Not even the most efficient set of institutions in the World could generate lower net-taxation rates than that (and the government is even running a budget surplus!) No wonder Bolivians are reluctant to change the status quo. It is difficult to imagine a set of alternative institutions that would let everybody keep at least 97% of their income.

"Este artículo estaba particularmente bueno, y linda la cita de Einstein. Quiero sacar una breve publicación sobre el problema del IVA y sobre algunas propuestas, me gustaría saber tus reacciones al respecto."
Ricardo Sánchez de Lozada, *La Paz*

If I were the mayor…

18 February 2008

"Putting off an easy thing makes it hard.
Putting off a hard thing makes it impossible."
George Claude Lorimer

If I were the mayor of almost any growing town or city in Bolivia, I would engage in land speculation with the municipality's resources. I would buy up cheap land in strategic places and build streets, install water, sewage, electricity, and in general prepare for ordered urbanization. Then I would sell the plots for about 10-20 times what it cost me to prepare them.

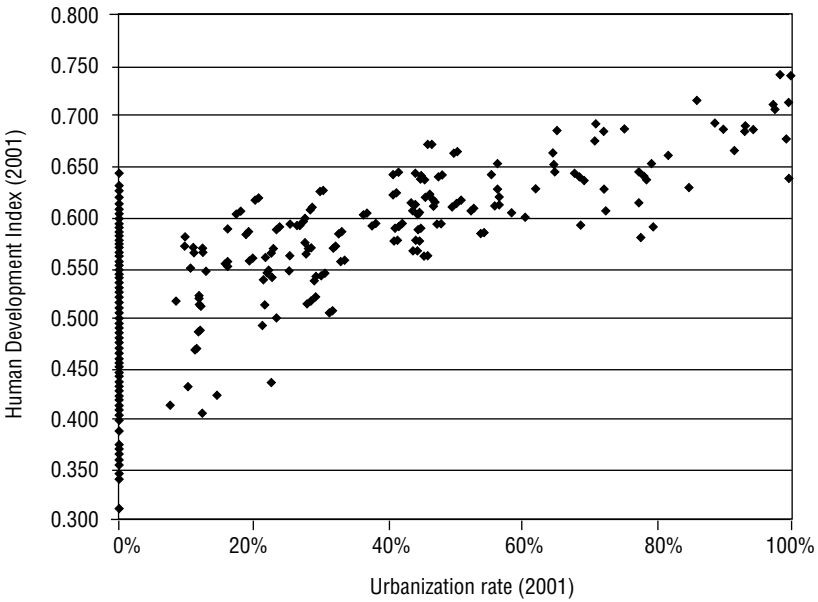
If municipal governments were at the forefront of the urbanization process, instead of lacking decades behind, they could make a lot of money on the services they have to provide anyway. It is also easier to build streets and dig down sewage systems on empty land than on land that is already clogged up with randomly scattered houses.

Apart from being more profitable, such planning and prevision would also enhance safety, as the municipality would only develop areas with relatively low risk of flooding, landslides and other socio-natural disasters. A smooth flow of traffic could also be taken into consideration, as could logical house numbering, and the need for green areas and other public spaces.

The success of a municipality depends a lot on the quality of urban planning. A well-designed city which is attractive to both people and business can attract more tax payers. The additional tax income can be used to provide quality services, which in turn would attract even more tax payers and the municipality would thus enter a virtuous circle of growth and prosperity.

While there is a positive correlation ($p= 0.30$) between population size and the Human Development Index at the municipal level, there is a much stronger correlation ($p= 0.68$) between the level of urbanization and the Human Development Index (see Figure 1).

Figure 1: Urbanization and Human Development at the municipal level



So even if I were the mayor of a small, rural municipality, I would get some urban planning going as soon as possible.

Chapter 9
Public health

Cost-free policies to improve public health

26 June 2006

It does not necessarily have to be expensive to improve the health of the population. It could be free - or even revenue generating!

Here are two ideas:

1) *Slap a substantial tax on distinctly health-damaging products such as cigarettes:* According to the World Health Organization, tobacco use is the leading cause of preventable death in the World today. With almost 5 million tobacco-related deaths per year, no other consumer product is as dangerous, or kills as many people, as tobacco[78]. In a poor country like Bolivia, a cigarette tax may actually work as a deterrent to smoking. In addition, in contrast to richer countries, such a tax would be progressive in Bolivia, as smoking is more common among the rich than among the poor. It would also help if the US stopped subsidizing the export of cigarettes to developing countries.
2) *Exercise and nutrition*:
Considering the high levels of poverty in Bolivia, it is amazing that problems of overweight and obesity are so widespread. An amazing 46% of the women surveyed in the National Demographic and Health Survey of 2003 were overweight or obese, while less than 2% were thin or underweight. The obesity problem is probably decreasing all by itself, as fatness is less of a status symbol now than it has been. However, the drop could be further promoted by relatively inexpensive public policies, such as more sports classes in school and high school, and maybe a tax on those sugary, carbonated drinks with absolutely no nutritional value.

That said, there is still a need for massive health spending on maternal and child health, which have no obvious cost-free solutions. Probably the cheapest way to reduce maternal and infant mortality is to avoid the risky and generally unwanted higher order births (6^{th}, 7^{th}, 8^{th} … child) through access to inexpensive, safe and convenient family planning methods. Too bad many donors (and many Bolivian men) are opposed to this.

Vaccination controversy: What is fact and what is myth?

12 February 2007

"100 years from now we will know that the biggest crime against humanity was vaccines."
Guylaine Lanctot, MD

In Bolivia, vaccination rates depend strongly on the education level of the mother. More educated mothers are more likely to have their children vaccinated than less educated mothers[79].

In United States the relationship is the opposite. Highly educated mothers are less likely to have their children vaccinated[80].

This seems strange until you realize there is a big controversy about the effectiveness and dangers of common childhood vaccines[81]. Maybe well-educated women in United States are sufficiently educated to question "conventional wisdom" (carefully established by pharmaceutical companies), whereas educated women in Bolivia have only reached the point of adopting "conventional wisdom".

Admittedly, vaccination requirements in the U.S. (33 vaccines mandated by the age of 6) are much more extensive than in Bolivia (about 7), so there is a much higher likelihood of adverse side effects in the former and thus more cause for concern.

The concerns about vaccinations range from not really being effective at preventing the disease they are supposed to immunize against to causing death, autism, attention deficit disorders, dyslexia, allergy, cancer and more, in a worrying percentage of cases.

These potential side-effects arise because vaccines contain some highly toxic components (thimersol, aluminum phosphate, formaldehyde, and phenoxyethanol) as well as modified versions of the diseases themselves.

The scientific literature on side effects is inconclusive, mostly because careful long-term studies on possible side-effects have never been carried out. This means that the suspicions regarding safety arise mainly from the following three sources:

- Parents whose children died or got seriously disabled immediately following vaccinations.
- Researchers who found Sudden Infant Deaths tended to occur within few days of vaccinations.
- The general correlation between increased vaccination coverage and

increased prevalence of autism, epilepsy, learning disorders, asthma, obesity, and impulsive violence in developed countries.

In the article "Dispelling Vaccination Myths"[82] by Alan Philips, the following list of Vaccination Myths and Facts arise (not complete):

Myth:	Fact:
#1: Vaccines are safe	#1: Vaccination causes significant death and disability at an astounding personal and financial cost to uninformed families
#2: Vaccines are very effective	#2: Evidence suggests that vaccination is an unreliable means of preventing disease
#3: Vaccines are the reason for low disease rates in the US today	#3: It is unclear what impact, if any, that vaccines had on 19th and 20th century infectious disease declines
#4: Vaccination is based on sound immunization theory and practice	#4: Many of the assumptions upon which immunization theory and practice are based are unproved or have been proven false in their application
#5: Childhood diseases are extremely dangerous	#4: Dangers of childhood diseases are greatly exaggerated in order to scare parents into compliance with a questionable but highly profitable procedure
#6: Polio was one of the clearly great vaccination success stories	#6: The polio vaccine temporarily reversed disease declines that were underway before the vaccine was introduced; this fact was deliberately covered up by health authorities. In Europe, polio declined in countries that both embraced and rejected the vaccine
#7: My child had no reaction to the vaccines, so there is nothing to worry about	#7: The long term adverse effects of vaccinations have been ignored in spite of compelling correlations with many serious chronic conditions. Doctors can't explain the dramatic rise in many of these diseases

But it is just as easy to find sources which switch the headings (e.g. Dr. Spock)[83] so it is really difficult to know what is myth and what is fact. (However, in these specific cases the Phillips article is clearly the most convincing with a long list of specific references, whereas Dr. Spock just makes a general and rather unconvincing reference to the National Network for Immunization Information.)

If you think about it, why would somebody try to demonize vaccinations, unless there is a good reason for it? The only reason I can think of is because mourning parents of dead or disabled babies need to blame something or somebody and vaccinations and Big Pharma seem obvious scapegoats as virtually all kids have been vaccinated. But the other side (the pharmaceutical companies) is considerably more powerful than some mourning parents and has a multi-billion dollar interest in suppressing the concerns about vaccinations.

Probably both sides are right. Vaccines work and are safe for the vast majority of children, have mild side-effects in some cases and are lethal or crippling for a small minority. People ought at the very least to receive objective information about the odds before subjecting their babies to the needle. A flyer in a doctor's office in the U.S. attempted that. It said that the chances of a serious adverse reaction to the DPT vaccine were one in 1750, while the chances of dying from Pertussis (the P in DPT) were one in several million[84]. So, if you had the choice, which would you prefer?

In the U.S. there is a vaccine injury report system in place (the Federal government's Vaccine Adverse Events Reporting System), which receives about 11,000 reports of serious adverse reactions to vaccinations, although it is recognized that only 1-10% of adverse events get reported[85]. There is also a **National Vaccine Injury Compensation Program**, which uses tax revenue to compensate families with children who have been permanently disabled by vaccines.

In Bolivia there are no warnings, no monitoring, no compensation, no information and no research. We simply have no idea what damage vaccinations are causing, so we can't give parents objective information about risks and benefits.

Vaccines are promoted all over the world under the assumption that all recipients –regardless of weight, age, genetic makeup, diet, geographic location, etc– will respond the same. This is not likely to be the case. In Australia's Northern Territory an immunization campaign among native aborigines resulted in a terrifying 50% infant mortality rate![86]

Fortunately, child mortality has been going down systematically in Bolivia, but it is not at all clear what role vaccinations play in this decline. It could be because of better hygiene, better education, better access to hospitals, fewer risky high-order births, better alimentation or several other positive developments.

I think the institutions which promote universal vaccination in Bolivia ought to sponsor a research project on the risks and benefits of vaccination in this particular environment. This would help confused parents determine what is myth and what is fact about vaccinations. One hundred years seems an awfully long time to wait.

C-sections for convenience?

12 March 2007

Giving birth the natural way (vaginally) is extremely painful and often inconvenient, which is why some women decide on a planned Cesarean section instead. According to the latest national health survey in Bolivia (2003), 47.1% of mothers in the richest quintile have C-sections, while this only happens to 4.0% of mothers in the poorest quintile. Such a large difference is obviously not due to more pregnancy complications among the rich. C-section rates vary greatly from doctor to doctor, but the rate medically justified is usually around 10-15%.

In the United States the C-section rate has reached an all time high of 29%, which is considerably higher than in most other developed countries, but not nearly as high as among the relatively rich mothers in Bolivia. The high and increasing C-section rate has started to worry people as recent scientific evidence indicates that C-sections increase the risks to both mothers and babies. A Canadian study, for example, shows that the risk of severe complications is about three times higher for planned Cesareans than for planned vaginal birth[87]. And an Australian study suggests that a first Cesarean delivery increases the risk of complications during subsequent deliveries[88].

Obviously C-sections are necessary and life-saving in some circumstances and can be recommended in other cases after a careful weighing of risks and benefits, but the 47.1% rate mentioned above is so high that I suspect obstetricians in Bolivia are taking advantage of relatively rich and uninformed Bolivian women to schedule births at convenient hours and extract extra money, without telling them about the risk.

I know an obstetrician in La Paz who recommends planned C-sections for *all* first births, so that the babies don't have to suffer the squeeze through the narrow birth canal. This is obviously absurd, and it actually deprives the baby of the natural stimulation that will help it breathe once born and of certain hormones that will help it deal with the trauma of being born. First-time mothers are extremely vulnerable and tend to trust their doctors much more than their own bodies, since they have never previously experienced anything even remotely like child birth. So they are easy to take advantage of. And once you have had one C-section, you will most likely need them during following deliveries also, due to the increased risk of uterine rupture.

If your or your baby's life depends on a Cesarean, of course you will agree to have it, but why you would voluntarily choose to have unnecessary

major surgery and expose yourself and your baby to a host of additional risks and a much longer recovery period is beyond me (but I am admittedly more than normally scared about needles, scalpels and doctors).

There is one big advantage of having a C-section, though, which is that it is easy to make a female sterilization while your gut is wide open, so you can with no further inconvenience eliminate the risk of ever having to give birth again.

Vaccination failure in La Paz

4 June 2007

"100 years from now we will know that the biggest
crime against humanity was vaccines."
Guylaine Lanctot, MD

As previously stated in the newsletter "Vaccination Controversy: What is Fact and What is Myth?", vaccination requirements in the U.S. are much more extensive than in Bolivia, so there is a much higher likelihood of adverse side effects in the former and indeed many horror stories be found on the Internet[89].

Last week the horror moved uncomfortably close as a 3-year old girl from the French School in La Paz died from meningitis caused by the bacteria "Hemophilius Influenzae type B" (Hib) against which she and all her classmates had been vaccinated when they were babies as part of the standard vaccination program in Bolivia and because it is a requirement for acceptance at the French School.

Thus, a vaccinated girl, in a 100% vaccinated population, not only contracted the disease she was vaccinated against, but she died from it, and she died so rapidly that the doctors did not have any chance at all to save her (she entered into coma within 20 hours of the first symptoms of a mild influenza, without showing the usual signs of meningitis – stiff neck, high fever, drowsiness – that would have prompted immediate treatment with antibiotics).

The panel of doctors who were assembled to calm down the very nervous parents at the French School could not convincingly explain how this could happen. They said that she must have been the 1 in 1,000,000 where the vaccine does not work and in addition she must have had a defective immune system.

I cannot help suspect that it was the vaccine itself that affected her immune system and that if she had not been vaccinated she might just have suffered a week of influenza, with no permanent damage. Hib is a bacterium that is commonly present in nose and throat, but occasionally can spread into the blood-system and cause severe damage. But even if an unvaccinated child contracts meningitis due to an invasive Hib bacteria, the mortality rate is limited to 2-5%, as the infection usually can be treated by antibiotics[90].

Also, I don't believe the 1 in 1,000,000 figure that those doctors in the panel mentioned (even in writing). No research has been carried out

in Bolivia to show the effectiveness and risks associated with the different vaccines, so that number could at most come from the U.S, for which some numbers do exist[91]. But more likely it comes out of thin air.

We urgently need some serious research and information on the risks and benefits of the different vaccines in Bolivia. In the US it has been calculated that the chances of a serious adverse reaction (death, paralysis, permanent brain damage, etc) to the DPT vaccine (part of the pentavalente vaccine that is given in Bolivia) is one in 1750. In contrast, the chances of dying from Pertussis (the P in DPT) are one in several million[92]. The same with Diphteria (the D in DPT), where only 7 cases (not deaths) were reported during 1998-2004 in a population of close to 300 million[93]. Tetanus is the most frequent, with about 1-2 cases (not deaths) in a million inhabitants per year[94].

I think these are lousy odds, especially considering that it is not money but our children's lives we are gambling with.

It may be OK to sacrifice one child to save a thousand, but to sacrifice a thousand to save one seems like a very strange policy indeed.

"Your article is great, caused me concern and horror at the same time. Please do us a favour and write for a local newspaper. Congrats."
David Gutierrez, La Paz

The world of drugs

16 November 2009

The World is full of drugs, some of which are good and some of which are bad. What they all have in common is that they create addiction (a craving for more).

One of the first drugs you get exposed to in your life is the casomorphine in breast milk. This is a very useful drug that helps stimulate the mother-infant bond and helps secure that the infant gets all the nutrients it needs. It also exists in cow's milk, and thus in all the dairy products we consume. It gets very concentrated in cheese, which helps explain why cheese is one of my favorite foods.

Another essential natural drug is adrenaline, which is released from our adrenaline glands in case of danger or stress and works to boosts the supply of oxygen and glucose to the brain and muscles, while suppressing other non-emergency bodily processes (digestion in particular). It increases the heart rate, dilates the pupils, and constricts arterioles in the skin and gastrointestinal tract while dilating arterioles in skeletal muscles. It elevates the blood sugar level by increasing catabolism of glycogen to glucose in the liver and at the same time begins the breakdown of lipids in fat cells. For some reason, all this leaves you feeling great and sometimes creates "adrenaline junkies." Adrenaline junkies usually enjoy dangerous activities (such as extreme sports) because it provides them with an "adrenaline rush". Personally, I got my biggest adrenaline rush ever from winning a chess game in the last second before time ran out, so the sports don't have to be very extreme at all in order to provide the adrenaline rush.

Then there is the powerful drug cocktail consisting of dopamine, norepinephrine and phenylethylamine, which races through our bodies and brains when we first fall in love, and which causes giddiness, elation, sleeplessness, craving, loss of appetite, and an intense focus on the object of our love. It is still pretty much a mystery which set of conditions triggers the cocktail, and it does tend to push aside rational thought, but I really miss a shot.

Fortunately there are endorphins, which are more long-lasting. They are the body's natural painkillers and also play a key role in long-term relationships. They produce a general sense of well-being, including feeling soothed, peaceful and secure. Endorphins are released during sex, physical contact, exercise, dancing and other activities.

Apart from all the drugs our body produces itself, we use a wide variety of drugs from nature. These can be divided into two main groups: "Uppers" and "downers". Caffeine is an "upper" and the World's most widely consumed psychoactive substance, usually ingested in coffee, tea, soft drinks and energy drinks. It has the effect of temporarily warding off drowsiness and restoring alertness. Nicotine is another "upper" widely used across the World for its stimulating effects. Chocolate contains a delicious mix of theobrine (chemically similar to caffeine), anandamide (an endogenous cannabinoid which is also naturally produced in the Human brain), tryptophan (involved in regulating moods) and phenylethylamine (often described as a 'love chemical'). Particularly popular in Bolivia is the coca leaf, which contains a number of alkaloids, including cocaine, methylecgonine cinnamate, benzoylecgonine, truxilline, hydroxytropacocaine, tropacocaine, ecgonine, cuscohygrine, dihydrocuscohygrine, nicotine and hygrine. When chewed, coca acts as a mild stimulant and suppresses hunger, thirst, pain, and fatigue.

Downers include ethanol (found in alcohol) and barbiturates, and are mainly used to reduce feelings of anxiety and stress, to induce analgesia and relieve pains, to cause muscle relaxation, to lower blood pressure and heart rate, and to boost the mood and enhance sociability.

However, if you produce or take any of these drugs in excess, your body will automatically reduce their effects either by reducing the amount of receptors or increasing the amount of inhibitors in your body. For example, if you drink coffee several times per day for several days, your body will adapt by substantially increasing the number of adenosine receptors in the central nervous system. Adenosine is an inhibitory neurotransmitter promoting sleep, thus off-setting the effect of caffeine. Similarly, terminal cancer patients receiving morphine for pain relief will gradually build up the tolerance to morphine, so that they can safely drive a car with morphine levels that would instantly kill a person not accustomed to morphine. But the patients will need ever higher doses to achieve the same amount of pain relief, as the body adapts by reducing the number of opioid receptors.

The Human body is a finely tuned machine, which depends on drugs for its normal functioning and which knows how to deal with drug doses lower or higher than optimal. However, it can be deprived or abused so much that it loses its ability to take advantage of the drugs and handle the drugs. So, as always, moderation is key.

I, for one, admit to being a drug addict. I would not want to live in a world without adrenaline, dopamine, norepinephrine, phenylethylamine,

endorphins, theobrine, anandamide, tryptophan, phenylethylamine, and all the rest. Just writing this article has required an impressive list of nasty sounding chemical compounds.

"Interesting!"
L. C. Freire, Denmark

Chapter 10
Ecotourism in Bolivia

Bolivia in the flat World

29 January 2007

In China, when you are one in a million
–there are 1300 other people just like you"
Microsoft saying in Beijing

Globalization has recently shifted into warp drive, integrating the World and increasing competition in a way we have never experienced before. Many services that used to be non-tradable (like accounting) are now being done just as well on the other side of the globe at a fraction of the cost. And many services that previously could only be supplied by large organizations can now be done just as well, or better, by independent individuals (news reporting, for example). Barriers are tumbling down all over the world and everybody with an Internet connection and an imagination can do really well[95].

While developed countries have good reasons to worry about the effects of the integration of a billion well-educated and highly motivated Asians into their labor markets, poor countries, such as Bolivia, might as well despair.

What can Bolivia possibly produce better or cheaper than the Chinese? Let's take a look at Bolivia's comparative advantages.

We clearly cannot compete on labor, as skilled labor is scarce and unskilled labor is not very interested in working long hours at low wages for somebody else. Capital is also scarce, which leaves natural resources as our one abundant production factor and possible comparative advantage.

While our natural gas exports currently make macroeconomic indicators look healthy, it is not exactly an export product that generates

employment and reduces poverty[96]. We do have one export product which could potentially do that, but unfortunately it has been declared illegal[97].

What Bolivia has in abundance is nature and culture, and those two things are going to be rarer as the rest of the world globalizes and homogenizes. A long term development plan ought to take that into account, and start developing Bolivia's potential as a friendly, safe, and cheap destination for ethno-eco-adventure tourism.

It has all the basic conditions in place to become that, but safety is a key concern and has deteriorated dramatically during the last few years. Bolivia used to be one of the most peaceful and safe places in Latin America and if the country wants to become a major eco-tourist destination it has to be able to guarantee the safety of visitors. This means that road blocks cannot be tolerated and fake policemen ripping off tourists have to be eliminated before Bolivia gets a permanent bad reputation. This is obviously a job for the government and the longer it is neglected, the more difficult it will be to fix.

There are a lot of other things the government could do to stimulate the development of eco-tourism and which would encourage private, complementary investments. They could mark, improve and protect hiking trails, highlight natural attractions, set up waste bins and construct public toilets in strategic locations, develop maps and tourist guides, open tourist offices, certify tour operators and guides, educate and train people in the tourist business, etc.

In a flat, fully integrated and super-competitive world, it may not be so bad to stand out with majestic mountains, towering waterfalls, vast rainforests, ancient ruins and colorful people.

Believe it or not: Bolivia is one of the World's Top Emerging Tourism Destinations!

25 June 2007

The World Tourism Organization publishes facts and figures on international tourism, including a table of the "World's Top Emerging Tourism Destinations"[98], as measured by the growth in international tourist arrivals.

The good news is that Bolivia has made it to the table! (Mexico and Brazil didn't). The bad news is that it is at the very bottom of the table. Of the 76 countries included, Bolivia was last with an average annual growth rate in international tourist arrivals of 4.0% between 1995 and 2004.

Bolivia does indeed have an enormous tourism potential, but is not very good at exploiting it. Bolivia receives about 400 thousand international tourists per year, which means that just 1 in every 2000 international tourists stop by Bolivia. If tourists were randomly wandering all over the Earth's land surface (including Antarctica), about 1 in 150 would accidentally enter Bolivia, so it seems they are actively avoiding this country.

This is a pity, both for Bolivia and for the tourists. For Bolivia because tourism is one of the few areas where Bolivia has a natural comparative advantage due to the amazing diversity of natural and cultural attractions, and because, in sharp contrast to natural gas exports, tourism generates jobs in a wide variety of sectors for both skilled and unskilled workers and entrepreneurs. Bolivia's complicated geography is a serious constraint for the export of physical goods, but for the "export" of adventure and nature experiences to tourists, it is a distinct advantage.

For tourists it is a pity because Bolivia has so many spectacular things to offer at very affordable prices. Backpackers breathe a sigh of relief when they come to Bolivia, as their daily expenses drop to only a fraction of those in other Latin American countries.

While Bolivia doesn't cater to the mass tourism market with long rows of beach hotels, it has plenty to offer to the more adventurous traveler. One of my favourites is the 6-hour bicycle ride on the World's most dangerous road from La Cumbre to Rio Selva Resort near Coroico. The trip starts at over 5000 meters among snow clad mountains and goes down through the most spectacular and varied landscape on a mud road clinging to the almost vertical mountain sides, and ends in the swimming pool at a five-star hotel in the jungle.

But often Bolivia is just too adventurous. Most tourists are on a tight schedule and have non-changeable, non-refundable flights to catch. Just

one little road block can disrupt an entire vacation. If you want to have a lot of tourists visiting a wide variety of places, at the very least you would have to be able to keep the roads passable.

A more systematic public tourist policy, however, could move Bolivia up the list of emerging tourism destinations to a more impressive position than 76th place. Bolivia ought to be close to Peru with tourist arrival growth rates above 10% per year. Especially since tourists in South America often visit several countries at a time, and Bolivia occupies a central position between the other main tourist destinations (Brazil, Argentina, Chile, Uruguay, Peru). It is not like they would have to go out of their way to visit Bolivia also.

Chapter 11
Bolivia's natural resource boom

True public goods, local consumption or imported goods
3 July 2006

The impacts of windfall profits such as foreign aid or hydrocarbon revenues depend crucially on how the money is spent and/or invested. There are basically the following three options:

1) **True Public Goods:**
   Theoretically, the most growth and welfare enhancing option is for the government to invest the money in true public goods. *True public goods are goods/services which enhance the productivity and welfare of everybody by making life and business easier*. A classic example is a road which allows goods and persons to move around much easier and, importantly, the fact that one person uses the road does not preclude others from also using the road[99]. This is in contrast to a washing machine which is a private productivity enhancing good, but which usually benefits only one family. Another classic example is research: Once that malaria vaccine has been invented, hundreds of millions of people can benefit from it, hopefully at very low cost.
   The Internet and most other networks, such as telephone networks, electricity networks, road networks and natural gas networks, also function as true public goods. You may have to pay a fee to get connected to the network, but this fee is incredibly small compared to the cost of building your own private pipeline to the gas plant or laying down your own private telephone lines to all the people you might want to speak with. Investing in public goods is not always a public sector job. Private companies may do it very efficiently, but the initial investments

are huge, so it is typically a job for big, multinational companies or consortia, rather than small, credit constrained Bolivian companies or even state companies.

Many true public goods, such as research on tropical diseases and the development of new technologies, require much more investment than the Bolivian government can handle, but there are still many public goods that *only* the Bolivian government can provide. For example, most Bolivians spend an inordinate amount of time on bureaucracy because there is no well-functioning central register of people and landholdings. Such simple things as opening a bank account, obtaining a passport, receiving your pension payment or getting a building permit may turn into month-, year- or decade-long nightmares if you can't produce the right documents. When identifying true public goods you just have to think about what would make life and business easier for a lot of Bolivians at the same time.

2) **Local Consumption:**

Instead of investing in public goods the government could distribute the money directly to the people and each person could decide how best to spend/invest his share of the windfall. Many people might prefer private consumption goods such as food, clothes and shelter rather than a road between Rurrenabaque and Cobija or a central register of land holdings. If people buy locally produced goods and services, this may have a positive effect on the economy through the multiplier effect: If one person uses his money to hire a nanny, the nanny can use the money to buy clothes and the clothes maker can use the money to invest in a new sewing machine, etc. The money keeps circulating and creating more economic activity until it escapes abroad, for example by the purchase of an imported sewing machine or until it is hidden under a mattress.

How growth enhancing it would be to distribute the money directly to the people depends a lot on how people react to receiving windfall profits. Some people celebrate and throw a party and that's it. Other people consider a regular flow of windfall incomes much more pleasant than hard work and stop, or reduce, their normal productive activities, in which case the transfers would have a distinctly negative effect on growth. Finally, some people decide to invest the money productively, for example in their children's education, in which case there may be a positive growth effect in the future. Some recent papers have studied the effects of remittances in order to investigate how recipients respond to windfall incomes and the results are not very encouraging[100].

3) Imported Goods

In an economy that depends heavily on foreign aid and natural resource rents there are not a wide variety of attractive local products to consume, so people tend to spend a relatively large share of their incomes on imported goods. A large inflow of imported goods has two negative effects on the local economy. First, it stops the multiplier effect mentioned above as the money escapes abroad. Second, imported goods compete with local products and thus depress local production and GDP growth. The government might try to counteract this by putting restrictions on imports, but that hurts the consumers who have to settle for inferior, locally produced goods. Most productivity enhancing goods and machinery are not produced locally at all, and thus have to be imported if the economy is to grow. Probably the best thing would be to put an import tax on luxury goods, but not on productivity enhancing and educational goods, such as machinery and books. However, it is not always easy to decide which is which. Some people may consider a washing machine a luxury good, whereas I consider it incredibly productivity enhancing.

In sum, it is not at all obvious how hydrocarbon revenues or aid money is best spent. Some kinds of spending may increase inequality or decrease growth, or both[101]. The least damaging or distorting option is probably to spend it on the children[102].

Governments giving gifts – populations acquiring rights

22 October 2007

Recently, the Bolivian government has made a generous change to the universal pension payment scheme (formerly BONOSOL, now Renta Dignidad) lowering the pension reception age from 65 to 60 years, and increasing the annual payment from Bs. 1,800 to Bs. 2,400. This means an immediate doubling of universal pension payments. However, due to the rapidly increasing population aged 60+, already by 2025 this implies a pledge of 3.5 times the current universal pension payments.

The government expects ever increasing natural gas rents to pay for this scheme. With a little luck, the exceptionally high natural gas revenues will continue for several more years, but some day they are likely to come crashing down. The current spike in oil-prices looks a lot like the spike in the late 1970s and it can end just as suddenly (see Figure 1).

By the time oil prices come down, however, these pension payments will have become a perceived right, many people will have difficulties doing without them and will strongly object to their reduction.

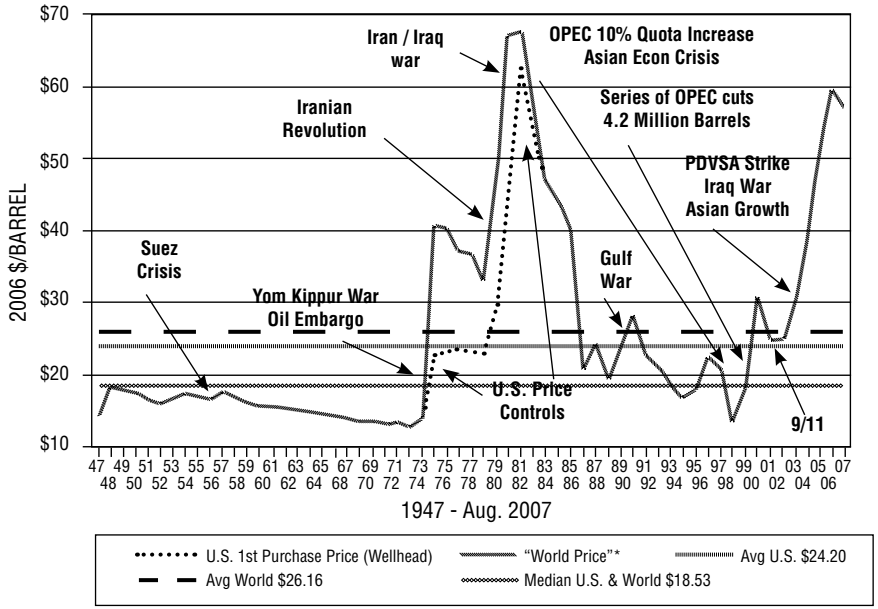
Apart from the problem of unsustainability –which is shared by most countries' pension systems– there is also a problem of justification. Public spending should either be an investment in public goods (which increases total productivity) or a transfer from rich to poor (which increases total utility). The Renta Dignidad is neither. As shown in Figure 2 below, the older age groups have below average poverty levels and such transfers reduce the funds available for the provision of infrastructure and other public goods.

In contrast, the Bono Juancito Pinto for school children is justified on both accounts. It is a transfer that benefits the poorest segments of the population (see Figure 2) and since it is only given to children who attend school, it encourages education, which has both an investment component and a public good component. Nevertheless, the Bono Juancito Pinto is only a small fraction of the size of Renta Dignidad (Bs. 200 versus Bs. 2400).

Old people have had a lifetime to accumulate assets and if they do not have enough for retirement it is to a large extent due to their own lack of planning and prevision. In contrast, if children are poor, it is in no way their own fault and they deserve all the help they need to overcome their initial disadvantage.

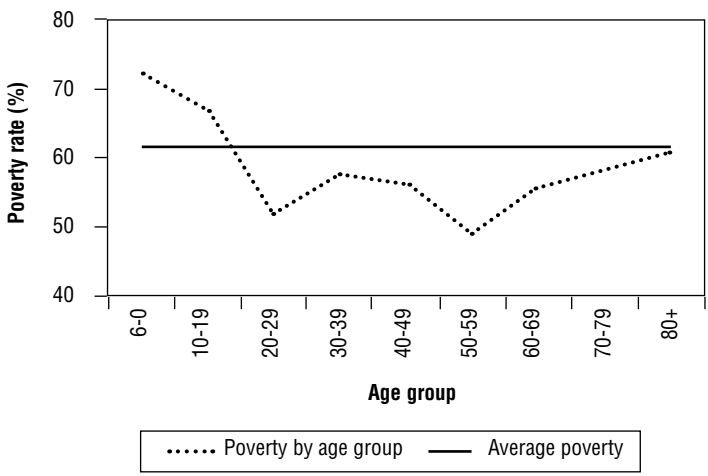
In conclusion, if the government wants to give away money, I would much rather see them pamper the children than the old. The former will carry Bolivia into the future, whereas the latter represent the past.

Figure 1: Evolution of world oil prices, 1947 - 2007



Source: www.wtrg.com. WTRG Economics ©1998-2007

Figure 2: Poverty rate in Bolivia, by age group, 2005



Source: MECOVI 2005. *Note:* A person is considered poor if average per capita income in the household is below the official poverty line.

How can $700 million in hydrocarbon revenues be bad for the poor?

31 July 2006

It was recently shown in an academic paper[103] that the natural gas boom in Bolivia is likely not only to *increase inequality* but also to *increase poverty*.

How can this be true? How can windfall revenues of $700 million per year, received by a clearly pro-poor government, increase poverty???

Three main mechanisms are at work:

1. **Government spending cannot be pro-poor even if it tries, at least not in the short run:**
   A large part of government spending inevitably goes to pay teachers, health personnel, bureaucrats, armed forces and consultants, none of which are among the poorest 50% of the population. When the government purchases equipment and materials it is not from rural small holders and urban informals – the two groups that encompass almost all of the poor in Bolivia. Some of the spending is obviously meant to benefit the poor, such as public education and public health services. This may indeed have positive effects in the long run, but it does not increase the incomes of the poor immediately in the same way as it does for public sector employees and providers.
2. **Dutch Disease – appreciation of the boliviano:**
   The large inflow of dollars into the economy will tend to make dollars abundant and thus cheaper, and at the same time bolivianos more expensive. This causes a change in the exchange rate which will make Bolivian goods more expensive for foreigners (reducing exports) and foreign goods cheaper for the Bolivians (increasing imports). With less exports and more imports, local production will fall together with local employment in the productive sectors. When Bolivian consumers start buying Pringles instead of local potato chips or driving their own imported car instead of using the buses or trufis, then a lot of small Bolivian businesses, both rich and poor, will suffer.
3. **Cost of living increases:**
   The poor people, who do not get higher incomes because of the gas boom, will see their *real* incomes fall because the costs of living increases. This increase is due to higher demand from all the richer people who do get higher incomes through government spending and investment. The price increases especially affect non-tradable goods and

services, such as housing, transportation, water, electricity, construction materials, etcetera.

What is the solution, then? What should the government do with all this money if they don't want to increase inequality and poverty?

Two options spring to mind:

1. Create public enterprises to employ the poor (nationalization)
2. Give the money directly to the poor instead of spending it (transfers)

The first option is tempting, but unlikely to be successful. Public enterprises are most appropriate in natural monopoly markets (where one enterprise is optimal), because otherwise they would go into markets where they would compete unfairly with private enterprises. But natural monopolies are usually extremely capital intensive, which means that they use a lot of money, some managers and some specialists, but little unskilled labor. So the public enterprise option is likely to increase inequality and poverty just as other types of government spending.

The second option does indeed improve income distribution, but likely at the expense of domestic production. Why work hard if there is an easier way of getting money? And if the money is particularly targeted at the poor; why risk becoming non-poor and lose the right to the transfer?

The word "curse" does indeed seem quite appropriate in relation to natural resource abundance. Maybe with increased autonomy we can contain the curse within a few departments.

Natural resources: Curse, disease or trap?

18 September 2006

For many years I thought that the reason why natural resource abundance could turn into a curse was that people and governments reacted in an irrational and counter-productive way when confronted with new natural resource wealth. That seemed logical because it didn't seem possible that additional money distributed fairly and invested wisely could do any harm.

So I was as perplexed and frustrated as everybody else when confronted with my own research results[104]. Using a Computable General Equilibrium Model of the Bolivian economy we found that the current natural gas boom is likely not only to increase inequality, as might be expected, but also to increase poverty. The latter is quite surprising given that the computer model, rather unrealistically, assumes that everybody behaves rationally and that the government invests its revenues 100% effectively in public goods that improve the productivity of everybody. No room for corruption, failed public investment projects, demonstrations, blockades, civil unrest, or any of the other everyday events in Bolivia.

Even in this, for Bolivia outrageously optimistic scenario, additional GDP growth due to the natural gas boom is only about 1% per year or less, whilst inequality as well as poverty increases substantially. The largest and poorest group, rural small-holders, is predicted to have 20% lower real incomes compared to a scenario without natural gas exports.

This is mostly the result of the following:

Basic economic forces: A large inflow of dollars causing an appreciation of the boliviano which discourages exports and encourages imports thus suppressing national production and employment ("Dutch Disease").

The structure and composition of the work force: Almost all poor people are concentrated in the two groups that are naturally excluded from participating in the government's spending and investment boom: rural small-holders and urban informals.

The lack of mobility between groups. While a rural small-holder might sell or abandon his land and join the urban informal sector, it would be virtually impossible for him to obtain a formal job as teacher, doctor, secretary, petroleum engineer, or any of the other professions that prosper under the natural gas boom.

The first force is universal to all countries that experience natural resource booms, but the second and third are characteristics particular to Bolivia and other poor, underdeveloped countries and they are the

characteristics which make natural resource booms problematic. If there were no poor informal sectors, or if people could move relatively easily towards the groups that clearly benefit from the boom (especially public sector employees, construction workers and service providers), then the natural resource boom would not be much of a problem. The economy could adjust to and live quite well with the disease. Thus, while the "Dutch Disease" is relatively harmless for the Dutch it can be quite serious for the Bolivians.

And this is before we even begin to take into account the irrational and counter-productive behavior that newfound natural resource wealth seems to inspire in some countries. A recently published book "La trampa del rentismo"[105] focuses on the additional problems that arise when natural resources prompt a switch from productive activities to rent-seeking behavior. The book shows a high correlation (0.83) between proven natural gas reserves and the annual number of social conflicts (of which 676 were registered in Bolivia in 2004). Almost all of the conflicts represent demands on the "newly rich" government by a population that has come to believe that demonstrations and blockades are equivalent to dialogue and democracy. Even very damaging activities (such as blocking the free movement of people and goods across the country or outright vandalism) are widely tolerated as part of freedom of expression with no negative consequences whatsoever for the perpetrators.

It is difficult to say which is the most problematic -- the almost automatic adverse economic effects or the self-inflicted social problems -- but natural resources clearly have features that justify the words "curse", "disease" and "trap", especially in countries like Bolivia.

The question is what to do about it?

Considering how bad the alternative options are, the abovementioned book tentatively suggests that the government might just distribute the rents directly to the population. This would clearly have a better impact on the income distribution than regular government spending and investment.

How this would affect GDP growth rates and development depends entirely on how households choose to spend the money. There are three main possibilities for each household:

- Invest the money to improve future income earning capacity.
- Spend the money immediately on a party (or other consumption goods).
- Reduce work effort now that an easier source of money is available.

If most households choose the first option, a permanent increase in GDP and incomes might result from the transfers. If most households choose to have a party instead, the consequences are limited to a few lost working days. But if people reduce their labor supply in response to the transfers (as basic economic theory would suggest), then the consequence might easily be a reduction in domestic production and an increased dependency on transfers.

Which is most likely? Knowing myself and many other Bolivians, I think a combination of 2 and 3 is the most likely. A recent study[106] on the effect of Bonosol transfers (unconditional, universal pension payments) in Bolivia appears to confirm that. The study analyses consumption patterns in the MECOVI household surveys for the years 1999-2000 (no Bonosol payments) and 2001-2002 (Bonosol payments of $120 per year to people aged 65 or more). Households with no eligible member are used as control group. This allows an estimation of differences in differences between "young" and "old" households in years with and without Bonosol transfers. The sample includes 11640 households.

While the study finds no effect of Bonosol on consumption in urban households, it does find a substantial effect on rural small-holders. Indeed, consumption in the latter type of households increases by a larger amount than the transfer itself, suggesting that the households have been able to invest the Bonosol payments productively on the farm. Additional regressions test the hypothesis that Bonosol increases on-farm investment (seeds, fertilizers, animals, tools, etc), but the only significant result found was that non-poor rural farms spend more on seeds as a result of Bonosol. For poor rural household, no increase in investment was detected.

If the rural results are analyzed in more detail by the age of the oldest member in each household, the impact of the 2001-2002 Bonosol payments are detected only for those aged 73 or more, although theoretically there should be an effect for all aged 65 or more. This makes me suspect that what the difference in difference analysis is really capturing may be the effect of the initial and much larger Bonosol payment received in 1997 ($247) rather than the smaller payments in 2001 and 2002. If true, the good news is that this initial Bonosol payment, which took most recipients by surprise, then had a permanent positive effect on consumption in rural households. The bad news is that subsequent payments did not seem to have any detectable impact neither on consumption nor investment. This may be because receiving households reduce their labor supply in response to regular/expected transfers, a hypothesis which could be easily tested using the same methodology as applied in Martínez (2006)[107].

"Acabo de leer tu artículo "Natural Resources: Curse, Disease or Trap?" y me parecio absolutamente impactante, altamente educativo y obliga a la reflexión. Ojala puedas difundirlo en español también por otros medios."
Gover Barja, La Paz

The worst way to use the hydrocarbon revenues

4 December 2006

It is not quite clear which is the best way to use exceptional oil and gas revenues[108], but the worst way is probably for the government to use expected future revenues as collateral to borrow money. This would not only increase inequality and poverty during the boom (see "How can $700 million in hydrocarbon revenues be bad for the poor?"[109]), but also burden future generations with excessive debt, which becomes difficult to service after the boom has ended.

Ecuador is a scary example of that[110]. After discovering oil in the rain forest in 1967, Ecuador quickly became the second biggest oil exporter in South America. By 1974 oil accounted for half of all export earnings (like Bolivia's gas now) and approximately half of the government budget. Annual GDP growth rates went as high as 25% and it was easy to obtain foreign loans for big development projects. Billions of dollars were invested in roads and industrial parks, hydroelectric dams, transmission and distribution systems, etc. Public debt increased from $240 million in 1970 to around $16 billion thirty years later.

When oil prices collapsed in the early 1980s, the public sector was blown completely out of proportion. By 1981, public spending was 20 times higher than the 1970 levels and debt servicing kept increasing. Spending cuts had to be made and by 1999 the share of the national budget allocated to health had fallen to less than three per cent, while debt service skyrocketed to more than fifty per cent. Since the 1970s the official poverty level grew from 50 to 70 percent[111].

In addition, the oil exploitation in the Ecuadorian rain forest has been an ecological disaster. In 2003, a group of more than 30.000 indigenous Ecuadorians filed a $1 billion lawsuit against ChevronTexaco, asserting that between 1971 and 1992 the oil company dumped over 4.000.000 gallons per day of toxic wastewater onto the land and into the rivers, leaving behind nearly 350 uncovered waste pits that continue to kill people and animals[112].

Unfortunately Ecuador is not an atypical case.

If leveraging the boom by taking on additional loans is the worst possible scenario, then paying off debts might be the best use of the extraordinary revenues. This would certainly reduce future debt service at a time when fewer resources are available and thus smooth consumption levels over time. It would also mitigate the immediate adverse effects of the gas boom on income distribution and poverty levels, whilst making the country less dependent on foreign donors and thus better able to make its own development decisions.

How to explain a building boom in a stagnant city

24 March 2008

La Paz is one of the slowest growing cities in Bolivia, in terms of population. Every year, twice as many people move away from the city than move into it from other regions[113]. Between 1992 and 2001, the city's population grew a modest 11%, compared to the 60% growth of El Alto and Santa Cruz de la Sierra, and the 40% growth of the total urban population (see Table 1).

Table 1: Growth of the 10 main cities in Bolivia

	Population 1992	Population 2001	Percentage increase 1992-2001
La Paz	713,378	789,585	11%
El Alto	405,492	647,350	60%
Santa Cruz de la Sierra	697,278	1,113,582	60%
Cochabamba	397,278	516,683	30%
Tarija	90,113	135,783	51%
Sucre	131,769	193,876	47%
Oruro	183,422	201,230	10%
Potosí	112,078	132,966	19%
Trinidad	57,328	75,540	32%
Cobija	10,001	20,820	108%
Urban Bolivia	3,694,846	5,165,230	40%
Total Bolivia	6,420,792	8,274,325	29%

Source: INE, 1992 and 2001 census.

Despite the almost stagnant population, and the uncertainty concerning the future location of the government city, there is a huge building boom taking place in La Paz at the moment. Skyscrapers are popping up like mushrooms and the exceptional demand for construction workers has doubled the daily wage rate compared to 2 years ago. Demand for cement in the department of La Paz increased by 17% between 2006 and 2007, whereas in all of Bolivia it increased only by 10%[114]. More than twice as many building permits are issued in La Paz than in Santa Cruz de la Sierra[115], despite the fact that every time La Paz increases its population by 100 people, Santa Cruz de la Sierra adds 550. There are also twice as many construction companies in La Paz than in Santa Cruz[116].

This is strange. If I had money to invest, I would be reluctant to invest in real estate in a stagnant city. Simple economic laws suggest that when

supply increases under conditions of constant demand, then prices (property values and rent) are going to fall. There is a real risk of ending up with empty apartments and offices once the economic boom ends, or even just slows down a bit.

But there is of course an explanation to this seemingly irrational building boom and it was revealed to me by one of the faithful readers of this newsletter. The explanation can be found in the Bolivian tax system, which has declared the entire construction sector virtually tax-exempt. The sector does not pay value added tax nor profit tax. The workers are hired as day laborers and thus pay no income taxes nor make any contributions to the social security system. The only tax the sector pays is the 3% transaction fee and the 0.5% municipal tax once the property is sold (and cheating on both is common). In contrast, the formal manufacturing and commerce sector pays 67-80% of value added in tax, depending on the source[117].

On top of that, there is the "Dutch Disease"[118] explanation, which predicts that a natural resource boom, such as Bolivia is experiencing now, will favor the non-tradable sectors (especially construction) at the expense of the tradable sectors (manufacturing) due to the currency appreciation.

These two factors together easily explain why there are many more formal enterprises engaged in construction and real estate than in manufacturing in Bolivia. According to the "System of Enterprise Statistics" launched by the Superentendencia de Empresas[119] last week, 35% of all formal enterprises in Bolivia are engaged in construction and real estate, 23% in commerce, and only 15% in manufacturing. More than 2/3 of all the municipal Enterprise Registrations (Tarjetas Empresariales) extended since 2003 are given to the construction sector.

As a private person on the renting side of the market, I think all this construction looks like very good news indeed. But as a development economist, I believe favoring the housing sector at the expense of the manufacturing sector is an unfortunate development strategy. There is not much we can do about the natural resource boom, but there is no excuse for maintaining a tax system that only worsens the situation.

Unless tax incentives are soon changed, the current natural resource boom will be turned into mountains of cement, rather than the productive, competitive enterprises we will need once the natural resource boom ends.

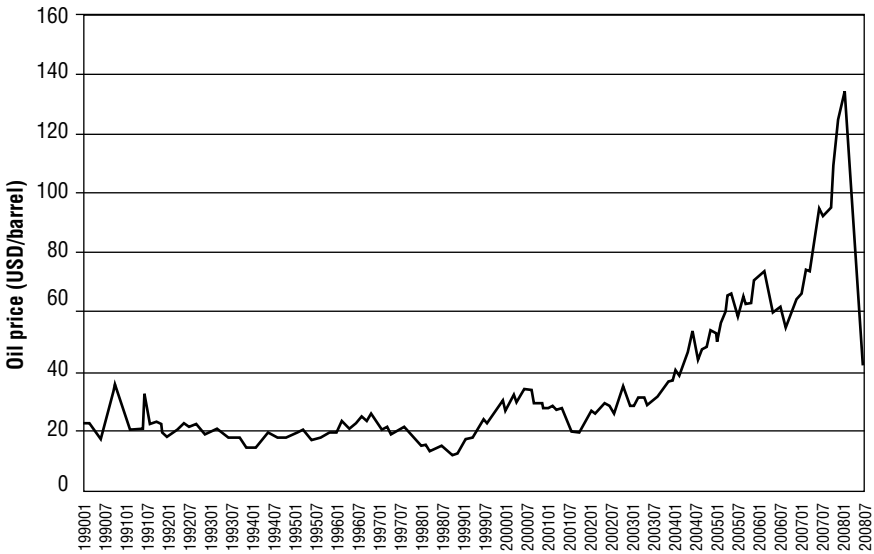
What to do about YPFB?

15 December 2008

> "Thinking to get at once all the gold the goose could give, he killed it and opened it only to find - nothing"
> *By Aesop, The Goose with the Golden Eggs*

During the last 5 years we have experienced a spectacular oil-price boom (see Figure 1), which has been thoroughly exploited by the Bolivian government to increase public revenues. Between 2002 and 2007, government revenues from the upstream hydrocarbon sector increased by a factor of 7, lately accounting for more than a third of all government revenues[120].

Figure 1: Price of West Texas Intermediate Crude (USD), January 1990 – December 2008



Source: www.economagic.com .

The high oil-prices certainly justified a steep increase in taxes, but the nationalization in May 2007 probably amounted to badly maiming the goose with the golden eggs. Instead of sitting back and collecting billions of dollars in royalties without making any investments and without taking any risks, we are now straddled with a public oil company (YPFB) that needs

to borrow a billion dollars from the poor Bolivians in order to make the investments that should have been made three years ago in order to take full advantage of the high oil prices.

Now oil prices are down to around $40 per barrel and you would need a pretty good crystal ball to predict how prices are going to behave over the coming decades. This means that investment in this sector is rather risky. It could give very good returns if world oil prices increase again and if the sector is well managed. It could also turn into some spectacularly expensive holes in the ground. Certainly, good returns are by no means automatic or guaranteed.

I don't think poor country governments should be making this kind of expensive gambles with poor people's money, but now that the nationalization has been carried out, there is no easy way back. The sector needs massive amounts of investments and they are not going to come from private companies under the current circumstances.

The obvious solution is to undo the unfortunate Law 3058 of 2005 which created the *Impuesto Directo a los Hidrocarburos* (IDH) and distributed hydrocarbon revenues to pretty much everybody except YPFB (departments, municipalities, universities, police, armed forces, indigenous people, etc.), leaving the public oil company without any money to do its job and much less with billions to invest.

Instead of securing YPFB a fair share of the royalties, the government has ordered the Central Bank to lend the company a billion dollars. The Minister of Finance, Luis Arce, assures the public that the loan is not going to be financed with the International Reserves of the Central Bank[121]. However, that is not a very assuring assurance, since it means that the loan would instead be financed by printing money. And 7 billion bolivianos is an awful lot of money to inject into the economy. It would increase the amount of bolivianos in circulation by almost 50%[122] causing massive inflation, devaluation and dollarization.

However, that is not really an option. The investments YPFB needs to make consist of very sophisticated deep drilling equipment and other capital not available in Bolivia. Almost all of the billion dollar investment would therefore have to be imported and, since foreigners do not want bolivianos, this money would have to come from the International Reserves of the Central Bank. There really is no other option.

The International Reserves of the Central Bank are not savings of the government or the Bolivians. They have accumulated in the Central Bank as the country has de-dollarized (for every 7 bolivianos printed, the BCB

has received 1 dollar), and they back up the value of all the bolivianos that has been injected into the economy over the last few years. As soon as the boliviano starts depreciating again – and it will if this billion dollar loan is approved – the Central Bank will have to change bolivianos into dollars, and International Reserves will fall precipitously (indeed it will fall by much more than the 1 billion dollars).

Another problem with lending YPFB money is that YPFB has no way of paying back the loan since Law 3058 gives all the hydrocarbon revenues away to departments, municipalities, universities, police, armed forces, indigenous people, etc. It would be really irresponsible to approve the loan without at the same time changing Law 3058 and securing YPFB some income that it can use to repay the loan.

So, this billion dollar loan is a really bad idea. It will revert many years of hard work to create an independent central bank, control inflation and de-dollarize the economy. A hyperinflation crisis does not come about just because a group of central bank directors decide to print money. It comes about because of bad ideas like this one and central bankers who don't have the balls to say no.

Chapter 12
Environment

Aesop, golden eggs and ecosystem services

14 June 2010

Everybody knows Aesop's fable about the farmer with the goose laying golden eggs: Day after day, the lucky farmer awoke to rush to the nest and find another golden egg, growing richer by the day. But with his increasing wealth came increasing greed and impatience, and unable to wait, the farmer decided to kill the goose and get all the eggs at once. But when he opened the goose he found it empty, with no eggs and no way to get any more. He killed the very asset that produced his wealth, while he should have nurtured and nourished it.

In this article we will apply the fable to the concept of ecosystem services. The natural capital we have (forests, streams, lakes, soil, atmosphere, etc.) is the goose, and as long as we take good care of it, it will provide us with a continuous stream of ecosystem services (wood, fish, fruits, wildlife, fuel, nutrient recycling, water filtering, air cleansing, waste decomposition, climate regulation, spiritual and aesthetic pleasures, etc.) which are the golden eggs.

The problem in Bolivia is that we have an abundance of geese (natural capital) laying golden eggs (ecosystem services), whereas we are a bit short on ordinary chickens (physical and human capital) laying edible eggs (income). Since we can't live on golden eggs alone, and since there is no well-functioning market where we can trade our golden eggs for edible eggs, we naturally try to convert some of our geese (natural capital) into chickens (agricultural land) or even directly into edible eggs (income).

There is nothing wrong with converting geese into chickens. Even turning geese into edible eggs would be OK, if we refrained from eating

the eggs, and let them grow into chickens. The important thing is to at least maintain, and preferably increase, our total stock of productive capital (physical, human and natural capital), and not be tempted to make a big feast out of all our geese, chickens and eggs.

Is Bolivia feasting too much? Nobody knows, because nobody is keeping track of anything but the edible eggs.

While the number of edible eggs (income) clearly has increased during the last few years, it is impossible to know whether this is a healthy, sustainable increase, unless we also know what has happened to the number of geese and chickens. If the number of geese and chickens has increased, we should be allowed to eat more eggs, but if the number of geese and chickens has decreased, we are on an unsustainable path that will eventually reduce future incomes, as we have been eating our productive capital.

The point I want to make is that the System of National Accounts needs to be expanded to keep track not only of edible eggs, but also of golden eggs, chickens and geese. That is, we need a System of Integrated Economic and Environmental Accounts, if we are going to be able to know whether we are on the right track or not.

A secondary point to be made is that much goose killing could be avoided if there was a well-functioning market for golden eggs (Payment for Ecosystem Services). The REDD mechanism was trying to accomplish that, since it would pay us directly for the golden eggs, thus avoiding the need to kill the goose. I hope we didn't kill that too.

Environment versus development

10 July 2006

Bolivia is one of the top 15 countries in the World in terms of biodiversity and endemic species. Consequently, Bolivia is of high priority for the international conservation community and so far more than 16% of the country's surface has been declared protected area.

However, Bolivia is also one of the poorest countries in Latin America, desperately seeking ways of rapid development. This often involves the exploitation of natural resources, such as land, timber, minerals and petroleum in national parks and other areas that provide important environmental services.

Given that conservation and human development are both very worthwhile objectives, it is important to find ways to maximize both simultaneously or at the very least have the other objective firmly in mind when maximizing the one that one happens to consider of primary importance.

Balancing and integrating the objectives of conservation and human development in Bolivia is exactly what we are trying to do in a series of joint projects with several other development and conservation institutions in Bolivia[123].

Fortunately, there does not seem to be a strong trade-off between conservation and development in Bolivia. It is a big country, with enough space for both humans and natural areas. The key is to take advantage of the impressive geographical variation in this country. Some areas are clearly more important for the conservation community than others, because they have higher biodiversity, more unique species, store more carbon, or bring a clean and steady flow of water to more people. Similarly, some areas are more attractive for human development than others. Unless the two priorities are highly correlated, and that does not seem to be the case, it is possible to super-impose the two maps of priorities and create an "optimal" mosaic of land uses[124]. Some areas will be obvious candidates for conservation, while others will be obvious candidates for human activities. This means that interventions will only be necessary in the areas of conflict between the two objectives.

Conflict is often brought about by unfortunate location of public infrastructure investments. If you invest hundreds of millions of dollars in roads and other infrastructure smack in the middle of a high priority conservation area (e.g. Chapare), you are clearly not maximizing both objectives simultaneously, and probably not even one of them.

I hope that future infrastructure projects will be located with a serious attempt at maximizing human development and minimizing environmental damage, rather than succumbing to pressure from outside interests or pressure from small special interest groups within Bolivia.

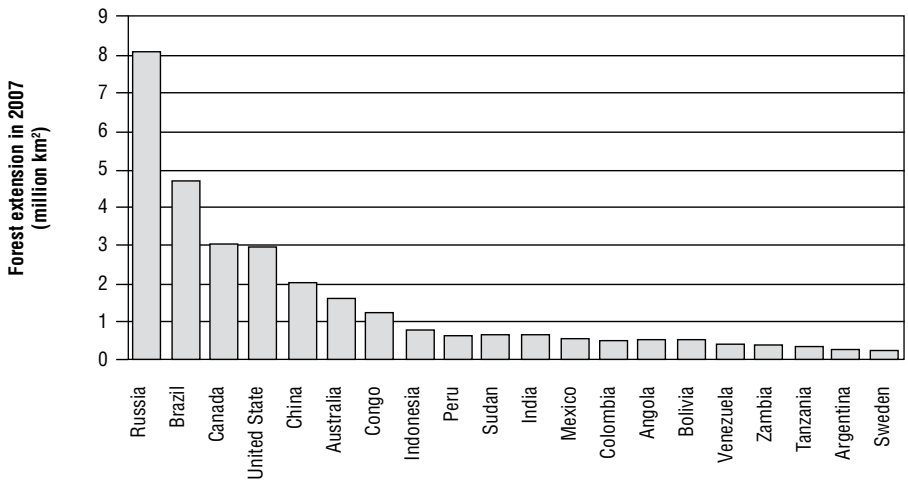
I also hope that the conservation community will help find ways in which Bolivians can benefit from the country's extremely high levels of biodiversity, so that conservation does not just imply succumbing to outside pressure as well.

China's impressive forest regrowth

26 April 2010

China is the fifth most forest rich country on the planet with more than 200 million hectares of forest. This is about 4 times more than Bolivia, which is the 15th country in the World in terms of forest extension (see Figure 1).

Figure 1: Forest extension for the World's top 20 forest countries, 2007

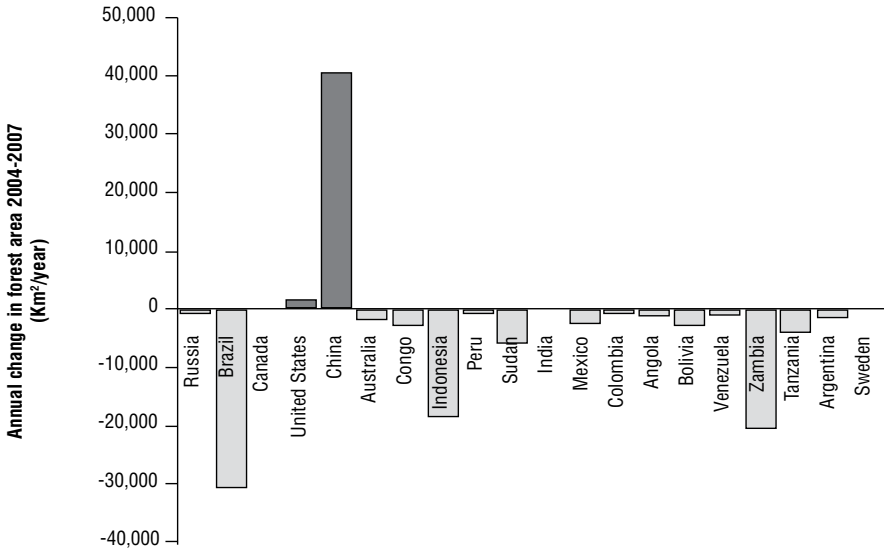


Source: Author's elaboration based on the now free World Development Indicators from the World Bank.

Still, considering the size of the Chinese population (1.3 billion), forest is very scarce in China, with an average of only 0.16 hectares per person (Bolivia has 40 times more forest per person than China). Therefore, China has embarked on a massive reforestation project with the consequence that the forest area in China has been growing by about 4 million hectares per year during the period 2004-2007 (see Figure 2).

While forests are also growing in United States, India and Sweden, the scale is nothing like China. Indeed, China is reforesting faster than all the countries in South America together are deforesting.

Figure 2: Annual change in forest area 2004-2007 for the World's top 20 forest countries

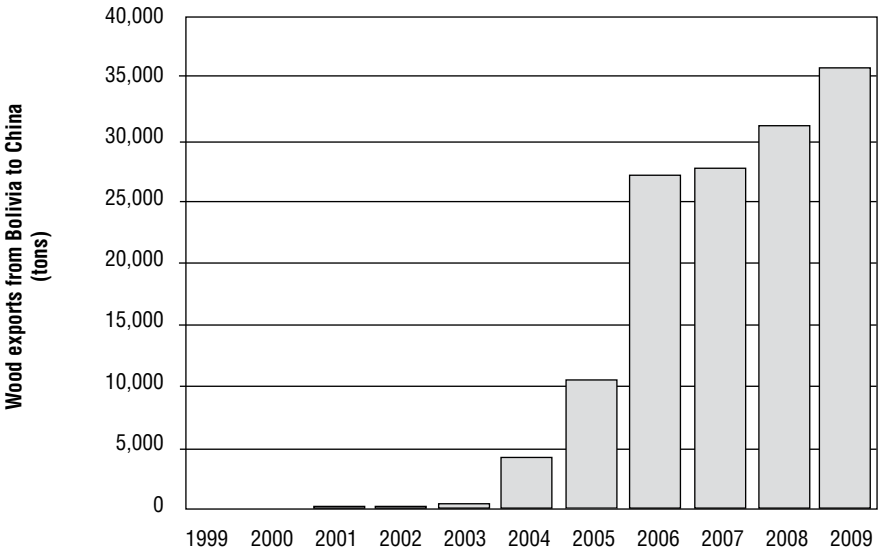


Source: Author's elaboration based on the now free World Development Indicators from the World Bank.

Given the rapid economic growth in China, how has it been possible for them to reverse the pressure on their forests? Easy: They decided to import wood from abroad rather than further run down their own wood stocks. A large part of deforestation in nearby Indonesia is due to wood demand from China, and China is even importing massive amounts of wood from Bolivia, located about as far away from China as possible on this planet. Wood exports from Bolivia to China have increased by a factor of 200 during the last 10 years and China now accounts for more than 30% of Bolivian wood exports (see Figure 3).

Selling wood to China is not a bad idea - it is certainly better than just burning the forest to make room for agriculture. There is considerable potential for growth in that market, so Bolivia ought to support and regulate the forestry sector with well-designed policies. A lot of jobs and incomes can be generated in this sector, especially if we export processed wood products instead of raw timber and if we ensure that the wood is harvested in a sustainable fashion and that regrowth is supported by adequate forestry techniques.

Figure 3: Annual wood exports from Bolivia to China, 1999-2009



Source: Author's elaboration based on the excellent trade database freely available at the website of the National Statistical Institute in Bolivia (www.ine.gov.bo).

Saving REDD after Cochabamba

17 May 2010

The historical "World People's Conference on Climate Change and the Rights of Mother Earth"[125] held in Cochabamba last month highlights the need for a new global development model that secures harmony with nature and among people. Such a new system would require a change of mindset away from the current consumerist practices of human beings and their striving for ever greater accumulation of material goods.

According to Working Group 2, the construction of new paradigms such as Living Well in Harmony with Nature requires the examination of different forms of wisdom and experiences, and a collective evaluation of current realities using new indicators that allow us to measure the well being of humans as well as the wellbeing of the planet.

This is a very wise statement as the currently most popular indicator, GDP per capita, has only a very limited correlation with human well-being and life satisfaction and probably a negative correlation with the well-being of the planet. The current system of national accounting is out of sync with the real objectives of development and indeed violates the basic principles of sound accounting, as it does not take into account the reduction of natural capital nor the accumulation of human capital.

There are many other wise statements in the "People's Agreement"[126] that came out of the Conference, but the very strong condemnation of the REDD mechanism is not one of them. As long as REDD is not based on the trading and shifting around of carbon emissions permits and carbon emissions reductions, the mechanism has the potential not only to help reduce the decimation of the natural forests on which many indigenous peoples depend, but also to help secure financing for a development path that is consistent with living well in harmony with nature.

I agree that a market based REDD mechanism is likely to do more harm than good. But so far, all funds behind the still-to-be-designed REDD mechanism have come from direct donations unrelated to carbon markets. Such donations from countries eager to make a real difference (instead of just shifting carbon emissions from poor people to rich people) are likely to dominate REDD funding for quite some time.

Almost all developed countries, as well as many developing countries –including China– have stopped deforestation within their own borders[127].

They consider their forests too valuable to chop down, and prefer to buy the timber they need from countries like Bolivia, which are still willing to sell out their forests cheaply. The same countries have also stopped expanding their agricultural frontier, because they prefer to import agricultural products from countries like Bolivia, instead of ruining their own natural areas.

If well managed, the REDD mechanism could help stop this exploitation of Bolivia by increasing the perceived value of forests. Not only could it protect natural forests on indigenous lands from capitalist depredation, but it could also provide the Bolivian government with substantial funds for public investments in favor of living well in harmony with nature.

The Peoples Agreement states that a REDD mechanism would be "violating the sovereignty of peoples and their right to prior free and informed consent as well as the sovereignty of national States, the customs of Peoples, and the Rights of Nature." But in reality, it is the responsibility of the Bolivian Government to design its own internal REDD policies in a way that does not violate the sovereignty of peoples and their right to prior free and informed consent. Bolivia has already been awarded several million dollars to finance this process of designing fair and efficient REDD policies in an inclusive way, and there are more funds on the way, on the condition that the country demonstrates a realistic plan for consultation and inclusion of stakeholders in the preparation phase.

The people's conference and the Bolivian government are right to condemn market based mechanisms as both unfair and ineffective. Instead they should demand a fund based REDD mechanism, with funds deriving from the rich countries 'historical environmental debt' and voluntary contributions from countries and institutions with a real interest in protecting forests and biodiversity for future generations.

The main institutions promoting REDD at the international level (UN, FCPF and some environmental institutions) should avoid relying on carbon markets for the reduction of deforestation. Forests are infinitely more than just carbon and we don't want natural forests to become a casualty of bungled international climate negotiations and over-eager, paper-pushing bureaucrats.

Chapter 13
Climate change

Managing change
6 November 2006

"The world hates change, yet it is the only thing that has brought progress." *Charles Franklin Kettering*

"Some people change their ways when they see the light; others when they feel the heat." *Caroline Schroeder*

It has happened to most of us, even the poorest of the poor. We used to feel safe and secure; the things we needed seemed to come to us automatically without any effort on our part. We were living in a care-free world, with no worries, little pain and few threats, cushioned from all shocks.

Then one day something happened that would change our lives forever. It began quietly, just a mild tugging feeling. But it quickly turned into a violent, jolting earthquake. Our walls of security came crashing down upon us, our bodies got squeezed and our limbs twisted. The pressure on our heads was so strong that we thought we would die.

Actually, we were just getting born.

Most of us resent change, not realizing that status quo is never sustainable. If we had had the power to refuse to be born, we would certainly have inflicted unbearable pain and even death on our mother.

Resistance to change often inflicts unnecessary suffering (or prevents happiness) on both ourselves and others. Some types of resistance are at the personal level and the consequences are limited to the nearest family. For example, a person may stay in an unfulfilling job just because it provides a regular income and health insurance, and the thought of looking for a more interesting job or starting a new enterprise is too daunting. The result is an

unhappy and unproductive worker, as well as a grouchy husband and father, but the damage is limited to that. If status quo becomes too unbearable, the person will eventually change.

However, other types of resistance to change have become institutionalized and adversely affect millions of people. One example is immigration laws which prevent people from settling down in places where they would have more opportunities to become happy and productive than at the place where they happened to be born. The limits to physical mobility, both the self-induced kind and the more formal constraints, imply that hundreds of millions of people live in sub-optimal places with little chance of escaping the cruelties of poverty and disease.

If the world is to become a better place with more happiness and less suffering, we have to become better at dealing with change. As it is now, even very slow change (such as an average global temperature increase of one or two degrees over a lifetime) scares the shit out of us.

Instead of trying to prevent the climate from changing (an impossible task since the climate has always changed and will go on changing no matter what we do), we should teach people how to deal with change. This effort, if successful, would have a lot of positive spill-over effects as people would not only become better at handling climate change, but also all the other changes that life inevitably throws our way (the loss of loved ones, lay-offs, change of residence, technological changes, etc).

I am not sure how we can teach people to handle change better, but we could start by cutting back on all the scare campaigns associated with change (e.g. The Population Bomb in the 1960s[128], Natural Resource Shortages in the 1970s[129], the Sixth Extinction in the 1990s[130], or Climate Change now). Lots of people profit from our fears, but I don't think we should let them.

Also, at least in developed countries, parents are advised that regularity is important when raising your child. Meals should be served at regular intervals and at the same time every day; the child should be put to bed at the same time every night, in the same bed, with the same bed-time ceremony, since this will make the child feel more secure.

I disagree with that approach, as I think it results in adults that are afraid of change (and have eating and sleep disorders as well). Children should learn from baby-hood that change is exciting, not dangerous, and children should learn to trust the signals of their own bodies and eat when they are hungry and sleep when they are tired, instead of following some arbitrary rules imposed by well-meaning parents.

Fortunately, the fear of change is much less severe in developing countries. Possibly because parents in poor countries never read any books on child rearing, or because the scare campaigns don't reach them. They are faced with real problems of survival almost every day, so they don't have to dream up some distant disaster to get their daily adrenaline shot.

"Gracias, estimada Lykke, como estoy en una fase de cambio personal y profesional, me han "tocado" fuerte tus palabras...."
Martin Thomas, La Paz

WARNING! Excessive use of the Precautionary Principle may be bad for you

30 October 2006

The Precautionary Principle basically says that we should not do something unless we are sure it will have no harmful or potentially harmful side-effects.

On the face of it, that may sound reasonable, but in reality it is a one-sided consideration, which completely ignores the benefits or potential benefits of any action/product/invention. The Principle does not weigh benefits against costs; it just says that if there are any costs at all, the action should not be carried out. For example, a new invention which could benefit millions of people, but also might possibly harm a few (people or other species) in the process, should be banned according to the Precautionary Principle.

If the Precautionary Principle had been enforced at the time of the invention of the wheel, the wheel would surely have been banned, especially if the people of that time had had the imagination to foresee all the death and destruction this invention has caused in terms of traffic accidents, contamination, environmental destruction, obesity, etc.

A more modern example is Genetically Modified Organisms (GMOs), which have the potential to substantially increase crop yields, to reduce the need for expensive and dangerous herbicides and pesticides, and to make food products healthier, tastier and more nutritious as well. This should be good news if you are worried about hunger in the third world, protection of the environment, and/or your own health. Still, many people and organizations are opposed to the use of genetically enhanced crops, frequently citing the Precautionary Principle[131].

Every single invention (indeed every single action) between the invention of the wheel and the GMOs has some risk associated with it. If it were not for billions of brave persons willing to take a risk and willing to violate the Principle, we would all be living in the stone-age, walking around paralyzed.

Unless stone-age living is your ideal way of living, you should be very cautious in the application of the Precautionary Principle.

Now you can off-set both carbon emissions *and* infidelity!

30 July 2007

Carbon-offsetting (paying others **not** to emit carbon into the atmosphere so that you can keep emitting) recently got an absolutely hilarious equivalent:

CheatNeutral (http://www.cheatneutral.com/).

This brilliant initiative allows you to pay somebody else to be faithful, so that you can keep going on as usual. Of course it is recommended that you first look for ways of reducing your cheating. But once you have done this, you can use CheatNeutral to offset the remaining, unavoidable cheating. This supposedly neutralizes the pain, unhappiness and heartbreak in the atmosphere and leaves you with a clear conscience.

According to Pete Witucki[132], there are at least five ways in which CheatNeutral is like carbon off-setting:

- CheatNeutral tries to make it seem acceptable to cheat on your partner. In the same way, carbon offsetting tries to make it acceptable to carry on emitting excess carbon.
- CheatNeutral doesn't really do much to reduce the amount of cheating in the world. Carbon offsetting does very little to reduce global carbon emissions.
- It seems impossible to measure how much harm cheating on someone does. With carbon offsetting, there is currently no practically feasible way of measuring how much carbon offset projects actually save.
- Having CheatNeutral's services available could actually encourage you to cheat more. If the carbon offsetters persuade you that it's possible to offset your emissions, you'll carry on emitting excess carbon through your lifestyle rather than think about reducing your emissions.
- CheatNeutral is fundamentally the wrong way to go about solving problems with your relationships. Carbon offsetting is fundamentally the wrong way to go about tackling climate change.

According to the same author there are also two ways in which CheatNeutral is not like carbon offsetting:

- Nobody makes money out of CheatNeutral. Offset companies in the voluntary carbon market take a cut of every transaction and make a profit.

- CheatNeutral is a joke that was thought up in a pub. Carbon offsetting presents itself as a credible solution to climate change, described by the British government's chief scientist Sir David King as "the most severe problem that we are facing today, more serious even than the threat of terrorism…"

Climate change in Bolivia - expect surprises

14 April 2008

Climate change has suddenly become a hot research topic in Bolivia[133]. The glaciers in the highlands are melting, the lowlands are flooded, and the government has declared a state of national emergency due to natural disasters. It is a good time to ask how climate change might be affecting the poor Bolivians.

But first let's check exactly what climate changes we are talking about.

The National Meteorological Service (www.senamhi.gov.bo) provides useful data for 33 different stations across Bolivia. They provide daily minimum and maximum temperatures since 1/1/2004 until yesterday, as well as historical monthly averages for the 1961-1990 period, which can be used for comparison. It is therefore relatively simple to calculate daily temperature anomalies for different parts of Bolivia.

The results of such an exercise might surprise you.

Of the 33 Bolivian weather stations, 7 experienced significant warming, 6 experienced no significant change, and 20 experienced significant cooling. Most of the cooling took place in the highlands (-1.5 degrees Celsius in Charaña, -1.2 in Oruro, -0.5 in Potosí, and -0.3 in El Alto, for example), while the lowlands experienced much more modest changes (about -0.2 degrees in most places).

Central La Paz is an atypical place by Bolivian standards, with warming of about 1.4 degrees Celsius in the recent 4-5 years compared to the average for 1961-1990. One might suspect the urban heat effect to be playing a role here, as La Paz is full of concrete[134] and has little vegetation to soften the effect. If any of the readers know exactly where the Central La Paz station is located, I would like to take a look at it.

Some people might be skeptical of these "cooling" results and suggest that the SENAMHI data are bad. Certainly, there are a lot of missing observations. The person responsible for recording temperatures at Potosí airport, for example, doesn't work weekends, so two-seventh of the observations are missing. Other stations didn't start recording until 2006.

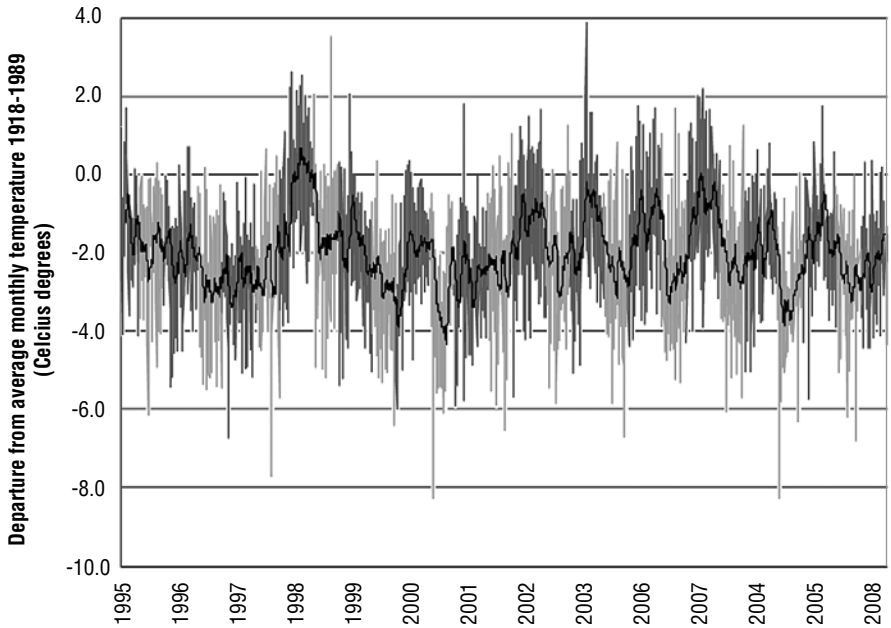
If we limit ourselves to the 17 stations with most complete data (at least 1100 daily observations since 1/1/2004), we find that 3 stations experienced significant warming, 2 experienced no change, and 12 experienced significant cooling. So, pretty much the same pattern.

If you don't trust Bolivian data at all, there are also some international data available. The longest series, I could find, is for El Alto for the 1/1/1995 - 31/3/2008 period, with a reference period of 1918-1989.

Figure 1 shows the daily anomalies calculated from this international data (see source below the graph). The average anomaly is -2.0 degrees Celsius, suggesting that El Alto is now substantially colder than it was during most of the previous century.

The international data thus shows even more cooling than the national data (-0.3 degrees for El Alto). This may have to do with the longer reference period, as the 1961-1990 period used by SENAMHI (and most of the IPCC work) was a relatively cold period. Indeed, in the 60s and 70s the media was making a big fuss about the World being on the brink of a new ice-age, because global temperatures were dropping and glaciers advancing almost everywhere[135].

Figure 1: La Paz (El Alto): Average Daily Temperature Anomaly 1/1/1995 – 12/3/2008, compared to average monthly temperatures for 1918-1989



Sources: For daily temperatures: Average Daily Temperature Archive, University of Dayton, GSOD weather station no. 852010, located at 16.51667S/68.18333W, 4014 meters above sea level. For 1918-1989 average monthly temperatures: The Global Historical Climatology Network, El Alto station located approximately at 16.50S/68.20W, 4103 meters above sea level (http://www.worldclimate.com/cgi-bin/data.pl?ref=S16W068+1202+0010853G2).

Note: Notice that the station for the historical data station apparently is located a 89 meters higher than the current station, implying that the historical data should be about half a degree colder than the current data. The average anomaly may therefore be biased towards zero by about half a degree Celsius.

So, if you would like to study the impacts of climate change in Bolivia (and thus receive some of the benefits), be sure at least to get the direction of change right.

"Lykke, I really enjoyed your article."
Carlos Freire, Aalborg, Denmark

Fighting climate change: Cures worse than the disease?

28 April 2008

The Intergovernmental Panel on Climate Change and Al Gore jointly won the 2007 Nobel Peace Prize "for their efforts to build up and disseminate greater knowledge about man-made climate change, and to lay the foundations for the measures that are needed to counteract such change".

I am sure these enormous efforts were done with the best of intentions, but I am not so sure they are contributing to World Peace. Certainly, a lot of wasteful and harmful policies are being implemented under the guise of fighting climate change.

One of the worst policies is probably the multi-billion dollar subsidies to turn food crops into so-called "green fuel" (ethanol and bio-diesel). Not only do these programs cost about a hundred times more than the average carbon sequestration project[136], but they also contribute to increasing the prices of basic food crops, the high prices of which are currently causing food riots in many poor countries (see recent articles in *The Economist*: "**Food and the poor: The new face of hunger"; "Food: The silent tsunami"; "Famine, farm prices and aid: Food for thought"**).

Since both demand and supply of food crops are very inelastic, even small shocks to either demand or supply can cause big changes in food prices. And the sudden increase in the demand for crops for the production of bio-fuel is no small shock.

Global ethanol production reached 20 million tonnes in 2006 and is growing at double or triple digit rates. Bio-diesel production in the European Union alone increased from 4.9 million tonnes in 2006 to 10.3 million tonnes in 2007. As countries struggle to reach the legislated targets for bio-fuel consumption, they convert hundreds of millions of tonnes of food crops (wheat, rye, barley, sugar beet, maize, rapeseed and others) into fuel each year. New Zealand is even turning cows' milk into bio-fuel, and France is considering whether it is more profitable to turn grapes into fuel instead of wine. The price of beer in Germany increased by about 40% in 2007 as farmers dedicate barley to fuel instead of beer production[137].

Developing countries are not obliged to meet bio-fuel targets, but are encouraged by the high prices to clear forest and produce crops for bio-fuels. Even Africa, which is more plagued by hunger than any other continent, is turning crops into bio-fuel. South Africa, Malawi, Swaziland, Zimbabwe, Ethiopia, Kenya, Tanzania and Mozambique are all commercial bio-fuel producers, and bio-fuel projects are also under way in Burkina Faso and Madagascar[138].

Companies that were aiming for a green image by switching to bio-fuels, are understandably beginning to get cold feet. The UK transport group, National Express, for example, has discontinued its bio-diesel trial after a scientific report showed that switching its busses to bio-diesel might do more harm than good to the environment. Specifically, the report warned that natural habitats might be destroyed to make room for bio-fuel crops, food prices in developing countries might be pushed up, and the net effect on carbon emissions might be close to zero, or even positive, as the production of bio-fuels is in itself an energy intensive process and it may also release carbon through additional deforestation[139].

The current high prices of food crops obviously benefit commercial farmers, but they harm most of the World's poor, who have recently seen their purchasing power fall by 25-50%[140]. This widespread adverse effect on the poor is orders of magnitude larger than the likely adverse effect from climate change, with the additional problem that there has been no time to adapt or adjust to soaring food prices.

"Thank you Lykke for this interesting piece."
David Seddon, UK

Living on the edge: The perils of climate change[141]

26 May 2008

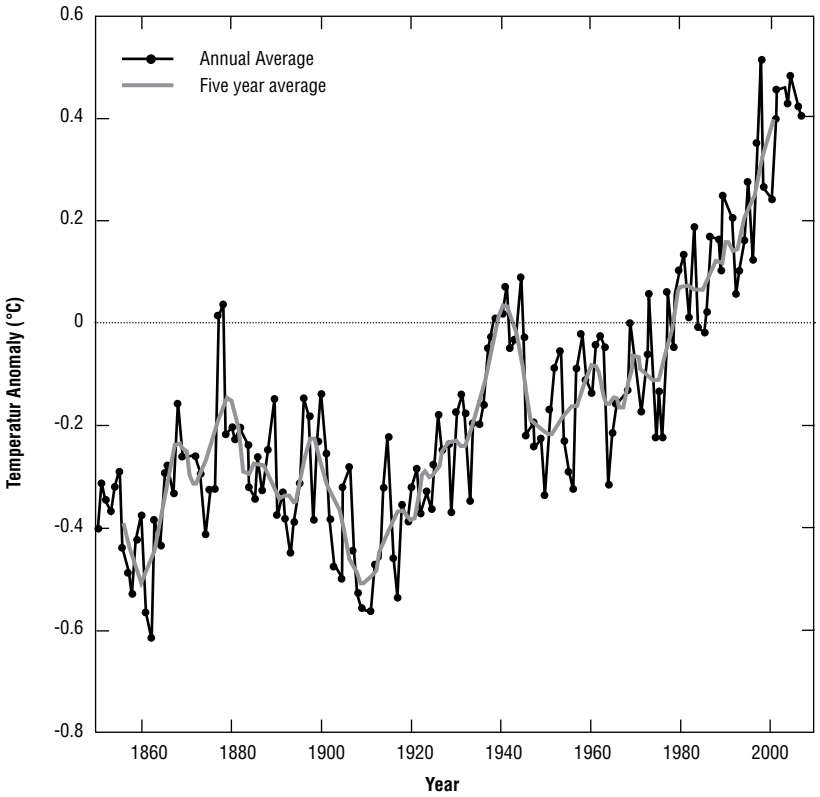
During the last 100 years, we have experienced four rounds of significant climate change. In 1912, when Titanic struck an iceberg and sunk, the New York Times reported that "Prof. Schmidt Warns Us of an Encroaching Ice Age." Los Angeles Times the same year: "Fifth ice age is on the way. Human race will have to fight for its existence against cold."

Global temperatures were indeed unusually cold during the first decades of the previous century (see Figure 1 below), and ice age warnings regularly popped up in the media: Los Angeles Times, 1923: "The possibility of another Ice Age already having started… is admitted by men of first rank in the scientific world, men specially qualified to speak." Chicago Tribune, 1923: "Scientist says Arctic ice will wipe out Canada."

But then temperatures started increasing for a while, and the media started warning about warming instead. Los Angeles Times, 1929: "Most geologists think the world is growing warmer, and that it will continue to get warmer." New York Times, 1933 "America in Longest Warm Spell since 1776. Temperature line records a 25-year rise." In 1938, British amateur meteorologist G. S. Callendar made the now familiar claim, in the Quarterly Journal of the Royal Meteorological Society, that man was responsible for heating up the planet with carbon dioxide emissions.

Before the media grew frantic, however, temperatures started falling again. Although average temperatures fell by less than half a degree Celsius, both scientists and media found sufficient reason for doomsday warnings. New York times, 1974: "the facts of the present climate change are such that the most optimistic experts would assign near certainty to major crop failure in a decade," if policy makers did not take immediate action "mass deaths by starvation and probably in anarchy and violence" would result. Newsweek, 1975: "There are ominous signs that the earth's weather patterns have begun to change dramatically and that these changes may portend a drastic decline in food production – with serious political implications for just about every nation on earth." Nigel Calder, 1975: "The threat of a new ice age must now stand alongside nuclear war as a likely source of wholesale death and misery for mankind." Lowell Ponte, 1976: "The cooling has already killed hundreds of thousands of people in poor nations." If proper measures weren't taken, then the cooling would lead to "world famine, world chaos, and probably world war, and this could all come by the year 2000."

Figure 1: Instrumental Temperature Record



Source: http://en.wikipedia.org/wiki/Image:Instrumental_Temperature_Record.svg

But by that time temperatures had already started increasing again, and during the last couple of decades global warming has replaced the media's ice age claims. The results have pretty much stayed the same, however – the deaths of millions or even billions of people, widespread devastation and starvation. People apparently believe that we are living on a knife edge, where everything is just right (or was just right about 30 years ago), and that any change is likely to lead to disaster.

Many of the current claims about the effects of climate change could make even Malthus turn in his grave: "Billions will die…Human civilization will be reduced to a broken rabble ruled by brutal warlords, and the plague-ridden remainder of the species will flee the cracked and broken earth to the Arctic, the last temperate spot, where a few breeding couples

will survive" (James Lovelock in the Daily Telegraph, 2006). "Our ability to live is what is at stake" (Trailer to the 2006 Al Gore movie "An Inconvenient Truth").

The Stern Review on the Economics of Climate Change states that if global temperatures increase by more than 5 degrees Celsius "effects could be catastrophic, but are currently very hard to capture with current models as temperatures would be so far outside human experience." True, global average temperatures have not been five degrees warmer than now at any time in human history. Last time it was 5 degrees warmer was during the Eocene Climate Optimum about 50 million years ago. Still, most people experience warming of more than 5 degrees every morning between 7 and 9, and somebody who moved from Boston to Florida would experience a whooping 14.5 degree increase in average temperatures. The poor students at University of Chicago suffer average temperature increases of almost 30 degrees Celsius between January and July every year.

I suspect that people are probably a whole lot better at dealing with climate change than they are currently getting credit for.

Climate variability versus climate change

16 June 2008

"Climate is what you expect, weather is what you get"
Robert A. Heinlein

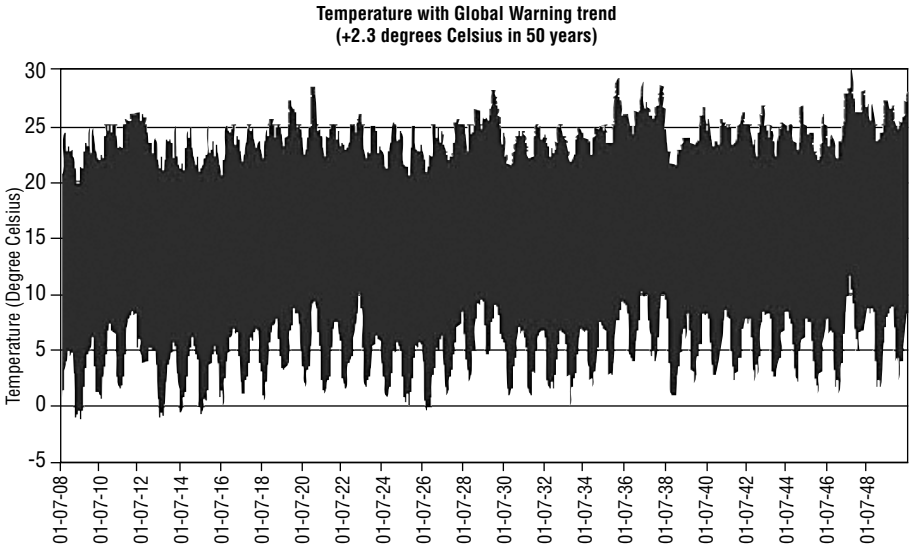
Between 1905 and 2005, the average global air temperature near the Earth's surface increased by somewhere between 0.5 and 1.0 degrees Celsius. Climate model projections summarized by the IPCC indicate that average global surface temperature will likely rise a further 1.1 to 6.4 °C during this century[142].

To the uninitiated, this would not sound like much, but to others this suggests a worldwide catastrophe of unprecedented scale[143]. Having studied this topic for about a decade now, and despite excellent scientists and experts having done their best to educate me, I still seem to belong to the uninitiated group. In this newsletter I will spell out a few of the reasons why I am not particularly alarmed by climate change.

One reason has to do with the fact that natural climate variability in any particular location is so large that the relatively small "global warming signal" drowns in all the noise. You have to average over very large areas (millions of square kilometers), and over several decades, in order to detect the global warming signal[144]. In any specific place, temperatures and precipitation may show trends completely different from the global one.

If you are a normal person, living in a specific location, you probably won't be able to detect the global warming signal within your own lifetime (although a lot of people may try to convince you that you are already experiencing it). For example, assuming a very strong global warming trend of 4.6 degrees Celsius during this century, a person living in La Paz would experience temperature variations similar to the ones depicted in Figure 1. This figure shows the normal daily and monthly variations in temperature, with some random el Niño events (zero mean) and a strong global warming trend added on.

Figure 1: Simulated temperature variations in La Paz with Global Warming, now – 2050



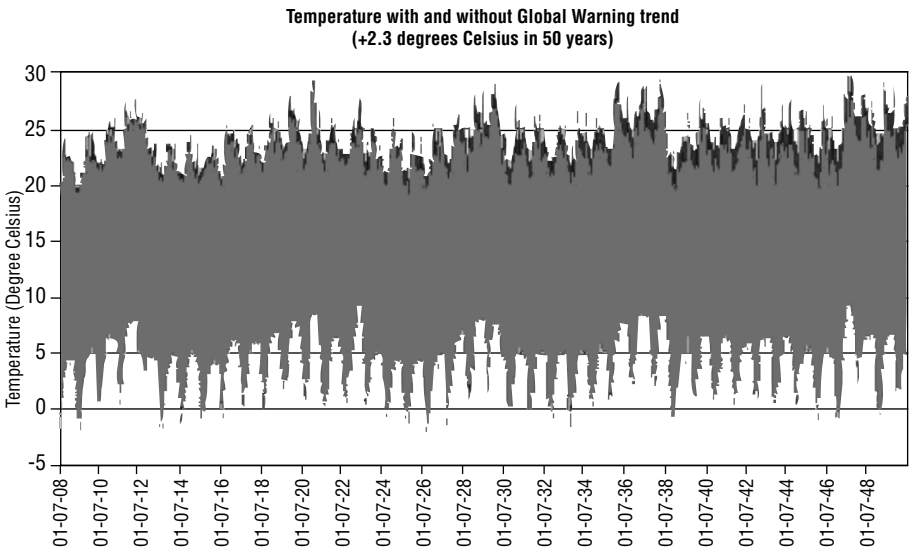
For comparison, Figure 2 includes the simulated temperatures in the absence of a global warming trend. The difference looks small, if not tiny. I am not sure how it would feel on a human body, but I suspect that it would be like the difference between living in El Alto and living in Achumani. I can't imagine that my grand children will think it is a big deal, but if they do, they are free to move to El Alto.

Of course it may not be temperature in itself that is the big problem, but rather associated events like sea-level rise. This is not going to be a problem in La Paz any time soon, but Al Gore's book "An Inconvenient Truth" uses impressive computer generated images to show how New York, Florida, San Francisco, The Netherlands, Beijing, Shanghai and Calcutta would be affected by a 20 foot rise in sea-levels, and uses phrases like "in Beijing and surrounding area, more than 20 million people would have to be evacuated."

He just forgets to say that such a 20 foot increase is very unlikely to occur in neither this, nor the next, nor the following century. According to the latest IPCC scientific report, sea-levels are projected to increase by 18-59 cm this century (about 1 foot, give or take), depending on the scenario. Assuming, without any scientific evidence so far[145], that the sea-level rises would accelerate greatly in the coming centuries, the 20 foot increase may be experienced as soon as the year 2300. Or it may not[146].

Anyway, I will make sure to let my great-great-great-great-great-great-great grand-children know that they maybe should think about selling the summerhouse near the beach that my father built, because by the time they have great-great-great-great-great-great grand-children themselves, the house may be *at* the beach. "Evacuation" is not exactly the word I would use for this process.

Figure 2: Simulated temperature variations in La Paz with and without Global Warming, now – 2050



Al Gore also talks a great deal about natural disasters, which are expected to be amplified by climate change. He mentions that in 2005 there were so many hurricanes that for the first time in history, we ran out of letters in the alphabet and had to start using Greek letters to name the last hurricanes of the season. He writes that "Hurricane Wilma was the strongest hurricane ever measured. It traveled back eastward from Mexico's Yucatan Peninsula to southern Florida causing massive damage and leaving thousands without water or electricity for weeks."

I feel sorry for the people who were adversely affected, of course, but what about the 3 billion people in the rest of the World who have never had electricity at all? Or the 1.1 billion who never have gotten piped water installed in their houses? Their problems seem to be on a completely different scale.

For the record, I am not part of any oil company disinformation campaign. Actually, I pretty much accept the scientists' explanation of what is going on and what is likely to happen with the climate during the next century (especially the low-end projections), but it is a mighty big leap from there to "it is our ability to live on planet Earth – to have a future as a civilization – that is at stake."

Statements like "The world has less than a decade to change course. No issue merits more urgent attention –or more immediate action"[147] seem not only to be scientifically unsubstantiated, but also to ignore the fact that we right now have at least a billion very poor people living in conditions that we would not want for our own descendants, whereas our descendants are likely to be unimaginably rich.

If the World economy keeps growing at the rate it has done the last 28 years (with global warming and all), then the average person would be more than 500 times richer (in real terms) in the year 2300 than now. Thus, instead of a dollar per day, the poverty line might be $500 per day, and the average reader of this newsletter might easily earn more than a million dollars per month.

This is just a conservative estimate, because the global real per capita income growth rate has actually been consistently increasing during the last millennium. So, even if it is difficult to imagine, your descendants in the year 2300 may be earning a million dollar per week, and even a million dollar per day would not be uncommon.

Any policy that weighs the interests of the unimaginably rich people of year 2300 higher than the desperately poor of year 2008 would be a very odd policy and should be hard to defend.

Reducing vulnerability to climate change: Mitigation, development or migration

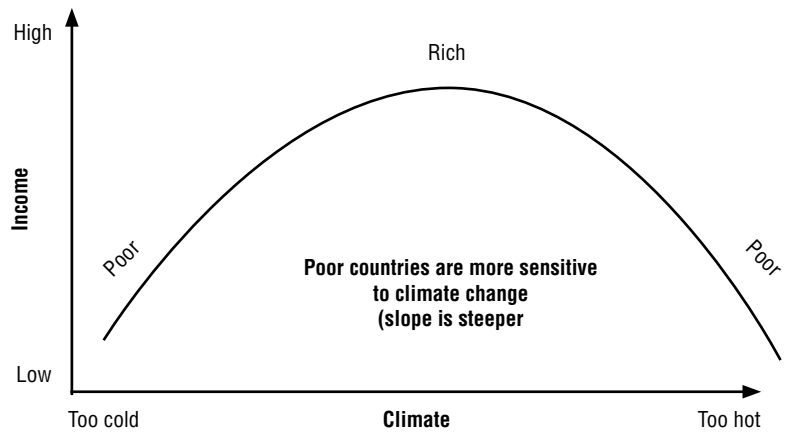
28 July 2008

Most humans have a preference for temperatures around 20ºC. If the climate is hotter, they use air-conditioners to bring down the temperature, and if it is colder, they use heating systems to increase the temperature.

Except the poor, who cannot afford air-conditioners and heating systems. They just have to accept the climate as it is and accept the resulting inconveniences in terms of increased mortality and decreased productivity. Especially if they are too poor to move to a place with a better climate.

If temperate climates are more conducive to human development than either too cold or too hot climates, then the relationship between temperature and development must look something like the following:

Figure 1: Theoretical relationship between temperature and development



Given this relationship, rich countries/persons are relatively insensitive to climate change (the slope of the temperature-development curve at the maximum is flat) while the poor are very sensitive to climate change (the slopes at the extremes are steep).

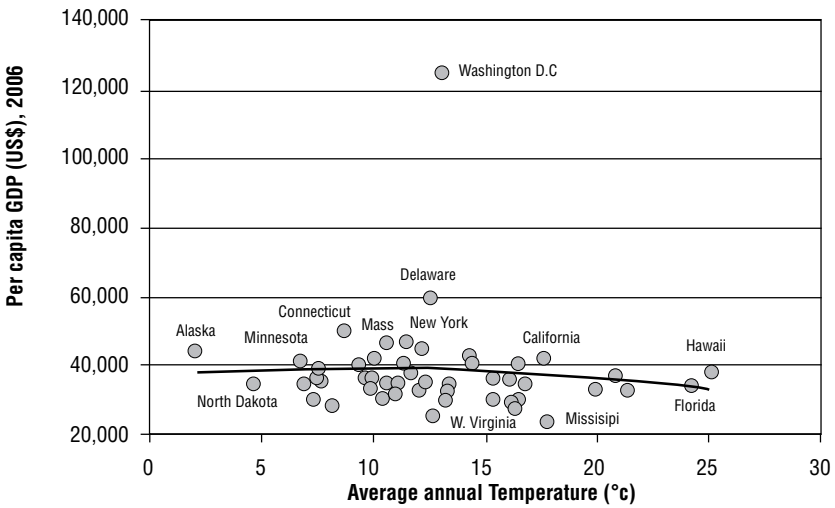
In this framework, there are three basic ways to reduce poor people's vulnerability to climate change:

1) You can try to prevent climate change,
2) You can help people move to regions with more suitable climates, or
3) You can help people in cold and hot climates increase their incomes, so that they can buy air-conditioners, heating systems, mosquito nets and other things that would help them deal with sub-optimal climates. You can also help them become better educated so that they can engage in economic activities that are less climate sensitive than agriculture. This essentially means flattening the curve so that nobody will be very sensitive to climate change (and nobody will be very poor).

Reducing the sensitivity to climate change even at extreme climates is possible as evidenced by the success of many countries or cities located in very adverse climates. Las Vegas, Dubai and Qatar, for example, are all doing great despite hot desert climates, while Alaska, Canada, Finland, and Norway are all doing considerably better than you would have thought possible given their icy cold, dark winters.

The US has almost completely flattened its relationship between temperature and income across states (see Figure 2). Although the extremely high levels of incomes in Washington D.C. do pull up the average for mid-range temperatures, both the coldest state (Alaska) and the warmest (Hawaii) belong to the wealthiest half of all states (see Figure 2).

Figure 2: Empirical relationship between temperature and income in the US, by state



Source: Author's elaboration based on data from www.worldclimate.org and www.wikipedia.org.

Thus, climate is clearly not destiny.

Of the three options for reducing vulnerability to climate change, two can be applied at the individual level. Option number 1 is clearly not feasible, as no individual can control the climate. Option number 2 works well if you live in a big country with large variations in climate (if you get tired of the climate in Chicago, you can move to Florida), but if you live in a small country that is invariably hot, then the restrictions on international migration sometimes make it difficult to employ this option. At the individual level, option number 3 involves actions to reduce your vulnerability to climatic extremes. For example, acquiring education to avoid working the land in the hot sun, building your house with attention to the climate, installing a shower so that you don't have to bathe in a mosquito infested pond, etc.

Option number 1 is only possible at the collective level as it would require a tremendous concerted global effort. I seriously doubt it is at all possible, however. The climate has always changed and will always change, no matter what we do. We may be able to nudge the climate in one direction or the other, but then some natural event (like a volcanic eruption, a change in solar activity, or even a supernova thousands of light-years away) will come along and push us away from the "normal" level that we fought so hard to reach.

At the collective level, option number 3 is called development (or development aid, depending on your perspective) and it has been practiced with varying degrees of success ranging from spectacular to disappointing. In cases of rapid development (like much of Asia), this is a very effective mechanism for reducing people's vulnerability to climate change.

In places where development has proven elusive despite the best of efforts, something else is necessary. We are here talking mostly about sub-Saharan Africa, but could also include the Bolivian Altiplano. In these places the climates are so far from optimal that just maintaining the present climate would do little in terms of reducing climate stress. We can keep trying option 3 until we either find a way that works or finally conclude that sustained development in these areas is impossible.

Alternatively, we can resort to option 2: Help people move away from places where they seem to be doomed to poverty and misery no matter how the global climate changes. This is not that difficult and the process wouldn't have to be rushed. Mostly it would just require refraining from obstructing these people's voluntary attempts to move. Certainly this option seems more feasible than controlling the planet's climate.

Still, development would be my first choice as a mechanism of reducing vulnerability to climate change because it has so many positive side-effects apart from reducing climate sensitivity.

Climate alarmists versus science

11 August 2008

It is not easy to be worried about average temperature increases of a few degrees over the rest of your life if the temperatures you experience change ten times as much every single day.

Consequently, much of the concern around global warming is focused on associated effects such as the melting of glaciers, sea-level rise, floods, droughts, hurricanes, an increase in the frequency and severity of the El Niño – Southern Oscillation (ENSO) and possible abrupt climate changes such as the shut-down of the thermohaline circulation (MOC) which brings warm waters and mild climates to northern Europe.

The supposed simultaneous increase in floods and droughts has always seemed a bit illogical to me, but the melting of glaciers and the resulting increase in sea-levels seem obvious, and since hurricanes form over warm waters, an increase in those might also be suspected. Since El Niño events are associated with unusually warm waters in the east Pacific ocean, these might also increase in either frequency or intensity, whereas one might suspect less La Niña events (cooling of the east Pacific). Finally, the MOC is driven partly by salinity and temperature differentials, so it is conceivable that a large release of cold freshwater (from melting Greenland ice, for example) could interfere with the functioning of the MOC.

But what do climate scientists have to say about the likelihood, extent and timing of these expected events?

The Fourth Assessment Report (AR4) from the Intergovernmental Panel on Climate Change (IPCC) published last year provides a comprehensive overview of peer-reviewed scientific research on the topic and summarizes the results in a language that is pretty much understandable to non-climate scientists[148]. Chapter 10 from Working Group 1 is titled "Global Climate Projections" and is therefore a central chapter if you want to know what to expect for the rest of the century in terms of climate.

Here are a few interesting excerpts from the Executive Summary of Chapter 10:

"General Circulation Models indicate that the Antarctic Ice Sheet will receive increased snowfall without experiencing substantial surface melting, thus gaining mass and contributing negatively to sea level." (p. 751)

"Most recent published modelling studies investigating tropical storm frequency simulate a decrease in the overall number of storms." (p. 751)

"Model projections show fewer mid-latitude storms averaged over each hemisphere." (p. 751)

"There is no consistent indication at this time of discernible changes in projected ENSO amplitude or frequency in the 21st century." (p. 751)

"It is *very unlikely* that the MOC will undergo a large abrupt transition during the course of the 21st century." (p. 752)

Contrast that to Al Gore's statement in his 2006 book *An Inconvenient Truth*: "Our ability to live is what is at stake." Or James Lovelock in the Daily Telegraph in 2006: "Billions will die…Human civilization will be reduced to a broken rabble ruled by brutal warlords, and the plague-ridden remainder of the species will flee the cracked and broken earth to the Arctic, the last temperate spot, where a few breeding couples will survive."

One can't help wondering if they are even talking about the same planet.

NASA still reluctant to admit that the Sun might affect Earth's climate

29 September 2008

Last week, NASA held a conference on solar activity showing the results of Ulysses' third and last orbit around the sun[149]. "The sun cycles between periods of great activity and lesser activity. Right now, we are in a period of minimal activity that has stretched on longer than anyone anticipated," explained Ed Smith, NASA's Ulysses project scientist at the Jet Propulsion Laboratory in Pasadena, California. "When the results of the third scan were compared with observations from the previous solar cycle, the strength of the solar wind pressure and the magnetic field embedded in the solar wind were found to have decreased by 20 percent. The field strength near the spacecraft has decreased by 36 percent."

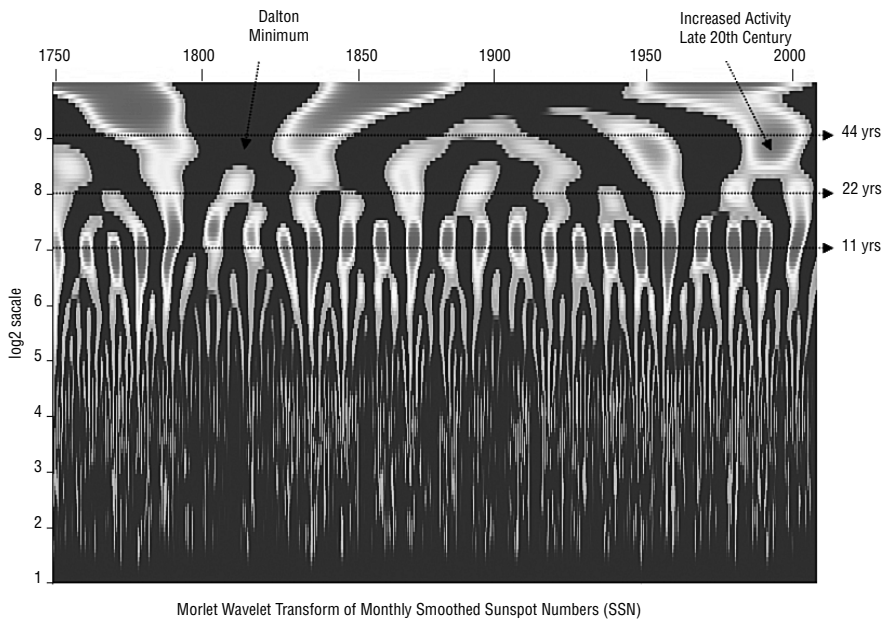
As someone trained at finding patterns in data (and trained at recognizing when patterns are spurious), I couldn't help wondering if the sun's current low level of activity might help explain the sharp drop in global temperatures over the last year. And whether the exceptionally strong solar activity during the last decades of the previous century[150] might have had something to do with the sharp increases in global temperatures during those decades.

Of course I am not the first to suspect that variations in the sun's activity might have an influence on our planet's climate. Already in 1878, the English economist William Stanley Evans suggested that the sunspot cycle influenced the business cycle through its effect on crop productivity[151]. As more information accumulated and the technical methods of the analysis of cyclical data improved, people started testing the relationships between sunspots, Earth's climate and economic activity on Earth. In 1934, Carlos Garcia-Mata and Felix I Shaffer published a long article in *The Quarterly Journal of Economics* on "Solar and Economic Relationships"[152].

Figure 1 shows the sunspot series from 1750 to 2008 subjected to one of those fancy technical methods, the Morley Wavelet Transform. Time is read on the horizontal axis (on top) and frequency is read at the vertical axis (2^x months) with cycles of 11, 22 and 44 years highlighted. Sunspot intensity is indicated by colors, with red being high intensity and blue low intensity. The well-known 11 year sunspot cycle is very clear. There is also a strong cycle of about 85 years (2^{10} months), and some weaker cycles in between.

Sunspot cycles are counted at the 11 year frequency. The last cycle is Cycle 23, which is noticeably weaker than the previous 5 cycles. Currently we are at a low point of solar activity as indicated by everything being blue from top to bottom. This has only happened once before, just before the Dalton Minimum in the beginning of the 19th century.

Figure 1: A Morlet Wavelet Transform of Smoothed Sunspot Numbers

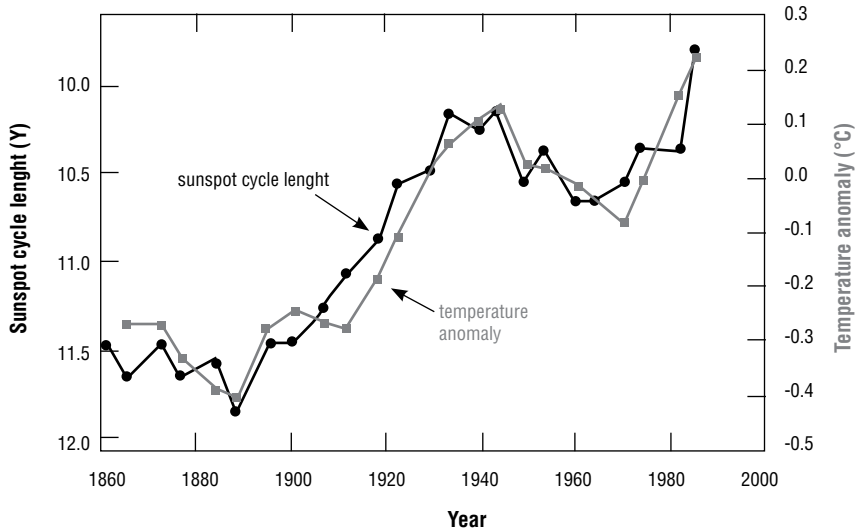


Source: http://wattsupwiththat.files.wordpress.com/2008/09/wavelet_ssn.png

Sunspot cycles are not entirely regular, but vary in length between 10 and 12 years, depending on the sun's activity level. When the sun is very active (strong magnetic field), the cycles get shorter and when the sun is relatively quiet, they get longer.

A 1991 *Science* paper by Friis-Christensen and Lassen showed that there is a close inverse relationship between sunspot cycle length and Northern Hemisphere land temperatures over the 1860-1985 period[153]. See Figure 2.

Figure 2: Sunspot cycle length and temperature on Earth



Source: http://www.sciencemag.org/cgi/content/abstract/254/5032/698.

Until recently, nobody really understood how the sunspot cycle could affect climate on Earth, since the direct effects of variations in irradiance are clearly too small to drive climate variations on Earth.

However, in 2007, the Danish physicist Henrik Svensmark, together with science writer Nigel Calder, published "**The Chilling Stars: A New Theory of Climate Change"**, which puts forth a theory which does explain the links. Basically, when the sun is very active, its magnetic field is strong, which helps shield the Earth from cosmic rays. Cosmic rays are central to cloud formation on Earth, so when the sun is active, there are fewer clouds. Since clouds have a net cooling effect on Earth's climate, fewer clouds will imply higher temperatures.

The theory corresponds very well to observation, with cool periods coinciding with periods of low solar activity and more cloud cover. It also explains events that the theory on CO_2-induced global warming has trouble explaining, such as the cooling period from 1945 to 1970, and the cooling of Antarctica amidst general warming.

The theory is understandably unpopular among the Anthropogenic Global Warming (AGW) crowd, as it leaves little room for a CO_2 effect on global temperatures.

My guess is that if you put together the two theories (Svensmark and AGW), you will be able to model climate much more accurately than if you rely on just one of them, and the predictions of the combined model would be much less dramatic future warming than current IPCC models suggest.

Tipping Points

20 October 2008

A Tipping Point is the moment when an idea, trend or social behavior crosses a threshold, tips, and spreads like wildfire - the point where something previously rare suddenly becomes common[154]. Fashion is an obvious example, where certain styles and patterns are virtually unseen for decades, and then suddenly boom for a couple of years, after which they fade back into negligence. In many ways, the rise and fall of ideas resembles the rise and fall of epidemics.

This article will focus on the rise and fall (and rise and fall) of climate change concerns.

During the last 100 years, we have experienced four rounds of significant climate change. In 1912, when Titanic struck an iceberg and sunk, the New York Times reported that "Prof. Schmidt Warns Us of an Encroaching Ice Age." Los Angeles Times the same year: "Fifth ice age is on the way. Human race will have to fight for its existence against cold." Global temperatures were indeed unusually cold during the first decades of the previous century, and ice age warnings regularly popped up in the media: Los Angeles Times, 1923: "The possibility of another Ice Age already having started… is admitted by men of first rank in the scientific world, men specially qualified to speak." Chicago Tribune, 1923: "Scientist says Arctic ice will wipe out Canada."

But then temperatures started increasing for a while, and the media started warning about warming instead. Los Angeles Times, 1929: "Most geologists think the world is growing warmer, and that it will continue to get warmer." New York Times, 1933 "America in Longest Warm Spell since 1776. Temperature line records a 25-year rise." In 1938, British amateur meteorologist G. S. Callendar made the now familiar claim, in the Quarterly Journal of the Royal Meteorological Society, that man was responsible for heating up the planet with carbon dioxide emissions.

Before the media grew frantic, however, temperatures started falling again. Although average temperatures fell by less than half a degree Celsius, both scientists and media found sufficient reason for doomsday warnings. New York times, 1974: "the facts of the present climate change are such that the most optimistic experts would assign near certainty to major crop failure in a decade," If policy makers did not take immediate action "mass deaths by starvation and probably in anarchy and violence" would result. Newsweek, 1975: "There are ominous signs that the earth's weather patterns

have begun to change dramatically and that these changes may portend a drastic decline in food production -- with serious political implications for just about every nation on earth." Nigel Calder, 1975: "The threat of a new ice age must now stand alongside nuclear war as a likely source of wholesale death and misery for mankind." Lowell Ponte, 1976: "The cooling has already killed hundreds of thousands of people in poor nations." If proper measures weren't taken, then the cooling would lead to "world famine, world chaos, and probably world war, and this could all come by the year 2000."

But by that time temperatures had already started increasing again and during the last couple of decades global warming has replaced the media's ice age claims. I don't remember the earlier episodes of climate change concerns, but this time around the concerns seem to have reached much farther and deeper than before. After the release of Al Gore's movie "An Inconvenient Truth" in 2006 and the publication of the Fourth Assessment Report of the IPCC in 2007, the worries about catastrophic man-made global warming had become almost universal. The fact that the topic of the 2007 United Nations Human Development Report was Global Warming and the theme of the 2010 World Bank Global Development Report will be on Development in a Changing Climate suggests that this issue is of highest concern worldwide.

I suspect, however, that we will soon see a tipping point again. Global temperatures seem to have peaked in 1998 and, according to all four principal centers of global temperature measurements, global temperatures have fallen substantially lately. The Hadley Climate Research Unit in the UK showed a 0.60ºC drop in temperatures between January 2007 and January 2008; NASAs Goddard Institute for Space Studies showed a fall of 0.75ºC during the same period; University of Alabama, Huntsville a drop of 0.59ºC; and Remote Sensing Systems of Santa Rosa, CA a drop of .63ºC[155]. It is worth pointing out that a drop of 0.6ºC corresponds approximately to the accumulated warming over the last 140 years[156]. Also, according to satellite measurements, global sea levels have been falling since 2006, ending the trend of steady increase since satellite measurements began. Arctic sea-ice cover has started growing again, with ice cover now being about 25% larger than same time last year[157].

Anecdotal evidence of unusually cold weather around the world is also piling up. In February 2007, Kathmandu experienced its first snowfall in 60 years[158]. In June 2007, Johannesburg got its first snow cover since 1981[159], and in October 2007 we got snow in my garden in the south zone of La

Paz for the first time in the lives of my children. They made snow angels and claimed it was the best day of their lives (it only lasted until about 9 am, though). In January 2008, Baghdad received its first snowfall in recent memory[160], and Thailand experienced its first snowfall ever in March of 2008[161].

We are probably not quite ready for a major global cooling scare yet, but I think the Global Warming scare is likely to go out of fashion soon. Too bad, because it made for some spectacular consulting contracts. Maybe we can keep running computer simulations and ignore the real data for a couple of years more?

The World is cooling so the WWF is turning the heat on

27 October 2008

Last week, WWF came out with an alarming report "**Climate Change: Faster, Stronger, Sooner**: **An overview of the climate science published since the UN IPCC Fourth Assessment Report**"[162] suggesting that Global warming is accelerating beyond IPCC's forecasts.

That is a really impressive accomplishment at a time where everything points to the Earth being several years into a cooling cycle[163], probably related to the Sun having suddenly changed from unusually active to unusually quiet[164] and the Pacific Decadal Oscillation having turned into its negative mode[165].

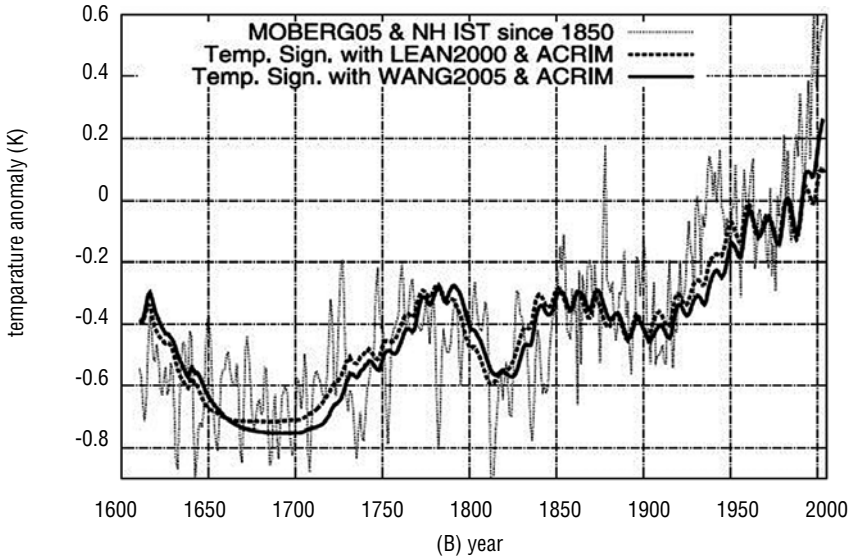
Recent climatic developments notwithstanding, it is theoretically possible that the new research that has come out since the latest IPCC report would suggest that IPCC's model parameters should be adjusted, and that such adjustments would lead to faster, stronger and sooner warming.

Only by doing a very selective review, however, could you come to such a conclusion. It is quite easy to do a review which would lead to the opposite conclusion: that warming is going to be weaker and slower and be delayed for several decades compared to IPCC forecasts.

This is no place to do a thorough IPCC-like review of the scientific literature, but we do have space to review a few recent peer-reviewed scientific articles, which would definitely lead to adjustments in the opposite direction of what the WWF report indicates.

One important group of papers suggests that the effect of solar activity is underestimated in the 2007 IPCC models. For example, a 2007 paper in the *Journal of Geophysical Research* by Scafetta and West[166] finds a very strong correlation between solar activity and temperature over the last 400 years (see Figure 1 below). According to their data sets, the Sun would have explained 42% (+/-20%) of warming since 1950, whereas the IPCC found that the Sun has contributed virtually nothing to the warming since 1950. The paper ends with the following conclusion: "If we assume that the latest temperature and TSI secular reconstructions, WANG2005 and MOBERG05, are accurate, we are forced to conclude that solar changes significantly alter climate and that the climate system responds relatively slowly to such changes with a time constant between 6 and 12 years. This would suggest that the large-scale computer models of climate could be significantly improved by adding additional Sun-climate coupling mechanisms."

Figure 1: Solar activity (WANG2005) and Global Temperature Anomalies (MOBERG2005)



Source: Scafetta and West (2007).

There is still room for CO_2 to have an effect on temperatures, but the effect is clearly not as large as if one assumes that the Sun has had only a negligible effect on Global temperature changes since 1950.

Another paper by Schwarz in the same journal[167] also suggests that the currently used climate sensitivity parameter (how much warming would a doubling of CO_2 cause) is overestimated. His estimations suggest that a doubling of CO_2 would cause the average global temperature to increase by 1.1 +/- 0.5K, which is much smaller than what the IPCC models currently operate with (about 3K).

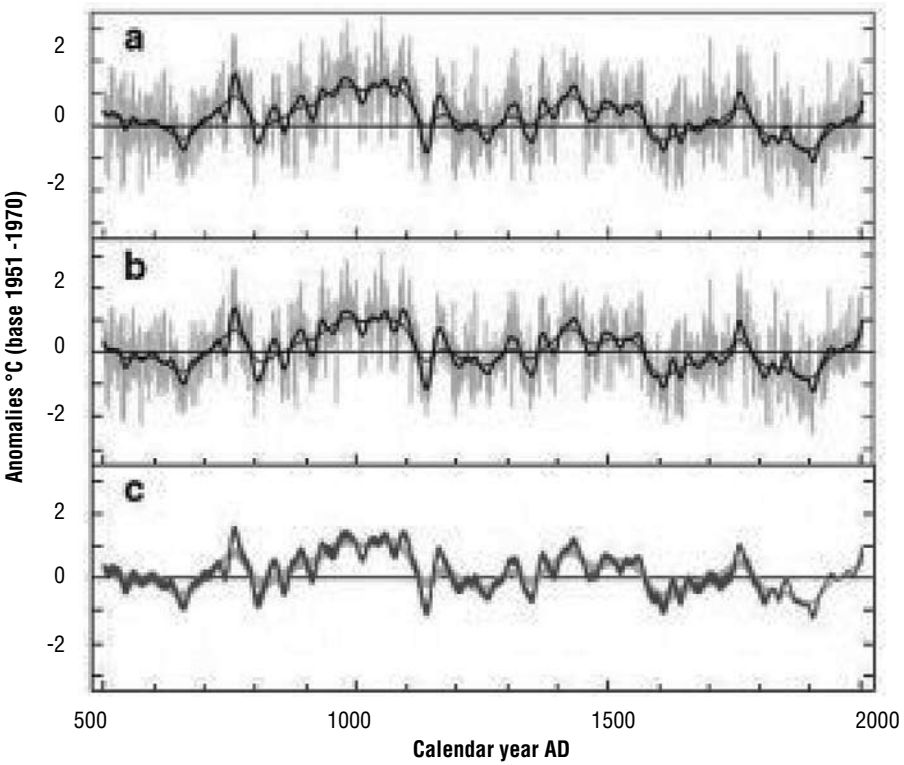
Another group of papers attack the temperature records that underlie all analysis and models. McKitrick (2008), for example, finds that when properly excluding effects from local land surface modification, the estimated 1980-2002 global average temperature trend over land is reduced by about half[168].

The discussion about the quality of temperature measurements turns even more animated for the longer temperature reconstructions based on proxies and the question of how warm the Medieval Warm Period was (important if you want to claim that current warming is unprecedented). A very recent paper by Craig Loehle in Journal of Climate Change[169] suggests

that trees show a non-linear growth response to temperatures and that the assumption of linearity (as applied in Mann's hockey-stick) will create a cold-bias in past temperature reconstructions.

Grudd (2008) reconstructs arctic temperatures based on a modern tree-ring analysis from Torneträsk in the northern part of Sweden (within the Arctic Circle).[170] Here is the key estimated temperature anomaly series from year 500 to 2004 AD:

Figure 2: Reconstructed summer (April–August) temperature for the period AD 500–2004



Panel "a" shows the reconstruction from ring widths exclusively. Panel "b" shows the "multi-proxy" reconstruction from widths and densities. Both series are expressed as anomalies (in °C) from their 1951–1970 mean. The annual data (grey) has been filtered to emphasize climatic variability on 30- and 100-year timescales (black curves). Panel "c" shows the difference on multi-decadal (dark grey) and centennial (light grey) timescales between the two reconstructions (expressed as an in-between fill of the curves), with the "multiproxy" reconstruction showing on average 0.2°C lower temperature estimates.
Source: Grudd (2008).

Here is an excerpt from the paper: "The late-twentieth century is not exceptionally warm in the new Torneträsk record: On decadal-to-century timescales, periods around AD 750, 1000, 1400, and 1750 were all equally warm, or warmer. The warmest summers in this new reconstruction occur in a 200-year period centered on AD 1000. A 'Medieval Warm Period' is supported by other paleoclimate evidence from northern Fennoscandia, although the new tree-ring evidence from Tornetraäsk suggests that this period was much warmer than previously recognised." "The new Torneträsk summer temperature reconstruction shows a trend of -0.3°C over the last 1,500 years."

So, while arctic temperatures have indeed increased during the last century, there doesn't seem to be anything unusual about this warming. The increase looks a lot like the increase that took place about year 650-750 AD. If you base your climate sensitivity estimation only on the last 100 years (or on the now debunked hockey-stick proxy[171]), you would get a high parameter, but if you use new and more credible proxies for the last 1600 years, you would find little relationship between CO_2 concentrations and Global temperatures.

Nobody knows how long the current cooling cycle is going to last (some say 30 years), but if it lasts just a few more years, then computer models definitely would have to be revised in order to fix the increasing discrepancy between predictions and actual climate. For the purpose of improving climate models, another 10 years of cooling would definitely be a good thing.

"Hi Lykke, Just wondering why you dedicate so many articles on debunking this global warming "myth"? In any case, wouldn't the collateral benefits of this (i.e. more pressure on states and companies to reduce CO_2, more global conscience about our ecosystems, etc) be better than just accepting that the planet is not getting warmer anymore?"
Percy Prieto, La Paz

Does the World benefit from being deceived?

3 November 2008

> "A good lie will have travelled half way around the world
> while the truth is putting on her boots"
> *Mark Twain*

As regular readers of this newsletter will have discovered, I believe the threat of Climate Change is being vastly exaggerated not only by the media and certain individuals, but also by big international institutions, such as the United Nations and WWF.

One might defend such exaggeration if one believes that it would benefit the World if people get scared into taking some actions that they would not otherwise take. For many people, the fight against Global Warming is a symbol of a broader and higher objective: promoting environmental awareness, sustainability and fairness instead of greed, pollution, environmental destruction and ever increasing consumption. One might argue that these noble causes justify misleading the population.

I don't think deception is a good strategy, even if it is done for noble reasons.

First of all, wild exaggerations are likely to backfire and bite you in the end, as your exaggerated claims will be easier to prove wrong. For example, it won't take much more data generation and scientific research to prove that a 4ºC increase in global temperatures this century is extremely unlikely, whereas a 1ºC increase really can't be ruled out until very close to year 2100. A sea-level rise of 20 feet this century has already been ruled out, whereas a 1-2 feet increase will remain plausible for a long time. By exaggerating, you make yourself vulnerable to being proven wrong faster and thus to losing credibility and effectiveness in promoting your objectives.

Second, exaggerating a distant, uncertain threat seems to be a very inefficient way of promoting your higher goals. We all want clean water to drink, pure air to breathe, healthy food to eat, spectacular natural areas to visit, world peace, and less disease and suffering, but caps on carbon emissions sure seem like a very roundabout way of achieving those objectives (or any other objectives you might have, except for making money from carbon trading). There may be some positive side-effects of the policies implemented to fight climate change, but one would expect considerably better results if the money was spent directly targeting a well-specified set of goals through well-understood relationships between cause and effect.

The current approach is a bit like shooting wildly in the dark with a machine gun in the hope of hitting a target, instead of turning on the light, aiming, and shooting a few carefully selected targets and avoid hitting innocent bystanders in the process.

Third, scaring people and institutions into taking certain actions will necessarily divert attention and money away from other actions, which might be more worthwhile. It is often claimed that the poor will suffer most from climate change, so for the sake of world justice we have to limit carbon emissions. However, there are certainly more direct and immediate ways of benefitting the poor. It seems unethical to trick governments into spending incredible amounts of money on fighting a distant, uncertain threat when there are huge, immediate problems that could be tackled instead. It seems particularly unethical if you claim to do it for the benefit of the poor.

Good policies and good actions require a good understanding of causes, effects and side-effects. At the moment, our understanding of how we affect the climate and how the climate affects us is extremely limited, and the best thing that can be said about the Global Warming hype is that it has prompted a lot of interesting research. A lot more is still needed for us to be able to implement good policies, so postulating that "the debate is over" and that there is a "scientific consensus" is both counterproductive and deceptive.

Hollywood and Greenpeace are allowed to lie and exaggerate all they want.

That is anticipated by the audience and easily compensated for in people's minds. But scientists, Nobel Prize Laureates and international development institutions ought to be more responsible and live up to the trust that society has placed with them.

How we know what isn't so

2 February 2009

"I will see it when I believe it"
Slip of the tongue by Thane Pittman

Almost 20 years ago Thomas Gilovich wrote a very interesting book about the "Fallibility of Human Reason in Everyday Life" explaining some of the mechanisms through which we tend to deceive ourselves and each other.

In this article I will use some of his insights to analyze the Anthropogenic Global Warming (AGW) theory. Our collective beliefs on this topic have so important consequences that we cannot allow ourselves to be deceived. If human carbon emissions are really overheating the globe, the costs of not believing this and not acting accordingly could be catastrophic. Likewise, if carbon emissions have little or no impact on climate, but we are convinced that they do and thus impose draconian measures to reduce energy consumption, we could unnecessarily keep millions of people in poverty for decades. Personally, I wouldn't want to be wrong in either direction.

Both this winter and the last have been unusually cold in many parts of the globe, with many cold records and snow records being recorded[172]. However, it would be incorrect to conclude that the AGW theory is wrong just because a few years of data are not cooperating with the theory. Likewise, it would be erroneous to consider any heat record and extreme weather event as proof of AGW. According to Gilovich, one of our main fallacies is our tendency to conclude "too much from too little" or, in other words, "misinterpreting incomplete and unrepresentative data."

A prime example of "concluding too much from too little" is Michael Mann's[173] conclusion of unprecedented warming in the late 20th century based on a flawed principal component analysis of unrepresentative tree ring data. Basically, the algorithm used would mine the data for series with a hockey-stick shape and give almost all the weight to these series in the final temperature reconstruction. If the algorithm was fed random numbers, it would have generated a hockey-stick in 99% of the cases. As it happens, there were a few bristlecone pine series in California which showed an upward trend towards the end of the period and these were enough to generate the famous hockey-stick, even though the scientists who originally created and analyzed this data warned that they could not be used as climate proxies. Without those Californian bristlecone series, the hockey-stick graph cannot

be generated, and anyway, it would be wrong to suggest global warming if the only evidence of it comes from an unusual stand of bristlecone pines in California while tree rings from the rest of the World do not suggest a hockey-stick shape[174]. It is perhaps even worse that the IPCC singled out this flawed study to support the AGW theory, despite countless other studies of tree-rings, ice-cores and ocean sediments indicating that late 20th century warming was not unusual in a historical perspective[175].

Even with overwhelming statistical evidence against the AGW theory, a very large share of the World population has come to believe it. Gilovich discusses three "Motivational and Social Determinants of Questionable Beliefs." The first is "Seeing What We Want to See," which is a well-established psychological mechanism. In the case of AGW it is quite easy to understand why researchers would tend to focus on the bits of evidence in favor of AGW and ignore the majority of evidence against it, because both publication and funding opportunities have favored positive evidence. The media has also been biased in this direction since catastrophic climate change sells much better than just normal climate variability. The second motivational and social determinant explains why the public at large has also come to believe it, even if they have no clear reason for wanting to see AGW evidence. This mechanism is "Believing What We Are Told." If both scientists and media repeatedly tell us AGW is true, then we would naturally come to believe in it.

The third motivational and social mechanism is "The Imagined Agreement of Others" or the "False Consensus Effect," which has been exploited to the fullest by proponents of the AGW theory. They have repeatedly claimed that there is now a scientific consensus in favor of the AGW theory, that only a handful of scientists dissent from this view, and they have compared skeptics to holocaust deniers, heretics, or worse, who should be prosecuted for crimes on humankind[176]. However, even if it is risky to be a skeptic, more than 650 scientists (many of them former IPCC contributors) have now come forward publicly to say that they do not believe in the AGW theory, demonstrating that the consensus is indeed imaginary[177].

While erroneous beliefs can sometimes be comforting and useful, this does not seem to be the case with the AGW theory. We ought to be much better at objectively analyzing the data and reporting the results, and avoiding falling into all the above-mentioned traps. Gilovich suggests that the way forward is more widespread social science education, as this kind of training teaches us the necessary habits of mind to analyze messy, complex phenomena like the climate and its effects on human development.

The challenge of teaching people to think critically, instead of mindlessly memorizing and repeating imparted information, is a daunting one, and to be honest, I think the AGW theory will have proven itself wrong long before we manage to get people to think clearly and critically.

Climate feedbacks: Positive or negative

2 March 2009

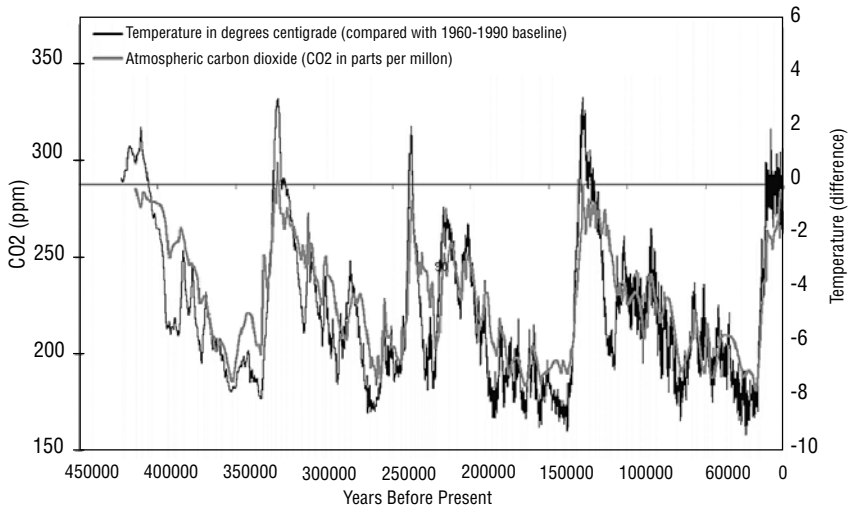
"Lisa, in this house we obey the laws of thermodynamics"
Homer Simpson

By itself, a doubling of CO_2 in the atmosphere has only a modest effect on global temperatures –an increase of around 1°C. Even a quadrupling of CO_2 in the atmosphere would only cause a direct temperature increase of about 2°C[178]. However, this modest increase can be either amplified or reduced depending on the feedback effects.

Some feedback effects are clearly positive. For example, warmer climates cause ice to melt, and the darker surface exposed by melting ice is much less reflective than ice and would therefore tend to absorb more heat, thus amplifying the initial warming.

Another positive feedback effect is related to the solubility of CO_2 in water, which is negatively related to temperature. Thus, when oceans warm, they release CO_2 to the atmosphere, amplifying the initial effect. This is the effect responsible for the close relationship between temperature and CO_2 over the last several hundred thousand years, with changes in CO_2 concentrations lagging behind changes in temperature by a few hundred years (see Figure 1).

Figure 1: Temperature and atmospheric CO_2 over the last 400,000 years as measured from the Vostok ice core



Source: http://www.brighton73.freeserve.co.uk/gw/paleo/400000yrfig.htm

Other feedback effects are negative, however. For example, higher temperatures cause more evaporation and thus more clouds. Clouds have a net cooling effect, which means that they would tend to reduce the initial heating effect.

The whole global warming debate is really a debate about these feedback effects. If, all together, the feedback effects are negative, then the planet will warm less than 1ºC over this century, which is hardly anything to despair about. However, if the net feedback effects are positive, then the planet may get progressively warmer, which would clearly be a cause for concern.

Our theoretical understanding of the feedback effects is very incomplete, which means that we rely on empirical data to calibrate the climate models. So far, most climate models have been calibrated with positive net feedback effects. The Stern Report even includes studies that ten-double the initial effect, thus predicting warming of more than 10ºC during this century.

The ice core data from Figure 1 is useful in evaluating these feedback effects. If they were dramatically positive, as suggested by the Stern Report, then at times of high CO_2, we would expect ever increasing temperatures and ever increasing CO_2 concentrations due to the positive feedbacks from melting ice and CO_2 released from the warming oceans. In fact, every time temperatures reached a bit above the current level, both temperatures and CO_2 levels plunged dramatically, instead of continuing upwards.

Similarly, during cold periods with low CO_2 concentrations, we would expect ever decreasing temperatures due to the positive feedbacks of increasing ice coverage causing higher reflectivity and colder oceans absorbing ever more CO_2, thus further reducing the temperature. But in fact, although the downward trend in both temperatures and CO_2 concentrations has clearly been dominant over the last 400,000 years, the planet has recovered from every single ice age ever experienced, instead of getting progressively colder.

If the net feedback effects were positive, the climate system would be unstable, and we would be heading towards an ever warmer planet or an ever colder planet. But for hundreds of millions of years, the global temperature has always oscillated within a 10ºC range, even during periods when atmospheric CO_2 concentrations were more than 10 times higher than today[179]. This is incredibly strong evidence of a negative feedback effect.

Unless humans have caused the laws of the universe to change lately, I suspect that the net feedback effects are still negative. The average global

temperature may still increase by a couple of degrees before those negative feedback effects really kick in (see Figure 1), but any increase larger than that would be difficult to reconcile with the data.

Bolivia's high CO_2 emissions

16 March 2009

Bolivia is one of the poorest countries in Latin America and the Caribbean (LAC) with average per capita incomes that do not even reach half the regional average ($4140 for Bolivia compared to $9321 for LAC)[180]. Average productivity per person of working age is now exactly the same as it was in 1967[181], despite the substantial advances in education, health, basic services and available technology over the last four decades.

According to the last census, electricity coverage is about 20% in rural areas and 82% in urban areas. This leads to a very low average electricity consumption of only 479 kWh per person per year, compared to 1715 kWh for the whole LAC region[182]. The high level of poverty (60%), together with the very deficient road network, implies that there are only about 5 cars per 100 persons in Bolivia, in comparison to the worldwide average of 16 per 100 persons[183].

This sorry state of affairs suggests that Bolivia probably does not emit much CO_2 to the atmosphere. The data suggests an average of 0.8 t CO_2 per person per year, compared to the regional average of 2.5 t and the average for OECD countries of 13 t per person per year[184].

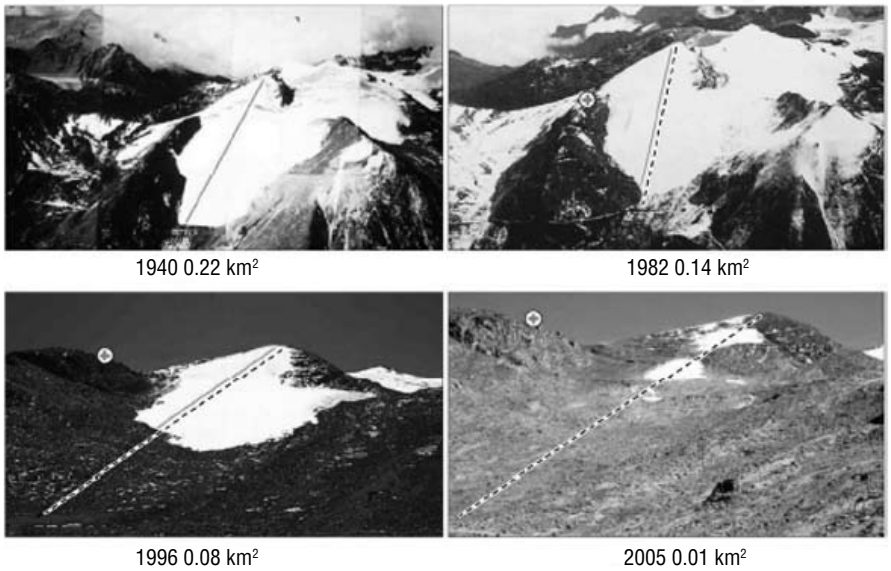
However, this number does not include emissions from deforestation, which amounts to about 110 million tons per year, or about 11 tons per person per year[185]. This means that total CO_2 emissions per capita in Bolivia are quite close to the level of OECD countries.

Reconciling melting glaciers and falling temperatures in the Bolivian highlands

23 March 2009

Bolivia's rapidly diminishing Chacaltaya glacier has been widely used as a symbol of Anthropogenic Global Warming[186]. However, it is an unfortunate choice of symbol, because the retreat of this specific glacier is demonstrably not due to increasing temperatures caused by CO_2 emissions.

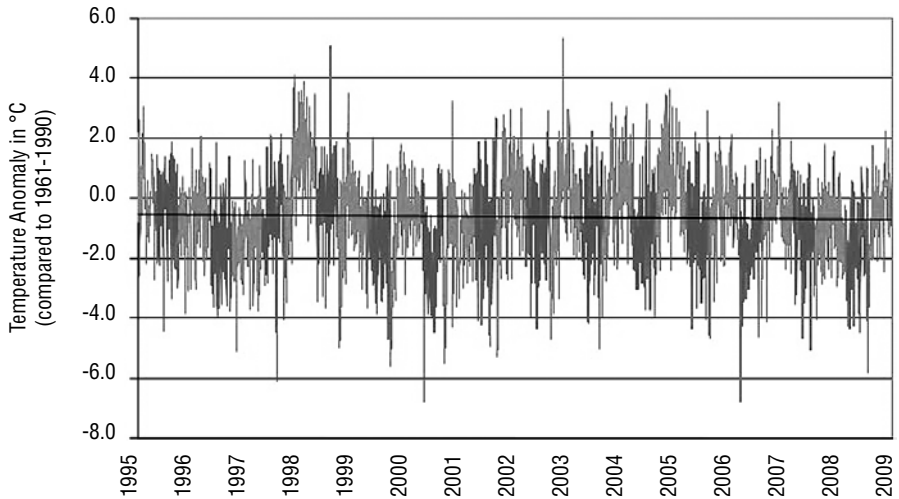
Figure 1: Retreat of the Chacaltaya glacier, Bolivia, 1940 – 2005



Source: IPCC Working Group II Fourth Assessment Report 2007, Figure 1.1.

All long-run monthly temperature series for the Bolivian highlands, including the La Paz/El Alto station, which is located near Chacaltaya, show cooling trends over the last six decades of about -0.2ºC/decade[187]. This is confirmed by more recent daily temperature anomalies from the University of Dayton Daily Temperature Archive since 1995 (see Figure 2). There is a statistically significant negative trend of -0.11ºC/decade since 1/1/1995 (98% confidence). The average anomaly for the 1995-2009 period is -0.6ºC, suggesting that the recent negative trend is a continuation of a longer trend, as suggested by the monthly data.

Figure 2: Daily temperature anomalies for La Paz/El Alto, 1 January 1995 – 12 March 2009



Source: Author's elaboration based on data from the University of Dayton Daily Temperature Archive (http://www.engr.udayton.edu/weather/).
Note: Green is summer temperature anomalies and blue is winter temperature anomalies. The black slightly downward sloping line is the linear trend.

These observed negative temperature trends in the Bolivian highlands beg two questions:

1. How can the falling temperatures in the Bolivian highlands be reconciled with the visibly diminishing glaciers?
2. Why are temperatures falling, when they are supposed to be increasing?

The answers to these questions are quite complex and involve many different factors.

First, it is important to understand that changes in glaciers do not only depend on temperatures, but also on precipitation, cloud cover, relative humidity and the intensity of solar irradiation. And in the case of temperatures, summer temperatures (rainy season) are more important than winter temperatures (dry season), and daytime temperatures are more important than night time temperatures.

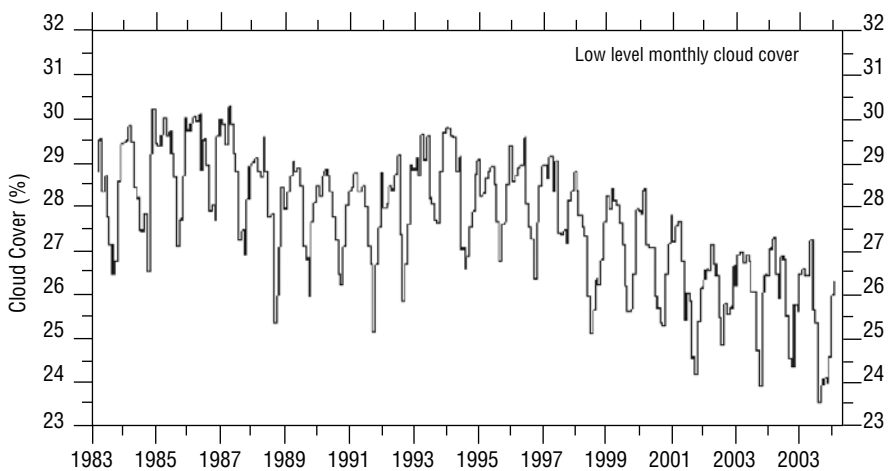
In Figure 2 above, we see that winter temperatures have fallen more strongly than summer temperatures (the average winter anomaly is -0.9ºC while average summer anomaly is -0.4ºC). Since winter is the dry season in this region, colder winter temperatures will have little effect

on the glaciers because temperatures are already well below freezing. In contrast, warmer summer temperatures can have a dramatic effect. It was the unusually hot and dry summer of 1998 (the Mega-El Niño) which caused the permanent closing of the Chacaltaya ski-resort, and the four consecutive warm summers of 2002, 2003, 2004 and 2005 almost completely eliminated the glacier.

A meteorologist from the Hadley Climate Research Centre suggested to me that the likely explanation for the observed decrease in temperatures in the Bolivian highlands is a decrease in low level clouds. With fewer low level clouds, night time temperatures would tend to fall substantially (due to increased outgoing infra-red radiation), which would pull down average temperatures. During the day, fewer clouds would have a positive effect on temperatures, increase solar irradiation reaching the ice, and decrease air humidity and precipitation, all of which would contribute to speed up melting, despite stronger night time cooling.

I could not find specific data on cloud cover in the Bolivian highlands, but worldwide low level cloud cover has clearly decreased since about 1987 (see Figure 3). According to NASA/GISS the decrease is particularly strong in the tropics, including Bolivia[188], so the meteorologist's hunch is likely to be correct.

Figure 3: Global low level cloud cover, 1983-2007



Source: http://www.climate4you.com/. (Look under the topic: "Climate Clouds").

The decrease in cloud cover is related to decreases in precipitation, which have had a large influence on the fate of the Chacaltaya glacier. The increase in the glacier regression rate since the end of the 1970s appears to coincide with the Great Pacific Shift of 1976, after which precipitation has decreased systematically, both according to direct measurements at the La Paz/El Alto station and according to precipitation proxy series generated from ice cores from two other Bolivian glaciers[189].

If the rapid melting of Chacaltaya since the mid 1970s were caused by increasing temperatures due to increased CO_2 in the atmosphere, we would have observed increased night time temperatures, increased average temperatures and increases in cloud cover and precipitation (that is what CO_2 driven climate models would suggest). But instead we have observed decreasing cloud cover, decreasing average temperatures (likely the result of night time temperatures falling more than day time temperatures increased) and decreasing precipitation, all of which conspired to melt the glacier.

The observed evidence from Chacaltaya is thus inconsistent with the Anthropogenic Greenhouse Warming (AGW) theory, or, at least, if there is an AGW signal, it is completely drowned by other climatic changes unrelated to AGW.

It is ironic that the melting Chacaltaya glacier has become such an important symbol of the AGW theory, when in fact the evidence from Chacaltaya seems to refute this theory. (In contrast, the evidence from Chacaltaya is fully consistent with Svensmark's cosmic ray theory[190], but that is another story).

The runaway climate train

8 February 2010

I have been awfully quiet about climate change issues since the "Climate Gate" scandal broke on November 17th 2009. But by now there are several associated issues, such as "Glacier Gate"[191] and "Amazon Gate"[192], and it is time to figure out what it all means.

Climate Gate was the release (by a hacker or an insider) of thousands of e-mails and commented source codes from the Hadley Climate Research Unit (CRU). There is enough fascinating material to write books about it[193], but one of the e-mails that have attracted most attention is one from November 1999 where Phil Jones of CRU wrote to Michael Mann, Raymond Bradley and Malcolm Hughes (the authors of the famous "hockey stick" graph that suggested unprecedented warming during the last century) saying: "*I've just completed Mike's Nature trick of adding in the real temps to each series for the last 20 years (ie from 1981 onwards) and from 1961 for Keith's to hide the decline*." By itself, that could mean anything, but the source code of the related computer program makes abundantly clear that they substitute Keith Briffa's original tree ring temperature proxy with Hadley's instrumental record from 1961 onwards in order to hide the apparent decline in temperatures indicated by the tree-ring data[194].

The general impression that one gets from reading the material is that a small group of generously funded researchers have been torturing the temperature data from all over the globe to get it to show a 0.8ºC increase over the last 150 years, and, amazingly, they (together with Al Gore, IPCC and others) have managed to convince most people that such an increase is unprecedented, caused by human CO_2 emissions, and disastrous for all life on the planet.

One of the other main issues in the climate gate scandal is that the Hadley Climate Research Unit has resisted releasing data and methods, so that other researchers could verify their results. The scientific method in general requires researchers to make their data and methods available for independent replication, and the British Freedom of Information Act specifically requires publicly funded institutions to do so, but the hacked e-mails make clear how the involved climate researchers have resisted and evaded legal and reasonable information requests.

Glacier Gate, on the other hand, is the debunking of the claim in the IPCC's fourth assessment report that Himalayan glaciers are receding faster than in any other part of the world and could "disappear altogether by 2035

if not sooner". This statement has proven to be completely unfounded and one glaciologist, Professor Cogley at Ontario Trent University, believes the IPCC has misread the date in a 1996 report which said the glaciers could melt significantly by 2350. The IPCC has now officially retracted the statement (5), but what makes it particularly embarrassing is that the IPCC chairman had ridiculed Indian scientists who refuted the claim, calling their work "voodoo science"[195].

Amazon Gate is another example of the flimsy evidence on which the IPCC has based its claims of climate calamities. In the Working Group II report of 2007 they state that "up to 40% of the Amazonian forests could react drastically to even a slight reduction in precipitation" on the basis of a non peer-reviewed WWF report whose lead author, Andy Rowell, is a free-lance journalist. If you follow the reference used by WWF, it leads to a 1999 article in *Nature* about the impacts of logging. IPCC could have used that reference, as it is at least peer-reviewed, but the problem may have been that the *Nature*-article mentions nothing at all about climate change[196].

However, by now it doesn't matter much what the evidence shows or does not show. The Climate Change Train is going at full speed and it is difficult to get off. Many institutions, which jumped on the climate change bandwagon before the Copenhagen summit, have committed themselves and their budgets to climate change activities instead of their usual activities and now find it difficult to backtrack.

Bolivia has planned a big Peoples' World Conference on Climate Change and Mother Earth's Rights for April, and I hope this conference will try to assess what are real threats to people and Mother Earth and what are imaginary threats concocted by headline grabbing journalists, researchers trying to get the results their employers wants or bureaucrats trying to secure funds for their institutions. Admittedly, it is difficult to separate the wheat from the chaff in this area, but somebody has to fight for effective solutions to real problems rather than ineffective solutions to imaginary problems.

"Fremragende newsletter du lige har sendt ud."
Helle Eg, Silkeborg, Denmark

"Me parece un análisis tan bueno, que supongo va a levantar cuestionamientos al interior de los responsables de esta "época de cambio", sobre todo por el "summit de abril", pero la verdad es irrefutable, todo se maneja de acuerdo a los intereses de cada ONG ó grupo de poder. Felicitaciones.",
German Calderón, La Paz

Happiness and climate change

28 June 2010

> "The brain and the eye may have a contractual relationship in which the brain has agreed to believe what the eye sees, but in return the eye has agreed to look for what the brain wants."
> *Daniel Gilbert, Professor of Psychology at Harvard University*

Which would you prefer: 1) Winning 100 million dollars in the lottery or 2) becoming paraplegic, impotent and confined to a wheelchair for the rest of your life?

Easy choice, or stupid question, most would respond. But studies actually show that after one year there is no significant difference in happiness between subjects who won the lottery and subjects who became paraplegic. According to Daniel Gilbert of Harvard University, humans have an amazing psychological immune system which helps us adapt to almost everything that happens to us, especially if it is irreversible[197].

Given the documented extreme adaptability of the human brain within just one year and our generally impressive capacity for innovation when needed, you would think that adapting to a slightly warmer climate over generations would pose few problems to our civilization.

So, why do we worry so much about climate change? Why do United Nations, the World Bank and many respectable scientists consider climate change the biggest challenge facing our generation, while others think it is just a storm in a teacup?

One of the reasons for the high degree of polarization is likely the extremely high degree of uncertainty involved in all aspects of climate change, from the physical science, via the economic impacts to the political response. The human brain has a natural tendency to filter the information we receive and play down the evidence that goes against our initial convictions and give more weight to evidence that confirms our position[198]. Thus, when faced with huge amounts of contradicting and flimsy evidence, our brains will gradually trick us into two widely separated camps of climate alarmists and climate skeptics, leaving only the blissfully ignorant with a reasonably accurate perception of the dimensions of the problem.

Good scientists are acutely aware of the danger of unconsciously filtering information and biasing results, and will therefore demonstrate a healthy skepticism and actively try to find contradicting evidence and alternative explanations to any given theory. They will also keep an open mind and

repeatedly examine the basis of their own beliefs and perceptions. Formally trained scientists do not have a monopoly on such critical thinking, but the systematic training they have received in logical thinking does help them suppress the much more common emotional thinking, hopeful thinking, and wishful thinking.

Being aware of the dangers of both self-deception and manipulation from the outside, I know that I can't be sure that my own perceptions are correct, but it does seem to me that climate skeptics generally demonstrate a lot more critical scientific thinking than the alarmist camp. But perhaps the most un-biased and constructive thinking comes from the "don't worry – be happy – camp" which doesn't try to argue either way, but simply thinks that there are bigger and more urgent problems that need fixing first, and that we should focus our efforts and investments on improving human well-being and reducing unnecessary suffering.

Endnotes:

1 See, for example, the aid effectiveness studies of INESAD available online at http://www.inesad.edu.bo/pro_aid.htm.

2 See: Andersen L. E. & Christensen B. J. (2006) "Labor Mobility in Bolivia: On-the-job Search Behavior of Private and Public Sector Employees.", *INESAD Development Research Working Paper No. 01/2006*, Available online at: http://www.inesad.edu.bo/publicaciones_detalle_no11_e.htm.

3 See the book "How to Spend $50 billion to Make the World a Better Place" edited by Bjorn Lomborg and published by Cambridge University Press in 2006.

4 From the Center for Global Development in Washington, D.C. and member of the IPCC Working Group III.

5 World Bank (2005) "Global Economic Outlook 2006" Available online at: http://web.worldbank.org/WBSITE/EXTERNAL/NEWS/0, contentMDK:20725452~pagePK:64257043~piPK:437376~theSitePK:4607,00.html.

6 h/t to Fabian Soria for pointing out the the freeing of the data from the World Bank (http://data.worldbank.org/data-catalog).

7 See www.gapminder.org.

8 Obviously, we can't all win the lottery and we can't all live from stealing from each other. Somebody has to work to generate that wealth.

9 In some places, due to overpopulation, the rural population does not have enough land to be able to live on it. But at least in Bolivia, poor rural children are usually better fed than poor urban children (according to data from the Demographic and Health Survey of 2003).

10 For references, see the Christmas 2007 edition of *The Economist*.

11 Lears, J. F. (1996) 'Quality of Life Index', *International Living*, Vol. 15, p. 1, pp. 9–18.

12 Human Development 2005. United Nations.

13 Veenhoven, R. (1993) **Happiness in Nations: Subjective Appreciation of Life in 56 Nations 1946–1992** (RISBO, Rotterdam).

14 Diener, E. & E. Suh (1997) 'Measuring Quality of Life: Economic, Social and Subjective Indicators.' *Social Indicators Research* 40: 189–216, 1997.

15 www.stress.org/job.htm.

16 www.iadb.org/res.

17 The subjective poverty module of the Mecovi 2003-2004 asks for the minimum amount of income the household would need to get by.

18 See Schwartz' TED talk (http://www.ted.com/index.php/talks/barry_schwartz_on_the_paradox_of_choice.html))
19 NEF (2009) **The Happy Planet Index 2.0**. The New Economics Foundation. (http://www.happyplanetindex.org/public-data/files/happy-planet-index-2-0.pdf).
20 See, for example, the World Values Survey (http://www.worldvaluessurvey.org/) and the ASEP/JDS (http://www.jdsurvey.net/jds/jdsurveyMaps.jsp?Idioma=I&SeccionTexto=0404&NOID=103).
21 See: http://www.jdsurvey.net/jds/jdsurveyMaps.jsp?Idioma=I&SeccionTexto=0404&NOID=103.
22 Zizzo D. J. & Oswald A. (2001) "Are People Willing to Pay to Reduce Others' Incomes".
23 Alesina, Alberto & Di Tella, Rafael & MacCulloch, Robert (2004) "Inequality and happiness: are Europeans and Americans different?" *Journal of Public Economics*, vol. 88(9-10), pp. 2009-2042.
24 See the Social Mobility studies of INESAD available online at www.inesad.edu.bo/pro_mob.htm.
25 See the WIDER World Income Inequality Database (http://www.wider.unu.edu/wiid/wiid.htm).
26 See, for example, Raut, L.K. (1996) "Signalling Equilibrium, Intergenerational Mobility and Long-Run Growth." University of Hawaii-Manoa, Draft, February and Hassler, J., J.V. Rodríguez Mora (1998) "IQ, Social Mobility and Growth." Institute for International Economic Studies, Stockholm University, Seminar Papers No. 635, January.
27 See the UNU-WIDER Inequality Data Base: http://62.237.131.23/wiid/wiid.htm .
28 As estimated by the author from the 2005, 2002, and 2001 MECOVI surveys.
29 In the World's largest inequality data base, the UNU-WIDER Inequality Data Base, all of the 120 Gini coefficients for the US are based on income and none on consumption or expenditure.
30 Krueger, Dirk & Fabrizio Perri (2006) "Does Income Inequality Lead to Consumption Inequality? Evidence and Theory", *Review of Economic Studies*, **73**(1): 163-193.
31 According to the 2003 National Health Survey.
32 Based on results from a counterfactual microsimulation with data from the 2005 MECOVI household survey.
33 Author's calculation based on the 6 latest MECOVI household surveys.
34 Ermicsh, J., M. Francesconi & T. Siedler (2006) "Intergenerational Mobility and Marital Sorting." *The Economic Journal*, 116: 659-679.
35 See Andersen, Lykke E., Alice Brooks & Alejandro F. Mercado "Macroeconomic Policies to Increase Social Mobility and Growth in Bolivia." Development Resaerch Working Paper Series No. 02/2004, Institute for Advanced Development Studies, La Paz, July.
36 With one notable exception: The Danish NGO, IBIS, actually trained and supported Evo Morales, noticing his great potential as a leader for the Indigenous movement.
37 See Andersen, L. E. (2009) "Social Mobility in Bolivia is Finally Improving!" Development Research Working Paper No. 16/2009" Institute for Advanced Development Studies, La Paz, December. The paper was prepared as a thesis for admittance into the Bolivian Academy of Economic Sciences, and presented at the ceremony of incorporation on the 18th of December, 2009 at the Catholic University of Bolivia.

38 See, for example, Andersen (2000) "Social Mobility in Latin America." Institute for Socio-Economic Research, Universidad Católica Boliviana. Working Paper No. 03/2000; Mercado, A. F., L. E. Andersen, O. Nina & M. Medinaceli (2002) "Movilidad Social: Clave para el Desarrollo." Programa de Investigación Estratégica en Bolivia (PIEB) – Instituto de Investigaciones Socio-Económicas (IISEC), Universidad Católica Boliviana, La Paz; Andersen, L. E. (2003) "Social Mobility in Latin America: Links with Adolescent Schooling" in Duryea, S., A. Cox-Edwards & M. Ureta (eds.) Critical Decisions at a Critical Age: Adolescents and Young Adults in Latin America. Washington D.C.: Inter-American Development Bank. Chapter 6, pp. 219-247; Azevedo, V. & C. P. Bouillon (2009) "Social Mobility in Latin America: A Review of Existing Evidence. Inter-American Development Bank, August 2009.

39 Santa Cruz, José G. (2006) "La Educación Superior en el Marco de la Descentralización: Contexto y Perspectivas". Documento de Trabajo 02/2006, Red de Análisis Fiscal, Ministerio de Hacienda, La Paz, Enero.

40 Santa Cruz, José G. (2006) "La Educación Superior en el Marco de la Descentralización: Contexto y Perspectivas". Documento de Trabajo 02/2006, Red de Análisis Fiscal, Ministerio de Hacienda, La Paz, Enero.

41 Santa Cruz, José G. (2006) "La Educación Superior en el Marco de la Descentralización: Contexto y Perspectivas". Documento de Trabajo 02/2006, Red de Análisis Fiscal, Ministerio de Hacienda, La Paz, Enero.

42 Principles of Education Reform (http://www.inesad.edu.bo/mmblog/mm_20060807.htm)

43 It is worth pointing out that the students in Cuba (all from public schools), did substantially better than those depicted in the figure. Indeed they scored an average of 380 out of 400 possible, whereas the best average score for private schools was 314 (Argentina).

44 CEPAL (2002) "Panorama de la Educación en América Latina y sus Principales Desafíos." Presentación de Arturo León en la reunión FNUAP/CEPAL sobre Pobreza y Población, Ciudad de México, 14 y 15 de octubre 2002.

45 Andersen, Lykke E. & Beatriz Muriel (2002) "Cantidad versus Calidad en Educación: Implicaciones para Pobreza" *Revista de Estudios Económicos y Sociales*, No. 1, pp. 11 - 41.

46 See http://www.ntu.edu.sg/home/hblim/passages/animalschool.htm. It is less than one page long and explains what is wrong with virtually every public as well as many private education systems in the World. Here is a link to a Spanish version: "La Escuela de los Animales" (http://sardis.upeu.edu.pe/~alfpa/f05-escuela-animales.htm) if somebody should prefer that.

47 CEPAL (2002) "Panorama de la Educación en América Latina y sus Principales Desafíos." Presentación de Arturo León en la reunión FNUAP/CEPAL sobre Pobreza y Población, Ciudad de México, 14 y 15 de octubre 2002.

48 Albo, Xavier & Amalia Anaya (2004) "Niños alegres, libres, expresivos: La audacia de la educación intercultural bilingüe en Bolivia." Cuadernos de Investigación No. 58, CIPCA & UNICEF, La Paz.

49 See, for example, the "World Population Counter" of Peter Russell (http://www.peterussell.com/Odds/pop.php).

50 "World Education Report", UNESCO, 2000 (http://www.unesco.org/education/information/wer/index.htm).

51 World Development Indicators, 2005.
52 Comparisons based on the 2005 MECOVI household survey.
53 See Andersen, L. E. & B. Muriel (2007) "Informality and Productivity in Bolivia: A Gender Differentiated Empirical Analysis" commissioned by the World Bank (http://www.inesad.edu.bo/publicaciones_detalle_no42_e.htm).
54 According to the World Development Indicators for Bolivia in 2005.
55 See Andersen, L. E. & B. Muriel (2007) "Informality and Productivity in Bolivia: A Gender Differentiated Empirical Analysis" commissioned by the World Bank (http://www.inesad.edu.bo/publicaciones_detalle_no42_e.htm).
56 See Andersen, L. E. & B. Muriel (2007) "Informality and Productivity in Bolivia: A Gender Differentiated Empirical Analysis" commissioned by the World Bank (http://www.inesad.edu.bo/publicaciones_detalle_no42_e.htm).
57 See Andersen, L. E. & B. Muriel (2007) "Informality and Productivity in Bolivia: A Gender Differentiated Empirical Analysis" commissioned by the World Bank (http://www.inesad.edu.bo/publicaciones_detalle_no42_e.htm).
58 International Organization of Migration (www.iom.int).
59 Examples of migrants who have vastly improved the World: Russian born migrant Sergey Brin, by founding Google Inc., has arguably "saved more time for more people than anything else in the world." Scottish born migrant Alexander Fleming, by inventing penicillin, has saved and is still saving millions of lives. German born migrant Albert Einstein, one of the greatest scientist and intellects of all time, renounced his German citizenship at age 17 to avoid military service and became Swiss instead. In 1933, when Hitler became Chancellor of Germany, Einstein again renounced his German citizenship and became citizen of United States. Scottish born Alexander Graham Bell first migrated to Canada and then to United States, where he invented the telephone to the benefit of almost every person on the planet. Of the last 25 Nobel Peace Prize winners, more than half were migrants.
60 UNFPA, State of the World Population 2006 (http://www.unfpa.org/swp/2006/english/chapter_1/index.html).
61 United Nations (2006) "World Population Monitoring: Focusing on International Migration and Development: Report of the Secretary General" (http://portal.unesco.org/shs/en/ev.php-URL_ID=9521&URL_DO=DO_PRINTPAGE&URL_SECTION=201.html).
62 United Nations (2006) "World Population Monitoring: Focusing on International Migration and Development: Report of the Secretary General" (http://portal.unesco.org/shs/en/ev.php-URL_ID=9521&URL_DO=DO_PRINTPAGE&URL_SECTION=201.html).
63 Hatton, T. J. & J. G. Williamson (1992) "International Migration and World Development: An Historical Perspective" NBER Historical Paper No. 41.
64 United Nations (2006) "World Population Monitoring: Focusing on International Migration and Development: Report of the Secretary General" (http://portal.unesco.org/shs/en/ev.php-URL_ID=9521&URL_DO=DO_PRINTPAGE&URL_SECTION=201.html).
65 UNFPA, "State of the World Population 2006" (http://www.unfpa.org/swp/2006/english/chapter_1/index.html).
66 For example, Kofi Annan "Why Europe Needs and Immigration Strategy" (http://www.un.org/News/ossg/sg/stories/sg-29jan2004.htm).

67 Docquier & Marfouk (2004) Measuring the international mobility of skilled workers (1990-2000): release 1.0.. The World Bank, Policy Research Working Paper No. 3381.
68 Andersen (2007) "Análisis y Proyecciones de Población y Pobreza para Nicaragua 2005 – 2025". Development Research Working Paper No. 8/2007, Institute for Advanced Development Studies, La Paz, October.
69 See Andersen L. E & Evia J. L. (2003) "*The Effectiveness of Foreign Aid in Bolivia*", INESAD Development Research Working Paper No. 01/2003. Available online at http://www.inesad.edu.bo/publicaciones_detalle_no01_e.htm
70 See Andersen L. E (2002) "*Rural-Urban Migration in Bolivia: Advantages and Disadvantages*." IISEC Working Paper No. 5/2002. Available online at: http://www.iisec.ucb.edu.bo/papers/2001-2005/iisec-dt-2002-05.htm.
71 See Andersen L. E (2002) "*Rural-Urban Migration in Bolivia: Advantages and Disadvantages*." IISEC Working Paper No. 5/2002. Available online at: http://www.iisec.ucb.edu.bo/papers/2001-2005/iisec-dt-2002-05.htm.
72 See Andersen L. E (2002) "*Rural-Urban Migration in Bolivia: Advantages and Disadvantages*." IISEC Working Paper No. 5/2002. Available online at: http://www.iisec.ucb.edu.bo/papers/2001-2005/iisec-dt-2002-05.htm.
73 United Nations (2004) "World Population to 2300." (http://www.un.org/esa/population/publications/longrange2/WorldPop2300final.pdf)
74 See, for example, the Gapminder presentation "Has the World Become a Better Place?" (http://www.gapminder.org/fullscreen.php?file=/GapminderMedia/GapTools/aBetterPlace/swfVersion/start.swf).
75 Gwartney, J., R. Lawson & E. Gartzke (2005) "Economic Freedom of the World: Annual Report 2005".
76 World Development Indicators, 2005.
77 This was the main question of a conference organized jointly by MpD and INESAD last week in La Paz. The main presenters were Antonio Saravia and Fernando Untoja, and the present newsletter is inspired by their talks and the subsequent discussion.
78 See scary poster on the body of a smoker from WHO at http://www.who.int/tobacco/en/smokers_fr_en.pdf.
79 Instituto Nacional de Estadística & Ministerio de Salud y Deportes (2004) "Bolivia: Encuesta Nacional de Demografía y Salud 2003." La Paz, November.
80 Sam S. Kim, Jemima A. Frimpong, Patrick A. Rivers, Jennie J. Kronenfeld (2006) "Effects of Maternal and Provider Characteristics on Up-to-Date Immunization Status of Children Aged 19 to 35 Months." American Journal of Public Health. December 28, 2006.
81 For an overview, read "Dispelling Vaccination Myths" by Alan Philips, Director of Citizens for Healthcare Freedom (http://www.whale.to/v/phillips.html). For a review of books on the subject of vaccination, see http://www.shirleys-wellness-cafe.com/vaccine-books.htm.
82 "Dispelling Vaccination Myths" by Alan Philips, Director of Citizens for Healthcare Freedom (http://www.whale.to/v/phillips.html).
83 http://www.drspock.com/article/0,1510,5161,00.html.
84 See introductory paragraph of "Dispelling Vaccination Myths" by Alan Philips (http://www.whale.to/v/phillips.html).
85 See Myth #1 in "Dispelling Vaccination Myths" by Alan Philips (http://www.whale.to/v/phillips.html).

86 Archie Kalokerinos (1981) Every Second Child, Keats Publishing, Inc.
87 Shiliang Liu, Robert M. Liston, K.S. Joseph, Maureen Heaman, Reg Sauve, Michael S. Kramer (2007) "Maternal mortality and severe morbidity associated with low-risk planned cesarean delivery versus planned vaginal delivery at term." *Canadian Medical Association Journal*, February 13, 2007, 176(4): 455-460.
88 Robyn Kennare, Graeme Tucker, Adrian Heard and Annabelle Chan (2007) "Risks of Adverse Outcomes in the Next Birth After a First Cesarean Delivery." *Obstetrics & Gynecology*;109:270-276.
89 See, for example: 1) http://www.thinktwice.com/stories.htm, and 2) http://www.shirleys-wellness-cafe.com/vaccine-books.htm. There are also horror stories about children who have suffered due to lack of vaccinations, however: http://www.highschoolscience.com/vaccines/tragedies.html.
90 http://www.vaccineinformation.org/hib/qandadis.asp.
91 www.vaccineinformation.org says that 2 or 3 doses will protect more than 95% of children.
92 See introductory paragraph of "Dispelling Vaccination Myths" by Alan Philips (http://www.whale.to/v/phillips.html).
93 http://www.vaccineinformation.org/diphther/qandadis.asp.
94 http://www.vaccineinformation.org/tetanus/qandadis.asp.
95 For numerous concrete examples and captivating reading, see Friedman, Thomas L. (2006) "The World is Flat: A Brief History of the Twenty-Fist Century." First updated and expanded edition. New York: Farrar, Straus and Giroux.
96 See INESAD's research on the distributional effects of the natural gas boom (http://www.inesad.edu.bo/pro_gas.htm).
97 Coca, of course.
98 http://www.world-tourism.org/facts/eng/pdf/indicators/ITA_emerging04.pdf.
99 Blocking of existing roads may thus be considered a negative public good, or the act of unblocking roads a positive public good.
100 See Andersen, Christensen & Molina (2005) "The Impact of Aid on Recipient Behavior: A Micro-Level Dynamic Analysis of Remittances, Schooling, Work, Consumption, Investment and Social Mobility in Nicaragua" Institute for Advanced Development Studies. Development Research Working Paper Series No. 02/2005.
101 See, for example, Andersen, Caro, Faris & Medinaceli (2006) "Natural Gas and Inequality after Nationalization" Institute for Advanced Development Studies. Development Research Working Paper Series No. 05/2006.
102 See the Monday Morning Development Newsletter: "Do Your Aid Projects Hurt the Poor?" (http://www.inesad.edu.bo/mmblog/mm_20060605.htm).
103 Andersen, L.E., J. Caro, R. Faris & M. Medinaceli (2006) "Natural Gas and Inequality after Nationalization" Institute for Advanced Development Studies. Development Research Working Paper Series No. 05/2006.
104 Andersen, Lykke E., Johann Caro, Robert Faris & Mauricio Medinaceli (2007) "Natural Gas and Inequality in Bolivia after Nationalization." *The Journal of Energy and Development*, 31(2): 233-260.
105 Laserna, R., J.M. Cordillo & J. Komadina (2006) **La trampa del rentismo**. Fundación Milenio. La Paz, July.
106 Martínez, S.W. (2006) "Invertir el Bonosol para Aliviar la Pobreza: Retornos Económicos en los Hogares Beneficiarios" En: Fundación Milenio (2006) **La Inversión**

Prudente: Impacto del bonosol sobre la familia, la equidad social y el crecimiento económico, pp. 109-144. La Paz, Agosto.

107 Martínez, S.W. (2006) "Invertir el Bonosol para Aliviar la Pobreza: Retornos Económicos en los Hogares Beneficiarios" En: Fundación Milenio (2006) **La Inversión Prudente: Impacto del bonosol sobre la familia, la equidad social y el crecimiento económico**, pp. 109-144. La Paz, Agosto.

108 See new study: Andersen, L. E. (2006) "How Best to Use the Extraordinary Hydrocarbon Revenues in Bolivia: Results from a Computable General Equilibrium Model." Development Research Working Paper No. 14/2006, Institute for Advanced Development Studies, La Paz, December.

109 http://www.inesad.edu.bo/mmblog/mm_20060731.htm.

110 See Jochnick, Chris (2001) "Perilous Prosperity" *New Internationalist* No. 335. Or even more scary: Perkins, John (2004) **Confessions of an Economic Hit Man**. Penguin.

111 See Jochnick, Chris (2001) "Perilous Prosperity" *New Internationalist* No. 335. Or even more scary: Perkins, John (2004) **Confessions of an Economic Hit Man**. Penguin.

112 Ellin, Abby (2003) "Suit Says ChevronTexaco Dumped Poisons in Ecuador" *New York Times*, May 8.

113 According to information from INE based on the 2001 census.

114 According to the Sociedad Boliviana de Cemento (SOBOCE), www.soboce.com.

115 In 2006, there were issued 358,000 construction permits in Santa Cruz and 783,201 in La Paz (www.ine.gov.bo).

116 According to FUNDEMPRESA's records of formal businesses in Bolivia (www.superempresas.gov.bo).

117 According to the World Development Indicators of the World Bank, the effective tax rate for formal enterprises is 80%. But tax evasion is widespread in Bolivia, and according to the admittedly outdated 1997 social accounting matrix, the effective tax rate for the formal sector is "only" 67%.

118 See http://www.inesad.edu.bo/mmblog/mm_20070813.htm.

119 http://www.superempresas.gov.bo/.

120 According to official information from www.upf.gob.bo.

121 See http://www.jornadanet.com/Hemeroteca/n.php?a=23676-1&f=20081119.

122 According to data from the BCB, there are currently about 15.5 billion bolivianos in circulation.

123 See the Environment & Development projects at INESAD (http://www.inesad.edu.bo/pro_env.htm).

124 See Andersen, L. E., J. C. Ledezma & M. Vargas (2006) "Un Mosaico de Conservación, Desarrollo Humano y Tensiones en el Corredor Amboró-Madidi." Development Research Working Paper No. 04/2006. Institute for Advanced Development Studies, La Paz, Bolivia, June.

125 http://cmpcc.org/.

126 http://pwccc.wordpress.com/2010/04/28/peoples-agreement/%23more-1584.

127 See the previous article in this chapter: "China's impressive forest growth."

128 "The Population Bomb" (1968) was a best-seller written by Paul R. Ehrlich predicting worldwide disaster and mass famine within a couple of decades due to overpopulation. The predictions did not come true. In fact, the world developed in a direction completely opposite to the one predicted by Ehrlich, without the implementation of his proposed measures to dramatically limit population growth.

129 "The Limits to Growth" (1973) argued that the world's use of raw materials is growing exponentially, implying that we would soon run out of many non-renewable natural resources, especially oil. The high prices of oil and several metals at the time supported the hypothesis, but a decade later the very same prices plummeted, suggesting no scarcity.

130 Many biologists, most notably Harvard professor E.O. Wilson, predict that man's destruction of the biosphere could cause the loss of one-half of all living species within the next 100 years. In severity this would correspond to the Fifth Mass Extinction (about 65 million years ago) which wiped out the dinosaurs and paved the way for the evolution of mammals (including humans). We don't know yet whether such extensive man-made extinction will actually happen, but given the emerging GMO technology, it is just as possible that we move in the opposite direction of increased bio-diversity during the next 100 years.

131 There is not much else to cite, as, to date, there is not a single scientifically documented case of harm done by genetically modified crops.

132 Pete Witucky published most of this piece in the blog: theCORgroup (theCORgroup.org) on 5 June 2007. It was so perfect that it is reproduced almost in its entirety here.

133 For those interested, UNDP in Bolivia has a call for proposals on the Impacts of Climate Change on the Bolivian Economy. The deadline is the 21st of April, 2008.

134 See http://www.inesad.edu.bo/mmblog/mm_20080324.htm.

135 See, for example, the 1975 Newsweek article "The Cooling World" (http://www.resiliencetv.fr/uploads/newsweek_coolingworld.pdf).

136 Koplow, Doug (2006) "BIOFUELS - AT WHAT COST? Government support for ethanol and biodiesel in the United States." The Global Subsidies Initiative (GSI) of the International Institute for Sustainable Development (IISD) Geneva, Switzerland. According to this report, the cost per metric ton of GHG emissions reductions through public support of corn-based ethanol could have purchased more than 140 metric tons of removal on the Chicago Climate Exchange.

137 Biofuels International, September 2007, Issue 4, Volume 1.

138 Biofuels International, September 2007, Issue 4, Volume 1.

139 Biofuels International, September 2007, Issue 4, Volume 1.

140 See IFPRI (http://www.ifpri.org/themes/foodprices/foodprices.asp).

141 The main source for this article: R. Warren Anderson (2006) "Fire and Ice", Business and Media Institute (http://www.businessandmedia.org/specialreports/2006/fireandice/fireandice.asp). The summary of the climate change debate by Michael Goodfellow: "Global Warming: Our Story So Far" is also very useful (http://www.free-the-memes.net/writings/warming/warming.html).

142 Fourth Assessment Report of the Intergovernmental Panel on Climate Change. See www.ipcc.ch.

143 Al Gore, for example, says that "it is our ability to live on planet Earth – to have a future as a civilization – that is at stake" in his 2006 book "An Inconvenient Truth."

144 According to personal communication with one of the lead coordinating authors of the latest IPCC Working Group 1 report, Jens Hesselbjerg Christensen.

145 The IPCC Working Group 1 report suggests that it would take millennia. On p. 752 of Chapter 10 it says: "the Greenland Ice Sheet would largely be eliminated, raising sea level by about 7 m, if a sufficiently warm climate were maintained for millennia."

On the same page it says "The Antarctic Ice Sheet is projected to remain too cold for widespread surface melting, and to receive increased snowfall, leading to a gain of ice…In current models, the net projected contribution to sea level rise is negative for coming centuries."

146 The IPCC Working Group 1 report suggests that it would take millennia. On p. 752 of Chapter 10 it says: "the Greenland Ice Sheet would largely be eliminated, raising sea level by about 7 m, if a sufficiently warm climate were maintained for millennia." On the same page it says "The Antarctic Ice Sheet is projected to remain too cold for widespread surface melting, and to receive increased snowfall, leading to a gain of ice…In current models, the net projected contribution to sea level rise is negative for coming centuries."

147 Introduction of the 2007 Human Development Report from UNDP. See: http://hdr.undp.org.

148 Fourth Assessment Report of the Intergovernmental Panel on Climate Change. See www.ipcc.ch.

149 NASA: "Ulysses Reveals Global Solar Wind Plasma Output at 50-Year Low" (http://www.nasa.gov/topics/solarsystem/features/ulyssesr-20080923.html).

150 In 2004 we learned that "Sunspots have been more active the last 70 years than it has for the previous 8000 years." (New Scientist, 27 October 2004).

151 Jevons, W.S. (1878) "The Periodicity of Commercial Crises and its Physical Explanation." Paper read at the meeting of the British Association on August 19, 1878.

152 Garcia-Mata, C. & F. I. Shaffner (1934) " Solar and Economic Relationships: A Preliminary Report." The Quarterly Journal of Economics, 49(1): 1-51.

153 Friis-Christensen, E. & K. Lassen (1991) "Length of the Solar Cycle: An Indicator of Solar Activity Closely Associated with Climate." *Science*, Vol. 254. no. 5032, pp. 698 – 700.

154 The Tipping Point concept is brilliantly explained in Malcolm Gladwell's book of 2000: "The Tipping Point: How Little Things Can Make a Big Difference."

155 See the analysis by Anthony Watts at: http://wattsupwiththat.com/2008/02/19/january-2008-4-sources-say-globally-cooler-in-the-past-12-months/.

156 According to Dr. Philip Jones at Hadley (http://www.cru.uea.ac.uk/cru/annrep93/globtemp.htm).

157 Also by Anthony Watts: http://wattsupwiththat.com/2008/10/15/arctic-sea-ice-now-287-higher-than-this-date-last-year-still-climbing/.

158 http://news.bbc.co.uk/2/hi/south_asia/6362679.stm.

159 http://thelede.blogs.nytimes.com/2007/06/27/in-johannesburg-first-snowfall-since-81/.

160 http://ericiniraq.scrappydog.com/2008/01/first-snow-in-baghdad-in-recent-history.html

161 http://whatismatt.com/saraphi-district-records-thailands-first-snowfall/ .

162 http://www.panda.org/about_wwf/where_we_work/europe/news/index.cfm?uNewsID=148141.

163 Global temperatures have been stagnant or falling at least since 2002 (http://icecap.us/images/uploads/MSUCRUCO2.jpg); global sea-levels have started falling since 2006 for the first time in the record of satellite measurements (e.g. http://sealevel.colorado.edu/results.php); arctic ice area has recovered rapidly this year (e.g. Nansen Environmental and Remote Sensing Center) having by now entered the "normal" range as measured from 1979-2007.

164 See the Monday Morning Development Newsletter from 29 September 2008: "**NASA still reluctant to admit that the Sun might affect Earth's climate**" http://www.inesad.edu.bo/mmblog/mm_20080929.htm.

165 See http://topex-www.jpl.nasa.gov/science/pdo.html and http://wattsupwiththat.com/2008/07/20/shifting-of-the-pacific-decadal-oscillation-from-its-warm-mode-to-cool-mode-assures-global-cooling-for-the-next-three-decades/.

166 Scafetta, N., and B. J. West (2007) "Phenomenological reconstructions of the solar signature in the Northern Hemisphere surface temperature records since 1600", *J. Geophys. Res.*, 112, D24S03, doi:10.1029/2007JD008437.

167 Schwartz, S. E. (2007) "Heat capacity, time constant, and sensitivity of the Earth's climate system." *J. Geophys. Res.*, 112, doi:10.1029/2007JD008746.

168 McKitrick, R. R. (2008) "Quantifying the influence of anthropogenic surface processes and inhomogeneities on gridded global climate data" *Journal of Geophysical Research* – Atmospheres, In Press.

169 Loehle, C. (2008) "A mathematical analysis of the divergence problem in dendroclimatology" *Journal of Climate Change*, Sept. 10, 2008.

170 Grudd, H. (2008) "Torneträsk tree-ring width and density ad 500–2004: a test of climatic sensitivity and a new 1500-year reconstruction of north Fennoscandian summers." *Climate Dynamics*, Volume 31, Numbers 7-8, pp. 843-857, DOI: 10.1007/s00382-007-0358-2.

171 See http://www.climatechangeissues.com/files/PDF/conf05mckitrick.pdf , which is a shocking read.

172 Several usually hot places have been surprised by very unusual snow during the last couple of years. For example, Johannesburg in June 2007 (http://thelede.blogs.nytimes.com/2007/06/27/in-johannesburg-first-snowfall-since-81/); Baghdad in January 2008 (http://ericiniraq.scrappydog.com/2008/01/first-snow-in-baghdad-in-recent-history.html); Thailand in March of 2008 (http://whatismatt.com/saraphi-district-records-thailands-first-snowfall/); and United Arab Emirates in January 2009 (http://www.thenational.ae/article/20090125/NATIONAL/688880349/1010/enewsletter). Usually cold places have also seen records. For example, in 2008 Canada had a white Christmas *everywhere* for the first time in 4 decades (http://www.pentictonherald.ca/stories_national.php?id=155008).

173 Mann, M.E., Bradley, R.S. and Hughes, M.K. (1998) "Global-Scale Temperature Patterns and Climate Forcing Over the Past Six Centuries," Nature, 392: 779-787. Mann, M.E., Bradley, R.S. and Hughes, M.K. (1999) "Northern Hemisphere Temperatures During the Past Millennium: Inferences, Uncertainties, and Limitations," *Geophysical Research Letters*, 26: 759-762.

174 See http://www.climatechangeissues.com/files/PDF/conf05mckitrick.pdf for a thorough statistical criticism of the Mann et al study.

175 See, for example, Huang, Shaopeng, Henry N. Pollack and Po Yu Shen (1997). "Late Quaternary Temperature Changes Seen in Worldwide Continental Heat Flow Measurements." *Geophysical Research Letters* 24: 1947—1950, which presents evidence from over 6000 boreholes from every continent of the World and confirms both the Medieval Warm Period and the Little Ice Age, which has been common knowledge even to the IPCC (see Figure 3 in the 2nd Assessment Report).

176 See, for example, http://www.americanthinker.com/2007/11/green_fever_global_warming_and.html.

177 See U.S. Senate Minority Report Update: More Than 650 International Scientists Dissent Over Man-Made Global Warming Claims. (http://epw.senate.gov/public/index.cfm?FuseAction=Files.View&FileStore_id=83947f5d-d84a-4a84-ad5d-6-e2d71db52d9)
178 See http://wattsupwiththat.com/2009/02/25/a-short-primer-the-greenhouse-effect-explained/#more-5853.
179 See http://www.geocraft.com/WVFossils/Carboniferous_climate.html .
180 World Development Indicators, 2007, measured in PPP-adjusted international dollars.
181 Real GDP has grown at an average rate of 2.47% per year between 1967 and 2007 (WDI), which is exactly the same as the average growth rate of the working age population (CEPAL population projections).
182 World Development Indicators, 2005.
183 See http://www.nationmaster.com/graph/tra_mot_veh-transportation-motor-vehicles.
184 World Development Indicators, approximately 2005.
185 Deforestation in Bolivia amounts to about 300.000 hectares per year, and each hectare contains an average of 100 tons carbon, which is equivalent to 367 tons of CO_2.
186 Figure 1 of this newsletter is a reproduction of Figure 1.1 of the IPCC Fourth Assessment Report from Working Group 2. It has been reproduced countless times before in climate change studies and presentations all over the World.
187 According to the NCDC Monthly Climatic Data for the World Data Base, which starts in 1948 (http://www7.ncdc.noaa.gov/IPS/mcdw/mcdw.html).
188 For NASA cloud data, see: http://isccp.giss.nasa.gov/climanal1.html.
189 See Hoffmann, G., E. Ramirez, J. D. Taupin, B. Francou, P. Ribstein, R. Delmas, H. Dürr, R. Gallaire, J. Simões, U. Schotterer, M. Stievenard & M. Werner (2003) "Coherent isotope history of Andean ice cores over the last century." *Geophysical Research Letters*, 30(4): 1179-1182.
190 See Svensmark, H. & N. Calder (2007) The Chilling Stars: The New Theory of Climate Change. Totem Books.
191 See summary at The Sunday Times "World misled over Himalayan glacier meltdown" (http://www.timesonline.co.uk/tol/news/environment/article6991177.ece).
192 See summary by James Delingpole at the Daily Telegraph "After Climategate, Pachaurigate and Glaciergate: Amazongate" (http://blogs.telegraph.co.uk/news/jamesdelingpole/100023598/after-climategate-pachaurigate-and-glaciergate-amazongate/).
193 That has already been done. See, for example, "Climategate: Caught Green-handed" by Christopher Moncton or "Climategate: The CRUtape Letters" by Steven Mosher and Thomas Fuller.
194 See analysis by Steve McIntyre (http://climateaudit.org/2009/12/10/ipcc-and-the-trick/).
195 See The Guardian: http://www.guardian.co.uk/environment/2009/nov/09/india-pachauri-climate-glaciers.
196 See summary by James Delingpole at the Daily Telegraph "After Climategate, Pachaurigate and Glaciergate: Amazongate" (http://blogs.telegraph.co.uk/news/jamesdelingpole/100023598/after-climategate-pachaurigate-and-glaciergate-amazongate/).

197 See Gilberts TED Talk at: http://www.ted.com/talks/dan_gilbert_asks_why_are_we_happy.html.

198 This is a well-known psychological phenomenon. For example, according to Daniel Gilberts 2007 book "Stumbling on Happiness" (p. 210), "we pay more attention to favorable information, we surround ourselves with those who provide it, and we accept it uncritically."