CDM, JI and climate protection:

looking after our future

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Abstract. *This paper deals with principles, open issues and economic attractiveness of CDM and JI. In the first part, some reflections about additionality, baseline criteria and problems that can arise in implementing CDM and JI projects are carried out. CDM is also analysed within the wider perspective of Foreign Direct Investment and ODA. In the second part, with reference to a CDM project, some simulations are performed in order to clarify its economic results and understand the role that different variables can play. The simulations show that different scenarios can be hypothesised and, thus, no general conclusion can be derived about the economic attractiveness of CDM and JI. Avoiding any possible conflict between CDM and JI, as they are described by theory, and the numerous obstacles that exist in the real world, will be a key issue in the future climate change policies.*

Theory

According to the theory, CDM and JI are simple, useful and reasonable tools. CO_2 emissions abatement costs vary across countries and, thus, if the Parties are allowed to abate where they wish, and not only inside a country, the most convenient opportunities will be grasped. As a consequence, cost savings will emerge.

As a co-benefit, by investing in Less Developed Countries (LDCs), Developed Countries (DCs) will export environmentally clean technology in those countries. This means that new capacity will be built and sustainable development favoured.

Finally, CDM and JI can be regarded as neutral and sound tools: atmosphere is a traditional common good characterised by non-rivalry and non-exclusion, so the CO_2 emissions aggregated cap will not be exceeded if the abatement abroad replaces the abatement inside.

In synthesis, cost minimisation, contribution to sustainable development and neutrality with respect to the final Kyoto target (- 5.2% in GHGs emissions) are three benefits of CDM and JI.

But, this nice picture that holds in an ideal word is disturbed by several limitations that may arise in the real world. Here, the implementation of CDM and JI seems to be not so simple and easy, as the theory suggests. Many implementation alternatives exist and each of them gives rise to different economic results. They must still be clarified. Moreover, beside the technical aspects, when we look at CDM and JI in a wider perspective, new problems emerge.

Open issues

Very probably, additionality is the main issue that must be clarified. In art. 6 and 12 of the Kyoto Protocol, we read:

"Any such project provides a reduction in emissions by sources, or an enhancement of removals by sinks, that is additional to any that would otherwise occur" (art. 6, JI);

"Reductions in emissions that are additional to any that would occur in the absence of the certified project activity" (art. 12, CDM).

Additional is the key word and depending on the way in which it is interpreted, very different amounts of ERUs and CERs can arise. It is strictly related to the word *baseline*, that is the reference line that must be considered in accounting the additional reduction in emissions. Several interpretations and classifications of additionality and baseline exist. The main of them are the following:

With reference to the context:

- emissions additionality, i.e. a reduction in emissions which arises from a certain project which gives rise to less emissions with respect to a standard project that would otherwise occur.
- financial additionality, i.e. the implementation of a project that would not exist without a CDM or a JI programme. In other words, the JI-CDM project generates financial resources that are additional to what would occur in the absence of it.

With reference to the dimension:

- project-specific baseline, i.e. a baseline that is calculated for a given project and whose validity is limited to that project;
- Similarly, it is possible to think of many other types of baselines which are valid for wider set of projects: technology-specific, multi-project specific, sector-specific, regional-specific, country-specific, global.

With reference to time:

- constant baseline, i.e. a baseline that does not change for the lifetime of the project.
- dynamic baseline, i.e. a baseline that is revised during the project lifetime due to a variation in the emissions level arising from a technology change. Such a revision can be either ex-ante or ex-post.

The complexity of these issues is enlarged by the fact that even if we decide to limit our interpretation of additionality to emissions (or financial) additionality, many problems still exist since emissions (or financial) additionality can be interpreted in several, alternative ways. Baumert (K. A. Baumert 2001) provides a nice summary of many alternatives for determining the baseline of a project. According to this summary, it is possible to distinguish between top-down and bottom-up baselines:

- Top-down baselines derive an emission rate from existing national or sectoral data. Examples of this kind of baseline are: GHG emissions/megawatt hour (national level); GHG emissions/average mileage (national transportation data); GHG emissions/value of output (sector or company data); GHG emissions/unit of output (sector or company data). Top-down baselines can be both hystorical and forward looking, that is derived by either current-past national/sectoral data or forecasted emissions rates. Among the advantages of top-down baselines, there are easy determination and easy comparison among different sectors and countries, and thus low implementation costs and, probably, as a consequence, high JI-CDM flows. On the other hand, top-down baselines can be unable to capture marginal decisions when they are built on hystorical data: for istance, "a country's energy sector could be pre-dominantly coal-oriented, yet this does not mean that the next plant built will also be coal-powered" (K. A. Baumert 2001).
- Bottom-up baselines are determined on a case-by-case basis. Similarly to top-down baselines, they can be hystorical or forward looking. In comparison with them, bottom-up baselines do not require large amount of data, but need to be established project-by-project, and this can increase the implementation costs.

The possibility of some mitigation measures renders the picture more complex. For istance, in order to avoid an overstatement of emissions reductions, it is possible to aggregate projects and use an average measure, or take into account the intertemporal uncertainty and discount emissions reductions. As to the baseline measurement unit, tons or rates could be used: the former favour overcrediting (undercrediting) in the case of economic collapse (unforecasted growth), while the latter favour a large amount of CERs in the case of unforecasted growth. These are some aspects that render the issue of baseline and emissions additionality complex and open. Morevover, if we enlarge our perspective and focus on financial additionality, a new interpretation frontier emerges. Financial addtionality could mean the acceptance of: some specific and pre-determined projects (e.g. projects on renewables); projects that are initiated by the host country; projects financed outside the Official Development Assistance (ODA) and the Global Environment Fund (GEF); projects that are financially sustainable just because of the generation of CERs; projects that overcome market, or institutional or technological barriers; projects that are initiated directly as a result of the CDM.

In order to define a set of rules that govern CDM and JI projects, several approaches and approval criteria have been proposed. Among them there are:

- Berlin criteria, i.e. a set of indications that stem from the Berlin decision (Cop 1) and refer to projects within the AIJ ("activities implemented jointly") programme. Basically, AIJ projects must: be financed by funds additional to ODA or GEF; generate real, measurable and long-term environmental benefits; be previously approved by the Governments of the involved Parties; transfer technology and build new capacity; be open to external verification.
- World Bank criteria for the AIJ programme. Basically, AIJ projects must: generate both reductions in emissions and environmental benefits; transfer new technology and create new market for it; explore methodological issues such as baseline and additionality; have a replication value.
- OECD/IEA criteria. They are based on the concept of "barrier removal" and claim that a project is additional if its implementation is not inhibited by financial, technological, institutional or informational barriers that, on the contrary, inhibit the baseline project.
- US EPA criteria. They are based on a set of options such as: i) additionality defined in terms of barriers overcoming; ii) a priori additionality, defined for a narrow class of projects; iii) sector-specific additionality; iv) additionality defined by a wide programme

(e.g. USIJI); v) overall limit to CDM and JI, e.g. by means of limits to their lifetime or scope; vi) combination of options.

- USIJI criteria. They define additionality both in terms of emissions reduction and funding. Moreover, they offer a set of punctual instructions that must be followed in the JI projects. For instance, projects under the initiative must: provide all the necessary information to establish current and future baselines; be periodically verified as to reduction in emissions, by comparing projections with actual estimates; give information about change in emissions elsewhere and effects other than reductions in emissions.

A part form the differences in their specific contents, the above mentioned criteria differ as to the degree of punctuality. Very probably, the USIJI criteria offer the most punctual indications. Besides them, it must be recognised that many other countries established analogous sets of rules and their degree of detail is sometimes very high (for a synthesis, see A. Michaelowa et al. 1999).

Possible contradictions

As already noticed, CDM and JI rely on a nice idea aiming at minimising the attainment costs of the Kyoto Protocol while favouring an environmentally sound development in LDCs. Thus, they are win-win tools. Nevertheless, a part from implementation problems, this idea contains some ambiguities that weaken it:

- Cheating and emissions overstatement. Both countries, the one that invests in the project and the one that hosts it, take advantage by the project, respectively in terms of reductions in emissions and new capacity and technology. Thus, there exists for both countries a direct and indirect interest in overestimating the reduction in emissions. Such a risk renders the emissions reduction accounting very important. But accounting depends strictly on baseline criteria, which are still uncertain.
- Perverse incentives. Even if there is still uncertainty about what exactly additionality is, very probably it will imply that projects that would be realised also without CDM-JI programmes will not be considered for CDM and JI. On the contrary, only if a project overcomes some kind of barrier (e.g. financial or institutional), that is not overcome by a standard project, will be considered for CDM and JI. This is possible just for the economic advantage that stems from the project emissions credit. But such a mechanism

implies the risk that only least cost-effective projects would fall within CDM and JI. This is not necessarily negative. In fact, in the short run, and from a narrow economic point of view, this result could mean that CDM and JI would favour inefficient projects. But, on the long run, the high CDM and JI costs could be reduced due to scale economies.

- Perverse projects. *Ceteris paribus*, the higher the reduction in emissions, the higher the project convenience. This could mean that CDM and JI favour projects related to Land Use, Land-Use Change and Forestry (LULUCF) since their carbon removal potential is remarkable. This point was also discussed at the last COP 6 in The Hague, where the EU (EU 2000) and some environmental organisations argue that CDM could become a driver for deforestation. This can happen if projects that have a high carbon removal potential substitute native forests. On this issue, Greenpeace and WWF (T. Cadman 2000) quoted the case of the Tamar Valley, in Tasmany, where a CDM project by a Japanese utility gave rise to a plantation of eucalypti for 3,000 ha on the native forest. Certainly, this is a perverse effect because there is no sense in protecting climate and environment by means of natural environment and biodiversity destruction. On the contrary, wise CDM projects oriented both to afforestation and deforestation control could be very useful, deforestation being the source of approximately 20% of global greenhouse gas emissions. In this context, the development of some legally binding treaty, or protocol, for forests preservation would be very appropriate, especially if this action were co-ordinated with the Kyoto Protocol.
- Indirect effects. It is possible that the implementation of CDM or JI projects could have negative indirect effects. It could occur a simple displacement of activities, and thus emissions, from one place to another. For instance, such a displacement could be channelled through a strong decrease in some energy input price: the replacement of coal with gas in power plants could lower the coal price, so that building new power plants which are filled with coal, in other regions, may become very convenient. Another indirect effect that should be considered is the rebound effect. It can arise as a consequence of a relaxation that can occur, to some extent, both in the host and investor country. Such a sort of leakage and rebound effects remind us that the whole CDM and JI issue must be considered within a general equilibrium perspective rather than a partial equilibrium one.
- Low prices for CERs and ERUs. The Kyoto mechanisms will be successful only if there are positive conditions for them. Above all, this means high prices for CERs and ERUs. On the contrary, if there will be low prices, their convenience is reduced. This can give rise to

a sort of paradox. The diffusion of CDM and JI means an increase in CERs and ERUs supply and thus, *ceteris paribus*, a fall of their price. In turn, this renders CDM and JI less convenient. Even if this hypothesis reduces the potential for CDM and JI, it must not necessarily be interpreted as a negative effect, since it is simply a consequence of the usual demand-supply market rule. Nevertheless, it can become a risk if there is a constant high demand for CERs and ERUS that keeps their prices high. This can depend on the fact that the Parties do not implement sufficient domestic actions (policies and measures). If that occurs, the above mentioned perverse incentive effect is reinforced and CDM and JI will spread in spite of their inefficiency.

In synthesis, it is very difficult to say what is the macro-effect of the above mentioned ambiguities. In any case, it must be recognised that besides the idea that CDM and JI are win-win tools, they are also characterised by some intrinsic ambiguities, which could act as a wedge between theory and practice. At a macro level, a competition among CDM and JI, ODA and GEF, policies and measures could emerge. So, on the one hand, an increasing number of CDM and JI projects is positive because of their win-win nature; on the other hand, they can spread against policies and measures, or ODA and GEF, and this could be not sound.

Experiences

The first COP, held in Berlin in 1995, provided for a pilot phase of “activities implemented jointly” (AIJ). Countries cannot claim for reductions in emissions that arise from projects occurred within the AIJ pilot phase and this means that its economic attractiveness is reduced. Nevertheless, the implemented experiences provide useful indications. A survey by OECD (OECD 1999), focusing on 95 projects located in 24 host countries (68 projects in EIT), finds the following drawbacks:

- unclear and unjustifed baselines methodology
- not trasparent calculation of many emission baselines
- emission baselines data not always justified or referenced
- unexplained timeline
- unexplained system boundaries

In other words, many imperfections still exist and a high degree of improvement is required. Another experience that has to be considered is the USIJI. It stands out for its width: as July

1998, there were 110 proposals submitted and about 30 approved (R. Lile, M. Powell, and M. Toman 1999). The main lesson that emerges from this experience is that transaction costs can play a key role. Their source can be different: project approval iterative process; host country lack of experience in international commerce; possibility of a change in the original project design; high number of involved actors; political and macroeconomic instability in the host country; resistance from ministries and centres of power; bureaucratic and political struggle, etc. For instance, Lile, Powell and Toman refer about a fuel-switching, cogeneration and efficiency improvement project in the Czech Republic, whose total transaction costs were equal to US $ 600,000, equivalent to the total project financing. Very probably, due to an increase in complexity, transaction costs are higher when baselines are project-specific and site-specific, while standardised baselines tend to lower transaction costs. According to some surveys about AIJ in eastern Europe, "total transaction costs, including JI specific transaction costs such as baseline determination and GHG emission reduction monitoring, ranged from 12 to 19% of the total initial investment in energy sector projects, and from 15 to 30% in smaller and more complex industrial sector projects" (E. Woerdman 2000). Such experiences tell us that transaction costs should always be considered in the evaluation of CDM and JI projects.

A wider perspective

The potential for CDM seems to be very high. A handbook by USUE/USAID (USEA/USAID 2000) provides a survey of best practices for over 70 climate change action areas, showing for each of them features, costs and potential usage. According to USEA/USAID, the following areas could be exploited in order to obtain reductions in GHGs emissions: Environmental Pollution Control; Fuel Systems; Conventional Power Generation Systems; Transmission Systems; Distribution Systems; End-Use Efficiency and Demand-Side Management; Renewable Energy; Offset and Emissions Trading; Data Research and Monitoring Actions; Energy Sector Institutional Reform and Restructuring; Regulatory Reform.

A survey by WRI (D. Austin et al. 1999) suggests that "offset options in developing countries could make up between one third and one half of total reductions during the first budget period, in the absence of any constraint on CDM activity. If so, the value of CER credits to

Annex I (developed) countries could be US$5 billion to US$17 billion per year by 2010, or US$25 billion to US$85 billion for the whole budget period".

Certainly, these news are good. Nevertheless, besides opportunities, the investment potential and the probable impact of CDM on the financial flows from DCs to LDCs must be carefully considered. In other words, since CDM projects are investments by developed countries to developing countries, it is useful to consider them in a wider perspective. This can be done taking into account the recent history of investments towards LDCs, either private funds [mainly Foreign Direct Investment (FDI)] or public ones, that is aid. Since 1990 to 1998, FDI increased from $24 billion to $171 billion, while official aids were $58 billion in 1998 (N. Kete et al. 2001). This shows that the idea that the private sector can play a key role in boosting CDM projects is right. Moreover, the FDI rapid increase since 1990 (+ 800%) tells us that a huge potential exists and DCs can do a lot. Nevertheless, a critical aspect must be stressed. FDI flow towards a few, important countries. Ten countries representing around 60% of the world population (China, Brazil, Mexico, Colombia, Chile, India, Indonesia, Malaysia, Thailand and Venezuela) attract about 75% of the total FDI. This occurs because FDI are mainly influenced by factors such as market size, political stability, income levels, quality of private and public institutions, infrastructure, labour cost, openness to foreign investment (N. Kete et al. 2001). It can be hypothesised that private investments for CDM projects will be characterised by a similar concentration. This fact could hamper the CDM goals (more development and a cleaner environment in LDCs), limit its ability to exploit the most convenient opportunities, put many little and very poor countries at a disadvantage. A possible solution for this would be a greater role for public aids. Unfortunately, the recent trend is a declining one. In spite of the Rio de Janeiro Conference goal (aid equal to 0.7% of a country's GNP), the aid/GNP ratio declined from 0.42% in 1991 to 0.26% in 1998.

Moreover, a problem that must be carefully addressed is corruption. Evidence shows that, in spite of the OECD "Convention on Combating Bribery of Foreign Public Officials in International Business Transactions"(signed in 1997 and entered into effect in February 1999), "corruption is still a widely spread phenomenon (and) corruption appears to be associated with more FDI (...) Corruption makes dealing with government officials, for example, to obtain export licenses and production permits, less transparent and more costly, particularly for foreign investors. In this case, having a local partner lowers the transaction cost (e.g. the cost of securing local permits)" (B. K. Smarzynska and Shang-Jin Wei, 2001). Smarzynska and Shang-Jin Wei show that when the corruption level is very high, there can be no foreign investment. On the contrary, at lower levels it becomes an obstacle that must and can be overcome, but this means misgovernment and dissipation of financial resources. Thus, corruption is a form of transaction cost.

Besides the distributive problem, there is the conflict between fossil fuels and clean projects: "a recent study by the Sustainable Energy and Economy Network concludes that the anticipated benefits from the CDM are vastly outweighed by the continued transfer of public money from industrialised countries to developing and transition economies for fossil fuel projects (...) if only 20 percent of the financing (...) were diverted away from fossil fuel toward investments in energy efficiency and renewable energy, the emissions avoided each year would have equalled more than one-and-a-half times the amount of carbon averted under a best case scenario for CDM" (N. Kete et al. 2001). This conflict enlightens the necessity to look at the CDM issue within a wider perspective, which cares for the coherence of the development and environmental policy among which a possible trade-off can exist. On the one hand, CDM projects can subtract funds from the ODA, on the other hand ODA projects can just offset the CDM attainment.

Besides this probable trade-off between CDM and ODA, another possible trade-off that has to be considered is the one between the "C" and the "D" of the acronym CDM. CDM means both clean environment and development. But, there is no certainty that harmony will exist between these two targets. As CDM will push development, there is a risk that environmental damages different from the greenhouse effect are stimulated. This can occur if CDM concentrates on energy projects, which push the economic growth while leaving the link between GNP and environmental degradation unchanged. In Asia, for instance, environmental damages are a significant percentage of GNP: "the Chinese Academy of Social Sciences has estimated environmental damages in China in 1990 to be US $31 billion, or 8.5% of GDP (...) Far less comprehensive estimates for Indonesia, Pakistan, and the Philippines range between 2% and 3.3%. (...) A reasonable average figure for annual damages and production losses for the typical Asian country would be around 5% of GDP" (T. Panayotou 2000). It is reasonable to face such huge figures and stimulate a kind of development in LDCs that decreases them. This is possible if, besides global warming, investments from DCs try to combat other kinds of environmental problems. Certainly, there is a high probability that, in many cases, CDM projects generate co-benefits. But, there exists also a possibility that an excessive focus on global warming subtracts funds necessary to manage other environmental damages. Such a possibility is critically related to the huge development of megacities and the need for infrastructure.

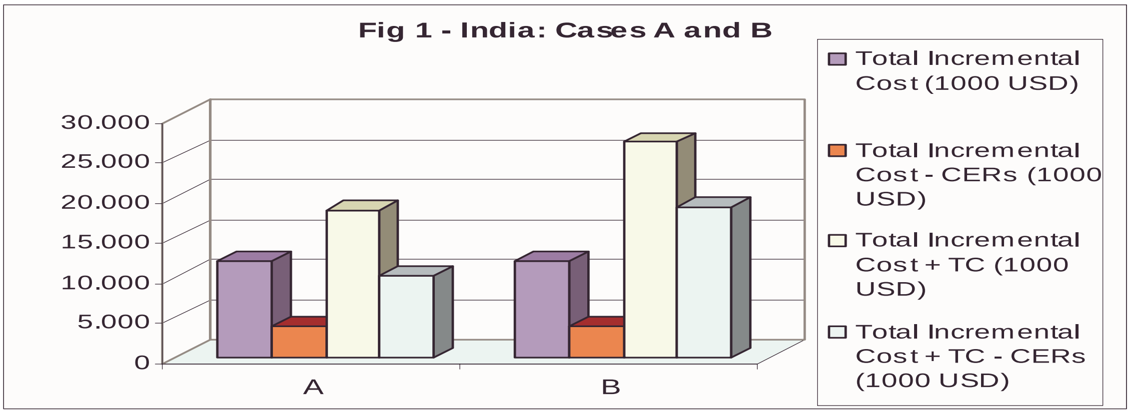
Simulations

In order to clarify the role that different variables can have in CDM and JI, some system dynamics simulations are here proposed. They are based on OECD/IEA data (J. Ellis and M. Bosi 1999, OECD/IEA 2000) and refer to India and Brasil. For India, 7 exercises were carried out. All of them take into account a project for the realisation of a CCGT gas plant. All the exercises have a 20 years time horizon. Four of them (cases A, B, C, D) fix the plant capacity in 50 MW, while the last three (cases E, F, G) consider some capacity expansion, that is the possibility that other similar projects are realised within the time horizon. The variables on which sensitivity analysis is carried out are: baseline, CERs price, transaction costs, discount rate. The simulation hypotheses are showed in table 1. Recent capacity addition baseline means a baseline that is built taking into account plants after 1994. For India, the all sources baseline is equal to 565 tCO_2/GWh, while the fossil fuel only baseline is equal to 960 tCO_2/GWh. Other basic assumptions are: a 75% load factor, a unit standard cost equal to 0.045 USD/kWh, a BAT unit cost equal to 0.0477 USD/kWh, BAT emissions equal to 382 tCO_2/GWh.

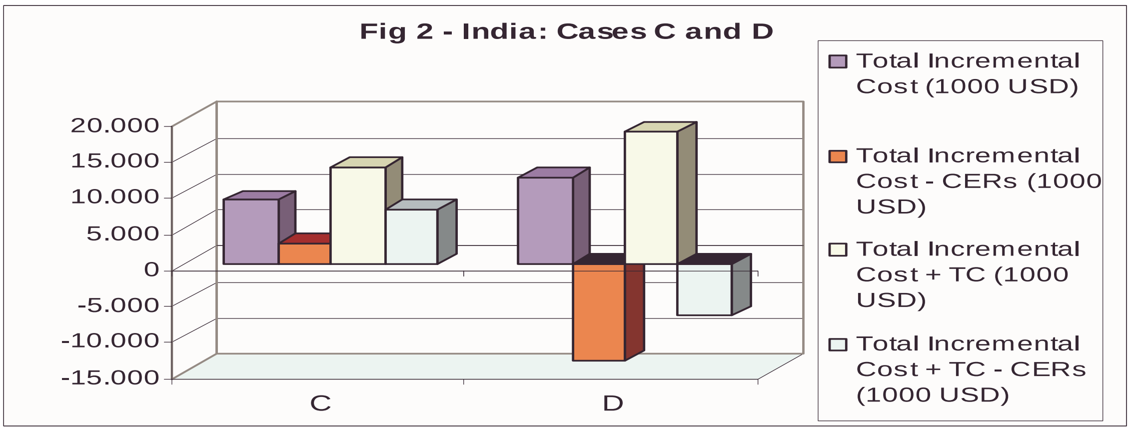
***Table 1**: CDM Project in India, simulations hypotheses*

	Baseline	*Transaction Costs*	*CERs Price*	*Discount rate*
Case A	All Sources (Recent Capacity Additions)	3% of the BAT Unit Production Cost	10 USD	5%
Case B	All sources (Recent Capacity Additions)	7% of the BAT Unit Production Cost	10 USD	5%
Case C	All sources (Recent Capacity Addition)	3% of the BAT Unit Production Cost	10 USD	10%
Case D	Fossil Fuel Only (Recent Capacity Additions)	3% of the BAT Unit Production Cost	10 USD	5%

The main simulation results, for the entire time horizon, are showed in Fig. 1. It is possible to see that both simulations give rise to negative economics, even if transaction costs are not taken into account. The result range is about 10 – 25 Million USD. In the A case, given a CERs price equal to 10 USD, the total CERs value is not sufficient to compensate the difference between BAT costs and standard costs, plus transaction costs (TC). In the B case, given higher transaction costs (7%), the results are worse. In order to attain the project economic balance, the CERs price must increase up to 22.5 USD (case A) and 33 USD (case B). These simple exercises show how transaction costs can play a key role, rendering a project less attractive, even if not very high transaction costs are assumed. In fact, it must be noticed that, as mentioned above, there are situations in which transaction costs can be equal to 30% of the entire project cost. In this situation, the CERs price should increase up to about 93 USD.



The results of the other two simulations (C and D) are showed in Fig. 2. Case C is equal to A, but with a 10% discount rate. The results are very similar and this shows that in this particular case the discount rate plays no role in determining the economic result sign, but it reduces the amount of the deficit. On the contrary, Case D, that assumes a fossil fuel only baseline, gives rise to a positive balance (Total Incremental Cost + TC – CERs = - 7.291 Million USD). In this case, the CERs price can decrease down to around 7 USD. On the other hand, if transaction costs were much higher (e.g. 30%), the economic balance would be negative (Total Incremental Cost + TC – CERs = 49.7 Million USD) and the CERs price should increase up to 29.5 USD in order to reach the economic balance.

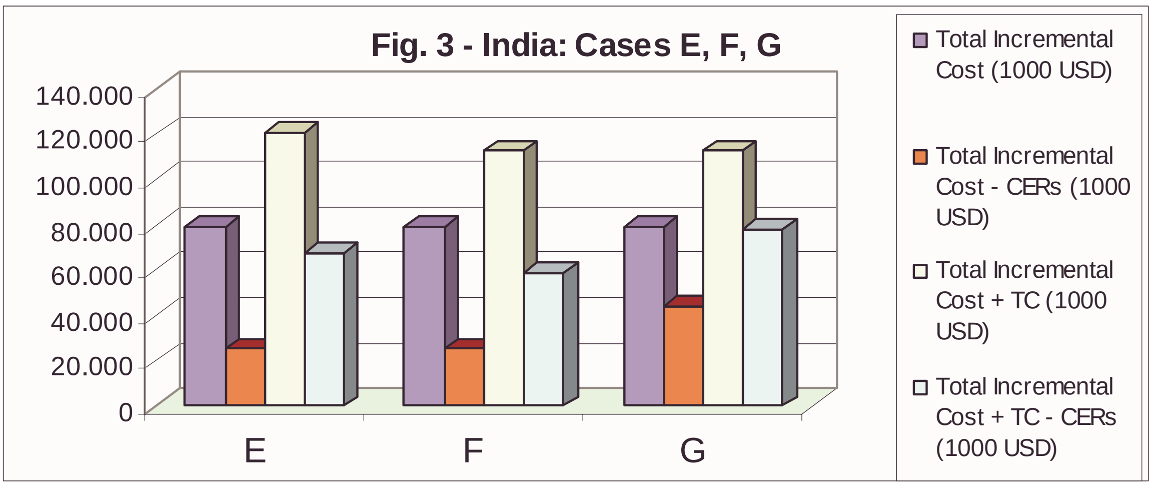


The basic assumptions of the last three simulations for India (cases D, E, F) are showed in table 2, while the results are showed in Fig. 3.

Table 2: CDM Project in India, simulations hypotheses

Case E	Like Case A, but with a Capacity Growth Rate that linearly increases up to 5%/year in the 20th year.
Case F	Like Case E, but with linearly decreasing Transaction Costs from 7% to 1% of the BAT Unit Production Cost.
Case G	Like Case F, but with a decreasing Baseline from Fossil Fuel Only to All Sources to Natural Gas Only.

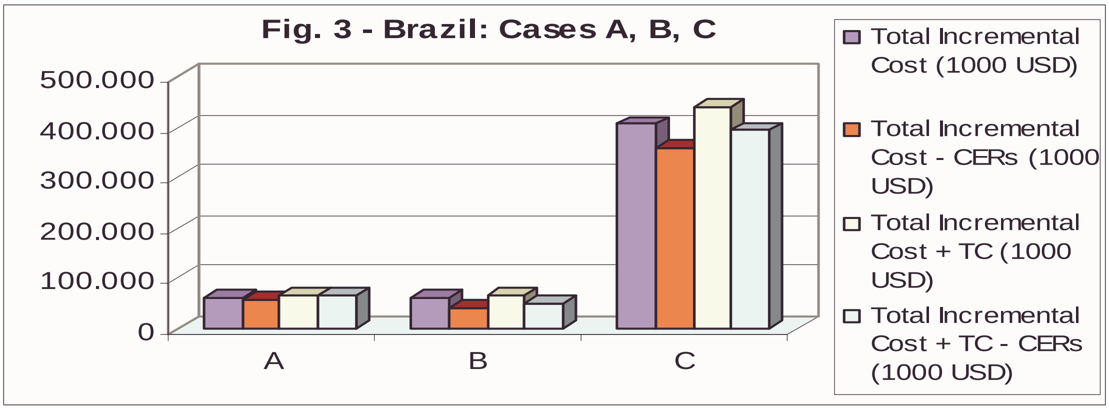
At the end of the 20th year, 3682 MW are built in India. Negative results, that are positive differences between costs and CERs values, emerge in all the simulations. The worst performance occurs in case G where, due to the hypothesis of a decreasing baseline, the amount of CERs that arise from the project is lower than in cases E and F. Due to decreasing transaction costs, Case F is better than case E, in spite of higher transaction costs in the first years. The hypothesis that transaction costs decrease in the years reflects organisational improvement and learning effects in the relationships between the investor and host country. Similarly, the hypothesis of a decreasing baseline reflects the fact that, due to a change in the host country technology and fuel mix, the baseline could be revised in the years. Since we do not know how such a revision occurs, a simple hypothesis of a scaled baseline in the years is done. It must be noticed that since all the cases, but case D, give rise to negative economic results, some form of subsidy, high tariffs or higher CERs prices must be hypothesised. In particular, for the three cases (E, F, G) the economic balance is attained at 22.5, 21, and 32.5 USD.



Similar simulations were performed for Brazil. The studied project is the same, but differences exist as the unit standard cost (0.338 USD/kWh) and baselines. In particular, because of the dominion of hydro, the all sources (recent capacity additions) baseline is only 108.03 tCO_2/GWh. Since, if we assume this baseline, the unrealistic result of no CERs arises, it was not considered. The baselines taken into account are the (recent capacity additions) natural gas only (426.4 tCO_2/GWh) and fossil fuel only (807.93 tCO_2/GWh) baselines. Three simulations were performed (Table 3 and Fig. 3). It is possible to see that the results of these simulations are worse than the Indian ones, even in the B case, where a fossil fuel only baseline is assumed. Basically, this depends on higher incremental costs. In order to attain economic balance in the A, B, and C cases, the CERs price must increase up to 345, 36 and 97 USD. Thus, even with the hypothesis of a strong decrease in transaction costs (case C) there must be a very high CERs price.

Table 3: CDM Project in Brazil, simulations hypotheses

	Baseline	***Transaction Costs***	***CERs Price***	***Discount rate***
Case A	Natural Gas (Recent Capacity Additions)	3% of the BAT Unit Production Cost	10 USD	5%
Case B	Like Case A, but with Fossil Fuel Only Baseline.			
Case C	Like Case A but with: a Capacity Growth Rate that linearly increases up to 5%/year in the 20th year; linearly decreasing Transaction Costs from 7% to 1% of the BAT Unit Production Cost; a decreasing Baseline from Fossil Fuel Only to Natural Gas Only.			



These simple simulations are some possibilities among many alternatives. The differences in the results that arise show that, at the moment, it is not possible to derive any conclusion about the CDM and JI potential and utility. Concrete experiences seem to give more useful indications than abstract simulations. In particular, they show that in the real world a friction exists. Such a friction is often not considered in theoretical discussions but can play a key role: it is represented by transaction costs.

Conclusions

The main conclusions of this research can be summarised in the following points:

- Several different implementation criteria exist and they are not always coherent. CDM and JI projects can be implemented in several different ways which can give rise to entirely different economic results.
- The idea of the possibility of win-win projects is nice, but only partially true. Many ambiguities are contained within it. If they are not solved, CDM and JI can be transformed in weak and/or negative tools.
- Giving indications about the CDM and JI potential is very difficult, and maybe impossible. Several variables (incremental costs, tariffs, baselines, ERUs and CERs prices, transaction costs) are at stake, and a key one (baseline) has not jet be defined.
- Certainly, through FDI the private sector can play a key role in boosting CDM projects and development in LDCs countries. Nevertheless, there exists the risk that such investments flow towards few, important countries. Moreover, CDM could subtract funds to ODA or be partially compensated by ODA for fossil fuels projects.
- Avoiding any possible conflict between CDM and JI, as they are described by theory, and the numerous obstacles and possible contradictions that exist in the real world, will be a key issue in the CDM and JI guidelines definition and, thus, in the future climate change policies.

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