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Coding Error or Statistical Embellishment?
The Political Economy of Reporting Climate Aid

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Abstract

During the last few decades, general awareness has increased that along with problems of international development, environmental problems, notably with respect to climate change, represent yet another global challenge. In an attempt to win further public support for aid expenditures, aid administrations may have tried to make use of this trend in public perception by labeling some of their aid activities as conducive to the mitigation of, or the adaptation to, climate change. In this case, whether a donor reports a project with a climate-related "Rio marker" should depend not only on the actual content of the project, but also on the national voters' ecological preferences, meteorological extreme events, or the media coverage of international climate policy issues.
In our paper we test these hypotheses using project-level aid data and country-level political data for 21 DAC donors from 1995 to 2007. Keyword search in the project descriptions of the PLAID database and complementary hand-coding allows us to assess all projects for their actual climate change-related content, and to thereby construct our most relevant control variables. We then econometrically analyze the impact of political factors on climate aid reporting, in a multilevel setting, controlling for a number of additional project-level and donor country characteristics. Our results reveal that indeed, coding is influenced systematically by political factors. Further factors are a misinterpretation of the Rio marker, and insufficient coding diligence.

Keywords

Development assistance, climate policy, public choice, project coding, mitigation, adaptation

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"Never trust any statistics that you didn't forge yourself."
(Unknown source, albeit sometimes attributed to Winston Churchill; for details see Frankford 2002)

1. Introduction

In order to assess the contribution of development aid to the objectives of the 1992 UN Conference on Environment and Development in Rio de Janeiro, in 1998, the OECD Development Assistance Committee (DAC) introduced the so called "Rio markers" for reporting aid projects related to biodiversity, desertification and climate change. In this paper, we only consider the marker related to climate change. Some individual donors have used such markers since 1995.
The climate change-related objectives of the Rio Summit, codified in the UN Framework Convention on Climate Change (UNFCCC), refer to the reduction or sequestration of greenhouse gas emissions ("mitigation"). The corresponding Rio marker should therefore indicate aid activities related to the objective of climate change mitigation (OECD-DAC 2009a, p. 1). However, even at first glance, the list of aid activities reported as climate change-relevant to the DAC reveals a number of curiosities. In the list, we find, for instance:

- Savannah elephant vocalization (US)
- Uniforms for park guardians in Central America (Spain)
- Protection of Maya archaeological sites (Germany)
- Tobacco control (New Zealand)
- Lead reduction in transport fuels in Pakistan (UK)
- Earthquake safety (Switzerland)
- Green Parliament contribution to UNICEF telemarathon (Greece)
- Monetary climate in Democratic Republic of Congo (Belgium)
- Education sector assistance in Kiribati (Australia)
- Love movie festival (Belgium)

Most of these obvious coding errors may be related to misunderstandings (e.g. associations of any kind of environmental objectives with climate change) and some may be related to rapid coding procedures. But some might also be related to politico-economic factors, i.e. to systematic over-coding for political reasons. In any case, even at first glance, there appear to be too many errors to be purely random.
A closer look at the data confirms this initial impression. There is, indeed, a considerable mismatch between the aid activities coded as climate change-relevant by donors, and those for which keyword search reveals an actual climate change orientation. For a random sample of 115 000 aid projects, Roberts et al. (2008) find evidence for climate relevant content only for about 25% of the projects coded as such with the Rio marker. Our own analysis based on all 636 962 aid activities listed in the project level aid (PLAID) database for 21 bilateral DAC donors for the years 1995-2008 yields very similar results (see Section 2, Table 1b).
Can such strong discrepancies be purely coincidental, i.e. a random error by coding administrators when typing the data into the system? In this paper, we test this hypothesis against the alternative that at least some of the miscoding is systematically related to variables such as the national voters' ecological preferences, meteorological extreme events, or the media coverage of international climate policy issues. Drawing from the wider field of public choice literature, we assume that governments want to maximize political support. Depending on the valuation of environmental policies by the general public, this support may be positively influenced by statistics showing a significant climate change-related effort of development cooperation projects. At the same time, especially when transparency and the

level of information are not very high, these projects may not necessarily have anything to do with climate change. The corresponding coding mismatch may be reduced, however, if the government does not only value public support, but also intrinsically values environmental objectives.

To the best of our knowledge, there is no literature on politically motivated project coding so far. There is, however, a substantial amount of literature on politically motivated aid allocation. Ever since the late 1970s, researchers have examined politico-economic determinants of aid allocation (for early studies, see McKinley 1978, McKinley and Little 1979, or Maizels and Nissanke 1984).[1] More recently, other aspects of aid, such as the relationship between multilateral donors' policies and the interests of member governments (see e.g. Kilby 2009; Dreher, Sturm and Vreeland 2009a, 2009b), or the use of specific procedures and instruments of aid delivery, have also been assessed from a politico-economic perspective. For an overview of various aspects of the recent literature on the political economy of aid, see Lahiri and Michaelowa (2006). From a similar perspective, other authors examine discrepancies between donor rhetoric and actual policies (see e.g. Weaver 2008 for an excellent study on the World Bank) or incentive structures that result in imprecise or biased reporting of project outcomes (Martens 2002, Michaelowa and Borrmann 2006). This literature comes closest to our study which intends to contribute to the political economy of aid reporting, i.e. to the assessment of political factors that may lead to a misalignment between actual aid allocation and aid allocation reported to the DAC.

The literature on the political economy of climate policy is less comprehensive by far. In this field, one of the few studies related to developing countries is Flues et al. (2010) examining the Executive Board of the Clean Development Mechanism. In the context of environmental aid flows, Hicks et al. (2008) use PLAID data to assess donors' incentives to increase aid flows benefiting the environment, while reducing aid that has negative impacts on the environment.

In our study, we specifically consider aid officially dedicated to projects related to climate policy ("climate aid")[2]. The recent availability of "project" level aid data[3] with individual project descriptions provides us with the unique opportunity to compare actual project content with the donors' own coding of climate relevance. In Section 2, we first present some descriptive statistics about the problem of coding mismatch. In this context, we also highlight some inconsistencies within the definition of the Rio marker itself that may be responsible for part of the problem. Moreover, we discuss our own keyword-based recoding strategy.

In Section 3 we develop the conceptual framework of our politico-economic analysis based on a political support function model augmented by elements of government ideological orientation. The econometric estimation strategy and the operationalization of the relevant variables are discussed in Section 4. Section 5 provides the empirical results, and Section 6 presents the conclusions of our analysis.

[1] For more recent analyses, see e.g. Fleck and Kilby 2010, Berthélemy 2006; for a meta-analysis of some of this literature, see Doucougliagos and Paldam 2007.

[2] We use the term "climate aid" as a short hand for climate change-related aid.

[3] The aid activities listed in the PLAID database also include non-project aid, e.g., budget support, other program funding, or small activities such as feasibility studies. These distinctions do not matter in the context of our analysis. As the vast majority of activities are traditional aid projects, we interchangeably use the term "projects" for ease of exposition.

2. Coding mismatch in climate aid

According to the OECD-DAC's definition of Rio markers, agreed to in 1998,

"*climate-change related aid is defined as activities that contribute to the objective of stabilization of greenhouse gas (GHG) concentrations in the atmosphere at a level that would prevent dangerous anthropogenic interference with the climate system by promoting efforts to reduce or limit GHG emissions or to enhance GHG sequestration.*" (OECD-DAC 2002a, p. 4)

This definition can also be found in virtually all other climate-aid related DAC documents as well as on the OECD-DAC homepage (see e.g. OECD-DAC 1998, OECD-DAC 2002b, p. 4, OECD-DAC 2009a, p. 1, OECD-DAC 2009b). As already mentioned above, it focuses exclusively on climate change mitigation, i.e. on the reduction or sequestration of greenhouse gas emissions. Despite its at least equally strong relevance for developing countries, the objective to adjust to climate change impacts (adaptation) is explicitly excluded from the definition of the Rio marker. This is explained by the fact that mitigation, rather than adaptation, is the ultimate objective of the UNFCCC (see e.g. OECD-DAC 2009a, p. 1). To cover adaptation, a different marker was introduced in January 2010 (OECD-DAC 2010), but has not been used for project coding yet and, therefore, cannot be taken into account in this study.

At first sight, the definition appears to be very clear and well explained. However, this is less so at second sight. For example, the DAC definition includes the reduction of ozone-depleting gases although they are not regulated under the UNFCCC, but only under the Montreal Protocol. In addition, even the distinction between mitigation and adaptation is less clear than it might appear. In fact, directly under the clearly mitigation oriented definition, OECD-DAC (2009b, p. 1) speaks about adaptation when it comes to the clarification of individual scores for the Rio marker.[4] While this appears to be a simple typo, it may lend itself to some confusion. In addition, the DAC eligibility criteria for the Rio marker include impact and vulnerability assessments (see OECD-DAC 2002b, p. 4), which are related to adaptation, but not to mitigation.

Confusion about the correct definitions may lead to problems of unintended miscoding through lack of clarity, but may also give rise to politically motivated over-coding through the inclusion of adaptation related projects. Development specialists are usually not experts in climate policy, and the actual use of the climate related Rio marker reveals that many projects were recorded as climate relevant due to their link to adaptation, rather than mitigation (see Tables 1a-c). This confusion may also arise through the fact that mitigation aims at a global public good that does not provide any specific advantage for the developing country in which the activity takes place, and is therefore not a typical aid activity. This is different for adaptation which gives a clear local benefit to the recipient country.

Table 1a shows that, for the years 1995-2008 and 21 bilateral DAC donors, the PLAID database lists a total of 636 962 projects, out of which 10 414 are coded as climate relevant by the donors themselves. According to our keyword search, not even half of these (i.e. a total of 4 321 projects) clearly contribute to either mitigation or adaptation of climate change. For another 2 867 projects, descriptions are so limited that their contribution is not clear. And for about one third of the projects (3 226 projects in total), the bilateral donors' coding is clearly inappropriate, i.e. projects were coded as climate change-relevant while they are not (not even when including adaptation along with mitigation). At the same time, we observe a high

[4] "Activities receive a significant score (score "1") where climate change *adaptation* was an important, but not principal objective. The score not targeted (score "0") means that the activity has been found not to be targeting significantly climate change *adaptation*." (OECD-DAC 2009b, p. 1, emphasis added by the authors)

number of cases (12 238) in which some relation to climate policy can be observed, while bilateral donors did not use the Rio marker.

Table 1: Donor coding versus authors' recoding

Table 1a: Overview

		Authors' recoding			
		No climate relevance	Unclear[2]	Climate relevance[3]	Total
DAC coding[1]	No climate marker	614 310	0	12 238	626 548
	Climate marker	3 226	2 867	4 321	10 414
	Total	617 536	2 867	16 559	636 962

Table 1b: DAC Rio markers versus authors' mitigation coding

		Authors' recoding		
		No mitigation	Mitigation related	Total
DAC coding[1]	No climate marker	623 294	3 254	626 548
	Climate marker	7 616	2 798	10 414
	Total	630 910	6 052	636 962

Table 1c: DAC Rio markers versus authors' adaptation coding

		Authors' recoding		
		No adaptation	Adaptation related	Total
DAC coding[1]	No climate marker	617 545	9 003	626 548
	Climate marker	9 137	1 277	10 414
	Total	626 682	10 280	636 962

[1] "DAC coding" refers to bilateral donors' reporting to the DAC using the climate-related Rio marker.

[2] "Unclear" refers to cases in which project descriptions were insufficient to assess climate relevance, i.e. when the project description contained no elements to determine either relevance or irrelevance for climate change. "Unclear" coding only appears in the context of positive DAC coding since in cases in which project descriptions are missing or extremely uninformative, potential climate relevance is only revealed though the DAC coding itself. Such projects would have been assumed to be climate irrelevant had they not received a Rio marker. Since unclear cases do not even allow us to reassess the climate coding altogether, the more specific links to mitigation or adaptation cannot be established either. In Tables 1b and 1 c, these cases are subsumed in the categories "no mitigation" and "no adaptation".

[3] If a project is coded "climate relevant" this usually implies that it will also be found in the categories "mitigation related" and / or "adaptation related". However, there are some cases in which the climate relevance was clear while the concrete project activities were not indicated. Therefore the sum of projects we code "climate relevant" exceeds the sum of projects we were able to count as relevant for mitigation and adaptation.

Looking more closely at Table 1b, we see that if the Rio marker were taken seriously as a code only for mitigation related projects, evidence of over-coding would be even stronger. In fact, the numbers reveal that only about one fourth of all projects with Rio marker are actually relevant for mitigation (2 798 out of 10 414). The remaining three quarters would be over-coded. If we add projects relevant for adaptation (1 277, see Table 1c), the share of over-coded projects is reduced to below 60%. Obviously, this share is still extremely high. Thus, even if we assume that all adaptation related over-coding is solely due to lack of knowledge or insufficiently clear coding directives, we still have a very high share of over-coding to explain by other factors.

Let us now look at those projects which were *not* reported as climate relevant to the DAC, but still are related to either mitigation or adaptation. Figure 1b reveals that more than half of the actually mitigation relevant projects since 1995 have not been coded as such. For adaptation the share of relevant but unrecorded projects is still much higher, at almost 90% (Figure 1c). This probably reflects that after all, to some extent, project administrators have realized that the focus of the Rio-coding is mitigation rather than adaptation.

Table 2 breaks down the information on over- and under-coding by donor country. Note that, to be on the safe side, we report only those projects as "over-coded" which meet neither mitigation nor adaptation related criteria, i.e. we treat the Rio marker as if it included adaptation as well. To remain consistent with our definition of "correct" coding, we then report all those projects as "under-coded" which are not coded as climate relevant with a Rio marker although they are relevant for either mitigation or adaptation. The values for "under-coding" therefore have to be interpreted with care: Whenever donors do not apply the marker to adaptation, their coding is in line with the definition of the Rio marker, but will be considered as under-coding in the following.

Table 2: Climate aid reporting by donor country, for the period 1995-2008

Donor country[1]	Total number of projects in the database	Number of projects with DAC coded climate assessment[2]	of which [in %][3]: over-coded	under-coded	unclear
Australia	20 972	4 597	1.68	2.81	0.02
Austria	12 938	971	5.97	2.78	2.16
Belgium	37 173	5 342	4.08	1.35	0.77
Canada	23 926	9 035	1.11	3.59	0.27
Denmark	5 '707	2 512	5.97	2.67	5.69
Finland	10 051	3 375	1.72	3.05	0.50
France	43 289	2 062	1.60	0.29	1.50
Germany	53 938	5 959	6.57	1.49	6.93
Greece	6 252	4 653	2.71	0.64	0.11
Ireland	21 235	6 901	1.75	6.33	0.65
Italy	23 114	3 583	3.99	1.93	0.89
Japan	41 479	24 701	0.09	0.42	5.12
Netherlands	27 548	2 991	20.60	3.28	5.18
New Zealand	5 405	2 884	3.33	2.70	0.14
Norway	44 059	1 710	12.63	2.69	17.25
Portugal	9 142	134	9.70	3.73	2.24
Spain	74 302	26 962	1.96	2.16	0.20
Sweden	30 100	15 296	0.20	1.56	0.55
Switzerland	30 334	3 872	0.83	1.65	2.66
United Kingdom	24 176	2 432	1.23	4.32	0.45
United States	91 822	362	45.58[4]	0.00[5]	33.43

[1] Some smaller DAC donors are not included in this table and in this study in general because information on relevant variables is missing or without any variance that could be explored (e.g. for Luxembourg, there is no project coded as climate relevant).

[2] This number refers to those projects for which donors reported some climate coding to the DAC. This coding (Rio marker) could be either 0 (climate objective not relevant) or positive (1or 2, depending on how central the climate objective is for the project). For other projects, we cannot be sure whether they were actually assessed for their climate relevance by the individual donor.

[3] Note that overall, the percentages shown here are much larger than those discussed earlier, because they only refer to those projects for which donors reported some climate coding to the DAC.

[4] When applying the Rio marker, the United States never uses the 0-code. Thus the percentage effectively corresponds to the share of over-coded projects among those projects with a positive code. This share would obviously be much higher for other countries, too.

[5] As the United States never uses the 0-code (see above), projects assessed as climate irrelevant cannot be distinguished from projects not assessed at all. As a consequence, we cannot find any under-coding within the set of projects to which the Rio markers were applied.

As countries started using the marker at different points in time, and still appear to apply it only to a fraction of their climate change-related projects, we decided to report the number of donor coded projects along with the total number of projects in the dataset. In Table 2, over- and under-coding refers to this restricted number of projects. In addition to over- and under-coding, we add a column reflecting those cases where the information provided on the project was so limited that the coding-decision could not really be verified (unclear coding).

Table 2 reveals that the quality of climate related reporting varies substantially among donor countries. Over-coding is particularly prevalent in the United States, Netherlands and Norway, followed by Portugal, Germany, Denmark and Austria. In all of these countries, over-coding concerns more than 5% of the projects for which these countries reported some climate coding to the DAC. The United States represents a particular case with perhaps somewhat inflated percentages due to the fact that they have never applied climate coding to any project considered as climate irrelevant (i.e. the US values for the Rio marker are either 1 or missing). Thus the overall number of climate coded projects that the US reports to the DAC is very small. Nevertheless, a high number of miscodings is obvious in the project descriptions since in the United States, virtually all wildlife protection projects were coded as climate relevant.

In addition, many donors show a high share of projects with extremely limited information. Japan and New Zealand do generally not provide long descriptions which are often crucial to evaluate the project. Belgium, Denmark, Germany, Norway, Sweden and Switzerland lack long descriptions for the majority of projects. For most of these countries, this leads to a considerable share of unclear codings, i.e. codings which we were unable to verify. Only for New Zealand, Sweden and Switzerland, the problem is mitigated through the fact that the Rio marker they provide for most of the projects is zero anyway, so that no coding conflict does arise.[5]

Obviously, whatever discrepancies and inconsistencies we find in the data may be, in principle, related as much to mistakes in our own recoding, as to mistakes in the original coding reported by DAC donors. Such errors may arise, in particular, because we had to assess a huge number of projects within very limited time. Since, for the sake of our politico-economic analysis, we require information on all projects, we were not able to use an in-depth study of a sub-sample of projects such as Roberts et al. (2008). We were also unable to follow the method of machine based recoding suggested by Roberts, Weissberger and Peratsakis (2010). They use a specific algorithm allowing a computer to code of the full dataset on the basis of the experience gathered in the initially drawn random sample. Unfortunately, their recoded data have not yet been available in time for our analysis.

However, given our familiarity with climate related aid projects, and the safeguards we set up through a double-check of all mismatches, we believe that our own coding efforts can be considered as sufficiently reliable in the context of this study. We had the opportunity to cross-check our keywords with those used by Roberts et al. (2008), in order to ensure the inclusion of all important categories. In addition, our own coding tries to avoid the ambiguity of some coding categories (such as “cleaner production” and “air pollution enforcement”).[6]

Our coding procedure was based on the following three steps:

First, we decided about a comprehensive list of keywords relevant in the context of mitigation and adaptation. For mitigation, these keywords were derived from project types found in the Clean Development Mechanism (CDM) as listed by UNEP Riso Centre (2010). For

[5] If there is no climate relevance apparent from the project description and the project is not coded as climate relevant by the donor, we do not see any reason to assume that it might be climate relevant. We therefore do not consider these cases as unclear despite the limited project documentation.

[6] While it might be safer to include these categories if one wants to make sure to cover all possibly climate related projects, we exclude them because the probability that they are truly related to climate change mitigation (without further mentioning of this relationship) appears to be relatively small.

adaptation, the selection of keywords was driven by our own knowledge of the field (for the list of keywords, see Appendix 1). This keyword search led to an overall output of over 30 000 projects potentially relevant for mitigation, and over 50 000 projects potentially relevant for adaptation.
Second, we manually assessed the actual relevance of these projects. This procedure led us to delete the vast majority of the above projects because the keywords appeared in a context unrelated to mitigation and / or adaptation activities.
Third, we double checked the mismatches between our coding and initial donor coding to ensure that no project would appear as wrongly Rio-marked by any donor (over-coded) simply for having escaped our initial mechanical search procedure. This led us to reconsider a total of 8 854 projects which did not appear in our list of climate-relevant projects while having obtained a positive Rio marker. Where necessary, our mitigation and adaptation codes were revised accordingly. Cases of unclear project descriptions that did not allow us to take any firm decision, were coded separately, and were not considered as a mismatch in our final measure of donor over-coding. This implies that, if our coding is biased, it is biased in favor of donors, i.e. it might show less over-coding than actually present in the data.
Projects that we finally code as climate irrelevant although they are coded with a Rio marker are thus only those projects for which this is obvious from the project description. As already noted by Roberts, Weissberger and Peratsakis (2010), some countries have a tendency to report any environmentally relevant project as climate relevant. This may include lake and river cleaning (Greece), various kinds of wildlife protection activities (Greece, United States), or the financing of environmental NGOs or donor staff travelling to conferences. In yet other cases, there is not the loosest link to even any environmental objective.
Many more specific examples of miscoding are provided along with a much more detailed description of our coding procedure in Appendix 1 of this paper. Appendix 1 also includes a discussion of certain problems faced during the coding process. The list of projects together with our codes is available online at http://www.cis.ethz.ch/publications/publications.

3. A conceptual framework for politically motivated coding decisions

Let us now return to the question whether the strong discrepancies between climate coding by bilateral donors and our recoding based on individual project descriptions can be purely coincidental. To some extent, they certainly reflect a lack of expertise with respect to climate policy or unclear information about the new marker. They may also reflect a lack of diligence driven by time and resource constraints, or even a lack of knowledge about the project itself – if some head office administrative staff rather than the project manager assigns theses codes (Roberts et al. 2010, p 3). These reasons for coding mismatch would simply lead to a random error of donor coding.
The mismatch is, however, so substantial that this may be only part of the story. Climate policy has become such a prominent part of international and national policy debates that it could be relevant for electoral decisions. Aid agencies are well aware of the public relevance of climate policy. Anecdotal evidence suggests that high-level staff in aid agencies considers moving towards climate related topics in order to escape from a general aid fatigue (see also Michaelowa and Michaelowa 2007). Hicks et al. (2008, p. 160) speak of a “political market for environmental aid in wealthy countries” and argue that “this market is shaped by the preferences of voters within each country”. Despite a dominance of discourses about issues such as unemployment, taxes, migration, or maybe trade openness, in national election campaigns, evidence shows that at least those political and administrative officials directly responsible for development cooperation care tremendously about their public image, notably before the elections. How else to explain why, in the mid-1990s, the French DAC delegation

went up to the level of the OECD Secretary General to push through a couple of changes in the wording of the DAC Peer Review on the performance of French development aid. Or the German DAC delegation responding to a 50-page draft of the DAC Peer Review by a 70-page fax with requests for "factual changes" briefly before the 1998 general elections? A number of academic studies also suggest the relevance of voters' aid and / or environmental preferences for government policy (see e.g. Milner and Tingley 2010, List and Sturm 2006).
At times, rhetorical changes (or changes in coding), rather than changes in substance may be sufficient to ensure public support. This should be particularly true for policy areas as difficult to verify as climate aid.

More formally, let us assume a government's utility depends on public support, on the one hand, and on some ideological preferences on the other hand. In line with most of the literature on the political economy of environmental policy making, we do not distinguish between the administrative side and the political side of government (see e.g. Hicks et al. 2008, List and Sturm 2006, Blanke 2002, Felder and Schleiniger 2002). To simplify the exposition, we rather imagine an aid administration headed by the relevant minister for development cooperation (reflecting the political side of the aid administration) as a single agent.
Public support is increased through greater evidence for the government's climate change-related activities, especially if environmental objectives are considered important by the country's population (see e.g. Hicks et al. 2008). In our context, this implies that aid statistics showing strong evidence of climate change-related activities will increase public support by an environmentally concerned population in the donor country.
We now consider that this evidence can be generated by either actually increasing climate related activities, or by forging the statistics through over-coding. The former has the disadvantage that subject to a given budget constraint, any additional climate project will lead to the reduction of activities elsewhere. Over-coding, however, can provide the impression of enhanced climate activities without the need to reduce other activities. It will therefore increase government utility.
Unfortunately, this does not lead us to a clear prediction with respect to the impact of the public's valuation of environmental issues. While the literature clearly suggests that the public's ecological preferences are positively correlated with actual environmental policy making (List and Sturm 2006, Knill et al. 2010), this is less obvious for over-coding. For instance, voters with environmental preferences may not only value climate related aid, but may also be more critical observers of the government's environmental policies, so that over-coding becomes a risky business. While the sign of the relationship can thus not be unambiguously determined on theoretical grounds, our hunch is that the incentive for over-coding will dominate, because actual detection of wrongly reported aid statistics has been an extremely difficult task so far (given the low level of publicly available information on the details of individual aid activities and the high transaction cost involved in such an analysis). This leads us to our first hypothesis:

H1: Over-coding will be the stronger the more the national population in the donor country values environmental objectives.

Nevertheless, we consider that change in transparency may play a role with respect to the public's critical scrutiny (typically led by NGOs). While there has not been much change over time concerning the transparency of aid activities, information on climate change-related issues has varied over time along with different levels of media coverage. A high level of information may render the obfuscation of over-coding more difficult and thereby increase the risk of discovery. This leads us to our second hypothesis:

H2: Over-coding will be the stronger, the less the population is informed about climate policy issues.

Finally, we assume that the government also has ideological preferences, whereby "ideological" refers to an intrinsic valuation of certain objectives, unrelated to voter preferences and exogenously determined, i.e. not explained within our model. This is a typical assumption in models of environmental policy making (see also Knill et al. 2010). The consideration of ideology alters the government's optimization problem and complements the purely opportunistic perspective of a simple political support function model. If a government has ecological preferences, an increase of actual climate change-related activities will lead to higher utility even if other activities equally valued by the public will have to be reduced. This implies that at a given level of transparency and public support of environmental issues, a government with ecological preferences will generate more truly climate relevant activities. As long as reporting incentives remain unchanged, this should reduce the gap between actual and reported climate related aid activities, and thereby lead to less over-coding. This leads us to our final hypothesis:

H3: The prevalence of over-coding is reduced if the government has ecological preferences.

However, is it not conceivable that reporting incentives increase, too? It certainly would if we relaxed our simplifying assumption of considering the administrative and the political part of the government as a single, unitary actor. One could then, alternatively, imagine a principal-agent framework with the administration being the government's agent for the implementation of development aid. In this case, a change in government ideology towards environmental preferences could lead to an additional incentive for the aid administration to over-report climate related projects. The principal-agent framework would thus lead to very different predictions for the relationship between government ideology and over-coding. As we cannot draw on any prior studies to clarify this theoretical argument, we will have to rely on the results of our econometric analysis to see whether our simplified model, or rather a more complex theoretical framework including a principal-agent relationship between the government and the aid administration, is more appropriate to describe the empirical evidence.

4. Operationalization and econometric estimation strategy

We can test these hypotheses using the project-level aid data provided by PLAID (AidData 2010) in combination with political, economic and environmental data from other sources. As we want to explain the donors' coding decision, the dependent variable is based on the Rio marker reported to the DAC. We generate a dummy variable "Rio dummy" that takes the value 1 if a donor reports that his project is climate change-relevant (i.e. with mitigation as the principal objective or among the important objectives) and 0 otherwise. As discussed above, we cannot clearly distinguish between those projects assessed by the donors as climate change-irrelevant and those projects not assessed at all (in particular for the United States which did not use zero-codes at all). Therefore all of these will be coded as 0 in our Rio dummy.
As an alternative dependent variable, we will directly use our dummy for "over-coding" taking the value of 1 if we find clear evidence that the project has no link to either mitigation or adaptation activities while the Rio dummy is still reported as 1. Unclear cases are coded as 0 rather than 1, i.e. they are considered as correct.

We use different variables to measure the environmental or ecological preferences of the population (as necessary to test Hypothesis 1). First, we explore the World Values Survey (WVS) which provides us with the percentage of the population in each donor country considering global warming or the greenhouse effect as a very serious problem (World Values Survey Association 2009). Unfortunately, the information is only available for a single year (2005). Nevertheless, assuming that – at least relative to other countries – these preferences stay relatively stable over time, we can use these figures as a general estimate of cross-country differences in the population's valuation of global environmental problems, and even more specifically, the problem of climate change. For some countries, for which data on this question were not available, we used information from other questions related to the environment from the 2005 and earlier WVS surveys to impute the missing values. Only for one donor (Greece) no imputations are possible because it did not participate in any of these surveys.

Second, we assume that ecological preferences of the population should find their reflection in votes for green parties, so that we can use the share of green seats in national parliaments as a second indicator of the relevance of environmental objectives in the population. These data are available from Armingeon et al. (2008).

Third, we consider the rate of unemployment as an indicator of the relative salience of environmental problems. Our expectation is that in periods of high unemployment, people will be less concerned with environmental issues. As business cycles do not necessarily move in line with electoral cycles, this variable might capture some of the variation in preferences which is not covered by the more direct measure of preferences reflected in electoral outcomes. Data on unemployment are available from the World Bank's (2009a) World Development Indicators (WDI).

Let us now turn to the variables required to test our other hypotheses. The information of the population about climate policy issues (as required for Hypothesis 2) is measured by a count of press articles referring to climate change in their abstract or introductory paragraph. As we cannot assess the press in all national languages, we consider only one relatively widely read international newspaper, namely the New York Times. While this does not allow us to explore cross-country variation in the level of information, it should capture variation over time at the global level. The data on this variable was obtained through keyword search in LexisNexis (2010).

Regarding the preferences of the government (Hypothesis 3) we consider several variables. First, we assume that green or, more generally, left governments tend to have ecological preferences. As ecological preferences are only imprecisely reflected on a left-right dimension (Knill et al. 2010, p. 304), the ideal indicator would more closely reflect party positions (e.g., the indicator based on the assessment of party manifestos by Cusack and Engelhardt 2002). However, these data are not available for most of the time period relevant for the Rio coding. We thus do not see any alternative to the measure of the traditional left-right dimension. In this context, we use the index of cabinet composition developed by Schmidt (1992) and updated by Armingeon et al. (2008). The index takes on values from 1 (hegemony of right-wing and center parties), to 5 (hegemony of social-democratic and other left parties).

Second, we suppose that the relative Kyoto gap, i.e. the difference between the national emission target adopted in the framework of the Kyoto Protocol and current emission levels, divided by the base year emissions level, could provide further information on government preferences. If the government is itself responsible for the emission reduction target, a stringent target (and thus a high initial relative gap) is a direct reflection of the government's position on this topic. In other words, the stronger the governments environmental preferences, the more stringent should be the Kyoto target. For later governments who inherit the target, the remaining gap is proportionate to the necessity of action. If the target is eventually not met, the government will lose credibility at the international level. Thus even if the "green" beliefs

are not fully authentic, the fears to lose face at the international level may increase the preferences for concrete environmental policy action. Data on the Kyoto gap are available from IGES (2009).
Third, we conjecture that extreme meteorological events with severe consequences in any particular donor country (such as flooding, storms, heat waves or droughts) will influence the government's perceptions about the general need for climate policies. Of course, such events will also influence the preferences of the population as a whole. However, it is the effect on the government's own preferences which distinguishes this variable from other variables such as unemployment. It is through the effect on government preferences that we expect a reduction rather than an increase in over-coding. We extract data on extreme events from publications by the World Meteorological Organization (WMO various years) and construct a corresponding dummy variable.

Finally, we will consider a certain number of controls. Most importantly, when we use the Rio dummy as our dependent variable, we need to control for actual mitigation and adaptation. In our recoding procedure described in Section 2 and Appendix 1 we generate two separate dummy variables indicating a project's relevance for either of these two. It is worthwhile to distinguish between both because of the Rio marker's official focus on mitigation only. Controlling for mitigation and adaptation separately, we will be able to make out to what extent this has been incorrectly interpreted to include adaptation.
In addition, we control for income and growth in donor countries. The underlying idea is that these factors may influence the government budget constraints when considering climate related interventions. While the general level of income (GDP per capita) affects the overall level of resources and therefore shapes government spending in the long-run, temporary relaxation of the budget constraint is determined by economic growth. We thus expect that with a higher general level of income and in periods of high growth there is less need to use over-coding since finance for truly climate related measures is more easily available.
As yet another macroeconomic variable, we consider the share of agricultural value added in donor GDP. In developed countries, a strong agricultural sector usually goes hand in hand with important lobbying activities. As national policies against climate change often have a negative impact on immediate earning prospects in agriculture due to increase of energy costs, these lobbying activities tend to be directed against such interventions or against the mere perception of a need for action. In New Zealand, for instance, in 2003 the agricultural lobby immediately led politicians to shelve a proposal for a tax on livestock methane emissions (Fickling 2003). Such lobby interventions may override the preferences of the government and / or the preferences of the population as a whole.
These additional macroeconomic variables are available from the WDI database. Missing values for all our macroeconomic variables are imputed using linear imputation based on related macro variables from the same dataset.
Apart from macroeconomic variables, we consider a few additional controls which may be relevant to avoid omitted variable bias in our regressions. First, we consider that the age composition of the population in donor countries may interfere with voters' climate policy-related preferences and therefore be relevant in the context of the variables used to assess Hypothesis 1. The neglect of climate change today is equivalent to living on the future generations' resources. A younger population may have stronger preferences for environmental policies if it feels more directly concerned by its consequences than older people. If, however, the detrimental effect of today's neglect of climate change is expected to be relevant only further in the future, it might also be that older people care more. In their empirical assessment, Torgler et al. (2008) find that older people tend to express less support for general environmental policies, but show even more active engagement for environmental objectives. Since the relationship between age and environmental preference is not clear, we

cannot use this variable to test Hypothesis 1 on the effect of environmental preferences on over-coding. This is why we simply add this variable as a control. To capture the impact of age, we include the share of the population aged 65 and over which is available from the OECD (2008) (and reported along with the political variables used here in Armingeon et al. 2008).

Another relevant control may be project size. On the one hand, any government wishing to impress its population by a high share of climate change-relevant aid will be able to do so more easily with financially large projects. After all, financial flows rather than project numbers are usually presented in published statistics. This implies that, for political reasons, large projects may tend to be over-coded more frequently. At the same time, the project description for big projects could simply be less detailed, so that even if climate change is indeed among the important objectives, this may not always have been recognizable for our recoding. In this case, a positive relationship between project size and over-coding may simply be an artifact of imprecise reporting. Unfortunately, there is no way to distinguish between these two effects.

We also introduce a control variable which directly captures part of the reporting problem related to a lack of diligence or uninformed coding decisions, rather than politico-economic motives. This is possible if we assume that the quality of coding is positively related to a donor country's general level of bureaucratic quality. Bureaucratic quality can be measured with the indicator on government effectiveness provided by the World Bank's (2009b) World Governance Indicators (WGI). According to its definition, this indicator captures "perceptions on the quality of public services, the quality of the civil service and the degree of its independence from political pressures, the quality of policy formulation and implementation, and the credibility of the government's commitment to such policies" (Kaufmann et al. 2009, p. 6). As this variable was only created on a bi-annual basis until 2003, we use linear interpolations from data of neighboring years to impute missing values.

Finally, we include one project level control variable indicating whether the recipient country is a member of the group of Small Island Developing States (SIDS). In these countries, most projects are climate relevant in some way or the other due to their high vulnerability to climate change. Therefore, by definition, there may be less scope for over-coding.

Details on all variable definitions and sources are provided in Appendix 2. Unfortunately, many of the explanatory variables, notably the political variables most important for our analysis, are only available until the end of 2007. As mentioned earlier, the starting year of our analysis is 1995 since no country used the Rio marker for any earlier year. This leads to an overall time period covered from 1995-2007.

The estimation approach needs to reflect the structure of the data, notably the fact that any given donor carries out a multitude of projects which cannot be considered as fully independent from each other. This leads us to adopt a two-level hierarchical model in which projects are nested in donors. However, there is also some risk that unobserved donor characteristics might induce bias. We thus test the typical two-level (random effects) model against a model with donor fixed effects using a standard Hausman test. This test consistently rejects the random effects model. We therefore proceed with the fixed effects model here. It should be noted, however, that due to the large sample size the precision of estimated coefficients is very high and the difference between the coefficient estimates in both models is hardly visible.

Apart from projects being nested in donors, there may be other interdependencies between our observations induced by the structure of our data. For instance, certain years could be of particular relevance leading to a general effect on all projects across all donors. One could imagine that the year 1998 when most donors introduced the Rio coding, should be a matter in case. Surprisingly, we do not find much evidence for such year specific effects. They are

mostly insignificant, so that we eventually decided to leave them out of the final specification. Results of other variables remain unaffected.
In addition, there could be unknown relationships between projects in certain sectors or regions which we have not explicitly taken into account through any variables in the model. This suggests using estimation methods robust to serial correlation and heteroskedasticity.
As our dependent variable is binary (reflecting the coding decision) the problem becomes more complicated, however, since binary response models (logit or probit) are inconsistent in the presence of serial correlation or heteroscedasticity (Greene 2002, p. 673f.). In other words, if we believe that we need robust estimation, the whole model is incorrectly specified in the first place. We therefore proceed by presenting both, a logit estimation under the assumption of homoscedasticity and no autocorrelation, and a linear probability model to assess what happens if we relax this assumption and use a robust estimation for our variance-covariance matrix.
As an additional robustness check, we estimated the whole model at country level, using shares of over-coded projects as the dependent variable. This considerably reduces the number of observations and therefore, the precision of the estimation, and also induces us to drop or average certain project-level variables. However, it avoids the problem of unknown interdependencies of observations at the project level. Moreover, it is the only specification where the Hausman test suggests RE-estimation, so that time invariant variables can also be taken into account.

5. Politico-economic determinants of systematic coding mismatch: econometric evidence

Let us now examine the results of our analysis. Table 3 presents six regressions. Regressions A-C use the Rio dummy as the dependent variable and control for mitigation and adaptation, while Regression D and E directly use our dummy for over-coding. Regressions A, B and D are based on the (robust) linear probability model, whereas Regressions C and E are logit regressions. Regression A differs from Regression B in that we drop two of the macroeconomic variables (unemployment and GDP per capita) which are clearly insignificant. Finally, Regression F presents the results of the country level estimation using the annual share of over-coded projects as the dependent variable.

Regressions A-C which use the donor's coding decision as the dependent variable allow us to include our coding of mitigation and adaptation to control for the match of coding decisions with the projects' actual climate relevance. As our descriptive statistics have already suggested, instead of a one-to-one relationship between mitigation and a positive Rio marker, our mitigation dummy increases the probability of a positive Rio marker by only about 34 to 42%. Projects related to adaptation increase this probability by another 6 to 10% (depending on the different specifications). Much of the overall variance in the dependent variable remains unexplained, and we will now see whether some of it is indeed systematically related to our politico-economic variables.
We obtain the clearest results for our two major political variables, the share of green parliamentarians and cabinet composition. The latter is significantly negative throughout suggesting that the ideological position of government clearly plays a role for over-coding – with over-coding being less prevalent in left-wing governments (Hypothesis 3). This is in line with our conjecture that, due to their own preferences, these governments may tend to truly act on climate related issues rather than to simply rely on over-coding.[7]

[7] Note that the first part of this conjecture cannot be tested with climate aid data. Government preferences for environmental protection tend to be positively correlated to government preferences for development aid. An environmentally oriented government should thus not be expected to substitute action against climate change for

In most regressions the substantive effect lies between -0.5 and -1 percentage points for a full switch from hegemony of right parties to hegemony of left parties. If the left-right dimension only imprecisely captures the governments' environmental preferences, the true effect should be even stronger.
Among the other variables included as more indirect measures of government preferences, the effect of meteorological extreme events is also relatively clear: If the donor country is hit by a meteorological extreme event, over-coding tends to be reduced by 0.1-0.5 percentage points. This effect is sustained over the following year. In the country level regression (Regression F) this effect is insignificant, but similar in size.
For the Kyoto gap, coefficient estimates also have the expected sign but they are small (as they refer to a change of the gap by 100%) and significant only in regressions without robust standard errors (Regressions C and E).

When distinguishing donor governments' preferences from the preferences of their population to assess the specific effect of the latter (Hypothesis 1), our most direct variable is the share of green parliamentarians. As already mentioned above, this variable appears to be clearly relevant. Our results suggest that increasing the share of green party representatives in a national parliament by 1 percentage point leads to a 0.1 percentage point increase of projects coded as climate relevant, irrespective of the projects' actual relationship to mitigation or adaptation. The positive coefficients are significant in all but two regressions, but even there, they fall only slightly under the threshold of a 10% significance level. These results are in line with our conjecture that ceteris paribus, a population's ecological preferences, as expressed in the votes at national elections, lead to higher over-coding.
We do not find significant effects for the other two variables introduced to measure public preferences, unemployment and the expressed concern about global warming. Generally, the effect of our macroeconomic variables (including those introduced as controls) is far less robust than the effect of many other variables. This seems to be at least partially related to their correlation among each other. We therefore drop the unemployment variable as well as GDP per capita from Regressions B-F.

Hypothesis 2 on the role of media information in reducing over-coding is less clearly in line with the empirical evidence. As expected the coefficients are negative, but it is significant only in 2 out of 6 regressions. Moreover, the substantive effect is rather small: One hundred more New York Times articles mentioning climate change in their abstract or introduction in any given year only reduces over-coding by only 0.05-0.5 percentage points.
Moreover, considering the lag of our information variable, we find that the effect is reversed only one year later. Our interpretation is that information first increases the call for truly climate relevant interventions and the critical scrutiny of government action in this respect. However, after some time, if the information effort is not sustained, people reduce their effort of critical policy assessment so that simple statistical embellishment tends to become the governments' preferred strategy. All in all, the substantive effect is weak, which may be related to the fact that media information on climate-change related issues is generally rather superficial.

As far as our control variables are concerned, the most significant results are obtained for the share of elderly people (which tends to increase over-coding), the general quality of bureaucratic services (which tends to decrease over-coding), and the share of agricultural value added in donor countries (which equally tends to decrease over-coding). While fully

traditional development projects, but rather, to carry out additional mitigation activities (e.g. through emission reduction at home). Indeed, actual climate aid (as opposed to climate aid related coding) seems to be relatively unaffected by any of the political variables above (Michaelowa et al. 2011).

significant in only two regressions, there is also some evidence for the expected stronger coding gap for large projects.

Table 3: Estimation results[1]

Regression number	(A)	(B)	(C)	(D)	(E)	(F)
Regression type	FE, linear[2]	FE, linear[2]	FE, logit[3]	FE, linear[2]	FE, logit[3]	RE,linear[4]
Dependent variable	Rio dummy	Rio dummy	Rio dummy	Over-coding	Over-coding	Share of over-coding
Environmental preferences, donor country population						
Green parliamentarians, in %	0.001	0.001	**0.001**	**0.001**	**0.0002**	**0.001**
	(0.13)	(0.13)	(0.00)	(0.02)	(0.00)	(0.09)
Unemployment, in %	-0.0003					
	(0.76)					
Global warming very important						0.002
						(0.93)
Information						
New York Times	-4.63e-05	-4.56e-05	**-2.58e-05**	-1.36e-05	**-7.89e-06**	4.07e-06
	(0.13)	(0.14)	(0.00)	(0.26)	(0.00)	(0.72)
New York Times, lagged	0.0001	0.0001	**0.0001**	-1.13e-05	**1.66e-05**	0.0006
	(0.18)	(0.24)	(0.00)	(0.77)	(0.00)	(0.12)
Donor government preferences						
Cabinet composition, 1 right-5 left	**-0.002**	**-0.002**	**-0.0004**	**-0.001**	**-0.0002**	**-0.001**
	(0.06)	(0.02)	(0.00)	(0.06)	(0.01)	(0.03)
Kyoto gap relative to base year	-0.003	-0.001	**-0.007**	-0.010	**-0.004**	0.005
	(0.85)	(0.96)	(0.02)	(0.31)	(0.01)	(0.51)
Extreme events	**-0.005**	**-0.005**	**-0.002**	**-0.002**	**-0.001**	-0.002
	(0.02)	(0.00)	(0.00)	(0.02)	(0.00)	(0.47)
Extreme events, lagged	**-0.005**	**-0.005**	**-0.003**	**-0.003**	**-0.002**	-0.001
	(0.05)	(0.03)	(0.00)	(0.01)	(0.00)	(0.63)
Controls: Actual climate relevance						
Mitigation	**0.416**	**0.416**	**0.337**			
	(0.00)	(0.00)	(0.00)			
Adaptation	**0.095**	**0.095**	**0.064**			
	(0.02)	(0.02)	(0.00)			
Other controls						
GDP growth, in %	-0.0005	-0.0006	**-0.0003**	-0.0003	**-0.0002**	-0.0002
	(0.58)	(0.50)	(0.00)	(0.61)	(0.00)	(0.68)
GDP per capita	-1.39e-07					
	(0.85)					
Agricultural value added, in %	-0.002	-0.002	**-0.001**	**-0.005**	**-0.002**	-0.001
	(0.77)	(0.74)	(0.04)	(0.09)	(0.00)	(0.11)
Population 65 and over, in %	**0.008**	**0.008**	**0.003**	**0.001**	**0.001**	-0.0002
	(0.00)	(0.00)	(0.00)	(0.13)	(0.00)	(0.71)
Big project	0.005	0.005	**0.002**	0.03	**0.001**	
	(0.21)	(0.20)	(0.00)	(0.13)	(0.00)	
Government effectiveness	**-0.025**	**-0.025**	**-0.011**	**-0.009**	**-0.004**	-0.002
	(0.01)	(0.01)	(0.00)	(0.02)	(0.00)	(0.60)
SIDS	-0.0003	-0.0003	-0.0002	-0.007	**-0.0004**	
	(0.77)	(0.78)	(0.46)	(0.21)	(0.09)	
Prob > (Wald) Chi[2] or Prob > F	0.00	0.00	0.00	0.00	0.00	0.00
Observations	557278	557278	557278	557278	557278	259
Number of donors	21	21	21	21	21	20
Number of years	13	13	13	13	13	13

[1] P-values in parentheses, constants and fixed effects not presented. Coefficients significant at the 10% level or above are presented in bold.
[2] Robust estimation with standard errors clustered by donor.
[3] Marginal effects, evaluated at the mean of the explanatory variables; for dummies, discrete change from 0 to 1.
[4] Estimation at donor, rather than at project level. At this level, the Hausman test suggests RE estimation. One country observation is lost due to missing values for the "global warming" variable.

The overall picture clearly shows that politico-economic variables systematically influence donors' coding of aid projects. While the effects observed are relatively small in magnitude, for the most part, they are clearly different from zero and relatively robust across different specifications – at least in terms of direction and significance. Especially the impact of government ideology and of public environmental preferences is clearly supported by the data. Media information appears to have a smaller effect than expected, which may be related to the relatively superficial coverage of climate policy issues.
At the same time, the strong evidence for adaptation related coding indicates a wide-spread misunderstanding of the current Rio marker. Our control for government effectiveness also suggests that there may be problems of coding diligence at least in some countries.
All in all, our different political-economic models allow us to explain up to about 15% of the variance in the respective dependent variables.

6. Conclusions

Important discrepancies between climate coding of aid projects reported to the DAC and a keyword based examination of actual climate change-relevance have led us to conjecture that climate coding may be motivated by political factors, at least to some extent. As we cannot draw from prior theoretical analysis on politically motivated coding decisions, we derive our hypotheses based on a conceptual framework related to the general literature on public choice, the political economy of aid, and the political economy of environmental policy. The analysis remains largely exploratory and many interpretations may lend themselves to further debate.
Nevertheless, our empirical results are generally consistent with our hypotheses. They are tested using project-level aid data and country-level political data for 21 DAC donors from 1995 to 2007. Keyword search in the project descriptions of the PLAID database and complementary hand-coding allows us to assess all projects for their actual climate change-related content, and to thereby construct our most relevant control variable.
The econometric model takes into account the hierarchical structure of our data, whereby projects are nested in donor countries. We find that mitigation, the official focus of the DAC reported climate coding, only adds about one third to the probability to actually receive the so-called climate related "Rio marker" by DAC donors. Relevance to adaptation, which is excluded by the formal definition of the Rio marker, roughly adds up to another 10%. The latter may, at least in part, be due to a misunderstanding of the Rio marker.
In addition to these two variables characterizing the substance of the project, a number of political variables are systematically related to the coding decision. In line with our politico-economic framework, we find that general ecological preferences of the donor country population and the ideological preferences of the donor government influence the coding decision. While the former leads to stronger over-coding, the latter leads to reduced over-coding – presumably because in this case, the government pushed for actual climate policy. We also find some evidence for the impact of information on climate policy by the media, although this effect is only relatively small and changes from a positive effect of information, to a negative one (implying more over-coding) in the following year.

All in all, our results imply that for a given relevance of any project to climate change mitigation or adaptation, politico-economic factors significantly influence the statistics reported to the DAC. What we observe in the data is clearly inconsistent with a simple random error around an otherwise correct coding of climate relevant aid.

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Appendix 1: Information on recoding climate relevance

The evaluation of the climate mitigation / adaptation contribution was done per keyword search in the title, the short and long description of all projects in the PLAID database as follows:

Mitigation technologies were evaluated for the project types found in the Clean Development Mechanism (see UNEP Riso Centre 2010), i.e. cogeneration, composting, efficient stoves, efficiency improvements (power plant rehabilitation), gas flaring reduction, industrial gas reduction, landfill gas and methane recovery, renewable energy (including biomass power, geothermal, hydro, solar photovoltaics/thermal, and wind), solid waste management in large cities, transport (including rail, public transport and river/inland shipping activities), waste to energy, and waste water. Moreover, forestry-related projects such as forest protection, afforestation and reforestation were considered. Finally, the development of greenhouse gas inventories and the explicit mention of Activities Implemented Jointly, Joint Implementation and the Clean Development Mechanism were covered by the keyword search.[8]

For each project that showed one of the keywords, it was assessed manually whether the keyword really referred to the project type. For example, many projects showing the term "hydro" referred to hydrological analyses for agriculture / water supply systems, or "rehabilitation" referred to physical rehabilitation of war victims. Such projects were then excluded.

For adaptation, besides the keyword adaptation, strengthening of resilience against and relief of impacts of meteorological extreme events was looked at with the keywords flood, drought, storm (including cyclone, hurricane, typhoon), as well as disaster, urgency, compensation. The set up of early warning and meteorological coordination systems was also included. Moreover, dyke / sea wall projects as well sea-level-related projects were looked at. Resource availability improvement integrated rural development projects were also included if they strengthen overall resilience or lead to a better management of water / agricultural resources, even if they do not have an explicit disaster-related component.[9]

As in the case of mitigation projects, the context was assessed to exclude projects that do not contribute to adaptation. While it is simple to exclude non-meteorological disasters such as earthquakes, tsunamis or civil war, it is much more difficult to assess whether a resource-related project can be seen as a resilience-enhancing activity. Especially regarding water resources, frequently projects relate to digging a few wells. Such projects with a limited scope were excluded.

Given that sometimes only the original language of the donor country was used in the descriptions, we tried to cover all of those descriptions as well. As we did not do a search for all possible terms in all languages, however, some projects that only had non-English terminology are likely to have been overlooked.

Another problem could be that the terminology used to describe aid projects might have changed over time so that certain projects in earlier years may have escaped our attention. To limit this effect, we tried to keep the range of keywords sufficiently large. In addition, as our study only covers the period from 1995-2007, we are confident that this problem is not too strong.

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[8] The following mitigation-related keywords were entered into the PLAID project search engine: Energy, fuel switch, methane, carbon capture, industrial gas, HFC, N_2O, PFC, SF_6, afforestation, reforestation, forestry, transport, renewable, biomass, geothermal, hydro, solar, photovoltaic, wind, power, landfill, composting, waste, stove, charcoal, retrofit, rehabilitation, cogeneration, electricity, boiler, heating, flaring, steam, efficiency, manure, biogas.

[9] The following adaptation-related keywords were entered into the PLAID project search engine: Adaptation, early warning, disaster, compensation, insurance, dyke, seawall, resource, ressource, relief, urgence, urgency, inondation, inundation, flood, rehabilitation, river, drought, storm, cyclone, hurricane, typhoon, dry, sea level..

Textbox 1: Projects without any conceivable climate change connotation

- Health campaigns in Vietnam against SARS and avian flu (Australia); 1 similar project (New Zealand)
- Trauma counselling of tsunami victims (Australia), house rebuilding after tsunami in Sri Lanka (Belgium) as well as several other post-tsunami rehabilitation and early warning projects (3 from Canada, 1 from France, 5 from Germany, 1 from New Zealand, 3 from Spain).
- Transparency International anti corruption campaign in the Pacific (Australia)
- Capacity building for East Timor's Parliament (Australia)
- Education sector assistance in Kiribati (Australia)
- Institutional support for non-military national service in Georgia (Austria)
- Support for an Austrian secondary school in Albania (Austria)
- Surgery training programme (Belgium)
- NGO campaign on Congolese debt (Belgium)
- Monetary climate in Democratic Republic of Congo (Belgium)
- Capacity building of officials of the Algerian Ministry of Justice (Belgium)
- Bee-keeping programme of a cooperative (Belgium)
- Financing the sarcophagus of Chernobyl nuclear power plant (Belgium, Greece)
- Fight against proliferation of small arms in Colombia (Belgium)
- Transport of educational material for school (Belgium)
- Disposal of expired pesticides (Belgium, Germany); organic pesticide commercialization (Germany), pesticide awareness (Norway)
- Love movie festival (Belgium)
- Gujarat earthquake rehabilitation (Canada), house reconstruction after earthquake (Belgium),
- geo-risk evaluation (Germany), earthquake safety (Switzerland)
- Education Program Development Fund (Canada)
- Capacity building for state auditors in Vietnam (Denmark)
- Hazardous waste management (Denmark), also Germany (2), New Zealand (1), Norway (3), Spain (1), Switzerland (1)
- Communication equipment for airports (Germany)
- Protection of Maya archaeological sites (Germany)
- Green Parliament contribution to UNICEF telemarathon (Greece)
- 422 professional uniforms for students of Georgian school of tourism (Greece)
- HIV / AIDS (Ireland), one similar project from New Zealand
- Media handbook for Balkans (Ireland)
- Chernobyl humanitarian assistance (Ireland)
- Village leprosarium (Italy)
- Therapy of smile for sick children in Cape Verde (Italy)
- Kilns for burning used currency notes in China (Netherlands)
- NGO communication equipment in Balkans (Netherlands)
- Child protection in Somalia (New Zealand)
- Lombok crafts (New Zealand)
- Tobacco control (New Zealand)
- Management of toxic chemicals (New Zealand, Norway), similarly PCB decontamination of transformers in China (Italy), POPs phaseout (Italy), support for Basel Convention (New Zealand), 6 toxic chemical projects (US)
- Acid rain impact (Norway)
- Development of Gaiety theatre (Norway)
- Rescue archaeology (Norway)
- Prevention of cardiovascular diseases in Mozambique (Portugal)
- Museum restoration in Paraguay (Spain)
- Uniforms for park guardians in Central America (Spain)
- Marketing of organic coffee (Spain)
- Primary and secondary education support (Spain, 8 projects)
- Identification of pathogenic fungus in watermelon in Tunisia (Spain)
- Tomato virus in Morocco (Spain)
- Trade unions for democracy (Spain)
- Guinea pig farm (Spain)
- Long-distance Spanish language training (Spain)
- Support of victims of landmines (Switzerland)
- Aid for victims of munitions explosion in Albania (Switzerland)
- Lead reduction in transport fuels in Pakistan (UK)
- Derelict fishing gear and related debris (US)
- Mercury reduction (US, 2 projects)

In a final step, all 8 854 projects that have a climate change mitigation Rio marker, but did not feature any of our keywords were assessed whether they fit in any of our mitigation / adaptation categories. If they do, our initial coding is revised. Projects for which this final assessment is impossible due to a lack of relevant information in the project description receive a special code. Projects obtain a zero-code for climate irrelevance only if the project descriptions clearly reveal that there is no connection to either mitigation or adaptation.

While the criteria for the marker include ozone-depleting gases regulated in the Montreal Protocol, the corresponding projects are not really addressing climate change. Projects purely related to Montreal Protocol gases have thus been rated as not contributing to greenhouse gas mitigation. This coding problem related to the criteria of the marker itself, however, concerns only a very small number of projects (19 in total). In all other cases, the donor coding is wrong even using the widest possible interpretation of the marker.

Countries have specific ways of wrongly reporting climate change-related projects. Greece for example reports whatever environment-related activity, be it lake and river cleaning or national park management. Ireland lists hundreds of projects financing NGO staff that has nothing to do with climate change. The Netherlands list support for conferences and steering committees. Wildlife protection activities of all kinds - that do not contribute to forest protection - feature prominently in the US project list (106 projects, particularly intriguing ones are “Savannah elephant vocalization”, “Presence of antibodies to Ebola virus in Gorilla survivors”, “The role of seismic detection in African elephant ecology” and “Passive transponder marking of Rhinoceros”).

Some projects may have slipped through the attention of non-expert aid administrators because they seem to be addressing climate change issues while they are not. For example, Australia reports a project cleaning up coking plant wastewater.

For certain projects, it is unclear how they got the climate marker because even at first glance they have nothing to do with climate change. The most curious examples are shown in Textbox 1. It is likely that these entries were just made by exhausted officials mechanically checking boxes (e.g. looking for the term “climate”) and are not deliberate obfuscation.

Some projects are even counterproductive, as they increase emissions (see Textbox 2):

Textbox 2: Projects increasing emissions

- Road building in Western China (Canada), other road building/improvement projects include Denmark (1), Germany (19), Norway (3), Sweden (1), UK (3)
- Oilfield recovery (Canada)
- Rehabilitation of electrostatic filters of cement plant (Denmark), which reduces local pollution but increases greenhouse gas emissions
- 18 MW diesel power plant in Ouagadougou (Denmark)
- Reduction of traffic congestion (France)
- Support to Department of Motor Transport (Germany)
- Financing of mining equipment (Germany)
- 12 seater minibus for Georgian school of tourism (Greece)
- Electricity supply Kirkuk / Mosul (Norway)
- Diesel generation on isolated islands (UK)

Further categories relate to publicity expenses for development assistance activities in the donor countries, such as awareness building of Canadians / Britons on Canadian/UK development assistance and climate change, or to promotion of companies from the donor country, as done by Denmark. The Netherlands even list the support for the Dutch candidate to chair Working Group 3 of the IPCC!

Appendix 2: Variable description

Variable	Mean	Std.Dev.	Min	Max	Source
Rio dummy (1 for climate relevance reported to the DAC)	0.02	0.13	0	1	AidData (2010)
Mitigation (dummy: 1 if keyword search reveals relevance for mitigation)	0.01	0.10	0	1	AidData (2010) / authors' coding[1]
Adaptation (dummy: 1 if keyword search reveals relevance for adaptation)	0.02	0.13	0	1	AidData (2010) / authors' coding[1]
Over-coding (dummy: 1 if keyword search reveals climate irrelevance, but Rio dummy=1)	0.01	0.07	0	1	AidData (2010) / authors' coding[1]
Under-coding (dummy: 1 if keyword search reveals climate relevance, but Rio dummy=0)	0.02	0.14	0	1	AidData (2010) / authors' coding[1]
Unclear coding (dummy: 1 if Rio dummy=1, keyword search provides no indication for either climate relevance or irrelevance)	0.004	0.07	0	1	AidData (2010) / authors' coding[1]
Big project (dummy: 1 if project among the biggest 25% in terms of commitments)	0.25	0.43	0	1	AidData (2010) / authors' coding
SIDS (dummy: 1 if recipient country belongs to the group of small island development states)	0.06	0.23	0	1	UN (2007)
Global warming very important: Share of donor population considering global warming or the greenhouse effect as very serious (measured only once in 2005)	0.60	0.08	0.47	0.72	World Values Survey Association (2009)
Extreme events (dummy: 1 if an extreme event occurs in a particular year in a donor country)	0.07	0.26	0	1	WMO (various years)
Kyoto gap (absolute Kyoto gap, i.e. current emissions minus Kyoto target emissions level, divided by base year emissions)	0.08	0.12	-0.24	0.38	IGES (2009)
New York Times (annual number of abstracts containing the term "climate change")	71.75	82.29	10	273	LexisNexis (2010)
Green parliamentarians (share of seats in the national parliament, in %)	2.42	3.42	0	13.3	Armingeon et al. (2008)
Cabinet composition (Schmidt-index: from 1: hegemony of right-wing and center parties, to 5: hegemony of social-democratic and other left parties)	2.50	1.62	1	5	Armingeon et al. (2008) following Schmidt (1992)
GDP growth, annual %	2.71	1.34	-2.05	11.68	World Bank (2009a)
Unemployment, in % of total labor force	6.89	2.97	2.5	22.7	World Bank (2009a)
GDP per capita, PPP (constant 2005 international USD)	32571	6149	16544	49359	World Bank (2009a)
Agricultural value added, in % of GDP	2.14	1.08	0.9	9.25	World Bank (2009a)
Population 65 and over, in % of total population	15.64	2.44	10.8	21.5	OECD (2008), as listed in Armingeon et al. (2008)
Government effectiveness (index with mean 0, and standard deviation 1; negative numbers stand for low, positive numbers for high effectiveness)	1.71	0.38	0.32	2.64	Kaufmann, Kraay, and Mastruzzi (2009), World Bank (2009b)

[1] Available as an online appendix at http://www.cis.ethz.ch/publications/publications.