Defining and implementing policy targets together: Two concrete examples (WBIF and SDGs)

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Summary

This text develops the intuitive idea that sharing objectives is a precondition for, and can be a way to achieve, coordination between different stakeholders in realizing international development cooperation in a context in which uncertainty is likely to be pervasive.

Section 1 discusses uncertainty as a possible cause of both market and government failure in international policy cooperation for development – particularly in fragile contexts, in which it is more likely that stakeholders have heterogeneous views on how to achieve development goals. The discussion is developed from the viewpoint of collective decision-making and makes use of the concept of expectational market failure.

In Sections 2 and 3, two concrete examples are presented that give insights from actual or foreseen international-development cooperation situations. These examples are those of the cooperation developed within the Western Balkans Investment Framework and that developing for defining common criteria for concessionality in support of private-sector projects that pursue the United Nations' Sustainable Development Goals.

Based on these examples, it is argued that agreement on setting common objectives mitigates the pervasive effects of uncertainty on collective decision-making and is an important precondition for successful international-development cooperation.
cooperation.

Introduction

When development policy is pursued through the cooperation of different stakeholders, this cooperation implies collective decisions that take time and resources, and which condition the speed and type of development results obtained.

The difficulties in collective decision-making have been emphasized already by Nicolas de Condorcet[2] in his famous paradox, popularized by Kenneth Arrow.[3] In its original formulation, the Condorcet paradox states that when decisions are to be taken between mutually exclusive alternatives on the basis of the majority rule, as long as there are more than two choices the majority rule may fail to produce a rational ordering of collective preferences.[4] Georges-Théodule Guilbaud illustrated the general and pervasive nature of Condorcet's paradox, from which even the Bergson–Samuelson ordinal social-welfare function is not exempt (see Guilbaud, 2012: 712–18).[5] In his analysis, if we reject cardinal utility only "dictatorial" or "unanimity" decision rules would preserve collective decision-making from the inconsistencies that Condorcet brought to light for the majority rule.[6]

Intuitively, we can expect that Condorcet's paradoxical results may arise more frequently when opinions are very diversified or, worse, conflicting. On the contrary, in the extreme case in which everybody shares the same opinion, whichever way preferences are aggregated, the collective decision-rule coincides with unanimity. More generally, if we take, for instance, the subjective approach to probability as a reference, however individual probabilities are defined, if opinions are very divergent, subjective probabilities (*prévisions*) can never converge to objective probability, defined as the frequency of favourable outcomes when several trials of "exchangeable events" are repeated.[7] In such cases, the very notion of "price of risk" needs to be reinterpreted,[8] or completely abandoned[9] – a point that severely limits the practical relevance of the *Efficient Market Hypothesis*[10] and would suggest

[2] Marie Jean Antoine Nicolas de Caritat Marquis de Condorcet, *Essai sur l'application de l'analyse à la probabilité des décisions rendues à la pluralité des voix*, Paris, Imprimerie Royale, 1785

[3] Kenneth J. Arrow, *Social Choice and Individual Values, 2nd ed.*, Yale, Cowles Foundation Monographs Series, [1951] 1963. After a period of oblivion and dismissal, Condorcet's paradox gained worldwide recognition with the celebrated second edition of Arrow's thesis. It was Guilbaud who gave Arrow Condorcet's reference after Arrow presented the first version of his seminal contribution in Paris.

[4] When there are three possible choices A, B and C, Condorcet compares them two by two and shows that, depending on the distribution of preferences of individual voters, under the majority rule it is possible that A is preferred to B and that B is preferred to C but that C is preferred to A. In the words of Guilbaud, p. 664, the maximum of collective satisfaction does not coincide with the minimum of dissatisfaction when there are three options (or more), contrary to happens with binary choices.

[5] Georges-Théodule Guilbaud, "Les théories de l'intérêt général et le problème logique de l'agrégation", in *Revue économique*, Vol. 63, No. 4, [1952] 2012, p. 659-720, https://www.cairn.info/revue-economique-2012-4-page-659.htm.

[6] *Ibid*, "Les deux seuls extrêmes sont cohérents : le concert ou la servitude", p. 719.

[7] Bruno de Finetti, "La notion de distribution d'opinions comme base d'un essai d'interprétation de la Statistique", *Publications de l'institut statistique de Paris/Annales de l'ISUP*, Vol. 1, No. 2, 1952, p. 1-19.

[8] Elyès Jouini, "Tarifer un risque dont l'intensité est diversement perçue", in *Revue Trimestrielle de l'Association d'Économie Financière*, No. 133, 2019.

[9] Simone E. Casellina and Giuseppe Pandolfo, "Probability of default does not exist. Speech on Simplicity and Comparability of the Risk Measures", in Nicola Mattoscio (ed.), *A Tribute to Bruno de Finetti: Bruno de Finetti and the 'probability' of pursuing new economic knowledge,* Global & Local Economic Review, Vol. 22, No. 2, 2018, p. 133-160.

[10] Massimo Cingolani, "What Economic Modelling Hypotheses Should Underlie Regulation & Policy Advice? Towards a probabilistic approach", forthcoming in *Forum for Social Economics*, 2020.

prudence in proposing "market solutions" to development problems, especially in fragile contexts.

As developed in the first section below, the argument holds a fortiori if, instead of the rationality assumption implicit in the expected utility hypothesis, other less rational approaches to risk and uncertainty are considered – such as those retained by prospect theory or others that behavioural finance has shown to be relevant in describing actual individual choices in the face of uncertainty.[11]

In the first section, below, some aspects of the impacts of uncertainty on international policy cooperation are discussed from a collective viewpoint with the help of the concept of *expectational market failure*, which is likely to arise when the effects of uncertainty are pervasive.

In the following sections, two practical examples are examined in which it is argued that coordination in setting common objectives may reduce the negative impact of uncertainty: the policy cooperation developed within the *Western Balkans Investment Framework*[12] and that of concessionality in support of private-sector projects that pursue the *Sustainable Development Goals*. The final section draws some conclusions.

1. International coordination in uncertain policy environments

In the absence of a world government that could play the role of a single decision centre and, as a matter of principle, impose decisions that would respect the properties of individual rational decision-making,[13] a way must be found to decide on the scope and means of international-development cooperation – and it is likely that differences of opinions or even conflicts may arise between the various parties involved. It is argued in this contribution that defining common objectives and specific goals may help in reducing this "decisional uncertainty" and can thus foster development cooperation, being moreover a necessary precondition for achieving concrete impact results that can also be measured and evaluated ex ante and ex post.[14]

Whereas in the 19th century, classical Political Economy developed around the discussion of major policy issues, nowadays economists tend to dodge policy debates by assuming the existence of a social-welfare function that summarizes the preferences of policymakers and

[11] See Richard H. Thaler, *Misbehaving: The making of behavioral economics*, New York, WW Norton, 2015; Amos Tversky and Daniel Kahneman, "Prospect theory: An analysis of decision under risk", in *Econometrica*, Vol. 47, No. 2, 1979, p. 263-291; Amos Tversky and Daniel Kahneman, "Advances in prospect theory: Cumulative representation of uncertainty" in *Journal of Risk and uncertainty*, Vol. 5, No. 4, 1992, p. 297-323. For a critique of prospect theory see Michael Nwogugu, "A further critique of cumulative prospect theory and related approaches" in *Applied mathematics and computation*, Vol. 179, No. 2, 2006, p. 451-465.

[12] See www.wbif.eu and www.wbedif.eu and in particular the latest annual reports of WBIF and WB EDIF.

[13] These are reflexivity, symmetry, transitivity, etc. A classic reference is Amartya K. Sen, *Collective choice and social welfare: an expanded edition*, Cambridge (MA), Harvard University Press, [1970] 2019, p. 53

[14] The perspective in this section is that of a committee in which different stakeholders coordinate their development action in view of financing a project or an action that will exert its effects in the future. It is assumed that opinions on the content of the action and its possible financing are diverse, independently from the way in which they are formed. One stakeholder may derive his opinion from the optimization of discounted worldwide utility for the next 100 years, another from an evaluation of his chances to get promoted by his national hierarchy, a third one by a minimization of the time spent before he may be able to come back home. The starting point is thus one of heterogeneity of opinions: the way in which these are defined is not discussed.

on the basis of which policy targets can be quantified. Following Jan Tinbergen, the best use of policy instruments to achieve these targets is then determined on purely technical grounds.[15] Despite Arrow's negative result,[16] a large literature developed on social choice and welfare that was not always conclusive – for instance, in the debate between ordinal and cardinal welfare functions. Moreover, this literature was essentially static and did not discuss in a sequential framework the risk implicit in environments in which opinions diverge and agents interact, adapting their behaviour to circumstances[17] – which are also those environments in which Condorcet's paradoxes have more chances to arise.

When collective decisions must be taken by a negotiated consensus that is unpredictable in its timing, scope and content and when, as is the case almost surely in extreme poverty and/or conflict areas, these actions are deployed in an environment that is itself highly uncertain, the partial ignorance of decision-makers on the future consequences of their actions can delay agreeing on a common course of action – and thus reduce the efficiency of collective decision-making. This contribution suggests that such ignorance should be addressed rationally – i.e. with the help of probability.[18]

The first and most obvious element of uncertainty that affects collective decision-making in the context of development policy is the uncertainty on the future environment in which policy must be implemented. Depending on the future scenario on which one bets, the effect of a certain policy action can be different and sometimes of opposite sign. This type of uncertainty is likely to generate what Roger Guesnerie called an "expectational market failure",[19] a concept that he traces back its origin in the work of Pierre Massé.[20] Expectational market failures are defined with reference to a comparison between the static intertemporal

[15] Jan Tinbergen, *On the Theory of Economic Policy*, Amsterdam, North Holland, [1952] 1955

[16] Kenneth J. Arrow, *Social Choice and Individual Values,* cit. Arrow's celebrated impossibility theorem asserts that it is not possible to find a rule aggregating individual preferences (some say "a constitution"), that respects all possible preference orderings and is symmetric, transitive and not dictatorial. While partisans of welfare economics such as Samuelson asserted that this did not prevent to assume an ordinal social welfare function of the type introduced by Bergson and Samuelson himself (see Kotaro Suzumura, "An interview with Paul Samuelson: welfare economics, 'old' and 'new', and social choice theory", in *Social Choice and Welfare*, Vol. 25, No. 2-3, 2005, p. 327-356), and as mentioned above, Guilbaud asserted that this is only possible with a cardinal welfare function, little attention was given to the rather obvious fact that, in the abstract mathematical setup of Arrow, a dictator is someone whose preferences coincide in all aspects with the preferences of society. But since in this setup there is no social interaction other than voting, the dictator could simply be a "happy idiot", hence the pessimistic interpretation of Arrow's result for democratic decision-making is not the only one possible.

[17] Serge-Christophe Kolm, *Reciprocity: An Economics of Social Relations*, Cambridge, Cambridge University Press, 2008. Kolm adopts a sequential approach but does not discuss the expectational market failure.

[18] "La théorie des probabilités n'est, au fond, que le bon sens réduit au calcul", Pierre Simon Marquis de Laplace. *Théorie analytique des probabilités*, *Œuvres complètes de Laplace publiées sous les auspices de l'Académie des Sciences, Tome septième*, Paris, Gauthiers-Villars, 3rd ed, [1820] 1886; "[…] la concezione della teoria della probabilità come un ramo della logica, […] nel senso intuitivo e totalitario di 'logica del modo di ragionare sui giudizi di probabilità, di plausibilità, di verosimiglianza' ", Bruno de Finetti, "Probabilisti di Cambridge", in Marco Mondadori (ed.), *Bruno de Finetti: La logica dell'incerto*, Il Saggiatore, Mondadori, Milano, [1938] 1989, p. 203-222

[19] Roger Guesnerie, "The Government and Market Expectations", in *Journal of Institutional and Theoretical Economics*, Vol. 157, No. 1, [2001] 2005, p. 116-126; Roger Guesnerie, "Expectational Coordination Failures and Market Volatility", in Roman Frydman and Edmund S. Phelps (eds), *Rethinking Expectations: The way forward in macroeconomics*, Princeton, Princeton University Press, 2013

[20] Pierre Massé, *Le plan ou l'anti-hasard*, Paris, Hermann, 1991

general equilibrium, as extended to uncertainty by Arrow[21] and Gerard Debreu,[22] and a sequential temporary equilibrium such as that presented by Roy Radner.[23] Radner showed that a sequential equilibrium of plans, prices and price expectations achieves the same efficiency conditions of the Arrow–Debreu static intertemporal framework when "price expectations are correct in the sense of being market clearing prices" and when expected prices are the prices prevailing when future markets are open.[24] These assumptions boil down to retaining the *Rational Expectations Hypothesis (REH)*, which in fact "provides the missing link between a sequential world à la [Léon] Walras and the static intertemporal Arrow–Debreu world".[25] Under temporary equilibrium, in the absence of the "focal point" provided by rational expectations, economic agents cannot anchor their expectations to a common view of the future on which they can draw individual plans with reasonable comfort that they have a chance of succeeding. In this literature, which originates in the French indicative-planning approach,[26] a key role for economic policy is that of reducing this type of uncertainty, which can be labelled "uncertainty on the future scenario".

A second and less obvious source of "decisional uncertainty"[27] may be the lack of consensus (or collective ignorance) on the causal relationship to be expected between means and goals. For stakeholders to agree on a development policy, it is not sufficient to have a reasonably convergent view of the future, it is also necessary to share a common understanding of the causal relations between policy instruments and targets. A typical example is that of the relationship between public expenditure and employment, wherein many argue that more public expenditures decrease private employment while others assert the contrary.[28] In the absence of an agreement on which level of public expenditures should accompany a certain

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[21] Kenneth J. Arrow, "The Role of Securities in the Optimal Allocation of Risk-bearing", in *The Review of Economic Studies*, Vol. 31, No. 2, 1964, p. 91-96

[22] Gerard Debreu, *Theory of Value: An axiomatic analysis of economic equilibrium*, New Haven and London, Yale University Press, Cowles Foundation for Research in Economics at Yale University and Wiley and Son, 1959

[23] Roy Radner, "Existence of Equilibrium of Plans, Prices, and Price Expectations in a Sequence of Markets", in *Econometrica*, Vol. 40, No. 2, March 1972, p. 289-303. These notions correspond respectively to Hicks's concepts of "futures" and "spot" economies, which are associated respectively to intertemporal and temporary equilibria (see John R. Hicks, *Value and Capital. An inquiry into some fundamental principles of economic theory*, Oxford, Oxford University Press, 1979 [1939], p. 136-140). Already in Hicks already, the two coincide under "perfect foresight".

[24] Jacques H. Drèze and Jean-Jacques Herings, "Sequentially complete markets remain incomplete", in *Economics Letters*, Vol. 100, No. 3, 2008, p. 445

[25] Roger Guesnerie, "The Government and Market Expectations", p. 118, cit. In this quoted paragraph, Guesnerie associates Walras to a notion of temporary equilibrium. Authors such as Petri associate Walras to a notion of "classical equilibrium" (long-term dynamic equilibrium of reproduction), which could, under stationary conditions, be seen as logically equivalent to the neo-classical intertemporal equilibrium (see Fabio Petri, "Walras on capital: Interpretative Insights from a review by Bortkiewicz", in *Contributions to Political Economy*, Vol. 35, No. 1, 2016, p. 23-37). To the best of the author's understanding, both interpretations find confirmation in Walras' writings (see Massimo Cingolani, "Augusto Graziani's Equilibrio generale ed equilibrio macroeconomico: a key milestone in a long journey out of the neoclassical mainstream" in *Review of Keynesian Economics*, Vol. 4, No. 3, 2016, p. 295).

[26] For a comparison between the French and Dutch approaches to indicative planning, see Alain Desrosières, "La commission et l'équation: une comparaison des Plans français et néerlandais entre 1945 et 1980", in *Genèses*, Vol. 34, 1999, p. 28-52, https://www.persee.fr/doc/genes_1155-3219_1999_num_34_1_1550

[27] Instead of "decisional uncertainty", one may also talk less neutrally about "administrative" or "bureaucratic" uncertainty. The modern literature of behavioural economics has identified many other sources of uncertainty that cause "non-rational" or "sub-optimal" behaviours, but these two appear more relevant in the context of the decisions of a committee and are sufficient to illustrate the point.

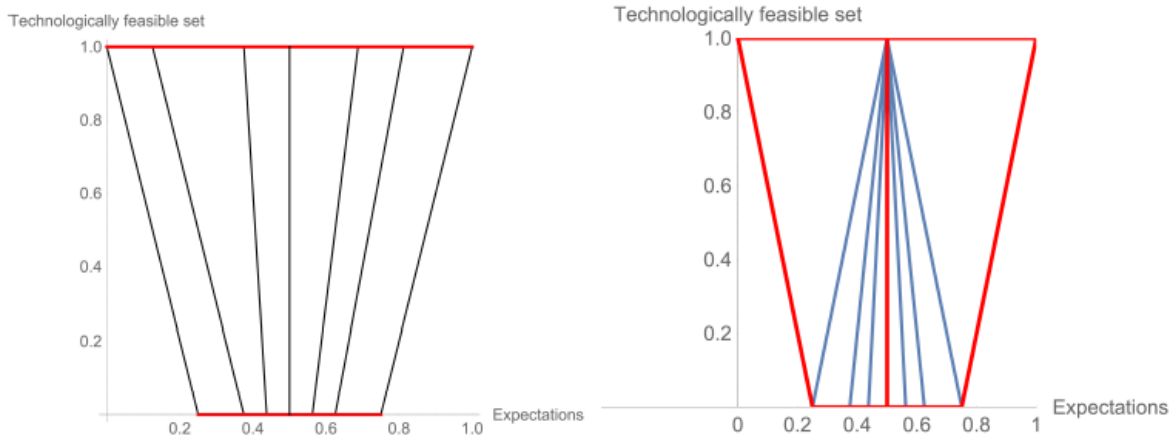
[28] Massimo Cingolani, "What Economic Modelling Hypotheses Should Underlie Regulation & Policy Advice? Towards a probabilistic approach", cit.

employment policy, discussions can be difficult. De facto, in actual policy negotiations, consensus is reached only by boredom and exhaustion of the energies of the negotiating parties. Cooperation in setting common goals may be a way to reduce decisional uncertainty, as it helps identify a common view of the future and forces stakeholders to be explicit about possible causal relationships between means and ends. A geometrical illustration may clarify this point.[29]

The basic idea is that today there are several possible futures depending on many circumstances but tomorrow there will be only one present, which will be the ("equilibrium") outcome of the plans undertaken today by all involved stakeholders.[30]

Let us assume that there is a spectrum of ex ante expectations that is depicted in the lower, red segment of the charts in Figure 1 below. Each point on this segment represents a view on the future. Against this spectrum of ex ante expectations, there is a range of possible outcomes defined by technology. Assume that technology allows reaching all possible outcomes comprised between 0 and 1 (higher red segment in the charts below). Let us draw a line joining the set of initial expectations to the range of possible outcomes. This is a feasible plan ex ante, and its length could be thought to be proportional to the production period.[31] Considering all lines joining the range of possible outcomes to the segment of expectations defines the population of all possible plans on the future respecting technological constraints that could thus in principle be undertaken, showing also that all futures contained between 0 and 1 are technologically possible. These plans are included in the "glass shape" area meshed diagonally in the left chart in Figure 1.

Figure 1: Ex ante and ex post feasible plans



Source: Elaborations of the author

However, we should exclude from this set all plans that are not consistent between each other, which are those that do not intersect "after one production period". Only the plans represented by lines located on the inverted triangle in the chart on the right, which start from the point of intersection with the segment of feasible outcomes above and join the

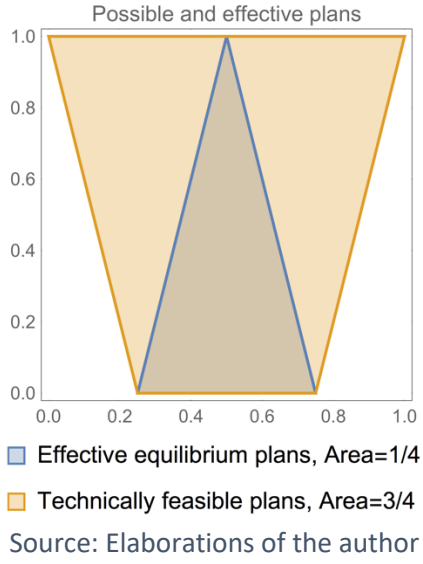
[29] This hypothetical example is reproduced from a presentation given at a meeting of the *Western Balkans Investment Framework*.
[30] Implicitly the word "equilibrium" is used here in the sense of "solution of a mathematical system" as suggested by Patrick Artus, Michel Deleau and Pierre Malgrange, *Modélisation macroéconomique*, Paris, Economica, 1986, p. 120-122.
[31] The line can also be seen as an individual steady state whose growth rate is given by its slope.

expectation segment below, are feasible plans that will be realised and will produce positive net revenues (the triangle meshed diagonally on the rightmost chart).[32]

But the plans included in that triangle are only a fraction of all the plans that could potentially be undertaken without policy coordination. All ex ante plans contained in the "glass-shaped" area depicted in the chart on the left are in fact possible, and could in principle be undertaken. Part of them (the part not included in the triangle on the right) will, however, fail.

In Figure 2 below, the two areas (the glass and the triangle) are overlaid, showing that the area of the triangle outlined in blue is ¼, whereas that of the yellow "glass" is ¾ – hence, a difference of ½. The more uncertainty there is (the larger the base of the cone and the glass) the larger also the difference between the two areas – and hence, the magnitude of the "expectational market failure".

Figure 2: Possible and effective plans: Illustration of the expectational market failure



Source: Elaborations of the author

Given that the units in this example are such that the overall square has an area of 1, these areas can be interpreted as probabilities. In this simple and purely illustrative example, just because of the differences of opinions, there is thus a 25 percent chance of undertaking a successful project, a 50 percent chance of undertaking an unsuccessful one and a 25 percent chance that no investment will be done at all. Hence, in the example there are sizeable potential gains that can be realized through policy coordination, of a magnitude of 200 percent. This coordination can also be seen as a coordination on policy goals if it concerns the definition of the apex of the triangle and of the ways in which to reach it.[33]

2. The Western Balkans Investment Framework (WBIF): a regional instrument blending loans and grants from different donors

[32] There is no particular reason why the intersection point should be in the middle of the upper segment, other than it simplify the calculation of the areas of the various triangles presented below.
[33] Kanie Norichika and Frank Biermann, *Governing through goals: Sustainable Development Goals as Governance Innovation*, Cambridge (MA), MIT Press, 2017. Norichika and Biermann argued that setting common goals at an international level is a way to foster the attainment of SDGs.

2.1 Background

The former Yugoslavia was the object of a tragic war in the 1990s, which broke up the country into several states, some of which – such as Slovenia and Croatia – have since entered the European Union (EU). Even before the fall of the Berlin Wall, international financial institutions were active in the country, which, at the time, was the leader of the non-aligned world. With the breakup of ex-Yugoslavia, what were before regions became countries and – together with Albania – were confronted with the double challenge of reconstruction from the war and transition from a command to a market economy. Each of them had to deal separately with the various national and international organizations active in their territory, having to address their specific procedures and conditionalities. For this reason, a request coming initially from Croatia around 2006 went through the European Council in 2008 under the Slovenian EU presidency and led to the establishment of the *Western Balkans Investment Framework* (WBIF).[34] The WBIF was thereafter launched in December 2009 as a EU led instrument,[35] blending grants and loans from different bilateral and multilateral donors, implementing the initial idea of a "single stop and single shop" but also that of a "single pot", in which grant money from different donors would be pooled before being blended with International Financial Institution (IFI) loans.

2.2 Features

Although similar to other regional blending mandates outside the EU,[36] the WBIF also differs from them – in particular, because

1. it joins together a larger number of bilateral and multilateral donors committed by cash contributions;
2. it takes decisions that have a stronger element of commonality than those of other similar instruments; and
3. it foresees an active role for the beneficiary countries that is absent from other instruments of this kind.

Typically, WBIF stakeholders decide together on the common use of the pooled inputs and are jointly committed to the WBIF's output. This output is the shared "pipeline" of priority investment projects on which WBIF grant and loan resources are blended.[37] This investment

[34] At its meeting of 14 May 2008, the *Economic and Financial Affairs Council* welcomed the initiative of the Commission to establish a comprehensive WBIF "to enhance harmonisation and co-operation in investments for socio-economic development in the region".

[35] Besides the European Commission (EC), the three "European International Financing Institutions" (namely the Council of Europe Development Bank -CEB, the European Bank for Reconstruction and Development – EBRD and the European Investment Bank -EIB) were the *Partner IFIs*. Later KfW, World Bank and AFD joined what are now, together with the EC, the *Partner Institutions* of the WBIF. Initially the WBIF covered also Croatia, now it covers the 6 Western Balkans Countries still in the process of EU Accession (WB6): Albania, Bosnia Herzegovina, Kosovo (as per UN resolution 1244), Montenegro, North Macedonia and Serbia.

[36] Such as the *Neighbourhood Investment Facility* (NIF), now *Neighbourhood Investment Platform* (NIP, part of EFSD+); the *EU-Africa Infrastructure Trust Fund* (EU-AITF) and others that were developed at the same time or later.

[37] In arguing in favour of his proposal for an *Investment Board,* Keynes wrote: "But a wise public policy to promote investment needs, as I have said, long preparation. Now is the time to appoint a board of public investment to prepare sound schemes against the time that they are needed. If we wait until the crisis is upon us we shall, of course, be too late. We ought to set up immediately an authority whose business it is not to launch anything at present, but to make sure that detailed plans are prepared. The railway companies, the port and river

coordination is embedded into the policy framework of the EU accession process, defined notably by the IPA (Instrument for Pre-Accession) regulations, which also set the financial resources that the European Commission budget devotes to the WBIF. The IPA grant resources made available to the WBIF increased from roughly €350m in the 2007–13 period to more than €1bn in the 2014–20 period,[38] and are expected to further increase in 2021–27 financial period.

Although apparently similar to that of other EU blending facilities, the output of the WBIF is – given the commonality of its decisions – also different because of the number of stakeholders involved[39] and the magnitude of its created "*consensus*".[40]

The following principles of the WBIF are characteristic features of the framework, and illustrate a high level of sharing and commonality in its decisions:

- The principle of ownership of the beneficiary by the beneficiary making the grant request.
- The pooling of technical and financial expertise of donors in a *single stop, single shop and single pot*. Each stakeholder, but particularly the IFIs, puts its specific expertise at the disposal of the instrument for the screening (the Commission) and evaluation (the lead IFIs) of the proposals, based on the "four eyes principle"; the donors pool their grant resources into the European Western Balkans Joint Fund (*single pot*). Lead IFIs contribute to the common pot, and can access funds to be blended with their loans. The General Conditions of the joint fund are at the centre of an original co-delegation legal structure signed by all IFIs and donors.
- Decisions are taken by consensus.
- In principle, financial resources are not earmarked ex ante by sector or by country.
- A common *Management Information System* (MIS) helps beneficiaries to submit their grant requests, and the Commission and IFIs to transparently give their expert opinions before the decision is taken together by all donors.

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authorities, the water, gas, and electricity undertakings, the building contractors, the local authorities, above all, perhaps, the London County Council and the other great Corporations with congested population, should be asked to investigate what projects could be usefully undertaken if capital were available at certain rates of interest – $3^{1/2}$ per cent, 3 per cent, $2^{1/2}$ per cent, 2 per cent. The question of the general advisability of the schemes and their order of preference should be examined next. What is required at once are acts of constructive imagination by our administrators, engineers, and architects, to be followed by financial criticism, sifting, and more detailed designing; so that some large and useful projects, at least, can be launched at a few months' notice". John M. Keynes, "How to Avoid a Slump", in *The Times*, 12 January 1937, p. 72.

[38] In the 2007-2013 period, WBIF benefitted from circa EUR 70 m of EC grants per year from 2009 to 2013, in the 2014-2020 period, the budget allocated exceeds EUR 150 m per year, hence at least EUR 1 bn is available for grants (mainly investment) over the 2014-2020 period.

[39] As of end 2019, 20 bilateral donors have brought EUR 98.7 m to the EWBJF, excluding a contribution of about EUR 5 m from the EIB.

[40] In the WBIF, decisions are taken by consensus, which is different from unanimity. The logic of the consensus approach is justified if it can reach a "general interest" that goes beyond and is higher than the sum of the individual "best interests" of each stakeholder. De Finetti showed that aggregating the solutions of a maximisation of individual objective functions that consider as given the decisions taken by others does not yield the same result as maximising all individual objective functions simultaneously (see Bruno de Finetti, "Problemi di 'Optimum'", in Bruno de Finetti (ed.), *Un matematico e l'economia*, Milano, Giuffré, 2005, p. 50-53; Bruno de Finetti, "Problemi di 'optimum' vincolato", in Bruno de Finetti (ed.), *Un matematico e l'economia*, Milano, Giuffré, 2005, p. 54-66; Bruno de Finetti, *Requisiti per un Sistema economico accettabile in relazione alle esigenze della collettività*, Franco Angeli, Milano, 1973.

- Any proposal should be part of investment priorities agreed in the context of EU accession at sectoral level (*Single Pipelines*), which link to the EU accession programming framework (*Economic Reform Programmes*).

2.3 The WBIF project pipeline of investment projects

The following results were achieved over the first eleven years of the WBIF's existence, and testify to the fact that the rather complex type of cooperation that it established worked reasonably well in creating consensus on a common project pipeline of investment projects.[41] In infrastructure, from 2009 to 2020, no less than 244 projects were supported by the grants of the WBIF, for a total investment cost of €24.4bn, through 389 grants of a cumulated amount close to €1.4bn.

Table 1: Financing the WBIF project pipeline: IFI blending of WBIF grants and loans, 2009–20 – € million

Investment Cost		***Financing source***		***Instruments by IFI***				
Monitoring IFI		*Source*	*Total*	*Loan IFI*	*Grants*	*Loans*	*of which:*	
							Signed	*To be signed*
AFD (*)	66,7	WBIF Loans	14 480,2	AFD (*)	1,5	41,7		41,7
CEB (**)	784,5	WBIF Grants	1 417,7	CEB (**)	36,1	683,0	610,2	72,9
EBRD (***)	7 726,8	Own Contributions	3 591,5	EBRD (***)	717,7	6 189,7	2 030,8	4 158,9
EIB (+)	10 290,4	Other Sources	2 989,8	EIB (+)	403,8	5 891,4	3 361,6	2 529,8
KfW (++)	2 339,7	External Grants	1 503,0	KfW (++)	271,4	1 330,5	687,4	643,1
WB (+++)	254,9	External Loans	376,6	WB (+++)	19,7	448,7	388,7	60,0
EC (#)	15,1			EC (#)	3,6			
EBRD & KfW	403,1			Others		271,6	66,0	205,6
EBRD & EIB	2 233,3							
EIB & KfW	244,3							
Total	***24 358,8***	***Total***	***24 358,8***	***Total***	***1 453,9***	***14 856,8***	***7 144,8***	***7 712,0***

(*) Agence Française de Développement
(**) Council of Europe Development Bank
(***) European Bank for Reconstruction and Development
(#) European Commission
(+) European Investment Bank
(++) Kreditanstalt für Wiederaufbau
(+++) World Bank

These grants – mainly coming from the European Commission (EC), but also from 20 bilateral donors – leveraged 347 IFI loans of a total value of €14.5bn. Of these, 153 have already been signed for a total value of €7.1bn and another 138 have been identified for a value of €7.7bn and will be signed in the future. The level of blending achieved is thus quite substantial, as also shown in Table 1 above.

In terms of infrastructure, the WBIF covered a broad range of sectors. Energy, environment and transport account for roughly the same number of projects (respectively 67, 66, 63), followed by the social sector (34). As shown in Table 2 below, in monetary terms the most

[41] The focus on the financial results presented here is justified, because ex ante it is not straightforward that so many stakeholders agree on such a broad range of investment projects that are all in line with EU policy. The figures should thus be interpreted first as indicators of "consensus performance". If one accepts further that consensus should lead to better projects (also thanks to the 4 eyes principle) these output figures can also be seen as indicators of expected actual impact at macro level. This does not mean that the impact at microeconomic level of each of these projects should not be examined at a later stage, when they will be finished. Nor does it mean that the mobilization of investment is sufficient for the needs of accelerating the growth of the Western Balkans. A back of the envelope calculation shows that the WBIF pipeline, which had an investment cost of EUR 19.7bn as of end 2018, represented that year some 5.6% of the capital stock of the WB6 countries. Hence the pipeline will replace some 6% of the present value of the WB6's capital stock once fully implemented and this could be seen as insufficient for the development needs of the region.

capital intensive sectors of transport and energy concentrate most of the WBIF financial resources.

Table 2: WBIF project pipeline by sector, 2009–19, 2009–20 – € million

Investment Cost		***Financing source***		***WBIF grants***	***WBIF Loans***		
Sector		*WBIF loans and grants*	*Others*		*Total*	*Signed*	*To be signed*
Digital	506,1	369,9	136,1	8,5	275,8	4,3	271,5
Energy	5 956,7	4 093,4	1 863,3	257,7	3 888,4	1 008,3	2 880,1
Environment	2 974,1	2 101,8	872,3	153,5	1 817,6	985,2	832,4
Private Sector Development	297,0		297,0	8,5			
Social	3 522,0	2 215,9	1 306,1	57,6	2 111,2	1 346,9	764,3
Transport	11 103,0	7 202,2	3 900,8	964,6	6 763,7	3 800,0	2 963,7
Total	***24 358,8***	***15 983,2***	***8 375,6***	***1 450,4***	***14 856,8***	***7 144,8***	***7 712,0***

Source: Elaborations of the author on data extracted from the WBIF-MIS

In addition to infrastructure, the *Western Balkans Enterprise and Innovation Facility* (WB EDIF) was created in 2011 to provide a platform for SME (Small and Medium-sized Enterprises) for the WB6 region – i.e. the area comprising the half-dozen Western Balkan countries still in the process of EU accession: Albania, Bosnia Herzegovina, Kosovo, Montenegro, North Macedonia and Serbia. From the beginning, the platform included two equity pillars (*Enterprise Innovation Fund* or ENIF and *Enterprise Expansion Fund* or ENEF), one guarantee pillar (*Guarantee Facility* or GF) and one Advisory and Support Services pillar (AS). A competitiveness pillar was added later. Today, most of the WB EDIF pillars are operational and as of end 2019 the facility has committed €760m in funding, financing 500 projects involving 5,390 SMEs, which supported 112,705 jobs.[42] In 2018, a *European Youth Employment and Training Initiative* of €10m was proposed by the European Investment Bank (EIB) Group. The EU contribution was implemented in 2021. Also in 2019, a €20m grant was approved for the European Bank for Reconstruction and Development (EBRD) Small Business Support TA programme (SBS) and for the World Bank's EU REPARIS programme.

Finally, two platforms proposed by EBRD were established in the context of the WBIF that focus on energy efficiency in the private sector. They blend EC grants with EBRD and KfW (German Credit Institute for Reconstruction) loans, also providing support in the form of technical assistance. Overall, these two energy-efficiency facilities have a budget of €393m – of which €47.7m are investment grants, €28m are technical assistance grants and €317m are loans, mainly from the EBRD.

2.4 Judgement

In general, the cooperation achieved between donors and beneficiaries in the WBIF is recognized as a value added of the instrument per se, and is acknowledged to work well. This was not straightforward ex ante, considering that there are 20 bilateral donors, 6 recipient countries and several international and bilateral financing institutions who take decisions by consensus. Certainly, the fact that this cooperation was developed for a specific region where there was a rather natural consensus on the needs of reconstruction, transition to a market economy and preparation for EU accession helped to strengthen the process. Cooperation also benefited from some cultural homogeneity in the area on the beneficiaries' side, despite

[42] WB EDIF, *Annual Report 2019*, http://www.wbedif.eu/library/wb-edif-annual-report-2019/ . See also Atanasijević, Corradin, Sartore, Uvalic, Volo & Cingolani (2021).

the well-known religious divisions that were so much exploited by destabilizing forces during the war and that are still today a potential threat to its stability.

In thinking about the scalability of the WBIF, the main message seems to be that this type of consensus cooperation can be made to work in geographically defined areas where a broad policy consensus on priorities exists or can be naturally built up, the instruments themselves contributing to this built-up. For the WBIF there was an initial agreement on a few high-level objectives such as reconstruction, transition and EU accession. Starting from shared broad objectives, it is possible to define lower-scale targets that ultimately translate into concrete cooperation at project level in a way that is then part of a general strategy – defined in this case in the context of EC accession policy. This requires an institutional framework that is as lean as possible and allows sequential interactions. This institutional framework is needed because important background policy work is required. In the absence of dedicated institutions able to lead it (such as the European Commission in the case of WBIF), the framework should at least be compensated by the adherence of the interested stakeholders to concrete goals and targets, as discussed in the next section.

3. Coordination in pursuing Sustainable Development Goals (SDGs): Concessionality for climate projects in the private sector

3.1 Background

Kanie Norichika and Frank Biermann claim that developing the Sustainable Development Goals (SDGs) is a means to foster international cooperation that will, in the end, enhance their realization.[43] However, since there is no central government able to enforce SDGs at world level, their realization is left to the decentralized *voluntary cooperation* of individuals, as well as local and central governments and their financing institutions (bilateral or multilateral).

In this section, the argument is developed that for private-sector projects the logic of defining common SDGs (with their intermediate targets and evaluation indicators) should be extended to the coordination of the main parameters necessary to define public support at project level[44] – and, notably, the shadow (or accounting) prices to be used to determine such support. This would reduce the decisional uncertainty referred to in the first section and render practical cooperation possible at project level, thus increasing the likelihood that the SDGs are effectively realized at the required scale.[45] A formal framework for discussing the main parameters to be considered in order to determine public support at project level is introduced below, and is presented in more detail in the Appendix.

3.2 Indicative project parameters

[43] Kanie Norichika and Frank Biermann, *Governing through goals: Sustainable Development Goals as Governance Innovation*, cit.
[44] It is assumed that the project is sufficiently mature to determine these parameters.
[45] It is of course always possible for a few donors to agree on the main parameters for support to a single project, but this microeconomic voluntary cooperation is unlikely to address systematically an investment challenge of the size of a few points of world GDP per year.

Let us assume that there is a project that enhances the realization of the SDGs – say, a project that will remove X units of pollutants over the course of its economic life. Let us further assume that the shadow (or accounting) discounted value of the removal of one unit of pollutant is P_S, however this is calculated.[46] The social value of this project is then shown by $V_S = P_S*X$. If P_M is the discounted price at which one unit of pollutant can be sold on the market (P_M can be negative), the project has market value, which is a cash flow (revenue) for its owner of $V_M = P_M*X$ in present value terms.

If c_u is the discounted unit cost of the project before earnings and financing (inclusive of investment cost and entrepreneur's remuneration) and r is the average percentage cost of obtaining financing for the project on the market (a "real" interest rate), what could be called the "natural profit", labelled π, is that profit that covers the project costs inclusive of investment. Accordingly, we can distinguish the following three components of the cost of production of X:

1. the cost before financing and profit $C_{BFP} = c_u*X$ (cost incurred to pay the factors of production and the raw materials);
2. the cost of obtaining financing for the project: $C_F = r*C_{BFP}$[47]; and
3. the "natural" earnings for the owner of the project: $\pi*(C_F + C_{BFP})$.[48]

The "natural cost" of the project that would prevail under maximum efficiency is then: $C_N = (1 + \pi)*(C_F + C_{BFP})$. This cost is generally unobservable. What can be observed is the cost C, which includes what can be called the target profit rate of the investor π^*,[49] which could potentially converge towards the "natural" competitive profit rate under free entry – a condition unlikely to be fulfilled in a development context. The target profit rate exceeds the natural rate by an amount that could be called a rent: $\pi^* = \pi$ + Rent%. Therefore, the actual cost of the project observable on the market is:

$$C = (1 + \pi^*)*(C_F + C_{BFP}) = (1 + \pi)*(C_F + C_{BFP}) + \text{Rent}.$$

Following the logic of Arthur Pigou, the maximum public support that can be given to this project is: $MPS = V_S - V_M = (P_S - P_M)*X$.[50] For a project complying with SDGs, it is

[46] Massimo Florio, *Applied Welfare Economics: Cost-benefit Analysis of Projects and Policies*, New York, Routledge, 2014, chapter 3

[47] In classical economics there is no distinction between the rate of profit and the rate of interest. In neo-classical economics π=r under the golden rule of the steady state, which is also the one that maximises efficiency. For Post-Keynesians, the Cambridge equations states that the rate of profit is equal to the growth rate divided by the savings rate of the capitalists, while the former should also be equal to the rate of interest (see Massimo Cingolani, "Interest, Growth, and Income Distribution: What Ought to Be the Objectives of EU Macroeconomic Policy Coordination?", in *International Journal of Political Economy*, Vol. 40, No. 4, 2011, p. 31–61. If risk is introduced, as it was done more systematically in the neo-classical tradition, most economists working under this paradigm would argue that π>r, which implies that the risk is transferred to the consumer. *De facto*, one observes that generally the financial rate of profit exceeds by far the rate of interest.

[48] The profit rate is defined here over all invested capital: circulating and fixed.

[49] To simplify, it is assumed that, if any, financial rents are included in π^* and r is a competitive rate. It is clear that the latter assumption can only be provisional and that conditions should be expected to be non-competitive in a development context, i.e. characterized by the lack of convergence of rates of return to a single value. In such cases, one can assume both the minimum profit rate and the range of sectoral rates of return as given; see: Paolo Sylos Labini, "L'utilizzo del contributo di Sraffa nell'analisi dello sviluppo", *Atti dei Convegni Lincei, n. 200, Convegno Internazionale Piero Sraffa*, Roma: Accademia Nazionale dei Lincei, 2004.

[50] Arthur Cecil Pigou, *The Economics of Welfare (4th ed.),* London, Macmillan, 1932. This is for instance the principle that DG REGIO's applied to calculate the *Funding Gap* in EU regional projects (see Andrea Mairate

reasonable to assume that its social value exceeds its market value ($V_S > V_M$) and that therefore MPS > 0. We should also not be too surprised to see a market value below the total cost of the project, otherwise it would not be so difficult to achieve the SDGs. The net market cash flow of the project, NMV = V_M - C<0, would thus be negative for a typical SDG project.

Without public support the private sector would be unwilling to undertake the project because its return would be below the target rate of profit. For the project to be undertaken, the available public-sector support for the project, APS, would therefore have to be higher than the minimum public support, mPS = -NMV. The latter would probably be higher than the desired or preferred level of support from the public sector, which is DSP = mPS - Rent but is unknown. In any case, any level of available public support above mPS would allow the project to be undertaken by the private sector:

$$APS \geq mPS$$

As noted above, the total value relation for the project being $V_S = V_M + MPS$, the maximum public support that the public sector would accept for the project is MPS:

$$MPS = V_S - V_M.$$

Above MPS, the public sector would stop supporting the project because its costs to society would exceed the social benefits. Hence, in the end the range for which APS makes the project feasible is bounded by mPS and MPS:

$$\text{mPS} \quad \leq \quad \text{APS} \quad \leq \quad \text{MPS}$$

Within these boundaries, the specific distribution of APS will determine the probability that the project occurs, which will be zero outside of this range. The length of this "project feasibility interval" is: $MPS - mPS$. As detailed in the Appendix below, taking as given (or observable) the market price P_M, the unit investment costs c_u and the interest rate r, the main unknown or exogenous parameter influencing mPS is shown to be the target rate of profit of the private sector π^*, whereas the main unknown exogenous parameter influencing MPS is the shadow price of the output P_S. The bounds mPS and MPS thus depend on parameters that are generally non-observable, and on which there can be differences of opinions between stakeholders: P_S for MPS, which depends on the specific social-welfare function of each donor, and π^* for mPS, which includes the Rent parameter known to the investor but not to the donors.

3.3 Advantages of cooperation in setting common targets

Now, assume several donors i (i = 1, … n) pool their grant support for a project, trying to reach an aggregate amount of public support as close as possible to mPS (to eliminate unknown rents). Each donor will have their independent opinion on the highest and lowest (unitary) levels of support that they consider adequate for this particular project. If these opinions are independent and distributed normally, aggregating the various MPS_i and mPS_i

and Francesco Angelini. "Cost-benefit analysis and EU cohesion policy", in Massimo Florio (ed.), *Cost-Benefit Analysis and Incentives in Evaluation: The Structural Funds of the European Union*, Cheltenham UK, Edward Elgar, 2007, p. 49-64), which went beyond Pigou. It is noteworthy that, strictly speaking, Pigou's analysis assumes that resources are fully used and income is equally distributed (see Richard F. Kahn, "Some Notes on Ideal Output", in *The Economic Journal*, Vol. 45, No. 177, March 1935, p. 2).

defines the range of available public support (APS) for the project from these donors, which would be given by the interval: $\sum_1^n MPS_i - \sum_1^n mPS_i$. Under the assumptions retained, this interval will be distributed following a normal distribution with a mean equal to the difference between the sum of the means of the maximum and minimum supports and with variance equal to the sum of the individual variances. For instance, with two donors labelled 1 and 2, if we have:

$$MPS_1 = N[\mu_{MPS1}; \sigma_{MPS1}]; mPS_1 = N[\mu_{mPS1}; \sigma_{mPS1}]$$
$$MPS_2 = N[\mu_{MPS2}; \sigma_{MPS2}]; mPS_2 = N[\mu_{mPS2}; \sigma_{mPS2}]$$

where N indicates the normal distribution, μ its mean and σ its standard error, the distribution of the range for the aggregate supports will be given by:

$$MPS_1 + MPS_2 - mPS_1 - mPS_2 = N\left[\mu_{MPS1} + \mu_{MPS2} - \mu_{mPS1} - \mu_{mPS2}; \sqrt{\sigma^2_{MPS1} + \sigma^2_{mPS1} + \sigma^2_{MPS2} + \sigma^2_{mPS2}}\right]$$

Then agreeing ex ante on the value of the shadow prices to be used for valuing the project's output will reduce the uncertainty attached to the distribution of the maximum public support aggregated for the two donors, which would obviously have a lower standard error when σ_{MPS1} and σ_{MPS2} are zero (MPS_1 and MPS_2 will be then be known with certainty). The same is true if an agreement is reached on a higher bound for the parameter π*, which determines the aggregated minimum public support mPS. Other things being equal, agreement on these two factors of exogenous uncertainty will reduce the time needed to find an agreement on the public support to be given to the project, facilitate the collective decision-making on the project's financing and increase the probability that the level of public support is not defined outside the range of justified project feasibility (i.e. lower than mPS or higher than MPS).

Conclusion

The experience of the WBIF confirms that consensus decision-making may help in building support for shared objectives on concrete projects. Blending allows grants to focus on projects that have a better chance of having an impact because they are linked to IFI loans, while grants integrate the required policy dimension sometimes absent from the IFIs' quasi-commercial loans. The principles of the WBIF seem sound:

- Ownership of final beneficiaries seems a logical prerequisite for development.
- The holistic policy approach – including infrastructure, SMEs, energy efficiency, climate change and the private sector – is also a less obvious prerequisite for development.
- The fact that the WBIF is embedded in the EU pre-accession policies is consistent with the conclusions of the Wieser Report[51].
- The pooling of expertise and funding between IFIs leverages scarce grants.
- The "four eyes" principle fosters effectiveness.

[51] Thomas Wieser (Chair), José Antonio Alonso, Monique Barbut, Erik Berglöf, Jacek Dominik, Nanno Kleiterp, Norbert Kloppenburg, Franco Passacantando, Susan Ulbæk. 2019. *Europe in The World: The future of the European financial architecture for development. An independent report by the High-Level Group of Wise Persons on the European financial architecture for development* General Secretariat of the Council of the EU, Economic and Financial Affairs (October).

- The common pipeline of priority projects implies a joint commitment of all stakeholders for the future – and hence, the coordination of expectations (and the reduction of uncertainty).

Experience shows that over the years in which these principles were applied by several donors in six recipient countries of the Western Balkans, they allowed support to be given to a broad range of sectors with sizeable amounts of grants and loans.

Similarly, given that SDGs assume decentralized planning procedures in which there is no umbrella coordination by any structure other than that of voluntary cooperation, to make them successful it is advisable to foster cooperation further and to set common objectives at project level for the accounting prices and maximum allowable target profit rate of the private sector. These are important parameters, on the basis of which suitable levels of project concessionality can be calculated. It can be suggested that the appropriate concessionality levels for climate projects in the private sector should consider:

1. The economic and social return of the project: a synthetic measure of the economic and financial flows generated by the project evaluated from a policy perspective (i.e. including externalities), which depends on the shadow price of the project output.
2. The financial return of the project before financing and earning: a synthetic measure of the stream of cash flows generated by the project.
3. The cost of funding to the borrower or investor: a synthetic measure of the cost (if any) at which a borrower can finance their project on the market.
4. The target rate of return of the investor: the minimum return that the investor expects from the project's financial cash flows in order for them to undertake the project.
5. The price at which any blended finance is provided for the project inclusive of concessionality, which can be assessed in terms of pure grant equivalent. The latter should be comprised between the bounds of minimum and maximum public support discussed in Section 3 and in the Appendix below.

Taking the above parameters into account, a possible decision principle to refer to could be: provided that (4) remains reasonable, it is only for projects for which (1) exceeds (2) that (5) could and should be lower than (3) and part of the difference between the IFI conditions and (4) could be covered by public funding.

Following this rule should facilitate decentralized collective decision-making on SDG projects and increase the probability that the relevant projects are realized – and, thus, that their impact is achieved.

Appendix: Model used in Section 3.2

Assuming as given a "normal profit rate" above the exogenous rate of interest, a formalization of the problem discussed in Section 3.2 is provided by the following system, made of 18 variables linked by 11 equations.

$$\begin{cases} V_s = P_S X \\ V_M = P_M X \\ C_{BFP} = c_u X \\ C_{FIN} = r C_{BFP} \\ CF = VM - C_{BFP} - C_{FIN}; \\ \mathrm{NC} = (1+\pi)(C_{BFP} + C_{FIN}) \\ Rent = (\pi^* - \pi)(C_{BFP} + C_{FIN}) \\ C = (1+\pi^*)(C_{BFP} + C_{FIN}) \\ mPS = C - V_M \\ MPS = V_S - V_M \\ DPS = mPS - Rent \end{cases} \quad ; \quad \text{(I).}$$

The acronyms are defined by:

1.	X	Cumulated output of the project
2.	C	Total cost of the project
3.	c_u	Discounted unit cost of the project before earnings and financing (*)
4.	C_{BFP}	Cost of the project before earnings and financing (*)
5.	C_{FIN}	Financing costs (real)
6.	NC	Normal Cost
7.	CF	Cash Flow
8.	P_M	Market price of output
9.	P_S	Shadow price of output
10.	V_M	Market Value of output
11.	V_S	Social Value of Output
12.	R	Percentage financing cost
13.	π	Normal Profits (Percentage)
14.	π^*	Target Profits (Percentage)
15.	$Rent$	Rent
16.	mPS	Minimum Public Support
17.	MPS	Maximum Public Support
18.	DSP	Publicly Desired Public Support

(*) Inclusive of investment cost

The exogenous variables are: c_u, P_M, P_S, p^*, r and X. Solving the nine equations for the endogenous variables gives the final form of the model,[52] which is given by the system II:

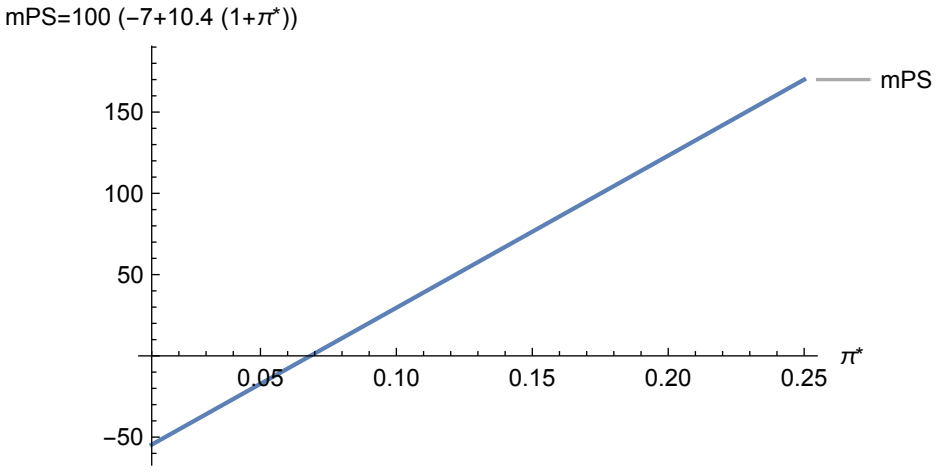
$$\begin{cases} V_S = P_s X \\ V_M = P_M X \\ C_{BFP} = c_u X \\ C_{FIN} = r c_u X \\ CF = [P_M - (1+r)c_u]X \\ NC = (1+\pi)(1+r)c_u X \\ C = (1+\pi^*)(1+r)c_u X \\ Rent = (\pi^* - \pi)(1+r)c_u X \\ mPS = [(1+\pi^*)(1+r)c_u - P_M]X \\ MPS = (P_S - P_M)X \\ DPS = [(1+\pi)(1+r)c_u - P_M]X \end{cases} \quad \text{(II).}$$

[52] Patrick Artus, Michel Deleau and Pierre Malgrange, *Modélisation macroéconomique*, p. 120-124, cit.

The solution (II) implies, for instance, that if we take the values of 100 for output X, 10 for its market price P_M, 9 for the unit cost c_u, 4 percent for the interest rate or financing cost r, 20 for the shadow price of output P_S, 8 percent for the normal profit rate and 25 percent for the target profit rate of the investor π^*, then the result for the endogenous variables is: (V_S = 2,000; V_M = 1000; C_{BFP} = 900; C_{FIN} = 36; C = 1,170; CF= 64; Rent = 159; mPS = 170; MPS = 1,000; DPS=10.88).

Keeping the other parameters fixed at the value in the above example, Figure 3 below shows the sensitivity of the minimum public support mPS to changes in the target profit rate of the private sector π^*, showing that when the latter changes from 0% to 25%, the minimum possible subsidy varies between 0 and 170, which could be compared with a total "natural" project cost (cost before profit) remaining constant at 1,011 while total cost varies between 936 and 1,170:

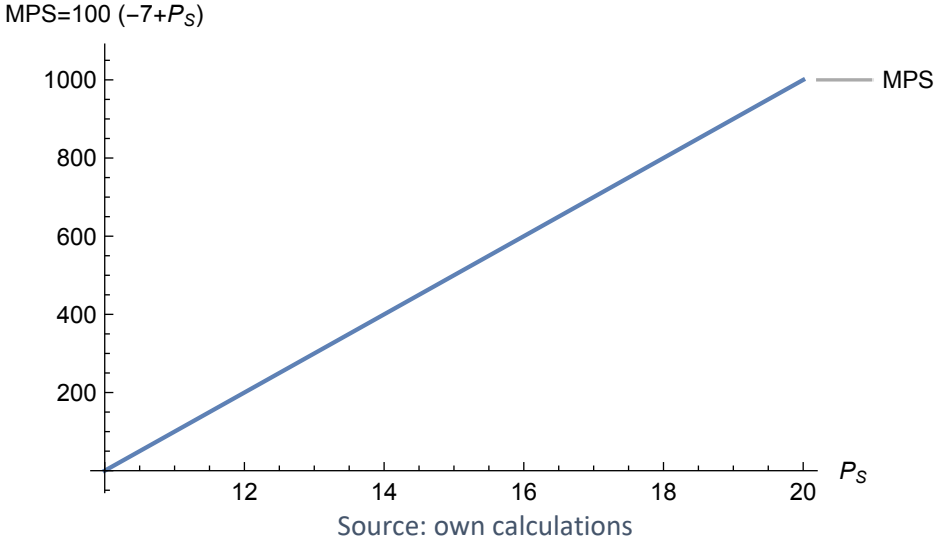
Figure 3: Sensitivity of the Minimum Public Support to the target profit rate



Source: Own calculations

Similarly, Figure 4 below shows that for a shadow price varying between 0 and 20, the maximum public support (MPS) would vary in principle between 0 and 1,000. Beyond that level of support, the public sector would not finance the project.

Figure 4: Sensitivity of Maximum Possible Support to the shadow price of output



Source: own calculations

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