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Asylum provision: A review of economic theories

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In recent years, using economic theories, a small number of researchers have examined asylum provision by non-persecutor countries. Unfortunately, the nature of their analyses makes the results inaccessible to many who are interested in understanding the topic from multidisciplinary perspectives but are unfamiliar with mathematical methods in economics. We communicate the findings of those studies in non-mathematical fashion, thereby contributing to a facilitation of interdisciplinary research on asylum policy.

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1. Introduction

This paper aims to facilitate interdisciplinary research on asylum policy making by describing the current state of the economic literature on asylum provision by non-persecutor countries.

We concentrate on the theoretical studies that construct and analyze mathematical models.

The nature of their analyses makes the results inaccessible to many who are unfamiliar with mathematical methods in economics. Yet the studies offer much insight into the incentive problem of asylum provision when there are more than one potential host countries. To convey the insight to a wide audience, we describe the theories non-mathematically.

The studies show that asylum provision remains low even if people in non-persecuted countries are humanitarian because of the way refugee protection benefits them. In the reviewed models, the government of each potential host country derives a benefit from the protection of the persecuted because it cares about the welfare of its humanitarian citizens who in turn care about the welfare of the persecuted. However this benefit accrues to the government whether the protection is provided in its country or in other safe countries. Since hosting asylum seekers is costly, each non-persecutor government faces an incentive to rely on the asylum provision by other safe countries. As a result, the provision of asylum remains low.

This type of incentive problem in asylum provision was first articulated verbally before the model-based studies appeared, e.g. Suhrke (1998). In fact, the problem is not specific to asylum provision but is common to the provision of various *public goods*. Public goods are distinguished from private goods by the degree of non-rivalry and non-excludability in consumption. In our context, the ‘consumption’ of refugee protection is not rivalrous because when the humanitarian citizens of one country gain from the protection of the persecuted

their gain does not reduce the benefit that accrues to the humanitarian citizens of another country. On the other hand, the consumption of private goods, such as cake, is rivalrous because if someone has already eaten the cake another person can no longer eat it. The ‘consumption’ of asylum is not excludable either. The provider cannot prevent humanitarian citizens of other countries from enjoying the protection of the persecuted. The provision of a public good thus generates positive *externalities* – the benefits enjoyed by people who did not supply the good. Kaul et al. (1999) offer a lucid description of the concepts of public goods and externalities for non-mathematical readers. Cornes and Sandler (1996) is a standard reference. We use these terms in what follows.

The existing studies offer various models where asylum enters as an international public good. We describe them from the simplest to the most elaborate. Each model assists us to precisely understand how different factors influence asylum provision in a multi-country setting – the advantage of model-based analysis over verbal argument. Each study examines how we could mitigate the incentive problem among potential host countries. However, as we will see, their searches for ways to increase asylum provision reveal, instead of a solution, difficulties in resolving the incentive problem. As a signpost and for ease of comparison, the following table summarizes the analytical models we review below. (We use footnotes to give modeling details for interested readers. Other readers can skip the footnotes.)

[Insert Table 1 here]

2. Coordination among host countries

In this section, we describe three studies that examine the difference between coordinated and uncoordinated asylum provisions by potential host countries. Each study constructs a model

where there are only two potential host countries that face a mass of identical asylum seekers. We begin with the case where two countries are identical. We then turn to the case where the countries are not identical. Finally, we look at the case where financial transfers are allowed between two non-identical countries.

2.1 Two identical countries

Hatton (2004: 45-48) is the first to use a mathematical model to analyze asylum provision as an international public good. The two countries care about the total number of people who are given asylum. The countries therefore benefit when the global provision of asylum increases. Each country however gains a higher benefit from hosting an asylum seeker in itself than from observing the person being hosted abroad.¹ At the same time, it is costly for a country to host an asylum seeker in itself. The two countries are identical in terms of the relevant parameters (namely, the benefit and cost per person granted asylum). Furthermore, the number of places offered by one country negatively affects the number of asylum seekers hosted by the other country. This is because Hatton implicitly assumes that a fraction of asylum seekers prefer the former country to the latter, and hence more of them go to the former if it increases the number of places on offer.²

¹ In this sense, Hatton regards asylum as an impure public good. See Andreoni (1989) for an analysis of the warm glow effect on private provisions of public goods.

² It should be noted that, in his model, the number of places offered by each country can exceed the number of places taken up in that country. This is due to the specific way in which the negative effect of one country's policy on the other country's intake is formulated. Namely, Hatton's equation (2) implies that country 1 offers to host $\gamma_1 A$ but consequently receives only $(\gamma_1 - \beta\gamma_2)A$, while country 2 offers to host $\gamma_2 A$ but consequently receives only $(\gamma_2 - \beta\gamma_1)A$. Since the two countries are identical, the total number of people hosted in those countries is $2(1 - \beta)\gamma A$ where $\gamma = \gamma_1 = \gamma_2$, while the total number of places offered in those countries is $2\gamma A$. Thus, there remains $\beta\gamma A$ untaken places in each country. Only when $2(1 - \beta)\gamma = 1$ or equivalently $\gamma = 1/2(1 - \beta) > 1/2$, all asylum seekers are hosted.

Hatton first derives the optimal number of places offered by each country when the two countries do not coordinate with each other. In this case, each country chooses the number that maximizes its own net benefit by taking the other country's choice as given, i.e. by ignoring the fact that the other country's net benefit depends on its choice.³ Hatton next computes the optimal number of places offered by each country when the countries coordinate with each other. In this case, each country jointly chooses the number that maximizes the sum of their net benefits, taking into consideration the fact that one country's provision affects the other's net benefit. Here, each country internalizes the positive externality its asylum provision causes to the other country. The difference between coordinated and uncoordinated outcomes shows that the former offers higher asylum provision than the latter. The net benefit to each country is also larger under coordinated than uncoordinated maximization.

Facchini et al. (2006: 416-422) presents a more elaborate model that differs from Hatton's in three significant ways. First, it incorporates an explicit process of selecting a policy maker in each country. As a consequence, the model consists of two decision-making stages. In the first stage, the electorate select one citizen to be their country's policy maker. In the second stage, the elected representative decides on the number of asylum seekers to be hosted by the country. Within each country, citizens differ in the benefits they gain from an increase in the number of people given asylum. Some feel happier than others because, for example, the

³ The situation is thus modelled as a static game of complete information, and the Nash equilibrium is employed as the solution concept. Each country's net benefit is formulated with two components: the benefit as a function of the number of people hosted in both countries, and the cost as a function of the number of people hosted in itself. The benefit per hosted person diminishes as the number of people hosted in both countries increases, while the cost per hosted person is unaffected by it. The net benefit is concave in the number of hosted people.

former are more humanitarian than the latter. The distribution of citizens over different humanitarian types is however the same in the two countries, so the countries are identical.

The second difference is that the cost of asylum provision to each country increases not only in the number of asylum seekers hosted in itself but also in the number of asylum seekers hosted in the other country because some asylum seekers admitted in one country eventually move to the other country. Yet, hosting asylum seekers in itself is costlier than hosting asylum seekers in the other country.⁴ The third difference is that a citizen of each country gains the same humanitarian benefit from giving an asylum seeker protection, whether the asylum is provided by his/her country or the other country.⁵

Although modeling details differ from Hatton, Facchini et al. also show that when the policy makers in the two countries coordinate with each other, the resulting provision of asylum is higher than the uncoordinated outcome because coordination internalizes the externalities across the countries.⁶ (In their two-stage model, both coordinated and uncoordinated outcomes are subject to strategic delegation at the election stage, i.e. each citizen's most ideal

⁴ This assumption is represented by their parameter restriction, $1/2 < \lambda < 1$, in the cost function (Facchini et al., 2006: 417).

⁵ Therefore, unlike Hatton's model and contrary to the title of their article, their model does not contain a warm glow effect in Andreoni's (1989) sense. They thus regard asylum as a pure public good. It is also useful to note that they model the net benefit by a combination of a linear benefit and a convex cost while Hatton models it by a combination of a concave benefit and a linear cost, although the net benefits in both models are concave in the number of people granted asylum.

⁶ The uncoordinated outcome is the subgame-perfect Nash equilibrium of the two-stage game with complete and imperfect information. Coordination is represented by the maximization of the Nash product, while it was represented by the maximization of the utilitarian welfare in Hatton's. The former takes into account the incentive compatibility of coordination by requiring the gain difference between coordination and non-coordination to be non-negative.

policy maker is less humanitarian than himself/herself. While this aspect of their study points out another potential source of the tendency to underprovide asylum, we do not discuss the details in order to focus on the problem of international coordination.)

Both models suggest that, in theory, countries should be willing to coordinate with each other to increase asylum provision because each country can then increase the net gain. As we relax the assumption that the potential host countries are identical, we can no longer hold such optimism.

2.2 Two non-identical countries

To examine the case of two non-identical host countries, Facchini et al. (2006: 424-426) assume that the distribution of citizens over different humanitarian types is not the same in the two countries, and the median voter in one country is more humanitarian than the median voter in the other.⁷ Like the case of two identical countries, when countries do not coordinate with each other, both countries provide less asylum than they would under coordination. The more humanitarian country provides more asylum than the less humanitarian.

Czaika's (2009: 95-98) model is similar to Hatton's but departs from it by assuming that the two countries differ in the cost per person hosted in itself and the benefit per person hosted abroad. (The benefit per person hosted in itself is the same in the two countries.) Moreover,

⁷ Note that there is another modification they made to their model in analyzing the case of two non-identical countries. They removed the possibility of negative externalities caused by cross-border movements of people granted asylum. Compare their equation (29) with (1).

due to the functional form he uses for the net benefit, each country's uncoordinated provision of asylum is independent of the other country's provision.⁸

Coordination again internalizes the externalities and yields a global net benefit larger than the uncoordinated outcome.⁹ However, unlike in the case of two identical host countries, the coordinated outcome does not always ensure each country to enjoy a national net benefit larger than the uncoordinated outcome. Both countries benefit from coordination only if the countries are similar to each other in the relevant benefit and cost parameters. When the countries are sufficiently different from each other, coordination is incentive-incompatible for the country that does not benefit much from the other country's intake and/or faces high costs of hosting asylum seekers. In reality, potential host countries can be very different from each other in those parameters, suggesting that in practice coordination is difficult to achieve.

2.3 Two non-identical countries with financial transfers

Facchini et al. (2006: 426-427) examine how each country's coordinated asylum provision is influenced by an international financial transfer. The aim is to investigate whether the possibility of sharing the hosting cost could increase the overall provision of asylum. The transfer is assumed to split the global net benefit equally between the two countries, i.e. the transfer rule is pre-determined in the model. Such a transfer is shown to make both countries

⁸ Like Hatton, he models the gross benefit as a weighted sum of the two countries' asylum provision, and the cost is independent of the other country's asylum provision. However, like Facchini et al., he models the net benefit by a combination of a linear benefit and a convex cost. As a result, the countries do not interact with each other strategically, i.e. each country has a dominant strategy. See his equation (2).

⁹ The uncoordinated outcome is the Nash equilibrium of the static game of complete information, and the coordinated outcome is obtained by maximising the utilitarian welfare.

better off. The more humanitarian country financially supports the less humanitarian to accept more asylum seekers than it would without the transfer.

While Facchini et al. assume an equal split rule for the financial transfer, Czaika (2009: 98-103) allows two host countries to decide on the amount of transfer in his model. The countries first decide on their cross-border transfers and then decide on asylum provision. (Note that, in Facchini et al.'s model, a financial transfer takes place after each country decides on the number of asylum seekers to host.) As noted in the previous subsection, each country's uncoordinated provision of asylum is independent of the other country's provision in his model because of his functional specification of the net benefit. However, with the possibility of financial transfers before asylum provision, each country's transfer influences the other country's asylum provision.

Czaika shows that each country's uncoordinated intake of asylum seekers with financial transfers can be higher than without transfers.¹⁰ For transfers to increase a country's unilaterally determined intake, the other country must value the protection abroad more highly than protection by itself.¹¹ The other country then decides to transfer a positive financial amount in order to increase asylum provision abroad and subsequently its own welfare. Czaika also shows that even if financial transfers increase uncoordinated asylum provisions, each country's provision under coordination remains higher than under non-coordination. The finding suggests that when coordination is incentive-incompatible, i.e.

¹⁰ The uncoordinated outcome is the subgame-perfect Nash equilibrium of the two-stage game with complete and imperfect information.

¹¹ This requirement is expressed by the parameter restriction, $\beta_i > 1$, in his model (Czaika, 2009: 99).

when the countries sufficiently differ from each other in the relevant benefit and cost parameters, the introduction of cross-border transfers may have a role in increasing provision.

3. Modeling the behavior of prospective asylum seekers

In all three studies we have described so far, asylum seekers are assumed identical and do not make any decision within each model. In this section, we describe two other studies where prospective asylum seekers are not identical and decide on whether and where to seek asylum in response to policies of potential host countries. We first describe the only model where asylum does not enter as an international public good. We then turn to the study that examines asylum provision when asylum seekers may or may not be persecuted in their own countries.

3.1 When asylum seekers differ in the preferred destination and the severity of persecution

In Monheim-Helstroffer and Obidzinski's (2010: 87-91) two-country model, each country's citizens do not care about the welfare of the persecuted. Instead, each country cares about its international reputation. The reputation of each country is determined by its standard of proof used to assess asylum seekers. Requiring asylum seekers to meet a very high standard of proof can damage the country's reputation.

Each persecuted person is assumed to prefer one country to the other. Various factors can affect their preferences, including location, economic opportunities and/or cultural considerations. For instance, countries that have pre-existing networks of migrant communities may be preferable to the persecuted of the same communities. The introduction of destination preferences among prospective asylum seekers inevitably makes the two

potential host countries non-identical.¹² In addition to their destination preferences, persecuted people also differ from each other in terms of the gravity of their cases. Therefore, a given standard of proof can be met by some but not by others. The persecuted are assumed to be distributed over different severities of persecution. Under the assumption of this bi-dimensional heterogeneity, a persecuted person seeks asylum in his/her preferred country if he/she can meet the standard of proof required by the country. If the person can meet the standard only in the other country, he/she seeks asylum in that country because the less preferred country is still better than the status quo.

In this model, each country's standard of proof generates an externality through the destination choices of asylum seekers. As a country adopts a lower standard, more people choose to seek asylum in that country, which in turn decreases the number of people seeking asylum in the other country. Lowering one country's standard thus creates a positive externality of reducing the total cost of hosting asylum seekers in the other country.¹³ When each country unilaterally chooses a standard, it sets a higher standard than when they coordinate with each other because they do not internalize the externalities.¹⁴ The coordination is represented by the utilitarian social welfare optimization, i.e. the maximization of the sum of both countries' net benefits. In both coordinated and uncoordinated cases, the more popular country's standard of proof is higher than the other

¹² Giordani and Ruta (2013) also assume that migrant candidates prefer different destinations. They do not study the problem of coordinating asylum policies among destination countries, but of coordinating immigration policies in general. However, their model is similar to Monheim-Helstroffer and Obidzinski's in the sense that while there is no public good, foreign policies affect the behavior of prospective migrants and the number of arrivals in each country.

¹³ Note that in Facchini et al.'s model (case of two identical countries), a rise in asylum provision abroad increases the total cost of domestic hosting, generating a negative externality. See subsection 2.1 above.

¹⁴ The uncoordinated outcome is the Nash equilibrium of the static game with complete information.

country's. Coordination increases asylum provision, as the standard is lowered in both countries.

Monheim-Helstroffer and Obidzinski then consider two additional coordination regimes: fixed- and maximum-standard regimes.¹⁵ These regimes are meant to be more practical alternatives than the utilitarian social welfare maximization because the utilitarian optimum requires the two countries to accept different standards of proof in this model where one country is more popular than the other among prospective asylum seekers. In an environment such as the EU, the principle of anonymity is likely to prevent the union-level law makers from prescribing different standards of proof according to different degrees of popularity. Hence the utilitarian approach may not be sensible.

The fixed-standard regime requires the two countries to use a common standard of proof. Since the standards are the same in both countries, they do not affect the destination choice of any asylum seeker. All those who decide to seek asylum choose their destinations purely based on their country preferences. In other words, the fixed-standard regime removes cross-border policy externalities.

When one common standard is chosen to maximize the sum of the two countries' net benefits, it is not as high as the popular country's unilaterally chosen standard. But it can be higher or lower than the unpopular country's uncoordinated choice. As a result, the popular country's net benefit is always lower under the fixed-standard regime than under unilateral decision making because the common standard attracts more asylum seekers to the country. On the

¹⁵ The authors call the second regime the minimum-standard regime because they define a high standard as a standard that does not require strong evidence of persecution. We call it the maximum-standard regime to maintain the usual definition of standard of proof, i.e. a high standard requires strong evidence.

other hand, the unpopular country's net benefit can be higher or lower under the fixed-standard regime than under unilateral decision making, depending on whether the fixed standard is higher or lower than the unilaterally chosen standard. The implication is that the fixed-standard regime is not incentive-compatible because, even if the unpopular country gains from it, the popular country loses. Furthermore, the fixed-standard regime increases asylum provision only if the unpopular country also loses.

The other alternative coordination regime, the maximum-standard regime, sets a standard that the two countries are both prohibited from exceeding. This approach leaves each country a room to choose its own standard but the choice range is capped.¹⁶ Like the fixed-standard case, if the maximum standard is set to maximize the sum of the two countries' net benefits, it is not as high as the popular country's uncoordinated choice. Hence the best the popular country can do is to set its standard equal to the maximum standard. This attracts more asylum seekers than the unilaterally optimal standard. Hence the popular country's net benefit is always lower under the maximum-standard regime than under unilateral decision making.

On the other hand, since the maximum standard is higher than its unilaterally optimal standard, the unpopular country could set its standard as high as the maximum so as to deter asylum seekers. However, the maximum standard is not optimal for the unpopular country because the regime forces the popular country to receive more asylum seekers by lowering its standard, which in turn enables the unpopular country to lower its standard (and hence better its reputation) without attracting more asylum seekers. Accordingly, the unpopular country's

¹⁶ The maximum standard is set by anticipating the reactions of the two countries, i.e. it is the subgame-perfect Nash equilibrium of the two-stage game with complete and imperfect information.

net benefit is always higher under the maximum-standard regime. This again suggests that the maximum-standard regime is not incentive-compatible for all parties unless the gain by the unpopular country exceeds the popular country's loss and the unpopular country is willing to share its gain to compensate the popular country. Asylum provision increases under the maximum-standard regime, as both countries lower their standards.

3.2 When economic migrants seek asylum

Monheim-Helstroffer and Obidzinski's model allows potential asylum seekers to differ in two dimensions: the preferred destination and the ability to meet the standard of proof in each host country. Bubb et al. (2011: 372-382, 394-399) go a step further by allowing non-persecuted persons in persecutor countries to seek asylum abroad. Prospective asylum seekers differ in five dimensions, and potential host countries face uncertainty about the true identity of each asylum seeker. In the first stage, each non-persecutor country sets a standard of proof for assessing asylum seekers. In the second stage, citizens of persecutor countries choose whether and where to seek asylum.

Their model consists of two regions: wealthy north and poor south. In each region, there are a number of non-persecutor countries and one persecutor country. Thus, there are two persecutor countries. Non-persecutor countries are potential host countries. Each persecutor country's population is divided into eight groups. First, it is divided into those who are persecuted and those who are not. Second, each of these two groups is divided into those who can produce strong evidence of persecution and those who can produce only weak evidence of persecution. This introduces a possibility that a non-persecuted person seeks asylum with artificial evidence, and also that a persecuted person is unable to produce strong evidence. Evidence produced by an asylum seeker is therefore not perfectly informative for assessment

by non-persecutor countries. Finally, each of those four groups is divided into those who know the strength of evidence they can produce and those who do not know it. This permits a situation where someone with strong evidence does not seek asylum because he/she is unaware of the strength of his/her case.

Two other heterogeneity dimensions relate to the cost of migration. Inter-regional travel is assumed costly in terms of time and money, but intra-regional travel is not. Hence it costs a person in the southern persecutor country time and money to travel to a northern non-persecutor country, but the travelling cost is negligible for a person in the northern persecutor country. In addition, each person in the persecutor countries must cover a psychic cost if moving to any other country, e.g. abandoning familiar environments and adapting to new culture and/or language. The psychic cost is high for some people and low for others.

Each non-persecutor country sets a standard of proof for assessing people seeking asylum in the country.¹⁷ However, unlike Monheim-Helstroffer and Obidzinski's model, the country's benefit is not a direct function of its standard of proof but of the total number of persecuted people granted asylum in the world. Thus, asylum provision is assumed to be an international public good. Therefore, one country's provision of asylum produces a positive externality to all other non-persecutor countries. Since the provider must bear the cost of provision, non-persecutor countries have an incentive to rely on provision by others.

Bubb et al. suggest that non-persecutor countries can be nudged to set a low standard and increase asylum provision if setting a high standard is condemned by international

¹⁷ Note that in this model an asylum seeker must produce evidence at least as good as the set standard in order to be hosted, while in Monheim-Helstroffer and Obidzinski's model an asylum seeker must produce evidence less than or equal to the set standard.

communities and hence costly.¹⁸ However, such nudging becomes more and more difficult to achieve when the income gap between source and destination countries widens and travelling becomes cheap. This is because it then becomes profitable for non-persecuted people in the persecutor countries to seek asylum.¹⁹ With some economic migrants disguising as refugees, it becomes very costly for non-persecutor countries to continue to host people without strong evidence of persecution, as these countries are unable to perfectly discriminate between persecuted and non-persecuted people and no altruistic gain but only a cost accrues when an economic migrant is admitted. Bubb et al. argue that this prediction is in line with the breakdown of the 1951 UN Refugee Convention.

3.3 Financially compensating a third country for hosting asylum seekers

Using the model described above, Bubb et al. (2011: 387-392, 401-403) examine the role of a transfer scheme in preventing economic migrants from seeking asylum. In this bilateral scheme originally proposed verbally by Hathaway and Neve (1997), a safe country in the poor region agrees to receive financial compensation for hosting a given number of successful asylum seekers in a safe wealthy country. Such a transfer scheme is likely to be adopted by all as long as there is one safe wealthy country running it. Suppose one rich non-persecutor country initially offers a contract to each safe poor country to host a certain number of people who seek asylum in the country and meet its standard in exchange for financial compensation. If the poor countries accept the offer, the other rich non-persecutor countries in the wealthy region are made worse off because they face greater demand for asylum by those who are now unwilling to seek asylum in the rich country running the

¹⁸ This is the subgame-perfect Nash equilibrium of the two-stage game with complete and imperfect information.

¹⁹ In their model, there is no way for people to apply for economic migration, so all potential economic migrants must seek asylum. The magnitude of economic migration in disguise is thus overestimated.

transfer scheme. To avoid an increased arrival of asylum seekers, each of the other safe countries in the wealthy region runs a transfer scheme. If every safe wealthy country runs such a transfer scheme, economic migrants lose the incentive to apply for asylum in the rich region, as they will be relocated to a safe country in the poor region and will not have access to income-earning opportunities available in wealthy countries.

However, their model-based analysis implies that, to run the scheme successfully, safe poor countries require compensation that can be expensive for safe wealthy countries. The scheme encourages the persecuted to go to a safe poor country directly rather than via a safe wealthy country that will eventually transfer them to the poor region. This increases the direct arrival of asylum seekers in the poor region. The scheme requires wealthy countries to compensate poor countries for hosting people who seek asylum in wealthy countries only. An implication is that, unless the scheme takes into account the negative externalities in calculating compensations, safe poor countries are unlikely to agree to be part of the scheme.

4. Tradable asylum quotas

The latest study in the literature examines the role of tradable quotas in increasing asylum provision (originally proposed verbally by Schuck, 1997). Like the other models (except Monheim-Helstroffer and Obidzinski's), Fernández-Huertas Moraga and Rapoport's (2014a,b) model regards asylum as an international public good. Hence uncoordinated provision of asylum is lower than coordinated provision that internalizes positive externalities to maximize the sum of host countries' net benefits.

However, the coordinated outcome can be replicated by first allocating asylum quotas to host countries and then allowing them to trade the quotas with each other. A country pays to

reduce its quota if the required payment is lower than the cost of fulfilling the initially allocated quota. It is paid to increase its quota if the payment is higher than the cost of fulfilling the quota. Thus, the use of tradable quotas lets host countries reveal their true costs of asylum provision through market transactions. Fernández-Huertas Moraga and Rapoport additionally show the possibility of taking into account asylum seekers' destination preferences through a particular matching mechanism (hence implicitly improving the post-admission welfare of asylum seekers) in replicating the coordinated outcome by using tradable quotas.

For this quota-trading scheme to be successful, it must attract participants. Fernández-Huertas Moraga and Rapoport show that the initial allocation of quotas across host countries can be manipulated to give the countries appropriate incentives to participate in the scheme.

However, the manipulation of the initial allocation requires the knowledge of relevant benefit and cost parameters for all potential participants. As each country has no incentive to reveal its true parameters, it is unclear whether the initial allocation of quotas can be set satisfactorily. In addition to the information problem, uncertainty remains as to whether potential participants can reach a multilaterally agreeable initial allocation of quotas.

5. Conclusion

Our review of the model-based studies reveals difficulties in achieving international coordination for increasing asylum provision. The studies examine the potentials of alternative arrangements such as cross-border financial transfers, cross-border refugee transfers, internationally fixing or capping the standard of proof for assessing asylum applications, and allocating tradable asylum quotas across safe countries. These arrangements can increase the global provision of asylum, but the reviewed studies imply that not all

countries support them. By establishing causal channels and quantifying gains and losses, the economic models help us systematically understand why some countries choose not to coordinate their actions. Without understanding the incentive problems clarified by the studies, we cannot make a progress in devising mutually agreeable international coordination that supports increased asylum provision. We hope that this paper assists non-mathematical researchers and policy makers working on issues of refugee protection in formulating coordination schemes for increasing asylum provision.

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Table 1. A summary of the analytical models

	Decision making agents	Positive externalities	Negative externalities
Hatton (2004)	Two identical host countries	Protection abroad increases altruistic welfare domestically (domestic and foreign protection are imperfect substitutes); Places offered (not necessarily taken) abroad reduces places taken domestically and hence the total cost of hosting domestically	Places offered (not necessarily taken) abroad reduces places taken domestically and hence altruistic welfare domestically due to the assumption that asylum is an impure public good
Facchini et al. (2006)	Two identical host countries	Protection abroad increases altruistic welfare domestically (domestic and foreign protection are perfect substitutes)	Protection abroad increases the total cost of hosting asylum seekers domestically due to cross-border mobility of hosted refugees
Facchini et al. (2006)	Two non-identical host countries	Protection abroad increases altruistic welfare domestically (domestic and foreign protection are perfect substitutes)	Nil
Czaika (2009)	Two non-identical host countries	Protection abroad increases altruistic welfare domestically (domestic and foreign protection are imperfect substitutes)	Nil
Monheim-Helstroffer & Obidzinski (2010)	Two non-identical host countries & Many non-identical potential asylum seekers	Low standard of proof required abroad reduces asylum seekers domestically and hence the total cost of hosting asylum seekers domestically	Nil
Bubb et al. (2011)	Many non-identical host countries & Many non-identical potential asylum seekers	Protection abroad increases altruistic welfare domestically (domestic and foreign protection are perfect substitutes)	Nil
Fernández-Huertas Moraga & Rapoport (2014a,b)	Many non-identical host countries	Protection abroad increases altruistic welfare domestically (domestic and foreign protection are imperfect substitutes)	Nil