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ABSTRACT

Climate Migration and International Aid*

Climate change increases the intensity and frequency of weather events that disproportionately threaten the lives and livelihoods of communities in the developing world. We explore internal and international migration as an adaptive response to climate change by reviewing evidence on the anticipated scale of such migration, as well as who climate migrants might be and where they might go. We investigate two dimensions of climate-induced migration. First, focusing on origin regions, we evaluate the role of international aid in affecting migration, drawing on a large literature that evaluates the effects and efficacy of international aid. Then, noting the possibility of significant future increases in international climate migration, we discuss examples of the other roles aid plays in recent migration policies. We conclude with open questions and outlooks.

JEL Classification:
Q54, F22, O19, Q56

Keywords:
climate change, migration, international aid

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1 Introduction

Climate change is increasingly driving human mobility within and across regions, countries and continents. In response, policymakers are reassessing the link between migration and international aid. Historically, international aid and economic cooperation have been alleged mechanisms for curbing migration, exemplified by initiatives such as NAFTA in the 1990s and recent European investments in North Africa and the Middle East aimed at preventing migrant arrivals in Europe. This report advocates an alternative perspective – unprecedented patterns of migration increasingly emerging due to climate change should serve as indicators of where aid is most urgently required. Rather than leveraging aid as a deterrent, policymakers should recognise climate migration as highlighting regions experiencing severe climate vulnerabilities that require targeted support and sustainable solutions.

This report uncovers several key insights. First, we present evidence that households engage in climate migration as an adaptive response, both in search of better economic and environmental conditions and to mitigate climate-induced harms. Consequently, restricting movement without addressing the underlying vulnerabilities can trap households in climate-induced poverty and instability. Climate-driven migration rates are already significant and expected to increase in response to increasingly frequent and severe environmental shocks (Desmet and Rossi-Hansberg 2015). While most climate-induced mobility is expected to be internal or regional, projections note limited but sizeable increases in international migration.

The relationship between international aid and migration is nuanced. While aid can address the root causes of migration by improving local economic conditions and building climate resilience among the vulnerable, it may initially increase migration opportunities by enhancing households' capacities and resources to move. This suggests that aid should not be anticipated as an immediate solution to address potentially large flows of climate migrants. Instead, it should be seen as complimentary to policies that facilitate orderly and humanitarian migration pathways; these may include actively managing climate migration flows or providing support to areas hosting them. Current policy disproportionately focuses on deterring relatively small numbers of irregular migrants from wealthy countries, overshadowing much larger internal and regional movements driven by the pressures of climate change. This redirects resources and attention away from areas in greatest need of support.

The report is structured as follows. Section 2 analyses existing evidence on climate-induced migration trends, as well as future projections. Section 3 investigates how international aid influences migration decisions in the context of climate change, emphasizing the

complexities and indirect consequences of development support. Section 4 critically evaluates destination countries' use of aid to streamline migration, arguing for a more balanced approach emphasizing integration and regional support. Section 5 concludes with broader views on future policies and identifies research priorities, advocating that climate migration is not so much to be prevented, as it is an indicator for where to target international aid.

2 Climate Change and Migration

Developing countries are particularly vulnerable to climate change for several reasons. More than 59% of the developing world (that is, over one billion people) are employed in agriculture, meaning that temperature rises have a disproportionate impact on economic output and livelihoods (Burke et al. 2015; Acevedo et al. 2017). This is compounded by the fact that many developing countries are in equatorial locations, which experience the brunt of global warming (Desmet and Rossi-Hansberg 2015; Nath 2020), and tend to have long coastlines, increasing their vulnerability to sea-level rises (Balboni 2025). These conditions are predicted to lead to effects of climate change around the global as visualized in Figure 1, showing the effect of a 1°C increase of average global temperature on real per capita output. Lower incomes and a lack of access to social safety nets in developing countries constrain the ability of households and firms to mitigate the effects of climate change or allocate resources towards adaptation (Hertel et al. 2010; Hanna and Oliva 2016; Costinot et al. 2016).

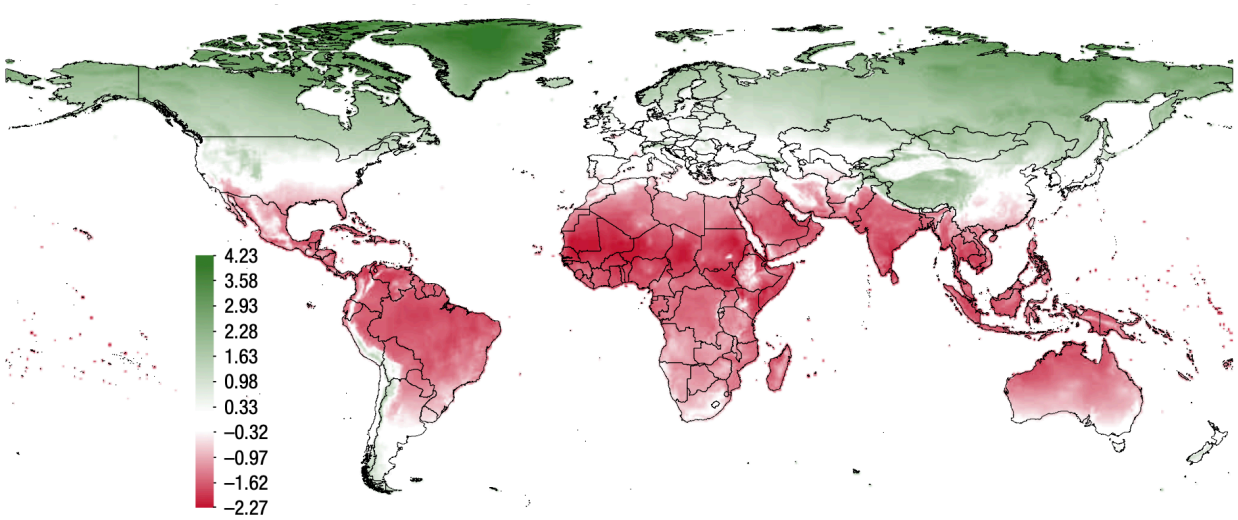


Figure 1: Effect of a 1°C Increase on Real per Capita Output (Acevedo et al. 2017)

There is a large body of evidence suggesting that vulnerable households and firms respond to climate shocks in a variety of ways. Weather insurance and credit products have

had recent success in overcoming growing downside risks in agricultural settings (Karlan et al. 2014; Lane 2024). Technological adoption is another avenue of adaptation, ranging from weather-resistant seed varieties (Dar et al. 2013; Emerick et al. 2016), to practices like crop diversification (Auffhammer and Carleton 2018) and crop rotation (Michler et al. 2019). In addition, in recent years jobs shifted away from agriculture towards more climate resilient jobs in vulnerable countries (Stringer et al. 2020; Jalal et al. 2024). In this report, we focus on climate migration, i.e. migration as an adaptive response to climate change by households in developing countries.[1]

2.1 Evidence of Climate Migration

Climate change is a "push factor", driving households out of vulnerable locations in search of food, work and safety. We categorise evidence of climate migration based on how permanent the decision to migrate is, as well as the intended migratory destination (Piguet et al. 2011).

Seasonal Migration. It is well-documented that rural poor households send temporary migrants to the city in order to smooth seasonal fluctuations in output and incomes driven by climate shocks. Minale (2018) and Morten (2019) document temporary migration as a response to low rainfall during the monsoon seasons in China and India respectively. Both studies emphasize seasonal migration as a way for households to cope with negative shocks, as opposed to a precursor to a permanent move or in search of better opportunity. Munshi and Rosenzweig (2016) and Morten (2019) emphasise the trade-off of households in insuring against shocks through either informal risk-sharing with other rural households or by migrating temporarily. Not migrating can strengthen risk-sharing networks through increased reciprocity of insurance against shocks. However, since weather shocks often affect entire regions, remittances from migrants outside the area are necessary for a household to maintain consumption levels (Riley 2018; Lee et al. 2021).

Although poor households may participate in seasonal migration, a distinct question is whether it is a welfare-improving strategy for climate adaptation. Bryan et al. (2014) conduct a randomised experiment which provided monetary incentives to households in Bangladesh to migrate in the event of a seasonal famine. The incentive induced 22% of households to send a seasonal migrant, increasing consumption of those households by up to 35% relative to households that did not send a seasonal migrant. These same households continued to send temporary migrants during the famine season even after the incentive was discontinued. By revealed preferences, this suggests that seasonal migration is welfare-improving for the

[1] For a review of firm adaptation to climate change, see Grover and Kahn 2024.

migrating household and that even a one-time reduction in its costs encourages the rural poor to adopt it as an adaptive strategy. The primary source of welfare gains for the general economy in this setting stems from subsidizing seasonal migration come from providing households with better insurance opportunities (Lagakos et al. 2023).

Rural-to-Urban Migration. Castells-Quintana et al. (2021) analyse global climate and census data from 1950 to 2015, finding that worsening rural climate conditions primarily drive permanent migration to cities in developing countries. Several studies corroborate this observation by exploiting the random occurrence of weather shocks, and show that climate shocks cause an increase in rural-to-urban migration. For example, Jessoe et al. (2018) show how (random) exposure to extreme heat over 28 years reduces employment opportunities in rural Mexico, inducing more migration to Mexico City. For Sub-Saharan Africa Mastrorillo et al. (2016) find temperature and precipitation to be key drivers of rural-to-urban migration.

In contrast to these studies on behaviour over long time horizons, the evidence for whether more extreme, sudden climate events also prompt rural-to-urban migration is mixed. In response to typhoon-induced flooding in Vietnam, Gröger and Zylberberg (2016) find that households cope with massive losses in income through permanent and long-distance labour migration to urban areas, since local rural networks fail to provide insurance. In contrast, Jalal et al. (2024) find that only 1% of their sample of poor, rural households permanently migrated after the extreme flooding in Pakistan in 2022. This echoes evidence from the US that low-income households in particular do not tend to migrate following a natural disaster (Sheldon and Zhan 2022). Jalal et al. (2024) explain this phenomenon by place-based aid provided by the Pakistani government. Alternative explanations include the destruction of capital stocks against which households borrow in order to migrate (Chen et al. 2017) or the potentially positive effects of flooding on soil quality and crop yields (Banerjee 2010).

International Migration. Cai et al. (2016) establish a causal link between international migration flows and climate variability, finding compelling evidence that temperature has a positive impact on out-migration from agriculture-dependent, developing countries. However, this big picture view is likely masking substantial heterogeneity: Cattaneo and Peri (2016) decompose how out-migration flows depend on income and find that temperature increases reduce out-migration of households from low-income countries who are trapped in poverty by climate-induced liquidity constraints, while out-migration of households from middle-income countries increases. Coniglio and Pesce (2015) find that the extent of out-migration depends on the season in which temperature shocks are realised, how spatially expansive the shock is, and exposure to past shocks impacting expectations around future

climate shocks. Similarly to regional rural-urban migration, faster onset shocks like natural disasters may also prompt international migration. For example, Mahajan and Yang (2020) find that increased exposure to hurricanes increases immigration to the US.

Summary. There is robust evidence that climate migration is taking place, across varying distances and time horizons. Migration offers a coping mechanism against climate change, allowing households to recoup lost incomes and providing them with urban livelihoods that are better-insulated against climate shocks. However, migration incurs costs that climate-vulnerable households may be increasingly unable to pay, forcing them to rely on in-situ aid or often insufficient local risk-sharing networks. With these opposing forces, a crucial next question is: which households are able and willing to migrate in response to climate change?

2.2 Who are climate migrants?

There is a relatively small body of research describing the types of individuals and households that migrate in response to climate shocks. Here, we discuss two main dimensions that have been found to explain heterogeneity in climate migration patterns (Cattaneo et al. 2019).

Household Wealth and Income. In Indonesia, Bazzi (2017) documents an inverted U-shaped relationship between the likelihood a household will send a migrant abroad and a household's level of wealth. Cattaneo and Peri (2016) and Peri and Sasahara (2019) document a similar inverted U-shaped curve using global grid-cell-level data, highlighting that wealth heterogeneity in the propensity to migrate in response to climate shocks is evident even at the country-income level of aggregation. Such a non-monotonic relationship suggests that positive versus negative climate shocks may induce different types of households to migrate. On one hand, negative shocks impose liquidity constraints on very poor households making them unable to migrate, which is the channel documented in Bryan et al. (2014). Slightly wealthier (albeit still poor) households migrate to cope with income losses, as found by Minale (2018) and Morten (2019). On the other hand, Bazzi (2017) shows that positive climate shocks such as good rainfall increase the likelihood of very poor households sending a migrant abroad since they ease liquidity constraints. Those same positive shocks do not induce migration among wealthier households though, who face an increased opportunity cost of migration when income is high (Bazzi 2017).

Gender. The relationship between climate-induced migration and gender is so far unclear from empirical evidence. Some studies find that climate shocks deepen gender-related vulnerabilities, in part because climate migration is more constrained among females (Dillon et al. 2011; Gray and Mueller 2012; Mueller et al. 2014). This may be because women have

unequal decision-making rights within the home, or have fewer opportunities to participate in the labour market (Cattaneo et al. 2019). Other studies find precisely the opposite: in certain cases, environmental change is found to drive women to undertake labour-related migration, as households are forced to cope with lower incomes by re-allocating women's time away from home production (Thiede and Gray 2017). As is the case for wealth, gender may be responsible for different types of climate-induced migration among a different set of households. To the extent that this impacts the policy response to aid or manage climate-induced migration, a more comprehensive structural framework is needed to understand the complex intersections between gender and climate migration.

Other Dimensions. There is a growing set of studies attempting to pin down other drivers of heterogeneity in who becomes a climate migrant. Sedova and Kalkuhl (2020) find suggestive evidence that, in contrast to other migrants from rural India, climate migrants are likely to be from the lower end of the skill distribution and from households strongly dependent on agricultural production. This is consistent with much of the evidence presented in Section 2.1. Occupational mobility and the ability to diversify income are also plausibly important aspects in determining both whether a household is climate resilient enough to adapt in-situ as well as whether they can pay the fixed costs of migration (Conte et al. 2021).

It is important to understand who climate migrants are, as directing aid or managing climate migration rests on distinguishing between households that migrate because climate shocks decrease their profitable opportunities, in contrast to households who migrate for survival. This feeds into a broader research agenda on decomposing global patterns of climate-induced migration and mapping the co-incidence of factors driving this migration.[2] With out-migration from climate-vulnerable areas predicted as one of the most important adaptation margins for lowering welfare losses from climate shocks, low-wealth, agriculturally-dependent households in equatorial locations with low skills and occupational mobility must be prioritised (Desmet et al. 2018).

2.3 Scale and Scope of Climate Migration

Given the amount of evidence discussed on climate migration, it is perhaps natural to ask what the scale of climate-induced migratory flows are and where they arise from. However, it is inherently convoluted to differentiate between households who are migrating in response to climate shocks, versus those migrating to economic opportunity, particularly for slow onset

[2]Missirian and Schlenker (2017) attempt to do this by combining asylum applications to the European Union from 2000 to 2014, with global grid-cell-level weather data.

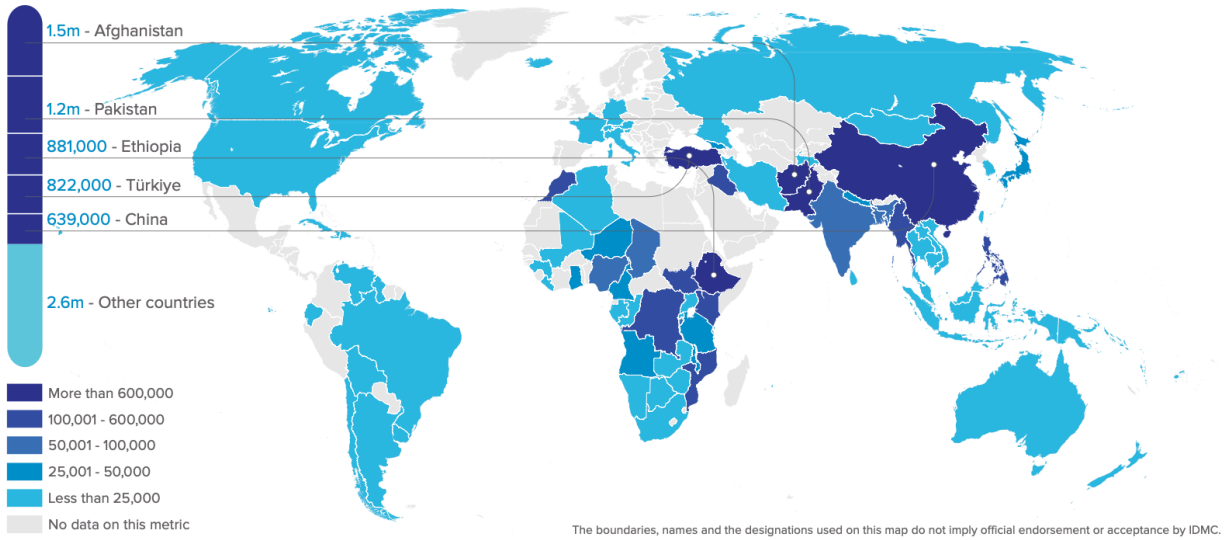


Figure 2: Distribution of Global Internal Displacements by Disasters

shocks such as heat stress. As a result, there are not many attempts at characterising exact numbers of climate migrants around the world. We present some estimates below.

The Internal Displacement Monitoring Centre (IDMC) publishes annual statistics[3] on *internal* displacement flows and internally displaced people (IDP).[4] Measuring internal displacements is often missing in country-level analyses of this topic. In fact, between 2008 and 2023, IDMC estimate a cumulative of 402.8 million internal displacements as a result of weather-related and geophysical events (together referred to as disasters). Floods account for 195.2 million internal displacements, with storm, earthquakes and drought together accounting for another 198 million.

As of the end of 2023, an estimated 7.6 million individuals are internally displaced due to disasters, with 3.5 million in displaced due to flood or drought alone. Figure 2 displays where these 7.6 million displaced individuals are located. The evidence overwhelmingly affirms the claim that developing countries are not only disproportionately affected by climate change in the distribution of climate shocks they receive, but also in terms of the number of people forced to move because of these shocks.

Despite some caveats regarding the challenge to precisely monitor these displacements[5]

[3]These statistics are quoted by the European Parliament, the UN Human Rights Council (UNHCR), and the International Migration Organisation, among others.

[4]An internal displacement is a flow measure, defined as a new forced movement of a person within the borders of their country of habitual residence recorded during a given year. Internally displaced persons measures the total stock of people living in internal displacement at the end of each year, in a given location.

[5]Notably, the IDMC flag monitoring and data-collection challenges arising from the following sources:

we read these (already large) numbers as substantively underestimating the true extent of climate-induced migration. Firstly, by construction, these figures deliberately exclude voluntary internal displacements driven by climate change, as the IDMC claim that it is challenging to distinguish displacement from climate migration, and climate migration from regular economic migration. Furthermore, the above numbers also exclude international movements of climate migrants. While there are many predictions of such movements (see Section 2.5), we did not find any current estimates on levels of international climate migration. Evidence from asylum applications in Missirian and Schlenker (2017) does suggest though that even temperature fluctuations can meaningfully translate into several thousands of asylum applications, which is the tip of the iceberg of routes to international climate migration.

2.4 Effects on Structural Transformation & Places of Origin

Rural-to-urban and international migration in response to climate change has the potential to expedite structural transformation and economic development in cities across the world. To the extent that this spatial reallocation of labour induces a sectoral reallocation of labour from agriculture to manufacturing and services, climate migration could lead to large productivity gains (Gollin et al. 2014; Lagakos et al. 2023). A prerequisite for such a reallocation is that cities must have the capacity to productively absorb the increase in labour supply from incoming migrants. Henderson et al. (2017) find that in Sub-Saharan Africa, cities supplying goods to agricultural areas experience declines in aggregate income upon receiving climate migrants, while cities with export-based manufacturing sustain increasing urban incomes.

Frictions in the labour market can also hinder the possibility of climate migration prompting structural transformation. Albert et al. (2021) show how both capital and labour market frictions restrict climate-immigrants from taking up manufacturing jobs in Brazilian cities, despite the benefits that these jobs would entail. In the presence of such frictions, migrants use their social networks in agriculture and low-skill service sectors to find employment. Furthermore, Colmer (2021) highlight the importance of regulatory environments in allowing firms to successfully absorb workers transitioning from agriculture to manufacturing in response to heat exposure. They find that only firms in Indian states with flexible labour regulations experience increases in economic activity upon receiving migrants.

Large flows of climate (or indeed, any) migrants have the potential to destabilize the economies of receiving cities and countries, generating welfare losses for host communities.[6]

reporting bias, the co-incidence of disaster zones and regions experiencing heightened conflict and violent, overlapping weather hazards and distinguishing true displacement from those ordered to evacuate.

[6]For a comprehensive and general review of this literature, see for example Dustmann et al. (2017).

Insights on this can be gleaned from the literature studying the impacts of refugee waves. Evidence on how these waves impact both formal and informal labour market outcomes of host communities is mixed. Some papers find overwhelmingly negative effects including falling wages and rising unemployment among local workers, particularly those who are most substitutable with refugee workers, while others find positive impacts on host communities. Similar contradictory results emerge once occupation type and skill are accounted for – Ruiz and Vargas-Silva (2015) and Maystadt and Verwimp (2014) both find no impacts along the skill gradient, but opposing results on employment likelihood across occupational types after the arrival of Burundian and Rwandan refugees in Tanzania.

A final point (in an otherwise brief discussion on how climate migrants impact receiving economies and communities) is that there is scant evidence that international climate migration has negative political impacts, which is not necessarily true of other types of migrants. Bosetti et al. (2021) find that climate emigration reduces the probability of local conflict and find no support for the hypothesis that it increases conflict in receiving countries. This is consistent with Helbling (2020)'s documentation of positive attitudes towards climate migrants Germany comparable to those afforded to political refugees, and with Arias and Blair (2024)'s finding that natural disasters (briefly) spike favourability towards climate migrants.

Places of origin. If climate migration do increase urban incomes, this will only serves to compound rural-urban inequalities, especially since climate migrants themselves are self-selected and tend to be wealthier than some of those they leave behind (Burzyński et al. 2021). The wealth heterogeneity in the decision to become a climate migrant is key here (Bazzi 2017): negative climate shocks will shift rural households down on the wealth distribution, changing their propensity to migrate. Middle-income households tend to migrate first and eventually richer households will be driven to migrate as their wealth erodes. The poorest households may end up stuck in climate-driven poverty traps (Jensen et al. 2024). The possibility of this scenario is compounded by findings by Jessoe et al. (2018) and Liu et al. (2023) that suggest climate shocks induce a reversal of structural transformation in rural areas. As agricultural incomes fall, rural areas face rising unemployment in non-agricultural work due to a high elasticity of demand for non-agricultural goods and services relative to food. In India, the magnitude of these effects are striking; for the average district, a 1 Celsius increase in a decade's mean temperature causes an 8.2% decline in rural non-agriculture output (Liu et al. 2023). A key area for future research is to develop methodologies to identify the most climate-vulnerable households who are left behind. Innovations of poverty alleviation programs are already underway, led by NGOs like BRAC, to help facilitate vulnerable

households in adapting to climate change (BRAC 2021).

2.5 Future Predictions

Amidst mounting evidence that climate migration is an increasingly used adaptation strategy against climate change, there is a growing literature on estimating the future economic impacts of climate change. In this section, we discuss three takeaways from a strand of this literature at the intersection of international trade and economic geography. These papers generate future predictions through combining stylised spatial general equilibrium models with scientific models of climate damages (Desmet and Rossi-Hansberg 2024).

The primary point of consensus from this literature is that regions traditionally reliant on agriculture face the largest future welfare losses from climate change. Combining evidence from 1.7 million fields across the globe, Costinot et al. (2016) predict a 0.26% reduction in global GDP from declines in agricultural markets for ten crops, even after fully efficient adjustments of trade and production patterns. This reduction masks extreme cross-country heterogeneity in welfare losses. Figure 3 demonstrates this heterogeneity for high (Representative Concentration Pathways (RCP) of 8.5) and medium (RCP 6.0) IPCC carbon emissions pathways. Sub-Saharan Africa, and Latin America face losses of up to 20%, while Europe experiences similar magnitude gains.

Welfare losses are projected to be highest in developing countries for two reasons. Equatorial locations, which are primarily developing, are both highly dependent on agriculture and increasingly becoming sub-optimal for agriculture due to global warming. Predicted relocation of agricultural production to higher latitudes to protect yields against extreme heat stand to cripple some developing economies (Desmet and Rossi-Hansberg 2015; Cruz and Rossi-Hansberg 2024). Since this drives subsistence agriculture in equatorial locations, labour becomes entrenched in a sector experiencing huge productivity declines, further exacerbating their welfare losses (Nath 2020). These prospects are worsened by predictions from Bilal and Känzig (2024) that macro damages from climate changes will be six times larger than previously estimated – a 1°C warming will reduce world GDP by 12%. Their substantially larger estimates are because they identify the impact of climate change by exploiting global (instead of country-level) temperature variability, which better mimics global warming and better predicts (economically-relevant) extreme climate events.

Migration is a key adaptation margin predicted to attenuate welfare loss arising from climate change. Leveraging their own methodological contributions to building tractable

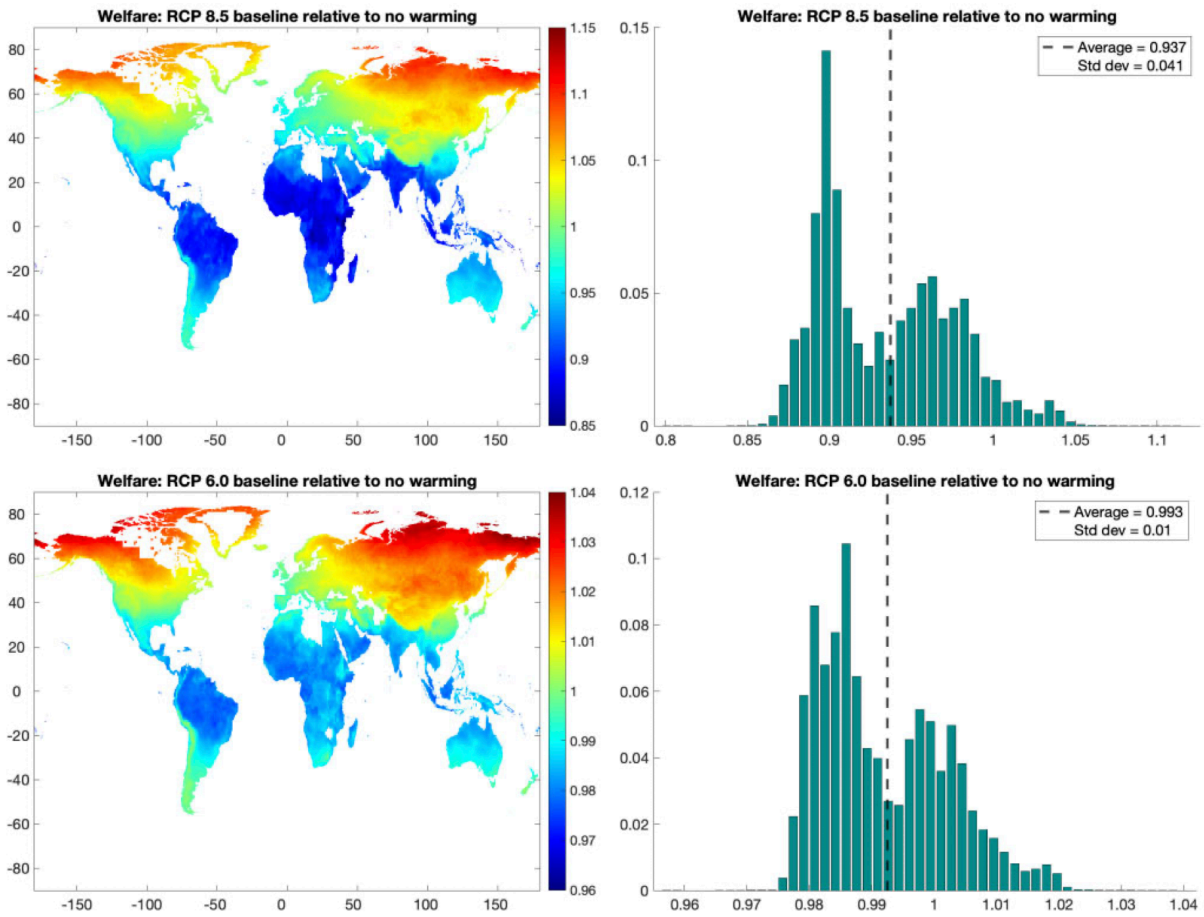


Figure 3: Welfare Losses due to Global Warming (Cruz and Rossi-Hansberg 2024)

Notes: This is Figure 8 from Cruz and Rossi-Hansberg (2024). Losses are estimated based on the global temperature dynamics from 2000 to 2400 in the IPCC RCP (Representative Concentration Pathways) 8.5 and 6.0 scenarios. These represent the two projections that lead to the largest global greenhouse gas concentrations among the several projections adopted by the IPCC. The graphs represent changes in modelled welfare over the globe (left graphs) and over the world population (right graphs). For example, a value of one represents no change relative to a baseline of no warming, while a value of 0.9 represents a ten percent decrease in welfare.

models with space and time dimensions,[7] Desmet and Rossi-Hansberg (2015) estimate negligible average welfare losses from climate change if labour would be fully mobile, since both aggregate losses and spatial inequities tend to grow in the extent of mobility restrictions. In a spatial growth framework, Cruz and Rossi-Hansberg (2024) find that increasing migration costs by 25% across the globe would increase the average cost of global warming by an additional 3% by the year 2200. In contrast, the impacts of increasing trade costs are projected

[7]See Desmet and Rossi-Hansberg (2014), Redding and Rossi-Hansberg (2017) and Kleinman et al. (2023) for details on these models that are increasingly used for projecting the economic impacts of climate change.

to be much smaller.

Interestingly, climate migration is an effective adaptation strategy even when zooming in on particular climate shocks and populations. For instance, under an intermediate greenhouse gas concentration trajectory, permanent flooding from sea-level rise is projected to displace 1.46% of world population by 2200. Without a migratory response to flooding, real global GDP losses are estimated to be 4.5% instead of a modest 0.11% (Desmet et al. 2018). Conte (2021) assesses climate migration in Sub-Saharan Africa and finds that in absence of climate adaptation, 12% of Sub-Saharan Africa's population is predicted to be displaced by 2080. In their model, this out-migration is only effectively curtailed by a location's ability to reallocate economic activity to non-agricultural sectors.

A final takeaway from this literature is that all types of migration are projected to become increasingly prevalent and crucial to mitigate losses from climate change. Burzyński et al. (2022) study how slow onset climate change (temperature increases and sea-level rises) as well as natural disasters will impact people's mobility worldwide. They project that climate change will induce 62 million working-age individuals to permanently relocate by the end of this century. Under existing mobility frictions, the majority of climate migrants would be unable to leave their homelands, with at most 20% able to move to OECD countries.

Before we conclude, we must note some challenges in estimating future trends in climate migration faced by researchers discussed here using state-of-the-art global dynamic spatial models. Firstly, these large quantitative models are inherently stylised to guarantee tractability. The norm is to treat migration as frictionless, or adopt a crude approximation for costly migration. This potentially leads to over-estimation of projected climate migration. However, micro-level evidence suggests that migration is very costly (Bryan et al. 2014), and often finds hard to rationalise levels of under-migration (Jalal et al. 2024).

A second challenge is the out-of-sample prediction problem faced in predicting the future impacts of climate change. For instance, many of the previously discussed models project climate migration patterns based on estimates of migration elasticities that rationalise current population movements. However, these may not represent the elasticity of migration in response to a climate shock, especially if the shock is extreme (Husby and Koks 2017).

These challenges, while non-trivial, should not diminish the value of having economic models that predict future global trends in climate migration. They do, however, highlight the need for two avenues for future work to improve these state-of-the-art models. The first is to integrate more realistic migration frictions into these models, to refine estimates of climate migration and its welfare implications. Secondly, more micro-level evidence is

needed on migration elasticities to different climate shocks and among different populations, to build a more complete picture about the scale and scope of future climate migration.

3 International Aid and Migration

The three key takeaways from our review of climate change and migration are as follows.

1. Climate migration and displacement are prevalent phenomena and projected to become more prevalent as the intensity and frequency of climate shocks increases
2. Migration in response to climate change is a key adaptation mechanism that policy-makers must facilitate in order to avoid huge welfare losses
3. Climate migration is, and will continue to be, predominantly within-country or within-region, although international climate migration will increase

In this section, we examine how international aid can potentially address climate migration and displacement from developing and rural areas. We focus on the traditional role of aid, which involves directing funds towards climate-vulnerable regions. Section 4 will discuss different uses of aid, which include providing support for areas receiving climate migrants.

With regards to addressing climate migration, we view international aid as playing a dual role. On one hand, aid can facilitate climate migration and support households who are in harm's way. On the other hand, aid could be used as a tool to counteract the need for climate migration, such as through providing climate-resilient livelihoods (Nyasimi et al. 2017), or funding infrastructure projects or land reclamation (Balboni 2025).

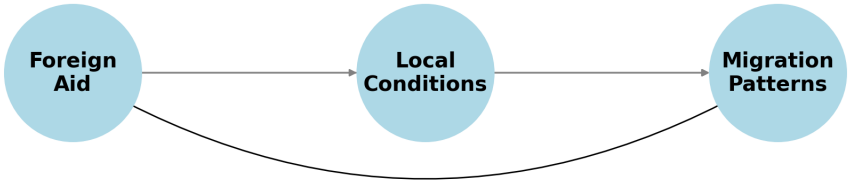


Figure 4: Foreign Aid and Migration Patterns

Figure 4 guides our approach to reviewing the existing literature on how aid can alter (climate) migration patterns in targeted regions. We begin by exploring evidence of the overall, combined effect of all potential mechanisms of aid on migration in the next section. We find extensive, but non-conclusive evidence, and little of it is causal. Our approach is then to decompose the effects of aid on migration into the co-existence of two causal channels. In Section 3.2 we investigate which broadly termed "migration-relevant location conditions" have been found to causally effect climate migration patterns. We then explore in Section 3.3 whether aid has been found to have a causal impact on the most relevant factors. We conclude by summarising the interaction of these two causal channels, proposing viable mechanisms through which traditional forms of international aid can affect climate migration.

3.1 Grounding Expectations: The Overall Effect of International Aid on Migration

The early macro-level evidence on the effects of aid on migration simply asks in correlational terms whether receiving more aid affects emigration. Some empirical work, such as Berthélemy et al. (2009), finds that aid positively correlates with emigration from a set of 22 low-income countries. Similar findings have been reported for sub-Saharan Africa (Mughanda 2011) and illegal emigration from Latin America (Bandyopadhyay et al. 2014). It is challenging to infer much from these studies, since they do not address the main channels through which aid plausibly affects migration. Moreover, they do not use a causal identification strategy. Aside from these concerns, other studies also find the reverse effects – Lanati and Thiele (2018) find that aggregate aid reduces migration, and Gamso and Yuldashev (2018) find that aid targeted toward rural development negligibly reduces emigration. Methodological differences in how migration and aid are defined, as well as country samples and estimation approaches make comparing these macro studies virtually impossible.

The one notable exception to this set of studies is Dreher et al. (2019), who are the first to causally estimate the effect of aid on one type of migrant – refugees. The authors combine refugee data on 141 origin countries over 1976-2013 combined with aid receipt data from the bilateral Official Development Assistance data. They use an instrumental variable approach to isolate the effects of aid on refugee movements.[8] Their findings show that aid does not significantly reduce refugee outflows in the short run, but has a delayed effect that reduces refugee flows after eleven or more years. In the short term, the findings are in line

[8]Specifically, the instrument is the interaction of donor-government fractionalisation and a recipient country's probability of receiving aid. See Dreher et al. (2019) for details.

with reduced financial constraints enabling previously constrained migration. The long-run effect reduction likely arises as aid improves local economic conditions in recipient countries.

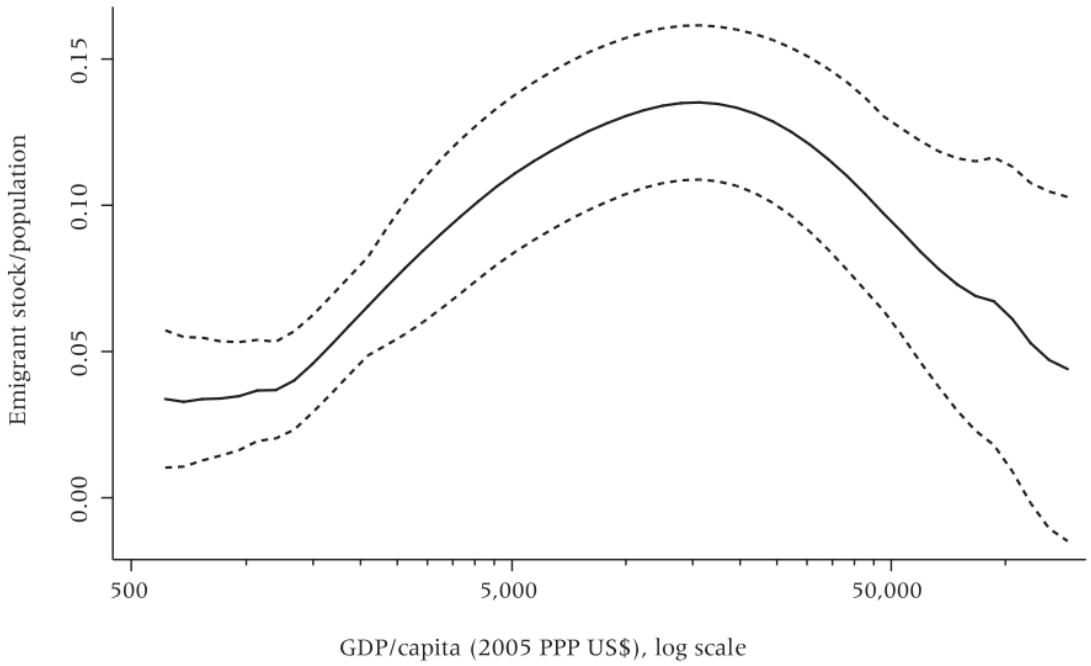
This tension between the role of aid in relaxing financial constraints which facilitates migration, versus discouraging migration through improving standards of living in-situ, would also seem to rationalise two key macro-level trends in country-income and emigration rates. The first trend is the hump-shaped (cross-sectional) relationship between country-level income (per capita) and emigration (Zelinsky 1971; Hatton 1998; Vogler and Rotte 2000; De Haas 2007; Venturini and Faini 2008; Dao et al. 2018). Clemens and Postel (2018) document this aggregate phenomenon for a cross-section of countries in 2013. In Figure 5a, with increasing average per-capita income, the emigration rate[9] increases before it peaks and then decreases. They are able to document that countries with a GDP per capita between $5,000 and $10,000 (PPP, as of 2005) show roughly three times as much emigration than countries with a GDP per capita of around $2,000 (PPP) (Clemens and Postel 2018, p.675). Only beyond a GDP per capita of around $10,000 (PPP) is a higher level of average per-capita income associated with decreasing emigration rates.[10]

The second trend, visualised by Clemens and Postel (2018) in Figure 5b, describes the aggregate changes in emigration rates *within countries* between 1960 and 2013. Here, the starting point of an arrow is a countries' emigration rate and GDP per capita in 1960, while the arrowhead is the same country's emigration rate and GDP per capita in 2013. Looking closely reveals that in the vast majority of cases, higher per capital income is positively associated with a higher emigration stock, and that this correlation becomes less strong (i.e. the arrows are more flat) the higher the per-capita income level in 1960.

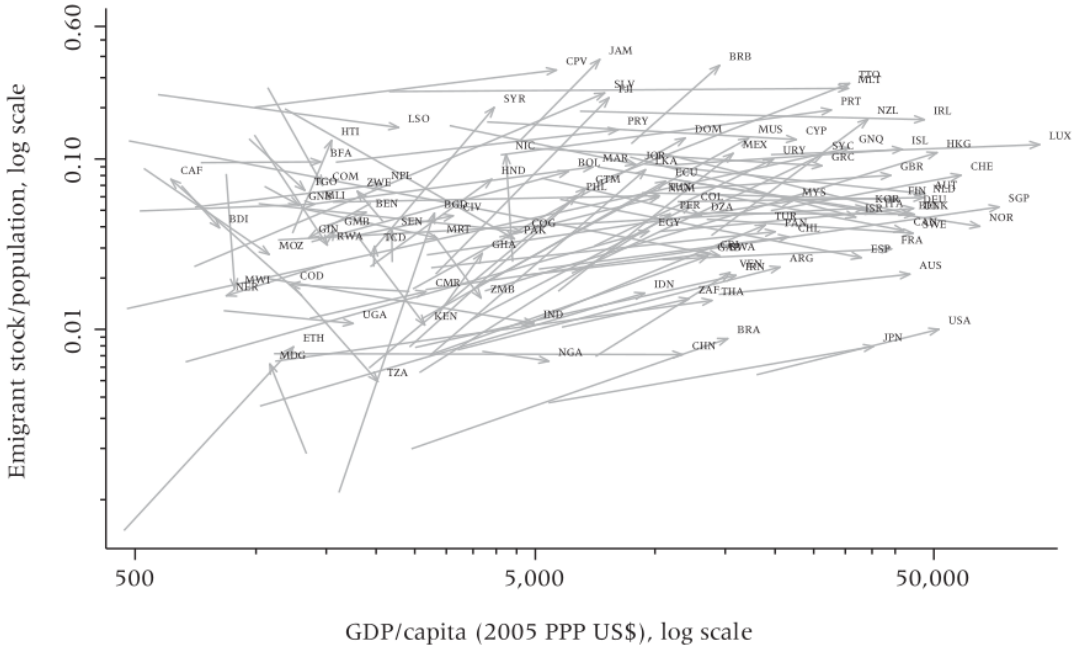
To summarise what we have learnt so far, Dreher et al. (2019) provide the only reliable macro-level evidence that aid affects emigration. The short- versus long-term effects they find, to the extent that aid makes a country richer, are consistent with macro-level evidence on the correlation between average per capita income and emigration. However, this is limited in its relevance to climate migration, the vast majority of which is internal and in response to climate shocks. Since we find no macro-evidence in this narrower domain, we turn to analysing what factors drives climate migration *and* can be affected by aid.

[9] As defined by the number of people born in a country but living outside it.

[10] These magnitudes are somewhat up for debate – for instance, Lucas (2019) employ a similar approach, confirming the hump-shaped relationship but finds that the income level at which emigration peaks is substantially lower. On the other hand, Dao et al. (2018) find the maximum level of income per capita before the emigration rate begins to fall around $6,000. Our aim is to highlight this general pattern rather than the most credible exact number.



(a) Level of emigration vs. level of real income (2013)



(b) Change in emigration vs. change in real income (1960-2013)

Figure 5: Emigration and Real Incomes

Notes: Subfigure (a) shows cross-country relationship with dashed lines in Subfigure (a) indicating the 95 percent confidence interval. Subfigure (b) shows data for 1960 as the beginning of the arrow and 2013 for the arrowhead. Both figures are taken from Clemens and Postel (2018, p.676), where all additional details can be found.

3.2 What Drives Climate Migration?

That higher per-capita income levels *eventually* lead to a drop in emigration rates is conducive with the simplest model of migration that treats the decision to migrate as a means to achieving higher standards of living through better jobs, incomes and amenities in the destination relative to the origin location. Thus, as a region becomes richer, out-migration should decrease as the standards-of-living gap between the origin and any destination closes. This can be interpreted as the *substitution effect of rising incomes on migration* – as entire regions grow richer, households will substitute away from migrating towards staying.

In the context of climate migration, improving standards-of-living equates to increasing resilience to climate shocks. There is evidence that this can be achieved through a variety of policy instruments, such as weather insurance (Karlan et al. 2014), disaster funds (Del Valle et al. 2020), guaranteed credit (Lane 2022), and guaranteed employment (Garg et al. 2020). On a larger-scale, and perhaps most sustainably, significant and well-planned infrastructure investments are a key source of climate resilience (Brooks and Donovan 2020). While there is limited evidence on how these pass through to the propensity of climate migration, it is plausible that such improvements in local conditions *eventually* lead to fewer voluntary migrants and displaced people (Cruz and Rossi-Hansberg 2024). Jalal et al. (2024) find tentative evidence in this direction, with government guarantees for house-rebuilding seen as a mechanism for deterring large out-migration in the aftermath of the 2022 Pakistan floods.

What is perhaps more interesting is the fact that Dreher et al. (2019) observe an initial *increase* in out-migration when populations first become richer. To rationalise this, our simple model of migration requires that, before standards-of-living rise sufficiently, rising incomes create forces or alleviate frictions that prompt households to migrate. This is akin to an "income effect", which counteracts the aforementioned substitution effect.

The literature on migration has several theories for (i) the barriers to migration alleviated by increased income and (ii) the dynamics created by more income to prompt migration; we discuss some of these below.[11] While much of the evidence is from studies on general migration, they are equally relevant for climate migration for two reasons. Firstly, voluntary climate migration is predominantly motivated by economic arguments. Secondly, climate shocks can be seen as exacerbating some of the conditions we discuss – indeed, climate shocks deepen credit constraints for agriculture-dependent households, increase the demand

[11] This is not an exhaustive list of reasons as to why an initial increase in per-capita income can be accompanied by an increase in out-migration; instead, we choose to focus on factors commonly found across climate vulnerable locations, including low-income countries and agriculture-dependent regions.

for insurance against weather shocks and expedite the necessity of structural change.

Credit constraints. Migration is costly. Before a household can migrate, they must be able to finance search for a destination and employer, transportation costs, and investments into any prior requirements, such as education or skill. These costs present a significant friction to migrating: with rising per-capita average incomes, a higher share of the population will be in a position to accumulate wealth that can be used to surmount these credit constraints. This phenomenon is well-documented in Bazzi (2017), who identify an inverse U-shaped relationship between wealth and climate migration in Indonesia. This empirical pattern is confirmed in other settings (Bilsborrow et al. 1987; Azuara 2009; Angelucci 2015a).

The magnitude of the credit or financing required to cover migration costs is highly context dependent. Bryan et al. (2014) cover the 8.50 USD cost of a bus ticket (plus a small additional survey incentive of 3 USD) for nearly 1300 households during Bangladesh's monga famine, and find that this incentivised 22% of them to migrate (albeit temporarily) to Dhaka. In contrast, to legally enter the UK, the minimal immigration charges for the first year are GBP 1700, excluding transportation and any prior investment (Migration Observatory 2025). Illegal entry to a different country can be even more costly, although is notoriously difficult to reliably quantify (Friebel et al. 2024). In 2018, the United Nations Development Programme (2019) surveyed 3,000 asylum seekers in 13 European countries who arrived in Europe via irregular routes. The cost of journey ranged from close to 2000 USD for North Africans to over 4,000 USD for West Africans, which is a factor of 6 (North Africans) and 20 (West Africans) compared to respondents' monthly incomes prior to departure.

Not only do rising per-capita incomes improve households' own ability to fund migration, it also is often accompanied by improvements in local financial markets and an expansion of borrowing opportunities (Popov 2018). This is amplified by the role of remittances from those who have already migrated. Naturally, since migration costs are relatively fixed, out-migration driven by relaxing these credit constraints is decreasing in household wealth.

Demand for insurance. From a household's point of view, migration does not only serve as an investment for future income, it also provides insurance against local shocks (Chen et al. 2003; Shonchoy 2011; Marchetta 2013). For example, local weather shocks have been shown to be smoothed through remittances from migrants living in urban areas or abroad (Musah-Surugu et al. 2018; Randazzo et al. 2023). While rises in per-capita income do not alter the propensity of climate shocks, the demand for insurance against these shocks may increase. This can be to protect an increasing stock of durable goods, or to preserve household

social status.[12] As the economy and insurance markets develops further, this demand may be satisfied locally, eventually reducing out-migration rates (Levine et al. 2000).

Structural Change. Income growth is often accompanied by structural change, with resources reallocated away from primary sectors like agriculture, towards manufacturing and service sectors. Structural change can trigger internal and international mobility of workers who will switch sectors, as the opportunity cost of moving (i.e. the benefits of staying in a sector) may decrease for sectors that previously held a large share of the workforce (Manning 2002; Bond et al. 2016; Green 2018; Garriga et al. 2023). This trend will be more pronounced if household incomes were to grow in climate-vulnerable countries and regions, for whom dependence on agriculture is already causing substantial out-migration among those who can afford it (Jessoe et al. 2018), and stands to generate substantial future welfare losses (Desmet and Rossi-Hansberg 2015; Cruz and Rossi-Hansberg 2024).

(Social) Conflict. While income growth is perceived to generally correlate with decreased social conflict,[13] to the extent that rising incomes can deepen economic dissimilarities between groups and has little bearing on ethnic or ideological divides, conflict can persist despite rising incomes (Esteban et al. 2012; Mitra and Ray 2014; Ray and Esteban 2017). In such contexts, providing a higher share of households with the means to migrate away can prompt increased rates of out-migration from conflict-affected regions.

Demographic change and youth (un)employment. Many low income countries experience high rates of both child mortality and fertility (O'Hare et al. 2013; Vandenbroucke 2016). This is also true of rural areas (Yaya et al. 2019). Stable and increasing incomes, which often coincide with improved access to healthcare and sanitation, causes child mortality to fall faster than fertility (Lee 2003). In the short-run, this generates growing youth populations and rising youth unemployment, heightening out-migration pressure (International Labour Organization 2012; Dibeh et al. 2018; Potužáková and Bílková 2022).

Barriers to Immigration. Focusing on immigration, richer countries are often popular destinations but also have several barriers to migration in place that are easier to overcome for higher relative to lower income individuals (Czaika and De Haas 2013). These may not exclusively be costs per se, but include likelihood of obtaining a visa, language requirements,

[12] Clemens and Postel (2018) hypothesise a contrast in willingness to pull a child out of education in response to parental job loss between a family of subsistence agriculturists with that of a middle-class family. Possibly, the latter would be more reluctant of doing so, increasing demand for employment insurance.

[13] Social conflict refers to within-country unrest, ranging from peaceful demonstrations, processions, and strikes to violent riots and civil war (Ray and Esteban 2017).

proof of fund requirements etc. As such, income growth may mean individuals face reduced barriers to migration simply by now being wealthier and better educated.

3.3 Can Aid alter Migration-Relevant Conditions?

Given a set of local conditions that may prompt climate migration in the short-run, and possibly reduce the need for climate migration in the long-run, we now turn to the other half of our causal chain – does international aid play a role in altering the conditions which affect a household's propensity to migrate in response to climate change?

Similar to before, a natural place to begin is to assess whether there is macro-level evidence on foreign aid's impact on the growth of per-capita income. Mekasha and Tarp (2019) conduct a meta-analysis of 141 empirical studies published between 1970 and 2011, examining the effectiveness of foreign aid on economic growth. They conclude that aid and economic growth have a positive and statistically significant correlation; that is, the correlation is unlikely to be zero and most likely positive. Their results cannot speak to the size of the correlation though, since Mekasha and Tarp (2019) merge a vast number of disparate empirical findings. We must rely on individual, context-specific studies to approximate how much growth one can expect per dollar of foreign aid. The more striking issue is that their conclusion, along with much of the literature they draw on, focuses on correlation not causation. Thus, they say very little about whether future aid will spark economic growth. We reiterate the need for better macro-level evidence on whether aid affects growth, as highlighted by prominent reviews of this topic (Banerjee and Duflo 2012; Qian 2015).

We proceed in two steps. First, we explore whether there is reason to believe that aid, or aid-funded interventions, improve the living standards and climate resilience of target populations. Then, we discuss whether aid influences some of the factors discussed in Section 3.2, that are poised to facilitate climate migration in the short-run.

Aid and Incomes, Jobs, Amenities

There is ample micro-level evidence that certain forms of development aid increase incomes and improve employment outcomes among vulnerable populations, at least in the short-term. Cash transfer programs (CTPs) are a prime example. Across 203 countries, over 900 CTPs reach nearly 1.4 billion people (Gentilini et al. 2022). In one of the largest evaluated CTPs till date, rolled out by GiveDirectly in Kenya, both beneficiaries and non-beneficiaries saw significant rises in consumption and expenditure, which translated into higher firm revenue, increased employment and a local fiscal multiplier of 2.5 (Egger et al. 2022). These strong effects on labour market outcomes tend to persist in the long-run for beneficiaries so

long as they are invested in human or physical capital (Gertler et al. 2012), which in cases like Mexico's PROGRESSA program, is enforced through conditioning transfer receipt on making some investment (Parker and Vogl 2018). However, evidence on whether vulnerable non-beneficiaries enjoy long-term improvements in labour-market outcomes remains mixed (Haushofer and Shapiro 2018).[14] Baird et al. (2018) note the heterogeneity in the labour market effects of CTPs once one separately focuses on charitable giving and humanitarian transfers, relative to government transfers or cash assistance for job search.

CTPs are not alone in the arsenal of aid-funded interventions that improve incomes and employment prospects. Multi-faceted poverty alleviation programs, such as BRAC's Ultra- Poor Graduation Program, have had both short- and long-run success (Banerjee et al. 2015; Bandiera et al. 2017), as have public workfare programs which provide guaranteed employment to impoverished individuals (Muralidharan et al. 2023; Franklin et al. 2024).

A more recent strand of the (exceedingly) vast literature on whether development aid-funded interventions improve standards of living focuses on the extent to which they build climate resilience among beneficiaries. The question is the extent to which climate resilience overlaps with the goal of poverty alleviation, implying that interventions targetting poverty build safety nets against climate shocks as a by-product (Garg et al. 2020; Banerjee and Maharaj 2020). The evidence here is mixed, with Arena et al. (2023) illustrating that the answer highly depends on what constitutes resilience to what kind of climate shocks.

Another, relatively under-explored angle through which aid-funded interventions could build climate resilience is if they led to an improvement in infrastructure and local amenities that protect populations from the impacts of climate change. For example, Valle (2024) find that municipalities with a disaster fund experienced accelerated reconstruction of infrastructure after a natural disaster in Mexico. This is an interesting avenue for future research.

Alleviating Migration Frictions with Aid.

We now turn our attention to whether there is evidence that aid acts to facilitate climate migration, through some of the channels discussed in Section 3.2. In the interest of space, we prioritise (i) credit constraints as a barrier to migration that is potentially alleviated by aid, and (ii) structural change as a phenomenon that is triggered by receiving aid.[15]

[14] Millán et al. (2019) and Bastagli et al. (2019) are two, among several, reviews of the vast literature on the impacts of CTPs.

[15] While certainly interesting and a motivation for future research, the role of aid in increasing demand for insurance as per-capita incomes increase and how this affects migration is so far under-studied. The literature on the effects of aid on social or political conflict is large and extensively reviewed (see, for example, Zürcher 2017), but is more an area for political research. Finally, barriers to immigration are a domestic policy issue, and hence not within the scope of this report.

Credit Constraints Given the evidence that aid has the potential to increase income among targeted beneficiaries, the question is whether this serves to alleviate (any existing) migration-related credit constraints. Bryan et al. (2014) provide the most conclusive evidence of temporary migration-related credit constraints among impoverished households in Bangladesh, that was alleviated through receiving 8.50 USD for a bus ticket to Dhaka. In rural China, Cai (2020) find that access to credit via a village banking program provides liquidity to households, and translates to a rise in out-migration to urban areas. Interestingly, Angelucci (2015b) find that aid in the form of guaranteed income streams over time is used by Mexican households as collateral to finance otherwise infeasible migration to the US.

Structural Change Does aid trigger structural change? At the micro-level, programs which focus on occupational transformation of beneficiaries, such as the Ultra-Poor Graduation Program and PROGRESSA, have shown evidence of triggering local levels of structural change (Bandiera et al. 2017; Millán et al. 2019). For large-scale structural change, of the kind which prompts internal mobility of workers to counteract the effects of climate change, targetted aid on a massive scale is required. One such example could be Chinese aid to Africa or Pakistan, which is focused on building infrastructure that improve transportation infrastructure and market access, both of which are seen as key ingredients for increased trade and structural change (Bogart 2014; Donaldson 2018).

3.4 Summing Up

Evidently, there is extensive literature on how aid affects migration-relevant conditions, and in turn how these affect migration patterns. While many of the channels through which aid can affect migration seamlessly apply to climate migration, there is definitely remaining scope for more evidence on whether these channels have differential roles and importance for mediating the effects of aid onto climate-driven versus non-climate driven migration.

One takeaway from this section for the reader is that the traditional role of aid does have the potential to play a dual role in altering patterns of climate migration – on one hand, it can facilitate climate migration, while on the other it can counteract the need for migrating out of climate vulnerable locations. However, confirming precisely what role aid plays, which direction the net effect goes or assigning reliable magnitudes that go from dollars of aid to number of climate migrants is not possible at present, given the lack of studies that complete the causal chain from aid to climate migration. Nevertheless, we end with a brief accounting exercise to motivate this conclusion and our next section.

Suppose we take magnitudes and numbers in Figure 5 seriously. We pose the following

question – if (appropriately designed and implemented) aid was given today, how long would it take a country to reach a level of per-capita income at which aid would reduce rates of out-migration? Consider three levels of income per-capita in 2023 – $1,000 PPP (Central African Republic), around $2,000 PPP (Afghanistan, the country of origin of one of the largest group of asylum seekers in European countries), and $5,000 PPP (Syria). At a rate of economic growth of 2% per annum due to the hypothesised effects of aid, it would take the Central African Republic over 90 years, Afghanistan over 60 years, and Syria around 20 years to reach the peak of the hump in Figure 5. Reducing this number to 1% annual growth, a number neither of these countries has shown for a long time horizon in recent years, increases these numbers to 180, 120, and 35 years, respectively.

We do not suggest that the reader takes these figures seriously. However, if anything, these figures provide further emphasis to the conclusions from Section 2 that climate-induced migration within and from low-income countries will rise, even if traditional aid would play its designated role of raising living standards and building climate resilience in these countries. This brings us to our final question of interest in this report – what else other role does international aid play, in the face of likely increasing flows of climate migrants?

4 Aid and Migration Policies

Taking a step back, traditional forms of aid entail a flow of funds from a donor country or organisation, to low-income countries and populations. The objective of this aid can then either be to facilitate migration or make it redundant by improving local economic conditions. However, in recent years, the intersection of aid and migration policies has often taken on a different form. Rather than targeting low-income countries where migrants originate from, aid is flowing to third countries (referred to as transit countries) that inevitably receive migrants from low-income countries. In principle, if the goal is to curb the flow of migrants (including climate migrants) into certain countries while still relocating them away from vulnerable locations, such efforts have the potential to see faster and larger effects than making long-run improvements in living standards in low-income settings.

In this section, we start by presenting several examples for such kinds of policies in the context of refugees, which have become more prevalent and expansive over recent years. Afterwards, we will address the main driver for dedicating billions in funds to policies that actively manage where migrants go, namely the occurrence of irregular migration into developed countries. We will put numbers of irregular migration into perspective of findings from previous sections on climate migration, ultimately taking a stance on what we perceive

is disproportionate attention devoted to preventing a relatively small fraction of migrants, at the expense of attention given to the dominant patterns of climate migration.

4.1 Aid to Re-direct Migration

One potential option available to policymakers is to use available funds to divert emigrants to other countries, by providing assistance to third-party countries who host them. For a country that receives large inflows of migrants this is at least theoretically an option. As scholars such as Clemens and Postel (2018) note, the empirical evidence on the effects of these policies is non-existent. Nevertheless, in recent years many such agreements have been put in place. For example, since 2023 the EU signed deals, increased existing cooperation, or announced future investment regarding the management of potential migrants with countries such as Tunisia (European Commission 2023b), Morocco (European Commission 2023a), Mauritania (European Commission 2024e), Lebanon (European Commission 2024c), Egypt (European Commission 2024b), Turkey (European Commission 2024a), and Jordan (European Commission 2025a). Notably, the sums invested and targeted at migration-related issues range from several hundreds of million to several billions .[16] Because many of these deals have only been signed or announced recently, it is difficult to assess their effects on migration into the EU, migrants themselves, and the transit countries. However, two explicit policy examples, namely the EU Migration Partnership Framework and the EU-Turkey deal have been in place since 2016, and hence offer some grounds for discussion.

EU Migration Partnership Framework (MPF). The MPF, launched in June 2016, was a response to the sharp influx of refugees in 2015–2016, and aimed to integrate migration management into the EU's foreign policy (Castillejo 2017; Bisong 2020). It employs diplomatic, development, and security instruments to reduce irregular migration and increase return migration in the short term, while aiming to address root causes such as economic development in the long term. The initiative prioritizes Ethiopia, Mali, Niger, Nigeria, and Senegal, seeking cooperation on migration control through incentives like development aid.

The MPF's impact on EU countries is mixed. While cooperation with transit states likely contributed to a decline in irregular migration, the extent to which this is attributable to the MPF rather than agreements like the EU-Turkey Deal remains uncertain (Papagianni 2022). However, for African partner countries, the MPF presents both opportunities and

[16] While we have not found any explicit budget for targeting migration patterns of below hundreds of million, for larger deals such as the over 5 billion euro of the EU-Egypt deal, it is not entirely clear how much money is aimed exclusively at migration, especially because the distinction to other goals, such as economic development, can often be difficult.

tensions. Governments have used the framework to access financial aid and political dialogue, with projects supporting border security, economic development, and migration governance (Fakhoury 2021; Adam et al. 2020). Yet, many African partners view the MPF as an EU strategy to externalize migration controls, often conflicting with local priorities and regional free-movement agreements. The EU's emphasis on swift returns and border enforcement has also created friction with African governments (Papagianni 2022).

EU-Turkey Deal of 2016. The 2015 refugee inflow brought over one million migrants to Europe, primarily via Turkey and the Aegean Sea, overwhelming Greece and other frontline states (Dagi 2020; Benvenuti 2017). The EU's failure to create an internal solution was seen as a near-collapse of Schengen and asylum regulations (Haferlach and Kurban 2017). In this environment, Turkey, already hosting millions of refugees, became a key partner due to its capacity to host these refugees (Benvenuti 2017).

The EU-Turkey agreement of March 2016 sought to curb irregular migration by returning all migrants crossing into Greece from Turkey, in exchange for EU resettlement of an equivalent number of Syrian refugees from Turkey (Haferlach and Kurban 2017). Priority was given to refugees who had not attempted irregular entry into the EU, creating both deterrent and incentive mechanisms. Turkey, in return, received €6 billion in aid for refugee support, along with promises of visa liberalization and renewed EU accession talks (Pries and Zülfikar Savci 2023). By 2024, funding rose to €10 billion (European Commission 2025b).

The agreement drastically reduced arrivals – from 861,000 in 2015 to 36,000 in 2016 – and also decreased deaths in the Aegean, easing pressure on EU asylum services in Greece (Terry 2021). However, the deal remains controversial. Again, critics argue that it externalized EU migration responsibilities to Turkey, raising human rights concerns (Haferlach and Kurban 2017; Pries and Zülfikar Savci 2023). Turkey, while leveraging the agreement for political and financial benefits, faced domestic backlash, with increasing anti-refugee sentiment and internal costs (Dagi 2020). Additionally, the EU's silence on Turkey's deteriorating human rights especially after the 2016 coup attempt, sparked criticism (Haferlach and Kurban 2017). The deal is seen as transactional rather than sustainable, making the EU and refugees vulnerable to Turkey's shifting political stance (Pries and Zülfikar Savci 2023; Dagi 2020).

The Jordan Compact. The Jordan Compact emerged in February 2016 in response to the Syrian refugee crisis, as Jordan hosted over 650,000 registered Syrian refugees, with the vast majority living outside formal refugee camps (Barbelet et al. 2018). The international community, particularly European policymakers, aimed to stabilize refugee populations in the region to prevent irregular migration flows. For Jordan, the Compact offered an op-

portunity to secure financial assistance, improve trade relations with the EU, and alleviate pressure on public services while integrating refugees into the labour market (Gordon 2021). Under the agreement, Jordan pledged to provide 200,000 work permits for Syrian refugees in specific sectors, such as agriculture, construction, and manufacturing. In exchange, the EU committed to relaxing trade rules to facilitate Jordanian exports under preferential conditions, while donor countries pledged significant financial support: $700 million in grants annually for three years and $1.9 billion in concessional loans (Barbelet et al. 2018).

The Compact delivered some tangible successes, particularly in expanding legal employment for refugees. By late 2017, over 70,000 work permits had been issued, a significant increase from pre-Compact levels (Barbelet et al. 2018). School enrolment for Syrian children also improved, though financial and logistical barriers continued to exclude many students. However, major shortcomings emerged in the labour market strategy. Many refugees formal jobs due to poor wages, harsh conditions, and long commutes, preferring informal employment despite legal restrictions. Women, in particular, faced difficulties due to social norms and the lack of suitable job opportunities (Gordon 2021). Critics argue that the Compact prioritized economic and geopolitical objectives over refugee well-being. The exclusion of the International Labour Organization (ILO) from negotiations is seen as a major oversight, as it could have provided expertise on labour rights and market conditions (Gordon 2021). Despite these concerns, funds from the UK and the EU to Jordan have recently increased (Foreign, Commonwealth & Development Office 2024; European Commission 2025a).

4.2 (The Lack of) Irregular Migration and Deployment of Aid

To take stock, in a world with increasing migrant flows due to climate change, as well as conflict and moving for economic opportunity, traditional aid may not be a viable short-term strategy to manage emigration rates from vulnerable, low-income regions. Moreover, with large numbers of refugees already residing in transit countries, there is a significant question mark on whether the strategy of redirecting migrant populations is a sustainable one, given the infringements on their wellbeing, as well as the substantial financial costs and political dependencies these deals have already generated.

Part of the rise in countries looking to divert migrants and negotiate their settlement elsewhere is explicitly attributed to their desire to curb persistent irregular migration.[17] In fact, this objective is openly stated in the policy initiatives discussed in Section 4.1.

[17]The International Organization for Migration (IOM) defines irregular migration as "Movement of persons that takes place outside the laws, regulations, or international agreements governing the entry into or exit from the State of origin, transit or destination."

Most irregular migrants travelling to Europe originate from the Middle East and North Africa (MENA) region and sub-Saharan Africa. Irregular migration flows surged following the Arab Spring uprisings in 2011, peaking with nearly one million arrivals in Europe in 2015. A substantial proportion of these migrants originated from conflict-affected countries in the MENA region. For example, Syrian nationals represented approximately 38% of irregular arrivals between 2009 and 2015. Other significant source countries include North African states like Egypt, Algeria, and Tunisia, alongside sub-Saharan African countries such as Nigeria, Niger, and Mali (De Bruycker et al. 2013; Dustmann et al. 2017). The MENA region also serves as an important transit zone for migrants from sub-Saharan Africa en route to Europe. Between 2014 and 2023, around 5 million migrants have arrived in the EU irregularly, contributing a small fraction of total migrants (European Commission 2024d).

While scholars project that irregular migration from the MENA region and sub-Saharan Africa to Europe will continue in the coming years (Beber 2022), it is useful to put these trends into a more global perspective. In 2020, nearly 20 million African-born migrants resided outside the continent: approximately 11 million in Europe, 5 million in Asia, and 3 million in North America. Yet, intra-continental migration within Africa itself involved roughly 21 million migrants, a figure that excludes individuals migrating within their home countries (International Organization for Migration 2024). We have already discussed how large these magnitudes can become as climate change continues to drive internal displacement: in 2023 alone, 7.6 million were internally displaced, and the cumulative number of internal displacements driven by natural disasters between 2008 and 2023 is around 400 million (see Section 2.3).

Put plainly, there is a significant amount of public debate that is generated by a relatively small number of irregular migrants entering Western countries. However, as climate-induced migration and displacement within continents and countries continues to rise, developing country cities and countries on climate-vulnerable sub-continents will require immense assistance in facing the physical, economic and social challenges of receiving many millions of climate migrants. There is an urgent need to underscore the importance of supporting regions receiving the majority of climate migrants, and not solely where this support may also act as a deterrent for irregular migration into Western countries.

5 Conclusion

Migration is increasingly providing respite to vulnerable households as they are compelled to adapt in response to climate change. At the same time, there is rising demand to understand

how international aid can be directed to address climate-induced migration. Utilizing aid as a deterrent to migration is neither highly effective nor particularly sustainable. Instead, as put by Clemens and Postel (2018), "aid agencies seeking to shape future migration flows can focus on cooperation with migrant-origin countries that alters how migration occurs, maximizing its potential benefits for everyone involved.…Current aid efforts around the world have devoted essentially none of their portfolio to supporting innovative ways to shape rather than deter migration…The first step in seizing this historic opportunity would be a substantial shift in aid agencies' new mandate – away from an exclusive focus on reducing migration and toward shaping migration for mutual benefit."

In line with this view, our report demonstrates that, in the context of climate change's unequal impact across the globe, climate migration should not be perceived as a negative phenomenon that can be reduced or prevented. Rather, climate migration increases migrant welfare and signals where international support is urgently needed to alleviate climate-induced harm. By reframing climate migration as an indicator of deeper vulnerabilities, policymakers can target aid to address its root causes and improve local conditions shaping migration decisions. This approach recognizes climate migration not as a policy failure or systemic issue, but instead as a necessary mechanism for adaptive response, mutual benefit, and economic opportunity.

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