

Visa Restrictions and Economic Globalisation

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ABSTRACT

The cross-border mobility of people, goods and services, and capital has expanded enormously both in intensity and diversity over recent decades. States have a general interest in facilitating these flows in order to benefit from economic globalisation. Yet, mainly due to security concerns, most governments grant visa-free mobility only very selectively. Drawing on a new bilateral visa policy database covering up to 194 destination and 214 origin countries over the 1995 to 2013 period, our analysis finds that the introduction of a visa restriction by a destination country for citizens from a particular origin country deters tourism inflows by more than 20 percent. Visa restrictions also reduce bilateral trade and foreign investment, but to a smaller extent than previous studies have suggested. Exploring heterogeneity across countries, we find visa restrictions to be economically most harmful for poorer countries. We further find that some of the deterred flows in tourists, goods and services, and capital are redirected to other visa-free destinations. Yet there is significant variation in the extent and the geographical direction of such effects. This deterrence-cum-deflection effect of restrictive visa policies implies significant economic costs for both visa-issuing and visa-targeted countries, but it also creates a much smaller positive externality benefiting countries with a more liberal visa policy. Liberalised visa policies would in particular help poorer countries to partake more in the benefits of economic globalisation.

Keywords: Visa restrictions; globalisation; spatial deflection; tourism; visitors; trade; foreign direct investment.

1. Introduction

The cross-border movement of people is perceived to be a double-edged sword by most countries' governments. On the one hand, they welcome the economic benefits that are typically associated with such movements in the form of tourism, trade, and the investment of foreign capital, even if globalisation is unlikely to benefit countries equally (Kemeny 2011). On the other hand, they are concerned about the cross-border flow of individuals both for security reasons and for fear that visitors might turn into illegal immigrants. National sovereignty includes the right to control and restrict who enters a nation state's territory, which has 'historically been viewed as inherent in the very nature of sovereignty' (Collinson 1996: 77). Globalisation has arguably weakened nation states' capability to enforce their right to control mobility, but it has not eliminated their prerogative.¹

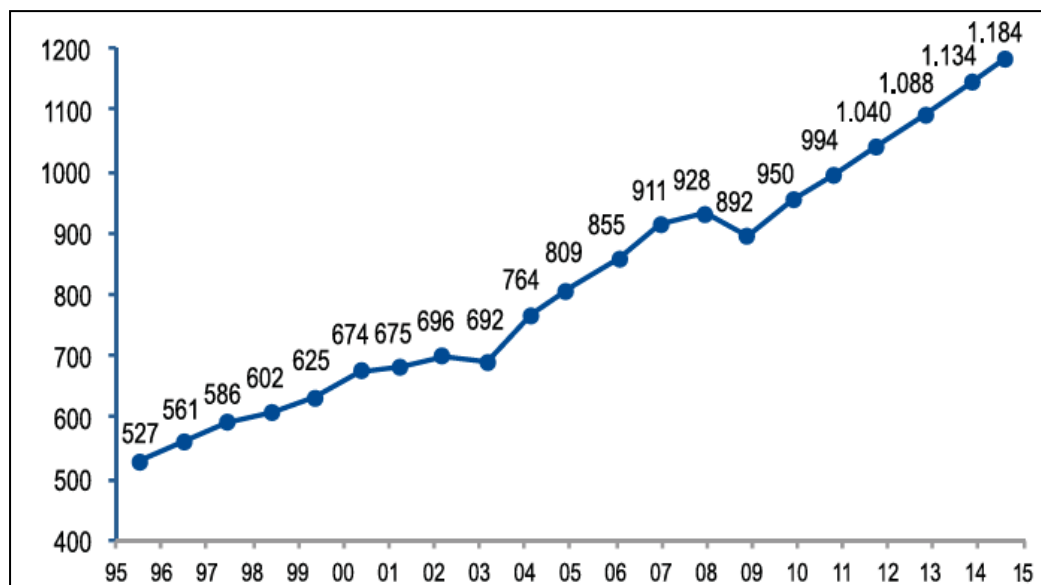
In this article, we analyse the economic cost of foregone bilateral tourist arrivals, trade and foreign direct investment as the consequence of one important policy instrument that governments have at their disposal to monitor, control and limit the cross-border flow of people: namely, visa restrictions. These impose a burden on those subjected to the restriction and allow the country imposing the restriction to pre-screen individuals before they arrive at its border. Torpey (1998: 252) calls visa restrictions 'the "first line of defence" against the entry of undesirables', that is, 'risky' and therefore 'unwanted' travellers who potentially pose a threat to the security, wealth and identity of a country (Torpey 2000; Mau et al. 2012).²

Globalisation, understood as the 'widening, deepening and speeding up of worldwide interconnectedness in all aspects of contemporary social life' (Held et al. 1999: 2), is a broad process that interlinks social, cultural and economic developments across spatial and political boundaries. In this article, we focus on three main aspects of economic globalisation. Technological progress and market competition have radically reduced the costs of air and other travel as well as communication over increasingly large distances (Castells 1996), and international market integration has spatially expanded opportunities for business, trade, investment and tourism. As a consequence, the world has seen an unprecedented rise in the cross-border mobility of people, goods and services, and capital. Over the past two decades, global travelling has more than doubled with international tourist arrivals reaching a total of 1.184 million in 2015 (see Figure 1). International travel and tourism has grown to be the world's fourth largest industry (after fuels, chemicals, and automotive products) contributing 9.8 per cent of global GDP, 4.3 per cent of total investments, 5.7 per cent of world exports and more than 250 million jobs, i.e. 9.4 per cent of total employment (WTTC 2015).

¹ There is no right in international law to enter the territory of a foreign sovereign nation-state. Even the non-binding Universal Declaration of Human Rights only postulates rights about entering one's own country, not foreign countries.

² Naturally, it is an imperfect first line of defence. For example, the 9/11 terrorists all entered the United States on valid visas.

Figure 1 World inbound travelling (in million), 1995–2015



Source: UNWTO (2015).

Mobility barriers established by visa restrictions may prevent the reaping of the full benefits of economic globalisation as their implementation entails not only significant administrative costs but comes with substantial economic costs as a result of forfeited tourism and travel, trade and investment. For instance, Hu (2013) estimates that the US Visa Waiver Program (VWP) has saved between US\$ 1.9 billion and US\$ 3.2 billion in administrative costs and contributed a further US\$ 6.9 billion to US\$ 10 billion in direct tourist spending per year. Studying the impact of post-9/11 visa policies on travel to the United States, Neiman and Swagel (2009) find that changes in visa policy were not important contributors to the decrease in travel to the United States after 9/11, however. They find that the largest decline was among travellers under the visa waiver program, i.e. those who were not required to obtain a visa (see also, Bangwayo-Skeete and Skeete 2016). For China, Song et al. (2012) and Li and Song (2013) demonstrate detrimental impacts from visa restrictions on tourism and the wider economy.

Cross-sectional studies at the global level by Neumayer (2010, 2011) provide evidence that visa restrictions decrease travel flows (by between -52 per cent to -63 per cent), bilateral trade (-21 per cent) and foreign direct investment (FDI) (-32 per cent). Lawson and Roychoudhury (2016) find an even higher effect on tourist travel of -70 per cent. However, these previous analyses of the economic costs of visa restrictions suffer from severe methodological shortcomings. Most importantly, due to the cross-sectional nature of their research design, these studies suffer from omitted variable bias since they cannot control for many unobserved factors that impact on tourist arrivals, trade and FDI and that might be correlated with visa restrictions. In this article, we use a new bilateral visa policy database from the DEMIG project at the University of Oxford covering 194 destination and 214 origin countries over the

1995 to 2013 period. The time-varying measure of visa restrictions allows us to identify the effect of visa restrictions on tourism, trade and FDI, respectively. We achieve identification by employing the most stringent econometric specification that dyadic panel data allow, namely the inclusion of dyad fixed effects in combination with time fixed effects that vary for both members of a country dyad. Such a specification excludes the possibility that unobserved time-invariant heterogeneity across dyads as well as time-varying heterogeneity across countries bias the estimated visa effect (Anderson and van Wincoop 2003; Klein and Shambaugh 2006; Baier and Bergstrand 2007). As a result of this rigorous specification, we find the effect of visa restrictions to be much smaller than the ones reported in Neumayer (2010, 2011) who admits that his estimates are likely to be upward biased. We also disaggregate the global sample into one of high-income and one of low-income destination countries to assess whether the effect is stronger in one of these groups.

We make a number of further contributions. Firstly, we investigate *asymmetric visa policy effects* by formally distinguishing a negative effect as a result of a visa introduction and a positive effect due to a visa waiver or removal of a visa requirement. Secondly, in addition we allow the effects of visa introductions and visa removals to differ over time, thus relaxing the constraining assumption of *temporal homogeneity*. Finally, we estimate *spatial diversion* effects which capture the extent to which visa restrictions produce positive externalities by shifting tourist, trade and investment flows to other, visa-free destinations. Just like trade agreements result in both trade creation within the trade agreement area and trade diversion from outside the trade agreement area, so do visa restrictions deter the flow of tourist arrivals, reduce trade and FDI for the dyad under observation but divert some of these flows to other destination countries. We are able to quantify the extent to which outbound flows of people, goods and services, and capital are diverted to other, visa-free destinations.

2. The economic costs of visa restrictions

A visa restriction requires a citizen who aims to travel to a visa-restricted country to apply for a travel visa, which is usually valid for only a short period of time (between 30 to 180 days). The applicant can do this either via post, which can take weeks or months to be processed, or in person, which requires visiting the destination country's embassy or one of the few consulates and waiting in the queue, possibly for hours. Alternatively, one can employ a professional visa service which charges a substantial fee in addition to the cost of the visa itself. In a few cases, one can apply for a visa upon arrival at the border. The pecuniary and non-pecuniary costs of receiving a visa will deter some from seeking entry into the destination country.

Other than any revenue generated by the visa fee, the main benefit to the country imposing the visa restriction is that they can pre-screen who enters their territory before the person even arrives at the border. Visa restrictions help countries to keep out potential illegal immigrants, potential terrorists and criminals as well as other *persona non grata* (Torpey 2000). To enforce this first line of defence, countries will typically require airlines and sea carriers to deny passengers who require a visa from boarding unless they are in possession of

a valid visa. Those who arrive at the border by land are denied access unless they have a valid travel visa.

Visa restrictions therefore allow countries to select among visitors. Passport holders from nations that do not require a visa are welcome and regarded as low-risk visitors by default, those who need a visa and have been given one are regarded as welcome upon closer inspection, whereas those who need a visa and do not have one or have been denied a visa are unwelcome. The problem is that visa restrictions will deter both unwelcome visitors, the policy's intention, and visitors who would be welcome but who are simply deterred from applying for the visa. There is therefore likely to be an economic cost in the form of reduced numbers of travellers, traders, and foreign investors.³

One would expect the negative effect of visa restrictions to be strongest for tourist arrivals. For the tourism industry, it is literally true that 'freedom of travel *is* freedom to trade' (O'Byrne 2001: 409; emphasis in original). Tourists and travellers come for a short period of time and they typically have alternative destination countries as options for their travel. The visa restriction will only deter some tourists of course, whereas others who wish to visit the destination country strongly enough are willing to shoulder the additional cost. That is, visa restrictions may influence the volume and spatial direction of international travel to an extent which is still unclear (Czaika and de Haas 2013, 2016).

By comparison, one would expect the negative effect of visa restrictions to be smaller for trade and FDI. Foreign suppliers and foreign investors usually have a significant economic interest in the country to which they wish to export their goods and services or wish to invest their capital in. However, much of international trade and the investing of capital in a foreign country requires personal or face-to-face contact (Storper and Venables 2004; Hovhannisyan and Keller 2015) with trading and investment partners, not least because of the importance of tacit knowledge (Gertler 2003). Globalisation has not created a 'borderless world' in which space and place no longer play a decisive role (Yeung 1998). In an op-ed, Rainer Stinner, member of the German federal parliament for the business-friendly Free Democratic Party, points out that German businesses lose out on export opportunities if the foreign business partner needs to wait six weeks until she receives a visa from the German consulate abroad (FAZ 2012).

True, the requirement to get a visa in case a visa restriction is in place will only deter those for whom the cost and hassle of acquiring the visa does not outweigh the economic benefits. One has to keep in mind, however, that the benefits from trade and FDI will often only be discovered after personal contact or after having visited the site of potential export or investment several times.⁴ Visa restrictions can therefore make it more difficult to ascertain whether the economic opportunities are significant enough. Moreover, visa restrictions make it more difficult for friends and family to visit foreign employees from the FDI source

³ There are likely to be other, non-economic costs as well that are however outside the remit of our analysis.

⁴ Bel and Fageda (2008) show that the availability of direct non-stop flights has a large influence on the location of multinational corporations' headquarters. They do not investigate the role of visa restrictions but it is a safe assumption to make that a country that imposes more visa restrictions than another country is less attractive as a location in which to situate headquarters.

country. Lastly, in some poorer countries much of international trade takes place directly in the border region with neighbouring countries. In such cases, even small additional costs like those imposed by visa restrictions can have a significant impact on travel and business activities.

The idea that visa restrictions impose economic costs is not a new one. Already the League of Nations in the inter-War period and, after the Second World War, the Council of Europe reminded nation-states that visa restrictions inhibit international trade and tourism (Salter 2003). Further below we report a trend toward a slightly more liberalised visa policy regime globally which started in the early 1990s. However, as of 2014, almost three quarters of country dyads still continue to have visa restrictions in place. One possible reason is that visa-issuing countries are not fully aware of the economic costs that their visa policies impose on them.

3. Research design: Deterrence, facilitation and diversion

We estimate gravity-type models except that due to the very stringent nature of our research design we do not need to, and in fact cannot, include any substantive control variables that vary at the level of countries. We estimate deterrence and diversion effects in separate sets of estimations. Specifically, we estimate the following two models:

$$(1) \text{ Deterrence: } \ln y_{ijt} = \alpha_1 + \alpha_2 \text{visa}_{ijt} + \eta_{ij} + \gamma_{it} + \theta_{jt} + \varepsilon_{ijt}$$

$$(2) \text{ Diversion: } \ln \sum_{\substack{m \neq j, \\ \text{visa}_{imt}=0}} y_{imt} = \alpha_1 + \alpha_2 \text{visa}_{ijt} + \eta_{ij} + \gamma_{it} + \theta_{jt} + \varepsilon_{ijt}$$

where $\ln y_{ijt}$ is the log of bilateral tourist arrivals, trade (imports) or FDI stocks from source country i into destination country j in year t , while $\ln \sum y_{imt}$ is the log of the sum of tourist, trade (imports) and FDI flows, respectively, from source country i into all other destination countries $m (\neq j)$, as long as passport holders from country i are not subject to visa restrictions from these other destination countries m , i.e., conditional on $\text{visa}_{imt} = 0$. In other words, the dependent variable in the diversion equation captures the sum of flows going into all other destination countries that do not impose a visa restriction on passport holders from source country i .

The visa_{ijt} variable is our visa policy measure that is coded as one if destination country j imposes a visa restriction on passport holders from source country i in year t , η_{ij} are dyad fixed effects, γ_{it} represent source-specific year fixed effects (i.e. every source country is allowed to have a separate intercept in every year), θ_{jt} represents the equivalent destination-specific year fixed effects, and ε_{ijt} is an idiosyncratic error term. The dyad fixed effects account for what is known in the gravity literature as time-invariant multilateral resistance (Anderson and van Wincoop 2003, Baldwin/Taglioni 2006), whereas the source- and destination-specific year fixed effects account for time-varying ‘multilateral resistance’

(Klein and Shambaugh 2006; Baier and Bergstrand 2007). The identification assumption is that $visa_{ijt}$ is uncorrelated with the error term conditional on the dyad-specific, source-specific year and destination-specific year fixed effects. The only possible bias could come from variables that vary over time within dyads and are correlated with the visa policy variable. All other potential sources of bias have been eliminated by design.

We estimate equations (1) and (2) with ordinary least squares (OLS). We acknowledge that a substantial part of the modern gravity-type estimation literature has moved toward estimating non-logged versions of equations (1) and (2) with Pseudo-Poisson maximum likelihood (PPML) estimators instead, following Santos Silva and Tenreyro (2006). This has the advantage that values of zero of the dependent variable can be easily included in the estimations for what they are, namely values of zero, and the PPML estimator is consistent in the presence of heteroskedastic residuals. However, such an estimation strategy is impossible for our research design since the PPML estimator does not converge with as stringent and large a set of fixed effects as ours.

Data for tourist arrivals by country of origin are taken from WTO (2015) and cover the period 1995 to 2013. The bilateral trade data are from the Center for International Data at UC Davis.⁵ Data on FDI stocks come from UNCTAD.⁶ This organisation now provides bilateral FDI data freely for the period 2001 to 2012. For the period 1995 to 2000 we use data purchased from UNCTAD by the authors, complemented by data from OECD (2009).⁷ The import and FDI data are in nominal US\$. We acknowledge that the three flows we analyse separately are not fully independent of each other – for example, more FDI can either replace or create more trade (Pantulu and Poon 2003). However, we leave tackling the interlinkages between the three flows to future research.

Our globalisation flows have missing values in the sense that no positive values are reported in our data sources for some (imports), many (tourist flows) or very many (FDI) dyad years (see Table 1). We do not fill these missing observations with zero or, rather, some arbitrary constant in order to prevent them from being dropped after taking the natural log of our dependent variables.⁸ Firstly, we have no way of knowing whether the true values in these dyad years are zero or very close to zero although we suspect in the vast majority of cases they are zero. Secondly, where a dyad has values of zero throughout the time period of our estimation sample, these values would be collinear to the dyad fixed effects and be dropped, and thus not affect our estimations anyway. The same is true for either source or destination

⁵ http://cid.econ.ucdavis.edu/Html/WTF_bilateral.html

⁶ <http://unctad.org/en/Pages/DIAE/FDI%20Statistics/FDI-Statistics-Bilateral.aspx>

⁷ Our starting point is the bilateral inward FDI stock reported by UNCTAD. For those dyads which do not report any inward FDI stock data but report outward FDI stock data, we reversed these to fill in missing inward FDI stock data. Where they overlap, inward and reversed outward FDI stock data are very highly correlated at $r = 0.86$. The combined FDI stock data from UNCTAD were then combined with publicly available data from OECD (2009) for the relatively small share of dyads for which UNCTAD does not report data. Where they overlap, data from the two sources are very highly correlated (both instock and reversed outstock data from both sources are correlated at $r = 0.99$).

⁸ The same holds for the minuscule number of observations in which UNWTO (2015) reports tourist flows of zero and the very small number of observations in which UNCTAD reports FDI flows of zero. Our source only reports positive values for trade.

countries who have zero values in a specific year in relation to all other countries with which they can form a country dyad. This is the case in the vast majority of missing values and marks a major difference between our study and many existing gravity-type studies. Our stringent model specification that contains the entire set of fixed effects that are possible in a dyadic time-series sample means that concerns about how to deal with values of zero that bedevil gravity-type studies are much less relevant for us. Observations with values of zero in a dyad over the entire study period or any observation with values of zero in a specific year for a specific source or destination country are collinear with the fixed effects.

Table 1 Descriptive statistics

Variable	Obs	Mean	Std. Dev.	Min	Max
Visa policy	788,617	0.725	0.446	0	1
Tourist flows	191,388	70,849.22	831,833.5	0	7.94e+07
Import flows	500,675	430,231.3	4,627,897	0	4.60e+08
FDI stocks	40,084	3,782.414	19,694.36	0	645,098

The $visa_{ijt}$ variable is defined as the requirement for passport holders from source country i to have received a valid visa before entering the territory of destination country j . Information on bilateral visa requirements (or exemptions) stems from the DEMIG VISA POLICY database collated at the University of Oxford and is based on original data from the IATA Travel Information Manual.⁹ The binary visa policy is coded zero if no visa is required and one if a visa permit is required. The database does not distinguish between visa exemptions for different lengths of stay. As long as the visa is exempted for entering the country we consider it as an exemption, regardless of the specific time frame. We do not consider visa exemptions for holders of residence permits in the country of visa issuance or other countries. We also ignore diplomatic passports or other exemptions that are not for normal, tourism-related purposes.

Table 2 shows that about 27 per cent of all 788,000 dyad-year observations for which we have information on their visa regimes were visa-free, whereas for the remaining observations – and thus for almost three quarters of dyadic relations – visas were required. A relatively small number (830) of dyad-year combinations concerned ‘blacklisted’ countries, in which case citizens could not even apply for a travel visa. We added these cases to the set of visa-constrained dyads.¹⁰

⁹ The IATA travel manuals are released on a monthly basis. The DEMIG VISA database contains information on visa and exit requirements from 1973–2013 taken from the January edition. The visa requirements tracked only apply to travel visa, excluding diplomatic or official passports and travel for business purposes (e.g. social visits, tourism, etc.).

¹⁰ The original database includes individuals with the nationality of a ‘blacklisted’ country, who are not allowed to travel to this country of destination. We have (re-)coded the visa policy variable for these dyads to one.

Table 2 Bilateral visa policy, 1995–2013

	Frequency	Percentage
No visa required (no. of dyad-years)	216,519	27.46
Visa required (no. of dyad-years)	571,268	72.44
Blacklisted (no. of dyad-years)	830	0.11
Total (no. of dyad-years)	788,617	100.00
<i>Visa restrictions (dyad-years) by level of development:</i>		
High-income destinations (per capita GDP > 4036 US\$)	414,174	64.56
Low-income destinations (per capita GDP < 4036 US\$)	374,443	81.38
<i>Visa policy changes:</i>		
Visa introductions (no. of incidences)	3,888	
Visa removals (no. of incidences)	6,233	

Note: Binary visa policy data capture 194 destination and 218 origin countries.

The prevalence of visa restrictions is not the same across the countries in the world. Instead, our data show high-income countries have implemented more liberal visa policies compared to low-income countries. According to the World Bank definition, an income per capita of US\$ 4,036 separates upper middle income countries from lower middle income countries. We use this threshold as the splitting point for our sample separating developed (high-income) and developing (low-income) countries. We find that visa policies are more restrictive among developing country destinations for which more than 81 per cent of dyad-years are visa-constrained, whereas this proportion is more than 15 percentage points lower for high-income countries (Table 2).

Within the period of 1995 to 2013, our visa database identifies almost 3,900 visa introductions and more than 6,200 visa removals.¹¹ This implies that on a global scale visa policies have become more liberal, i.e. more travel barriers have been removed than implemented. Some countries have harmonised their visa policies over time, most prominently the member countries of the Schengen zone, which required some countries joining the Schengen zone to impose visa restrictions on third countries where they granted visa-free travel before. The removal of visa restrictions have predominantly benefited passport holders from richer countries. The following analysis will exploit this within-dyad variation on visa policy changes in order to quantify the extent by which visa restrictions may contribute to a decline in bilateral tourism, trade and investment, as well as a potential diversion of these flows of people, goods and services, and capital towards other more liberal destinations.

¹¹ The share of dyads with no change in visa policy, i.e. with values of zero or one over the entire observation period between 1995 and 2013, is about 74 per cent. These observations are fully collinear with the dyad fixed effect. There is no collinearity with the origin-time fixed effect since no nationality has been fully visa-constrained/-free in a particular year. Dominica between 1999 and 2009 and Ecuador in 2009/10 are the only destination country-years with visa-free access for all nationalities and, therefore, respective observations are collinear with the destination-time fixed effect.

4. Results

a. Deterrence effect of visa restrictions

Table 3 reports the estimated effects of visa restrictions on total bilateral travel, trade, and FDI including sub-sample regressions broken down by level of development. Due to the three-dimensional panel data structure which provides the possibility to incorporate the largest possible number of fixed effects, we are able to minimize potential omitted variable bias as much as possible. The global coverage of our (unbalanced) dataset with 194 destinations and 214 origin countries also excludes any potential sample selection bias so that we have great confidence in the reliability and validity of the identified estimates.

The estimated average effect of the visa restriction on travel is -0.219 (Model 1), which implies that bilateral travel increases on average by about 24.5 per cent as a consequence of a visa removal and declines by around 19.7 per cent after a visa introduction.¹² Between 1995 and 2013, the average tourist flow has been about 71,000 people and a visa removal is estimated to increase average tourist inflows from a visa-waived origin by about 17,400 visitors per annum.

We refine this analysis by disaggregating the global sample into two sub-samples based on destination countries' level of development in terms of per capita income. We have taken a per capita income of US\$ 4,036 as the threshold that separates high-income from low-income countries and that divides the full sample into two similar sized groups. Model 2 and 3 (Table 3) report estimates of the visa deterrence effects for high- and low-income visa-issuing countries. The estimated coefficients for these two sub-samples vary between -0.232 and -0.189 with the stronger effect referring to the dyads with high-income destination. For these dyads a visa introduction leads on average to a 21 per cent decline in tourist flows in high-income destinations, whereas a visa removal increases similarly directed flows by about 26 per cent. Both estimated (semi-)elasticities for tourist flows are highly significant and the sizes of the respective effects are relatively close to the overall estimate (Model 1).

¹² If *visa restriction* switches from 0 to 1 (visa introduction), the percentage impact of a policy change on Y is $100 * [\exp(\beta) - 1]$. By contrast, if *visa restriction* switches from 1 to 0 (visa removal), the percentage impact of the policy change on Y is $100 * [\exp(-\beta) - 1]$.

Table 3 Visa requirements and their effects on globalisation flows

DV:	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)
Destination	All	Travel		All	Trade		All	FDI	
		High-income	Low-income		High-income	Low-income		High-income	Low-income
Visa restriction	-0.219*** (0.017)	-0.232*** (0.021)	-0.189*** (0.026)	-0.053*** (0.020)	-0.016 (0.026)	-0.0822*** (0.0293)	-0.060 (0.076)	0.058 (0.105)	-0.254** (0.105)
Observations	185,418	108,144	77,274	457,491	253,884	203,607	39,333	26,382	12,951
Number of dyads	14,558	8,724	7,524	35,777	20,652	18,897	3,925	2,659	1,473

Note: ***, **, * statistically significant at 0.1, 1 and 5 percent level. Standard errors clustered on dyads in parentheses. All regressions include origin-time, destination-time, and dyad fixed effects in addition to a non-reported constant. Dividing development income threshold: US\$ 4,036 (ppp, international)

Table 4 Visa policy changes and their effects on globalisation flows

DV:	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)
Destination	All	Travel		All	Trade		All	FDI	
		High-income	Low-income		High-income	Low-income		High-income	Low-income
Visa introduction	-0.205*** (0.0400)	-0.241*** (0.0477)	-0.144** (0.0627)	-0.0486 (0.0381)	0.00859 (0.0558)	-0.0883* (0.0534)	-0.166 (0.197)	-0.0562 (0.378)	-0.0411 (0.214)
Visa removal	0.245*** (0.0202)	0.267*** (0.0256)	0.207*** (0.0328)	0.0502* (0.0258)	0.0310 (0.0332)	0.0529 (0.0410)	0.0434 (0.0902)	-0.0706 (0.115)	0.311** (0.141)
Observations	185,418	108,144	77,274	457,491	253,884	203,607	39,333	26,382	12,951
Number of dyads	14,558	8,724	7,524	35,777	20,652	18,897	3,925	2,659	1,473

Note: ***, **, * statistically significant at 0.1, 1 and 5 percent level. Standard errors clustered on dyads in parentheses. All regressions include origin-time, destination-time, and dyad fixed effects in addition to a non-reported constant. Dividing development income threshold: US\$ 4,036 (ppp, international)

The overall effect of visa restrictions on trade is significantly smaller than the effects on tourism (Model 4). The estimated coefficient is -0.053 which represents a visa introduction effect of 5.16 per cent and a respective visa removal effect of 5.44 per cent. Between 1995 and 2013, the average annual bilateral import volume has been about US\$ 463.4 million and a visa removal is estimated to increase average bilateral imports from a visa-waived origin by about US\$ 25.2 million per annum. However, disaggregating the global sample into a developing and developed country sample, we find that the trade deterrence effect is particularly harmful for low-income countries where visa removals are associated with an on average 8.6 per cent increase in bilateral trade (Model 6). The respective deterrence effect for visa-issuing high-income countries is much smaller in size and statistically not significant (Model 5). This implies that visa facilitation policies in developing countries, which as we know pertain to an overall higher level of visa restrictiveness, could trigger a significant trade creation effect.

The visa deterrence effect on bilateral FDI is found to be negative as well but not significant at the global level and only disaggregation by level of development reveals why.¹³ Visa restrictions are only harmful for low-income developing countries but not for developed destination countries. A visa removal in a low-income country increases the influx of foreign investment from the visa-waived country of origin by on average 29 per cent whereas a visa policy change towards more restrictiveness reduces the respective FDI influx by about 22 per cent. Thus, while the visa deterrence effect on FDI in-stocks is large for low-income countries, foreign investments in developed countries remain unaffected by visa restrictions.

b. Deterrence effect of visa restrictions: Visa introduction versus visa removal

So far, we have constrained the estimated coefficient to be the same for visa introductions and visa removals. In Table 4, we relax this constraint and instead of estimating one single visa restriction coefficient, we estimate separate effects for visa introductions (when the destination country starts to impose a visa requirement on citizens from a source country) and for visa removals (when the destination country lifts an existing visa requirement for the source country). Formally, we estimate the following model:

$$(3) \text{ Deterrence: } \ln y_{ijt} = \alpha_1 + \alpha_2 \text{visa-intro}_{ijt} + \alpha_3 \text{visa-remov}_{ijt} + \eta_{ij} + \gamma_{it} + \theta_{jt} + \varepsilon_{ijt},$$

where visa-intro_{ijt} is set to one if (i) visa_{ijt} is equal to one, and (ii) visa_{ijt} has changed from zero to one during the observation period (1995–2013), and zero otherwise, and visa-remov_{ijt} is set to one if (i) visa_{ijt} is equal to zero, and (ii) visa_{ijt} has changed from one to zero during the observation period, and zero otherwise. The effect of visa-intro_{ijt} should be negative, whereas the effect of visa-remov_{ijt} should be positive. A t -test can test whether the effects, in absolute terms, are statistically indistinguishable from one another.

¹³ We have also run the FDI model with a longer time series (1980–2013), which has no statistically significant effect either in the aggregate global sample. Respective results are available on request from the authors.

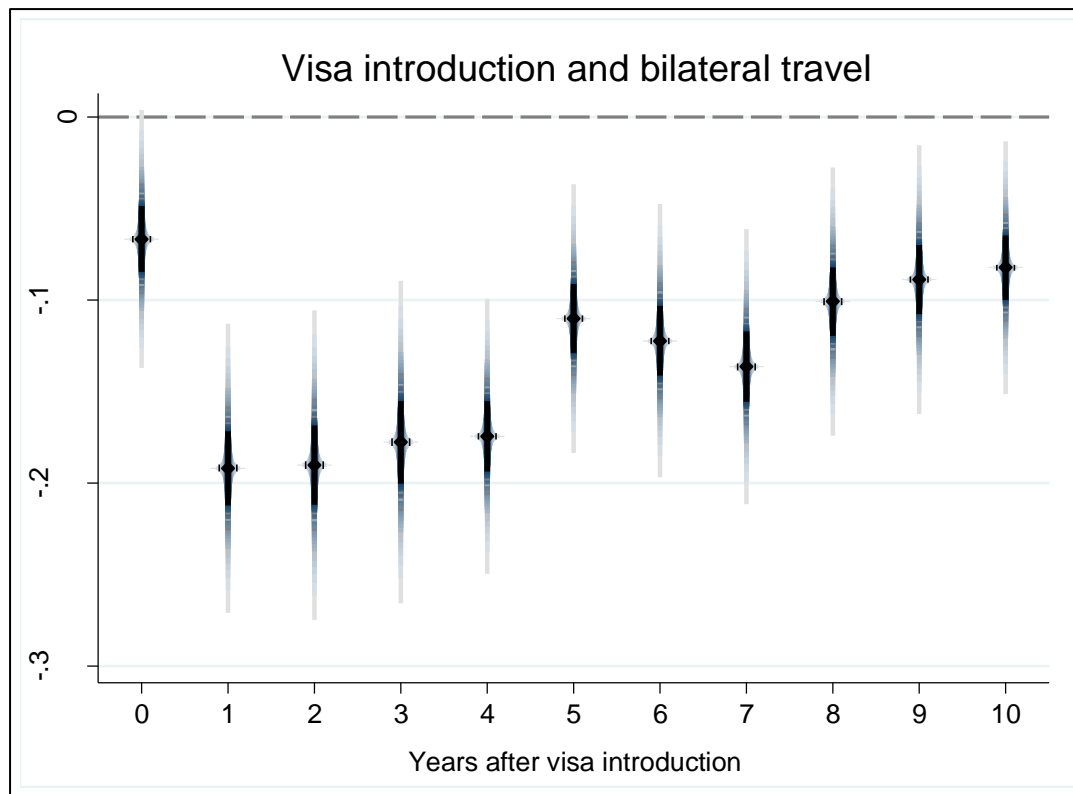
Starting with the effects of visa introductions and removals on bilateral travel, we find that both effects are statistically significantly different from zero in the global sample, the high-income and low-income sample. While the point estimates are always larger for visa removals, in absolute terms they are not statistically significantly different from one another. For trade and FDI, the point estimates for visa removals are mostly larger in absolute terms, although not always and, more importantly, given the relatively large standard errors, the estimated coefficient for visa introduction is never statistically significantly different in absolute terms from the estimated coefficient for visa removal. We conclude from this that there is no evidence that the effect of visa removals is statistically significantly different from the effect of visa introductions. Hence, the simplifying imposition of the constraint of one single coefficient in the baseline model, for which results were reported in Table 3, is justified.

c. Deterrence effect of visa restrictions: Temporal dynamics

We now relax another constraint that we imposed so far, namely that the effect of visa introductions and visa removals are *temporally homogenous* such that we could estimate a single average effect for the entire period after a visa has been introduced or removed. We now allow the effect to differ across the ten years following the change in visa restriction. We illustrate the dynamics graphically for the effects on bilateral travel only since for trade and FDI we find even more clearly that the constraining assumption of temporal homogeneity cannot be rejected on statistical grounds.

Figure 2 shows the dynamics for the effect of visa introductions on bilateral travel (point estimates with 95 per cent confidence intervals). As can be seen, there is a negative effect in the year of visa introduction that is however marginally statistically indistinguishable from zero. The effect becomes strongest one year after the visa introduction and slowly becomes weaker over time, thus overall roughly following a U-shape. Note, however, that once we take the uncertainty around the point estimates into account we cannot reject the hypothesis that the effects from year 1 onwards are statistically indistinguishable from one another. This implies that we cannot on statistical grounds reject the simplifying assumption of temporal homogeneity.

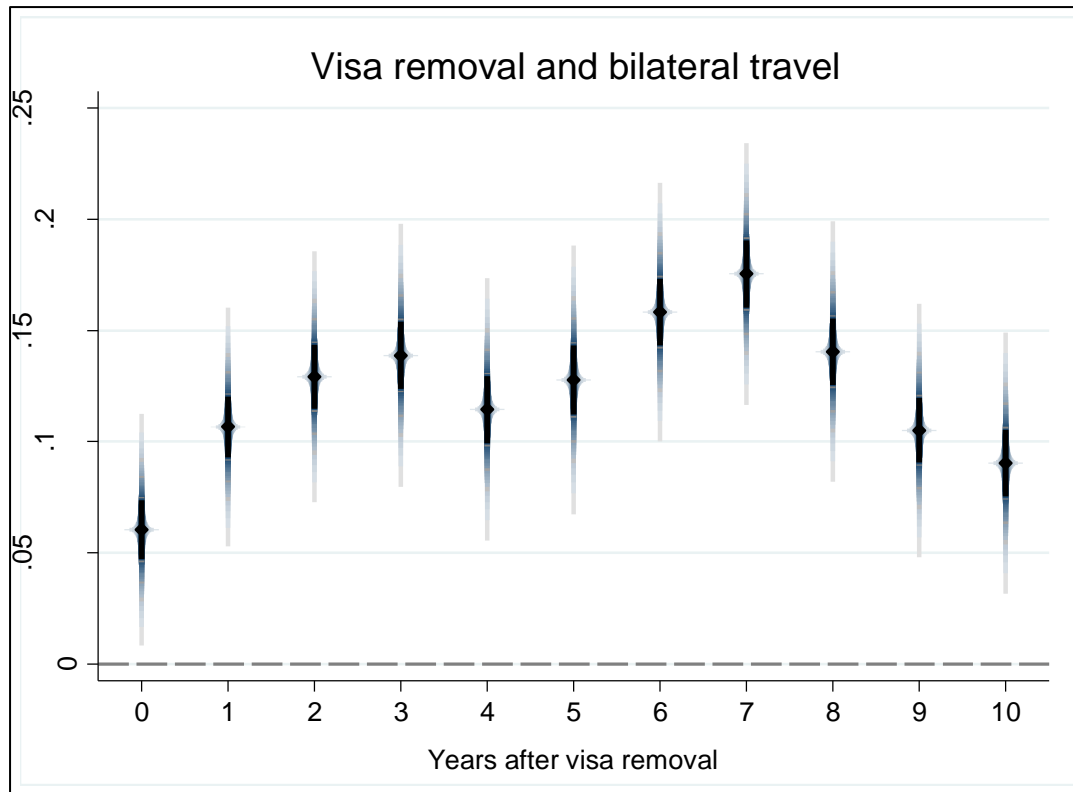
Figure 2 The dynamic effect of visa introductions on bilateral travel (semi-elasticities)



Note: Reference line (red) represents 'no visa introduction' during the observation period, i.e. reference group consists of dyads which are visa-free throughout the entire observation period. Dynamic (annual) effects for the year of visa introduction (year 0) and subsequently are then captured by respective point estimates and 95 per cent confidence intervals.

Figure 3 shows the dynamics of the effect of visa removals on bilateral travel. There is some symmetry with the dynamic effect of visa introductions in that the effect of visa removals roughly follows an inverted U-shape. Yet, contrary to the dynamics of visa introductions, the effect in year 7, when the effect is strongest, is statistically significantly different from the effect in year 0 when the effect is weakest. For visa introductions, we thus can reject the hypothesis of a temporally homogenous effect.

Figure 3 The dynamic effect of visa removals on bilateral travel (semi-elasticities)



Note: Reference line (red) represents 'no visa removal' during the observation period, i.e. reference group consists of dyads which are visa-restricted throughout the entire observation period. Dynamic (annual) effects for the year of visa removal (year 0) and subsequently are then captured by respective point estimates and 95 per cent confidence intervals.

d. Deflection effect of visa restrictions

While the deterrence effects correspond directly to the visa-issuing country of destination, the visa-targeted country of origin is only partially affected by these policy measures as some of its deterred outflows of people, goods and services, and capital may be spatially diverted to alternative destinations. Table 5 reports respective estimates on the effects of visa restrictions on bilateral tourism, trade, and FDI flows to all other visa-free destinations based on equation (2). The effect on tourism is hereby about three times bigger than the respective effect on trade, while we cannot identify a statistically significant effect on FDI. The spatial diversion effect leads to an increase in international tourism flows to other visa-free destinations by on average 2.3 per cent. This elasticity of the diversion effect is only about a tenth of the respective size of the deterrence effect. That is, only a relatively small proportion of the tourists who are deterred by a visa restriction seem to consider alternative travel destinations as a result of the visa policy. Obviously, those who are deflected by a visa-restriction towards other visa-free destinations are usually not spread evenly across the number of alternative destinations. Weighting flows to alternative destinations by the geographical distance between the visa-issuing destination and the visa-free destinations shows that geographically

proximate visa-free destination countries profit more from visa restriction put in place in another destination than destinations further away.¹⁴

Trade deflection to other visa-free destinations are even smaller in size than tourist deflections. Trade flows to other visa-free destinations increase by less than one percent after a visa introduction; the estimated diversion effect is of similar size for changes in FDI stocks in other visa-free destinations, but the effect is not statistically significant.

Table 5 *Diversion effects of visa restrictions on globalisation flows*

DV:	(1) Travel	(2) Trade	(3) FDI
Visa restriction	0.023*** (0.005)	0.007*** (0.001)	0.005 (0.005)
Observations	166,518	400,704	37,677
Number of dyads	13,464	31,286	3,773
Fixed effects:			
Origin-time	Yes	Yes	Yes
Destination-time	Yes	Yes	Yes
Dyad	Yes	Yes	Yes

Note: *** statistically significant at 0.1 per cent level. Standard errors clustered on dyads in parentheses. Dependent variable represents aggregate flows to other visa-free destinations.

5. Conclusion

In this article we have shown that despite employing a very restrictive and conservative research design in order to rigorously identify the effects of visa restrictions on the flows of people, goods and services, and capital, we estimate these detrimental effects to be substantial and particularly harmful for less developed countries. Since these estimates are based on our gravity-like model structure which includes the maximum number of fixed effects that such data allow in order to control for any possible time-variant and time-invariant omitted variable except the unobserved heterogeneity that varies within dyads over time, we are confident that these estimates are much closer to the ‘true’ effects than previous cross-sectional results such as those by Neumayer (2010, 2011) and Lawson and Roychoudhury (2016). That is, the ‘true’ deterrence effects of restrictive visa policies are much smaller in size than those reported in previous studies. Particularly for foreign investment and trade, our results show that travel barriers matter to a lesser extent than suggested by other cross-sectional studies.

¹⁴ The respective visa deflection estimate for the distance-weighted visa-free destination is 0.0238 versus 0.0230 (see Table 4) for the estimated flows towards unweighted visa-free destinations. Respective regression results are available on request.

We have tested whether the negative effects of visa introductions on the flows of economic globalisation are statistically significantly different in absolute terms from the positive effects of visa removals but found no evidence for this. Likewise, with the exception of the effect of visa removals on travel from the source to the destination country, we found no evidence that the effect of visa introductions or visa removals differs over time in a statistically significant way, thus failing to reject the constraining assumption of temporal homogeneity imposed on our baseline model. One should keep in mind, however, that our conservative research design absorbs the vast majority of variation in the data. This means that point estimates come with relatively large uncertainty around them resulting in the statistically insignificant findings on temporal heterogeneity despite the point estimates following rather clear patterns.

Novel to the literature, we have analysed whether a visa restriction that a destination country imposes on a specific source country leads to the diversion of travel, trade and capital flows to other destination countries that do not impose such a restriction on the source country. We found statistically significant effects for travel and trade. Substantively, these diversion effects are much smaller than the deterrence effect that a visa restriction imposes on bilateral exchange between the destination and the source country in the dyad under observation. The net effect of visa restrictions on economic globalisation is therefore clearly negative.

Although it is impossible for us to quantify the exact monetary costs and benefits of visa restrictions, their benefits would have to be very large indeed for visa restrictions to pass a cost-benefit test in most cases. Our analysis should prompt policy makers to re-consider whether their country's existing set of visa restrictions is worth the cost. Visa systems cause high administrative costs which are certainly not fully covered by the visa fees usually charged to applicants. Visa waivers save administrative costs and, much more importantly, spur international business activities and tourism by facilitating the cross-border mobility of people.

Less developed countries in particular should re-evaluate whether their restrictive visa policies make sense. A significant reduction in visa restrictiveness may not only increase their inbound tourism and generate extra revenues from private and business travel, but also increase trade and FDI. Liberalised visa policies would help poorer countries to more fully participate in the benefits of economic globalisation.

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