Does the "Melting Pot" Still Melt? Internet and Immigrants' Integration *

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December 10, 2024

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Abstract

The global spread of the Internet and the rising salience of immigration are two of the biggest trends of the last decades. And yet, the effects of new digital technologies on immigrants - their social integration, spatial segregation, and economic outcomes - remain unknown. This paper addresses this gap: it shows how home-country Internet expansion affects immigrants' socio-economic integration in the US. Using DID and event-study methods, I find that home-country Internet expansion lowers immigrants' linguistic proficiency, naturalization rates, and economic integration. The effect is driven by younger and less educated immigrants. However, home-country Internet also decreases spatial and occupational segregation, and increases subjective well-being of immigrants. The time use data suggests that the Internet changing immigrants' networking is part of the story. I also show the role of return intentions and Facebook usage, among other factors. These findings align with a Roy model of migration, augmented with a choice between host- vs. home-country ties. Overall, this paper shows how digital technologies transform the immigration, diversity, and social cohesion nexus.

Keywords: Immigration, Integration, Internet, Social Networks, Time Use

*I'm very grateful to Joop Adema, Cevat Aksoy, Catalina Amuedo-Dorantes, Catia Batista, Leah Boustan, Pedro Dal Bo, Frederic Docquier, Ruben Enikolopov, Martin Fernandez, Oded Galor, Paola Giuliano, Brian Knight, David McKenzie, Stelios Michalopoulos, Santiago Perez, Giovanni Peri, and David Weil for many valuable discussions and suggestions. This paper has also benefited from seminars at Brown, CERGE-EI, LISER, New Economic School, Rockwool, UC-Davis, U Copenhagen, and conferences: NBER, EEA-ESEM 2024, CESifo Venice 2024, CEMIR 2024 (Munich), Workshop on Culture, Institutions, and Development 2024 (Lund), ASREC 2022 (London), Paris Migration Workshops (IESEG and ICM 2023), Voluntary and Forced Migration 2024 (Lille), as well as Economics of Migration and PhD-EVS webinars.

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1 Introduction

We live in an era of rapidly expanding access to information and communication from abroad. Half a century ago, regular cross-border communications were hardly possible, and even 25 years ago, international calls were prohibitively expensive, with prices exceeding 1$ per minute for calls between the US and many developing countries (Telegeography (2000)). Since then, the growing spread of the Internet[1] and the emergence of new information and communication technologies (ICTs) such as Skype, Facebook, and YouTube, have provided unprecedented opportunities to stay in touch with distant families, friends, and media. While the Internet has transformed the daily lives of most people, immigrants are particularly sensitive to the opportunities it provides. And yet, despite recent evidence on how the Internet affects local economies and politics,[2] the cross-border effects of the Internet - on immigrants and host communities - remain unknown. This paper addresses this gap.

How does the Internet affect immigrants' social integration (e.g., language acquisition, citizenship) and economic outcomes in destination countries? Do immigrants adjust their location and job choices in response to the evolving digital landscape? Does Internet access reshape immigrants' networking behavior and overall well-being? Given the rapid expansion of Internet access in sending countries and the growing salience of immigration and integration challenges in many receiving countries, these questions are of first order importance. Recent literature points to significant effects that immigration exerts on host-country productivity, innovation, cultural backlash, and voting (Ottaviano and Peri (2006, 2012), Hunt and Gauthier-Loiselle (2010), Burchardi et al. (2020), Tabellini (2020), Alesina and Tabellini (2024)). Thus, if the Internet changes immigrants' integration, it could have significant implications for the economic and political dynamics of host countries.

To evaluate the effects of the Internet on immigrants' socio-economic integration, I look into home-country Internet shocks. First, home-country Internet access is independent of destination-country conditions, which helps to address many identification challenges. Second, home-country Internet provides immigrants with access to a significant portion of their distant networks (family, friends) and media sources. Theoretically, the effect of home-country Internet on immigrants is ambiguous. On the one hand, reduced social costs of

[1] In 2000, only 5% of the population in non-OECD countries had Internet access, compared to 24% in OECD countries. By 2017, this coverage increased to 50% and 83%, respectively. The total international bandwidth (cross-border Internet data flows) increased more than 3,000 times during this period (ITU data).

[2] See Hjort and Poulsen (2019), Guriev et al. (2020), Manacorda et al. (2022), Adema et al. (2022), and reviews in Zhuravskaya et al. (2020) and Campante et al. (2022).

migration could enhance immigrants' well-being and encourage greater integration efforts. Moreover, having online access to home-country peers and content might reduce the need for physical clustering with co-nationals, reducing spatial frictions at the destination. On the other hand, home-country Internet may confine immigrants to co-national online "bubbles," limiting host-country networking and hindering integration.[3] While there is some anecdotal evidence linking the Internet and immigrants' integration, we still lack systematic evidence.[4]

Focusing on the US as the main destination country, I begin by documenting new facts on immigrants' integration, using data from the American Community Survey (ACS) and the American Time Use Survey (ATUS). First, more recent cohorts of immigrants, especially those arriving after mid-2000s, show slower language acquisition and naturalization rates compared to earlier cohorts. Second, over the last 20 years, immigrants have significantly reduced the time spent on local socializing and communication, even more so than natives. Meanwhile, time spent on computers and on calls / messages with the family has increased.

To evaluate the effects of home-country Internet on immigrants' social and economic integration, I use two complementary strategies. First, given the importance of conditions upon arrival for immigrants' integration (e.g., Borjas (1987), Barsbai et al. (2023), Foged et al. (2024)), I use the variation in Internet coverage upon arrival across the *Arrival Cohort* $\times$ *Origin* cells. Specifically, I compare the integration trajectories of immigrants arriving a few years before vs. after sharp Internet improvements at the origins. Importantly, I partial out all fixed differences across origins and arrival cohorts, as well as US state $\times$ year shocks. I find that, despite being similar on observables upon arrival, "high-Internet" cohorts display slower social (English skills, citizenship) and economic (employment, wages, linguistic content of occupations) integration, loosing to low-Internet cohorts in the long-run. On the flip-side, high-Internet cohorts sort into locations with fewer co-nationals, lowering the extent of spatial segregation. The results are robust to different measures of Internet shocks, and are not driven by (i) correlated changes at the origins (e.g., income), (ii) increasing size of migrant cohorts, or (iii) differential return migration between high- vs. low-Internet cohorts.

Upon arrival differences in home-country Internet can still create both composition

[3]Moreover, home-country Internet access can change selection into migration and match upon arrival: better information pre-migration can boost immigrants' linguistic and labor market match, while lower cultural costs of migration can increase the prevalence of immigrants highly attached to their homeland.

[4]Dekker and Engbersen (2014) show that immigrants rely heavily on online media to remain in touch with distant social ties. Arat and Bilgili (2021) and Guo et al. (2022) find that online networks increase immigrants' subjective well-being and act as coping mechanisms. Miconi (2020) argues that immigrants' online networks are heavily co-national and bring little participation in local community or political life.

changes and post-migration effects. In my second strategy, I partial out composition changes, and identify the effects of sharp changes in home-country Internet (staggered roll-out of 3G technology) on pre-existing immigrants. Specifically, I focus on immigrants who arrived in the US before any 3G, and estimate how a post-migration 3G shock at the origins affects social integration. I find that, consistent with the first strategy, home-country Internet slows down immigrants' social integration. The effects are stronger if 3G shocks happen in the first years post-arrival: sensitive years for immigrants' integration. The Callaway and Sant'Anna (2021) event-study design (no "forbidden comparisons") shows similar effects.

I document several important heterogeneous treatment effects of home-country Internet. First, the negative effects of home-country Internet on social integration are driven by lower-educated (and those working in non-language intense jobs) immigrants. Thus, Internet improvements widen integration gaps between lower- and higher-skilled immigrants. The effects are also stronger for younger and family-left-behind immigrants. There are no effects of home-country Internet on under age 7 arrivals (Bleakley and Chin (2010)). Importantly, negative effects of home-country Internet are more pronounced in US counties with smaller shares of co-nationals: places where before the Internet, immigrants would interact with natives the most. Finally, the effects are stronger for Hispanic immigrants.

What are the mechanisms behind these effects? Using data from TeleGeography on international phone calls, I find that home-country Internet decreased the usage of more expensive technology, and shifted communications to Skype and Facebook. With the Time Use data, I show that Facebook usage at the origins increases immigrants' time on computers. And more generally, home-country Internet increases immigrants' digital time use (computers, calls to family), and decreases time on local socialization and communication.

Changing return intentions could also play a role: if home-country Internet shortens immigrants' planning horizon at destination, it can decrease their local human capital accumulation. Using data on (i) immigrants' home ownership in the US, and (ii) return intentions data from Gallup, I find no evidence for this mechanism. If anything, return intentions tend to weakly decrease for high-Internet cohorts of immigrants.

Finally, I document an important trade-off between social integration and subjective well-being of immigrants. On the one hand, there is a negative effect of home-country Internet on immigrants' social integration. On the other hand, subjective well-being and health of immigrants increases with growing home-country Internet access. All this evidence is consistent with a simple Roy model of migration, augmented with a choice between local vs. origin-country networks, which I present in the Appendix.

Contribution to the Literature The main contribution of this paper is connecting two of the biggest trends of the last decades: (i) the growing salience of immigration and immigrants' integration (Abramitzky and Boustan (2017), Alesina and Tabellini (2024)), and (ii) the growing spread of new digital ICTs - the Internet in particular - across the globe. This is the first paper to systematically document the effects of home-country Internet access on immigrants' social integration (language, citizenship) and economic success at destination.

Thereby, this paper contributes to the literature on immigrants integration. Previous works documented the changing dynamics of immigrants integration (Borjas (1985, 1987, 2015), Abramitzky and Boustan (2017); Abramitzky et al. (2020)), as well as the role of language acquisition (Dustmann and Fabbri (2003) Bleakley and Chin (2004, 2010), Foged et al. (2022), Heller and Mumma (2023)), and citizenship (Hainmueller et al. (2017), Gathmann and Keller (2018), Felfe et al. (2020), Dahl et al. (2021)) in this process. This paper highlights a previously overlooked factor shaping recent immigrants' language learning, citizenship uptake, and economic success: growing Internet access in sending countries.

Second, this paper expands the literature on the effects of new ICTs. Previous literature focused predominantly on the *local* effects of new ICTs: on local economies, politics, and social capital: Gentzkow (2006), Hjort and Poulsen (2019), Guriev et al. (2020), Geraci et al. (2022), and Manacorda et al. (2022), among others. However, as evident from recent reviews (e.g., Aridor et al. (2024)), this literature does not explore the cross-border effects of digital ICTs, which are increasingly important in the globalizing world.[5] This paper addresses this gap and documents the cross-border effects of the Internet on immigrants and host societies. My findings imply that today, immigrants (and people in general) are increasingly affected by communications and content from abroad.

Third, this paper expands the literature on co-national networks. Most of the existing literature has focused on the size or composition of co-national networks at destination, e.g., Bertrand et al. (2000) and Munshi (2003). Some papers found positive effects of co-national networks on immigrants' integration at destination (Munshi (2003), Martén et al. (2019), Biavaschi et al. (2021)), while others found negative effects (Beaman (2011), Glitz (2014)).[6]

[5] A small but growing literature on immigration and information (Farré and Fasani (2013), Barsbai et al. (2017, 2021), Adema et al. (2022), Blumenstock et al. (2023)) shows how new ICTs can affect intentions to move and flows of information between locations, but do not look into the cross-border effects of the Internet on immigrants and their integration at destination.

[6] Positive effects may stem from information provision, job referrals, and safety net effects. Negative effects may stem from intra-group competition and lack on investment in local human capital. Battisti et al. (2021) show that a higher local share of co-nationals has a positive effect upon arrival, but a negative effect in the longer-run, due to lower incentives to invest in local language.

In this paper, I show that in the era of online ICTs, physical proximity to co-nationals itself becomes less important, and that immigrants tend to settle in less co-national locations in the US. This has important implications for how we should think of co-ethnic/co-national segregation in the digital era.

The rest of the paper is organized as follows. Section 2 describes the data and documents several new regularities about immigrants' integration and time use. Section 3 documents the differences in socio-economic integration and spatial segregation of high-Internet vs. low-Internet arrival cohorts. Section 4 zooms into post-migration 3G Internet shocks at the origins to identify the causal effects of home-country Internet on immigrants' integration. Section 5 shows treatment effect heterogeneities, and Section 6 explores the mechanisms. Additional evidence on how home-country Internet affects immigrants subjective well-being and cultural selection is discussed in Section 7. Section 8 concludes.

2 Data and stylized facts

In this section, I describe the data, and document new regularities on (i) recent immigrants' socio-economic integration, and (ii) immigrants' time use as compared to natives.

2.1 Social integration: linguistic skills and naturalization

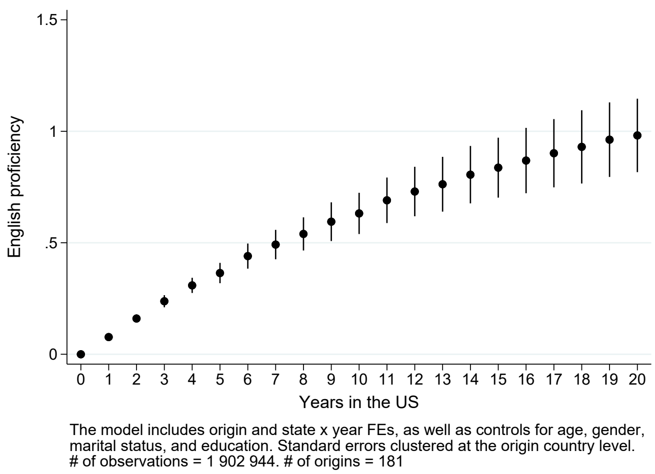
To measure immigrants social integration, I use data from the American Community Survey (ACS), obtained via IPUMS-USA. I focus on English proficiency and naturalization rates as key outcomes, and use residence in co-national enclaves as an additional outcome.[7] For my main analysis, I use the sample of immigrants aged 18 to 64, for whom English is not a native language, arriving from 1995 to 2019 (the period relevant for the roll-out of the Internet) Figure A1 shows the origin countries with the largest shares in the total foreign-born US population in this period. I model the baseline integration process in the following way, similar to, e.g., Borjas (2015):

$$Y_{i,o,s,t,m} = \sum_{t=m+1}^{m+T} \beta_{t-m} \cdot \mathbb{1}[YSM = t - m] + X'_{i,o,s,t,m} + \phi_o + \tau_{s,t} + \theta_M + \varepsilon_{i,o,s,t,m} \quad (1)$$

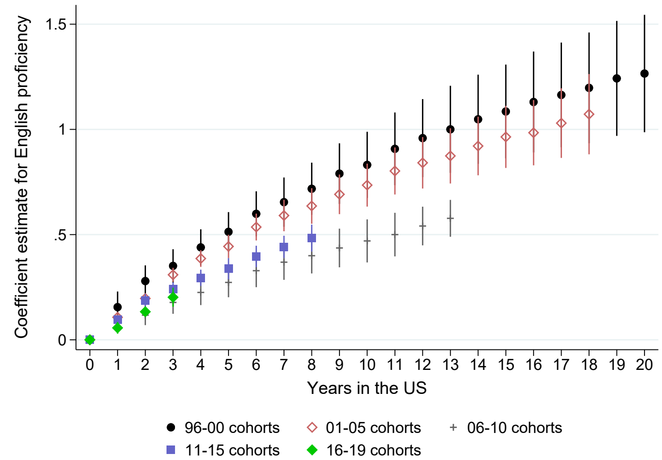
where $Y_{i,o,s,t,m}$ is integration outcome of immigrant i originating from country o, living in state s, observed in year t, who migrated to the US in year m. The model allows for state $\times$ year shocks $\tau_{s,t}$, fixed differences across origins, ϕ_o, and fixed differences across (bins of)

[7] In progress is data analysis for inter-ethnic marriages, Bleakley and Chin (2010).

immigration cohorts, θ_M. Individual controls $X'_{i,o,s,t,m}$ include gender, age, education, and marital status. Years since migration variable is captured by $YSM = t - m$. The key parameters of interest are β_{t-m} - the collection of time since migration FEs that together give the integration profile. I cluster standard errors at the origin country level.



(a) Baseline



(b) Differences by 5-year cohort bins

Figure 1: Linguistic Integration profiles

Figure 1a shows the baseline dynamics of linguistic integration with respect to the number of years spent in the US. One can clearly see a log-like dynamics, with the first 7 years post-arrival display the fastest accumulation of linguistic skill and accounting for half of the long-term increase. Importantly, already on Figure 1b we see that later cohorts integrate more slowly, especially since the second half of the 2000s.

In the Appendix, I use year 2004 as a threshold (the "age of the Internet")[8] to provide further evidence that while having an advantage upon entry, post-2004 cohorts integrate more slowly, lose their advantage in 4-5 years, and display lower levels of English skill in the long run, Figure A2. Importantly, the effects are driven by younger and lower-educated immigrants, as shown on Figure A3. Moreover, In Table B1, I show similar change in the integration dynamics in a log-linear specification for English proficiency, columns (1)-(3), and for naturalization rates, column (4)-(6). Post-2004 cohorts have an approximately 37% slow-down in the rate of English learning over the (log of) years spent in the US. Despite the fact that post-2004 cohorts enter with better English skills, this initial difference disappears

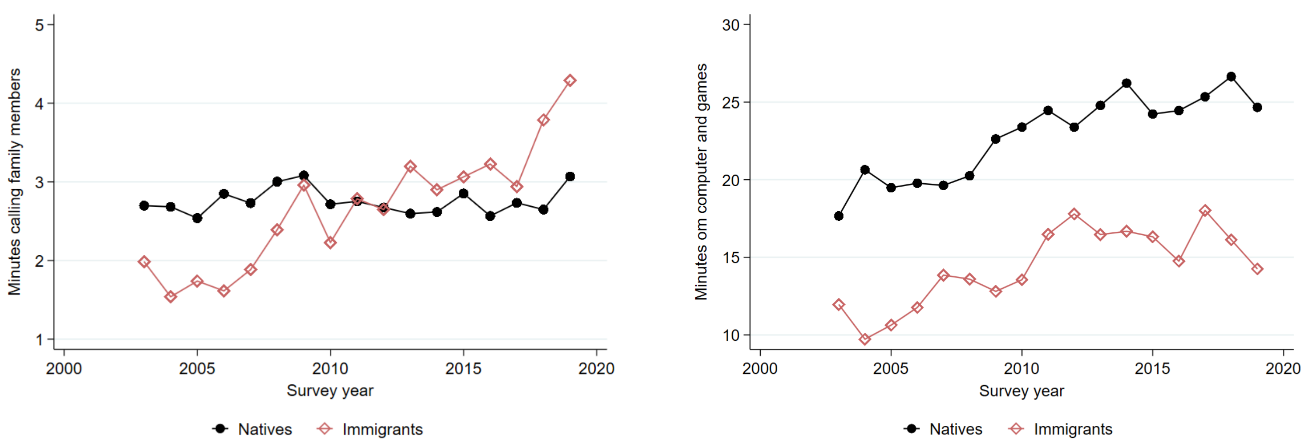
[8] The year 2004 is chosen as the first year when Skype and Facebook start to spread, and when the usage of the Internet first reached 50% in the developed world, Figure A6a. However, a similar picture is observed around any of the 2003-2006 threshold cohorts.

in 5-6 years, and earlier cohorts overtake later ones from thereon. As above, the effects are more pronounced for lower-educated immigrants. Naturalization rates also decrease for post-2004 cohorts. However, the effect mostly comes from higher-educated immigrants - potentially because they are more likely to pass the US naturalization test.

2.2 Networking patterns: American Time Use Data

To measure the patterns of immigrants' networking, both locally and with the origins, I use the American Time Use Survey (ATUS) data from 2003 to 2019. I calculate the time spent on (i) family calls; (ii) computer use for leisure (social media, games, etc.); (iii) socialization and communication (talking, partying, attending events, etc.). The data allows to see with whom and where the activity takes place, e.g., outside of home, with friends and neighbors.

Figure 2 shows the dynamics of the time devoted to (a) family calls and (b) computer use for leisure and games. While natives spend a constant amount of time on family calls, immigrants start at the lower level, increase family calls from 2006 onward, and eventually overtake natives. Time on computers for leisure (e.g., social media, chats) increases for both natives and immigrants, but the relative increase is greater for immigrants (approximately a 45% increase as compared to around 30% increase for natives).[9] Figure A4 in the Appendix shows that the effects are driven by (a) immigrants who live alone (so the calls are likely with family back at the origins), and (for computer use) (b) younger immigrants (15-35 years).

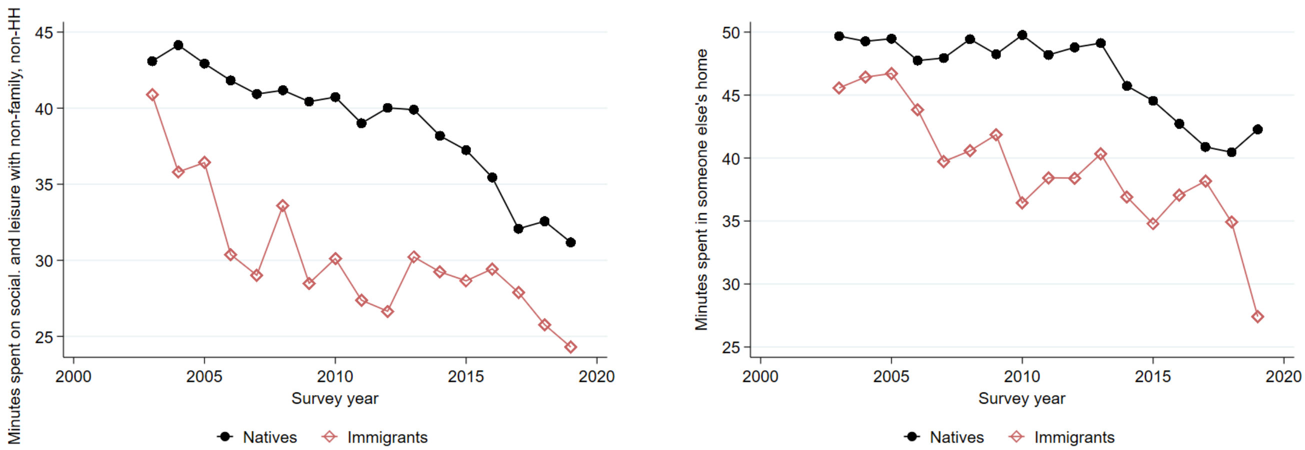


(a) Calling family

(b) Computer for leisure and games

Figure 2: Digital time use by immigrants and natives

[9]Keep in mind that all these activities are outside of work, so out of, approximately, 8 hours total. Moreover, each respondent submits a diary for one day only, so there are many zeros for irregular activities.



(a) Socializ-n and leisure with non-HH members (b) Time spent in someone else's homes

Figure 3: Local socialization, leisure, and networking: dynamics for natives and immigrants

How does immigrants' local networking change over time? Using the ATUS dimensions on "with whom" and "where" the activity is conducted, I measure time spent with non-household members, in someone else's homes, etc. Figure 3 shows that from 2003 to 2019, immigrants decreased socialization with non-household members by more than 40%. The decline for natives was much slower. As for the time spent in others' homes, immigrants were spending almost 50% less time on such activities in 2019 as compared to 2003. For natives, again, the decline was much smaller.[10] To show that changes in networking behaviors are not driven by changing immigrants' characteristics or origin-country mix, Figure A5 estimates differences between immigrants and natives, controlling for demographics (and origin FEs, in robustness): all the patterns remain the same as reported above.

Can home-country Internet expansion be responsible for these changes in immigrants' networking behavior and social integration (linguistic learning and naturalization) dynamics? To understand the role of home-country Internet in immigrants' socio-economic integration in the US, I conduct two empirical exercises in Sections 3 and 4.

3 Home-country Internet at the time of migration

This section is devoted to my first empirical strategy: I analyze the effects of home-country Internet at the time of migration on immigrants' subsequent integration. Large literature,

[10]Since natives also spend less time on socialization ("bowling alone"), the "supply of local networks" goes down for immigrants, which can interact with changes in immigrants' demand for local networks.

e.g., Borjas (1987), Battisti et al. (2021), Barsbai et al. (2021, 2023), shows that conditions upon arrival are crucial for immigrants' integration. Home-country Internet at the time of migration can play a crucial role: (i) information on destination country upon arrival, (ii) connection with home-country networks and media post-arrival, and (iii) lower social pressure from relocation. Do "high-Internet" arrival cohorts differ in their integration dynamics from low-Internet arrivals? This section estimates differences in integration dynamics (language skill, naturalization, employment, etc.) between immigrants who arrived in the US just after vs. just before large Internet expansions at the origins.

3.1 Data and empirical strategy

To measure Internet coverage at the origins, I rely on the ITU data on the share of country population with access to the Internet. Figure 4 gives two examples: for Korea and Russia - both among the top sending countries for the US. One can see that the most rapid Internet expansion in these (and many other) countries happens between 25% and 50% coverage.[11]

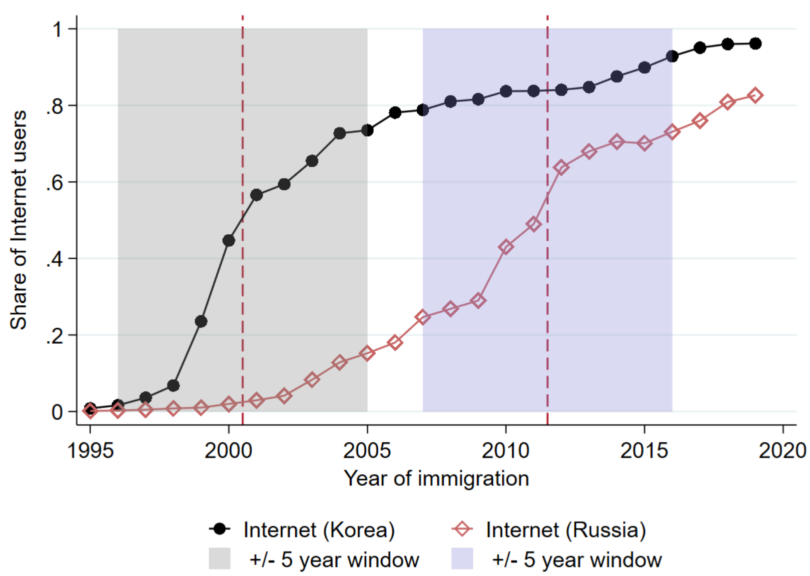


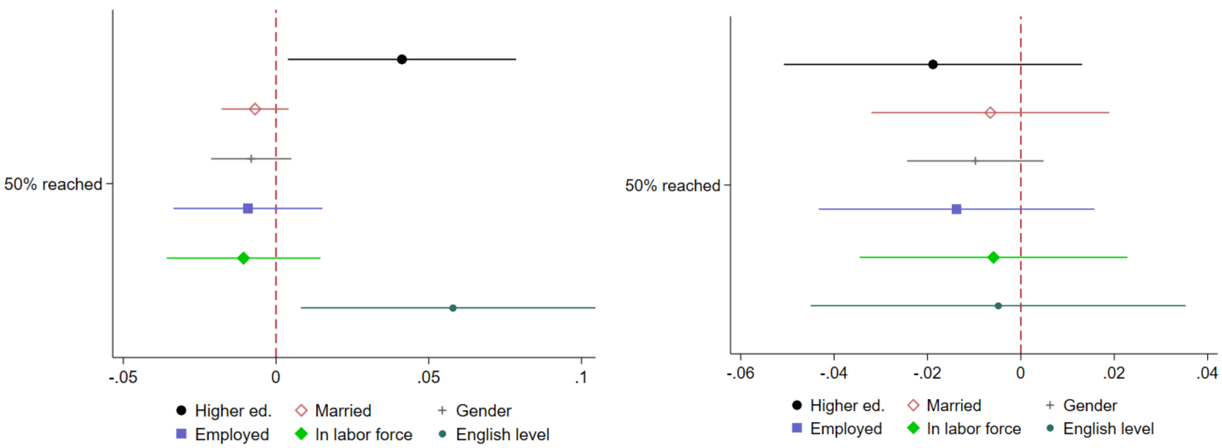
Figure 4: Internet expansion, 50% year, and treatment vs. control group definitions

I code origin × cohorts of immigrants as "high-Internet" if they arrived after at least 50% of origin-country population had access to the Internet. Alternatively, I use as a threshold

[11]Figure A6a shows that in OECD countries, the Internet expanded from 0 to 40-50% in the matter of several years from late-1990s to mid-2000s. In Germany, it took 4 years to go from 10% to 50%. In developing countries, the Internet expansion happened later and slower.

the year of the biggest increase in Internet coverage, or the 25% coverage threshold (in robustness checks).[12] Since the choice of thresholds is somewhat arbitrary, I also use a continuous population share of Internet users at arrival: the results remain the same.

How comparable are high- vs. low-Internet immigrants? To assess the extent of potential selection effects, Figure 5a shows upon-arrival (years 0 or 1 since migration) differences in immigrants' key demographics across treatment groups, including a set of origin, cohort, time, and state FEs. The only significant difference is in education and English skill: high-Internet immigrants are more educated and have better English skill at arrival.[13]



(a) Full sample

(b) 5-year window around 50% year

Figure 5: Observables' balance: immigrants arriving before/after 50% Internet at the origins

However, once I zoom into 5-year windows around the big improvements in origin-country Internet - the shaded areas on Figure 4 - upon-entry differences across treatment groups disappear, Figure 5b. A related question is whether home-country Internet induces cultural selection into migration. The results in Section 7.2 show no differences in cultural norms and political preferences between treatment groups. Despite being similar upon arrival, high- vs. low-Internet immigrants will display very different integration profiles post-arrival.

To estimate the effects of home-country Internet upon arrival on immigrants' subsequent integration, I compare social and economic outcomes of immigrants who came from the

[12]Figure A7 shows the distribution of differences in Internet access in the 5-year window around the 50% threshold year. On average, the increase is around 30 p.p, and more than 40 p.p for 20% of the sample. Thus, treatment and control groups have very different home-country Internet in their first years in the US.

[13]This result could reflect a stronger positive effect of the Internet on net benefits from emigration for higher educated people: e.g., online job search tends to be high-skill biased. Under the more restrictive set of FEs (e.g., interactions of cohort bin × origin FEs) differences upon arrival disappear.

same country, just after vs. just before large expansion in Internet coverage back home. For example, on Figure 4, cohorts of immigrants arriving from Russia in 2007-2011 are part of the control group, while those arriving in 2012-2016 are part of the treated group. Thus, I augment the baseline model in the following way (similar to, e.g., Battisti et al. (2021)):

$$Y_{i,o,s,t,m} = \sum_{t=m+1}^{m+20} \beta_{t-m} \cdot \mathbb{1}[YSM = t-m] \cdot HighInternet_{o,m} + X'_{i,o,s,t,m} + \phi_{o,M} + \tau_{s,t} + \varepsilon_{i,o,s,t,m} \quad (2)$$

where $Y_{i,o,s,t,m}$ is an integration outcome (e.g., language proficiency) of immigrant i, from origin country o, living in state s, who arrived to the US in year m, and is observed in year t. $HighInternet_{o,m}$ is a measure of origin-country Internet at the time of migration: e.g., an indicator for whether 50% coverage is reached.

As before, model (2) includes State x Year FEs to absorb shocks common to all immigrants across time (e.g., changes in national policies) and locations (e.g., local labor market shocks). Origin x Cohort Bin FEs capture fixed differences across immigrant origins and cohorts, Borjas (1985, 2015). The estimates of $\beta_{t-m} \cdot HighInternet_{o,m}$ show the difference in outcomes between high- and low-Internet immigrants along the integration path.

There are two main concerns with this empirical approach. First, origin-country Internet can affect the size of new immigrant cohorts, Adema et al. (2022), which can in turn affect immigrants' integration, e.g., Beaman (2011). I find no effects of the Internet on the size of immigrant cohorts, Table B2. Since migration may take time to respond, in robustness checks, I control for the local time-varying share of co-nationals: the results remain intact.

The second concern is that high- vs. low-Internet cohorts can have different patterns of return migration, e.g., Dustmann and Görlach (2016). On Figure A11, I estimate the differences in the size and educational composition of high- vs. low-Internet cohorts over time in the US. I do not find significant differences in the cohort attrition dynamics.[14]

Additional robustness checks in Section 3.4: (i) address concerns over the potential correlation between origin-country Internet access and development (I flexibly control for GDP per capita and other correlated shocks at the origins);[15] (ii) show no differences in integration paths between cohorts arriving before vs. after low-level Internet thresholds (e.g., a 1% or a 10% Internet thresholds play no role for immigrants' integration); (iii) compare high-Internet cohorts to those who arrived long before the good Internet (to ensure that the control group does not get treated shortly after arrival). The main results remain intact.

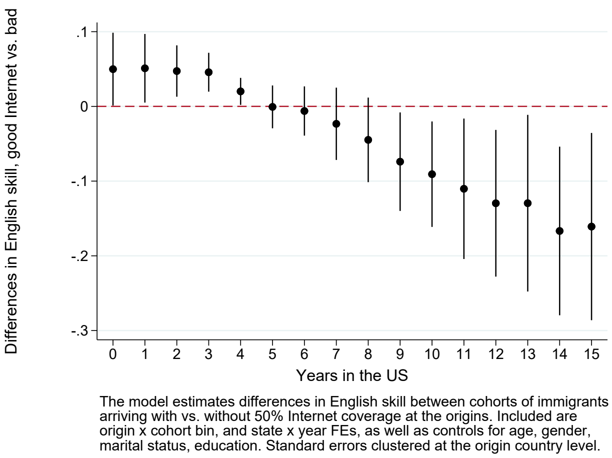
[14] In addition, the origin x cohort panel is not perfectly balanced for the treated group. If a country gets good Internet very late, there are only a few treated periods for immigrants from such a country. I verify that the results remain unchanged on a balanced panel of origin x cohort cells.

[15] I also allow for origin-specific ($\phi_o \times YSM_{t,m}$) integration paths. The results remain robust.

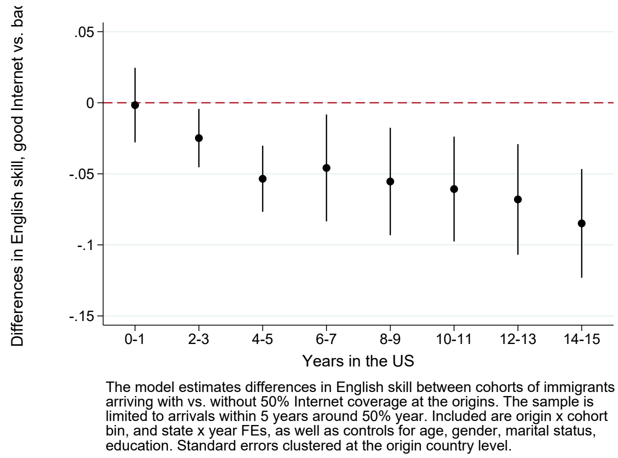
3.2 High-Internet immigrant cohorts integrate slower

Social integration: language learning and naturalization

Figure 6 shows the estimates of $\beta_{t-m} \cdot HighInternet_{o,m}$ from model (2): differences in linguistic integration between high- vs. low-Internet arrivals. Panel (a) uses the full sample, and panel (b) zooms into arrivals in the +/-5 year window around the 50% coverage year.[16] High-Internet immigrants show lower levels of English proficiency in the long-run.



(a) Full sample



(b) 5-year window around 50% year

Figure 6: Linguistic integration: arriving after vs. before the origin reaches 50% coverage

Table 1 shows the robustness of these effects of home-country at arrival on subsequent English skill with various specifications and sets of Fixed Effects. In all columns the sample is restricted to +/- 5 years around the Internet threshold. Column (1) starts with a simple TWFE regression, with only Origin and Cohort Bin FEs. Column (2) controls for the log of years in the US (increasing and concave baseline integration path), and adds State and Year FEs. Column (3) adds the Cohort Bin x Origin FEs, and State x Year FEs (to capture local destination shocks). Column (4) shows that the average negative effect of home-country Internet upon arrival reflects a slowdown in the pace of English learning. Columns (5) and (6) use my preferred indicator of "high-Internet": the 50% threshold. Those arriving just after 50% coverage - having on average 30 p.p. better coverage at the origins than those arriving just before - have lower learning rate, and lower English skill levels in the long-run. Columns (7) and (8) replicate these results for alternative "high-Internet" indicator: arrivals after vs. before the biggest increase in coverage.

[16] On panel (b), I combine years since arrival into 2-year bins, since the sample size drops 6-fold.

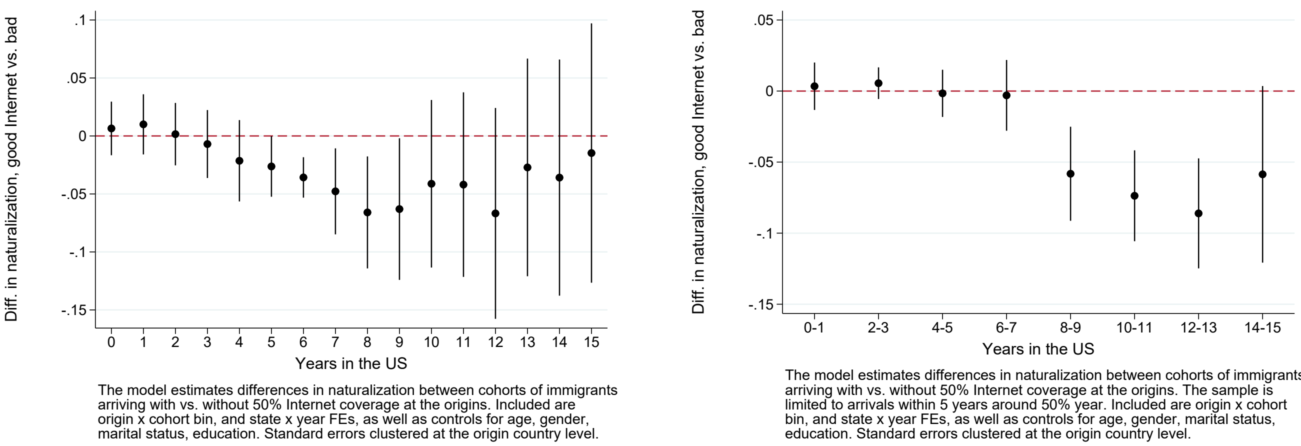
Table 1: Origin-country Internet at arrival and subsequent English learning

VARIABLES	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)
	English Proficiency (1 to 4)							
Log (Years USA)		0.184***	0.183***	0.233***	0.199***	0.218***	0.202***	0.229***
		(0.018)	(0.018)	(0.034)	(0.016)	(0.017)	(0.020)	(0.023)
Internet coverage (% of pop)	-0.251***	-0.205***	-0.214***	-0.035				
	(0.042)	(0.065)	(0.058)	(0.133)				
Log (Years USA) x Internet cover. (%)				-0.089*				
				(0.049)				
Internet reached 50%					-0.028***	0.028		
					(0.010)	(0.021)		
Log (Years USA) x Internet 50%						-0.040***		
						(0.011)		
After max. increase in coverage							-0.046***	0.038
							(0.012)	(0.037)
Log (Years USA) x After max. increase								-0.045**
								(0.020)
Observations	261,702	261,702	261,686	261,686	261,686	261,686	581,880	581,880
Adjusted R-squared	0.368	0.398	0.400	0.400	0.400	0.400	0.444	0.444
Fixed Effects	Origin, Cohort Bin	Origin, Cohort Bin, State, Year	Origin x Cohort Bin, State x Year	Origin x Cohort Bin, State x Year	Origin x Cohort Bin, State x Year	Origin x Cohort Bin, State x Year	Origin x Cohort Bin, State x Year	Origin x Cohort Bin, State x Year

Outcome variable is the level of English Proficiency rated on a scale from 1 ("Does not speak English") to 4 ("Speaks very well"). The Log of years spent in the US captures the concave integration path. Internet coverage (% of pop) measures the share of people with access to the Internet at the origins at the time of migration. Columns (1) to (3) show the average effect of arriving with higher Internet coverage at the origins. Column (4) shows how the pace of language learning changes with better Internet at arrival. Columns (5) and (6) replicate the analysis for the 50% "high-Internet" indicator. Columns (7) and (8) replicate the analysis for the alternative indicator for "high-Internet": arrivals after vs. before the biggest increase in Internet coverage. The sample if always restricted to +/-5 year arrivals around the 50% Internet threshold: the well-balanced sample (+/-5 years around the biggest increase for columns (7)-(8)). Robust standard errors, clustered at the level of countries of origin in parentheses, *** p<0.01, ** p<0.05, * p<0.1

Quantitatively, the long-run (10-15 year since migration) estimates of 0.08 on Figure 6 correspond to 0.25 of a standard deviation of cross-origin differences in English skill among all immigrants. Another way to quantify the slow-down in English learning is in relation to the baseline rate of English learning. Table 1 columns (6) and (8) show that the log rate of English learning slows down by approximately 20% for high-Internet arrivals.

Naturalization rates are also lower for high-Internet cohorts: Figure 7 shows that, on a balanced 5-year window sample, high-Internet cohorts show 6-7 p.p. lower naturalization rates in the long-run. The effects are null for the first 5 years because citizenship requires at least 5 years of permanent residency.



(a) Full sample

(b) 5-year window around 50% year

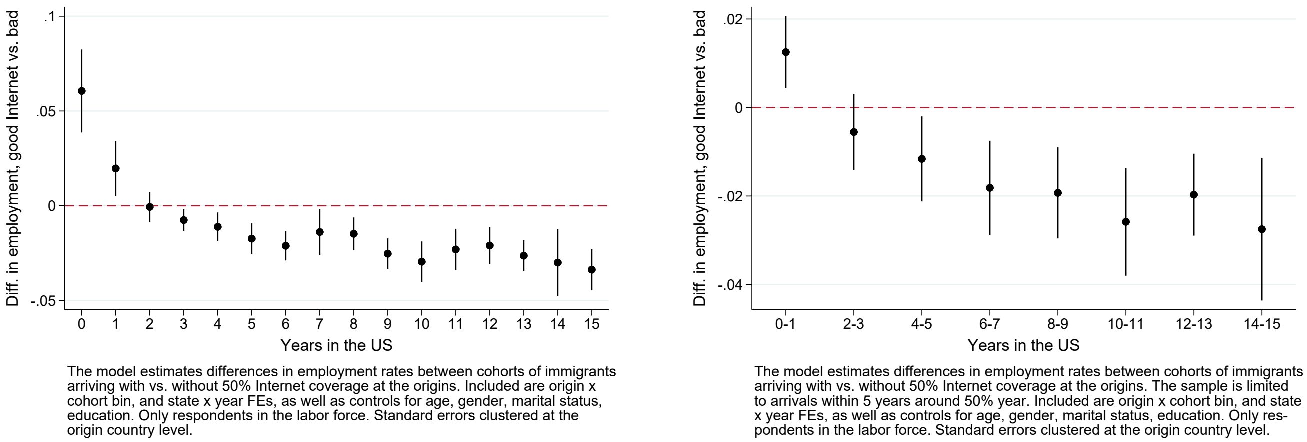
Figure 7: Naturalization dynamics: arriving after vs. before the origin reaches 50% coverage

Economic integration: employment, wages, and occupations

For economic integration of immigrants, I estimate models similar to (2) with employment and log wages as outcomes. The hypothesis is that while high-Internet immigrants can have better initial economic success (due to better information and labor market match), the subsequent slower integration will (over)compensate for the initial gain.

Figure 8 compares the employment rates of high-Internet (50% coverage threshold) and low-Internet arrivals, conditional on being in the labor force[17]. On both panel (a) (full sample), and panel (b) (5-year window around the 50% connectivity year), there is an initial gain in employment: 6% on the full sample and 1.2% on a more balanced sample. However, this initial gain quickly disappears and turns negative in the long-run. On a narrow 5-year window sample, the long-run effect of arriving with better Internet is negative 2-2.5%.

[17]Labor force participation also decreases for high-Internet cohorts, but only in the first 5 YSM.



(a) Full sample

(b) 5-year window around 50%

Figure 8: Probability of employment, differences by origin-country Internet (50%) at arrival

Similar results are observed for the 25% threshold Internet and for the years around biggest connectivity increase. Figure A13 in the Appendix shows similar differences between high- vs. low-Internet cohorts in terms of log-wage dynamics (conditional on being employed). Namely, initial wages are higher for immigrants arriving with good home-country Internet (could be an effect of better labor-market match at arrival), but this advantage disappears and turns slightly negative in the long-run.

Part of the story behind the Internet affecting immigrants' linguistic and overall integration might be related to the types of jobs high-Internet immigrants perform once they find employment. I use data from O*NET on the linguistic, cognitive, and manual skills required to work in various occupations (Caiumi and Peri (2024)), and test whether high-Internet immigrants are slower to take up on jobs that require linguistic, as opposed to other skills.

Overall, with time spent in the US, immigrants are more likely to work in occupations that require linguistic skills, and exit from jobs heavy on manual skills. However, as I show on Figure 9, this process of increasing linguistic content of jobs is slower for high-Internet cohorts of immigrants: in the long-run, high-Internet cohorts work in less speaking-intense jobs.[18] On Figure A14a, I show that the effect is weaker for the cognitive content of jobs, suggesting the effect is driven by language-specific slow-down in integration. Moreover, Figure A14b shows that exit out of manual-intense jobs is significantly slower for high-Internet immigrants.

[18]Similar effects are observed for the threshold around the biggest Internet increase. Moreover, controlling for the language content of jobs accounts for part - but far from all - of the effect of high Internet at arrival on English proficiency. Thus, the slow-down of linguistic integration operates partly through the types of jobs immigrants take, and partly through non-job related mechanisms, more on this in Section 6.

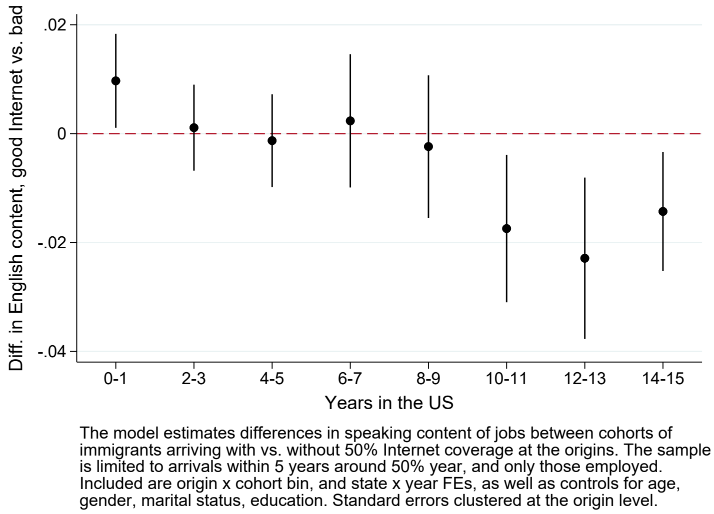


Figure 9: Linguistic content of jobs: differences by origin-country Internet (50%) at arrival

3.3 High-Internet cohorts choose less co-national locations

Physical proximity to co-nationals at destination is an important ingredient in the integration process, e.g., Borjas (1994, 2000), Edin et al. (2003), Beaman (2011), Battisti et al. (2021). How does home-country Internet affect physical proximity of new immigrants to co-nationals at destination? On the one hand, home-country Internet can help new immigrants find and connect with those already at destination, increasing spatial concentration with co-nationals. On the other hand, if home-country Internet provides more information on destination pre-arrival, it can decrease the reliance on the diaspora for information and safety net provision, reducing the incentives to settle in locations with larger diasporas. To test if high-Internet immigrants settle in less co-national locations in the US, I estimate the following model:

$$CoNatSh_{i,o,c(s),t,m} = \gamma \cdot HighInternet_{o,m} + X'_{i,o,c(s),t,m} + \phi_{o,s} + \psi_M + \eta_{c(s)} + \tau_{s,t} + \varepsilon_{i,o,c(s),t,m}, \quad (3)$$

where $CoNatSh_{i,o,c(s),t,m}$ is the share of co-nationals from o in county/PUMA[19] c in state s where immigrant i, who migrated in year m, resides in year t. Importantly, to construct the share of co-nationals in a given unit (county or PUMA) for a given origin, I use population counts from years 2005-2007 (three first years when county/PUMA IDs are available in the ACS). Thus, this model evaluates whether high-Internet immigrants sort into locations with

[19]PUMAs are geographical units designed to address the fact that not all counties can be identified in the ACS data due to data protection reasons. About 22% of immigrants live in non-identifiable counties. In contrast, PUMA IDs are available for all respondents since 2005. There are in total 1079 unique PUMA regions in my ACS immigrants sample, while the number of identified counties is 526.

fewer co-nationals based on the 2005-2007 ACS[20]. As before, $HighInternet_{o,m}$ is a measure of origin-country Internet access at the time of migration.

In addition to previous models, I also include county/PUMA FEs, $\eta_{c(s)}$. To evaluate the effects of the Internet on sorting within states, I add state x origin FEs, $\phi_{o,s}$. Since the goal is to estimate the effects on the initial location choice, I limit the sample to immigrants observed in years 0 and 1 since migration, and those who did not move within or across states (the results are robust to dropping this condition).

Table 2: Origin-country Internet and location choice (share of co-nationals in a county)

	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)
VARIABLES	Share of co-nationals in a county							
50 % Internet reached	-0.006**	-0.001*	-0.001***	-0.001***	-0.001***	-0.003**	-0.003**	
	(0.003)	(0.000)	(0.000)	(0.000)	(0.000)	(0.001)	(0.001)	
Share of Internet users								-0.009**
								(0.005)
Constant	0.039**	0.019***	0.023***	0.024***	0.024***	0.024***	0.029***	0.027***
	(0.019)	(0.003)	(0.001)	(0.000)	(0.000)	(0.000)	(0.001)	(0.002)
Observations	88,768	88,766	88,764	88,206	88,184	88,178	35,286	88,178
Adjusted R-squared	0.063	0.496	0.757	0.888	0.888	0.888	0.908	0.888
Origin FEs	No	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Cohort FEs	No	Yes	Yes	Yes	Yes	Yes	Yes	Yes
County FEs	No	No	Yes	Yes	Yes	Yes	Yes	Yes
State x Origin FEs	No	No	No	Yes	Yes	Yes	Yes	Yes
State x Year FEs	No	No	No	No	Yes	Yes	Yes	Yes
Origin x Cohort FEs	No	No	No	No	No	Yes	Yes	Yes
Sample	0-1 YSM	0-1 YSM	0-1 YSM	0-1 YSM	0-1 YSM	0-1 YSM	0-1 YSM, 5y window	0-1 YSM

This Table gives the estimates of the effect of home-country Internet at arrival on the initial location choice of new immigrants. The outcome variable is the share of co-nationals in the county of residence (available in the ACS from 2005 onwards). The sample is restricted to initial locations (0 or 1 years since migration, and those who did not move within the US). The main explanatory variable is a 0/1 dummy for whether the origin country had reached 50% Internet coverage at the time of migration. An alternative measure used in column (8) is a simple share of home-country Internet users at the time of migration. Column (1) starts with no FEs; column (2) shows a simple TWFE estimator. Subsequent columns add more demanding sets of FEs. Column (7) additionally restricts the sample to +/- 5 years around the 50% threshold. Standard errors, clustered at the origin-country level, in parentheses, *** p<0.01, ** p<0.05, * p<0.1

Table 2 shows that indeed, immigrants arriving with better origin-country Internet tend to select counties with smaller shares of co-nationals. Column (1) starts with the baseline specification, without any FEs, and columns (2)-(6) add progressively more demanding sets of FEs: the results remain qualitatively the same. Column (7) zooms into the +/- 5 years windows around the 50% connectivity threshold (to make treatment and control units more comparable), and finds identical effects. Column (8) shows similar results with a continuous

[20] An alternative is to allow the share of co-nationals to vary over time. The results are qualitatively the same, as the ranking of locations in terms of origin-country representation is relatively stable over time. Another option is to use older censuses (e.g., 1990) to calculate the county-level shares of co-nationals.

measure of home-country Internet access. Data on the county of residence is not available for some respondents, so Table B4 in the Appendix repeats this analysis using the share of co-nationals at the PUMA level - results are slightly weaker but qualitatively unchanged.

Overall, the evidence presented thus far shows dual effects of home-country Internet on immigrants' integration in the US. On the one hand, immigrants arriving just after vs. just before Internet expansion at the origins tend to settle in less co-national locations, reducing ethnic segregation. On the other hand, high-Internet immigrants display lower levels of (i) English proficiency, (ii) naturalization, and (iii) economic success in the long-run, despite lower segregation. Heterogeneity analysis in Section 5 will further explore the interaction of home-country Internet shocks and immigrants' segregation with co-nationals.

3.4 Robustness checks

Correlation between the Internet and development To make comparisons only within (and not across) origin-country groups with different development levels, I allow for separate integration paths for immigrants from OECD and non-OECD countries. The results remain intact, Figure A18.[21] Additionally, I control for GDP per capita, GDP growth, political stability, and corruption at the origins at the time of (and after) migration, to test whether these correlated changes could explain the effects of the Internet. Table B3 shows that the effects of home-country Internet remain negative and quantitatively unchanged.

Balance of the origin × cohort panel Countries of origin where significant Internet expansions happen late in the sample period have only a few post-treatment years, which makes the origin x YSM panel unbalanced (different sets of origin countries for, e.g., 3 vs. 10 years since migration). To amend this issue, I restrict the sample to sending countries with at least 10 years in the high-Internet period. The results remain intact, Figure A20.

Low levels of Internet as treatment and control groups On Figure A24, I show that there is no difference in integration profiles for arrivals just after vs. just before 1% or 10% Internet coverage. Thus, there are no "pre-trends": only large Internet expansions matter. In addition, to avoid control cohorts that get good Internet shortly after arrival, I compare treated cohorts to controls who arrived long before good Internet - the results remain qualitatively the same, Figure A25.

Alternative definitions of "good Internet" Arguably, the 50% threshold for "high-

[21] In the most demanding specification, I allow for origin-specific integration profiles. The results remain qualitatively the same, but somewhat weaken quantitatively, Figure A19.

Internet" status is quite arbitrary, so on Figure A15 I shows that the effects of home-country Internet on linguistic integration are robust to alternative definitions: (i) 25%, and (ii) "after the biggest increase" thresholds.[22] The results remain the same: high-Internet cohorts perform significantly worse than low-Internet cohorts arriving a few years before.[23] I also looked into average speed and average cost of Internet access at the origins as alternative dimensions of connectivity. These measures are very strongly correlated with Internet access.

The scale of dependent variable The main linguistic outcome is an ordinal scale from 1 (does not speak English) to 4 (speaks very well). For robustness, I create a binary variable taking the value of 1 for speaking well / very well, and 0 otherwise. Figure A16 shows that the results remain unchanged.

Educational selection The results are not driven by immigrants with different education levels showing different integration dynamics. On Figure A17 I allow for separate integration profiles by education, and show that the main effects remain intact, especially on the restricted 5-year sample. Thus, education-related selection is not driving the results.

Additional checks The results are robust to: (i) zooming into finer, 3-year windows around Internet thresholds, Figure A21, (ii) keeping only bigger origins, Figure A22, (iii) excluding Mexican immigrants (20% of the sample). To limit the influence of large origins, I collapse the data at the cohort x origin x state x year level. The results remain intact, Figure A23.

The analysis above does not find significant changes in composition or size of immigrant cohorts induced by the Internet. However, the estimates of $\beta_{t-m} \cdot HighInternet_{o,m}$ from model (2) can still reflect both (i) unobservable selection of new immigrants, and (ii) differential pace of integration, holding immigrants' characteristics fixed. To partial out selection/composition effects, I look into post-migration shocks to home-country Internet.

[22]For the "biggest increase", I identify, in each sending country, a year when the Internet coverage increased the most, requiring the jump to be at least 5 p.p., and reaching, eventually, at least 20% coverage.

[23]Figure A12 uses a linear origin-country % of Internet coverage at arrival - same results.

4 Home-country 3G Internet shocks after migration

In this section, I use post-migration staggered arrival of 3G Internet across origin countries to address the remaining concerns over selection/composition effects. Throughout this section, I limit the sample to immigrants who arrived in the US before any 3G/4G Internet was available at the origins. A clear advantage of this approach is that post-migration home-country shocks are exogenous to pre-existing migrants, so the composition effects are muted.

To measure the staggered rollout of 3G Internet across origin countries, I use the Collins-Bartholomew grid-level 3G/4G coverage data (e.g., Guriev et al. (2020) for other uses of this data). Specifically, I merge the mobile coverage rasters for 2006-2019 with population rasters, and calculate the share of origin-country population covered by 3G or 4G technology in each year.[24] As before, I define a given origin country as "high-(3G)Internet" if at least 50% of the population has access to 3G/4G technology.[25]

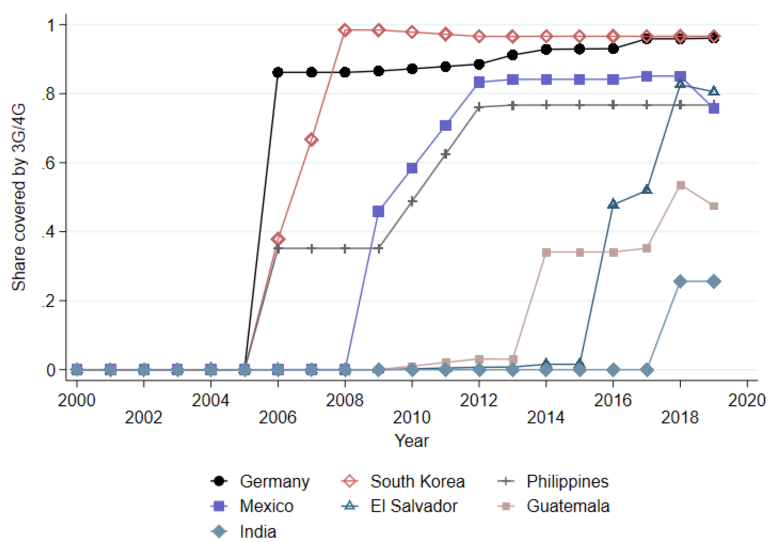


Figure 10: The dynamics of 3G/4G Internet expansion, several countries

Figure 10 shows that (i) 3G coverage expands very quickly once available in a country, and (ii) the timing of 3G deployment varied greatly between countries (the full distribution

[24]For the ongoing additional analysis, I also calculate the shares of population with 3G Internet access at the subnational level, and merge this data with Facebook social ties between US counties of residence and origin-country subnational regions.

[25]In robustness checks, as in the previous Section, I verify that the results are qualitatively similar when I use the 25% indicator for "good 3G coverage". Moreover, since Collins Bartholomew's data is incomplete for come countries, I combine it with the ITU data for 2010 onwards.

of 3G rollout cohorts is given on Figure A26 in the Appendix). Another feature of the 3G (mobile) Internet is that social media (Facebook, YouTube, Instagram, etc.) usage increased drastically post-2007, when mobile Internet started to spread, e.g., Datareportal (2018). By 2018, more than 90% of users were accessing social media platforms using mobile (3G or 4G) Internet.[26] Thus, 3G expansion at the origins grants immigrants access to networking and content consumption opportunities that previously were not there.

For illustration, consider a simple example, where I compare the English skill dynamics of the early-treated immigrants (good 3G coverage at the origins 2-5 years post migration) to that of never-treated: immigrants who never got home-country 3G in their first 10 years in the US. The sample is restricted by 10 years since arrival, so control units remain never-treated. As one can see on Figure 11, there are no differences in integration trajectories between control and treated immigrants before the arrival of 3G for the treated. However, once the treated origin x cohorts receive good 3G, their integration dynamics slows down relative to that of control immigrants.

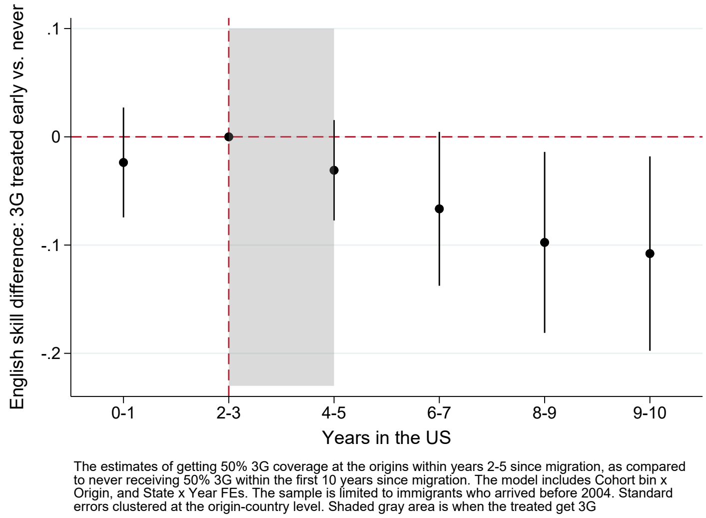


Figure 11: Linguistic integration: effect of home-country 3G shocks 2-5 years after migration. Control group: never treated in the first 10 years.

In the Appendix, Figure A27 conducts similar comparisons of (i) early-treated vs. later-treated (home-country 3G arrives 6-9 years post-migration), and (ii) later-treated vs. never-treated. One can see on panel (a) that early-treated and later-treated are comparable in the pre-periods, but once treated, early-treated integrate slower. Moreover, once the later-

[26]According to Bond Internet Trends (2019), in the US, from 2008 to 2018, time spent on digital media increased from just below 3 to just over 6 hours, exclusively due to access via mobile devices.

treated group receives good 3G, there is no further change in the dynamics, suggesting that 3G shocks happening in the early years post-arrival matter most. Consistent with this hypothesis, on panel (b) there is no significant difference in the integration dynamics between immigrants treated late in their tenure in the US and those never-treated by good home-country 3G.

4.1 Fully flexible event study of post-migration 3G shocks

For my main analysis, I implement a fully flexible event-study approach. I limit the sample to immigrants who arrived in the US from 2001 to 2005 (a 5-year cohort bin just before the 3G era), and estimate the following DID model on the data collapsed to the origin x arrival cohort x treatment cohort x year level[27]:

$$Y_{o,t,m} = \sum_{k=-K}^{-2} \beta_k^{lead} \cdot D_{o,t}^e + \sum_{k=0}^{L} \beta_k^{lag} \cdot D_{o,t}^e + X'_{o,t,m} + \phi_{g(o)} + \tau_t + \psi_m + \varepsilon_{o,t,m}, \tag{4}$$

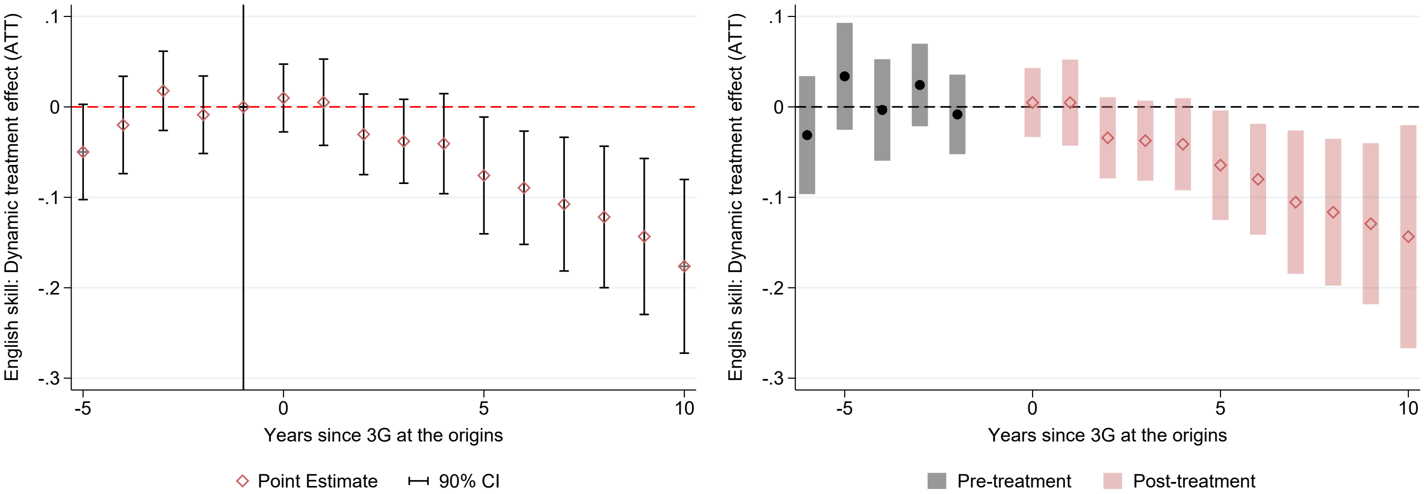
where $g(o)$ stands for the treatment cohort (when 3G expanded for a given origin o), and $D_{o,t}^e = \mathbb{1}[t - g(o) = k]$ is an indicator that exactly k years have elapsed since treatment. Coefficients β_k^{lead} and β_k^{lag} capture pre-treatment differences (pre-trends) and the dynamics of post-treatment effects. To avoid making "forbidden comparisons" (when early-treated cohorts are used as controls for the later-treated ones), I implement the Callaway and Sant'Anna (2021) approach. Thus, for each treatment group g, I only use never-treated and not-yet-treated cohorts as controls.[28]

Figure 12 gives the main event study DID estimates of post-migration home-country 3G shocks on immigrants' English proficiency. Panel (a) shows the baseline event study estimates, while panel (b) uses the Callaway and Sant'Anna (2021) estimator. Both panels show the absence of pre-trends, and a negative effect of origin-country 3G on treated immigrants' English proficiency. As one would expect, guided by standard learning models (and by the results from previous sections), the effects take time to accumulate.

Importantly, the strategy above does not restrict the number of years between the 3G shock and arrival, so the effects for later-treated immigrants can be muted, watering down the average estimates. To show that 3G shocks early post-arrival matter the most, Figure 13 reports the estimates for two types of comparisons. On panel (a), the treated groups is

[27] I partial out demographic controls before collapsing the data.

[28] Since the effects of home-country 3G expansion on immigrants social and economic integration take time, I exclude those treated (by good 3G) after 2017 from the treated group. The results are robust to keeping these units in the treated group.

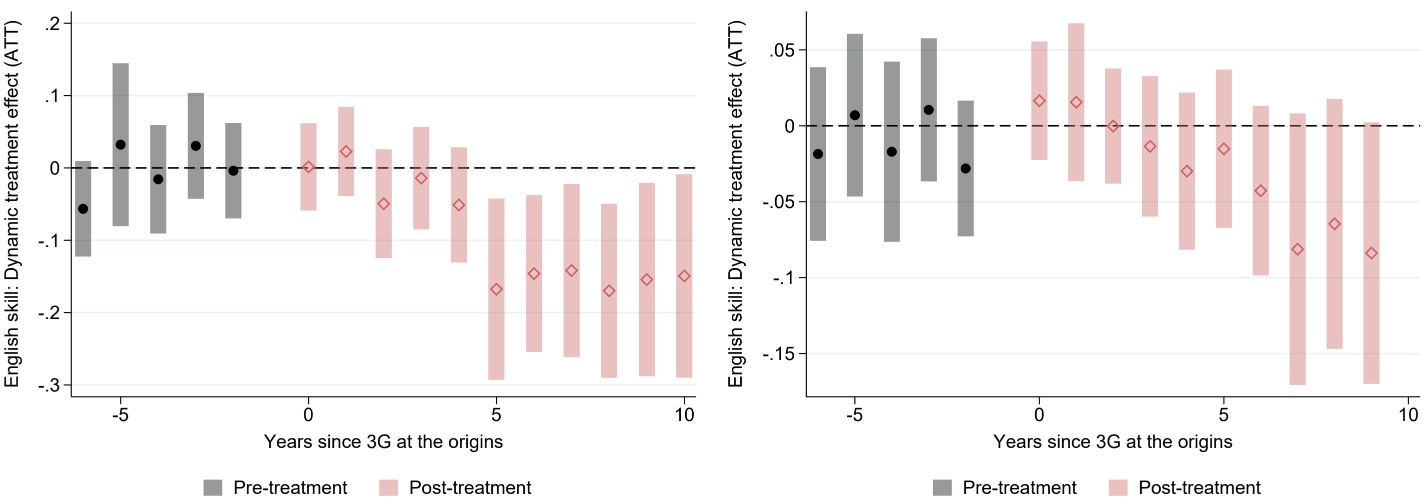


(a) Baseline event-study

(b) Callaway and Sant'Anna (2021) estimator

Figure 12: Event study: effect of the home-country 3G rollout on English skill of immigrants.

defined as those immigrants whose origins got 3G 1 to 5 years post migration, and those immigrants who got 3G 6-10 years after migration are omitted. On panel (b), in contrast, the early treated (1-5 YSM) immigrants are omitted. Clearly, almost the entire effect comes from immigrants receiving home-country 3G early on post arrival.



(a) Early treated

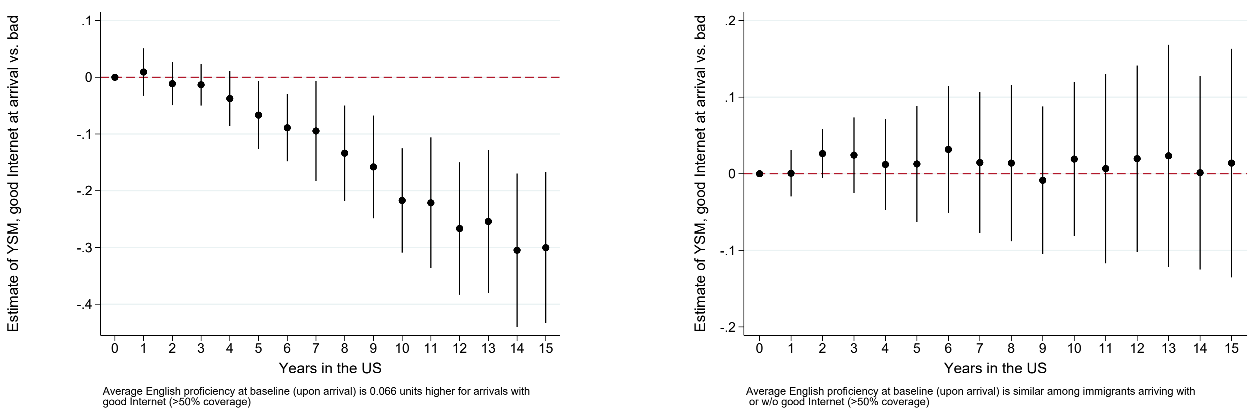
(b) Later treated

Figure 13: Event study: effect of the home-country 3G rollout on English skill of immigrants. Panel (a) received home-country 3G 1-5 years post-migration. Panel (b) receive 3G later.

5 Heterogeneous Effects of Origin-country Internet

There are several important dimensions of heterogeneity in how origin-country Internet affects immigrants' integration. This section explores heterogeneity with respect to the characteristics of (i) individuals, (ii) destination locations (counties, etc.), and (iii) origins.

Education and language skill I document that the bulk of the effect found in Sections 3 and 4 is driven by the less-educated immigrants. Figure 14 shows a very clear pattern: high-Internet cohorts learn English slower, but the entire effect is driven by lower-educated immigrants (high school (or less) and college dropouts). There is no effect of home-country Internet on immigrants with completed tertiary education. Thus, home-country Internet expansions widen the gaps between low- and high-skilled immigrants.[29]



(a) College dropouts, high school, or less

(b) College or higher

Figure 14: Effects of origin-country Internet: differences across education levels

To partial out selection effects, I replicate the post-migration 3G shocks analysis of Section 4: I limit the sample to immigrants who arrived before any 3G Internet, and estimate the effects of staggered home-country 3G expansion using the Callaway and Sant'Anna (2021) event study design. Figure A29 confirms that the effect is stronger for the lower-educated.

Notably, the effects of home-country Internet at arrival on subsequent naturalization display a very different heterogeneity: the entire effect is driven by immigrants with tertiary education, Figure A30 in the Appendix. This is intuitive, as getting US citizenship requires passing a test and demonstrating a certain level of English skill.[30] And indeed, the entire

[29]Similar heterogeneity is observed when dividing immigrants by English skill level (the negative effect of the home-country Internet comes from the lower end of the skill distribution), see Figure A28.

[30]Brettell (2020) and Hainmueller et al. (2018) show that that low-income and lower-educated immigrants

effect on naturalization comes from the higher-educated immigrants (similarly, the effects are much stronger within the upper part of the English skill distribution).

Age at migration It has been documented before (Bleakley and Chin (2010)) that under age 7 arrival ensures that children immigrants learn English very well. And indeed, there are no differences stemming from origin-country Internet at arrival for those arriving as young children, see Figure A31. Moreover, there are large differences in home-country Internet effects between under-30 vs. over-30 arrivals. The younger arrivals drive the results, while the older arrivals experience almost no effect of home-country Internet, Figure A32. This can be explained by the fact that younger immigrants are (i) more likely to use social media, and thus engage with origin-country content, and (ii) having more elastic integration dynamics to begin with.

Size of the local diaspora As long as the effect of origin-country Internet on immigrants' integration operates via sacrificing ties with natives in favor of that with the origins, one can expect the effect to be stronger for immigrants living in communities where immigrants were more likely to interact with natives to begin with. On the other hand, regions with larger international diasporas might also be more welcoming to immigrants overall, which can work in the opposite direction. Analysis in the Supplementary Appendix verifies that this is indeed the case: I subdivide PUMA localities into two groups, large- vs. small-diaspora PUMAs, and find that the negative effect of home-country Internet on English skill and naturalization is stronger in small-diaspora PUMAs.

Hispanic and Asian origins A large proportion of immigrants in the US originate from the Americas and, more recently, from South and East Asia. Moreover, in some locations, high levels of concentration of Spanish-speaking residents lower the incentives to invest in local linguistic skills. Whether the effects of home-country Internet are stronger or weaker for Hispanic / Asian or other minorities is an empirical question. Analysis in Supplementary Appendix shows that the negative effects of home-country Internet are stronger for Hispanic populations and weaker for Asian populations, other things equal[31].

face larger barriers to citizenship, even when eligible for naturalization. In the ACS data, the citizenship take-up rates of lower-educated immigrants are almost twice as small as for the higher-educated ones.

[31]This can at least partly reflect differences in education levels, starting English skills, etc.

6 Mechanisms

6.1 Home-country Internet and switch to cheaper ICTs

Do immigrants (and those left behind) switch to cheaper ICTs once the Internet becomes available? To test this, I combine the ITU Internet data with TeleGeography data on the volume of traditional international calls, and with Facebook usage data from Google Trends.

Switch away from traditional calls

Before the Internet, the main mode of cross-border communication was through carrier-based phone calls. In the 1990s, the US international call prices averaged more than 1 dollar per minute, with some destinations at 3-5 dollars per minute (TeleGeography 2023). Once the Internet and cheaper VoIP (voice over IP) tools like Skype become available at the origins, do we see a decline in traditional calls? To test this empirically, I use data from TeleGeography on the volume of international phone calls between the US and all other countries[32]. I estimate the effect of origin-country Internet on the (natural log of) calls with the US, accounting for country and year FEs. I cluster SEs at the origin country level.

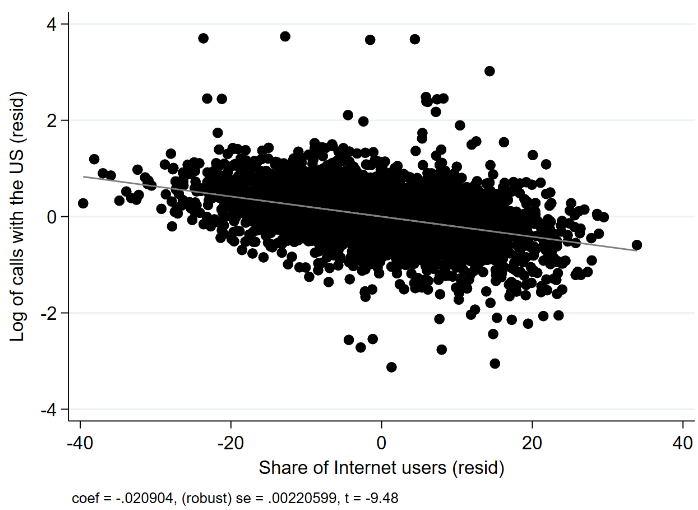


Figure 15: Log of calls with the US and spread of the Internet at the origins

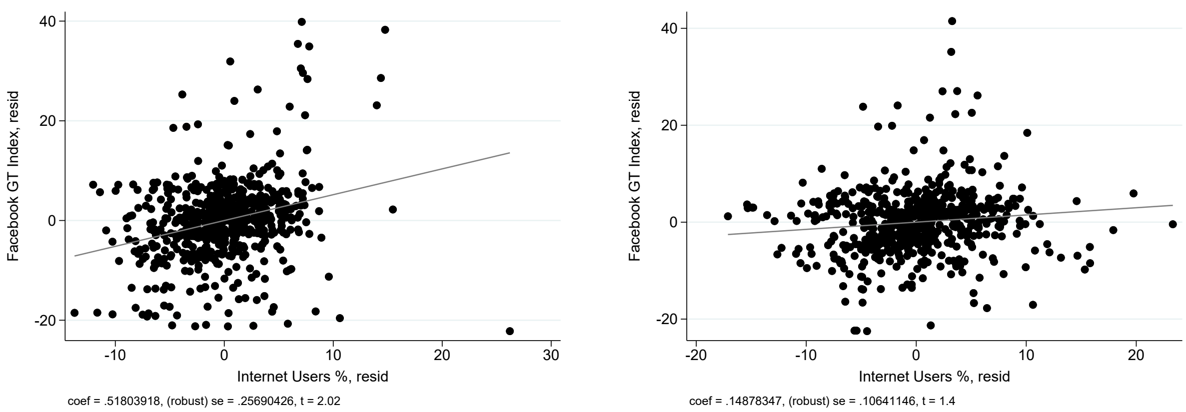
Figure 15 reveals a very clear substitution pattern: an increase in the Internet availability decreases reliance on traditional carrier calls to the US. Table B5 in the Appendix further

[32]Figure A6b shows that the US-OECD calls plateaued after 2005 (when OECD countries reached good Internet). In contrast, developing countries continued to see rapid growth in traditional calls up until 2012. Figures A8-A9 show that traditional calls dropped sharply in high-Internet countries once Skype started to spread after 2005. For late-adopters, the decline in calls happened only when the Internet usage picked up.

shows that the effect of Internet is amplified by the growth of Skype's international calls market share. Importantly, while reaching 25% and 50% Internet penetration has large effects on traditional calls, reaching 10% Internet is not sufficient (null effect).

Switch towards new ICTs

Once origin-country Internet expands, there a switch to cheaper online ICTs. To measure Facebook's popularity at the origins, I use data from Google Trends (GT). I calculate search intensity for a given keyword - "Facebook" - by country and month over a period from early 2004 to today. The measure scraped from GT is made relative to the highest point across all countries and time periods (Turkey in November 2012). As Facebook's global reach expanded after 2007, the GT search index grew until reaching its peak in early 2010s. Figure A10 shows the dynamics of interest in Facebook and breaks it down by net emigration rates. At the peak, high-emigration countries display 60% more interest in Facebook.



(a) High net emigration

(b) Low net emigration

Figure 16: Facebook usage in sending counties and Internet access, by net emigration

Figure 16 shows that Facebook usage across sending countries responds positively to growing Internet access (country and year FEs included). However, the effect is most pronounced for high-emigration countries. Thus, better Internet at the origins leads to a substitution away from traditional calls with the US, and towards new ICTs like Facebook.

6.2 Changes in Time Use

Does growing Internet access at the origins transform how immigrants spend their time on socializing locally vs. sticking to their old ties? To document the effects of post-migration shocks to home-country Internet on immigrants' networking behavior, I use the American

Time Use Survey (ATUS) data from 2003 (first available) to 2019. Specifically, I use the 3G post-migration shocks as my treatment variable and estimate the following model:

$$Y_{i,o,s,t,m} = \beta \cdot Connect_{o,t} + X'_{i,o,d,t} + \phi_o + \psi_m + \tau_{s,t} + \varepsilon_{i,o,s,t,m}, \tag{5}$$

where $Y_{i,o,s,t,m}$ is a measure of time spent on a given activity (e.g., calls to family, time on computer for leisure, or socializing locally in the US) by immigrant i from origin-country o, living in state/county s, observed in year t, who migrated to the US in year m. $Connect_{o,t}$ is a measure of origin-country 3G Internet penetration in a given year. As before, I focus on immigrants who arrived in the US before any 3G was available at the origins, to sidestep any concerns over the Internet affecting selection into migration[33].

Table 3 focuses on immigrants who arrived in the US after 2002 but before their origins get any 3G (to ensure that treatment arrives relatively early on in their tenure in the US) and shows that once an origin country gets sufficiently good 3G Internet, immigrants increase time spent on calls to their families (columns (1)-(3)), but decrease time spent on local socialization and communications (columns (4)-(6)). The effects are strongest for the 25% indicator, suggesting that it is the early phase of 3G adoption that matters most.

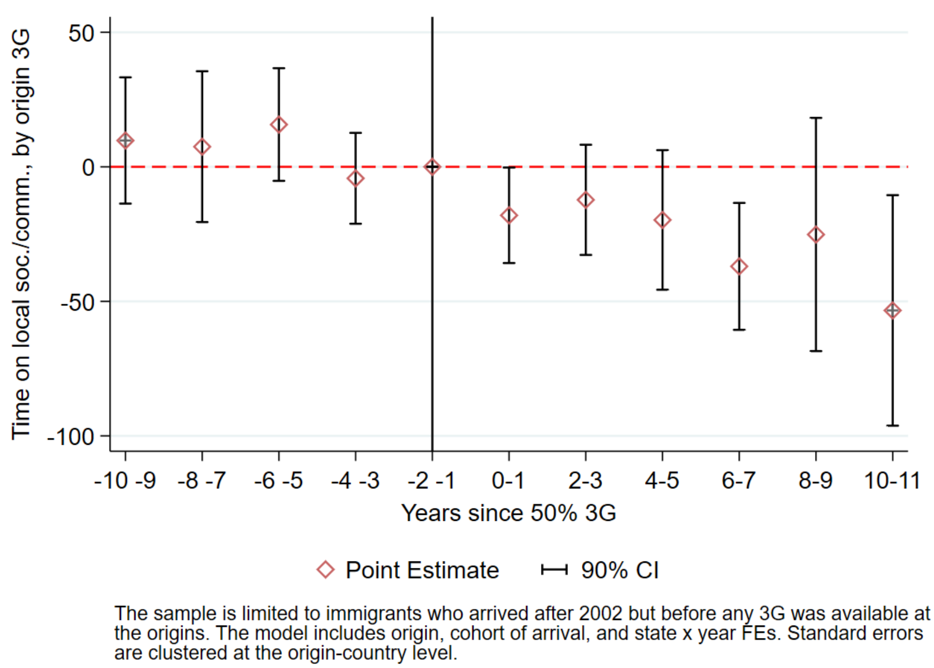


Figure 17: Event study: origin-country 3G and immigrants local socialization and communication.

[33]In additional robustness, I also verify that controlling for the overall Internet access, or conditioning on having similar overall Internet access at arrival does not change the effects of post-migration 3G shocks.

Table 3: Effect of origin-country 3G Internet on immigrants' networking

VARIABLES	(1)	(2)	(3)	(4)	(5)	(6)
	Time on family calls			Time on local soc. and comm.		
3G coverage (% of pop)	3.689**			-31.652*		
	(1.679)			(17.221)		
Reached 50% 3G		1.053			-11.800	
		(1.360)			(10.217)	
Reached 25% 3G			2.498**			-17.847**
			(0.967)			(8.086)
Constant	0.512	1.387	0.411	73.905***	67.398***	72.819***
	(1.739)	(1.771)	(1.767)	(12.149)	(11.068)	(12.353)
Observations	2,526	2,526	2,526	2,526	2,526	2,526
Origin FEs	Yes	Yes	Yes	Yes	Yes	Yes
Cohort FEs	Yes	Yes	Yes	Yes	Yes	Yes
State x Year FEs	Yes	Yes	Yes	Yes	Yes	Yes

Outcome variables in each column stand for the total amount of time per day (in minutes) spent on a given activity. Columns (1)-(3) – calls to the family. Columns (4)-(6) – overall time on local socialization and communication. While all treatment variables – continuous increase in the share of population covered by 3G, as well as a 25% and a 50% dummy variables – display a similar sign of the effect, the results seem to be driven by the early phases of 3G adoption (hence the 25% indicator more significant). Robust standard errors, clustered at the level of origin country in parentheses, *** p<0.01, ** p<0.05, * p<0.1.

To illustrate the dynamics of these effects, Figure 17 focuses on local socialization and communication as an outcome, and depicts the estimates from a dynamic event-study version of model (5). While there are no significant pre-trends, the post-3G periods show a significant decline in treated immigrants' time spent on local networking. In the Appendix, Figure A34 performs the Callaway and Sant'Anna (2021)'s correction, comparing 3G-treated immigrants to only never-treated (Panel (a)) or also not-yet-treated (Panel (b)). Thereby, these estimates do not use "forbidden" comparisons of later-treated using earlier-treated as controls. The results, while noisier, remain quantitatively the same.

Table B6 in the Appendix replicates these results with the simple ITU measure of the overall Internet access, and reports very similar results for a larger collection of outcomes: (i) messages, emails, family calls, etc. tend to increase, and (ii) socialization and leisure, communications outside of home, time in other's homes tend to decrease. Panel A shows that the effects are driven by relatively recent immigrants (who arrived in the "digital era", after 2003). Panel B shows that for pre-2003 immigrants, the effects are almost absent.[34]

[34] Figure A33 in the Appendix shows that the effects on telephone calls, messages and emails by immigrants is driven by post-2008 years (when Skype pushed out traditional international calls, and when Facebook started to expand, Section 6.1). All the effects are stronger for younger people.

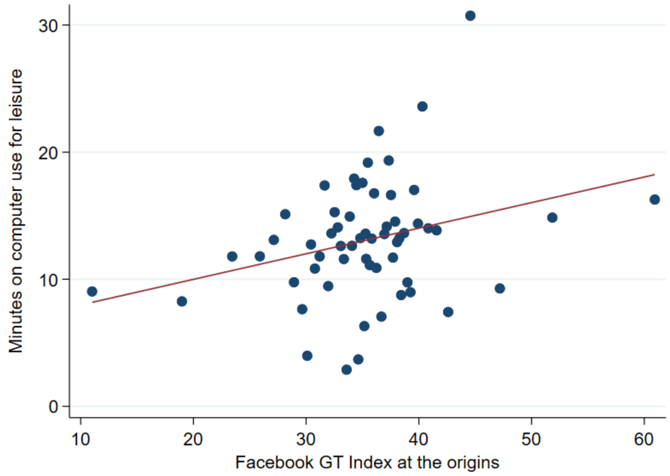


Figure 18: Binscatter: effects of origin-country facebook usage on computer leisure time. With origin and state x year FEs.

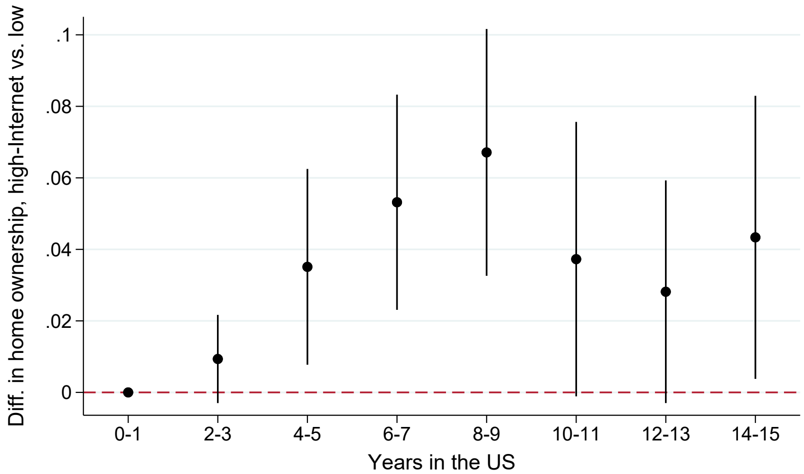
Using the Google Trends data on Facebook usage at the origins, I also find that immigrants' use of computers for leisure increases sharply with the spread of Facebook at the origins. Figure 18 illustrates this effect.[35]

6.3 Immigrants' planning horizon and intentions to stay

Another potential mechanism through which the Internet slows immigrants' social integration is its impact on immigrants' planning horizon at the destination. If an immigrant does not intend to stay long-term, there is less incentive to invest in local human capital (e.g., local language) or citizenship acquisition. I use two pieces of evidence to test whether home-country Internet affects immigrants' intentions to stay.

First, I use the ACS data on immigrants' home ownership - a proxy for immigrants' commitment to stay in the US, - and test whether there is any difference in transitioning from renting to owning property between high-Internet vs. low-Internet arrival cohorts. Figure 19 shows that high-Internet immigrants display faster transition from renting to owning property. I find similar results using (i) 25% or (ii) largest increase in coverage as thresholds, and conditioning on economic standing of immigrants.

[35]The measure of Facebook usage here is based on the Google Trends data introduced in Section 6.1. I extend the GT Index with its maximum value for each country for all years past the year of pick popularity (as Facebook usage does not decline, but simply grows slower afterwards). As before, this effect is driven by immigrants who arrived after 2003. The effect of Facebook is stronger than that of simple Internet access.



The model estimates differences in home owning vs. renting between cohorts of immigrants arriving with vs. without 50% Internet coverage at the origins. The sample is limited to arrivals within 5 years around 50% year. Included are origin x cohort bin, and state x year FEs, as well as controls for age, gender, marital status, education. Standard errors clustered at the origin country level.

Figure 19: Home ownership: arriving after vs. before the origin reaches 50% coverage

Second, I supplement the ACS analysis with the the Gallup World Poll (GWP) data, covering most destination and sending countries worldwide since 2006. I use GWP variables on whether immigrants (i) want to move permanently to another country, and (ii) if yes, whether this country is their home country. I evaluate the effects of home-country Internet access (using the ITU Internet coverage data, and, for robustness, the Collins Bartholomew's 3G coverage) on immigrants return intentions. In all specifications, I account for Origin FEs, as well as Destination x Year FEs.

Table 4 shows that on average across all origin and destination countries, there is a negative but insignificant effect of home-country Internet coverage on return intentions. However, the effect is significantly negative for certain population subgroups: (i) married immigrants, (ii) those with less education. Reassuringly, there is no effect of home-country Internet on immigrants without local Internet access.

The evidence presented suggests that growing home-country Internet access increases immigrants' intentions to stay in their host country. This effect may stem from the growing opportunity to maintain connections with the origins without needing to return. Overall, changing return intentions do not appear to drive the observed slowdown in immigrants' social and economic integration. If anything, stronger intentions to stay might serve as a positive force for integration over the long term.

Table 4: Effect of origin-country Internet on immigrants' return intentions (Gallup data).

VARIABLES	(1)	(2)	(3)	(4)
	Want to move back to the home country			
Internet coverage (% pop)	-0.027	-0.009	-0.024	-0.042
	(0.020)	(0.021)	(0.021)	(0.028)
Internet coverage (% pop) x Married		-0.030***		
		(0.008)		
Internet coverage (% pop) x Less educated			-0.020***	
			(0.008)	
Internet coverage (% pop) x No local Internet				0.025**
				(0.012)
Constant	0.103***	0.095***	0.094***	0.116***
	(0.011)	(0.010)	(0.010)	(0.013)
Observations	82,100	82,100	82,100	50,073
Adjusted R-squared	0.065	0.065	0.065	0.059
Origin FE	Yes	Yes	Yes	Yes
Destination x Time FE	Yes	Yes	Yes	Yes
Individual Controls	Yes	Yes	Yes	Yes

The main outcome variable is an indicator for whether a respondent wants to move back to his or her home country, constructed from two questions: (i) whether a respondent wants to move, and (ii) if yes, to which country. The value of 1 means that a respondent want to move, and the target country is his or her home country. The value of 0 is given to all immigrants who either do not want to move, or want to move a non-origin country. The main explanatory variable is the share of origin-country population with access to the Internet. Robust standard errors clustered at the origin-country level in parentheses, *** p<0.01, ** p<0.05, * p<0.1.

7 Additional Results

In this section, I provide additional evidence on the effects of origin-country Internet on (i) immigrants' subjective well-being, and (ii) several dimensions of cultural selection.

7.1 Immigrants' subjective well-being and home country Internet

One of the Section 8 model's predictions is that growing origin-country Internet allows immigrants to move out of the corner solution (no contact with the origin) into an interior solution with a better mix of local and origin-country contacts. Thus, the model predicts that origin-country Internet expansion increases immigrants' utility / happiness, creating a trade-off between immigrants' happiness and social integration at destination[36].

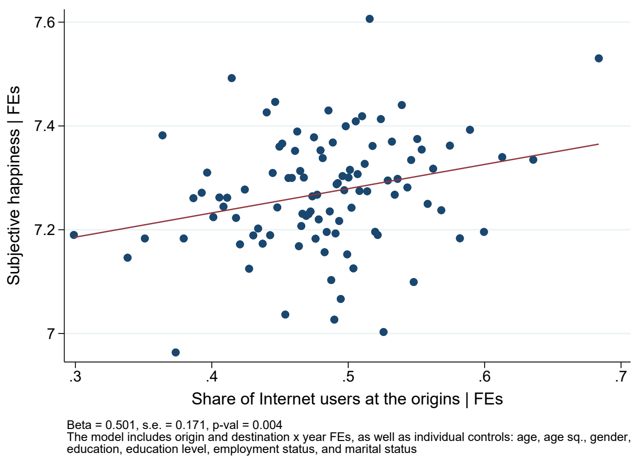
To explore the relationship between Internet access at the origins and immigrants' sub-

[36]Online access to origin-country friends, family, and information has two effects. On the one hand, it can reduce immigrants' local networking and slow down linguistic and social integration - as documented above. On the other hand, due to cultural attachment to home-country networks, having online access to the origins can increases immigrants' well-being.

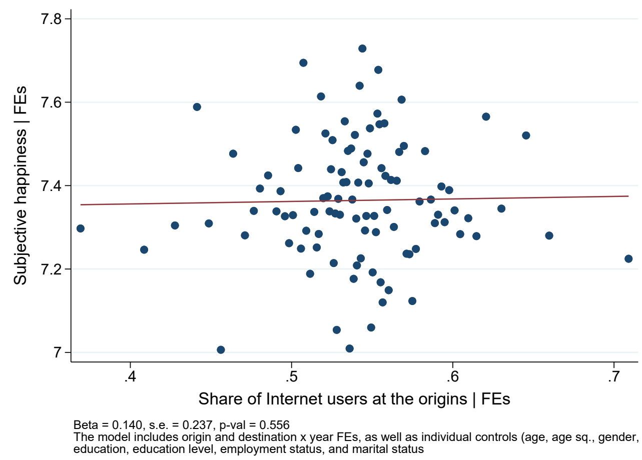
jective well-being, I rely on the European Social Survey (ESS) data from 2002 to 2019 (nine rounds of surveys). I use the following question: "Taking all things together, how happy would you say you are?" ranging from 0 (extremely unhappy) to 10 (extremely happy). As additional outcomes, I also use questions on life satisfaction, general health (physical and mental) and specific health issues, including mental health issues[37]. Combining the ESS data with the ITU data on the origin-country shares of Internet-users, I estimate a simple model where the level of immigrants' happiness / health depends on the origin-country Internet:

$$Y_{i,o,d,t} = \beta \cdot Connect_{o,t} + X'_{i,o,d,t} + \phi_o + \tau_{d,t} + \varepsilon_{i,o,d,t} \tag{6}$$

where $Y_{i,o,s,t}$ is a well-being outcome of immigrant i from country o, living in destination country d, observed in year t. The model allows for destination $\times$ year shocks $\tau_{d,t}$, and fixed differences across origins, ϕ_o. Individual controls $X'_{i,o,d,t}$ include gender, age and age squared, education, marital status and employment status. As before, $Connect_{o,t}$ is a measure of origin-country Internet access.



(a) First-gen immigrants



(b) Second-gen immigrants

Figure 20: Binscatter: effects of origin-country Internet on immigrants' happiness, ESS data.

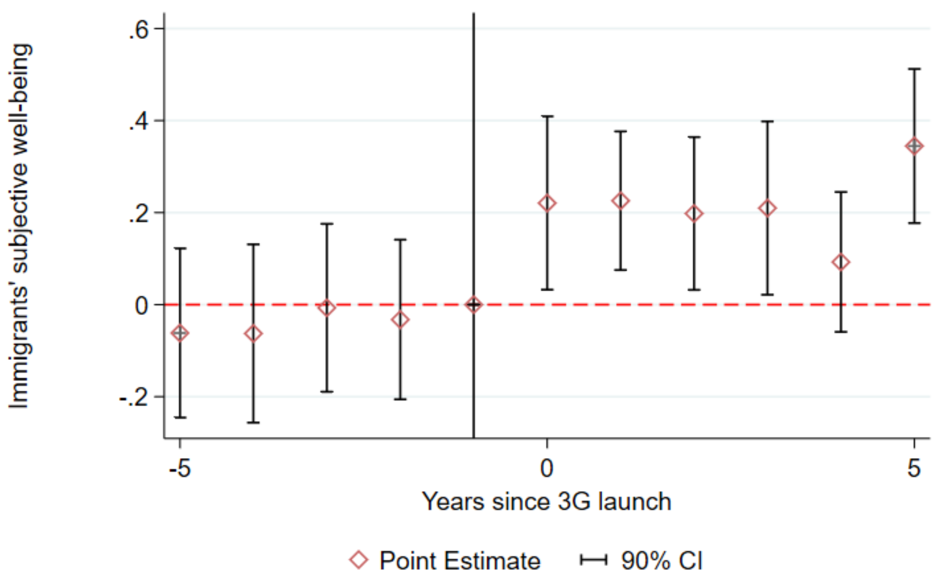
Table B7 in the Appendix shows that there are strong positive effects of home-country Internet on immigrants' happiness on the combined sample of 1st and 2nd-gen immigrants. However, as revealed by Figure 20, the entire effect is driven by the 1st-gen immigrants.

[37]Question on general health reads "How is your health (physical and mental health) in general?", ranging from 1 (very bad) to 5 (very good). The question on specific health issues reads "Are you hampered in your daily activities in any way by any longstanding illness, or disability, infirmity or mental health problem?", ranging from 1 (No), to 3 (Yes, a lot). Both scales were recoded to make them increasing.

Table B7 also shows positive effects on life satisfaction, general health, and lower incidence of health issues. Importantly, the effects are robust to restricting the sample to immigrants who arrived at destination before the year 2000 (before the global spread of the Internet). Thus, these effects are unlikely to be driven by the changing composition of immigrants.

Within the 1st-gen immigrants, home-country Internet has a weaker effect on happiness when immigrants live at destination with their parents, suggesting part of the effect operates through contacts with family left behind. Moreover, immigrants reporting higher importance of family and traditions experience slightly stronger effect of home-country Internet on happiness. In addition, more integrated immigrants (as measured by citizenship acquisition or destination-country language use at home) experience a weaker effect of home-country Internet on their happiness levels. Figure A35 in the Appendix documents these results.

To improve the identification, I use the staggered rollout of 3G/4G Internet across origin countries to test if sharp connectivity shocks affect immigrants' subjective well-being. Figure 21 reports the estimates from a standard staggered rollout event-study: there are clear positive effects of the emergence of 3G at the origins on immigrants' well-being. The sample is restricted to immigrants who arrived before 2006 (when global spread of the 3G began).



Main treatment variable is the number of years since the first launch of 3G or 4G Internet at the origins. The model includes standard individual controls, as well as origin and destination x year FEs. Standard errors are clustered at the origin-country level. The sample is restricted to pre-2006 arrivals.

Figure 21: Event study: effects of origin-country 3G emergence on immigrants' SWB

Importantly, since older immigrants might be under-utilizing digital tools, one can expect to see a weaker effect of home-country Internet on older immigrants. Indeed, after dividing the sample into two halfs (around age 51), I find that the entire effect of home-country 3G adoption on subjective well-being is driven by younger immigrants, Figure A36. Finally, the TWFE estimates in Table B8 in the Appendix reveal that 3G Internet expansion at the origins increases both immigrants' happiness and health. In contrast to Internet's effects on social integration, the effects on subjective well-being come from the early spread of 3G (first adoption, 10%), not 25-50% thresholds of 3G coverage[38].

Overall, this section emphasizes an important trade-off: immigrants' slower social integration vs. their better subjective well-being following home-country Internet improvements.

7.2 Is there a cultural selection effect of home-country Internet?

To assess the role of cultural selection effects driven by origin-country Internet access, I use data from the European Social Survey (ESS), which includes a range of questions on social, political, and cultural dimensions. Similar to the analysis in Section 3.3 on immigrants' location choices at arrival, I test whether high-Internet immigrant cohorts differ systematically from low-Internet cohorts across cultural and political domains. To minimize the influence of cultural assimilation (see, among others, Giavazzi et al. (2019) for the dynamics of cultural assimilation), I restrict the sample to recently arrived immigrants (within five years of arrival). I estimate is the following model:

$$CultValues_{i,o,d,t,m} = \beta \cdot Connect_{o,t} + X'_{i,o,d,t,m} + \phi_o + \tau_{d,t} + \psi_m + \varepsilon_{i,o,d,t,m}, \tag{7}$$

where $CultValues_{i,o,s,t,m}$ stands for one of the cultural values of immigrant i from country o, living in destination country d, observed in year t, who migrated in year m[39]. The model allows for destination × year shocks $\tau_{d,t}$, and fixed differences across origins, ϕ_o, and arrival cohorts, ψ_m. Individual controls $X'_{i,o,d,t,m}$ include gender, age and age squared, education, marital status and employment status. As before, $Connect_{o,t}$ is a measure of origin-country Internet access, where I use both the general share of Internet users, as well as the 3G expansion shocks at the origins.

According to the model in the Appendix, the hypothesis is that growing home-country Internet access reduces cultural costs of separation from the origins, thereby increasing the

[38]The reason for this discrepancy might be that the effects on subjective well-being are immediate, while the effects on integration take more time and require a larger part of the network to go online.

[39]Note that in the ESS data, specific year of migration is only available in rounds 5-9, so the sample here is (i) smaller, and (ii) represents years 2010-2019.

prevalence of immigrants more attached to the origins. However, Figure A37 in the Appendix shows no significant effects of home-country Internet access - whether overall Internet access or 3G Internet - on immigrants' cultural traits upon entry, based on ESS data[40]. If anything, immigrants arriving after the spread of 3G at the origins tend to be slightly more liberal. This finding aligns with the positive upon-entry effects of home-country Internet on education and English skills reported in Section 3. Overall, there is no evidence of selection based on traditional values, which could have negatively influenced average linguistic skills of immigrants at destination.

[40]Results are robust to using various thresholds of the overall or 3G Internet access.

8 Conclusion

A common belief is that globalization erases communication barriers, fastens integration, and makes individuals less "ethnic". Moreover, conventional wisdom suggests that immigrants from better connected countries would have an advantage. This paper explores in detail the effects of home-country Internet expansion on immigrants integration. I document how an access to cheap cross-border ICTs can slow down the process of immigrants' socio-economic integration, such that immigrants from better connected countries and better connected cohorts can be worse off in terms of integration.

In particular, the main finding is that increased home-country Internet access lowers the pace of immigrants' social (English proficiency and naturalization) and economic (employment, wages) integration. Importantly, these effects are most pronounced for low-skilled immigrants, implying that home-country Internet can further widen the gaps between low- and high-skilled immigrants. The effects are driven by changing immigrants' networking patterns: decrease in local socialization and increase in communications with the origins.

On the other hand, growing origin-country Internet tends to increase immigrants' subjective well-being and health, and makes them settle in less co-national locations at destination, reducing ethnic segregation. These results emphasize potential short-run and longer-term trade-offs of Internet expansion, both for immigrants, and for receiving communities. In particular, one can expect that in the long-run, decreasing clustering with co-nationals can offset the negative short-run effects of home-country Internet, see also Battisti et al. (2021). On the other hand, decreasing socialization and networking by locals (the "bowling alone" phenomenon) can be another force that prevents immigrants' integration, from the supply, not the demand side. The interaction of these forces can be explored in subsequent works.

One question remaining open for policy is how to address the fact that new ICTs can lock immigrants in their origin-country online bubbles? One avenue might be to expand language training programs and provide more incentives for immigrants' participation, given the evidence on high returns to such programs, Foged et al. (2022), Heller and Mumma (2023). Moreover, future research can explore potential ways of using the Internet to foster, not restrict, immigrants' integration: providing information about integration processes (Batista et al. (2022)), language learning apps, and community building networks.

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Online Appendix

to

"Does the "Melting Pot" Still Melt? Internet and Immigrants' Integration"

A. Additional Figures

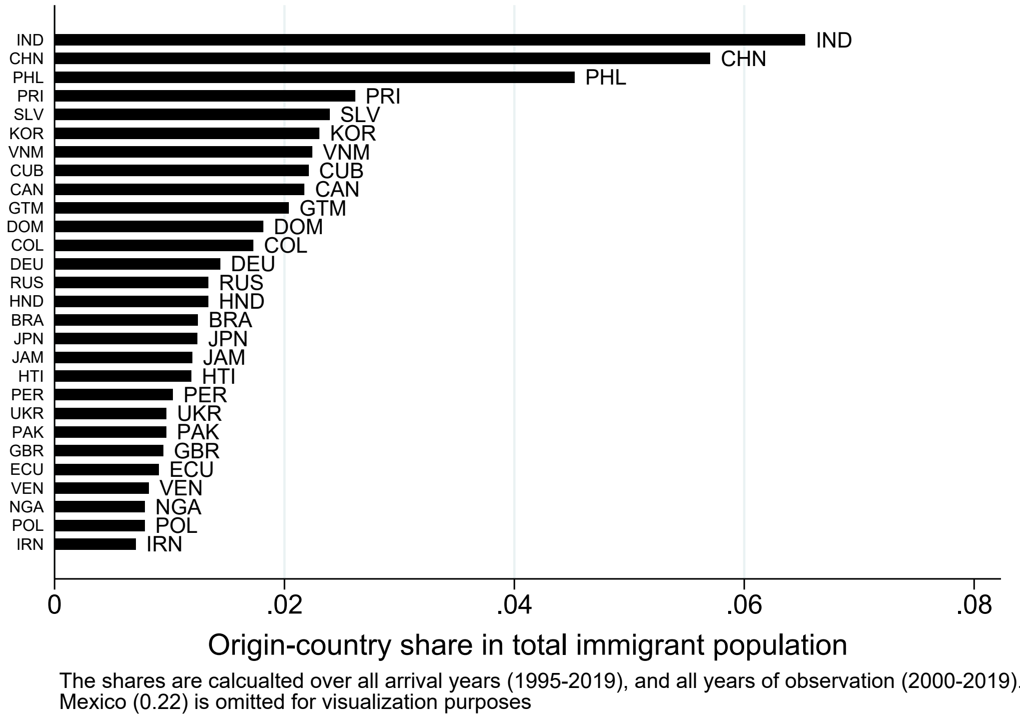


Figure A1: Biggest origin-country shares in total immigrant population, excluding Mexico.

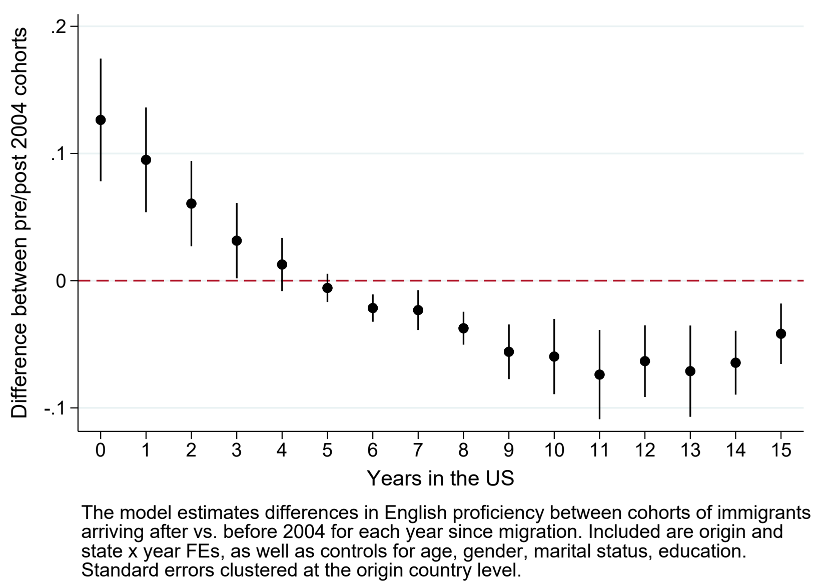
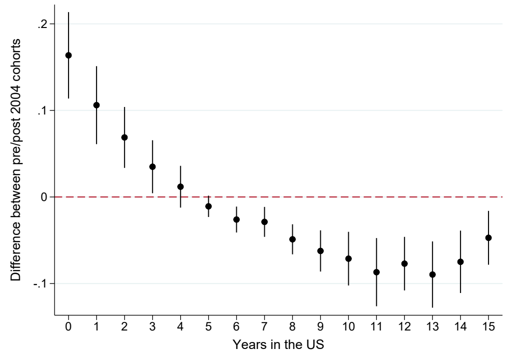
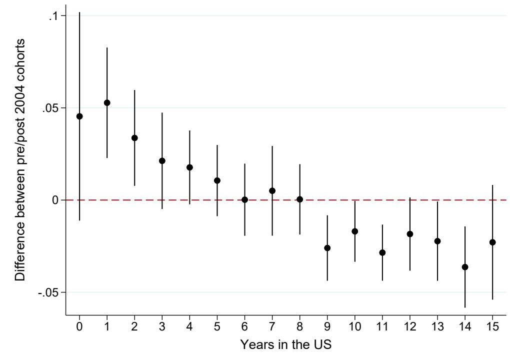


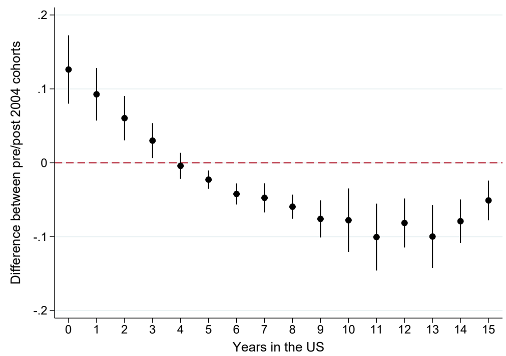
Figure A2: Difference between pre/post 2004 cohorts



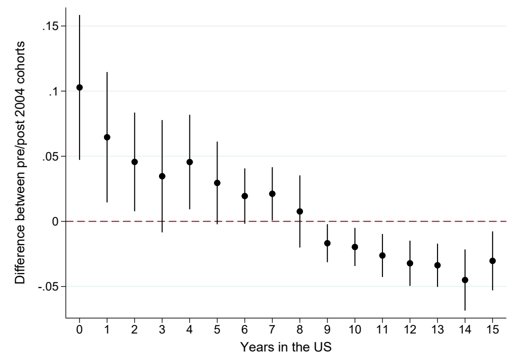
(a) Without tertiary education



(b) With tertiary education

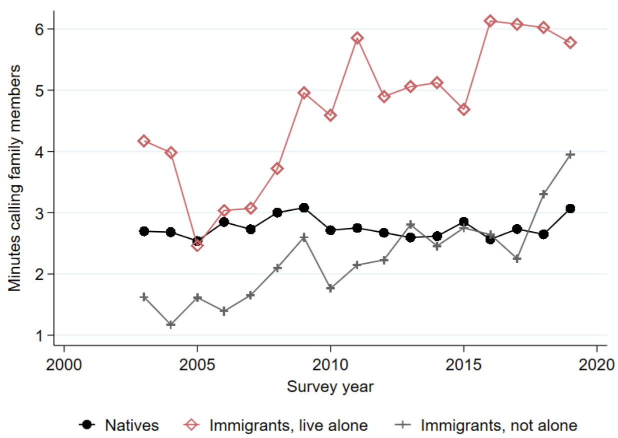


(c) Younger than 35

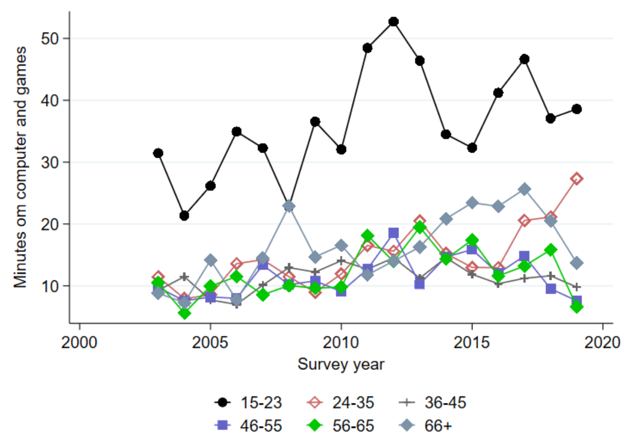


(d) Older than 35

Figure A3: Differences between pre- vs. post-2004 cohorts: heterogeneity by education and age

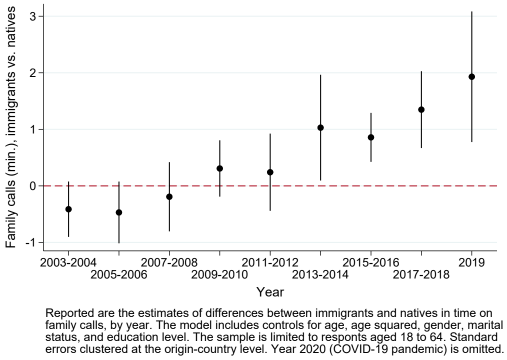


(a) Calling family

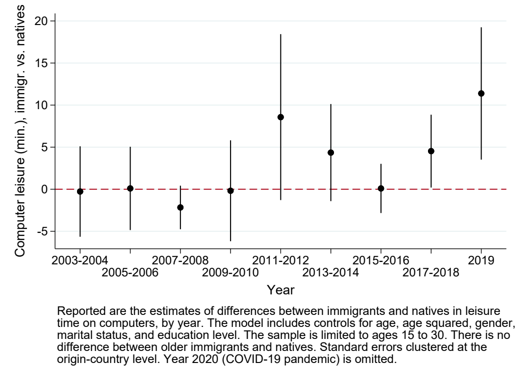


(b) Computer for leisure and games

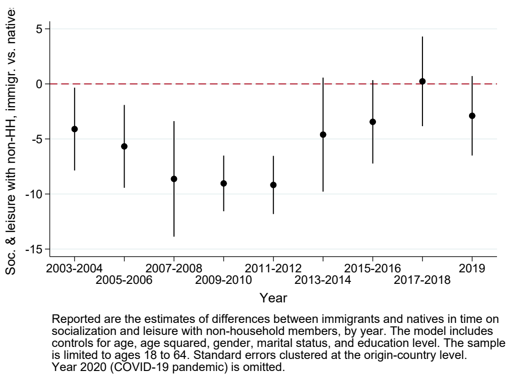
Figure A4: Time on (a) family calls (by HH composition), and (b) computer use (by age)



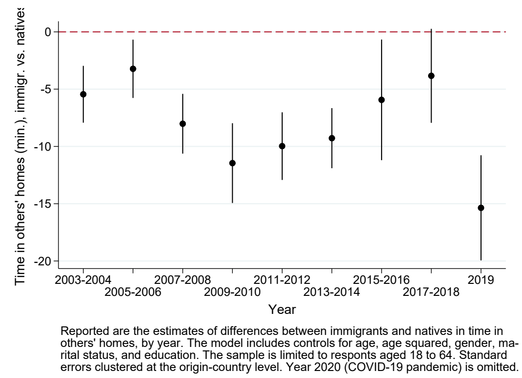
(a) Family calls



(b) Computer use (ages 15-30)

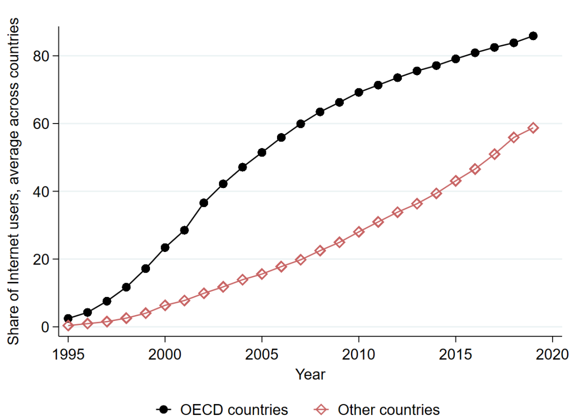


(c) Soc. & leisure with non-household

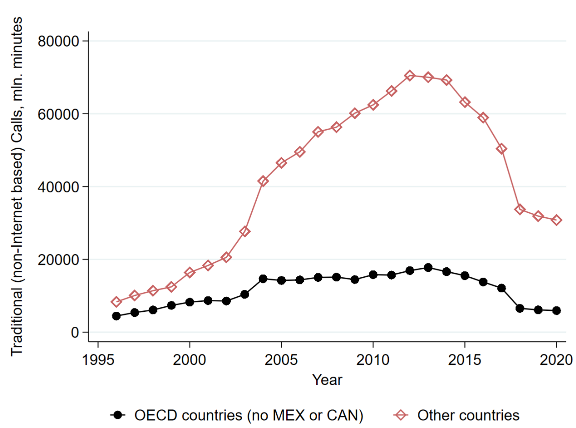


(d) In others' homes

Figure A5: Differences between immigrants and natives: controlling for demographics



(a) Internet access



(b) Traditional calls with the US

Figure A6: Internet access and traditional calls: OECD vs. other countries

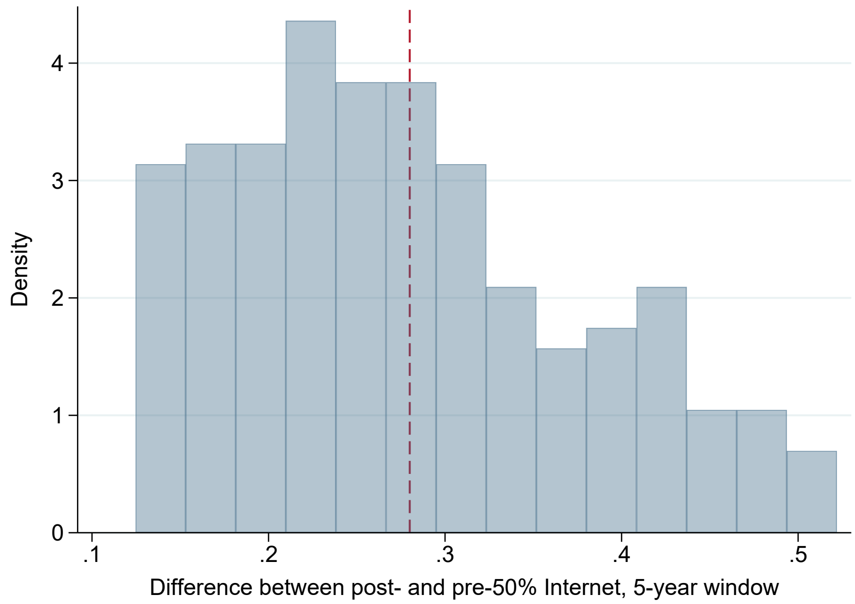


Figure A7: Difference in Internet coverage in the +/- 5 year window around the 50% coverage threshold, by sending country. Vertical red line stands for the average (0.28 p.p.) across countries.

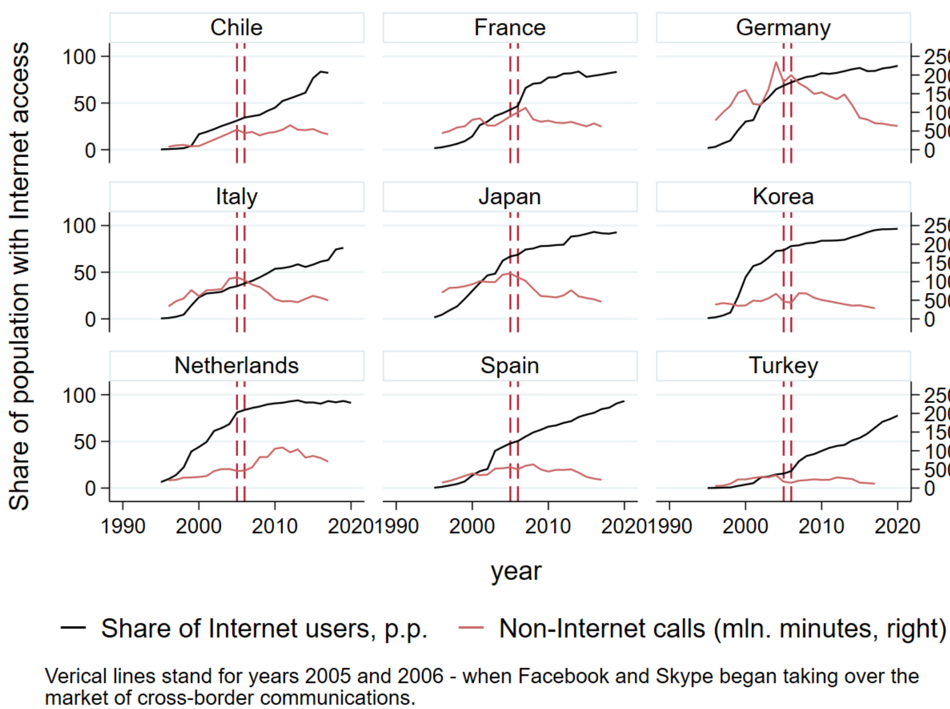


Figure A8: Calls with the US and Internet penetration, first adopters

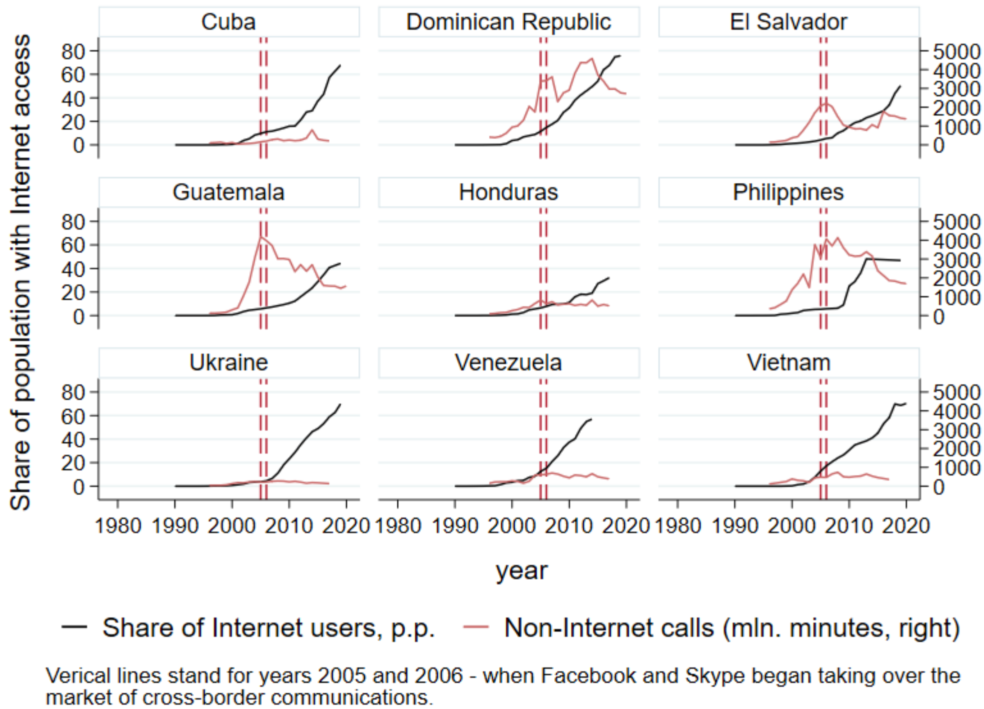


Figure A9: Calls with the US and Internet penetration, followers

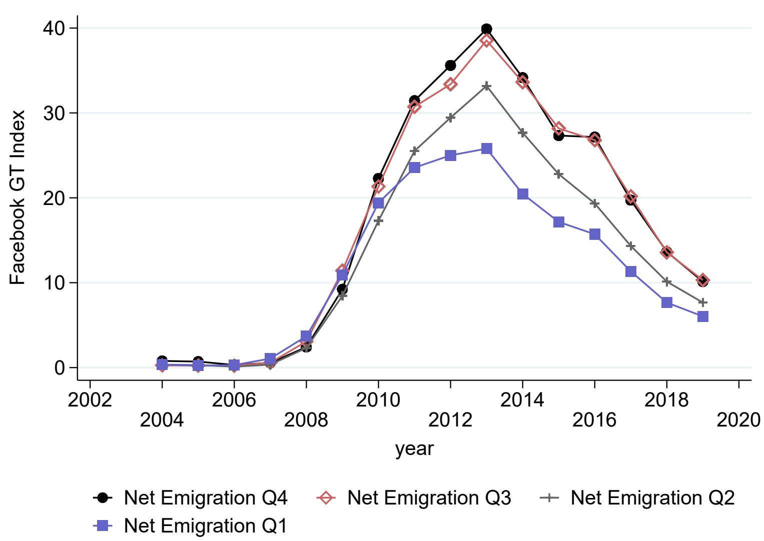
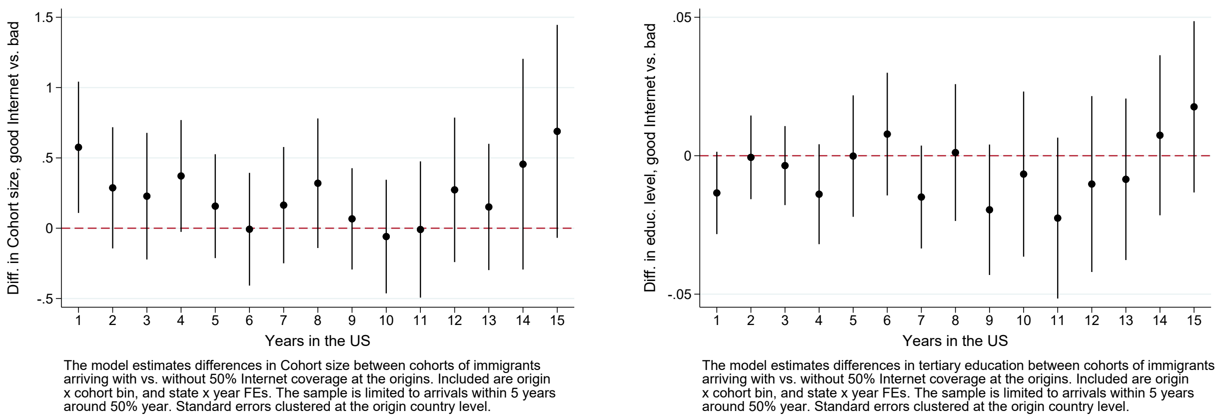


Figure A10: Dynamics of "Facebook" Google Trends Index, by Net Emigration groups



(a) Cohort size

(b) Share of tertiary educated

Figure A11: Size and education composition of cohorts: differences by origin-country Internet (50%) at arrival, 5-year window sample

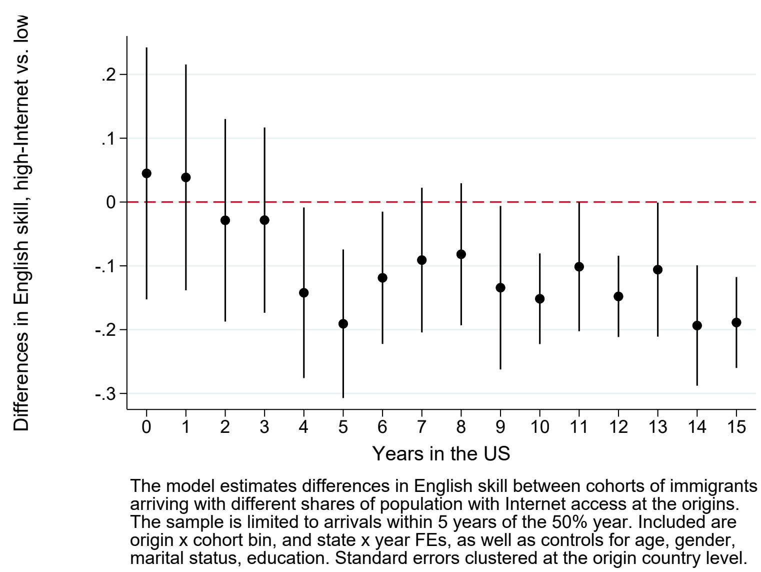
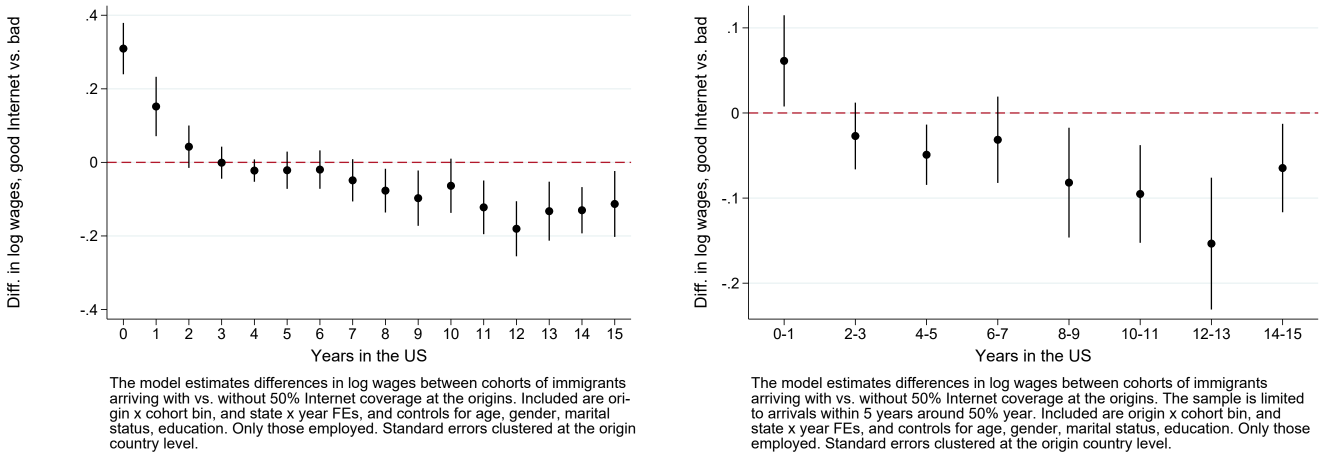


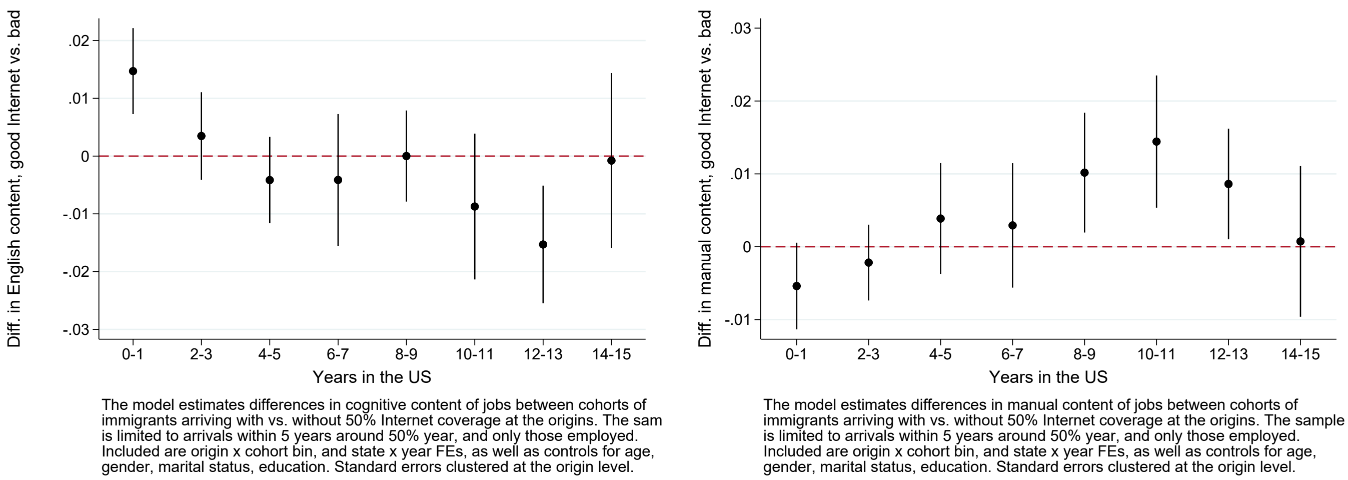
Figure A12: Linguistic integration: arriving with a higher vs. lower share of origin-country population with Internet access



(a) Full sample

(b) 5-year window around 50%

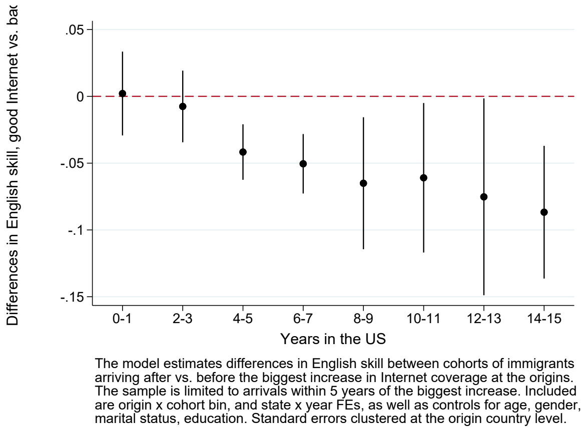
Figure A13: Log of wages, differences by origin-country Internet (50%) at arrival



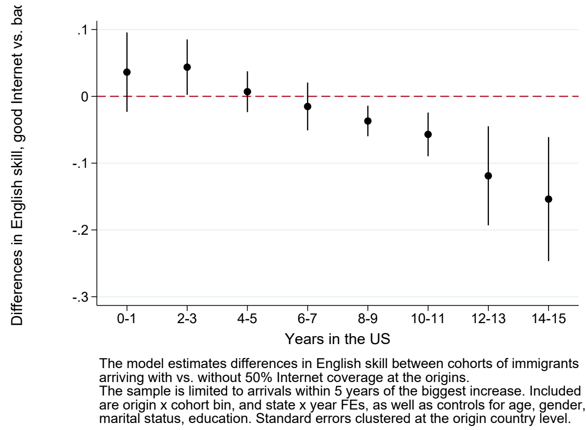
(a) Cognitive content

(b) Manual content

Figure A14: Manual and cognitive content of jobs: difference by origin-country Internet (50%) at arrival; +/- 5 year window sample

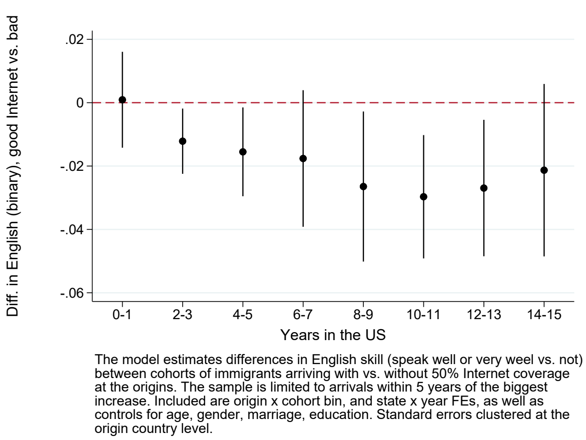


(a) After biggest increase in coverage

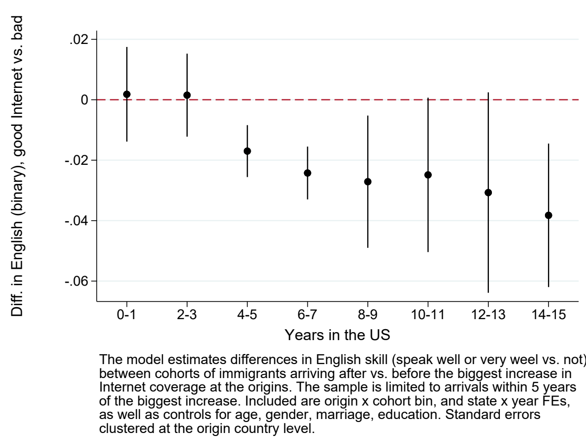


(b) After 25% coverage

Figure A15: Differences in linguistic integration: alternative measures of "high-Internet" at the origins

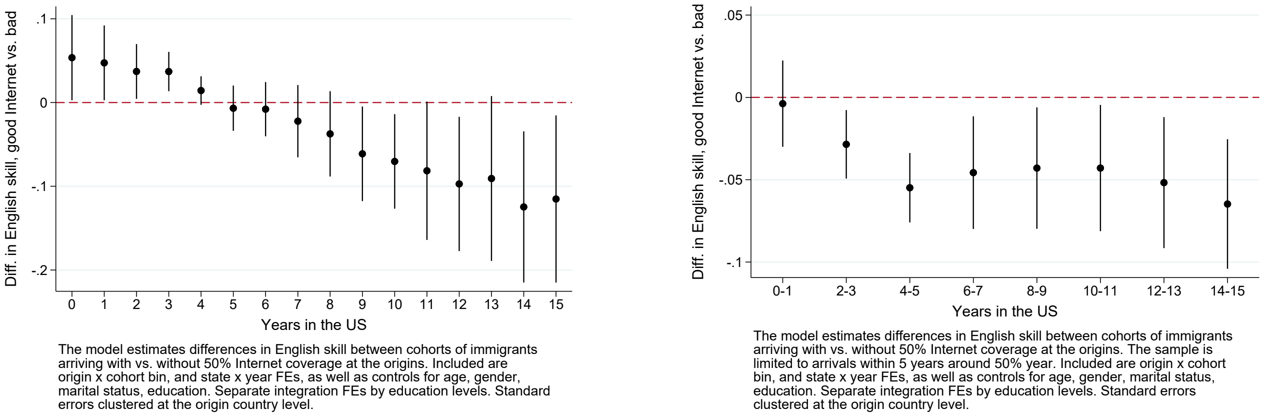


(a) After 50% coverage



(b) After biggest increase

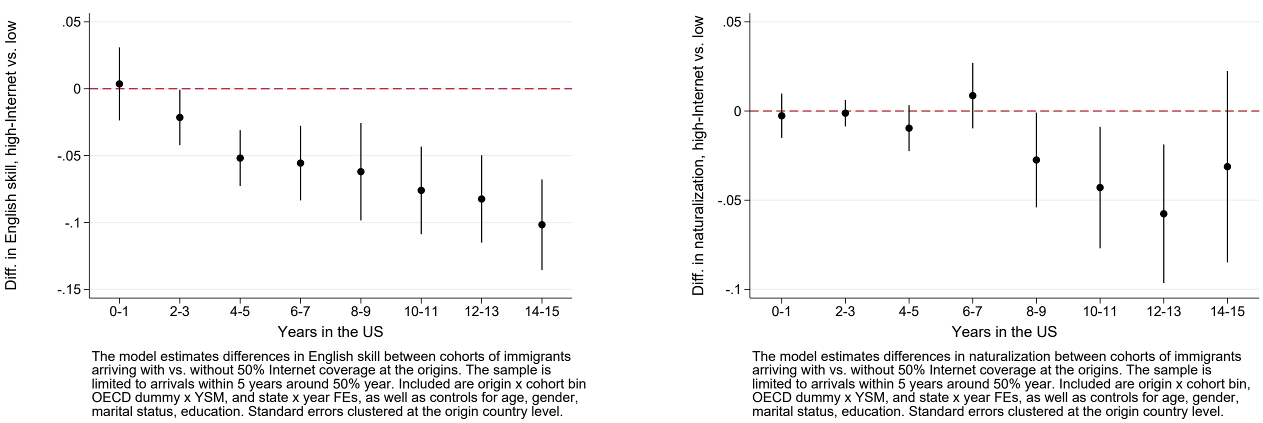
Figure A16: Differences in linguistic integration: binary outcome (speaks well or very well vs. not)



(a) Full sample

(b) 5-year window around 50% year

Figure A17: Linguistic integration: arriving after vs. before the origin reaches 50% coverage. Allowing for Education x YSM FEs.



(a) English skill

(b) Naturalization

Figure A18: Linguistic integration and naturalization: arriving after vs. before the origin reaches 50% coverage. Allowing for separate integration by OECD status.

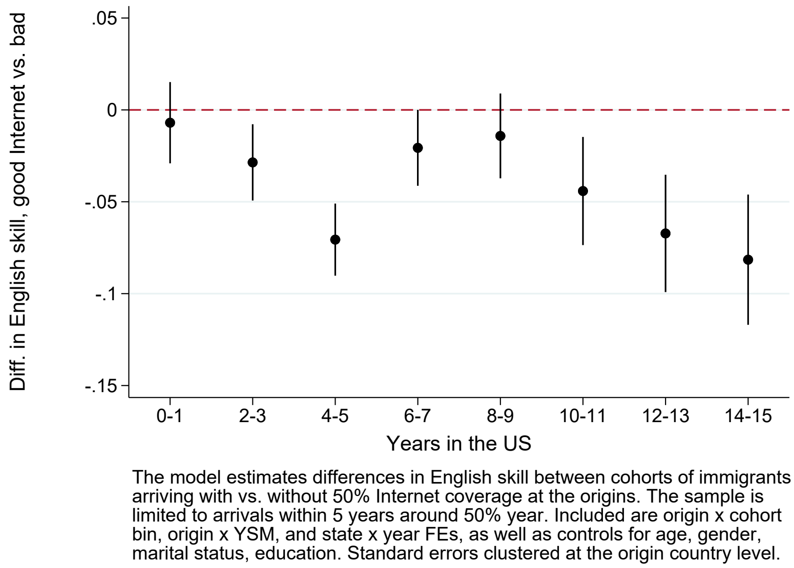


Figure A19: Linguistic integration: arriving after vs. before the origin reached 50% coverage; controlling for Origin x YSM Fixed Effects (5-year window sample)

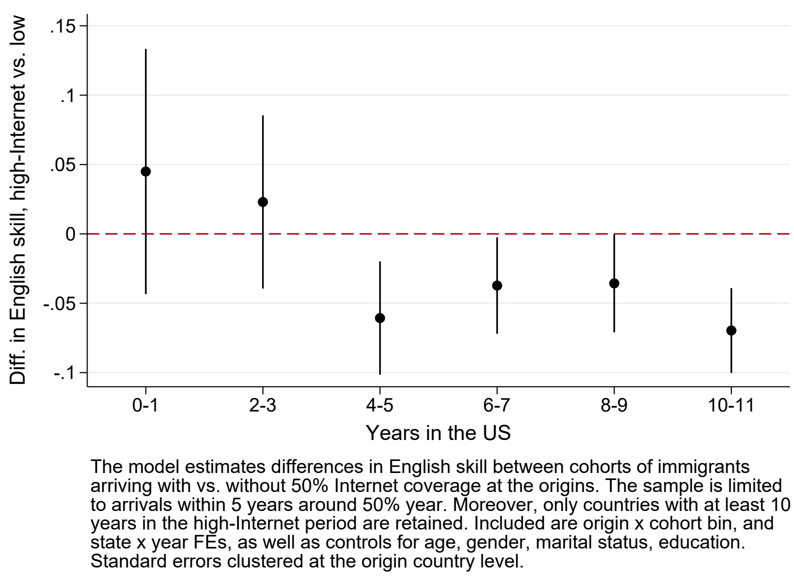
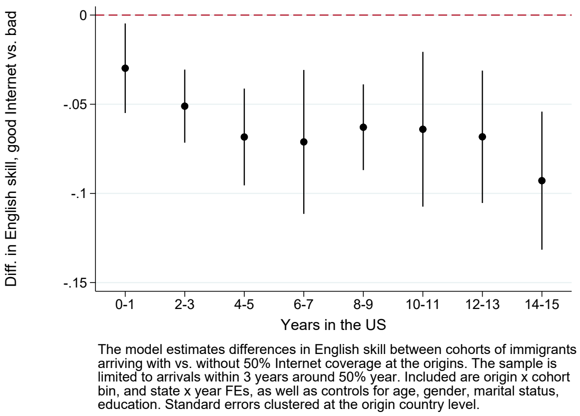
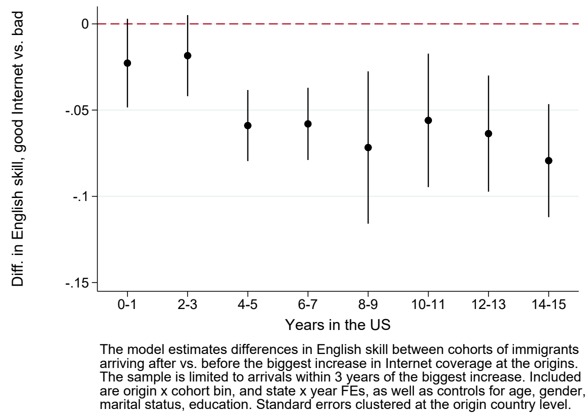


Figure A20: Linguistic integration: arriving after vs. before the origin reached 50% coverage. Balanced panel of Origin x Year since migration cells.

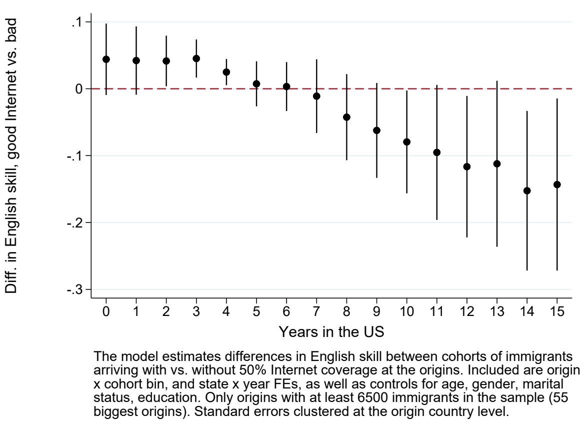


(a) 3-year window around 50%

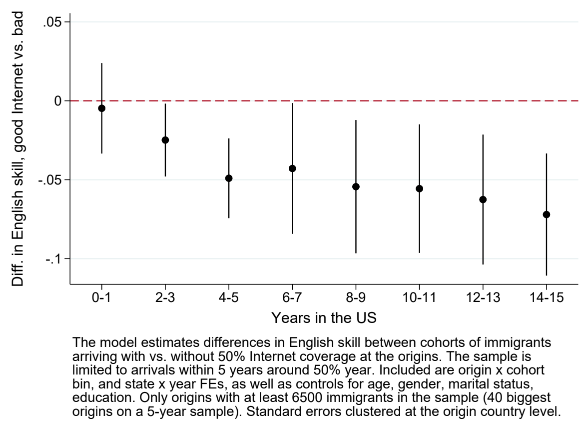


(b) 3-year window around biggest increase

Figure A21: Linguistic integration: 3-year windows around origin-country connectivity thresholds.

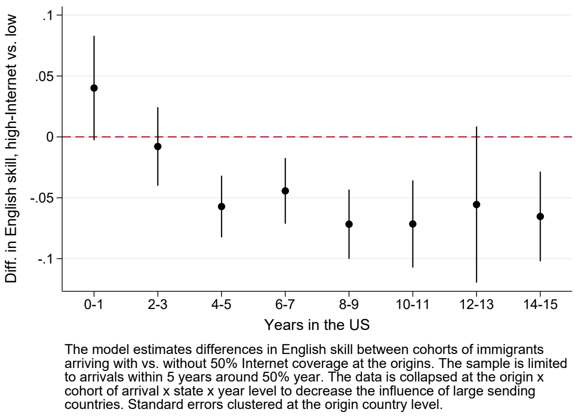


(a) Full sample

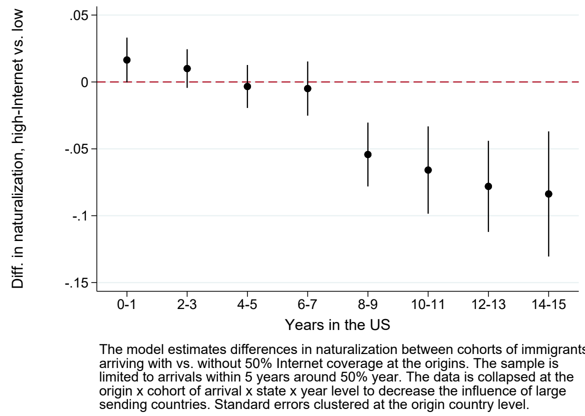


(b) 5-year window around 50% year

Figure A22: Linguistic integration: arriving after vs. before the origin reached 50% coverage. Only larger-sample origins

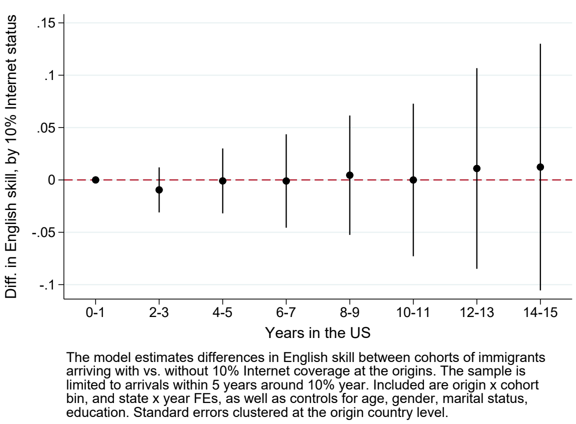


(a) English skill

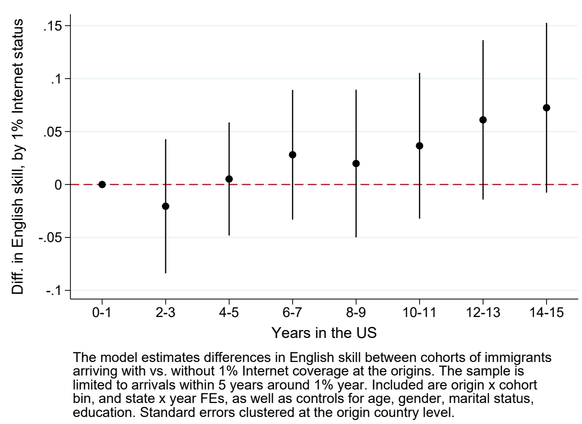


(b) Naturalization

Figure A23: Linguistic integration and naturalization on collapsed data (origin x cohort x state x year level): arriving after vs. before the origin reached 50% coverage.

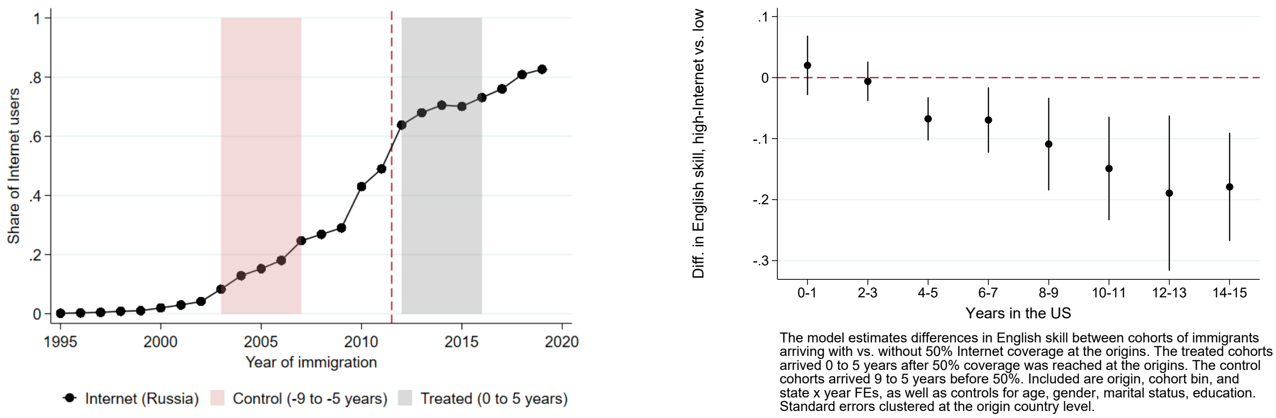


(a) 10% threshold



(b) 1% threshold

Figure A24: Linguistic integration: no difference if arriving after vs. before the origin reached (a) 10% and (b) 1% coverage.



(a) Example for Russia (b) English skill difference

Figure A25: Linguistic integration: high-Internet migrants (50% reached) vs. low-Internet (9 to 5 years before 50%).

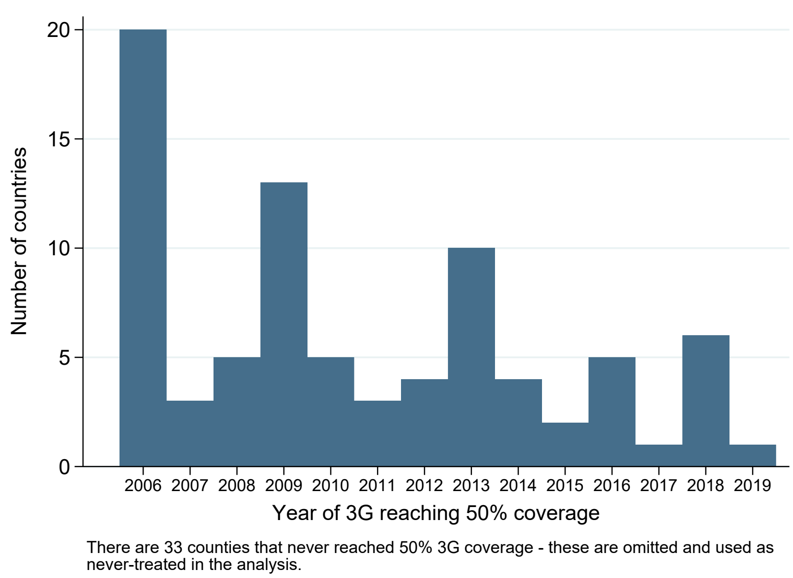
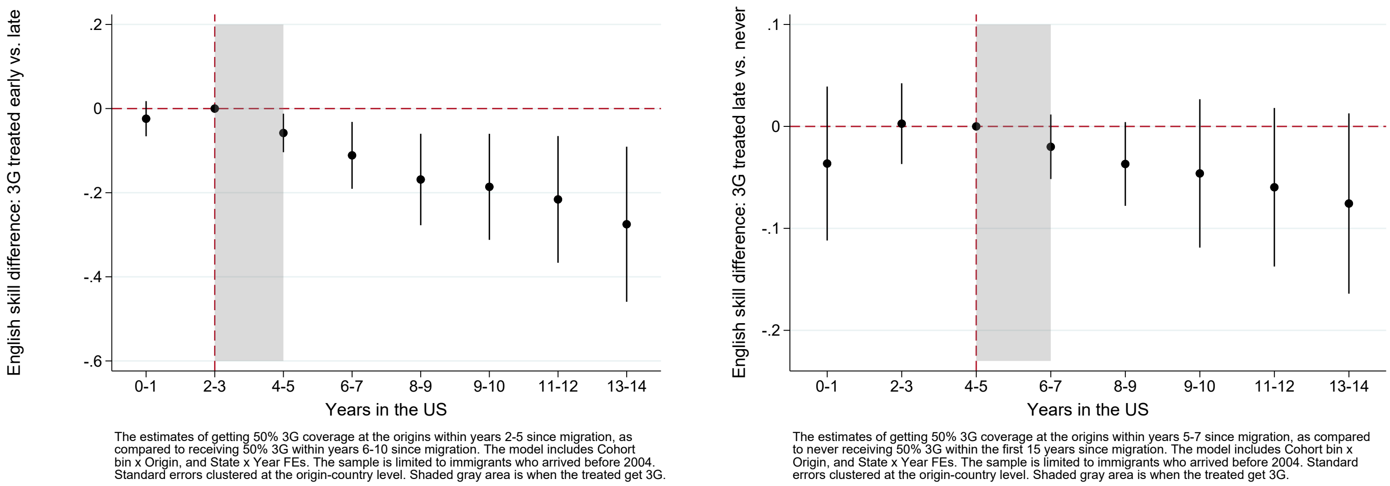


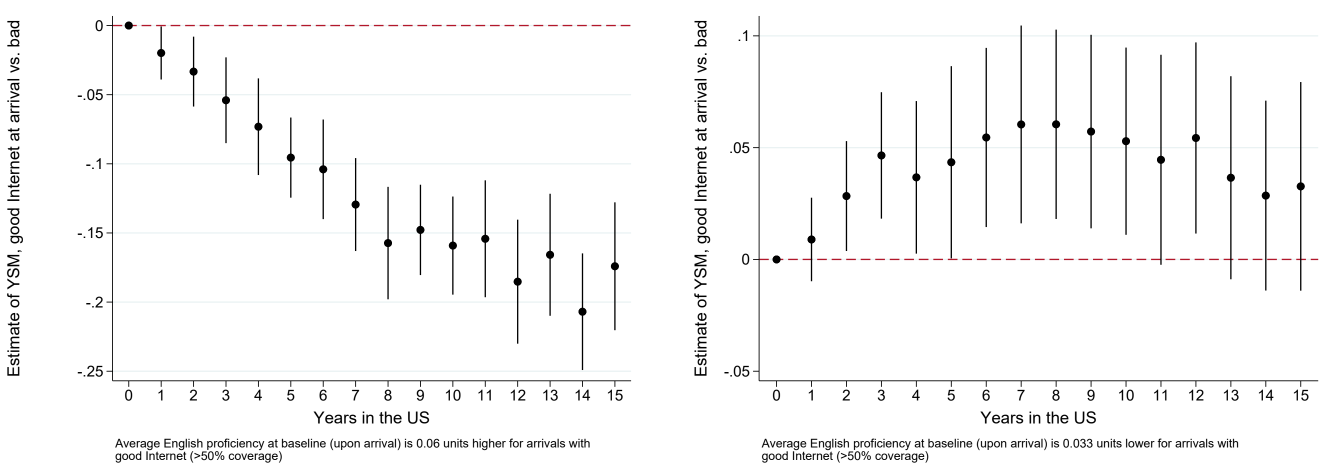
Figure A26: Distribution of 3G rollout dates (50% coverage year)



(a) Early treated vs. later-treated (6-9 YSM

(b) Later treated (6-9 YSM) vs. never-treated.

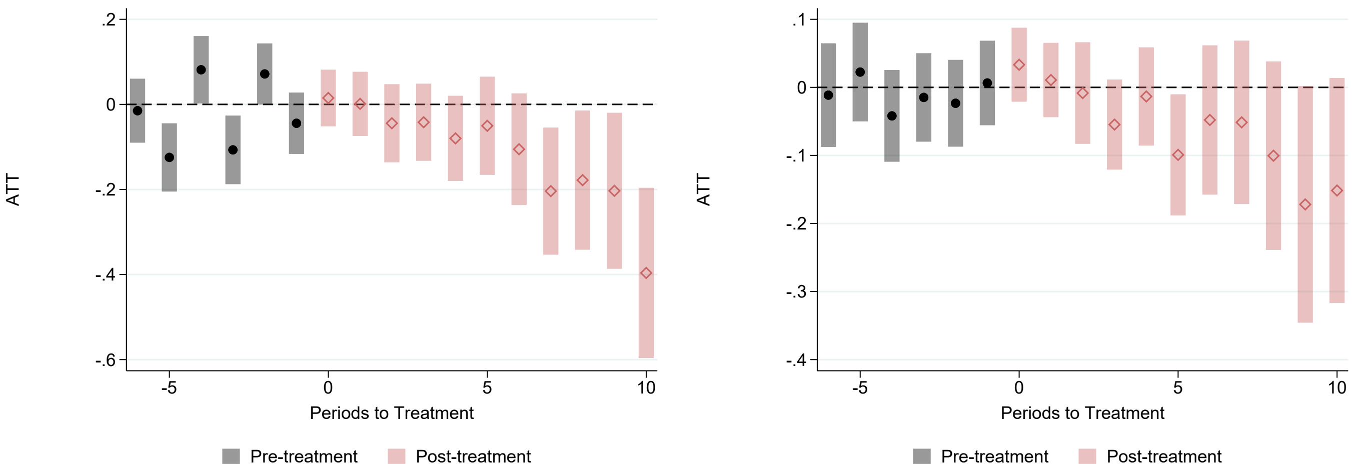
Figure A27: Linguistic integration: comparing (a) early-treated to later-treated, and (b) later-treated to never-treated.



(a) Low English proficiency

(b) High English proficiency

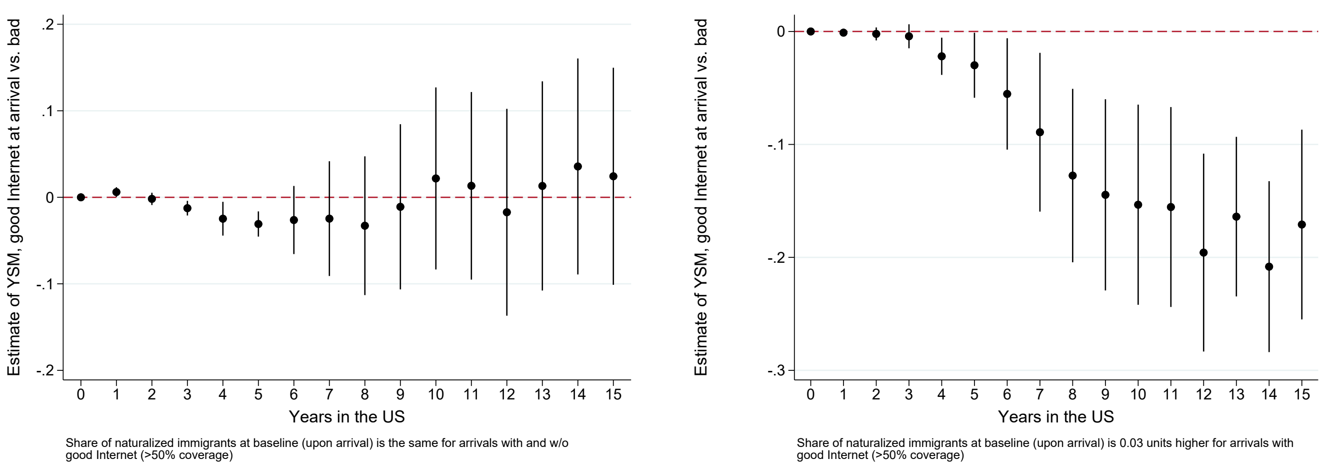
Figure A28: Effects of origin-country Internet on English skills: separate by parts of English sill distribution



(a) High school and college dropouts

(b) College or higher

Figure A29: Effects of origin-country 3G-Internet post-migration: differences by education



(a) College dropouts, high school, or less

(b) College or higher

Figure A30: Effects of origin-country Internet on naturalization: differences across education levels

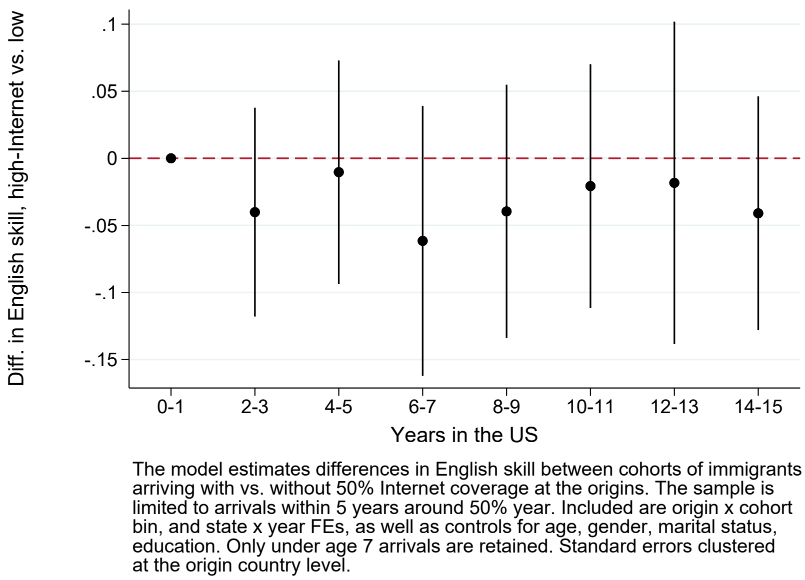
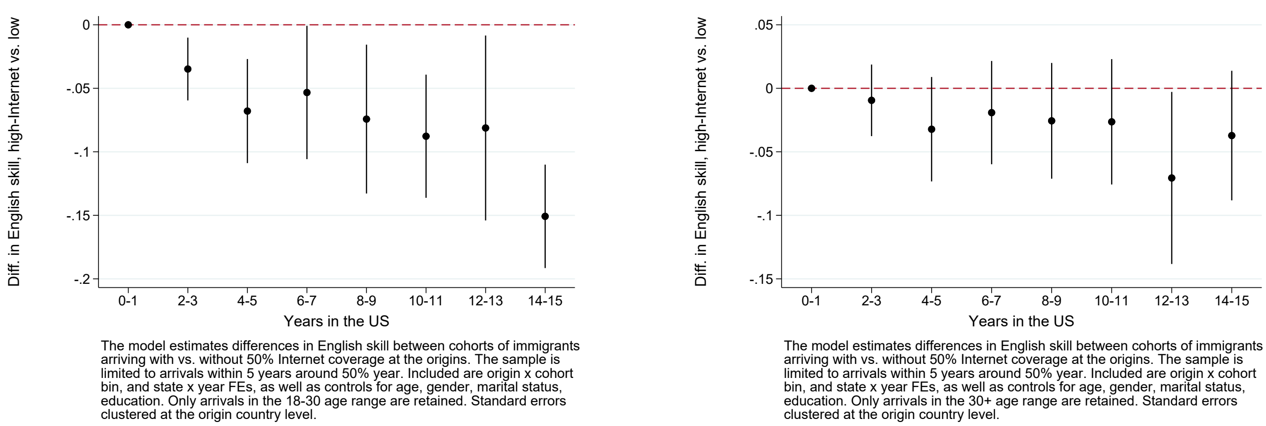


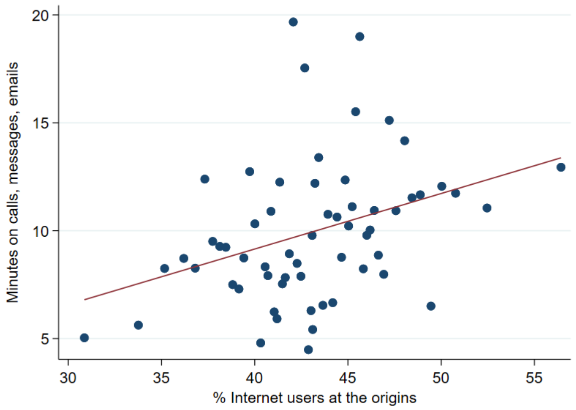
Figure A31: Linguistic integration: arriving after vs. before the origin reached 50% coverage. Under age 7 arrivals.



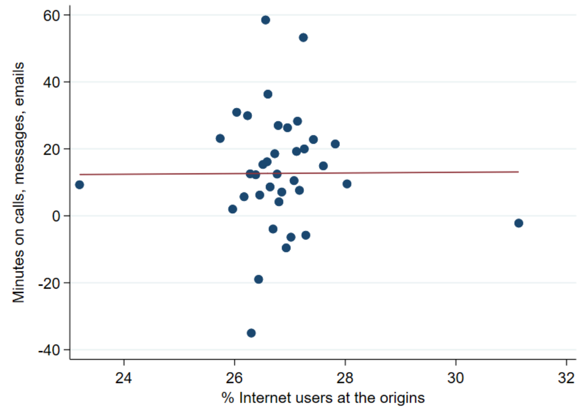
(a) Arrivals under age 30

(b) Arrivals over age 30

Figure A32: Linguistic integration: arriving after vs. before the origin reached 50% coverage. Under-30 vs. over-30 arrivals.

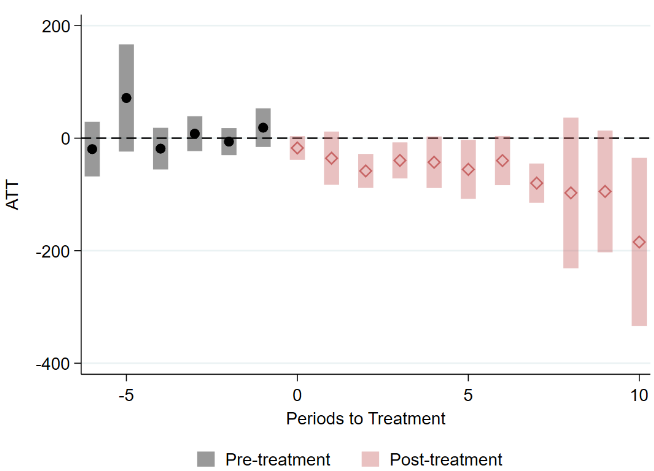


(a) Post-2008 years

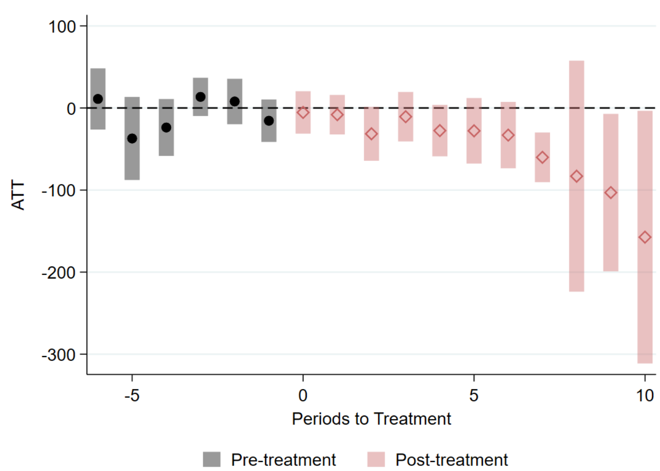


(b) Pre-2008 years

Figure A33: Binscatter: effects of origin-country Internet on calls/messages/emails. With origin and state x year FEs.



(a) Controls: only never-treated



(b) Controls: never-treated and not yet-treated

Figure A34: Event-study: origin-country 3G and immigrants' local socialization and communication, Callaway and Sant'Anna (2021) corrections.

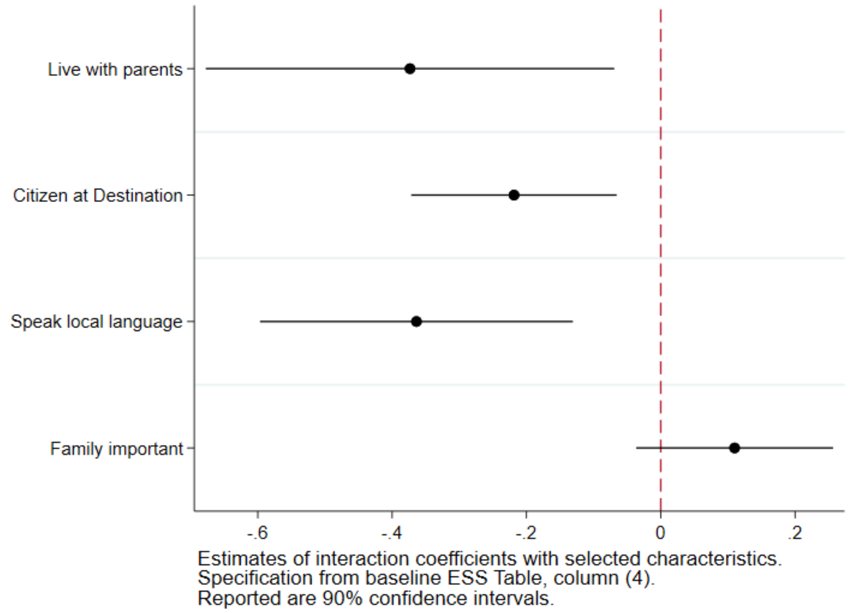
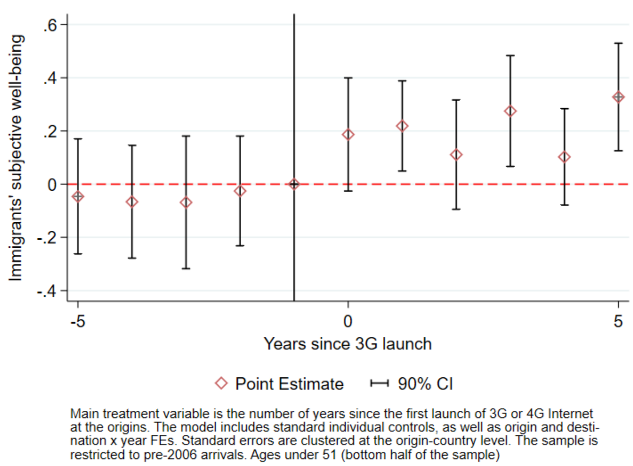
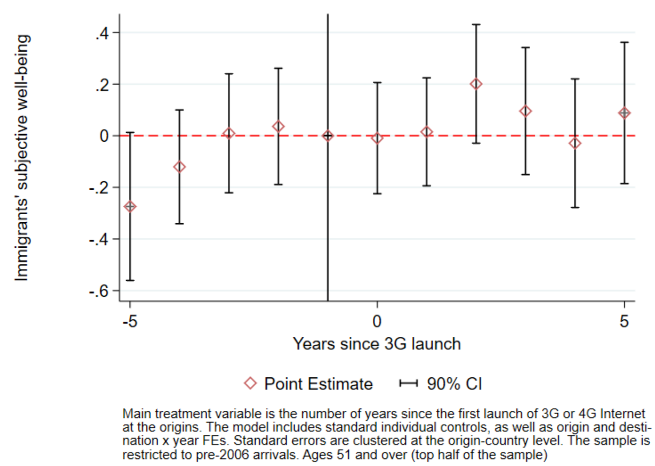


Figure A35: Origin-country Internet and immigrants' happiness: Interactions with integration at destination and family ties

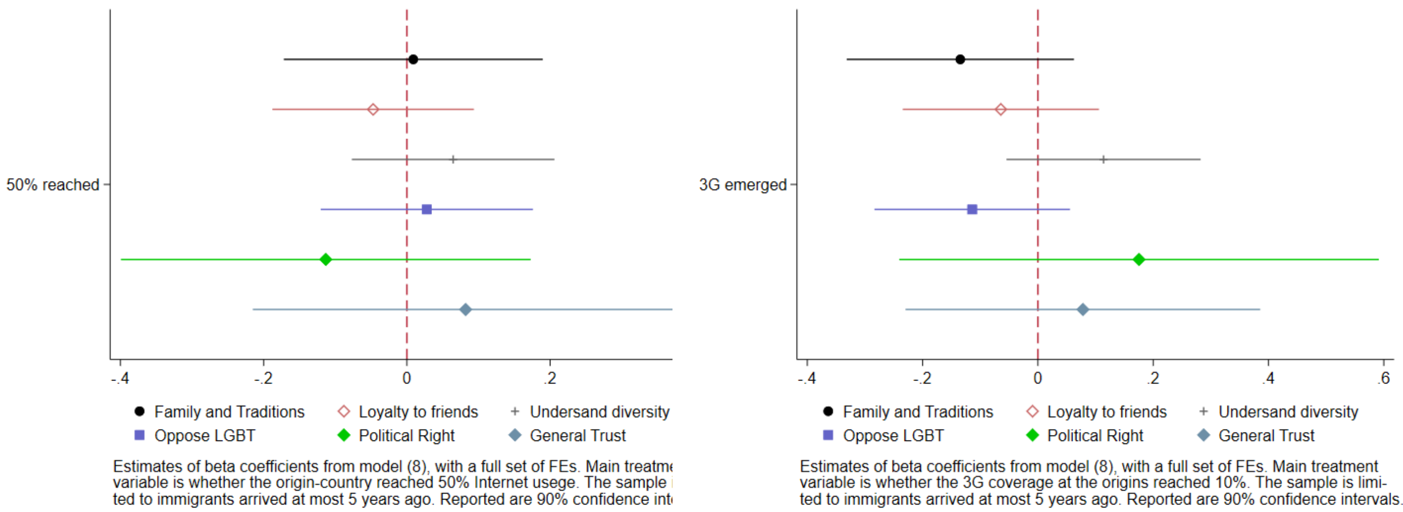


(a) Younger immigrants (under 51)



(b) Older immigrants (51 and over)

Figure A36: Event-study: effects of origin-country 3G emergence on immigrants happiness, by age groups



(a) Overall Internet access (50% dummy) (b) 3G Internet access

Figure A37: Effects of origin-country Internet on new immigrants' cultural values, ESS data.

B. Additional Tables

Table B1: Cohort-level differences in linguistic integration and naturalization rates

	(1)	(2)	(3)	(4)	(5)	(6)
VARIABLES		English Proficiency			Naturalized (citizenship)	
Log (Years in the US)	0.381***	0.433***	0.258***	0.246***	0.202***	0.344***
	(0.034)	(0.030)	(0.028)	(0.054)	(0.057)	(0.017)
Cohort post-2004	0.235***	0.277***	0.113***	0.164***	0.110***	0.302***
	(0.050)	(0.049)	(0.025)	(0.053)	(0.041)	(0.032)
Log (Years in the US) x Cohort post-2004	-0.141***	-0.165***	-0.065***	-0.087***	-0.055**	-0.172***
	(0.027)	(0.026)	(0.013)	(0.033)	(0.025)	(0.019)
Observations	1,626,396	1,104,666	521,725	1,564,263	1,056,821	507,437
Adjusted R-squared	0.434	0.360	0.251	0.209	0.197	0.259
Origin FE	Yes	Yes	Yes	Yes	Yes	Yes
State x Year FE	Yes	Yes	Yes	Yes	Yes	Yes
Sample	Full	Low skill	High skill	Full	Low skill	High skill

Outcome variable in columns (1)-(3) is the English Proficiency rated on a scale from 1 ("Does not speak English") to 4 ("Speaks very well"). Outcome variable in columns (4)-(6) is naturalization rate. The Log of years spent in the US captures the concave integration path. In each specification, Log (Years in the US) is interacted with the cohort of arrival: before 2004 vs. after (inclusive). Columns (2) and (5) restrict the sample to immigrants without higher education (college dropouts, high school or lower). Columns (3) and (6) restrict the sample to immigrants with completed higher education. Robust standard errors, clustered at the level of countries of origin in parentheses, *** p<0.01, ** p<0.05, * p<0.1

Table B2: Effect of origin-country Internet on the numbers of new immigrants.

	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)
VARIABLES				Number of new immigrants (origin x year)				
	OLS	OLS	OLS	OLS	Poisson	Poisson	Poisson	Poisson
Internet coverage (% of pop)	-141.377				-0.579			
	(277.682)				(0.424)			
Internet 50% reached		66.244				0.013		
		(72.043)				(0.106)		
Internet coverage (% of pop), lag			0.897				-0.491	
			(264.262)				(0.409)	
Internet 50% reached, lag				123.804				0.096
				(75.448)				(0.106)
Observations	3,353	3,353	3,257	3,257	3,353	3,353	3,257	3,257
R-squared	0.625	0.625	0.612	0.613				
Origin FEs	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Year FEs	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes

The outcome variable is the number of new immigrants arriving in the US in a given year from a given origin. The explanatory variables are (i) the share of origin-country population with access to Internet, and (ii) an indicator variable for reaching 50% Internet coverage at the origins, and the 1st lags of these variables. Columns (1)-(4) report the baseline OLS (TWFE) estimates. Columns (5)-(8) report the estimates from the Poisson pseudo-likelihood regression. Robust standard errors, clustered at the origin-country level, in parentheses, *** p<0.01, ** p<0.05, * p<0.1.

Table B3: Effect of origin-country Internet at arrival on English learning. Controlling for origin-country characteristics at the time of migration and post-migration

	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)
VARIABLES	English Proficiency								
Log (YSM)	0.218***	0.332**	0.228***	0.220***	0.205***	0.212***	0.219***	0.219***	0.219***
	(0.017)	(0.167)	(0.014)	(0.018)	(0.017)	(0.016)	(0.017)	(0.016)	(0.018)
Internet 50% reached	0.028	0.021	0.033	0.036*	0.017	0.033	0.029	0.029	0.029
	(0.021)	(0.016)	(0.021)	(0.020)	(0.018)	(0.020)	(0.021)	(0.021)	(0.022)
Log (YSM) x Internet 50%	-0.040***	-0.034***	-0.043***	-0.048***	-0.035***	-0.043***	-0.041***	-0.041***	-0.040***
	(0.011)	(0.010)	(0.011)	(0.011)	(0.010)	(0.011)	(0.011)	(0.011)	(0.012)
Controls: origin x cohort level									
Log (YSM) x Log (GDPpc) (arriv)		-0.013							
		(0.018)							
Log (YSM) x GDP growth (arriv)			-0.003						
			(0.003)						
Log (YSM) x Political Stab (arriv)				0.010					
				(0.017)					
Log (YSM) x Corruption (arriv)					-0.018				
					(0.014)				
Controls: origin x year level									
Log (GDP per capita)						-0.069			
						(0.121)			
GDP per capita growth							-0.001		
							(0.002)		
Political stability								-0.026	
								(0.024)	
Control of Corruption									0.060
									(0.053)
Constant	3.123***	3.332***	3.107***	3.103***	3.128***	3.765***	3.122***	3.120***	3.119***
	(0.124)	(0.804)	(0.122)	(0.125)	(0.126)	(0.158)	(0.124)	(0.124)	(0.126)
Observations	261,686	258,310	261,686	246,673	246,673	258,310	259,476	260,501	260,501
Adjusted R-squared	0.400	0.402	0.400	0.397	0.397	0.402	0.401	0.400	0.400
Origin x Cohort FE	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
State x Year FE	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes

Outcome variable in all columns is the English Proficiency rated on a scale from 1 ("Does not speak English") to 4 ("Speaks very well"). The Log of years since migration (YSM) captures the concave integration path. The main explanatory variable is the 50% indicator of "good Internet coverage" at the origins at the time of migration. The interaction of Log (YSM) and Internet 50% dummy shows how the integration profiles of high- vs. low-Internet cohorts differ. The first group of control variables is measured at the origins at the time of migration. The second group of control variables is measured at the origins in a given year of observation (post migration). The sample is limited to arrivals within 5 years around the 50% year. Robust standard errors, clustered at the level of countries of origin in parentheses, *** p<0.01, ** p<0.05, * p<0.1

Table B4: Origin-country Internet and location choice (share of co-nationals in a PUMA)

	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)
VARIABLES	Share of co-nationals in a PUMA region							
50 % Internet reached	-0.010***	-0.002***	-0.001**	-0.001**	-0.001**	-0.002	-0.002	
	(0.004)	(0.001)	(0.001)	(0.000)	(0.000)	(0.001)	(0.001)	
Share of Internet users								-0.007*
								(0.004)
Constant	0.039***	0.023***	0.029***	0.029***	0.029***	0.029***	0.034***	0.032***
	(0.015)	(0.003)	(0.001)	(0.000)	(0.000)	(0.000)	(0.001)	(0.001)
Observations	120,793	120,792	120,786	120,112	120,107	120,100	49,555	120,100
Adjusted R-squared	0.061	0.357	0.702	0.822	0.821	0.821	0.852	0.821
Origin FEs	No	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Cohort FEs	No	Yes	Yes	Yes	Yes	Yes	Yes	Yes
PUMA FEs	No	No	Yes	Yes	Yes	Yes	Yes	Yes
State x Origin FEs	No	No	No	Yes	Yes	Yes	Yes	Yes
State x Year FEs	No	No	No	No	Yes	Yes	Yes	Yes
Origin x Cohort FEs	No	No	No	No	No	Yes	Yes	Yes
Sample	0-1 YSM	0-1 YSM	0-1 YSM	0-1 YSM	0-1 YSM	0-1 YSM	0-1 YSM, 5y window	0-1 YSM

This Table gives the estimates of the effect of home-country Internet at arrival on the initial location choice of new immigrants. The outcome variable is the share of co-nationals in the PUMA region of residence (available in the ACS from 2005 onwards). The sample is restricted to initial locations (0 or 1 years since migration, and those who did not move within the US). The main explanatory variable is a 0/1 dummy for whether the origin country had reached 50% Internet coverage at the time of migration. An alternative measure used in column (8) is a simple share of home-country Internet users at the time of migration. Column (1) starts with no FEs; column (2) shows a simple TWFE estimator. Subsequent columns add more demanding sets of FEs. Column (7) additionally restricts the sample to +/- 5 years around the 50% threshold. Standard errors, clustered at the origin-country level, in parentheses, *** p<0.01, ** p<0.05, * p<0.1

Table B5: Effect of origin-country Internet and Skype on traditional calls with the US

	(1)	(2)	(3)	(4)	(5)	(6)	(7)
VARIABLES	Log (non-Internet calls with the US)						
Internet coverage (%)	-0.021***	-0.016***					
	(0.002)	(0.002)					
Internet coverage (%) x Skype share		-0.015***					
		(0.004)					
Internet 50% reached			-0.569***	-0.390***			
			(0.071)	(0.080)			
Internet 50% reached x Skype share				-0.748***			
				(0.260)			
Internet 25% reached					-0.404***	-0.127**	
					(0.068)	(0.061)	
Internet 25% reached x Skype share						-1.681***	
						(0.260)	
Internet 10% reached							-0.028
							(0.063)
Observations	4,009	4,009	4,009	4,009	4,009	4,009	4,009
Adjusted R-squared	0.931	0.932	0.925	0.925	0.922	0.925	0.919
Origin FE	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Time FE	Yes	Yes	Yes	Yes	Yes	Yes	Yes

Outcome variable is the Natural Log of international call minutes from the US to a given country. Main explanatory variable is the share of population with access to Internet. "Skype Share" stands for the international calls market share of Skype and changes over time. Columns (3)-(4) use an indicator variable for reaching 50% Internet coverage instead of a continuous variable. Columns (5)-(6) use a 25% threshold. Column (7) uses a 10% threshold. Robust standard errors, clustered at the level of origin country in parentheses, *** p<0.01, ** p<0.05, * p<0.1

Table B6: Effect of origin-country overall Internet access on immigrants' networking

VARIABLES	(1) Calls, mail/email	(2) Calls family	(3) Leisure, soc.. and comm.	(4) Soc. and comm.	(5) Soc. out of home	(6) Time other homes	(7) Attend-host events	(8) Org., civic, relig.
Panel A: 2003+ migrants								
Internet 25% reached	4.758**	2.827***	-31.500**	-15.190**	-17.780***	-11.230*	-2.359	-5.919
	(1.922)	(0.789)	(14.438)	(6.882)	(5.322)	(6.175)	(2.441)	(4.299)
Constant	3.613	-0.210	246.669***	68.461***	65.488***	51.039***	6.537**	7.612
	(2.926)	(1.268)	(18.457)	(6.753)	(8.839)	(9.413)	(2.769)	(6.780)
Observations	4,052	4,052	4,052	4,052	4,052	4,052	4,052	4,052
Adjusted R-squared	0.072	0.045	0.048	0.007	0.004	0.013	0.018	0.023
Panel B: 2003- migrants								
Internet 25% reached	1.029	0.171	-9.175*	-1.140	-1.361	-0.445	-0.946	0.775
	(0.838)	(0.369)	(5.139)	(2.616)	(2.564)	(2.437)	(1.124)	(1.597)
Constant	-3.767**	-0.960**	188.907***	53.782***	58.994***	44.073***	10.844***	5.888**
	(1.878)	(0.477)	(14.892)	(3.495)	(3.857)	(5.763)	(1.111)	(2.917)
Observations	21,501	21,501	21,501	21,501	21,501	21,501	21,501	21,501
Adjusted R-squared	0.040	0.032	0.099	0.003	0.009	0.008	0.008	0.021
Origin FE	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
State x Time FE	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes

Outcome variables in each column stand for the total amount of time per day (in minutes) spent on a given activity. Column (1) – calls, messages, emails, etc. Column (2) – calls to the family. Column (3) – overall time on leisure, socialization and communication. Column (4) – socialization and communication. Column (5) – socialization outside of home. Column (6) – time spent in others' homes. Column (7) – attending and hosting events. Column (8) – time on organizational, civic and religious activities. Panel A focuses on immigrants who arrived in the US after 2003. Panel B focuses on immigrants who arrived before 2003. Robust standard errors, clustered at the level of origin country in parentheses, *** p<0.01, ** p<0.05, * p<0.1.

Table B7: Effect of origin-country Internet on immigrants' happiness and health (ESS data).

VARIABLES	(1) Level of happiness (from 0 to 10)	(2)	(3)	(4)	(5) Life Satisf.	(6) General Health	(7) No health issues
Internet coverage (% pop)	0.916***	0.431***	0.502***	0.471**	0.569***	0.180**	0.112*
	(0.139)	(0.143)	(0.171)	(0.228)	(0.194)	(0.091)	(0.066)
Observations	51,724	51,708	34,416	24,620	24,662	24,786	24,706
Adjusted R-squared	0.073	0.144	0.140	0.149	0.186	0.271	0.154
Origin FEs	No	Yes	Yes	Yes	Yes	Yes	Yes
Destination x Year FEs	No	Yes	Yes	Yes	Yes	Yes	Yes
Sample	Full	Full	1st gen	Arrival pre-2000	Arrival pre-2000	Arrival pre-2000	Arrival pre-2000

This Table gives the estimates of the effect of home-country Internet in a given year on immigrants' subjective wellbeing. In columns (1)-(4) the outcome variable is the level of happiness (from 0 to 10). Column (1) does not include any Fixed Effects, while column (2) adds Origin and Destination x Year FEs. Column (3) restricts the sample to 1st gen immigrants, while column (4) requires that immigrants had arrived either before year 2000 (when the exact year of migration is available, rounds 5-9), or at least 10 years ago (rounds 2-4, covering years 2002-2010). Column (5) uses level of life satisfaction (from 0 to 10) as an outcome. Column (6) uses subjective assessment of general health (from 1 "very bad" to 5 "very good"). Column (7) uses as an outcome whether a respondent is hampered by a health issue (including mental health). Standard errors, clustered at the origin-country level, in parentheses, *** p<0.01, ** p<0.05, * p<0.1

Table B8: Effect of origin-country Internet on immigrants' happiness and health (ESS data).

	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	(10)
VARIABLES	Subjective well-being / happiness (scale from 0 to 10)								General Health	
3G first launch	0.168***	0.192***							0.083***	
	(0.057)	(0.065)							(0.028)	
10% 3G reached			0.117***	0.140***						0.031
			(0.044)	(0.052)						(0.024)
25% 3G reached					0.059	0.079				
					(0.049)	(0.056)				
50% 3G reached							0.039	0.069		
							(0.053)	(0.069)		
Observations	23,131	18,323	23,155	18,346	23,155	18,346	23,155	18,346	18,401	18,424
Adjusted R-squared	0.127	0.127	0.126	0.127	0.126	0.127	0.126	0.127	0.201	0.200
Origin FEs	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Destination x Year FEs	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Sample	1st-gen	1st-gen, pre-2006	1st-gen	1st-gen, pre-2006	1st-gen	1st-gen, pre-2006	1st-gen	1st-gen, pre-2006	1st-gen, pre-2006	1st-gen, pre-2006

This Table gives the estimates of the effect of home country 3G Internet rollout on immigrants' subjective wellbeing and health. In columns (1)-(8) the outcome variable is the level of subjective well-being / happiness (from 0 to 10). In columns (9)-(10) the outcome variable is subjective health assessment (from 1 to 5). Columns (2), (4), (6), and (8)-(10) restrict the sample to immigrants who arrived before year 2006. Standard errors, clustered at the origin-country level, in parentheses, *** p<0.01, ** p<0.05, * p<0.1.

C. A Simple Model of Migration, Networking, and the Internet

This section presents a simple model of migration and social networking. The model describes the process of immigrants' selection into migration based on their individual social costs of separation from family and friends. It then augments this Roy-type model with an endogenous choice between establishing new, destination-based social ties and maintaining existing ties at the origin. I present a simplified setting where social ties have solely intrinsic (non-monetary) value. Individuals decide whether to migrate based on the the balance between net monetary gains from migration (set as exogenous in this simple version) and social costs of separation from the origin.

Denote by $N^f_{i,o}$ the number of close friends and family members that individual i has at the origin, and let s^f_o be the share of origin-country population (and of individual's circle, assuming it is representative[41]) that has access to cheap communication tools to stay in touch with individual i had he or she decided to emigrate. Consider the networking behavior of immigrant i when in destination country d. An immigrant allocates time between two types of connections: establishing local (destination-country) ties, $n^f_{i,d}$ and maintaining origin ties, $n^f_{i,o}$. Establishing each destination country tie costs p_d units of time which we normalize to 1, and maintaining each origin country connection costs p_o units of time[42]. Before the Internet and cheap communication tools are both available at the origin, $p_o \gg 1$. To simplify things, let's assume that in this case, immigrants are forced into a corner solution with $n^f_{i,o} = 0$.

After the Internet and cheap communication tools arrive, p_o drops, and maintaining origin ties becomes possible. However, this comes at a cost of local networking. More formally, with a Stone-Geary utility derived from social ties, immigrants solve the following problem:

$$\max_{n^f_{i,o}\geq 0, n^f_{i,d}\geq 0} \quad U^f = \log(n^f_{i,o}) + \log(n^f_{i,d} + \bar{n})$$

$$\text{s.t.} \quad p_o \cdot n^f_{i,o} + n^f_{i,d} = T^f \;\; (BC)$$

$$n^f_{i,o} \leq s^f_o \cdot N^f_{i,o} \;\; (CC)$$

where T^f is the total amount of time an immigrant is willing to allocate to social interactions, locally or abroad[43], and $\bar{n} > 0$ is the weight put on origin-country ties - a cultural trait that we allow to vary both across and within countries.

[41] In reality, one can argue that immigrants may have a higher share of friends/family members online.

[42] It is easy reformulate the problem in terms of monetary costs of networking (after all, tools like Skype and Facebook cut monetary costs of ties to the origins). If prices of maintaining origin country ties go down, it requires less work time to get the wage to cover this price.

[43] In a more detailed version of the model, this variable is also endogenous, determined in the standard labor-leisure choice. E.g., assume that individuals derive utility from consumption and from social ties, and

When the connectivity constraint (CC) is non-binding, the solution to this problem requires an immigrant to spend $(n^f_{i,o})^* = \frac{T^f+\bar{n}}{2p_o}$ units of time with the origin-country ties, and the remaining time establishing host country ties[44]. However, if origin-country connectivity s^f_o is low, the (CC) constraint becomes binding, so that $(n^f_{i,o})^* = s^f_o \cdot N^f_{i,o}$. Combining the two conditions, the amount of time an immigrant spends on origin-country ties is given by

$$(n^f_{i,o})^* = \min\{\frac{T^f + \bar{n}}{2p_o},\ s^f_o \cdot N^f_{i,o}\} \tag{8}$$

Thus, for low levels of origin-country connectivity s^f_o, an increase in connectivity increases time spent on origin-country ties. This comes at the cost of fewer host-country ties. When origin-country connectivity reaches a threshold level, further increases do not affect the allocation of networking between origin and destination ties[45]. Note that subsequent reductions in the costs of origin-country ties (e.., entrance of Skype or WhatsApp) continue to increase origin-country networking at the expense of destination networking. This allows us to formulate the first key result.

Proposition 1 (Network substitution effect of origin-country connectivity)**.**

1. *For relatively low levels of origin-country connectivity, an increase in s^f_o decreases local networking at destination, and increases time spent with origin country ties.*

2. *For relatively high levels of origin-country connectivity, an increase in s^f_o has no effect on time allocation between destination and origin ties. A decrease in costs of origin-country ties p_o increases(decreases) origin(destination)-country networking.*

Let's proceed to the second key insight of this simple model and consider how growing connectedness of sending countries affects the process of selection into migration. If individual i remains at the origin, let's assume for simplicity that it is too costly to establish

that utility is additively separable in consumption and social ties. Then, the problem of choosing an optimal mix of social ties can be solved separately, for a given level of time allocated to networking.

[44]Note that an immigrant spends positive amount of time on destination ties only if $\bar{n} < T^f$, i.e., if the origin-country attachment is relatively low compared to the time available for socialization. In a more elaborate framework, with endogenous labor-leisure choice, time available for networking may become low if the opportunity costs (wages) are large relative to an immigrant's endowment. This introduces another reason for why immigrants from relatively poorer backgrounds may lag behind in terms social integration.

[45]Of course, this model can naturally be extended to a version where, realistically and importantly, host-country ties have not only an intrinsic value but also a monetary payoff: more local networking increases labor market success. However, note that this effect would not negate the prediction that a growing connectivity of the origin country decreases local networking. The only thing that changes is the elasticity of this effect.

meaningful ties with abroad, so $n^f_{i,d} = 0$[46]. All available time for social interactions is spent on local, origin-country ties, so $n^f_{i,o} = T^f/p_h = N^f_{i,o}$. This defines the number of origin-country friendships that we used above - naturally, it decreases with the costs of establishing local ties, but we treat this as a nuisance parameter.

Denote by $\Delta W_{o,d}$ the net monetary utility gain from migration (taking into account the moving costs). Denote by $\Delta V^f = V^f_o - V^f_d$ the difference between the "social" utility level if person i decides to stay at the origin, V^f_o, and the social utility level of person i decides to emigrate, V^f_d. Note that $V^f_o = \log(N^f_{i,o}) + \log(\bar{n})$, and that the value of V^f_d depends on whether the CC is binding or not.

Irrespective of whether the connectivity constraint is binding, it is easy to show that ΔV is increasing in $\bar{n}$. This means that social costs of migration are larger for individuals (or whole cultures) with a stronger sense of attachment to origin-country ties. Importantly, for low levels of origin-country connectivity (when the CC is binding), ΔV is decreasing in origin-country connectivity s^f_o: the more connected an origin country is, the lower social costs of migration are. Individual i from origin o migrates to destination d if and only if

$$\Delta W_{o,d} - \Delta V^f(s^f_o, \bar{n}) \geq 0. \tag{9}$$

Because $\Delta V^f(s^f_o, \bar{n})$ is increasing in $\bar{n}$ (attachment to origin-country ties) and decreasing in s^f_o (origin country connectivity), it is easy to show from (9) that the types of people who decide to emigrate are those with

$$\bar{n} \leq n(s^f_o), \tag{10}$$

with $n(s^f_o)$ increasing in s^f_o. This implies that growing connectivity at the origins increases immigration by people with a stronger sense of attachment to origin-country ties.

Proposition 2 (Cultural selection effect of origin-country connectivity)**.** *As origin-country connectivity s^f_o grows, the average value of $\bar{n}$ at destination increases, i.e., immigrants becomes more attached to the origin-country ties. This results in*

1. *lower average number of social ties immigrants have at destination*

2. *lower pace of integration for more recent cohorts of immigrants relative to earlier cohorts from the same origin country.*

[46]In reality, Internet allows one to find friends or even romantic partners from abroad prior to migration, which can speed up subsequent integration. An extended model can allow for such pre-migration investments.

This mechanism gives another reason why an increasing global connectivity can lower the pace of immigrants' social integration, especially those from relatively poorer countries. In Appendix D, I cite several interviews from Dekker and Engbersen (2014), where respondents express precisely the workings of mechanisms I modelled above.

The final prediction of this model is that growing origin-country connectivity, s_o^f, allows immigrants to move closer to the unconstrained optimum, thereby increasing their utility levels. In terms of the testable predictions, this implies that origin-country Internet expansion is expected to increase immigrants' subjective well-being.

D. Anecdotal evidence and interviews of immigrants

Descriptive evidence from Dekker and Engbersen (2014) provides the illustrations of the some of the mechanisms at play. First, on the “network substitution” effect:

- "I still have many friends in Ukraine and, regardless of the distance, we can still communicate – Skype is amazing. Once there was the birthday of my mate. They were at my friend’s apartment drinking beer, so they called me on Skype, ... and I was drinking beer with them." (Viktor, 21, migrated from UA to NL)

- "My life is very good here, but much of my social life is still in Brazil. Nowadays, 90 per cent of my contacts on the internet, in emails or on Facebook are in Brazil. ... much of my life is still there... I have friends here of course, but it is a ... more distant relationship. In Brazil, I have closer friendships, people whom I talk with more frequently, via Skype, Facebook or email." (Beatriz, 45, migrated from BR to NL)

Second, on the “subjective well-being” and selection effects:

- "If I were to migrate 20 years ago without having this technology, phones and internet, it would probably be far more difficult for me since my bonds with my friends are very close. ... So, it would be difficult for me. I would probably miss them a lot. But, now it is quite easy." (Viktor, 21, migrated from UA to NL)

- "I was not sure which country to go to so I decided that a good first step would be to contact a relative in Belgium ... . I had never met him in person because he migrated years ago but my father told me about him. I searched for him on Vkontakte.ru and found his daughter. They were very happy to hear from me and they sent me an invitation to visit them in Kortrijk [Belgium] so I could apply for a tourist visa." (Ivan, 27, migrated from UA to BE)