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Examining the transnational health preferences of a group of Eastern European migrants relative to a European host population using the EQ-5D-5L

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ABSTRACT

The concept of transnationalism may provide an alternative rationale to observed differences in patterns of migrant healthcare use and health-related behaviours. In this study, we examined the health preferences of Eastern European migrants residing in another European state relative to comparable natives through the prism of transnationalism. For the analysis, we focused on the health preferences of 87 Polish migrants living full-time in Ireland compared to 87 Irish natives. We used EQ-5D-5L composite Time Trade-Off (cTTO) utility data collected as part of the Irish value set during 2015/2016 to examine the health preferences of both groups. Propensity score matching was utilised to match comparable Irish respondents to Polish migrants with 1:1 matching. Since cTTO utility data is censored, a random effects Tobit model was used to explore differences in utility valuations, and in a secondary analysis, we examined the likelihood of applying a negative utility valuation using a random effects logit model. The results from this study demonstrate that on average Polish migrants apply a significantly greater disutility valuation to health states and are more likely to apply a negative utility valuation to a given health state when compared to comparable natives. Differences in utility valuations can be seen as indicative of time preference with a greater disutility valuation being associated with a higher rate of time preference. This finding may be suggestive of health-related behaviours, such as a greater likelihood of not engaging with preventive service use in as far as those with high rates of time preference have low uptake. Transnationalism can underpin the observed differences in health preferences between the Polish migrants and comparable Irish natives. Transnational ties shape health-related behaviours of migrants from the use of healthcare services to health preferences. The results of this study will be of interest to policymakers in Ireland and Europe.

1. Introduction

There has been an emergence of nations producing EQ-5D-5L value sets (Devlin et al. (2018); Xie et al. (2016); Purba et al. (2017); Versteegh et al. (2016); Ludwig et al. (2018); Hobbins et al. (2018)) with fourteen value sets published at the time of writing. The EQ-5D-5L instrument provides a descriptive framework for the characterisation of health status that when combined with preference data for those states can be used to estimate quality-adjusted-life-years (QALYs), which are most often used in cost-utility analysis (CUA) to inform healthcare resource allocation decisions. The EQ-5D-5L measures health-related quality of life across five dimensions, namely: mobility, self-care, usual activities, pain/discomfort and anxiety/depression. In the five-level health descriptive system, the EQ-5D-5L can describe 3125 (5^5) unique health states, with each dimension categorised by one of five levels of difficulty: no problems, slight problems, moderate problems, severe problems and extreme problems (Mulhern et al., 2016). To derive the utility index values for each value set full national EQ-5D-5L valuation studies are carried out to elicit preferences for health. The elicitation methods for health preferences include the composite Time Trade-Off (cTTO) technique and Discrete Choice Experiment (DCE) tasks (Oppe et al., 2016). The elicitation of preferences in the EQ-5D-5L follows a standardised protocol allowing for more meaningful comparison across countries (Oppe et al., 2014). Differences in health preferences are

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noted across nations with different cultures placing greater importance on certain dimensions of the EQ-5D-5L compared to others (Olsen et al., 2018). Previous studies have examined differences in health preferences between ethnic groups within a nation (Pickard et al., 2013), but there is a paucity of research examining the health preferences of migrants relative to a host population.

There is growing importance to understand the preferences of migrants within host countries in Europe due to the increasing size of migrant populations in many European Union (EU) states (Greenhill, 2016). The preferences of migrants have a transnational aspect that makes them distinct to those of a host population (Boccagni, 2017). Transnationalism refers to how migrants uphold their cultural, social, economic and political identity across national borders through cross-border movements that involve frequent visits to, and communication with, their country of origin (Gasper and Truong, 2010). Theories of acculturation and assimilation run counter to transnationalism and are noted by Teske and Nelson (1974) as separate processes. Acculturation denotes how a migrant adapts to a new culture by adopting the new culture, and assimilation sees a migrant becoming an integrated member of the receiving society, losing their own previous culture. Transnationalism offers an alternative characterisation of migrant preferences in which migrants remain distinct and retain significant connections with their country of origin. Due to the easier movement of people within Europe in recent decades arising from cheaper air travel, social media connectivity and free movement within EU member states, international migrants can retain transnational ties to a much greater extent than previously. These transnational ties have implications for migrant health-related behaviours.

The perspective of transnationalism is increasingly being applied to health and health services research to examine how transnational ties shape the health-related behaviours of migrants (Baldassar (2014); Tiilikainen and Koehn (2011)). Villa-Torres et al. (2017) carried out a systematic review examining migrant health practices and how these health-related behaviours have been influenced by transnationalism. The authors identified 26 studies targeting the transnational healthcare seeking practices of migrants. The authors note that migrants not only use transnational ties to overcome barriers to healthcare in their host country but also to provide additional options to meet their health needs by travelling back to or remaining in close connection with their country of origin. The authors again detail that transnationalism has a direct effect on the health outcomes and health-related behaviours of migrants and that further research on this area is required.

Since healthcare utilisation and health-related behaviours are grounded in preferences (Pol and Irvine, 2018) and not just opportunities it is important to examine how migrant health preferences differ from natives as this may provide valuable insight into differences in the groups' health-related behaviours. Understanding health preferences is an area of policy relevance as health preferences can be argued to be indicative of health-related behaviours, such as healthcare services use, willingness to engage in risky behaviours or increase investment in health capital. Between-country comparisons of health preferences have been conducted countries (Oddershede and Petersen (2015); Knies et al. (2009); Badia et al. (2001)); however, no studies to date have examined the health preferences of a migrant population relative to comparable natives. In this paper, we add to the literature by exploring the transnationalism of health preferences and their potential policy implications, which has not previously been examined to the best of our knowledge. This area of research is worthy of further investigation if we are to properly understand how other health-related behaviours of migrants compare to natives. This study contributes to the literature by filling this research gap by examining the health preferences of Polish migrants residing in Ireland relative to comparable Irish natives.

2. Methods

The data used in this study were collected as part of that used to determine an EQ-5D-5L value set for Ireland. Individuals were recruited into the study via stratified random sampling of small areas, with households and individuals within households recruited randomly in each area. Ethical approval for the study was granted by NUI Galway's Research Ethics Committee (application number 15/JAN/04). Full details of the study design, sample selection, ethical approval and quality assurance are provided in Hobbins et al. (2018). A team of trained interviewers collected EQ-5D-5L survey data during 2015/2016 using the EuroQol Valuation Technology (EQ-VT). Respondents were interviewed in person by trained interviewers using the EQ-VT, computer-assisted personal interview software owned by the EuroQol Research Foundation (Oppe et al., 2014). Respondents completed ten composite Time Trade-Off (cTTO) valuation exercises from randomly selected blocks of 86 health states, which is a subset of the 3125 possible health states in the EQ-5D-5L. A health state is defined as one of the five levels from each of the five health dimensions as detailed previously.

In total, data from 1228 interviews conducted as part of the Irish EQ-5D-5L valuation study were available for analysis in this study, of which 87 respondents self-identified as Polish. For the analysis, a cTTO exercise was used to elicit health preferences. The lowest achievable cTTO utility value is -1 with this value representing a health state so severe that a respondent has traded off all available time. However, it is important to note that while the elicited utility value is bounded at -1 due to the elicitation method, it is theoretically possible that the disutility associated with a given health state may be greater still. It is plausible that a respondent could potentially assign a value lower than the bounded -1 to a given health state if the elicitation method allowed. It might be possible that a health state could be considered so much worse than death, that the respondent would be willing to trade off *any* amount of time to avoid this, corresponding to a utility value of minus infinity. Thus, the true utility score runs from minus infinity to plus one. The highest achievable cTTO utility value is 1 representing a health state so inconsequential that a respondent has not traded off any available time. See the paper by Oppe et al. (2016) for further detail of cTTO health states.

Respondents indicated their level of self-reported health on the particular day of the survey using the EQ-5D-5L descriptive system and the visual analogue scale (VAS) in keeping with the EuroQol protocol. Respondents were also asked to provide a range of socio-demographic information. This information included their age, gender, employment status, marital status, educational attainment, household location (rural/urban), number of dependent children, whether they belonged to any religious faith and how often they attended associated services. Polish respondents were also asked how long they have been resident in Ireland.

2.1. Statistical analysis

We explored whether health preferences differed between Polish migrants residing in Ireland and Irish natives, with preferences for health states reflected in each groups' cTTO utility valuations. A naïve comparison between the groups would compare the average cTTO utility value for the Polish respondents to the average cTTO utility value of natives. However, such a comparison will reflect differences in the characteristics of these groups (e.g. age, gender) in addition to differences in preferences between the groups. The extent to which the characteristics of the groups differ can be assessed using the standardised difference (Austin, 2009) between the groups for each characteristic with an absolute standardised difference of < 0.1 consistent with a reasonably similar cohort (Normand et al., 2001). Where the initial cohorts do not meet this threshold, matching methods can allow us to improve the validity of comparisons, by finding a group of native respondents ('control' units) with more similar characteristics to those of the Polish migrants ('treated' units). We used propensity-score matching (PSM) to identify a suitable comparison group of native respondents. While matching is generally used to estimate causal effects,

it is also sometimes used for non-causal questions, for example, to investigate racial or gender disparities (Platt et al., 2016). The Neyman-Rubin Potential Outcome framework defines the effect as the potential outcome with treatment minus the potential outcome without treatment. Conceptually, such 'effects' are not clearly defined where the treatment is not manipulatable (e.g race, gender etc.). This is referred to as the principle of "no causation without manipulation". In our context, it would require that it be meaningful to consider the health preferences of a Polish migrant if they were instead Irish nationals, which conceptually is challenging. Our application of propensity-score matching is in line with this second type of usage, that is, we explore differences between the groups after ensuring they are similar on the available observable covariates. Hence, we use propensity-score matching to enhance similarity (reduce imbalance) rather than in the stronger sense of assuming 'selection on observables' (or conditional independence) holds.

First, we estimated the propensity for an individual to belong to the Polish subgroup *(D = 1),* given their characteristics via a logit regression model. We then matched individuals in the Polish subgroup to those natives *(D = 0)* with similar predicted propensity scores, implying the groups are similar in terms of their observable characteristics at least. By eliminating, or at least reducing, covariate imbalance between the groups, we can estimate the difference in preferences over and above that which can be explained by the groups' characteristics. Moreover, estimates from any subsequent regression analyses are less prone to model misspecification as we reduce the need to extrapolate between groups (King and Zeng, 2006). Since the matching procedure uses only observed characteristics, it is necessary to assume that if observed covariates are well balanced between the groups, then unobserved confounders are too (Dehejia and Wahba, 2002). That is, we assume exchangeability conditional on the observed covariates or the propensity score. The sensitivity of estimates to unobserved confounding can be assessed using the approach proposed by (Ichino et al., 2008).

The following covariates were included in the propensity-score model: age, gender, religiosity, marital status, employment status, educational attainment, number of dependent children, urban household and VAS self-reported health status. It is of importance to note that variables selected for the propensity-score model are selected not on their assumed determination of cTTO utility valuation, but on their assumed indication of whether a respondent is Polish or not. Albeit, it is again important to note that all of the variables which significantly determine cTTO utility valuations are included in the propensity-score model as documented by Sayah et al. (2016). The specification of each variable used in the analysis reported here is detailed in Table 1. Since the health states the respondents valued were block randomised, it was not necessary to match on these, as randomisation should ensure balance. Polish respondents were matched to Irish respondents on the logit of the propensity-score rather than on the propensity score as suggested by Austin (2011). In the baseline analysis, we applied a caliper of 0.8 times the standard deviation of the logit of the propensity-score and matched units using 1:1 matching with replacement. With matching units, there is a bias-efficiency trade-off when using multiple matches for each treated unit from the available control pool. On the one hand using more matches increases efficiency; however, the additional matched controls will be less similar to the treated unit than the best match, potentially leading to bias. Similarly, matching with replacement ensures that if a given control unit is the best match for more than one treated unit, it is used multiple times rather than using an alternative control unit, which is less similar to the treated unit which would again potentially introduce bias. We assess the sensitivity of our result to (a) the use of a wider caliper (0.1 & 0.25 standard deviations), (b) matching to multiple controls (i.e. 1:3 matching), and (c) using an extended Tobit model that includes all of the variables used in the propensity-score matching.

After matching, we compared the average cTTO utility value for the Polish respondents to the average cTTO utility value of matched natives. A complication arises due to the censored nature of the dependent variable (cTTO utility value), which is left censored at values of -1. Respondent values of -1 indicate a health state is so severe that the respondent was willing to trade off all available time. Potential differences in the censoring of data between Polish and Irish respondents means that a simple comparison of the mean cTTO utility valuation outcome would be misleading. Therefore, following Versteegh et al. (2016), a random effects Tobit model is used to account for censoring when comparing the groups' cTTO responses, and to account for multiple observations per respondent. Since the health states are block randomised, it is not necessary to control for the health state being considered in order to avoid bias; however, there can be an efficiency gain by doing so. Therefore, to obtain more precise estimates, we also control for the health state being valued in the Tobit model by including the main effects which are the 20 dummy indicators for each of the levels of the EQ-5D-5L dimensions recorded as = 1 if a given level of a given dimension is present and = 0 if not, with the base category representing the best scenario in each dimension (i.e. level 1 = no problems) is the omitted category in the model. The Tobit model can be written as:

$$Y_{it}^{*} = \alpha + \tau Polish_{it} + \sum_{k=1}^{5}\sum_{j=2}^{5}\beta_{jk} I_{jkit} + \varepsilon_{it}$$

Table 1
Observed matching characteristics.

Variable	Before Matching			After Matching		
	Irish	Polish	Standardised Difference	Irish	Polish	Standardised Difference
	Mean	Mean		Mean	Mean	
Propensity Score	0.068	0.198	−1.362	0.20	0.198	0.014
Independent variables:						
Age	50.4 ± 17.1	35.57 ± 6.5	1.144	36 ± 9.4	35.6 ± 6.5	0.054
Religiosity (1 = attended a religious service monthly)	468 (45.3%)	31 (35.6%)	0.199	27(31%)	31(35.6%)	0.098
Married (1 = married)	613(59.4%)	59(67.8%)	0.176	61(70.1%)	59(67.8%)	0.05
Urban household (1 = urban)	592(57.4%)	72(82.8%)	0.577	77(88.5)	72(82.8%)	0.164
Employed (1 = employed)	486(47.1%)	66(75.9%)	0.619	68(78.2%)	66(75.9%)	0.055
Third level education (1 = third level education)	548(53.1%)	67(77%)	0.518	65(74.7%)	67(77%)	0.053
Gender (1 = male)	378(36.6%)	25(28.7%)	0.169	34(39.1%)	25(28.7%)	0.22
Dependents U18	0.7 ± 1.1	1.4 ± 1	−0.686	1.5 ± 1.4	1.4 ± 1	0.029
Self-reported health VAS (scale 100% Best - 0% worst)	79.6 ± 15.2	82.7 ± 14.8	−0.204	84.1 ± 12	82.7 ± 14.8	0.10

There was no significant difference between the variables used to match both groups after matching using the *pstest*. Continuous variables are presented as mean ± the standard error, and dichotomous variables are reported as *N* (%).

$$Y_{it} = \begin{Bmatrix} Y_{it}^{*} & if & Y_{it}^{*} > -1 \\ -1 & if & Y_{it}^{*} \leq -1 \end{Bmatrix}$$

Where $i = 1, \ldots, N$, indexes the respondents in the matched sample, k indexes the five dimensions in the EQ-5D-5L and j indexes the levels within each dimension. I is a binary indicator equal to 1 if that level j of dimension k was in the health state being valued in choice task t. Polish is an indicator equal to 1 if the respondent was a Polish migrant and 0 if the respondent was a matched control.

To further assess the potential difference in health preference valuations we conducted an additional analysis to assess whether Polish migrants were more likely than comparable natives to assign a negative utility value, that is a 'worse than dead' (WTD) utility valuation, to a given cTTO health state. We applied a logit model with random effects to again account for the multiple observations per respondent (Barry et al., 2018). The same set of covariates was included in this model as described above. The dependent variable (D_{it}) for this model was coded as a 1 if the respondent indicated a cTTO value less than zero for that health state and a 0 otherwise:

$$D_{it} = \begin{Bmatrix} 1 & if & Y_{it} \geq 0 \\ 0 & if & Y_{it} < 0 \end{Bmatrix}$$

3. Results

In Table 1, the matching covariates are presented for both the 'treated' group and 'control' group pre-matching. Comparing the unmatched covariates, we see that the two groups differ quite a lot with respect to age, urban location, the number employed and the proportion that have attained third level education. Overall, the unmatched sample demonstrates that Polish migrants are younger, healthier and better educated. After matching, where the 87 Polish respondents were matched to 87 comparable Irish respondents, we find no statistical difference between observed characteristics using the *pstest from Stata version 15.0* which uses a series of t-tests to examine any significant difference between the matching variables amongst both groups and can be seen in Table 1 of the supplementary material. In terms of the propensity for being Polish, the imbalance is almost eliminated as shown in Fig. 1, after matching the distribution of propensity scores are virtually identical while before matching, we can see that the two groups were quite different.

The results from the random effects Tobit regression analysis are presented Table 2 in which the "main effects" (i.e. a series of dummy variables describing the health state valued) and a dummy variable for migrant status are controlled for. We find that as health states increase in severity, a greater disutility valuation (lower cTTO utility value) is applied, as one would expect. Polish migrants are found to attach a greater disutility value on average per health state when compared to comparable natives. Being Polish is associated with a utility decrement of 0.144 per a given health state relative to similar Irish respondents on average ($p < 0.05$). To give the utility decrement associated with being Polish of 0.144 some context, the value is similar in magnitude to the difference in the utility decrement of moving from level 4 to level 5 in the pain/discomfort dimension (0.385–0.236 = 0.149).

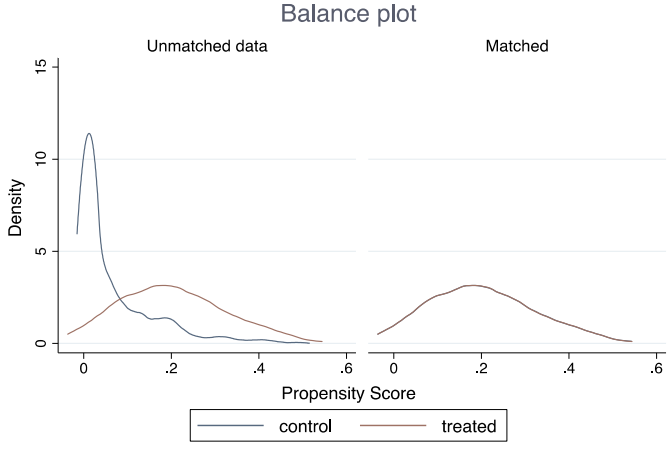

Fig. 1. Propensity score balance across both the control and treated groups before and after matching.

Table 2
(1) Random Effects Tobit model and (2) Random effects logit marginal effects controlling for health states and migrant status.

Variables	1. DV: cTTO disutility		2. DV: WTD	
	Coefficient	Standard Error	Coefficient	Standard Error
Polish	0.144**	0.071	0.114***	0.042
Mobility				
Slight problems	0.123***	0.034	0.079***	0.021
Moderate problems	0.097***	0.036	0.058***	0.02
Severe problems	0.188***	0.04	0.099***	0.022
Unable	0.229***	0.036	0.101***	0.02
Self-care				
Slight problems	0.088**	0.035	0.032*	0.017
Moderate problems	0.060	0.039	0.011	0.021
Severe problems	0.168***	0.039	0.032*	0.019
Unable	0.176***	0.035	0.05***	0.018
Usual activities				
Slight problems	0.050	0.036	0.009	0.022
Moderate problems	0.062	0.039	−0.007	0.022
Severe problems	0.095**	0.038	0.037*	0.02
Unable	0.138***	0.035	0.031*	0.017
Pain/discomfort				
Slight	0.03	0.032	−0.004	0.02
Moderate	0.045	0.039	0.01	0.02
Severe	0.236***	0.035	0.09***	0.019
Extreme	0.385***	0.038	0.134***	0.021
Anxiety/depression				
Slight	0.1***	0.038	0.063**	0.026
Moderate	0.136***	0.042	0.058**	0.026
Severe	0.426***	0.038	0.172***	0.028
Extreme	0.507***	0.036	0.195***	0.026
Constant	−0.076	0.063		
Observations	1740		1740	
Clusters	162		162	

***p < 0.01 **p < 0.05 *p < 0.1.
(1): Dependent variable (DV) = cTTO disutility value; base/reference category = no problems in each health dimension. The coefficients are from random effects Tobit model with 162 clusters with weights expanded. There are ten observations per respondent as each respondent valued ten-cTTO tasks.
(2): Dependent variable (DV) = WTD = 1 if respondent applied a negative utility value to a given cTTO health state, and 0 if not; base/reference category = no problems in each health dimension. The marginal effects are from random effects logit model with 162 clusters with weights expanded. There are ten observations per respondent as each respondent valued ten-cTTO tasks.

We assessed whether Polish respondents were also more likely to report states as being WTD (i.e. negative utility), using a random effects logit model and report the marginal effects in Table 2. As health states increase in severity respondents are more likely to assign a negative utility valuation. Polish migrants are 11 percentage points more likely to assign a WTD valuation to a given health state than comparable natives ($p < 0.01$). The 20 main effects are included only as a means to control for the health state valued by each respondent. Some logical inconsistencies are evident in both models, whereby the magnitudes of the coefficient do not monotonically increase with the severity of the health state. This may be attributed to random error, and it is typically not considered any reason for concern as noted by Versteegh et al. (2016). The logical inconsistencies may be attributable to our small sample size. In the supplementary material in Table 2, a random effects

Table 3
The estimated difference in cTTO disutility and the probability of reporting a state worse than death (WTD) by the method.

Pre-processing (k:k matching; caliper)	Analysis	Dependent Variable	Estimated Effect	Standard Error
Unadjusted	Comparison of means	cTTO	−0.08	0.05
PS matching (1:1; 0.8σ) ŧ	Comparison of means	cTTO	0.123*	0.065
PS matching (1:3; 0.8σ)	Comparison of means	cTTO	0.098*	0.054
PS exact matching (Gender & Urban 0.8σ)	Comparison of means	cTTO	0.07	0.07
PS matching (1:1; 0.8σ) ŧ	Random effects Tobit	cTTO	0.144**	0.071
PS matching (1:3; 0.8σ)	Random effects Tobit	cTTO	0.096*	0.057
Unadjusted	Random effects Logit	WTD	−0.03	0.03
PS matching (1:1; 0.8σ) ŧ	Random effects Logit	WTD	0.114***	0.042

****p < 0.01 **p < 0.05 *p < 0.1.*
ŧ primary method and result used in the study.
σ caliper size.

Tobit model was used to examine the impact of the length of residency (LOR) of Polish nationals on health preferences valuation, with the average LOR of a Polish migrant equal to nine and a half years. LOR was entered into a model with Polish respondents only as an independent variable and it was found to have no significant bearing on health preference valuation. For brevity, these results are not presented here but are in the supplementary material.

To assess the sensitivity of the results we used wider calipers of 0.1 and 0.25 using 1:3 matching in place of 1:1 matching with a caliper of 0.8. Results using the alternative calipers were identical to those presented above. Using 1:3 matching implies using more of the available controls, potentially increasing efficiency, albeit at the risk of obtaining poorer matches raising the possibility of bias. As shown in Table 3, estimates are somewhat smaller with 1:3 matching than in the baseline analysis. Exactly matching on gender and urban location leads to a smaller and statistically insignificant difference between groups; however, this leads to poorer matches in terms of the other covariates, namely on the age variable with the difference in age between the treated and control group becoming statistically different. These sensitivity results can be seen in Table 3.

In the final sensitivity analysis, we used an extended Tobit model that included all of the variables used in the propensity-score model which can be seen in the supplementary material in Table 3. In the extended Tobit model, our key explanatory variable 'Polish' becomes statistically significant at ($p < 0.1$). This result is to be expected as we have introduced multicollinearity into the model as each of the extra included variables are correlated with being Polish as noted in the logit model in the first part of the propensity-score matching model. This result was also to be expect given how the extra included variables all have small partial effects on cTTO utility valuation and are all statistically insignificant.

4. Discussion

Our study examined the health preferences of a group of Eastern European migrants residing in another European state relative to comparable natives. While other studies have examined the health preferences of ethnic groups within a nation (Pickard et al., 2013; Shaw et al., 2007)) to the best of our knowledge, our study is the first to explicitly examine the health preferences of migrants relative to comparable natives. The study more specifically examined the health preferences of Polish migrants living in Ireland relative to comparable Irish natives as an exemplar. The results of our study provide evidence that differences exist in the utility valuations assigned to a given health state according to migrant/native status.

Our findings should be set within the context of a large literature that delves into the differences in health and health-related behaviours of migrant populations relative to a host population. With the differences between migrants and host populations being explained in terms of the differing health stock of migrant groups, differing use and access to healthcare services. The so-called "healthy migrant effect" is well documented in the literature (Rechel et al. (2013); Rubalcava et al. (2008); Marmot (2016); Malmusi (2015)) whereby, migrants to a new country tend on average to be healthier than comparable natives and to fellow compatriots. Although the health advantage enjoyed by migrants is seen to dissipate with additional years lived in a host country (Constant et al., 2018). Any dissipation of the migrant health advantage that might exist here is not seen to translate to health preferences, as noted in a supplementary analysis, with the length of time a Polish migrant has been resident in Ireland having no significant effect on health preference valuation. Migrant populations are seen to have differing use and access to healthcare services in their country of destination in Europe, and are characterised by low levels of use of preventive service use and high levels of accident and emergency department use (Graetz et al. (2017); Guillon et al. (2018); Jayaweera and Quigley (2010)). Barriers to healthcare such as cost, language difficulties, lack of familiarity, and lack of entitlement are all causes of observed differences in healthcare use between migrants and their native counterparts (Norredam et al., 2010). Transnationalism provides another rationale for the observed differences in healthcare use of migrants. Migrants compensate for their relative low-level of use of healthcare services in their country of destination for more intensive use of healthcare in their country of origin. Eastern European migrants in both Ireland and the United Kingdom are shown to have more substantial use of healthcare services in their home country as noted in the respective studies by Stan (2015) and Sime (2014). Transnationalism can account for these differences in migrant healthcare seeking practice and health-related behaviours.

Transnationalism can be used to help explain health-related behaviours of migrants, but it can also be used to explain observed differences in health preferences of a migrant group relative to comparable natives as migrants may be more capable of upholding their cultural values and preferences in a host country through transnational ties. The data collected for this study used the EQ-5D-5L and the accompanying protocol to ensure a standard methodology in data collection was utilised allowing for a more meaningful comparison of both groups. The observed differences in healthcare use as noted above could be indicative of systematic bias against migrants, but equally, it could be evidence of transnational health preferences coming to light. The results from our study provide evidence that Polish migrants on average will apply a greater disutility valuation of 0.14 to a given health state. Pickard et al. (2013) note a similar finding using the EQ-5D-3L but across ethnicity and record that in the United States blacks will apply a lower disutility valuation per a given health state of 0.13 versus whites. Quantifying what is a meaningful difference in health state utility valuations is an area of contention with it noted by Shaw et al. (2007) that a difference of 0.10 or larger is generally held to be a meaningful difference. Shaw et al. (2007) again note that differences in health state utility valuations between groups may be indicative of time preference with it being suggested that individuals who apply a greater disutility

valuation to a given health state have a higher rate of time preference (discount future utility more heavily). Moreover, the differences in our study in terms of health state utility valuation, sees migrants attaching a greater disutility valuation to a given health state this may suggest the migrant group have a higher rate of time preference. We also note that the observed difference in health state utility valuations between Polish migrants and comparable Irish natives to be a meaningful difference. The second finding from our study denotes that Polish migrants are more likely to assign a negative utility value to a given health state highlighting their desire to avoid severe health states when compared to comparable natives and further signifying how migrants apply a greater disutility valuation to health states.

Further differences in health preferences are also shown to exist at a national level between Poland and Ireland. These differences are highlighted in each countries' respective EQ-5D-5L value sets; Polish residents place the greatest utility decrement on the pain/discomfort dimension at level five and Irish nationals place the greatest utility decrement on the anxiety/depression dimension at level five ((Golicki et al., 2019) (Hobbins et al., 2018)). While difference in health preference exist at national level, this study has noted differences in health preferences exist between a sample of Polish migrants and Irish natives. Migrant status is only one predictor of health state utility valuations. Previous work has noted the significance of several socio-demographic characteristics as predictors of utility valuations including sex, age, marital status and rurality and the insignificance of others has also been noted, including a respondent's own experience of serious illness, household income, health literacy level, ethnic background, self-reported health (VAS) and multimorbidity (Sayah et al., 2016). Unobserved variables which we were unable to account for also may determine cTTO utility valuations such as, an individual's rate of time preference as noted above. While unobserved factors may affect cTTO utility valuations we have shown that there is a significant association of being Polish on cTTO utility valuation when compared to an Irish native.

The findings from this study may have implications for the use of healthcare services including preventive services, end of life care, organ donation, advanced directives or even cancer medication use that prolong life in a poor quality by a short period. By migrants attaching a greater disutility valuation to health, this may signify a higher rate of time preference as mentioned previously and a lower propensity to consume certain healthcare services as the perceived benefits of care are less apparent. Migrants are well documented to have low use of preventive services as noted above. This low use of preventive services may be reminiscent of health preferences and not just a simple function of access and the traditional barriers to healthcare, as those with a high rate of time preference do not readily invest in preventive service use through low uptake (Lawless et al., 2013). The transnational health preferences of the Polish migrants will not influence access to healthcare services, but it might influence the desire to use certain vital healthcare services.

Our study has added another rationale to the observed differences in the health-related behaviours of migrants relative to the native population. Differing healthcare use is not only a question of access but of preferences, too. Transnationalism can underpin the observed differences in health preferences between the Polish migrants and comparable Irish natives. Transnational ties shape health-related behaviours of migrants from the use of healthcare services to health preferences. Further research in this area is needed to thoroughly examine how health preferences and healthcare service use are related. It can be argued that the EQ-5D-5L protocol has a secondary function to generating value sets. EQ-5D-5L health preferences can be used in analysing national healthcare systems, with this in mind policymakers in Ireland and Europe can, therefore, use the results from this study to help understand transnationalism and how it shapes the health preferences and health-related behaviours of migrants. Moreover, the results from this study could be used potentially in healthcare service design with a specific focus on migrants with the findings being used in a bid to increase demand-side factors for preventive service uptake amongst migrants.

5. Conclusion

Differences in health preferences are evident across nations that were measured using the standard protocol of the EQ-5D-5L. These differences can be meaningfully interpreted where differences in values are found. The health preferences of Polish migrants residing in Ireland are statistically different from comparable Irish natives. The results of our study can be interpreted through the prism of transnationalism. Transnationalism has a role in shaping migrant health-related behaviours, health outcomes and possibly health preferences. This study has offered another explanation to the observed differences in health-related behaviours of migrants by suggesting that the differences observed in healthcare use are not alone limited to the traditional barriers to healthcare experienced by migrants, but also to the health preferences of migrants. The importance of EQ-5D-5L health preferences is evident across nations with many national health regulatory bodies using them to help inform healthcare resource allocation decisions. Therefore, policymakers in Ireland and Europe can use the results from this study to guide their efforts in understanding transnationalism and its role in shaping the health-related behaviours of migrants. The results of this study may resonate, as a note of caution in assuming that differences in patterns of healthcare use are merely a function of access. The disparity observed, in other words, may not alone be inequality.

6. Limitations/further research

We had a relatively small sample size of Polish migrants and a small number of matched native Irish. The sample may not be representative of the Polish community residing in Ireland. Other potential important socio-demographic information was not included in the analysis as it was absent from our dataset such as an individual's rate of time preference or their health status before migration. The respondent's proficiency with English was not controlled for in the analysis. The collection of new EQ-5D-5L data, time preference data and healthcare service use data on Polish migrants and Irish natives will allow us to examine the area of health preferences and healthcare service utilisation in further depth. With the recent completion of the Polish EQ-5D-5L value set this will allow us to examine further how do the health preferences of Polish migrants differ to their fellow compatriots and to what further extent does transnationalism account for these potential differences. While this paper has uncovered there is evidence of a difference in the health preferences of Polish migrants and Irish natives further research in this area could look to collect new EQ-5D-5L data on Polish living in Poland and Polish living in Ireland to see how their health preferences potentially differ to more explicitly examine a migration effect.

Authors contributions

Each author fully, fairly and equally contributed to the drafting of this manuscript.

Dan Kelleher: data curation, data analysis, writing original draft and redrafting of the manuscript. **Luke Barry:** data curation, data analysis and redrafting of the manuscript. **Anna Hobbins:** data curation and redrafting of the manuscript. **Stephen O'Neill:** data analysis and redrafting of the manuscript. **Edel Doherty:** redrafting of the manuscript. **Ciaran O'Neill:** data curation and redrafting of the manuscript.

Declaration of competing interest

None of the authors have any conflicting interests, monetary or

otherwise that would in any way inhibit the submission and publication of this research.

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Appendix A. Supplementary data

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