

Inequalities in under-5 mortality. What about parental origin?

Emmanuel Idohou
PhD student in Demography, UCLouvain (Belgium)

Background

- Much progress in child survival has been made in all over the world
- This progress has been driven by the acceleration of a **decline in mortality among children under age 5 since 2000**(UN IGME,2019).
- **SDG target of 25 or fewer deaths per 1,000 live birth has been achieved by 121 countries** including France (UN IGME,2019) where Children face widespread ethnic disparities in their chances of survival (Wallace et al., 2020)
- How does under-5 mortality (U5M) vary by parental origin ?

Methodology

Data :

- The permanent demographic sample, the largest French sociodemographic panel with a sample of 657,548 births from 1990 to 2019.
- Parental origin is measured by the mother's country of birth grouped into 5 regions: Sub-Saharan Africa, North Africa, Asia, Europe, America-Oceania & Other.

Methods :

- The use of the **propensity score** in order to balance education, standard of living and Socio-professional category between immigrant and native
 $e(x_i) = P(z_i = 1|x_i)$,
 $(z_i, x_i)(i = 1, 2, ..., N)$,

$$\begin{cases} z_i = 1 \text{ for native} \\ z_i = 0 \text{ for immigrant} \\ x_i = \text{the set of covariates for individual } i \end{cases}$$

- **Inverse Probability of Treatment Weighting** (IPTW) method based on the propensity score was implemented and then compared to the **matching method** based itself on the propensity score
 $w_i = \frac{z_i}{e(x_i)} + \frac{(1-z_i)}{(1-e(x_i))}$
- This methods are implemented in $\mathbb{R}$ using the cobalt and MatchIt packages
- Regression model: parametric Weibull model using Stata

Results

How does age-specific mortality vary by parental origin?

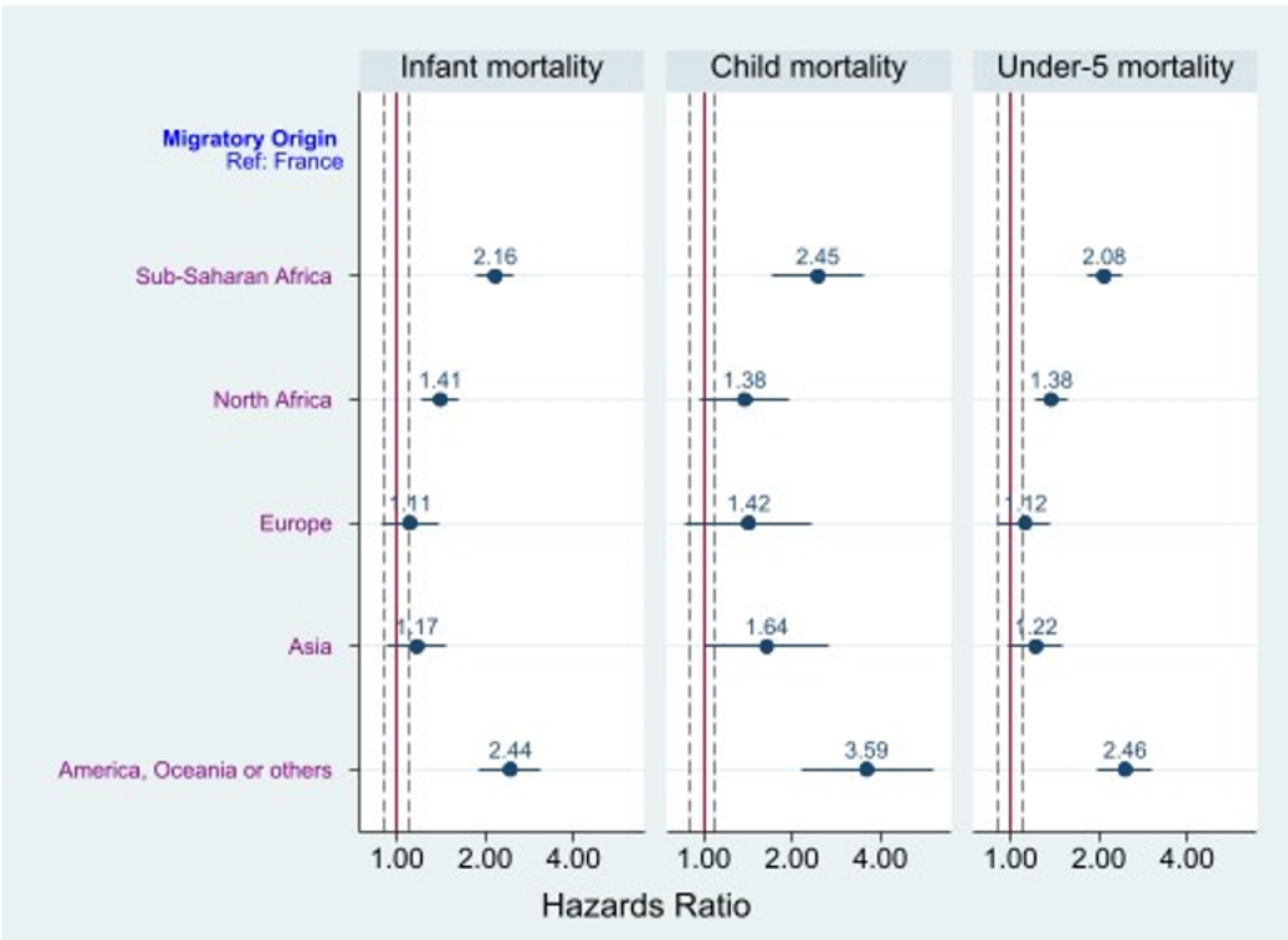


Figure 1:: Age-specific mortality by parental origin

Share of socioeconomic characteristics (SEC) before and after weighting

Socioeconomic characteristics	Before weighting		After weighting	
	Immigrant	Native	Immigrant	Native
Education				
No	20.3	11.6	14.1	13.4
Primary or secondary	45.3	48.1	47.8	47.5
University	34.4	40.3	38.1	39.1
Standard of living				
Poor	58.5	31.9	38.6	37.2
Intermediate	32.8	57.9	51.4	53.0
Rich	8.7	10.2	10.0	9.9
Socio-professional category				
Agro. trader or arts and crafts	3.0	4.1	4.0	3.9
Executive	4.2	6.1	5.9	5.8
Intermediate	11.8	26.3	22.1	23.4
Employee	21.7	30.9	29.0	29.1
Worker	4.5	4.5	4.5	4.5
Inactive or unknown	54.9	28.1	34.5	33.3

This table shows a balance between the two groups (immigrants and natives)

Then, to assess the balancing property of the propensity score, some indicators including the **standardized difference approach** were calculated using the following formula :

$$\sqrt{\frac{p_{Na} - p_{Im}}{p_{Na} \times (1 - p_{Na}) + p_{Im} \times (1 - p_{Na})}}$$

p_{Na} and p_{Im} are respectively the proportion of natives and immigrants for a given characteristic.

Socio-economic characteristics	Type	Diff.Un	V.Ratio	Diff.Adj	V.Ratio.Adj
Level of the last degree					
None	Binary	-0.0873	NA	-0.007	NA
Primary or secondary	Binary	0.0279	NA	-0.0026	NA
University	Binary	0.0593	NA	0.0096	NA
Standard of living					
Poor	Binary	-0.2651	NA	-0.0144	NA
Intermediate	Binary	0.2506	NA	0.0157	NA
Rich	Binary	0.0145	NA	-0.0013	NA
Socio-professional category					
Agro. trader or arts and crafts	Binary	0.0107	NA	-0.0011	NA
Executive	Binary	0.0191	NA	-0.0015	NA
Intermediate	Binary	0.1452	NA	0.0131	NA
Employee	Binary	0.0927	NA	0.0015	NA
Worker	Binary	0.0004	NA	0	NA
Inactive or unknown	Binary	-0.2681	NA	-0.0121	NA
pscore	Continuous variable	0.7564	0.8052	0.0244	1.0671

Table 1::Standardized differences and variance ratios before and after weighting

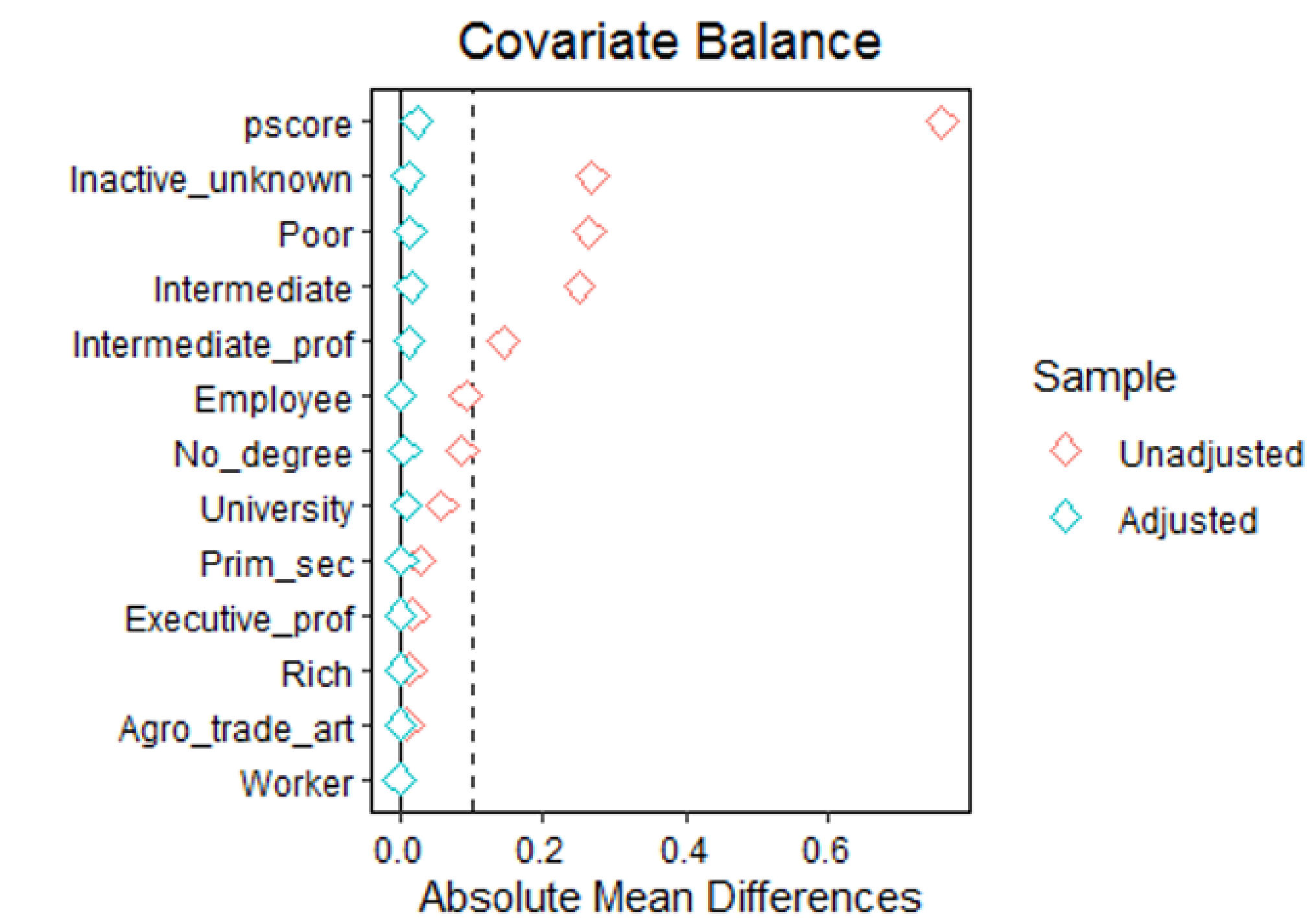


Figure 2:: Covariate balance

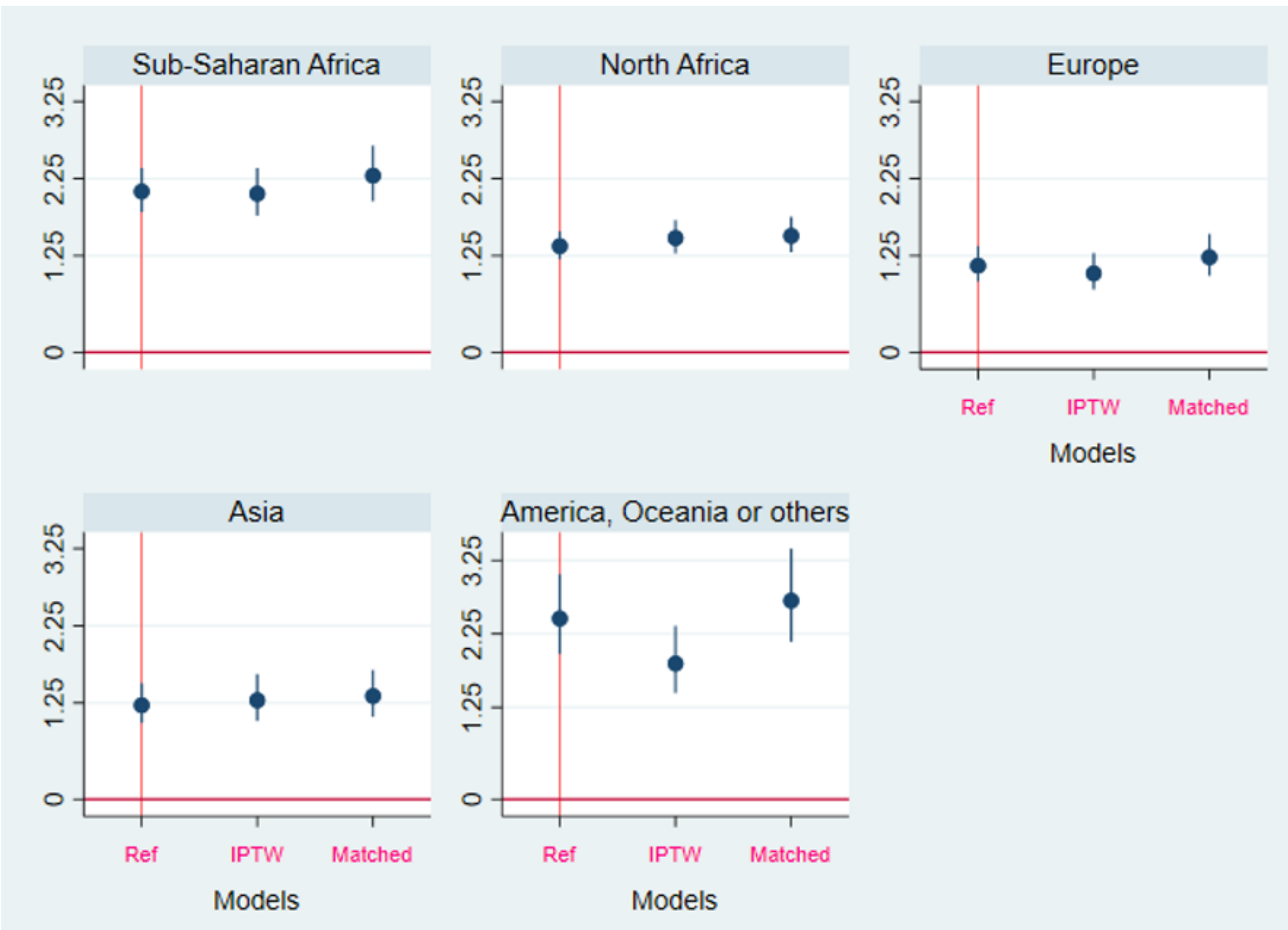


Figure 3:: Comparison of U5M according to the parental origin obtained from the propensity score methods

Comments :

- Figure 1 is the result of an unadjusted model showing an excess under-5 mortality among children of immigrant mothers, except for those from Europe and Asia regardless of the age group but higher for the 1-4 age group. In this model, the differences in terms of SEC between immigrants and natives make them incomparable.
- We therefore proceeded to rebalance them on the basis of covariates relating to standard of living, socio-professional category and level of education (tables and figure 2), which have been proven to be favorable to the natives.
- By comparing IPTW and matching methods which serve to adjust the SEC to the unadjusted model (Ref), the results (figure 3) not only confirmed an excess mortality of all children of immigrants except those from Europe but also a higher excess mortality for most children of immigrants.

In short

- Mother origin plays an essential role in the construction of inequalities especially in terms of under-5 mortality. These inequalities remain and are reinforced after adjusting for socioeconomic characteristics; which can be indicative of discrimination.
- What about other socioeconomic characteristics ?

Bibliographic references

- UN IGME. (2019). Levels & Trends in Child-Report 2019 (p. 1-52).
- Wallace, M., Khlat, M., & Guillot, M. (2020). Infant mortality among native-born children of immigrants in France, 2008–17: Results from a socio-demographic panel survey. European Journal of Public Health, 1-8.doi.org/10.1093/eurpub/ckaa186.

Address mail

idohou_e@yahoo.com