Erratum

Erratum: Fatter Attraction: Anthropometric and Socioeconomic Matching on the Marriage Market

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Alfred Galichon pointed out to us an error in our paper "Fatter Attraction: Anthropometric and Socioeconomic Matching on the Marriage Market" (Chiappori, Oreffice, and Quintana-Domeque 2012). The properties derived in the theory section (sec. III) are not sufficient to validate the empirical strategy developed in the following section; the latter requires more specific assumptions.

The issue can easily be described in the TU (transferable-utility) case (sec. III.B). We use the same notation as in the initial paper. In particular, women (men) are characterized by a vector $(X, \varepsilon) \in \mathbb{R}^L \times \mathbb{R}^K$ ($(Y, \eta) \in \mathbb{R}^K \times \mathbb{R}^L$), where X (Y) is a vector of observable female (male) characteristics and ε (η) is a random vector reflecting female (male) unobservable attributes. Proposition 2 actually implies that, for any stable matching, the conditional distribution of the female index $I(X)$, given the male characteristics Y, depends only on the male index $J(Y)$, and conversely. This property can be used to empirically estimate these indexes even in the most general framework, a possibility explored in forthcoming work.

However, under the hypothesis made in the initial paper, this property does not necessarily extend to individual characteristics themselves. The issue here is that in this context, generic uniqueness of the stable

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matching does not hold for index models. The argument goes as follows. Consider a stable matching, and take any $\bar{X}$ matched with some $\bar{Y}$; define the sets $\bar{\mathbb{X}} = \{X \text{ such that } I(X) = I(\bar{X})\}$ and $\bar{\mathbb{Y}} = \{Y \text{ such that } J(Y) = J(\bar{Y})\}$ (which, under standard smoothness assumptions, are included within $(L-1)$- or $(K-1)$-dimensional manifolds). Then any one-to-one, measure-preserving mapping from $\bar{\mathbb{X}}$ to $\bar{\mathbb{Y}}$ generates a stable matching. In other words, while the index structure constrains the mapping between indices, the matching within sets of individuals with the same index is fully indeterminate. In particular, it is always possible to find stable matchings for which the conditional distribution of some (or all) of the components of vector Y, given X, does not depend only on $I(X)$.

To be valid in a continuum context, the empirical strategy adopted in the paper requires more specific assumptions regarding the stochastic structure of the model. For instance, one may use the normal quadratic model of Chiappori, McCann, and Pass (2017), which can be estimated through ordinary least squares regressions (or SURs [seemingly unrelated regressions]) of individual characteristics on the spouse's. Alternatively, one may omit the stochastic vector η, take $K = L$, and assume that the surplus takes the additive form,

$$S(X, \varepsilon; Y) = s(X, Y) + Y'\varepsilon,$$

where the function $s(X, Y)$ is, moreover, linear in Y:

$$s(X, Y) = Y' \cdot \Psi(X) \tag{1}$$

for some mapping Ψ from $\mathbb{R}^K$ to $\mathbb{R}^K$. Then the utility $v(Y)$ of male Y satisfies

$$D_Y v(Y) = \Psi(X) + \varepsilon, \tag{2}$$

where $D_Y v$ denotes the gradient of v. If the mapping $\Phi : Y \rightarrow D_Y v$, from $\mathbb{R}^K$ to $\mathbb{R}^K$, is invertible, then equation (2) can be written as

$$Y = \Phi^{-1}(\Psi(X) + \varepsilon), \tag{3}$$

which is a multidimensional transformation model (see, e.g., Chiappori, Komunjer, and Kristensen 2015). In the specific version where the surplus s is bilinear and the distributions of (X, ε) and Y are normal, then both Ψ and Φ are, moreover, linear:

$$\Psi(X) = \bar{\Psi}X, \quad \Phi(Y) = \bar{\Phi}Y,$$

where $\bar{\Psi}$ and $\bar{\Phi}$ are $K \times K$ matrices. The relationship (3) becomes

$$Y = AX + \bar{\Phi}^{-1}\varepsilon, \quad \text{where } A = \bar{\Phi}^{-1}\bar{\Psi}.$$

If ε is independent of X, this relationship, which is a particular case of Chiappori, McCann, and Pass (2017), can be estimated by SUR.

Finally, if the surplus is indexed in X,

$$s(X, Y) = Y' \cdot \psi(I(X)),$$

then equation (3) becomes

$$Y = \Phi^{-1}(\psi(I(X)) + \varepsilon).$$

We still have a transformation model that moreover depends on X only through $I(X)$. In particular, the conditional distribution of Y, given X, depends only on $I(X)$; and in the linear case, the matrix A is of rank 1.

References

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