For each state (*s*)GTAP sector (*g*) dyad, we calculated elasticities that measure the average percent response of employment of each dyad to changes in the nationally-aggregated employment stocks in their respective GTAP sector. The baseline model, which controls for time-invariant dyad-specific characteristics, is formally specified as follows:

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where is the log of employment in the GTAP sector *g* of state *s*; is the log of employment for the nationally-aggregated GTAP sector *g,* defined as ; are dyad-specific intercepts; are coefficients that control for sector specific time effects for each period *t*; and are errors terms, assumed to be stationary and normally distributed. Elasticities , which are the parameters of interest, are heterogeneous across different dyads, with defined first (and second ( moments.

The intuition behind estimating of specific elasticities is that it is likely that it reasonable to assume that subsectors in each municipality will respond differently to changes in the aggregate GTAP sectors following a trade shock. By using heterogeneous elasticities, we incorporate more information through higher variability, resulting in a more precise estimates.

We then combine the simulated percent changes in employment for each one of the 57 GTAP sector, which resulted from the CGE model, and the estimated dyad-specific elasticities, to fit the expected percent changes in employment for each subsector of every municipality (*m*) after trade liberalization, assuming that elasticities are homogeneous within each state:

where stars denote simulated values.