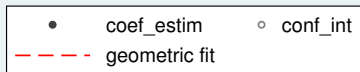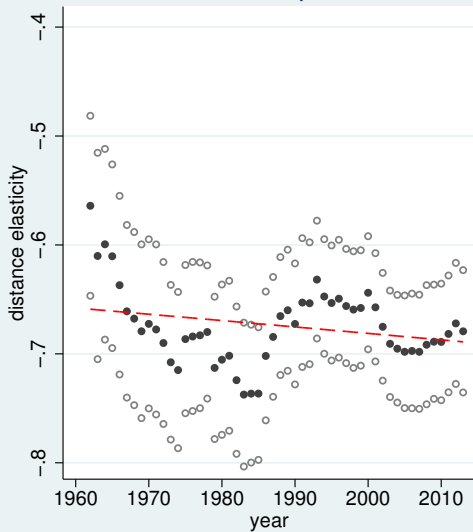The sample composition effect