

4.3 Matching estimation in presence of R&D subsidy spillovers

As we said above, the matching procedure is based on comparing a treated unit with a non-treated one resulting very similar to the first in term of economic structure. As suggested by Klette, Møen and Griliches (2000), nevertheless, the presence of high spillover effects induced by the subsidy on non-supported firms could severely underestimate the level of the (actual) additionality; indeed, since more similar firms are likely to be more “linked” (than dissimilar firms), when the R&D support is provided only to some firms, then its beneficial effect will be transmitted also to other firms according to their “closeness” to the first ones; since the “control group” is defined exactly as those non-supported units that are very similar to the supported units (in terms of economic structure), then it is likely that even these particular non-supported firms will benefit “indirectly” of the support, in so *augmenting* their R&D effort through their linkages with supported units.

In this sense, it would be not surprising if the level of additionality were underestimated; econometrically, it is like a sort of “omission of relevant variable” (as we saw above), that should be taken into serious account when getting results.

In this setting, one possible solution could be that of introducing into the structural equation governing the effect of support on R&D effort a spillover measure due to the support; nevertheless, when the support variable is binary and levels are unknown (as in the matching case), how can we produce a sound measure of the spillover variable? The previous authors do not provide any specific answer to this important issue; they only seems to look at that as a “cautionary footnote” for those implementing matching procedure.

What is now quite clear is that, when using matching rather than control function based on OLS, this problem is surely exacerbated; in such a situation, therefore, the benefits of using matching could not outweigh those of using simple OLS.

5. A STRUCTURAL SELECTION MODEL WITH BINARY TREATMENT

So far, we have considered a binary support variable both in a control function (based on OLS) and in a matching context; these methods are strongly empirical since the only included theoretical aspects are those concerning the choice of the control variables. Nevertheless, even in a setting where subsidization takes a binary form a structural model can be used.

According to Busom (2000), a selection structural model has two main advantages compared to matching and OLS: 1. it can overcome the problem of “selection on unobservables” that matching (as well as OLS) are unable to treat; 2. It can make more explicit the underlying theoretical model by the specification of a system of behavioural equations. We briefly present this approach.

If some unobservable variables affect simultaneously the outcome and the treatment status, even by conditioning on the right observables, the estimation of the ATET could be inconsistent since, by definition, w and y are still correlated. To take into account the presence of selection on unobservables, Heckman (1978) and Maddala (1983) provided an estimation procedure for a model with endogenous selection; the model is composed of two (correlated) equations: one for the outcome and one for the selection equation, and takes the following form: