Extended Abstract:

Incorporating Related and Unrelated Variety into Firm Dynamic Interrelationships

There is a considerable stock of literature concerning firm births and deaths. The interest in firm dynamics¹ research can be attributed to its importance in contributing to employment and growth (Dejardin and Fritsch, 2011; Urbano et al., 2019). Research in this area is increasingly taking a regional focus [see Bishop (2019); Lee et al. (2013); Colombelli and Quatraro (2018) for examples]. The importance of industrial factors like agglomeration economies, industrial specialisation, and diversification have also been incorporated into this area [see Content et al. (2019); Wixe and Andersson (2017) for examples]. There is less focus however on the role of firm dynamic interrelationships. Empirical research and has found that previous firm dynamic activity plays a significant role in influencing future levels of firm dynamic activity through competition and multiplier effects (Resende et al., 2015; Gajewski and Kutan, 2018). Yet firm dynamic interrelationships are still seldomly incorporated into models examining the determinants of firm dynamic activity [see Dong (2020); Power et al. (2019) for examples]. The few studies which do control for previous firm dynamic activity rarely do this while also accounting for sectoral effects [Dejardin (2004) and Carree et al. (2011) are two of few exceptions to this]. This can be considered somewhat remis due to theoretical and empirical evidence that firm sector influences firm dynamic activity [see Carree and Thurik (1996); Herrendorf and Teixeira (2011); Nyström (2006) examples]. The lack of sectoral information within these firm dynamic interrelationship studies also means that variables which are increasingly tested for in firm dynamics literature like related and unrelated variety [see Power et al. (2021) for examples] cannot be accounted for. This presents a knowledge gap to which this paper contributes directly.

This paper conducts a sectoral analysis of firm dynamic interrelationships in Ireland. The geographic and sectoral scope of the data is such that not only can sectoral effects be captured in the model, as they are by Carree et al. (2011); Dejardin (2004), but the paper can further expand on these works and incorporate the importance of related and unrelated variety into examining the determinants of firm dynamic interrelationships. This expands on the conceptual literature originally set out by Johnson and Parker (1994) and their competition, multiplier, and Marshall effects², and it also builds on current firm dynamic research by controlling for popular industrial factors like related and unrelated variety as well as more neglected variables like time lagged firm birth and death rates. By developing related and unrelated variety firm birth and firm death variables. To the best of the authors knowledge, these variables have never been applied before by any other paper examining this topic. The utilisation of these related and unrelated variety firm birth and firm death variables will allow for not only the examination of the relationships between aggregate firm births and firm deaths over time, but also the relationships between firm births and firm deaths in related sectors and unrelated sectors over time.

¹ Firm dynamics will henceforth be used to refer to firm births and firm deaths over time.

 $^{^2}$ These effects will be explained in greater detail in the section 2 but a brief explanation will be offered here. The multiplier effect is when firm dynamic activity (firm births or deaths) causes more of the same activity i.e. births cause more births. The competition effect is the opposite, when firm dynamic activity induces the opposite type of activity i.e., firm deaths cause births. The Marshall effect is the natural passing of firms which were previously birthed i.e., the firm births in one year are attributable to a series of births which occurred previously.

This is done by the utilisation of an incredibly novel dataset from the Central Statistics Office (CSO) of Ireland concerning business demography data at the NACE 4-digit level where all enterprises in NACE Rev 2 sectors B - N excluding K64.20 are contained in the dataset and are broken down geographically at the county and sub-county level into 34 different regions with over 100,000 observations between the 2008-2016. In order to capture related variety and unrelated variety effects sector sensitive firm births and death rate variables are constructed to show firm births and deaths in related or unrelated sectors. Additionally, other standard measurements are used as control variables to account for the influence which industrial, economic, and demographic factors may have on firm births and deaths in Irish regions. Standard OLS and fixed effects regression estimations are performed to obtain preliminary results for the analysis.

Results are mixed for the case of firm births and deaths influencing future firm births and firm deaths. Firm births are found to positively affect future firm deaths which would indicate the presence of the competition effect whereby firm births would induce increased levels of competition and cause future firm deaths (Carree et al., 2011; Pe'er and Vertinsky, 2008). Also, it appears that firm births both positively and negatively affect future firm births across models depending on whether the model is a pooled or fixed effects model respectively, which would provide partial evidence for both the multiplier effects whereby firm births can induce more firm births via income or signalling effects, and competition effects whereby firm births negatively impact future firm births due to competitive pressures (Gajewski and Kutan, 2018; Nyström, 2007). Regarding the related and unrelated variety measures for firm births and firm deaths, results indicate presence of the multiplier effect in the case of related variety firm births in affecting firm births as firm births from related sectors seem to positively influence future firm births and we also observe that firm deaths in related sectors appear to negatively impact future firm births. Regarding the unrelated variety measures of firm births and firm deaths, the findings show that in the case of determining firm births, there is evidence of the competition effect as firm births in unrelated sectors negatively impact firm births while firm deaths in unrelated sectors positively influence future firm births. In the case of determining firm deaths, unrelated variety measures provide mixed results depending on whether they are in a pooled or fixed effects regression; the coefficient sign switching positive to negative respectively. This indicates that in the case of determining firm births, the multiplier effect is present among related sectors and the competition effect is present in unrelated sectors. Mixed results are found for the case of determining firm deaths via unrelated variety firm births and no effect is found form unrelated variety firm deaths.

The findings of the paper can also be considered of interest to current policy measures set out in the European 'Smart Specialisation' and 'Cohesion' policy plans which both seek to encourage the formation and support of firms as a means of improving growth and employment (EC, 2020; EC, 2021). Additionally, the findings of this paper are also of particular concern to Irish policy organisations like Enterprise Ireland who invest millions of Euro into Irish firms and start-ups, \notin 43 million into start-ups alone in 2020 (EI, 2020), each year and consequently affect they rate of firm births and firm deaths within Irish regions. These findings would suggest that investment into firms in related sectors within a region would help to encourage further firm births in the future via multiplier effects, whereas investment into firms in unrelated sectors could bring about future firm births via competition effects.

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