**Firm-demographics and IPRs in Norwegian firms**

Submitted by Eric J. Iversen and Tore Sandven
**NIFU**

## Background

The paper analyses the role that IPR (patents and trademarks) play during different modes of firm-formation (and obsolescence). Firm formation is often more complicated than the term 'entry' suggests. In addition to "greenfield" start-ups, there is an array of cases in which 'new' firms grow out of established enterprises. Entities that spin out or off from incumbent entities carry with them a knowledge legacy from the parent. In addition to a founder, the spin-off may also include a team of experts from the parent, as well as other endowments (technical and commercial knowledge, networks, etc). In fact, the standard perception is that the parent spins out exactly this knowledge in the hopes that the seed (typically a novel technological solution) will germinate better outside the formal boundaries of the firm.

In this context, we start from the expectation that spin-offs— as well as other forms of firm-formation (start-ups, merger and acquisitions)— are likely to be accompanied by a heightened propensity to seek IPR protection. We discuss the complementary roles that patents and trademarks may play in the diversification of inventive and commercial activity in this context.[1] In as much as IPR protection contributes to firm-formation, the relationship may be important to industrial renewal.

Although the relationship between IPRs (patents in particular) has been studied both in relationship to firm entry, this work has generally been divided (spin-offs, start-ups, M&A, etc) and been hampered by a lack of more comparable, comprehensive longitudinal data. This paper applies an established (i.e. comparable) approach to identify spin-offs and other entry and exit events in national registry data. It then links IPRs to the same firm-registry using another established approach to study firm-level IPR use.

## Data and general approach

In order to analyse the role that IPR (patents and trademarks) play during firm-(re)formation, the paper pursues the following two data steps. In a first step, we identify different forms of entry and exit within a full-count set of Norwegian firms (with over one employee, excluding forestry and agriculture) over an 11-year period (2000-2010). We apply the labour-tracking approach developed in the Nordic countries (Svanfeldt and Ullstrøm 2001; Nås et al, 2003) in order to distinguish between spin-offs and other forms of firm-formation (and obsolescence) in Norway. This comparative approach has been used more recently to study different aspects of firm-demographics in the Norway (e.g. Møen, 2002; Nås & Sandven, 2008; Hvide, 2009), Denmark (e.g. Erickson & Kuhn, 2006)), and Sweden (e.g. Delmar & Shane, 2004; Andersson & Klepper, 2013).

This paper uses the labour-tracking approach to distinguish between five cases. Firms (establishment/plant level) may (i) remain unchanged, (ii) emerge as an entrant with no

[1] In general we expect patenting to accompany (precede and/or follow) spin-offs as well as other forms of firm-(re) formation. We also expect such firms to register trademarks in a bid to differentiate itself both from the brands of the parent firm and from other market incumbents. In addition, we expect this effect to be largest among patenting firms.

antecedent, (iii) involve M&A or other ownership change leading to transferal to another existing enterprise, (iv) involve a spin-off or other form of spin-out from an existing enterprise, or (v) close down or otherwise die. This results in a year-on-year unbalanced panel of Norwegian firms. In the second step, we link the enterprises in this panel to concurrent domestic patenting and trademark data (1999-2011). The name-harmonization approach employed in earlier work (Iversen, 2003) lays the basis for this link, which has been further improved in light of the ongoing work at the OECD to link international patent (Patstat) data with financial data (Amadeus from Bureau van Dijk).

- Registry data of all Norwegian firms (Strukturdata AA*): 2000-2010 (Statistics Norway)
- Registry data of employees (gross number of employees): 2000-2010 (Statistics Norway)
- Registry data of firm-level (re)registrations: 2000-2010 (Statistics Norway)
- Accountancy data (BoF and Amadeus, relevant information types): 1998-2010
- IPR data: EP and domestic applications: 1996-2010. Trademark data: 1996-2010.

**Observations**

The paper follows up on the call to, "more fully exploit matched firm-worker data to analyze the relationship between skills, long-term innovation and firm performance" (OECD 2010: 57). It contributes to existing work by investigating the role that patenting and trademark activity plays during spin-offs and other events involving firm-formation (and obsolescence). We note several advantages to linking patenting and trademark activity to new firms spun out from other companies: in short, there is a compelling story about the human-capital component of novel inventive and commercial activity.

The paper is based on two approaches that have been developed to make the comparison of micro-data easier across countries: the first is the labour-tracking approach to improve our analysis of entry and exit, the other is the name-harmonization efforts used to link firm-level data to IPR. By basing the paper on comparative approaches, we hope that a pilot study in Norway will demonstrate the viability of the approach and that it will be extended to other (Nordic) countries.

At this point, an immediate application is to improve our understanding of the sources of invention and new commercial activity in Norway. In OECD's preliminary work with firm-matched patents, Norway emerges as the country with the greatest proportion of 'new' firms that patent. If true, this observation may have important policy implications as Norway starts to follow up on its recent IPR whitepaper. (st.meld 28 2013). The application of the data presented above will help to better understand the vintage and the organizational underpinning of those current patents.

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