Innovation in West Michigan

Gerry Simons
Grand Valley State University

Follow this and additional works at: https://scholarworks.gvsu.edu/sbr

Recommended Citation
Available at: https://scholarworks.gvsu.edu/sbr/vol25/iss1/7
Innovation in West Michigan

Gerry Simons, Ph.D., Department of Economics

Innovation is a major driver of long-run economic growth. Although economists disagree on some issues, this is not one area of contention. The theoretical analysis of the connection between innovation and growth goes back to the likes of Schumpeter (1911) and Solow (1956), for which the latter won the Nobel Prize. Numerous researchers have conducted empirical analyses of innovation and growth rates in numerous countries as well (see, for example, Bae and Yoo, 2015, and Santacreu, 2015), concluding that stronger growth leads to higher innovation and, in turn, higher innovation leads to stronger growth.

The exact magnitude of innovation’s impact on economic growth is difficult to determine, though, as measuring the amount of innovation is not straightforward. Measuring research and development spending (R&D) is one approach, but that runs into the problem that it is a measure of one input into the innovation process (spending), and not a measure of the output (the actual innovation). One alternative is to count the number of innovations through a country’s patenting system. This is by no means a perfect measure – not all innovations are patented, and any one patented innovation need not have the same impact on economic growth as another. Yet counting patents does have the advantage of being an objective measure of the output of the innovation process, as well as one for which data are easily available.

The United States Patent and Trademark Office (USPTO) maintains a free, online, searchable database of innovations that have been granted patents in the U.S. Each patent record lists the home city and country for both the inventor and the assignee (owner) of the patent. For some patents, the inventor is also the assignee, but for most patents the inventor and assignee are separate entities (think of a researcher living in Detroit who creates an innovation as part of her work at General Motors; the researcher is the inventor, and GM is the assignee). The inventor and assignee could be in the same location, or they could be in different parts of the country, or even in different countries. The USPTO database allows us to collect a lot of information about the patenting process and patenting behavior in the U.S. All of the patent data presented here were obtained through the USPTO database (available at www.uspto.gov).

Figure 1 shows the number of patents issued per year with an inventor living in Michigan as a whole, living in the Grand Rapids area (Kent, Ottawa, and Muskegon Counties combined), and living in metro Detroit. Note that just because the innovations illustrated in Figure 1 were created by a Michigan resident does not mean that they have a Michigan assignee (in fact, many do not). Also, it is common for patents to have more than one inventor – the patents shown in Figure 1 are for where at least one of the inventors is from the relevant geographic region.

Figure 1: Annual Patenting by Location of Inventor

Although the trend for all three geographic areas is somewhat similar for 2000-2009, there is a noticeable change after 2009, with the number of patents with an inventor from Michigan and the number with an inventor from metro Detroit increasing much more substantially than for those with an inventor from the Grand Rapids area. Table 1 shows the overall percentage changes for these three regions. All three regions experienced a decline in the annual number of patents for 2000-2008, with the Grand Rapids area experiencing the largest decline of the three. All three experienced a significant increase for 2009-2018, with the Grand Rapids area experiencing the smallest increase of the three.

Table 1: Growth in Annual Patents by Location of Inventor

<table>
<thead>
<tr>
<th></th>
<th>Grand Rapids Area</th>
<th>Metro Detroit</th>
<th>Michigan</th>
</tr>
</thead>
<tbody>
<tr>
<td>% change 2000-2008</td>
<td>-18.57</td>
<td>-4.28</td>
<td>-10.78</td>
</tr>
<tr>
<td>% change 2009-2017</td>
<td>86.27</td>
<td>131.30</td>
<td>110.31</td>
</tr>
<tr>
<td>% change 2000-2017</td>
<td>45.03</td>
<td>125.62</td>
<td>85.91</td>
</tr>
</tbody>
</table>

Having innovative minds in a region is important, but the larger potential impact on the economy comes from innovations that are used by businesses in that region. To get at this distinction, we can look at the location of the assignee of the patent. Figure 2 and Table 2 duplicate the information of Figure 1 and Table 1, but for patent assignees.

Figures 1 and 2 look strikingly similar, but there are significant differences in the details, as made clear by a comparison of Tables 1 and 2. Of particular note is that the annual number of patents issued to assignees in the Grand Rapids area increased by 43% in 2000-2017, while the number for assignees in metro Detroit increased by 142% over the same period. Another way to look at this information is to think of flows of information between the “producers” of

Table 2: Growth in Annual Patents by Location of Assignee

<table>
<thead>
<tr>
<th></th>
<th>Grand Rapids Area</th>
<th>Metro Detroit</th>
<th>Michigan</th>
</tr>
</thead>
<tbody>
<tr>
<td>% change 2000-2008</td>
<td>25.41</td>
<td>12.64</td>
<td>3.81</td>
</tr>
<tr>
<td>% change 2009-2017</td>
<td>38.29</td>
<td>102.72</td>
<td>94.80</td>
</tr>
<tr>
<td>% change 2000-2017</td>
<td>42.83</td>
<td>142.21</td>
<td>105.14</td>
</tr>
</tbody>
</table>

knowledge – inventors – and the “users” of knowledge – the assignees. Knowledge flows “out” from inventors and “into” assignees. Figure 3 shows the annual net “inflows” of patents by location, measured as the annual number of patents by location of assignee minus the annual number of patents by location of an inventor.

For every year from 2000 to 2017, metro Detroit has a positive net inflow of patents, in the sense that the number of patents owned by corporations and other assignees in metro Detroit is greater than the number of patents with an inventor from metro Detroit. Assignees in this area are, effectively, “importing” knowledge from outside metro Detroit – for example, from inventors in Grand Rapids, Houston, or Beijing. This result is not unexpected, given the concentration of large, multinational enterprises in metro Detroit with numerous facilities in countries around the world.

However, for Michigan as a whole throughout 2000-2017, and for the Grand Rapids area for most of this time period, the net inflow is negative. This means that, although a significant number of innovations are created by inventors living in the Grand Rapids area or in Michigan in general from 2000-2017, many or at least some of them are not owned by entities in those locations. In a sense, inventors are “exporting” knowledge. In some cases, this imbalance is benign – innovations created by people in Grand Rapids but owned by GM in Detroit still have positive growth impacts on the West Michigan economy due to GM’s presence and connections in West Michigan. Other situations might be different, though – innovations created in Grand Rapids but owned by Boeing Co. are unlikely to have significant impacts on the West Michigan economy beyond the compensation provided to those inventors; that knowledge is not being invested into the West Michigan economy.

There is no debating that West Michigan currently has a strong and vibrant economy. The information presented here is not to be taken as fear mongering, nor as an argument that West Michigan is in some sense falling behind. Rather, it should be taken as an indication of opportunities missed and opportunities still to be taken. Greater investment in research and development could reap significant returns for the Grand Rapids area economy in the future, whether those investments are channeled through the creative minds of local inventors or are “imported” from elsewhere. ■

References