

KAUFFMAN FIRM SURVEY AND SURVEY OF BUSINESS OWNERS: A Sample Case of Improving Measurement of Intangible Capital Investment for Young Businesses

Proposed by

John Haltiwanger
University of Maryland
haltiw@econ.umd.edu

Priority changes suggested

- Measure expenditures on intangible capital investment for young businesses.
- Track the dynamics of young businesses to understand role of intangible capital investment for growth and survival dynamics of young businesses, as well as guide measurement of depreciation of intangible capital.

Potential advancement in understanding innovation

Recent evidence suggests intangible capital investment plays a key role in understanding U.S. productivity growth. However, measurement of intangible capital represents one of the largest measurement gaps in U.S. statistics. The role of intangible capital is potentially important for all businesses, but especially for young businesses.

SUMMARY

Exploratory but provocative recent evidence suggests that a critical component of U.S. productivity growth is the growth in intangible capital. Intangible investment, broadly defined, is expenditures and activity by businesses in the current year (other than for tangible assets) that are not for the production of goods and services to be sold in the current year, but, instead, to enhance the products and/or processes for production in future years. Existing surveys of business activity are not able to quantify the full extent of these activities especially for young businesses. By their very nature, young businesses are devoting substantial amounts of their time and resources to intangible investment. Measuring the contribution of intangible investment for young businesses (as well as all businesses) requires adding new questions to surveys on businesses, as well as addressing challenging measurement questions, such as how to value expenditures on intangible investment and how to depreciate the accumulation of intangible capital. For the latter, it is essential that firm growth, entry and exit dynamics be tracked accurately and that conceptual issues about the implications of firm exit for depreciation be resolved.

MEASURING INTANGIBLES

Much of the measurement literature on intangible capital (e.g., Corrado, Haltiwanger and Sichel, 2004) is exploratory. There has been relatively little research devoted to developing economy-wide measures of intangible capital investment. A key exception is the recent exploratory but provocative work by Corrado, Hulten and Sichel (2006)—hereafter CHS. CHS analysis should be viewed as a blueprint for how to think about and measure intangible capital, as well as first attempt to implement their approach. Their work draws on a myriad of sources, but they make it clear that there are large, current measurement gaps for implementing their approach. One can view this proposal as outlining steps to help fill this measurement gap with a focus on young businesses.

The approach advocated by CHS is to treat intangible capital like tangible capital—specifically, to measure intangible capital stocks using a perpetual inventory method. This implies that intangible capital in the current period (total or of a specific type of intangible capital) is equal to the discounted sum of real intangible capital investments in prior years. The discount factor used is based on a depreciation rate for intangible capital. This implies three key measurement requirements. First, the expenditures on intangible capital by asset type must be measured. Second, a price deflator for intangible assets must be measured to convert nominal expenditures into real

expenditures. Third, a depreciation rate by asset type must be measured. Each of these poses substantial challenges— for all businesses, but especially for young businesses.

CHS use a myriad of sources to measure expenditures on intangible capital as best they can, given the current measurement gaps. A core part of the CHS measurement is from surveys that attempt to measure scientific and nonscientific research and development (R&D) expenditures. Other components attempt to measure the contribution of improved use of information technology (other than that captured by software expenditures), brand equity and other investment by firms. It is apparent that R&D expenditures, as measured by existing surveys (such as the Industrial R&D Survey or the Service Annual Surveys that can be used to measure nonscientific R&D), don't capture the full extent of expenditures on intangible capital. Some of this is by design since, for example, the focus is particular types of scientific R&D. However, even if by design, the findings of CHS highlight a measurement gap in current U.S. statistics.¹

For price deflators, we know from tangible assets this is a challenge for many asset types given changes in capital quality (e.g., the rapid increase in computer quality over time). These problems are at least as great a challenge for intangible assets. CHS take the approach of using output price deflators as a placeholder, while others have used input price deflators. This issue remains an open area for future study that this proposal does not directly address. The use of output and input price deflators used in the literature is likely a good starting point.

Turning to the depreciation rate, we know this should reflect the service life of the asset, as well as the obsolescence and secondary markets for assets. One challenge for depreciation rates, even for tangible assets, is the role of business exit. In the standard approach in the national accounts, the presumption is that the tangible assets (e.g., fixed plant and equipment) of the business are sold on secondary markets if the business shuts down. Depreciation rate schedules for tangible assets have been developed that take into account the nature of these secondary markets. While there are open questions about the nature of secondary markets for tangible assets, it is even less clear if the presumption of secondary markets is appropriate for intangible assets.

All of these measurement challenges are that much more difficult for young businesses. First, since many young businesses are small, they have less formal job tasks. The business owner and coworkers do many different tasks. Compared with large corporations that have product or process development divisions, it is very difficult to measure the expenditures on such product and process development at young businesses using existing surveys. Put differently, the types of questions that are on existing surveys that ask about expenditures on product and process development are best suited to corporations that have separate divisions devoted to these activities. Second, as a recent National Academy of Sciences report emphasized (Haltiwanger, Lynch and Mackie, 2007), young businesses are underrepresented on U.S. surveys of businesses by the federal statistical agencies. Third, the issues associated with measuring depreciation associated with business exit rates especially are relevant for young businesses. The evidence on the dynamics of young businesses is that they exhibit an "up or out" dynamic in their first ten years (Davis, Haltiwanger and Jarmin, 2008). That is, they have very high exit rates relative to more mature businesses. However, conditional on survival, they grow much faster than their more mature counterparts. Given that secondary markets for the intangible capital may be limited or even nonexistent for businesses that shut down, this raises challenges for resolving the role of business exit for depreciation of intangible capital that especially are relevant for young businesses.

The role of exits and secondary markets is that much more challenging for intangible capital on a number of dimensions. To the extent the intangible capital is basic scientific knowledge, it may have a very long service life. For basic scientific knowledge, the issue may be more whether the knowledge is non-proprietary. Patents and other mechanisms are used to protect property rights for some types of such knowledge, but it is important to emphasize that these are issues relevant for the measurement of intangible capital. Alternatively, to the extent that the intangible capital is the "organizational capital" specific to the business, it is unclear what happens to that organizational capital if the business exits. For businesses that are acquired, the organizational capital presumably continues to have value, but for businesses that shut down, it is not clear that there is any secondary market of organizational capital in the same way there is for tangible assets like fixed plant and equipment. One interesting channel where some components of knowledge or organizational capital may be transferred and still be in service is through the business owner and/or coworkers. That is, the knowledge capital may be mostly embodied in the business owners and

¹ These remarks apply to the existing NSF R&D Survey. The latter is undergoing a redesign that is intended to remedy some of these limitations.

coworkers. Thus, tracking what happens to business owners and workers for a business that exits (and, in turn, what happens to the business these individuals transit to) is a way to study the extent to which the knowledge capital is embodied in the individuals.

WHY MEASURING INTANGIBLES IS IMPORTANT

The results from CHS suggest that the level and growth of the intangible capital investment in the last few decades is larger than tangible capital investment growth. Moreover, their work, and work in the related literature, suggests that measuring and analyzing intangible capital investment is critical for understanding U.S. productivity performance over the last several decades. A closely related literature (e.g., Brynjolfsson and Hitt, 2000) argues that the reason the United States has benefited the most from the information technology revolution is that U.S. firms had complementary investments in organizational capital. Their argument is that it is not enough for a business to simply buy IT, but also it is critical how the IT is implemented in terms of the organizational structure of the business and the workplace.

Young businesses, by their very nature, are spending a large fraction of their time and resources on intangible capital. That is, they are developing products and processes for the future. As such, it is critical to measure this activity, to understand how the nature of this activity varies across those young businesses that survive and grow and those that exit, and what happens to the intangible capital investment of exits.

PRIORITY IMPROVEMENT 1

A top priority is to measure the expenditures on intangible capital investment for young businesses. One way to make progress is to add intangible capital expenditure questions on firm surveys that especially target young and small businesses. Potential surveys where such questions could be useful include the Survey of Business Owners (SBO) conducted by the U.S. Census Bureau and the Kauffman Firm Survey (KFS). At the core, a question or line of questions should ask:

- What fraction of the time of your workforce in the current fiscal year is devoted to activities that are designed to develop products and/or processes (or improvements in the marketability of your products) for future years (i.e., not the current fiscal year)?
 - It is critical that the survey also include information on total payroll (see below).
 - It is also critical that the expenditures not be for the accumulation of tangible assets (e.g., workers who devote time to retooling the fixed plant and equipment).
- What is the amount of expenditures on materials or services designed for future-year product or process development or to improve future-year marketability of your products?

The objective is to decompose current expenditures on materials, services, and payroll into the expenditures devoted to current (fiscal year) products and services and those devoted to future-year products and services. The traditional approach in productivity growth accounting is to treat expenditures on materials, services, and payroll as contributing only to current year production. The insight from CHS is that an important fraction of these expenditures instead are intended to contribute to products in the future.

Beyond these most basic questions, further questions should be added to distinguish between product versus process development, scientific versus nonscientific development, the time spent by business owners and by different types of workers. Put differently, as with tangible capital, there are different types of intangible capital assets with different service lives, secondary markets, and the like. CHS group intangible assets into the following categories: computerized information (other than software), R&D (scientific), R&D (nonscientific), brand equity, and firm-specific resources. These categories were driven partly by data availability and need to be refined, but are a useful starting point.

In addition, consideration should be given to making the connection to other indicators of innovation. For example, questions could be asked about whether the intangible capital expenditures are designed to contribute to a patent or other measure of innovation. Alternatively, questions could be asked about changes in organizational structure of the firm (e.g., the use of teams) that have resulted from expenditures on intangible capital.

These same questions are applicable for larger, more mature businesses and substantial effort needs to be devoted to addressing the measurement challenges for larger, more mature businesses, as well. Many of the suggestions here also are applicable for improved measurement of large and mature businesses.

Note that the above questions need refinement and field testing before any implementation. The sample questions above are intended to highlight the type of information that should be collected.

IMPLICATION OF IMPROVEMENT 1

The information on expenditures on intangible capital is essential for measurement of intangible capital for young businesses. Currently, there is virtually no information on such expenditures. With such information, measures of intangible capital investment for young businesses could be constructed. With firm level information on intangible capital expenditures along with information about firm outcomes and other activities, the role of intangible capital for growth and survival of firms could be analyzed.

COST ESTIMATE OF IMPROVEMENT 1

The cost of adding a few questions to existing surveys should be relatively low. Since this is a relatively new area of measurement, adding such questions to a special module and then conducting analysis from the responses from the special module may be an appropriate first step. Even prior to this step, pretesting of this type of questions is needed as this is a new approach to measuring intangibles.

PRIORITY IMPROVEMENT 2

A second priority is the development of integrated LEHD (Longitudinal Employer Household Dynamics), Self-Employment Dynamics (SED) and ILBD (Integrated Longitudinal Business Databases) databases. The study of entrepreneurial dynamics will be aided greatly by the development of the data infrastructure to track individuals from careers as wage and salary workers to entrepreneurs and, in turn, through the “up or out” dynamics of young businesses discussed above. This integration must be done in a manner that permits other core data to be integrated into this infrastructure. For example, if the SBO, KFS or other surveys add questions about expenditures on intangible capital, then it is critical for this type of information to be integrated into the longitudinal worker and business databases that permit tracking the growth and selection dynamics of young businesses. Another closely related aspect of this data integration is to be able to track the career history of individual innovators. Using data on patents and citations, it is feasible to identify innovators at the individual level. Integrating innovator databases into the data infrastructure will permit unique statistics and analyses of the outcomes of the businesses with which these innovators are associated as either workers or business owners. For the purpose of measuring intangibles, this is critical for understanding whether knowledge capital is embodied in the workers and, thus, survives as businesses exit.

IMPLICATION OF IMPROVEMENT 2

Improvement 2 is vital for understanding the depreciation and obsolescence process for intangible capital. Integration of expenditures (improvement 1) with business dynamics (improvement 2) will enable the type of analysis that is essential to understand the relationship between business growth and survival on the one hand, and intangible capital investment on the other.

COST ESTIMATE OF IMPROVEMENT 2

The proposed data infrastructure integration permitting tracking of entrepreneurs' career history leverages other efforts to develop longitudinal business and worker databases to study entrepreneurial dynamics. These efforts are essential for this improvement, but also more broadly essential for the study of entrepreneurial dynamics. Further support is needed for the latter efforts so this priority improvement should be viewed as additional motivation to support these efforts.

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