Dynamic Effects of H-1B and Section 127 Policy Interaction on Higher Education

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Abstract

It is widely believed that employer educational assistance increases the quantity demanded for higher education, but the original passage of Section 127 which enables this tax-deduction for employers is associated with a reduction to the growth of higher education enrollment, and a simple regression of the assistance limit on total enrollment indicates a significant negative correlation. This raises concerns that confounding factors bias estimates of the effectiveness of Section 127 assistance. After taking extensive steps to account for policy effects and other dynamic economic factors, I robustly identify a positive effect on enrollment from employer educational assistance by exploiting real variation in employer educational assistance over the 27-year period from 1990 to 2016. Results are validating using panel vector autoregression (PVAR), dynamic least squares (DOLS) methods, and instrumental variable (IV) approaches. In the preferred model, an increase in tax-deductable employer educational assistance in the amount of one dollar is associated with an increase of about 600 to national total enrollment in institutions of higher education.

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1. Introduction

Basic supply and demand theory indicate that a reduction in price is associated with an increase to the quantity demanded. In 1978, a bill was passed allowing employer educational assistance to be tax-deductable in the United States up to a nominal limit of 5,000 dollars. It is surprising, therefore, that 1978 is associated with a local decrease in the growth rate on both total and public university enrollment. This study exploits real variation in the tax-deductable employer educational assistance limit to eventually identify the expected positive effect, but not before identifying and correcting for several interesting things going on in the economy. Specifically, an interaction between H-1B policy and Section 127 employer educational assistance is discovered and assessed.

1.1. Supply-Side Explanations

Before forming more exotic theories, some simpler hypotheses should be checked. One hypothesis is that there is an adjustment period after the passage of Section 127 and before widespread employer provision of the newly deductable benefit. Allowing for a 3 or 5 year lag around the passage of Section 127 in 1978 does not resolve the issue. Across the eight five-year periods from 1970 to 2010, the five-year public enrollment growth rate was above 9 percent as often as it was below. Two of the four low-rate intervals occured immediately subsequent to the 1978 creation of Section 127. The interval just prior, from 1970-1975, saw the highest growth in enrollment across the period. It does not appear to be a one-year fluke that the employer educational assistance is associated with declined enrollment growth.

Another important point is that Section 127 was passed in 1978, but it took effect in the 1979 tax year. 1979 saw modest growth in enrollment, but given the pre-existing long-run context of positive trend in enrollment, it is not clear that Section 127 can be attributed any causality.

An alternative to the 3 or 5 year lagged analysis is to directly refer to surveys of employers. Cappelli[1] identifies 3 employer surveys from 1992 and 1993

which indicate that at least 86 percent of surveyed employers provided educational assistance. These studies were samples of convenience with a focus on large employers, but additional information leads Cappelli to claim that a substantial majority of employers offer such plans over his period of analysis from about 1990 to 2004. Cappelli notes that employee utilization of the benefit favors graduate education with about 20 percent of graduate students receiving employer assistance and roughly 6 percent of undergraduates doing so. Common provision of the benefit has remained true in later years. In 2013, SHRM reported that 61 percent of employers offer tuition assistance[2]. In 2017, World at Work found that 85 percent of employers offered such a benefit, with another 7 percent offering non-reimbursement tuition assistance, such as upfront tuition discounts[3].

1.2. H-1B, Veteran Education Benefits, and Stafford Loan Interaction

The idea that graduate students mainly use employer education benefits motivates hypotheses around undergraduate access. Increasingly since the 1990s, developed economies have experienced degree inflation and experience inflation. Entry level positions now require a degree when previously this was not necessary, even when technology has made the work easier. It is possible that undergraduate access to employer benefits are reduced simply because employers increasingly hire individuals that already have the degree. Employers are known to value the degree as a signal of labor quality, but these days there are plenty of other, richer data sources on quality for certain professions. In computer programming we see some employers completely dropping the degree requirement and preferring technical interviews, digital portfolio evaluation, and other signals. Why, then, do other leading employers continue to require the degree? One answer is that the degree requirement forms an H-1B justification. Since the passage of the Immigration Act of 1990[4], a corporation must claim a shortage of qualified specialized labor to justify an H-1B. The "attainment of a bachelor's or higher degree" is written into the law as a test of whether labor is qualified and specialized. This would motivate employers to begin requiring

the degree in order to obtain cheap immigrant labor, even while knowing the degree may not be necessary.

Zero employers offered Section 127 educational assistance in 1977, but the majority offered the benefit by 1993. Immigration policy is a change which interrupts this period of analysis, but there are two other major policies to take note of. Stafford loans were available before Section 127, but the limits and rules for these loans and other government assistance to higher education fluctuated over the period of analysis. Government educational benefits for veterans is another major policy in the higher education assistance space. It becomes difficult to imagine a proper Section 127 analysis which does not include dynamic correction for these potentially important factors, as well as correction for general price changes and economic conditions in the economy over time. Such a corrected analysis is exactly what this paper completes.

1.3. Demand-Side Explanations

The prior explanations consistitute a supply-side exploration of the impotence of Section 127. An alternative explanation is that there simply wasn't much demand for college in the early years of Section 127. Indeed, lack of market demand appears to be a good explanation for the consistent college-age enrollment percent which is observed at 25.7 percent in both 1970 and 1980. A demand-side explanation is consistent with the falling average tuition and fees observed for all institutions from 1972 to 1980. After 1980 we see an upward trend in price and also an upward trend in college-age enrollment percentage, as well as simple total enrollment.

With an increase to the Stafford limit in the 1977 school year, a major change to veteran education benefits in the 1981 school year, Section 127 beginning in the 1978 school year, and price changes in higher education and for all other goods, claims about a particular cause become dubious without full and corrective statistical treatment. Even so, there is some plausibility to the claim that Section 127 was passed during a time when demand was weak, so that there may have been a positive effect on the part of Section 127 as early as the first

year, but it was overshadowed by general decline. The main contribution of this line of thought to a more general analysis is that corrective statistics should include price data for education in particular, and also for the general economy.

2. Empirical Model

Equation 1 is an ordinary least squares model of total enrollment higher education in the United States.

$$Y = \beta_1 X_1 + \beta_2 X_2 ... + \beta_k X_k + e \tag{1}$$

The Section 127 policy coefficient is the parameter of interest. Three other policy variables are included for federal lending policy, veteran education benefits, and H-1 Visa policy. In addition to the four policy variables, enrollment is modelled as a function of time, and the price of tuition and fees. A variable for personal consumption expenditures (PCE) as an measure of inflation is also included.

For robustness and analytical completeness, I test two other left hand variables using ordinary least squares, then I also test the relation of interest with two other modelling approaches. Specifically, I explore vector autoregressive (VAR) models and an instrumental variable regression following the Anderson–Hsiao pattern[5] with the lagged variable of interest as an instrument.

3. Data

Information on total enrollment for all degree-granting postsecondary institutions in the United States is provided by the National Center for Education Statistics (NCES)[6]. Enrollment figures are for the fall semester of the school year. Information on selected years from 1947 to 2028 is provided, where values for 2018 and later are projected. The present study does not use any of the projected values. Other data sources and policy considerations constrain the period of interest to the 27-year period from 1990 to 2016.

Information on the average undergraduate tuition and fees for full-time students in all degree-granting postsecondary institutions is also provided by NCES[7]. This price information is presented in constant 2016 dollars.

Personal Consumption Expenditures (PCE) data is a measure of inflation provided by the U.S. Bureau of Economic Analysis (BEA)[8].

Nominal Section 127 limits are a matter of public law. Section 127 took effect beginning after December 31, 1978 with a nominal assistance limit of 5,000 dollars[9]. In October 1986, Pub. L. 99–514 increased the nominal assistance limit to 5,250 dollars[10].

Changes to veteran education benefits are also a matter of public law. A categorical variable is used to capture the state of veteran education benefits among five possible states over the period from 1970 to 2020. The Servicemen's Readjustment Act of 1944, also called the G.I. Bill, is the first interesting case of veteran benefits, but it precedes the period of interest for this study. The original bill expired in 1956. This expired state is the first state represented by the veteran education state parameter in the data set. The Veterans Educational Assistance Program (VEAP) is established in 1981, and a third period of interest begins in 1984 with the enactment of the Montgommery GI Bill. The Post-9/11 Montgommery GI Bill went into effect for the 2009 school year, creating a fourth distinct period of interest for veteran education benefits. Finally, benefits from the Forever GI Bill became effective in 2018, but this fifth state is too recent to be included in the period of interest. This change in veteran education benefits is a critical caveat for any attempt at forecasting or prediction outside of the period of study.

Due to constraints on the availability of other data, the period of analysis ranges from 1990 to 2016. Veteran education benefits exhibit only one change during this period, but this factor proves to be significant in the preferred model.

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The real employer assistance limit values are my own calculations, based on the public nominal limits and corrected based on NPSAS tuition and fees rather than PCE. Because this could present a deviation from the general price level,

I also tested adjusting the employer assistance limit based on PCE, and I also included PCE as an independent variable. In neither case did PCE present as a significant factor.

4. Aggregate Results

1. ¿ .995 adjusted r2 for preferred ols model 2. empassist has positive coefficient in the range of 150-850; preferred measure around 600 3. visa effects are complex and important, but signing the effect is sensitive to specification 4. stafford and gi bill effects are also significant in the prefered model.

5. Conclusions

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