



# The Economics of Second Language Acquisition in Hawai'i

Research Note for the Hawai'i Language Roadmap Initiative

March 2013

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2/15/13

## Executive Summary

- Economics of language education is a subfield of the economics of education and estimates returns to individuals of acquiring language skills
- An additional year of education is an asset with an approximate 10% return for a worker, larger than the long run return on almost all market investments
- Learning a foreign language has an estimated return of 5-14% for workers in other countries
- Estimated returns to learning a foreign language for a worker in Hawai'i are similar
- Increases in firm profits and government tax receipts are difficult to quantify
- One economic area that could generate returns to foreign language acquisition is in exports of Hawai'i products, as Hawai'i exports appear to be higher to countries where Hawai'i residents have strong language skills

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The field of economics of education is the study of the financing and provision of knowledge accumulation and skill acquisition and the potential benefits that individuals and society receive as a result of their skills and abilities. Individual benefits include higher wages and higher productivity in both the labor market and home production, as well as more intangible things like better long term health, greater status in the community, or increased consumption of culture that all increase a person's happiness. Social returns to education include lower crime rates, greater workforce productivity, and a more informed electorate. The economics of language education is a subfield of the economics of education, focusing on how society pays for students to have the opportunity to learn a language and what benefits follow for both the student and for society at large. In this note, I will provide an overview of the sorts of questions asked and answered in these fields to inform the discussion of what a cost-benefit analysis of providing more second language acquisition in Hawai'i entails.

Over the past 20 years, the economics of education has become a vast literature. I focus here on the main findings of research on the economic returns to additional schooling in developed countries. This research asks how much the wages or lifetime earnings of a person increase when that person obtains one more year or one more level of education (high school degree, 2 and 4 year college degrees, graduate degrees). The main challenge in this literature is the correlation between wages, years of education, and innate ability. People who are inherently smarter or more capable might find going to school to be easy and thus get a high level of education, but the same people might also be good at any number of jobs and thus command high wages in the labor market. Economists have used a variety of research approaches and study designs to isolate the causal effect of education on wages, and most studies estimate that an additional year of formal education generates an increase in wages of approximately 8-13%.<sup>1</sup> This estimate of the private returns of education is generally accepted by economists due to its stability across different types of studies. Prominent economists have used the ballpark figure of a 10% return to an additional year of education in the popular press.<sup>2</sup>

An alternative method of calculating the return on education is to consider the return made on the tuition money paid for the education. In this case, the return is the increase in future wages, and this method accounts for the fact that some types of education, such as a private 4-year college, are more expensive than others, such as a public 2-year community college. Figure 1 shows estimates of the returns on various investments, with associate and bachelor's degrees appearing as the investments that offer the highest return per dollar of any investment since 1950, beating out common investments like stocks, top rated corporate bonds, or real estate. Overall, the literature on economics of education suggests that the return to schooling is very high relative to other investments that an individual can make, and these estimates do not consider any social benefits that may arise from a more educated population.

The research on the economics of language education has produced estimates of the increase in wages that come with increased fluency in a language. One strand of this literature

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<sup>1</sup>Card (1999) summarizes research on education returns primarily in the U.S. Psacharopoulos and Patrinos (2002) survey results across developed and developing countries and the results for developed countries are very similar to those in Card (1999). Hungerford and Solon (1987) estimate "sheepskin effects," the disproportionate returns to degree holders.

<sup>2</sup>Alan Kruger, indirectly quoted in Bernasek (2005).

estimates the increase in wages for immigrants from learning the main language spoken in a country. In general, this line of research finds a difference of approximately 15% in wages between those who describe themselves as proficient in a country's primary language as compared to those who are not proficient.<sup>3</sup> Another set of papers focus on the labor market returns from learning a second language for individuals who are already proficient in the main language spoken in a country. Learning these second languages have been estimated to cause the learner's wages to rise between 5% and 14% in Switzerland, with similar results found in Quebec, Ukraine, and Luxembourg.<sup>4</sup> It is reassuring that this range of estimates corresponds closely to the range given for additional years of education in the U.S., suggesting that a similar return may be obtainable for Hawai'i residents learning foreign languages. However, this literature is somewhat vague on how exactly individuals obtain this return: specifically, what is it about their language skills that makes employers willing to pay them higher wages? Understanding this mechanism is important for estimating how the Hawai'i economy might benefit from foreign language acquisition.

The returns to learning English in Switzerland is the closest comparison to the return to learning languages other than English in Hawai'i estimated in the literature for a number of reasons. First, while Switzerland has three official languages (German, French, and Italian), English is not one of them and therefore not a language that would be likely to be used in everyday economic transactions in any area of Switzerland. Second, the economy of Switzerland is dominated by the service sector, with over 71% of all output and 73% of employment coming from production of services. This is comparable both to the U.S. as a whole, which has 79% of output and employment in the service sector, and to Hawai'i in particular, which has approximately 76% of all output in the service sector.<sup>5</sup> Third, the geography of Hawai'i means that many of its natural trading partners are not predominantly English-speaking countries, while for Switzerland, English-speaking countries are its largest trade partners that do not share one of Switzerland's native languages. Economic growth in exports is a possible explanation for where foreign language economic returns could arise for Hawai'i. There is an old adage in business that one can buy in his own language but must sell in the language of his customer, and the pattern of language and trade seems to conform to this idea in Switzerland. According to the CIA Factbook, the top five export destinations for Swiss products are all countries in which the Swiss have a high level of language expertise: Germany, the U.S., Italy, France, and the U.K.

Tables 1 and 2 examine this claim for Hawai'i by listing the countries where Hawai'i imported and exported the greatest dollar amount of products in 2011 along with the languages other than English that the most Hawai'i residents reported speaking at home. The list of export destinations features first two predominantly English-speaking countries accounting for nearly 30% of total exports, followed almost exclusively by Asian countries where Hawai'i

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<sup>3</sup>See Chiswick and Miller (2007) for a thorough review of this literature.

<sup>4</sup>See Grin (2002) and Grin (2008) for summaries and additional citations.

<sup>5</sup>Statistics for Switzerland and the U.S, from the CIA World Factbook for 2012. Note that all 2012 numbers are estimates. Value for Hawaii from author's calculations from BEA State Gross Domestic Product data for 2011. For Hawai'i, GDP from government spending is excluded because the BEA does not provide separate data on government-provided goods and services, so this figure represents a percentage of all private output. Since most government spending is likely for services, this figure may represent a slight underestimate.

has a relative wealth of speakers of their native languages. In contrast, the import list features first two countries in whose native languages Hawai'i has little expertise. Saudi Arabia and Russia make up almost 29% of all Hawai'i imports. Clearly, one does not need to know Arabic or Russian to purchase oil. Even the countries that have strong language ties with Hawai'i generally account for a smaller percentage of total imports than exports - Japan (10% of all exports, only 4% of imports) and China (11% of exports, 4% of imports) are leading examples. It is worth noting that the languages listed in Table 2 are flawed estimates of language abilities in Hawai'i as they capture only the families who primarily speak a non-English language at home. Individuals who have acquired a foreign language or who are otherwise fluent in a language but do not use it over English at home are not included here, so the link between exports and language may be even stronger. Still, these data provide suggestive evidence that Hawai'i has the most success selling to consumers in countries where Hawai'i residents have the best language skills, and similar language patterns in trade have been documented for other predominantly English-speaking countries.<sup>6</sup>

The benefits and costs of acquiring additional language skills in Hawai'i are difficult to estimate precisely due to a lack of data, especially for foreign purchases of services and the extent of business demand for language proficient workers. Nonetheless, it is possible to create a back-of-the-envelope estimate using existing labor market data. In 2011, the average yearly salary of a postsecondary foreign language teacher in Hawai'i was \$55,650 in 2011 with 270 such teachers employed in the state.<sup>7</sup> In 2009, there were approximately 19,400 postsecondary students enrolled in foreign language classes in Hawai'i.<sup>8</sup> We can then approximate the workload of each teacher as educating 72 ( $\approx 19,400/270$ ) students per year. If we further assume that each year of instruction from one teacher includes 30 weeks of classes with 2 hours per week of class time, then the typical adult learner gains 60 hours of training every year plus any additional time spent studying outside class. For simplicity, let us assume that this outside time doubles the effective classroom time. The U.S. State Department, through the Foreign Service Institute, has published estimates of the amount of classroom and outside study necessary to develop general professional proficiency in various languages. The definitions of different levels of language proficiency are given in Table 3, while Table 4 shows the estimates for the amount of study time needed across different language groups under the assumption that students spend an equal amount of time studying outside of class. To obtain general professional proficiency in a language in Category I (say, Indonesian or Malaysian), a native English speaker taking two foreign language courses per year as described above would require 5 years of training at an estimated cost of \$7730 of teaching time.<sup>9</sup> For a Category III language such as Chinese, Japanese, or Korean, the estimate of training costs is \$28,340.

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<sup>6</sup>See CiLT (2005) on the United Kingdom and Bradshaw et al. (2008) on Australia.

<sup>7</sup>Data from Bureau of Labor Statistics Occupational Employment Statistics, available at [http://www.bls.gov/oes/current/oes\\_hi.htm](http://www.bls.gov/oes/current/oes_hi.htm).

<sup>8</sup>Data from Modern Language Association of America, available at [http://www.mla.org/pdf/2009\\_enrollment\\_survey.pdf](http://www.mla.org/pdf/2009_enrollment_survey.pdf). The data shows an enrollment of approximately 9700 postsecondary students in the fall semester of 2009, leading to the estimate here of 19,400 (not necessarily unique) students in foreign language classrooms over the calendar year.

<sup>9</sup>Calculation is as follows: 1 student taking 2 classes per year accounts for  $2/72 = 1/36$ th of a teacher's regular workload in a year. Multiplying by the cost of a teacher and the number of years yields  $(1/36)(\$55,650)(5) = \$7729.17$ .

While these costs may appear high, the worker and company can receive benefits from this training over an entire working career. If a worker acquires his language skills at the age of 25 and works until 65, this gives 40 years for benefits to accrue. Table 5 reports rates of return for languages in all three categories and for different hypothetical yearly salary increases over a 40 year period. For training costs commensurate with Category III language acquisition, a worker who receives an extra \$2000 per year in salary in each of his next 40 years of work will receive a return on this investment of 6.49%, which is in line with the estimates of Grin (2002, 2008). If this worker obtains a \$2000 salary increase for the cost of acquiring a Category I language, the return on this investment is 25.87%. The higher rate of return directly reflects the lower cost of learning the language. For Hawai'i, Category III languages such as Chinese, Japanese, and Korean likely represent those of highest value to an employer given the proximity to China, Japan, and Korea and the economic size of those countries. A firm in Hawai'i may choose to give a worker a larger raise for acquiring Category III language skills than for Category I language skills, if the firm finds that proficiency in Chinese provides a greater increase in profits than proficiency in Italian. Yet even when restricting attention to Category III languages and their high training costs, Table 5 shows that relatively modest gains in a worker's value to a firm, represented by the salary increase, correspond to large rates of return for investments in language skills. This estimation of benefits also ignores any increases in firm profits, as well as resulting increases in taxes received by federal, state, and local governments on the higher salaries and profits.<sup>10</sup> Ultimately, an actual estimate of the benefits to society of increased language skills would require knowing how much more a firm would be willing to pay a worker with a given language ability level than a worker with no foreign language skills. However, for young workers who have many working years ahead of them in which to collect the higher salaries that result from increased language skills, an investment in foreign language skills may prove to have higher returns than any market investment.

Overall, this note provides a rough cost-benefit analysis of foreign language acquisition, with estimates tailored towards conditions in the Hawai'i labor market. While the data is imprecise, the range of estimates derived here are comparable to estimates produced in the literature on the economics of language and the economics of education. As other research has suggested, investments in education have proven to be among the best that workers can make, and it appears that investing in language skills is no exception.

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<sup>10</sup>Estimation of increases in profits is particularly difficult given that firms should encourage workers to invest in languages that are beneficial to the firm's particular business interests, especially if the firm is targeting increases in exports to specific foreign markets. Economic research on exporting behavior suggests that the returns to firms may be highly skewed towards the largest and most productive firms.

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Figure 1: Return to Education vs. Other Investments

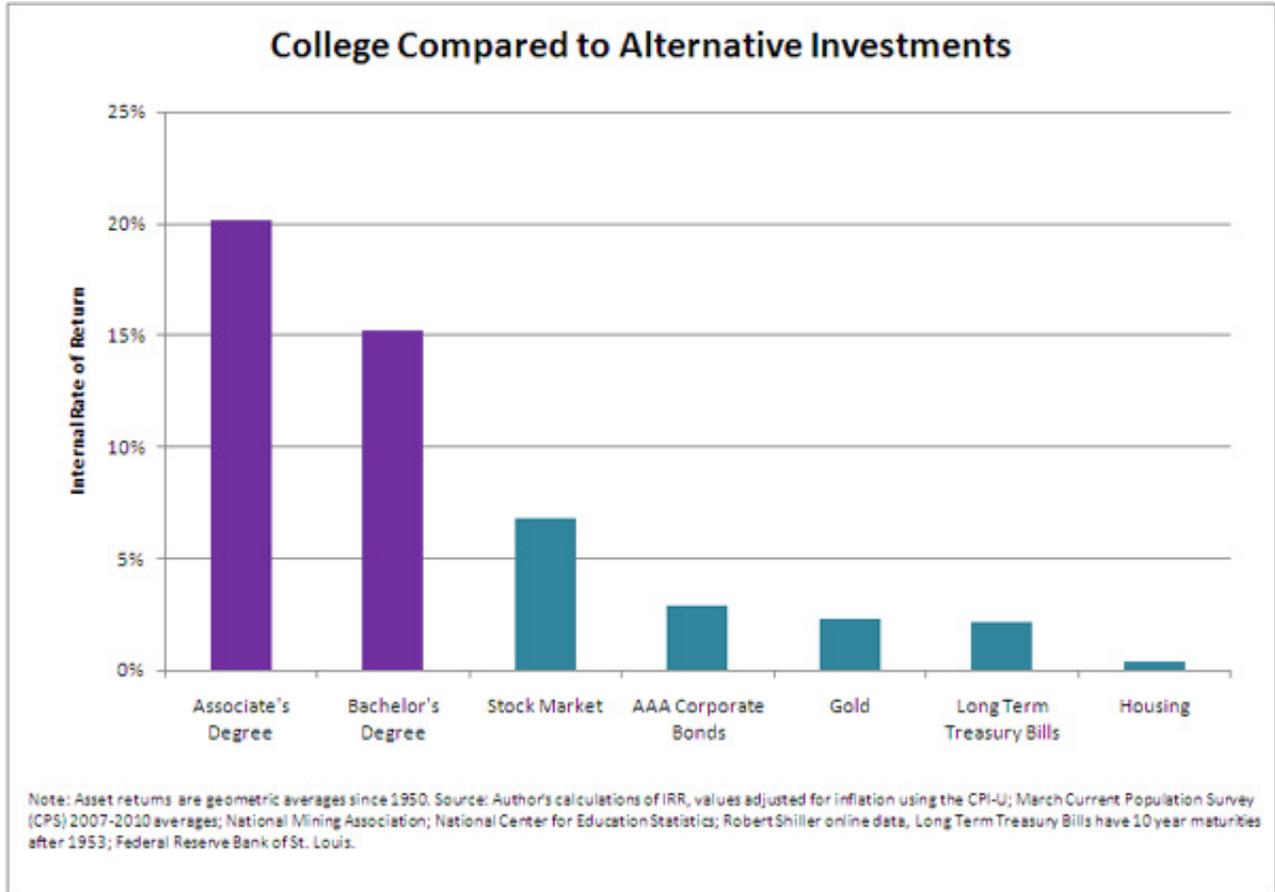


Figure from "Where is the Best Place to Invest \$102,000 – In Stocks, Bonds, or a College Degree?", blog post by Michael Greenstone and Adam Looney, 6/25/11. Estimates from Heckman et al. (2008).

Table 1: Hawai'i Imports and Exports by Country

Imports				Exports			
Rank	Country	Value (\$, millions)	Share	Rank	Country	Value (\$, millions)	Share
1	Saudi Arabia	897	15%	1	Canada	138	15.7%
2	Russia	817	13.7%	2	Australia	125	14.1%
3	Indonesia	781	13.1%	3	China	100	11.3%
4	Thailand	683	11.4%	4	Singapore	96	10.8%
5	Vietnam	442	7.4%	5	Korea, South	95	10.8%
6	Angola	374	6.3%	6	Japan	91	10.3%
7	France	272	4.6%	7	Netherlands	57	6.5%
8	Japan	259	4.3%	8	Indonesia	43	4.9%
9	China	250	4.2%	9	Hong Kong	24	2.7%
10	Argentina	225	3.8%	10	Taiwan	23	2.6%

Source: U.S. Census Bureau. All figures for year 2011.

Table 2: Proficiency in Foreign Languages in Hawai'i

Rank	Language	Population (2008)
1	Tagalog	52,562
2	Japanese	48,179
3	Ilocano	44,591
4	Chinese	27,588
5	Spanish	25,099
6	Korean	17,148
7	Samoan	11,960
8	Vietnamese	8,110
9	French	4,864
10	German	3,938

Source: U.S. Census Bureau. All figures are estimates from American Community Survey data collected from 2006-2008. "Population" is the number of people age 5 or older living in households who report primarily speaking that language at home.

Table 3: U.S. State Department Language Proficiency Ratings

Rating	Description
0	No functional proficiency
1	<i>Elementary proficiency</i> : able to satisfy routine courtesy and travel needs and to read common signs and simple sentences and phrases
2	<i>Limited working proficiency</i> : able to satisfy routine social and limited office needs and to read short typewritten or printed straightforward texts
3	<i>General professional proficiency</i> : able to speak accurately and with enough vocabulary to handle social representation and professional discussion within special fields of knowledge; able to read most materials found in daily newspapers
4	<i>Advanced professional proficiency</i> : able to speak and read the language fluently and accurately on all levels pertinent to professional needs
5	Functionally equivalent to an educated native speaker

Source: Jackson and Kaplan (1999).

Table 4: Foreign Service Institute Language Learning Expectations

Category I: Languages closely related to English 575-600 class hours for Level 3 proficiency	
Afrikaans	*Malaysian
Danish	Norwegian
Dutch	Portuguese
French	Romanian
*German	Spanish
*Indonesian	*Swahili
Italian	Swedish
Category II: Languages with significant linguistic and/or cultural differences from English 1100 class hours for Level 3 proficiency	
Albanian	Lithuanian
Amharic	Macedonian
Armenian	*Mongolian
Azerbaijani	Nepali
Bengali	Pashto
Bosnian	Persian (Dari, Farsi, Tajik)
Bulgarian	Polish
Burmese	Russian
Croatian	Serbian
Czech	Sinhalese
*Estonian	Slovak
*Finnish	Slovenian
*Georgian	Tagalog
Greek	*Thai
Hebrew	Turkish
Hindi	Ukrainian
*Hungarian	Urdu
Icelandic	Uzbek
Khmer	*Vietnamese
Lao	Xhosa
Latvian	Zulu
Category III: Languages which are exceptionally difficult for native English speakers 2200 class hours, second year of study in-country for Level 3 proficiency	
Arabic	*Japanese
Cantonese	Korean
Mandarin	

Source: Jackson and Kaplan (1999) and <http://web.archive.org/web/20071014005901/http://www.nvtc.gov/lotw/months/november/learningExpectations.html>. Languages marked with a \* are considered particularly challenging within those of its given level and may require additional time. Estimated times are based on Foreign Service Institute experience teaching small classes ( $\approx 6$  students) to middle-aged males.

Table 5: Estimated Language Costs and Rates of Return

Salary Increase	Category I	Category II	Category III
\$500	5.79%	1.80%	-1.60%
\$1000	12.83%	6.49%	1.80%
\$1500	19.39%	10.38%	4.32%
\$2000	25.87%	14.04%	6.49%
\$2500	32.34%	17.62%	8.48%
Estimated Cost of Training	\$7730	\$14,170	\$28,340

All figures from author's calculations under assumptions described in text.