

**ARTICLE**

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Measuring the economic impact of universities operating in unstable environments: The case of a private institution in Lebanon

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Abstract

This paper evaluates the economic impact of a university in a country characterised by the scarcity of significant data and quantitative information. It uses an input–output model that permits the use of gross domestic product (GDP) deflators to portray the economy of years following a year for which a complete data set input is possible. Using commonly available administrative data, the model not only allows for the calculation of monetary multipliers but also employment multipliers that play a major role in the educational sector. The study highlights the role of Higher Education in promoting economic development, even under difficult political, economic and security conditions, where lack of stability is the norm and aims to demonstrate that not only well-known historically grounded universities have significant economic impact but also smaller emerging universities play an important role in the development of their national economies.

1 | INTRODUCTION

Visitors to any university town will notice that institutions of higher learning have an impact on the surrounding environment that goes far beyond their gates. A classic example might be Cambridge, MA, or Palo Alto, CA, which are unthinkable without Harvard and Stanford universities. In Beirut, Lebanon, the neighbourhoods of Hamra, Qoreitem and Damascus Road teem with students and faculty from three of the country's universities (American

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University of Beirut, Lebanese American University (LAU) and Saint Joseph University); their activities visibly affect the quarters in economic terms.

Despite the fact that the contribution of universities to the local economy—understood as both direct and indirect effects on employment and overall economic development—is visible to the naked eye, attempts in the scholarly literature to assess the various ways in which this impact manifests itself, either quantitatively or qualitatively, have been few and far between. Although existing studies have adopted different theoretical approaches and methodologies (Drucker & Goldstein, 2007), their focus has been input–output relationships (Elliot, Levin, & Meisel, 1988; Goldstein, 1990; Jaffe, 1989). A number of studies examining the impact of educational investment have highlighted the long-term returns, such as increased wages over the course of a graduate's lifetime and the overall effects of having a more educated and productive workforce (Audretsch, Lehmann, & Warning, 2005; Bessette, 2003; Guerrero & Urbano, 2014; Siegel, Waldman, & Link, 2003; Siegfried, Sanderson, & McHenry, 2015). Some scholars have employed an economic base approach, emphasising the short-term benefits such as job growth and the profits accruing to a range of vendors and industries that sell goods and services to universities (Bessette, 2003; Blackwell, Cobb, & Weinberg, 2002; Chrisman, Hynes, & Fraser, 1995; Elliot et al., 1988; Parson & Griffiths, 2003; Stokes & Coomes, 1998). Still other scholars view the impact of universities as going beyond generating commercialisable knowledge in the form of patents and licences and qualified human capital to include the generation of new jobs, talent and collaboration with local, regional and international agents—for example, in the case of entrepreneurial universities (Guerrero, Cunningham, & Urbano, 2015). The university thus serves as a conduit of spillovers contributing through its multiple missions of teaching, research and service to economic and social development of a nation or region. However, the quantification of such impacts is extremely difficult. Jaffe (1989) attributes this to the fact that the precise linkages among educational investments, knowledge spillovers and regional output are unclear. Andersson, Quigley and Wilhelmsson's (2009) study, conducted in Sweden, clearly documents the positive effects of university investment in entrepreneurial and innovative activity in stimulating creativity and regional productivity. The study highlights the difficulty of distinguishing between the direct activities of the university and its ancillary role in inducing research-intensive industry in its surrounding region (Andersson et al., 2009), however, it maintains that clusters of research institutions—academic and industrial—have been found to facilitate the diffusion and creation of new knowledge (Andersson, Quigley & Wilhelmsson, 2004; Fischer & Varga, 2003; Jaffe, 1986; Varga, 2000).

Most of the existing economic impact studies—which tend to have been conducted in the United States—have been conducted as internal reviews within institutions of higher learning themselves (Alam, 2010) and follow a formal method developed by Caffrey and Isaacs (1971). In general, they tend to treat the increase and decrease in expenditure by a university as equivalent to the expansion or withdrawal of an industry from a region (Brown & Heaney, 1997). This trend has been gradually changing in recent years, with the focus of research shifting from single campus-based studies to system-wide analysis. Examples include studies conducted in the New England region in the United States, Madrid (Garrido-Yserte & Gallo-Rivera, 2010) and the United Kingdom (Alexander & Evgeniy, 2014; Guerrero et al., 2015). With the exception of one study carried out in Cyprus, which focuses on the impact of overseas students on the economy of North Cyprus (Katircioğlu & Bıçak, 1996), no such analysis has been carried out either at the university level or the system level in the Arab world (or Middle East more broadly).

This paper is one such effort, based on the case study of LAU, a leading Lebanese university with campuses in Beirut and the ancient city of Byblos. The paper at hand assesses LAU's impact on the Lebanese economy from the perspective of both direct and indirect effects, then presents what the quantitative approach is unable to account for. Finally, it concludes by offering some methodological suggestions for future research on other university contexts.

2 | JUSTIFICATION

Beck and Elliot (1995, p. 246) define economic impact as the difference between the existing economic activity given the presence of an institution in a particular region and the level of economic activity that would be present

if the institution did not exist. Early economic impact studies of universities focused on the direct expenditures by the university in the surrounding region, including its faculty, staff, students and visitors as well as the economic ripple effect of these expenditures on regional income, calculated using a series of multipliers. In recent years, the economic impact of Higher Education has taken on a more extensive meaning as the role of Higher Education has evolved to encompass the promotion of economic development (Blackwell et al., 2002).

Kott (1987–88), Haywood and Black (1993) and Berger and Black (1993) identify two complementary approaches to measure the economic impact of an institution: the 'short-run' expenditure methodology and the 'long-run' human capital contribution. The short-run approach focuses on the institution's contribution to the annual flow of regional economic activity, while the long-run approach emphasises the contribution of the institution to the region's stock of human capital. Elliot et al. (1988) as well as Varga (2000) go a step further by suggesting that comprehensive economic impact studies should also incorporate institutions' contributions to the technological base and incubation of regional industrial development.

In the Lebanese context, education and in particular Higher Education is a leading enterprise, one that is growing at a rapid pace. In 1990, the country had 16 institutions of higher learning; by 2017 their number had grown to 50 (Ministry of Education and Higher Education, 2018). Yet there is little awareness of the full breadth of the aggregate fiscal benefits for the country generated by this sector. The present study seeks to address this gap and to add to the broader literature on the impact of universities on local economies, by focusing on both the tangible and intangible contributions of LAU to the Lebanese economy, with a special emphasis on human capital development. Such a study has not been undertaken of any comparable institution either in Lebanon itself or in the region, and hence represents a crucial advancement of the field, as the region's political economy, education and economic dynamics have been proven to have unique characteristics.

The immediate question arises here of course as to why the focus of this study is LAU and not, for instance, the American University of Beirut (AUB), which has an indisputably more significant presence in Lebanon, both in respect of the university's physical size and obvious economic importance. Certainly, AUB is in a category all of its own—the purpose of this study is to demonstrate that it is not only behemoths such as this well-known university that have significant economic impact. In other words, in addition to 'obvious candidates' for analysis, the economic importance of universities may be seen on the scale of smaller, up-and-coming institutions; if we are correct, the conclusions of this study could be applied to other rising institutions in the Gulf States, for example, as well as to so-called 'second-tier' universities in the United States (where there is an overemphasis of studying the economic effects of places such as Harvard, while downplaying the significance of institutions such as Carnegie Mellon University or similar).

Finally, beyond merely describing the economic impact of LAU on its surroundings, this study highlights the role of Higher Education in promoting economic development by offering and designing programmes targeted at developing human capital that will help existing industries become more competitive, encourage new business development by supporting start-ups and expand existing industry or attract new firms to the local economy. The recognition of a university as an economic asset offers a unique opportunity for the institution to strengthen itself and enhance its ability to contribute to its community in areas that are aligned with its mission and purpose. It also brings attention to the role educational institutions play in building partnerships with industry that stimulate innovation and help ensure various sectors' continued vitality and relevance.

3 | CONTEXT AND METHODOLOGY

3.1 | LAU: A brief overview

Founded as a women's college in 1924, LAU is a not-for-profit private institution of Higher Education in Lebanon rooted in the tradition of liberal arts education. Granted an absolute charter by the Board of Regents of the University of the State of New York in 1955, in autumn fall 2015, LAU had 8,348 students, 1,582 faculty and other

employees, two distinct operating campuses, and was comprised of seven schools serving undergraduate, graduate and doctoral/professional practice students across 59 degree programmes. Its physical facilities included LAU Medical Centre–Rizk Hospital in Beirut, an academic centre and headquarters in New York, and an executive centre at Solidere in Beirut Central District.

3.2 | Situating LAU: The Lebanese economy

Lebanon has a competitive free-market economy system dominated by strong service and banking sectors. The service sector accounts for 70 per cent of the country's national income, with its main subsectors including tourism, health care and Higher Education (US Embassy of Lebanon, 2015). The Lebanese gross domestic product (GDP) per capita is estimated at \$8,257, with GDP growth in Lebanon at two per cent in 2016, an increase from the 0.8 per cent growth in 2015, which was the worst growth rate the country had seen since 1999 (World Bank, 2017b, 2018).

The Lebanese unemployment rate is estimated at 6.5 per cent, with a staggering 34 per cent youth unemployment rate noted as of 2016 (UNICEF, 2016). Since 2011, the country's economy has experienced significant spillover effects as a result of the Syrian crisis. Surprisingly, Lebanon has managed to maintain relative economic stability despite a refugee population that currently constitutes approximately 30 per cent of the total population (Blanchet, Fouad, & Pherali, 2016) and a regional economy battered by ongoing low oil prices, which although without direct effects on Lebanon which has yet to become an oil exporter, has significantly decreased tourism and export demands from the Arab world, as well as crucial remittances from regional expats working in oil-dependent economies. This economic stability can be attributed to some extent to a private sector that contributes to 75 per cent of aggregate demand, a large banking sector that supports this demand (Harake, Matta, Naji, Haneen, & Krayem, 2014; World Bank, 2017a) and ongoing remittances from the Lebanese diaspora (Banque du Liban, 2017) balancing out the economy's negative current account from its total trade deficit.

In this economic context, Lebanese universities have continued to operate successfully and roll out innovative new programmes (Bissar-Tadmouri & Tadmouri, 2009; Stephens Balakrishnan, 2013) preparing graduates for gainful employment. Thus, despite the weakness of the domestic and regional labour markets, Lebanon is retaining its reputation for quality Higher Education and university graduates capable of contributing to economic development and eagerly seeking career advancement. This study's implications therefore go beyond the specific issue of LAU's immediate effects on the local economic environment to the question of how universities in general might contribute to national economic well-being, if in Lebanon or beyond.

3.3 | Situating LAU: The Lebanese Higher Education milieu

Lebanon has a long history of both formal and non-formal Higher Education, with the oldest Higher Education system in the region (European Commission Tempus, 2010; Zakharia, 2011). The first university to be founded in the country was the AUB in 1866, followed by Saint Joseph University in 1875 and LAU in 1924. The first and only public university in the country, the Lebanese University, was established in 1951 (European Commission Tempus, 2010). The aforementioned universities have played a critical role in shaping the academic framework of the modern Lebanese academic system.

Today, Lebanon has a total of 50 Higher Education institutions, with 36 private universities, nine university colleges, and three institutes for religious studies and two licensed yet non-operational institutions (Ministry of Education and Higher Education, 2018). The gross enrolment in tertiary education amounts to 47 per cent of the total number of tertiary school-age population (UNDP, 2016). The students enrolled in tertiary education are 54 per cent female and 46 per cent male (Banque Bemo, 2014; World Bank, 2015).

Despite the high quality of tertiary education offered throughout the country, the total enrolment rate is considered relatively low; this is largely because Lebanon has only one public university, whereas private universities

require high tuition fees that are not affordable to the majority of low-income households (BankMed, 2014; European Commission Tempus, 2010). Moreover, while Lebanon is considered a national and regional hub for Higher Education (Gonzalez, Karoly, Constant, Salem, & Goldman, 2008), the sector suffers from the ramifications of the Lebanese civil war that took place from 1975 to 1990. The war, followed by the current political and social turbulence facing the country, has contributed to a high emigration rate among the highly educated, leading to a substantial brain drain (Migration Policy Centre, 2017; Nahas, 2010). Moreover, the number of foreign students enrolled in Lebanese universities has greatly decreased over the years, from around 50 per cent in 1970 to 20 per cent at the end of the war, and to only 15 per cent in 2009 (Nahas, 2010). Additionally, Lebanese universities are facing mounting competition from the growing number of universities in the Gulf region (Blom Invest Bank, 2014).

LAU has a unique profile within this overall field of Higher Education in Lebanon. What started off as a school for girls in 1835—signalling an important shift in education for women in Syria and the surrounding region—became a college for women in 1924, offering a two-year junior college curriculum. As a recognised liberal arts college (which went co-ed in the 1970s), the institution historically played a key role in serving the educational, social and economic needs of the Middle East, attracting women from across the region, enhancing their ability to contribute to the national economy across multiple fronts.

At LAU, students pursue their undergraduate and graduate education in an American-style institution that offers programmes integrating core academic knowledge with technical or professional and soft skill training, while reflecting the Middle Eastern cultural context. The undergraduate degrees include the liberal arts within all curricula, fostering an environment that promotes critical thinking and a commitment to social equality. Together with the soft skills they acquire through a range of academic and extra-curricular activities, the LAU education broadens students' horizons and offers graduates a competitive advantage in the national and regional labour market, ultimately allowing them to contribute to the national economy either directly or indirectly through remittances (Nauffal & Skulte-Ouaiss, 2018).

3.4 | Methodology

Within this context, the present case study seeks to quantify LAU's economic and employment impacts on the local economy, and to explicate the benefits of the institution's partnerships with the community. It analyses LAU's impact both as a major enterprise in its own right and through its mission of education, research, business development and public service. The study measures the effects of LAU's direct, indirect and induced spending, with a comprehensive analysis of a broader range of 'secondary' economic impacts focusing on LAU's role in enhancing human capital, fostering technological innovation and promoting business creation in Lebanon and to some extent in the region.

The study relies on an economic input-output model known as Impact Analysis for Planning (IMPLAN) (www.implan.com). IMPLAN—structurally based on Wassily Leontief's input-output model—produces economic impact multipliers appropriate for the context of LAU, allowing us to identify the university's direct, indirect and induced economic contributions. However, the paper, due to a vector of factual preconditions, does not aim to identify the effect of LAU's existence on the economy, which would mean comparing LAU's economic impact (under the existence of multipliers) with the counterfactual: a Lebanese economy in which LAU does not exist—which for obvious reasons remains unobservable. The impossibility to identify the counterfactual, including unidentifiable covariates and possible distortions such as equilibrium effects (of the demand and supply for education if LAU did not exist), hence lead to the conclusion that the results, especially the absolute impact of LAU on the Lebanese economy, should not be understood as a causal outcome of LAU's existence. Rather than quantifying how much smaller the GDP of Lebanon would be, if LAU did not exist, the impact calculated is to be understood as a share of the GDP that under today's economic conditions can be associated directly to LAU's existence as an agent in the Lebanese economy.

The limitation presented is not exclusive to the study at hand, but rather a structural weakness of input-output models regardless of the context in which they are applied. While well situated to assess the multipliers that arise from shocks on the demand side and hence the current economic impact one agent in the economy has, the input-output models are unable to account for transitory effects, especially in the long run. Evidently, it would have significant effects if the demand created by LAU, with its monetary and employment multipliers, did not occur. Yet in the long run, these effects do not necessarily remain of the same magnitude, as employees would find different jobs in other sectors, suppliers would sell their goods elsewhere or change production; or in other words, transitory effects would crowd out some of the current impact of LAU if it did not exist.

While LAU is a private university, the findings of this study are not strictly limited to private Higher Education institutions but rather can be generalised to public ones as well, as the differences in economic impact between private and public Higher Education institutions for the input-output models are marginal. In public universities where tuition fees are usually minimal, funds are generated through taxation that reduces consumption of the taxpayers. This is in essence the same in private universities where the fees usually reduce the final demand of the students' parents. The reduction in aggregate purchasing power, and hence aggregate effects on demand, are hence expected to be the same, when disregarding possible differences in income effects from taxation and private tuition fee collection, respectively. For public universities, the potential decrease in final demand because of reduced income is spread over the whole tax base, while for private ones the latter is distributed over the students in the university and their families.

The economic data for Lebanon utilised by IMPLAN come from the System of National Accounts released by the Central Administration of Statistics (CAS) in Lebanon (<http://www.cas.gov.lb>), particularly relying on data from the financial year 2013, for which the CAS provides a complete data set (CAS, 2013). By analysing detailed data provided by the Office of Finance at LAU and applying that data to the IMPLAN economic input-output model's national matrices, the total economic impact of the university and its operations in Lebanon was determined. The use of IMPLAN instead of possible alternatives such as Regional Economic Models, Inc. (REMI) stems from a number of unique characteristics of the former. On the one hand, IMPLAN allows the calculation of monetary and employment multipliers, whereby especially the second evidently play a major role in the educational sector. On the other hand, IMPLAN, rather than alternative models, permits the use of GDP deflators to portray the economy of years following a year for which a complete data set input is possible. The latter might be considered primitive for a study similar to the one at hand in a US-American context, as the first study of its kind for the Arab world however, it was crucial to find solutions to regional deficits such as its significant data and quantitative information scarcity.

Certainly, the data scarcity one faces when attempting to study a topic like the one at hand serves as the main explanation for why it remains a so far unprecedented study. A perfectly satisfactory and generalisable solution to the dilemma of lack of data, in the simultaneous context of a wide range of unanswered questions that would rely on such quantitative information, has yet to be discovered. This study suggests one methodological approach to nonetheless find a way out of the dilemma: the application of models that allow for a combination of broad macroeconomic data from national accounts, which is generally available even in states with poor data provision and microeconomic data from institutions that are subject to or have rendered themselves subject to data collection and statistical documentation standards somewhat atypical for their region. Internationally oriented universities, multinational companies and stock market listed companies subject to the requirements of the respective stock trading location, serve as such institutions. The combination of these two available data sources in the context of dire data scarcity, with models that allow them to be combined and assess the micro data in the broader context of the macro data, hence enable inferences to be found that allow for unprecedented conclusions in understudied contexts.

The study takes into account the economic contributions solely of LAU's Beirut and Byblos campuses in fiscal year (FY) 2015–2016. The economic contribution of LAU's Continuing Education Program is not analysed here, as its financial accounts are independent of those of LAU's campuses. The economic contribution of the LAU Medical Centre–Rizk Hospital has also not been considered as it was acquired very recently by LAU with

databases undergoing revision and restructuring. The applied model moreover also ignores income generated by students supported by remittances from relatives living abroad, due to the lack of reliable data. The same approach was followed for income generated by visitors to LAU.

4 | ECONOMIC IMPACT: QUANTIFIABLE ASPECTS

LAU contributes in several ways to the Lebanese economy, serving as an income generator, a leading employer, a consumer of goods and services, and a funder of construction and renovation projects.

LAU's endowment, which plays an important role in supporting university spending within the local community, was valued at nearly \$422 million as of 30 June 2015, an increase of 41 per cent from FY 2011–2012. In recent years, LAU's total operating budget increased from \$123 million in FY 2011–2012 to \$168 million in FY 2015–2016, an increase of 36 per cent. From 2011–2012 to 2015–2016, tuition fees constituted just over three-quarters of the revenue budget, while revenues from both restricted and unrestricted gifts ranged from \$12 million to \$29.3 million over the same period, an increase of 143 per cent.

Most of LAU's revenues are injected into the Lebanese economy through the university's various expenditure channels, a trend that has markedly increased over the past few years. LAU's expenditures on payroll totalled \$85 million in 2015–2016, up 38 per cent from 2011–2012, while its payments to local businesses in exchange for goods and services increased by 104 per cent over the same period. Whereas around half of LAU's expenses are in the form of salaries and benefits to employees, a substantial amount is in the form of financial aid to students. Financial aid allocations increased from \$16.8 million in the academic year 2011–2012 to \$27.4 million in 2015–2016, an increase of 63 per cent over five years. The developments presented above serve to present the significant level of growth within the institution. Even if inflation is adjusted for the average inflation level of 1.76 per cent between 2011 and 2016, the level of growth remains highly compelling.

4.1 | Specifics

In this section, we first examine the economic impact of salaries and benefits paid by LAU to its employees, the university's operations and capital project expenditures, and the expenditures by out-of-country students studying at LAU. In addition to the direct effect of this spending, we accounted for a multiplier effect, whereby the annual expenditures of LAU on payroll, operations, construction, renovation and capital expenditures are multiplied through additional direct, indirect and induced impacts resulting in increased employment, labour income and total economic output. Throughout, we looked at both the aggregate economic impact and separated out the economic impact of the two individual campuses, in Beirut and Byblos.

4.2 | Salaries and benefits

In autumn 2015, LAU paid its full- and part-time faculty and support personnel approximately \$85 million in salaries and educational and health benefits. Of these expenses, approximately \$45 million directly affected 905 employees on the Beirut campus, with a further \$40 million in salaries and educational and health benefits paid to 677 employees on the Byblos campus. Benefits accounted for by these expenditures include long-term health insurance, life and long-term disability insurance policies, pension plans, end of service indemnities, *ex gratia* in lieu of indemnity, housing allowances, company cars or car allowances, travel allowances, public liability policies and workers' compensation.

Additionally, LAU offers its employees and their dependants multiple opportunities to advance their education and receive professional training, spending approximately \$30 million on such programmes over the period 2011–2016. The university also offers full-time staff the opportunity to attain a postgraduate degree. Between

the academic years 2011–2012 and 2015–2016, 61 employees received 75–100 per cent coverage of tuition fees, totalling \$570,000. Dependants of full-time employees (spouse and children) are entitled to a 'Dependants Grant' equivalent to full tuition fees until attaining a BA/BS degree, or an equivalent degree in professional schools for a maximum of three dependants. In FY 2015–2016, 106 dependants received university educational benefits, for a total of \$1.9 million. Finally, in year 2015–2016, 652 dependants received schooling educational benefits totalling \$3.48 million.

4.3 | Purchase of goods

LAU affects the Lebanese economy through its direct purchase of goods and services from various national suppliers and through the utilisation of national contractors for the renovation of its existing facilities and the construction of new ones. During FY 2015–2016, the university spent a total of \$93 million on the direct procurement of goods and services, excluding the amount spent on construction and renovation projects.

Furthermore, LAU spent an additional \$3.2 million on the health care of employees and their dependants in FY 2015–2016, up 66 per cent from 2011–2012. LAU also spent \$13.3 million on pension plans, social security, insurance policies and other fringe benefits. LAU's procurement of local commodities and services has led to the creation of around 2,344 full-time jobs throughout the country, with the Beirut campus generating around 1,274 full-time jobs and the Byblos campus generating some 1,070 jobs.

4.4 | Renovations and capital projects

Between FY 2011–2012 and 2015–2016, campus construction, renovation and capital expenditure totalled around \$175 million, an average of \$35 million per year, with 54 per cent of spending on construction and renovation activity taking place on the Byblos campus totalling \$94 million. In FY 2015–2016, LAU spent \$31 million on construction, renovation and capital projects. Based on IMPLAN, LAU's construction and renovation activities generated approximately 560 full-time equivalent jobs, with the Beirut campus generating 91 full-time equivalent jobs and the Byblos campus generating 469 full-time equivalent jobs.

4.5 | Expenditures by out-of-country students

Lebanon has long been a destination for Higher Education attracting students from beyond its borders. These students are attracted to Lebanon by its reputation for quality Higher Education offered by a range of institutions of diverse historical origins, ethos of academic profession, rhythm of academic life and language of instruction, among other factors. In fall 2015, approximately 11 per cent of the LAU student population originated from outside of Lebanon. Their expenditures within Lebanon are included in this analysis as they would likely have attended other institutions outside the country had they not chosen to pursue Higher Education at LAU. While the model applied perfectly takes into account the magnitude of monetary expenditure of these students, the model cannot directly quantify a number of indirect positive effects on the Lebanese economy. Indeed, the expenditure of these students serves to add to Lebanese exports on the country's current account balance, which without such effects and remittances from abroad would be unsustainable due to the country's trade deficit.

Based on information of student spending collected through the Student Expenditure Survey conducted in 2014, it is estimated that LAU out-of-country students directly spent a total of \$31 million on housing, food, entertainment, transportation and other personal expenses. The vast majority of these out-of-country students are enrolled on the Beirut campus (65%). It is estimated that in 2015 LAU's Beirut campus out-of-country students spent a total of \$20 million on housing, food, entertainment, transportation and other personal expenses, while LAU's Byblos campus out-of-country students spent a total of \$11 million in FY 2015–2016.

The total economic impact of out-of-country student spending accounted for 1,474 jobs, \$15 million in labour income and \$62 million in total economic output. The total economic impact of spending by LAU's Beirut campus out-of-country students accounted for 958 jobs, \$10 million in labour income and \$40 million in total economic output; at the same time, LAU's Byblos campus out-of-country students generated 516 jobs, \$5 million in labour income and \$22 million in total economic output.

Because of the strict self-imposed limitation, to only count students with high school degrees from outside Lebanon as out-of-country students, the real impact of remittances sent to finance students' studies is most probably even higher than what the model accounts for. A student body of which at least 18 per cent have foreign passports and contemporary developments, that have children and one parent lives in Lebanon, while the family's breadwinner earns the income abroad, suggest that the real effects of remittances that finance out-of-country students' education are significantly higher.

4.6 | Indirect and induced effects

As already mentioned, the total economic impact of LAU on the Lebanese economy is greater than the total of the university's direct spending on payroll, goods and services and construction. It is comprised of direct, indirect and induced impacts. The 'indirect' impact are the jobs, salaries and sales generated by the spending of the businesses that LAU directly purchases its goods and services from. Subsequently, the jobs, salaries and other spending of the successive levels of recipient businesses evidence this indirect impact. The 'induced' impact is also demonstrated by the jobs, salaries and sales supported by employee household spending. The 'indirect and induced' effect—or alternatively, the 'multiplier' effect—is measured by what is known as Leontieff's 'input-output' economic model, which uses a series of multipliers to provide estimates of the number of times each dollar of 'input', or direct spending, cycles through the economy with regard to 'indirect and induced output', or additional spending.

Using the IMPLAN model, the direct as well as the indirect and induced impacts of LAU's spending on payroll, purchasing, construction, renovation and capital expenditure in FY 2015–2016 resulted in 8,095 employment opportunities, \$194 million in labour income and \$835 million in total economic output. When aggregated with LAU's out-of-country student spending, LAU's total economic impact accounted for the creation of 9,570 employment opportunities, \$209 million in labour income and \$897 million in total economic output. These findings are summarised in Tables 1 and 2. Hence, the total economic impact of LAU on the Lebanese economy equates to 1.8 per cent of Lebanon's GDP for the same year.

The direct as well as the indirect and induced impacts of LAU's Beirut campus spending on payroll, purchasing, construction and renovation in FY 2015 resulted in the creation 4,186 employment opportunities, \$99 million in labour income and \$423 million in total economic output. When aggregated with LAU's Beirut campus out-of-country student spending, LAU's Beirut campus total economic impact accounted for the creation of 5,144 employment opportunities, \$109 million in labour income and \$464 million in total economic output. Table 3 summarises these findings.

The direct as well as the indirect and induced impacts of LAU's Byblos campus spending on payroll, purchasing, construction and renovation in FY 2015 resulted in the creation of 3,920 employment opportunities, \$95 million

TABLE 1 Total economic impact of university spending and out-of-country student spending leading through created employment, labour income/wages and economic output as a result of additional direct, indirect and induced effects

	LAU operations, capital and construction	Out-of-country student spending	Total economic impact
Employment	8,095.20	1,474.50	9,569.70
Labour	\$194,045,911.00	\$15,265,258.00	\$209,311,169.00
Economic output	\$834,818,895.00	\$61,826,460.00	\$896,645,355.00

TABLE 2 Total economic impact of university spending and out-of-country student spending as a result of the multiplier effect through created employment, labour wages/income and economic output leading to additional direct, indirect and induced effects

	Direct	Indirect and induced	Total economic impact	Output multiplier
Employment	4,152.50	5,417.20	9,569.70	2.30
Labour	\$121,296,640.00	\$88,014,529.00	\$209,311,169.00	1.73
Economic output	\$522,029,014.00	\$374,616,341.00	\$896,645,355.00	1.72

TABLE 3 Total economic impact, including out-of-country student spending, of LAU's Beirut campus

	Direct	Indirect and induced	Total economic impact
Employment	2,369.00	2,776.30	5,144.30
Labour	\$63,527,710.00	\$45,483,065.00	\$109,010,775.00
Economic output	\$270,743,490.00	\$192,856,232.00	\$463,599,722.00

in labour income and \$411 million in total economic output. When aggregating the direct, indirect and induced impacts of the Byblos campus's spending on payroll, purchasing, construction and renovation in FY 2015 with the direct, indirect and induced impacts from out-of-country student spending in the same FY, LAU's Byblos campus total economic impact accounted for the creation of 4,426 employment opportunities, \$100 million in labour income and \$433 million in total economic output. These findings are summarised in Table 4.

5 | ECONOMIC IMPACT: QUALITATIVE CONSIDERATIONS/IMPROVING HUMAN CAPITAL

In this section, we look at the economic impact of LAU outside of the direct, indirect and induced effects of expenditures examined above, namely by focusing on how LAU contributes to the improvement of Lebanon's human capital potential. Human capital—that is, the knowledge, skills, talent and qualifications possessed by individuals and groups of individuals in communities—is a major contributor to economic development, productivity growth, creativity and innovation. It is a form of wealth that plays a critical role in steering positive change in communities as they strive to accomplish set goals of economic value. The paper at hand is hence the first research paper in the region examining the ways in which a university's economic impact may be assessed through looking at its contribution to raising human capital.

Human capital may be enhanced through education and job skill training, which in turn impacts employees' earnings. Research indicates that, in Lebanon, a bachelor's degree increases one's median earnings by 76.83 per cent, a master's degree by 127.05 per cent and a PhD by 187 per cent when compared to someone with no formal education (Dah & Hammami, 2002). According to Dah and Hammami (2002), an illiterate female with no formal education earns a median annual income of \$3,200, while an illiterate male earns a median income of \$5,000. Moreover, an individual's median income increases as his/her education level advances. A Lebanese female holding a bachelor's degree, master's degree or doctoral degree earns \$8,000, \$12,800 and \$19,300, respectively (which is equal to \$12,500, \$20,000 and \$30,000 in current US dollars), while a Lebanese male with the same aforementioned degrees earns a total of \$11,000, \$16,000 and \$22,500 (\$17,200, \$25,000 and \$35,000 in current US dollars), respectively. As of 2016, the median income for an employed youth is \$663 per month; with median individual earnings in the formal sector being double that of employees in the informal sector (Dibeh, Fakh,

TABLE 4 Total economic impact, including out-of-country student spending, of LAU's Byblos campus

	Direct	Indirect and induced	Total economic impact
Employment	1,784.50	2,640.90	4,425.40
Labour	\$57,768,930.00	\$42,531,464.00	\$100,300,394.00
Economic output	\$251,285,524.00	\$181,760,110.00	\$433,045,634.00

& Marrouch, 2016). Within the Lebanese context, the formal sector tends to attract employees who are degree holders of private universities whose tuition is beyond the reach of Lebanese families with an average income, while the informal sector remains the realm of those who are unable to afford a quality Higher Education.

In light of these data, the economic advantages of obtaining a high-quality university degree are evident, both for the quality of life of individual Lebanese citizens and for their ultimate contributions to the nation's economy as a whole. LAU tangibly develops human capital within Lebanon, both through offering career-relevant academic programmes and other forms of professional and soft skills training to both students and career professionals and through its commitment to providing these opportunities regardless of the constituents' financial background.

5.1 | Student enrolment at LAU

In the fall 2015 semester, LAU had 8,348 students enrolled on both campuses, up one per cent from 2011. Undergraduate enrolment totalled 7,553, while graduates and professional enrolment totalled 565 and 230, respectively, compared to 7,500 undergraduate, 649 graduate and 124 professional enrolments in fall 2011. The university attracts students from all over Lebanon, with the majority of students residing in Beirut and Mount Lebanon. Of the students enrolled at LAU in fall 2015, 6,795 students were Lebanese citizens while the remaining 1,553 were international students. International students are from various countries, with 39 per cent from the Middle East, 32 per cent from North America, 14 per cent from Europe and the Caucasus, and 15 per cent from various other countries.

The number of students graduating from LAU increased by 18 per cent between academic year 2010–2011 and 2015–2016 (from 1,705 to 2,012 graduates), in line with the increased enrolments over the same time. LAU alumni tend to enter the labour market having received an education that integrates academic knowledge with technical, professional and soft skills training, making them attractive to both Lebanese and foreign employers. Reflecting the trends discussed above, wherein degree holders earn higher salaries on average and more advanced degrees lead to higher salaries, LAU alumni are fuelling the economy at a rate that escalates together with the increase in the annual number of graduates. The graduates' personal economic success is accompanied by a multiplier effect, as their spending—whether in consumer goods, investments, construction or services—leads to additional financial benefits to the overall economy. Alumni who are dual citizens further fuel the economy through remittances. Notably, based on the findings of an alumni survey conducted in fall 2016, approximately 80 per cent of employed LAU graduates work in Lebanon.

5.2 | Financial aid and scholarships

Whether they come from unprivileged backgrounds or are subject to the negative effects of the increase in living costs accompanied by Lebanon's uncertain economic situation, many bright students' only chance of a good education is through scholarships/financial aid. By allowing them to attend LAU through its financial aid programmes, this university therefore tangibly contributes to human capital, positively transforming the overall economy.

LAU offers several forms of financial assistance. These include the University Scholarship Program and Tomorrow's Leaders programmes—programmes launched in partnership with USAID and the United States–Middle

East Partnership Initiative and focused on financially disadvantaged students from public schools. From 2011–2012 to 2015–2016 the University Scholarship Program has offered 327 students the chance to pursue degrees at LAU. The total spending on USAID students has amounted to approximately \$71 million with \$26 million spent in FY 2015–2016 alone. Likewise, 119 students have been part of the Tomorrow's Leaders programme since its initiation in 2008. The total spending on this programme, which has attracted students from across the Arab world, has amounted to approximately \$17 million. In addition to the University Scholarship Program and Tomorrow's Leaders programmes, LAU provides its students financial assistance in the form of work/study programmes, loans with a 12-year repayment period starting upon graduation or grants that are divided into four major categories: (a) need-based; (b) hardship; (c) school programme; and (d) special donor grants. The number of financial aid student recipients has been on the rise over the past few years.

In 2011–2012, 2,713 LAU students received financial assistance in the form of work-aid, loans, grants, merit scholarships, graduate assistantships, student employment or dependant grants. This figure increased by a remarkable 35 per cent over the following years, with 3,663 students receiving financial aid in 2015–2016, the equivalent of 44 per cent of the total student population. Over this same period, the total amount of financial aid awarded showed a significant increase of 63 per cent, ranging from \$17 million in 2011–2012 to over \$27 million in 2015–2016. Thus, it becomes evident that by enabling more students to pursue a private quality Higher Education in Lebanon, the university has had a positive economic impact impossible to portray in the IMPLAN model.

5.3 | LAU alumni

As of 2015, LAU alumni totalled 38,516 graduates, up 21 per cent from 2011, spread over 85 countries. Alumni chapters increased from 34 to 39 in this period. Most LAU students (80%) remain in Lebanon after graduation, reflecting the significant contribution the university makes to the country's post-secondary educated workforce. Graduates who leave the country in search of better career opportunities also contribute tangibly to the Lebanese economy, being part of a Lebanese diaspora worldwide that is a crucial source of remittances. These remittances act as a critical boost to local household consumption while assisting in decreasing the levels of poverty and deficit within the nation (Abla, Karaki, & Sweidan, 2013). Lebanon is one of the main recipients of remittances in the world, which accounts for around 14 per cent of Lebanon's GDP, totalling \$7.3 billion in 2016 alone (Credit Libanais, 2017; Ratha, 2016).

Findings of an exit survey administered annually show that, for the years 2011 through to 2015, around half of LAU's graduates found a job before graduating and a third were employed in the companies in which they completed their internships while enrolled at LAU. Based on results of the alumni survey, 85 per cent of graduates of the 2013–2014 and 2014–2015 academic years were employed 18 months after graduation. It is important to note that of the 15 per cent of graduates who were unemployed 18 months after graduation, approximately half did not seek a job. Additionally, over 50 per cent of the graduates of these two academic years were seeking another university degree or were enrolled in professional development programmes.

Furthermore, 80 per cent of LAU graduates were employed in jobs related to their field of study, suggesting that the university's efforts to match educational offerings to the needs of the contemporary job market have been relatively successful. The average basic monthly salary for initial employment following graduation for all bachelor's degree holders amounted to \$1,125 based on the findings of the 2015–2016 alumni survey. There was no significant variation of salaries across five cohorts of graduating students, indicating the availability of stable starting packages for LAU graduates over the past few years despite the complicated economic situation in the country and reflecting the high value local employers place on an LAU education.

LAU alumni have played a crucial role in boosting the Lebanese economy through innovations and business start-ups. From a start-up venture in solar-powered agricultural irrigation dynamic control that enables irrigation water consumption to be optimised, to one in automated robot smart drones that can detect oil and gas spills and leaks, as well as start-ups in renewable energy and energy-efficient solutions, the start-ups have spanned

a range of industries. The contributions of these innovations have been proven to significantly influence both the aggregate economy and the well-being of individuals. For example, LAU students and alumni developed an affordable exoskeleton that can enable paralysed people to walk in addition to a sign language translating glove that facilitates communication between deaf and other people. Other notable innovations are related to health, fashion design and hospitality.

The alumni's remittances and support to the Lebanese economy hence represent another qualitatively relevant channel in which the university adds to the stability and growth of the local economy.

6 | CONCLUSION

The basic objective of an economic impact study is to determine if the regional presence of a particular institution contributes to an increase in said region's economic activities, and if so, to measure this increase.

Evidently, a study like the one at hand—especially when being the first to be done in this particular context—comes with certain limitations, which have to be taken into account when digesting its findings. It will be for future research to consider how the indirect reduction of private consumption due to the reduction of available income to Lebanese families that pay tuition fees possibly reduces the total positive impact of a university, as the Keynesian Consumption Function would predict it, and whether or not the assumption that the latter does not significantly differ between private and public institutions holds empirically. Equally, further research would have to discuss whether IMPLAN suffices to measure the impact of educational institutions—or whether the educational economic impact analysis needs to develop its own model, given that certain assumptions of IMPLAN, such as constant returns to scale or no supply constraints, might not always accurately represent the realities of educational institutions. That these questions and concerns remain for the study at hand, give rise to a discussion of the internal and external validity of this study.

The internal validity, so this paper argues, remains despite the assumptions underlying the model, because the biases caused by the latter are unidentifiable as a whole and not of one direction but rather equally distributed between positive and negative biases, which, at least for a great part, would cancel one another out. For instance, the calculation that LAU's international students' expenditure in Lebanon is exclusively accountable to the existence of LAU and hence exogenous, based on the assumption that without LAU they would not have come to Lebanon to study, as if there were no other internationally recognised institutions, is possibly a cause for positive bias in the estimated economic impact. It is important to note, however, that enrolments of out-of-country students has remained consistent since 2011. Meanwhile, omitting, as the paper does, that some Lebanese students would certainly seek to attend universities overseas if LAU did not exist, as there is only a very limited number of universities with the same reputation and academic level in Lebanon, all of which are selective in their admission policies, arguably represents a source for negative bias of the estimates. Mainly, as the latter would mean financial flows leaving the country and negatively effecting the final demand in the economy. Hence, based on qualitative assumptions, the model omits both, factors that could lead to positive and factors that could imply negative biases of the calculated impact. However, rather than presenting the perfect impact value of a university to an economy, the paper rather aims to serve as a general indication that the value of the latter is much higher than one might expect. The external validity of this finding stems from the comparability of Lebanon to many other countries in the region, subject to the same conditions closely linked to their education system, such as brain drain, lack of development in technology and reducing numbers of high-skilled labour, despite having a reasonably sized Higher Education sector. For these countries, the study at hand serves as the best available evidence in respect of economic impact to support demands for higher funding for Higher Education and efforts to increase quality and international standing of existing educational institutions.

Methodically, there are two approaches to economic impact studies of universities in particular: the short-run, or economic base, approach and the long-run, or skill base, approach. The short-run approach is based on the

assumption that the injection of money into the economy is an impetus for economic growth in the form of new jobs and labour income. In addition, while in contexts other than that of the study at hand, where statistical data and data collection are more persistent, it would be desirable to average the short-term effects of more than one period, the context of this study does not allow for such measures. In this regard, the economic impact of LAU for FY 2015–2016 resulted in total economic output worth \$897 million, additional labour income worth \$209 million and 8,095 additional employment opportunities. Hence, the total economic impact of LAU alone equates to just under two per cent of Lebanon's GDP for the same time period.

The long-run methodology is complementary to the first approach. From the long-term perspective, universities produce skilled workers, who earn higher incomes than they would without an education. These individuals become productive tax-paying citizens who make an increased marginal contribution to the economy as a result of their education. This approach is particularly useful in the case of LAU, as 80 per cent of graduates remain in Lebanon after graduation. This indicates that the degree programmes offered by LAU are aligned with the labour market needs. Furthermore, while migration of skilled Lebanese workers may, in some contexts, be seen as impacting the economy negatively as it is an indication of the lack of employment growth in various sectors, this negative effect may be less pronounced for Lebanon given the high levels of remittances the country receives as a result of migration. This remittance is also in the form of skills as many migrants return to serve the country, bringing with them the know-how needed to remain on par with technological changes. Given that LAU, together with other Lebanese universities, have been operating under a difficult political, economic and security situation where the lack of stability is the norm, this study also shows the importance of Higher Education institutions in producing graduates of quality that can satisfy both a national and international labour market and that play a vital role in economic development even in the most difficult of times.

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