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ACADEMIC PAPER

House prices and tourism development in Cyprus: A contemporary perspective

Andrew A. Alola[1,4] | Simplice A. Asongu[2] | Uju V. Alola[3,4]

[1]Department of Economics and Finance, Faculty of Economics, Administrative and Social Science, Istanbul Gelisim University, Istanbul, Turkey

[2]Economic Development Section, African Governance and Development Institute, Yaoundé, Cameroon

[3]Department of Tourism Guidance, Faculty of Economics, Administrative and Social Science, Istanbul Gelisim University, Istanbul, Turkey

Correspondence
Andrew A. Alola, Department of Economics and Finance, Faculty of Economics, Administrative and Social Science, Istanbul Gelisim University, Istanbul, Turkey.
Email: aadewale@gelisim.edu.tr

Present address
Andrew A. Alola, South Ural State University, Chelyabinsk, Russia
Uju V. Alola, South Ural State University, Chelyabinsk, Russia

This study investigates the nexus between tourism development and house prices in the Republic of Cyprus over the period spanning from 2005Q1 to 2016Q4. Tourism indicators vis-à-vis tourism arrivals along with other explanatory variables (the domestic credit, the land area per person, and the consumer price index) are employed in a multivariate autoregressive distributed lag (ARDL)-bound test model. The empirical results indicate a significant evidence of cointegration. Indicatively, an observed adjustment of about 44% from short-run to long-run implies that the model is not relatively slow to adjust to disequilibrium. Importantly, a percent increase in tourism arrivals is observed to cause a rise in house price by about 37%. Expectedly, it is statistically observed that as the land area per person decreases, it is accompanied by a hike in house price. Also, the impacts of domestic credit offered to private enterprises and the consumer price index are different from the results in previous studies. As a policy guide, the government of Cyprus and stakeholder in the tourism and housing sectors should outline a strategy that will ensure the social welfare of people such that housing availability is not hampered by tourism activities.

JEL CLASSIFICATION
C22; O50; R31

1 | INTRODUCTION

In reality, issues of health, food, and housing are importantly attributed to human basic needs. As echoed in the key message of the World Bank on housing finance, "*Housing plays a key socio-economic role and represents the main wealth of the poor in most developing countries*" (Housing Finance-World Bank, 2017). This message further opined the importance of housing to human survival. The importance of housing is not far from the main cause of the 2007–2008 global financial crises which is traceable to the United States' housing market negatively affecting housing and other human basic needs (Batuo, Mlambo, & Asongu, 2018). Prior to the global financial crisis (GFC), a substantial body of literature had documented the relationship between house price and a handful of macroeconomic (Kishor & Marfatia, 2017), financial (Aoki, Proudman, & Vlieghe, 2004; Estrella & Mishkin, 1998), and socio-economic variables (Luttik, 2000). To mention a few, population, dependency ratio, unemployment, income or

wage pressure, interest rate, mortgage rate, construction cost, marriage or marital status, and migration patterns, are among others, variables that have been linked with house prices. For instance, population is reportedly vital to the dynamics of the housing prices (United Nations, [UN], 2017). The UN report indicates that about 83 million people are currently being added to the global population annually, and such a trend projects an increase in the world population from 7.6 billion people in 2017 to 8.6 billion, 9.8 billion, and 11.2 billion in 2030, 2050, and 2100, respectively. Subsequently, it also maintained that in 2017, 962 million people were 60 years old and above. This demography is forecasted to increase to 2.1 billion and 3.1 billion in 2050 and 2100, respectively. The statistical implication among other things supports the perception of the challenge of rapid urbanization and aging, resulting to an immense pressure on housing delivery systems.

Moreover, the population-induced factor that is being associated with the housing market includes migration and tourism

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学术论文

塞浦路斯房价与旅游业发展：当代视角

安德鲁·A·阿洛拉[1,4] | Simplice A. Asongu[2] | Uju V. Alola[3,4]

[1]土耳其伊斯坦布尔格里辛大学经济、行政和社会科学学院经济和金融系

[2]喀麦隆雅温得非洲治理和发展研究所经济数据科

[3]土耳其伊斯坦布尔格里辛大学经济、行政和社会科学学院旅游指导系

通信
Andrew A. Alola，土耳其伊斯坦布尔格里辛大学经济、行政和社会科学学院经济和金融系。
电子邮件：aadewale@gelisim.edu.tr

当前地址
Andrew A. Alola，俄罗斯车里雅宾斯克南乌拉尔州立大学
Uju V. Alola，南乌拉尔州立大学，车里雅宾斯克，俄罗斯

本研究调查了2005. 第一季度至2016. 第四季度期间塞浦路斯共和国旅游业发展与房价之间的关系。在多元自回归分布滞后（ARDL）界检验模型中，采用了旅游指标与旅游人数以及其他解释变量（国内信贷、人均土地面积和消费者价格指数）。实证结果表明了协整的重要证据。从短期到长期观察到约44. 的调整表明，该模型调整到不平衡状态的速度并不相对缓慢。重要的是，据观察，旅游人数增加百分之十会导致房价上涨约37. 。据统计，随着人均土地面积的减少，房价也随之上涨。此外，向私营企业提供的国内信贷和消费者价格指数的影响与以往研究的结果不同。作为政策指南，塞浦路斯政府和旅游和住房部门的利益相关者应制定一项战略，确保人们的社会福利，使住房供应不受旅游活动的影响。

JEL分类
C22; O50; R31

1 | 简介

在现实中，健康、食品和住房问题是人类基本需求界银行关于住房金融的关键信息所呼应的，"住房在大多数发展中国家起着关键的社会经济作用，代表着穷人的主要财富"（住房金融世界银行，2017）。这一信息进一步说明了住房对人类生存的重要性。住房的重要性离2007–2008年全球金融危机的主要原因不远，这场危机可追溯到美国住房市场，对住房和其他人类基本需求产生了负面影响（巴托、姆兰博和阿松古，2018）。在全球金融危机（GFC）之前，大量文献记录了房价与少数宏观经济变量（Kishor & Marfatia, 2017）、金融变量（Aoki、Proudman和Vlieghe, 2004；Estrella & Mishkin, 1998）和社会经济变量（Luttik, 2000）之间的关系。举几个例子，人口、抚养比、失业率、收入或收入

一趋势预计世界人口将从2017年的76亿增加到2030年、2050年和2100年的86亿、98亿和112亿。随后，它还坚称，2017年有9.62亿60岁及以上的人。这一人口结构预计将增加到21亿2050和2100年分别为31亿美元。除其他外，统计数据支持了人们对快速城市化和老龄化挑战的看法，这给住房供应系统带来了巨大压力。

此外，与住房市场相关的人口诱发因素包括移民和旅游业

(Hämäläinen & Böckerman, 2004; Alola & Alola, 2018a, 2018b; Alola & Alola, 2019, Alola, Alola, & Saint Akadiri, 2019). The recent dynamics in the real estate and property sector of the island of Cyprus may as well make the country's housing sector more desirable. In a recent study of the Cyprus housing market, Coutinho, Castiaux, Bricongne, and Philiponnet (2018) highlighted the determinants of the housing market to include the purchasing capacity, household deposit, unemployment rate, sales to foreigners, housing stocks, household nonperforming loans (NPL) ratio, and microfinance (MFI) loans. However, other salient factors such as the citizenship-by-investment program and other specific government policies are being projected to cause another property bubble in the country (Cyprus Property News, 2019a). The report of the Cyprus Property News indicates that the prices for housing, offices, warehouses, and retails increased by 4.8%, 11.6%, 4.2%, and 1.7% respectively against 4% growth rate of the country's gross domestic product (GDP). Indicatively, the obvious increase in the property prices has been largely attributed to foreign buyers whose main intent is to acquire the European passport instead of living in Cyprus (Cyprus Property News, 2019b).

1.1 | Contribution of the study

The novelty of this study is that the nexus between house prices and tourism is sparse in the literature. Previous studies have investigated the nexus between house prices and migration, and mostly fell short of focusing on the housing-tourism nexus (Hämäläinen & Böckerman, 2004; Meen, 2003; Portnov, Kim, & Ishikawa, 2001). The motivation for this study is built on the evidence that consistently classifies both the housing market and the tourism sector of Cyprus (Alola & Alola, 2018a). Only a handful to authors to the best of our knowledge has so far investigated housing prices in Cyprus without involving the country's tourism sector (Pashardes & Savva, 2009; Sivitanides, 2015). Using 1998 to 2008 annual data, a relatively small sample, Pashardes and Savva (2009) noted the country's population as a leading determinant of housing prices in addition to costs and economic growth. Sivitanides (2015) proceeded further by using quarterly data from 2006Q1 to 2014Q2 and maintained that nominal GDP per capita which is a proxy for economic growth, construction cost, and interest rates, as determinants of house prices in that order. Also, the studies mentioned above fell short of investigating whether a long-run equilibrium relationship exists between these determinants of housing prices in Cyprus. Hence, in order to complement the extant literature, the present study provides empirical evidence of cointegration between house price and tourism indicators, conditioning the investigated nexus on other potential determinants of house prices, notably, the land area per person, the domestic credit, and the consumer price index.

The rest of the study is structured as follows. Section 2 highlights existing studies and trends of housing prices and tourism in Cyprus while Section 3 covers the data description and empirical methodologies. The empirical findings are reported in Section 4. Concluding remarks and implications for policy are provided in Section 5.

2 | OVERVIEW OF EXISTING STUDIES

Consistent scholarly studies continue to reveal intriguing and more interesting behavioral patterns associated with the housing price indices. For instance, one of the earliest related studies is the work of Mankiw and Weil (1989) that detailed the relationship between house prices and aging. Very recently, the study by Hiller and Lerbs (2016) while supporting the evidence of the relationship between housing price and population further simplified the population effect to three distinct perspectives: the investment demand effect, the age effect (age composition of the population), and the size effect (size of the population). The study maintained that the total population is not as important as the size of households. This argument is based on the fact that if the household size (i.e., number of people in a family) decreases, housing price is expected to increase due to an increase in number of people in need of housing. While studying relationship between housing price and changes to the age distribution using 87 German cities of strong cross sectional dependence over 1995 to 2014, Hiller and Lerbs (2016) employed a mixed-regression spatial panel model with an underlying multivariate framework. The results revealed a minimal increase in the real urban housing price across cities with higher aged people and heterogeneous effects caused by population aging across housing segments. A follow-up study by Park, Park, Kim, and Lee (2017) using panel regression also showed significant evidence of inverse correlation between housing prices and dependency ratio in overall regional market while a positive correlation was observed between housing prices and real GDP per capita in each region. They opined that the negative correlation estimates between house price and dependency ratio are expected to cause between 3 and 12% decline in house prices by 2020 and about 20% by 2030 especially in the observed cities of South Korea.

Moving from population as a unit variable, Sirmans, Macpherson, and Zietz (2005) used hedonic regression analysis to estimate the marginal contribution of each of the eight enumerated characteristics of macroeconomics to house prices. Sirmans et al. (2005) characterized the macroeconomics variables affecting house prices as construction and structure variables, external house features, internal house features, environmental neighborhood and location factors, natural and environmental characteristics, public service amenities, marketing, occupancy and selling factors, and financial issues. But the studies of Tu (2000) clearly noted the significance of real GDP per capita, total housing stock, affordability, housing finance and supply, inflationary effects, and demographic variables on house price. The dilemmas caused by the nature of these variable dynamics on house price paved way to the study by Berry and Dalton (2004); such that, the factors affecting housing price were classified as institutional, short-run, and long-run factors. Berry and Dalton (2004) opined that the institutional factors include government taxes and levies, short-run factors include investment demands and interest rate, and the long-run factors are the wealth level, economic growth, and demography. Likewise, Canarella, Miller, and Pollard (2012) empirically discovered that the effect of shocks to the capital gain series on housing price which could be permanent or transitory would rather depend on the test assumptions because the result shows evidence of lack of uniformity.

（Hämäläinen & Böckerman, 2004；Alola & Alola, 2018a, 2018b；Alola&Alola,2019,Alola,Alola,Alola和Saint Akadiri, 2019）。塞浦路斯岛房地产和房地产部门最近的动态也可能使该国的住房部门更加理想。在最近一项关于塞浦路斯住房市场的研究中，库蒂尼奥、卡斯蒂奥、布里孔尼和菲利普内（2018）强调了住房市场的决定因素，包括购买能力、家庭存款、失业率、对外国人的销售额、住房存量、家庭不良贷款（NPL）比率和小额信贷（MFI）贷款。然而，其他显著因素，如投资公民身份计划和其他具体的政府政策，预计将在该国引发另一场房地产泡沫（塞浦路斯房地产新闻，2019a）。《塞浦路斯房地产新闻》的报告显示，住房、办公楼、仓库和零售业的价格分别上涨了4.8%、11.6%、4.2%和1.7%，而该国国内生产总值（GDP）的增长率为4%。从中可以看出，房地产价格的明显上涨主要归因于外国买家，他们的主要意图是获得欧洲护照，而不是居住在塞浦路斯（塞浦路斯房地产新闻，2019b）。

1.1 | 研究的贡献

这项研究的新颖之处在于，房价和旅游业之间的联系在文献中并不多见。此前的研究调查了房价与移民之间的关系，但大多数没有关注住房与旅游之间的关系（Hämäläinen & Böckerman, 2004；Meen, 2003；Portnov, Kim, & Ishikawa, 2001）。本研究的动机建立在对塞浦路斯住房市场和旅游业进行一致分类的证据之上（Alola & Alola, 2018a）。据我们所知，迄今为止，只有少数作者在没有涉及塞浦路斯旅游业的情况下调查了塞浦路斯的房价（Pashardes & Savva, 2009年；Sivitanides, 2015年）。Pas-hardes和Savva（2009）利用1998年至2008年的年度数据，在一个相对较小的样本中指出，除了成本和经济增长之外，该国的人口是房价的主要决定因素。Sivitanides（2015）进一步使用了2006年第一季度至2014年第二季度的季度数据，并认为名义人均GDP是经济增长、建筑成本和利率的代表，是房价的决定因素。此外，上述研究没有调查塞浦路斯房价的这些决定因素之间是否存在长期均衡关系。因此，为了补充现有文献，本研究提供了房价和旅游指标之间协整的实证证据，并将所调查的关系限定在房价的其他潜在决定因素上，尤其是人均土地面积、国内信贷和消费价格指数。

本研究的其余部分结构如下。第2. 重点介绍塞浦路斯房价和旅游业的现有研究和趋势，第3. 介绍数据描述和实证方法。第4. 报告了实证结果。第5. 提供了结束语和政策含义。

2 | 现有研究综述

持续的学术研究继续揭示与房价指数相关的有趣且更有趣的行为模式。例如，最早的相关研究之一是Mankiw和Weil（1989）的工作，该研究详细阐述了房价与老龄化之间的关系。最近，Hiller和Lerbs（2016）的研究在支持房价和人口之间关系证据的同时，进一步将人口效应简化为三个不同的角度：投资需求效应、年龄效应（人口年龄构成）和规模效应（人口规模）。研究认为，总人口不如家庭规模重要。这一论点基于这样一个事实，即如果家庭规模（即家庭中的人数）减少，由于需要住房的人数增加，预计房价会上涨。Hiller和Lerbs（2016）在研究房价与年龄分布变化之间的关系时，使用了一个具有潜在多变量框架的混合回归空间面板模型，使用了1995年至2014年间87个德国城市的强�截面依赖性。结果显示，在老龄化程度较高的城市中，实际城市住房价格的涨幅最小，并且不同住房部门的人口老龄化造成了不同的影响。Park、Park、Kim和Lee（2017）使用面板回归进行的后续研究也显示，总体区域市场中，房价和抚养比之间存在显著的负相关关系，而每个区域的房价和实际人均GDP之间存在正相关关系。他们认为，房价和抚养比之间的负相关估计预计将导致2020年房价下降3%至12%，2030年房价下降约20%，尤其是在韩国的观察城市。

Sirmans、Macpherson和Zietz（2005）将人口作为一个单位变量，使用特征回归分析来估计宏观经济学的八个列举特征对房价的边际贡献。Sirmans等人（2005年）将影响房价的宏观经济变量描述为建筑和结构变量、外部房屋特征、内部房屋特征、环境周边和位置因素、自然和环境特征、公共服务设施、营销、占用和销售因素，以及财务问题。但Tu（2000）的研究清楚地指出了实际人均GDP、总住房存量、可负担性、住房金融和供应、通货膨胀效应和人口变量对房价的重要性。这些对房价的可变动态的性质所造成的困境为Berry和Dalton（2004）的研究铺平了道路；因此，影响房价的因素分为制度因素、短期因素和长期因素。Berry and Dalton（2004）认为，制度因素包括政府税收，短期因素包括投资需求和利率，长期因素是财富水平、经济增长和人口统计。类似地，Can-arella、Miller和Pollard（2012）在经验上发现，对资本收益序列的冲击对房价的影响可能是永久性的，也可能是暂时性的，这更取决于测试假设，因为结果表明缺乏一致性的证据。

Furthermore, while studying house prices in Australia, Abelson, Joyeux, Milunovich, and Chung (2005) detailed both the long-run equilibrium and short-run asymmetric error correction of housing price dynamics. The study revealed empirically that both the real disposable income and the consumer price index significantly and positively determine house prices. Moreover, the unemployment rate, real mortgage rates, housing stock, and equity prices have significant and negative effects on Australian house prices. In a similar attempt, Reichert (1990) also detailed the microeconomic aspects of demand and supply side of the housing dynamics. Demand induced factors were implied by Pitkin and Myers (1994) and Flavin and Yamashita (2002). On the other hand, the supply-related effects examined were presented in the studies of Painter and Redfearn (2002) and Ball, Meen, and Nygaard (2010). Other potential factors that affect the housing price dynamics are land-use policy and governmental or organizational policies (Bajic, 1983; Campbell & Cocco, 2007; Ihlanfeldt, 2007; Katz & Rosen, 1987; Pollakowski & Wachter, 1990).

However, research on housing dynamics in the context of the aforementioned variables has been explored in several other studies (Hämäläinen & Böckerman, 2004; Johnes & Hyclak, 1999; Kishor & Marfatia, 2017, 2018; Meen, 2003). For instance, using an error correction model (ECM), Johnes and Hyclak (1999) showed a significant evidence that unemployment and labor force changes affect house prices. Also, Kishor and Marfatia (2017, 2018) observed the impact of domestic interest rates on the house prices of selected OECD (Organization for Economic Co-operation and Development) countries. In another perspective, the high frequency impact of both conventional and unconventional monetary policy, together with macroeconomics on the United States' housing market, was investigated in the studies of Gupta and Marfatia (2018) and Nyakabawo, Gupta, and Marfatia (2018). Likewise, the evidence of volatility in the housing prices dynamics (Case & Shiller, 2003; Case, Quigley, & Shiller, 2003) and in the context of the stock market (Ding, Granger, & Engle, 1993) was carefully considered. The evidence obtained from the study on house price and stock market dynamics as mentioned in the above studies is consistent with the observations of Luo, Liu, and Picken (2007) and Case and Shiller (2003); such that, the dynamics of housing prices were evidently regarded as unstable in nature.

2.1 | House prices and tourism in Cyprus

Overtime, few and rare studies have established a link between house prices and migration, and some in a related perspective (Alola & Alola, 2018a; Hämäläinen & Böckerman, 2004; Meen, 2003; Portnov et al., 2001). But the link between refugee and migration in the context of house prices was established by Alola and Alola (2018a) by citing the case of Malta and Cyprus. The island of Cyprus with a population of less than two million people (World Bank, 2017) is one of the 22 coastline Mediterranean countries and among the most preferred by international tourists in the region. Across the island's regions are notable natural and man-made tourist attraction sites and historical landmarks that annually compel millions of visitors (Alola et al., 2019;

Andronicou, 1979; Gillmor, 1989; Ioannides, 1992; Katircioglu, 2009a; Sharpley, 2001). This narrative is consistent with factors affecting tourism in countries with islands (Katircioglu, 2009a, 2009b, 2011). The property and housing markets in addition to tourism have consistently remained the leading contributors to the economy of the island nation. Over three million visitors were recorded in 2016; this was reported to be about a 19% increase from the previous year and consequently generating about 12% of the country's GDP in the same year[1]. The government of Cyprus formulated several tourism and housing policies, being the country's most resilient commercial sectors. Such policies are aimed at boosting its economy as it targets to generate twenty billion euros (€20bn) worth of new investments in the country by 2030. The country's location as a gateway bordering northern Africa, Middle East, and Europe, remains a competitive advantage. This is one of the policy mechanisms employed as an economic recovery strategy since the 2012–2013 financial crisis. As hinted by Sharpley (2000), the peculiarity of the country's housing and tourism sectors is a pointer suggesting a link between the two active sectors of the country. Added to this are reports of skyrocketed rent prices in Limassol (Cyprus Mail, July 2017) and other major cities across the island which is intuitively caused by the significant investment in the country's tourism sector as indicated by the report on the 2016 surge in the tourism sector. Since tourist activities are commonly measured using international tourists' arrivals and departures, the dynamics of the two indicators along with respective house prices for the estimated period (2005–2016) is presented in Table 1 and Figure A1 of the Appendix.

3 | DATA AND EMPIRICAL SPECIFICATIONS

3.1 | Data

A quarterly dataset that spans from 2005Q1 to 2016Q1 and comprising of 48 observations is employed for this study. Similar to the indication from the study of Coutinho et al. (2018), the restriction to the span of years was due to data availability constraints in Cyprus' house price (HP) index which was obtained from the European Commission database (Eurostat, 2017). The consumer price index (CPI) was retrieved from the International Financial Statistics database of the International Monetary Fund (International Monetary Fund, IMF, 2017). The World Development Indicators (WDI, 2017) of the World Bank database is the source of international tourist arrivals (ARR) and domestic credit. The land area per person was computed as the ratio of the land area to the population over the estimated period. All the datasets were subsequently balanced in uniformity with the quarterly dimension. The CPI is adjusted by 100 units using the base year 2010.

[1]Statistical service provides detail information regarding Cyprus economic sectors. http://www.mof.gov.cy/mof/cystat/statistics.nsf/services_71main_en/services_71main_en?OpenForm&sub=1&sel=1.

此外，在研究澳大利亚房价时，Abelson、Joyeux、Milunovich和Chung（2005）详细阐述了房价动态的长期均衡和短期不对称误差修正。这项研究从经验上揭示，实际可支配收入和消费价格指数都显著且积极地决定了房价。此外，失业率、实际抵押贷款利率、住房存量和股票价格对澳大利亚房价有显著的负面影响。在类似的尝试中，Reichert（1990）也详细描述了住房动态的需求和供给方面的微观经济方面。皮特金和迈尔斯（1994年）以及黄素和山下（2002年）暗示了需求诱导因素。另一方面，Painter和Redfearn（2002年）以及Ball、Meen和Nygaard（2010年）的研究中介绍了与供给相关的影响。影响房价动态的其他潜在因素包括土地使用政策和政府或组织政策（Bajic，1983；Campbell & Cocco，2007；Ihlanfeldt，2007；Katz & Rosen，1987；Pollakowski & Wachter，1990年）。

然而，在上述变量的背景下对住房动态的研究已经在其他几项研究中进行了探索（Hämäläinen & Böckerman，2004；约翰和海克拉克，1999；基肖和马尔法蒂亚，2017年、2018年；米恩，2003年）。例如，使用误差修正模型（ECM），Johnes和Hyclak（1999）展示了失业和劳动力变化影响房价的重要证据。此外，Kishor和Marfatia（2017年、2018年）观察了国内利率对选定的OECD（经济合作与发展组织）国家房价的影响。从另一个角度来看，古普塔和马尔法蒂亚（2018年）以及尼亚卡巴沃、古普塔和马尔法蒂亚（2018年）的研究调查了常规和非常规货币政策以及宏观经济学对美国住房市场的高频影响。同样，我们也仔细考虑了房价动态波动的证据（Case & Shiller，2003；Case, Quigley和Shiller，2003）和股市波动的证据（丁，格兰杰和恩格尔，1993）。上述研究中提到的从房价和股市动态研究中获得的证据与罗、刘和皮肯（2007）以及凯斯和希勒（2003）的观察结果一致；因此，房价的动态显然被认为是不稳定的。

2.1 | 塞浦路斯的房价和旅游业

随着时间的推移，很少有研究在房价和移民之间建立了联系，有些研究是从相关的角度进行的（Alola & Alola，2018a；Hämäläinen & Böckerman，2004；Meen，2003；Portnov等人，2001）。但是，阿洛拉和阿洛拉（2018a）通过引用马耳他和塞浦路斯的案例，确立了在房价背景下难民和移民之间的联系。人口不到200万的塞浦路斯岛（世界银行，2017年）是22个地中海沿岸国家之一，也是最受欢迎的国家之一
该地区的国际游客。岛上的各个地区
著名的自然和人造旅游景点和历史地标，每年吸引数百万游客（Alola等人，2019年；

此外，在研究澳大利亚房价时，安德罗尼库，1979.；吉尔莫，1989.；伊奥尼德斯，1992.；Katircioglu，2009.a；夏普利，2001.）。这种说法与影响岛屿国家旅游业的因素一致（Katircioglu，2009.a，2009.b，2011.）。除了旅游业，房地产和住房市场一直是该岛经济的主要贡献者。2016.，游客人数超过300.；据报道，这比前一年增长了约19.，因此在同一年产生了约12.的国内生产总值[1]。塞浦路斯政府制定了几项旅游和住房政策，是该国最具弹性的商业部门。这些政策旨在提振中国经济，因为中国的目标是到2030.为中国创造价值200.欧元（200.欧元）的新投资。该国作为北非、中东和欧洲边缘的门户，仍然具有竞争优势。这是自2012.2013.金融危机以来作为经济复苏战略使用的政策机制之一。正如Sharpley（2000.所暗示的，该国住房和旅游部门的特殊性是一个指标，表明这两个活跃部门之间存在联系。除此之外，利马索尔（塞浦路斯邮报，2017.7.）和岛上其他主要城市的租金暴涨的报告（塞浦路斯邮报，2017.7.）直接由该国旅游业的大量投资引起，正如2016.旅游业激增的报告所示。由于旅游活动通常使用国际游客的到达和离开来衡量，因此这两个指标的动态以及估计期间（2005.2016.）各自的房价如附录表1.图A1.示。

3 | 数据和经验规格

3.1 | 数据

本研究采用了一个从2005年第一季度到2016年第一季度的季度数据集，包括48项观察结果。与Coutinho等人（2018年）的研究类似，对年跨度的限制是由于塞浦路斯房价（HP）指数的数据可用性限制，该指数是从欧盟委员会数据库（欧盟统计局，2017年）获得的。消费者价格指数（CPI）是从国际货币基金组织（IMF，国际货币基金组织，2017年）的国际金融统计数据库中检索到的。世界银行数据库中的世界发展指标（WDI，2017）是国际游客入境（ARR）和国内信贷的来源。人均土地面积计算为估计期间土地面积与人口的比率。随后，所有数据集与季度维度一致。CPI使用2010年的基准年调整了100个单位。

[1]统计服务提供有关塞浦路斯经济部门的详细信息。http://www.mof.gov.cy/mof/cystat/statistics.nsf/services_71main_en/services_71main_en?OpenForm&sub=1&sel=1.

TABLE 1 House prices and tourism indicators

Period	hp	Tourist dpt	Tourist arr
2005	85.97	914,000	2,470,000
2006	96.17	932,000	2,401,000
2007	107.46	1,081,000	2,416,000
2008	113.52	1,210,000	2,404,000
2009	106.08	1,172,000	2,141,000
2010	100	1,246,000	2,173,000
2011	98.40	1,209,000	2,392,000
2012	95.39	1,194,000	2,465,000
2013	91.43	1,115,000	2,405,000
2014	89.88	1,209,000	2,441,000
2015	88.58	1,119,000	2,659,000
2016	87.84	1,268,000	3,187,000

Abbreviations: arr, arrival; dpt, departure; hp, house price.
Source: The *hp* is from the European Commission, while *dpt* and *arrivals* are from the World Development Indicators (WDI, 2019).

The HP index is the dependent variable while others are the independent variables. Both international tourists arrivals account for the short and seasonal periodic change in migration patterns (Asongu, Nnanna, Biekpe, & Acha-Anyi, 2019; Asongu & Nwachukwu, 2019; Asongu & Odhiambo, 2019; Hämäläinen & Böckerman, 2004; Koshteh, 2018; Meen, 2003; Munandar, 2017; Portnov et al., 2001).

GDP per capita, domestic credit, and the consumer price index are among the commonly used variables as determinants of house prices (Case & Shiller, 2003; Ding & Kim, 2017; Kishor & Marfatia, 2017). Hence, the descriptive statistics of the variables are displayed in Table 2.

3.2 | Model specification

The study by Reichert (1990) considered the changes in real housing prices through the development of a reduced form equilibrium model. The implied eight-factor model was further modified to reflect the equilibrium of supply and demand for housing services. Hence, the house price (HP) is represented as a function of quantity demand (Q^d_t) and quantity supplied (Q^s_t) of housing during a period t as

$$HP_t = f\left(Q^d_t, Q^s_t\right) \qquad (1)$$

Similarly, the study by Kishor and Marfatia (2017) recently investigated the relationship between house prices, personal disposable income, and interest rates which are components of demand and supply in the housing market. In a related study, Park et al. (2017) also considered the equilibrium of housing demand and supply using fluctuation rate of per capita real GDP, fluctuation rate of population and dependency ratio, in addition to the housing demand and supply components adopted by Kishor and Marfatia (2017).

TABLE 2 Descriptive statistics and unit root test with ADF and KPSS

Variables	Mean	Median	Maximum	Minimum	Skewness	Kurtosis	Jarque-Bera
lhp	4.5680	4.4417	4.7494	4.4157	0.3933	2.1666	2.6267
larrivals	14.7117	14.6977	15.0547	14.5607	1.4950	6.1059	37.1725**
llperson	−4.7875	−4.7964	−4.7115	−4.8413	0.4596	1.9694	3.8141
ldcredit	5.3811	5.4434	5.5344	5.0542	−0.9710	2.4131	8.2323
lcpi	4.6892	4.6084	9.1283	4.4672	6.6311	45.3380	3936.772*
Unit root tests	Level		Δ				
ADF	With intercept	Intercept and trend	With intercept	Intercept and trend	Conclusion		
lhp	−1.6344	−3.1900**	−4.6789*	−4.9107*	I (1)		
larrivals	0.3086	−0.1276	−3.5096*	−3.4415**	I (1)		
llperson	−1.9816	−12.1387*	−3.2630*	−3.5171*	I (1)		
ldcredit	−3.3646**	−3.6837**	−15.3474*	−15.2913*	I (0)		
lpi	−5.0405*	−5.1341*	−7.9332*	−16.3271*	I (0)		
KPSS							
lhp	0.3491	0.1619**	0.4584	0.2273**			
larrivals	0.4324	0.1941**	0.0825	0.0864			
llperson	0.8879*	0.2327*	0.3438	0.1040			
ldcredit	0.6808**	0.2276*	0.1004	0.0816			
lcpi	0.1224	0.0511	0.0542	0.0526			

Note. Level and Δ respectively indicates estimates at the level and the first difference with lag selection by Schwarz information criterion (SIC) (lag = 4) for the ADF (augmented Dickey–Fuller) and KPSS (Kwiatkowski–Phillips–Schmidt–Shin) unit root test.
*and **are statistical significance at 10% and 5% levels, respectively. Number of observations is 48.
Abbreviations: ADF, augmented Dickey–Fuller; KPSS, Kwiatkowski–Phillips–Schmidt–Shin.

TA BL E 1 房价和旅游指标

期间	hp	旅游景点	游客
2005	85.97	914,000	2,470,000
2006	96.17	932,000	2,401,000
2007	107.46	1,081,000	2,416,000
2008	113.52	1,210,000	2,404,000
2009	106.08	1,172,000	2,141,000
2010	100	1,246,000	2,173,000
2011	98.40	1,209,000	2,392,000
2012	95.39	1,194,000	2,465,000
2013	91.43	1,115,000	2,405,000
2014	89.88	1,209,000	2,441,000
2015	88.58	1,119,000	2,659,000
2016	87.84	1,268,000	3,187,000

缩写：arr, arrival; dpt,出发；hp,房价。
资料来源：hp来自欧盟委员会，而dpt和arrivals来自《世界发展指标》（WDI，2019）。

HP指数为因变量，其他为自变量。两位国际游客的到来都解释了移民模式的短期和季节性周期性变化（阿桑古、纳纳纳、比克佩和阿查·安伊，2019年；阿桑古和恩瓦丘库，2019年；阿桑古和奥德希安博，2019年；哈姆·莱宁和博克曼，2004年；科什特，2018年；米恩，2003年；穆南达尔，2017年；Portnov等人，2001年）。

人均GDP、国内信贷和消费价格指数是作为房价决定因素的常用变量（Case & Shiller, 2003；Ding & Kim, 2017；Kishor & Marfatia, 2017）。因此，表2中显示了变量的描述性统计数据。

3.2 | 型号规格

Reichert（1990）的研究考虑了实际住房的变化通过发展一个简化形式的均衡模型来确定价格。进一步修改了隐含的八因素模型，以反映住房服务供需平衡。因此，房价（HP）表示为需求量的函数（Q^d_t）以及t时期内住房时供应量（Q^s_t）

$$HP_t = f\left(Q^d_t, Q^s_t\right) \qquad δ1Þ$$

同样，Kishor和Marfatia（2017）的研究最近调查了房价、个人可支配收入和利率之间的关系，这些都是住房市场供求的组成部分。在一项相关研究中，Park等人（2017年）还利用人均实际GDP波动率、人口波动率和抚养比，以及Kishor和Marfatia（2017年）采用的住房需求和供应组成部分，考虑了住房需求和供应的均衡。

TA BL E 2 ADF和KPSS的描述性统计和单位根检验

变量	平均	中位数	最大值	最低	偏斜	峰度	雅克贝拉
lhp	4.5680	4.4417	4.7494	4.4157	0.3933	2.1666	2.6267
竞争对手	14.7117	14.6977	15.0547	14.5607	1.4950	6.1059	37.1725**
llperson	−4.7875	−4.7964	−4.7115	−4.8413	0.4596	1.9694	3.8141
ldcredit	5.3811	5.4434	5.5344	5.0542	−0.9710	2.4131	8.2323
lcpi	4.6892	4.6084	9.1283	4.4672	6.6311	45.3380	3936.772*
单位根检验	级别		Δ				
ADF	拦截	截距和趋势	拦截	截距和趋势	结论		
lhp	−1.6344	−3.1900**	−4.6789*	−4.9107*	I(1)		
竞争对手	0.3086	−0.1276	−3.5096*	−3.4415**	I(1)		
lpperson	−1.9816	−12.1387*	−3.2630*	−3.5171*	I(1)		
ldcredit	−3.3646**	−3.6837**	−15.3474*	−15.2913*	I(0)		
lpi	−5.0405*	−5.1341*	−7.9332*	−16.3271*	I(0)		
KPSS							
lhp	0.3491	0.1619**	0.4584	0.2273**			
竞争对手	0.4324	0.1941**	0.0825	0.0864			
llperson	0.8879*	0.2327*	0.3438	0.1040			
ldcredit	0.6808**	0.2276*	0.1004	0.0816			
lcpi	0.1224	0.0511	0.0542	0.0526			

笔记level和口分别表示ADF（增广Dickey-Fuller）和KPSS（Kwiatkowski-Phillips-Schmidt-Shin）单位根检验的水平估计值和Schwarz信息标准（SIC）（滞后= 4）滞后选择的第一个差异。
*和口分别为10. 和5. 水平的统计显著性。观察次数为48。缩写：ADF,增广型Dickey-Fuller；KPSS,克宙特科夫斯基-菲利普斯-旋密特-申。

Hence, by advancing the study of Alola and Alola (2018a, b) in which migration and tourism were separately modeled along with house price, the present study specifically models the house price–tourism nexus for Cyprus by using the representation below

$$Hp_t = \alpha_i + \beta_1\,arrivals_t + \beta_2 CPI_t + \beta_3 lperson_t + \beta_4\,ldcredit_t + \varepsilon_t \quad (2)$$

where Hp_t represents the housing price, ARR_t denotes international tourist arrival, $lperson_t$ is the land area per person (number of persons in square meter area of land), CPI_t is the consumer price index, and $dcredit_t$ is the domestic credit, all for the period $t = 1, 2, \ldots n$. Subsequently, the above representation is transformed by using the natural logarithm (ln) which indirectly reduces or eliminates the effect of heteroscedasticity. Hence, the expression becomes

$$\ln Hp_t = \alpha_i + \beta_1\,lnarrivals_t + \beta_2\,\ln CPI_t + \beta_3 lnlperson_t + \beta_4 lndcredit_t + \varepsilon_t \quad (3)$$

3.2.1 | Empirical specifications

Before investigating the aforementioned relationship between fluctuations in housing prices and tourist movements, it is important to ascertain the stationarity of the variables. Although the autoregressive distributed lag (ARDL) approach is capable of modeling series with either I (0) or I (1) and even for a mixed order of integration, yet it is necessary that none of the series is I (2). Therefore, the augmented Dickey–Fuller (ADF) by Dickey and Fuller (1979), and Kwiatkowski–Phillips–Schmidt–Shin (KPSS) are adopted to investigate the series' stationarity properties. Although, the step-by-step procedure is not specified[2], the results of the estimations are presented in Table 2.

Similarly, prior to employing the ARDL, the cointegration properties of the variables of interest are examined by using the Johansen (1995) cointegration approach. The result of the Johansen (1995) cointegration test establishes that the variables are significantly cointegrated (see Table A1 of the Appendix). This is in addition to the redundant test that further justifies the use of the independent variables, thus addressing the possible estimation biasness because of misspecification (Ferson, Sarkissian, & Simin, 2003; Hamilton, 1987).

3.2.2 | ARDL-bounds testing approach

Sequel to the application of the specification tests, the ARDL-bound testing approach is employed in this study to investigate the likelihood of the long-run equilibrium relationship between tourist arrivals and house prices in Cyprus. The ARDL model was a follow-up to an earlier method applied by Pesaran and Shin (1998) and further developed by Pesaran, Shin, and Smith (2001). The uniqueness of this model to the

study is not only due to the insensitivity of the model to sample size but also, it is not dependent on whether the variables are stationary at levels or first difference, that is, I(0) or I(1) except for I(2). This is because the output statistics (Wald statistics or joint F-statistics) are compared with the set of critical value variables; the lower bound critical values are estimated with assumption that the variable is I(0), and the upper bound critical values are estimated with assumption that the variable is I(1). Hence, evidence of long-run cointegration in the system is established when the F-statistic is greater (>) than the upper bound critical value, the case when the null hypothesis of no cointegration is rejected. Alternatively, we fail to reject the null hypothesis of no cointegration when the F-statistics is less than () the lower bound critical value. An inconclusive result is noticeable when the estimated F-statistics are between the two values. This cointegration procedure begins with the lag selection using the two main information criteria by Akaike (Akaike information criterion [AIC]) and Schwarz (Schwarz information criterion [SIC]). Preliminary diagnostic tests for stability, serial correlation, and heteroscedasticity are performed before the eventual bound test is employed.

This ARDL-bound test model which uses a more general expression of conditional ECM in addition to the option of imposing restrictions on the intercept, trend, and or both is performed for the general model of Equation (3), therefore resulting in the given expression below

$$\Delta lnHP = \alpha_0 + \sum_{j=1}^{n} b_j \Delta lnHP_{t-j} + \sum_{j=0}^{n} c_j \Delta lnarrivals_{t-j}$$
$$+ \sum_{(j=0)}^{n} d_j \Delta lnlperson_{t-j} + \sum_{(j=0)}^{n} e_j \Delta lndcredit_{t-j} +$$
$$+ \sum_{(j=0)}^{n} f_j \Delta lncpi_{t-j} + \partial_1 lnHP_{t=1} + \partial_2 lnarrivals_{t=1} + \partial_3 \quad (4)$$
$$ln lperson_{t=1} + \partial_4 lndcredit_{t=1} + \partial_5 lncpi_{t=1} + \varepsilon_{1t}$$

where the underlying ARDL model presents the parameters b_j, c_j, d_j, e_j, and f_j as the short-run dynamic coefficients, and ∂_1, ∂_2, ∂_3, ∂_4, and ∂_5 are the corresponding long-run multipliers, and ε_t is the (iid) serially independent random "disturbance" term.

Hence, the specified model above presents the null hypothesis of no cointegration as

H_0: $\partial_1 = \partial_2 = \partial_3 = \partial_4 = \partial_5 = 0$ against the alternative by comparing the estimated F-statistics with the critical lower and upper bound values detailed above. The above estimation output using the lag order of 4 is presented in Table 3.

3.2.3 | Diagnostic tests

Following the estimation of the dynamic long-run and short-run properties of the aforementioned model and the ARDL-bound test approach, a series of diagnostic tests are performed to validate the tests (see Table 3). The first category of these tests is the Wald test (short-run diagnostic) which presents the F-statistics of 3.7249 and chi-square statistics of 33.5240 (both rejecting the null hypothesis of 'no short-run'). Furthermore, the serial correlation and

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因此，通过推进Alola和Alola（2018a，b）的研究，其中移民和旅游业与房价一起单独建模，本研究通过使用下面的表示法，具体模拟了塞浦路斯的房价-旅游关系

$$Hp_t = \alpha_i + \beta_1\,arrivals_t + \beta_2 CPI_t + \beta_3 lperson_t + \beta_4\,ldcredit_t + \varepsilon_t \quad ð2Þ$$

其中，Hp_t表示房价，ARR_t表示国际游客抵达，$lperson_t$表示人均土地面积（土地面积平方米内的人口数量），CPI_t表示消费价格指数，$dcredit_t$表示国内信贷，所有时间段均为t = 1, 2, 上述表示通过使用自然对数（ln）进行转换，这间接减少或消除了异方差的影响。因此，这个表达式变得

$$\ln Hp_t = \alpha_i + \beta_1\,lnarrivals_t + \beta_2\,\ln CPI_t + \beta_3 lnlperson_t + \beta_4 lndcredit_t + \varepsilon_t \quad ð3Þ$$

3.2.1 | 经验规范

在调查上述房价波动和游客流动之间的关系之前，确定变量的平稳性很重要。虽然自回归分布式滞后（ARDL）方法能够以无论是I（0）还是I（1），甚至对于混合积分阶，它都是这个系列中没有一个是I（2）。因此，增强的Dickey-Fuller（ADF）由Dickey and Fuller（1979）和Phillips-Schmidt-Shin（KPSS）被用来调查该系列的内容平稳性属性。尽管如此，循序渐进的程序并非如此指定[2]，估计结果如表2所示。

同样，在使用ARDL之前，协整是正确的-利用Johansen（1995）协整方法研究了相关变量之间的联系。Johansen（1995）协整检验的结果表明，变量之间存在显著的协整关系（见附录表A1）。这是对冗余测试的补充，该测试进一步证明了自变量的使用，从而解决了由于错误指定而可能出现的估计偏差（Ferson、Sarkissian和Simin, 2003；Hamilton, 1987）。

3.2.2 | ARDL边界测试方法

在应用规范测试的基础上，本研究采用ARDL界限测试方法来调查塞浦路斯游客人数与房价之间长期均衡关系的可能性。ARDL模型是Pesaran和Shin（1998年）应用的早期方法的后续，Pesaran、Shin和Smith（2001年）进一步开发了该模型。这一模式的独特性

这项研究不仅是因为模型对样本量不敏感，而且也不取决于变量在水平上是平稳的还是第一差，即I（0）或I（1），除了i（2）。这是因为输出统计（瓦尔德统计或联合f统计）与临界值变量集相比较；假设变量为i（0），估计下限界值；假设变量为I（1），估计上限临界值。因此，当f统计量大于上限临界值（>）时，系统中长期协整的证据就成立了，这种情况下不存在协整的无效假设被拒绝。或者，当f统计量小于下限临界值时，我们无法拒绝无协整的零假设。当估计的F-统计量介于两个值之间时，不确定的结果是明显的。这个协整过程从使用Akaike（Akaike信息标准[AIC]）和Schwarz（Schwarz信息标准[SIC]）的两个主要信息标准的滞后选择开始。在采用最终界限检验之前，对稳定性、序列相关性和异方差进行初步诊断检验。

此ARDL绑定测试模型使用了更通用的对于等式（3）的一般模型，除了对截距、趋势和/或两者施加限制的选项外，还执行条件ECM的表达式，因此得出以下给定表达式

$$\Delta lnHP = \alpha_0 + \sum_{j=1}^{n} b_j \Delta lnHP_{t-j} + \sum_{j=0}^{n} c_j \Delta lnarrivals_{t-j}$$
$$+ \sum_{j=0}^{n} d_j \Delta lnlperson_{t-j} + \sum_{j=0}^{n} e_j \Delta lndcredit_{t-j} + \quad ð4Þ$$
$$+ \sum_{j=0}^{n} f_j \Delta lncpi_{t-j} + \partial_1 lnHP_{t=1} + \partial_2 lnarrivals_{t=1} + \partial_3$$
$$ln lperson_{t=1} + \partial_4 lndcredit_{t=1} + \partial_5 lncpi_{t=1} + \varepsilon_{1t}$$

其中，基础ARDL模型将参数b_j、c_j、d_j、e_j和f_j表示为短期动态系数，以及∂_1, ∂_2, ∂_3, ∂_4, 及∂_5是相应的长期乘数，ε_t是（iid）连续独立的随机"扰动"项。

因此，上述指定模型提出了无协整的零假设

H_0: $\partial_1 = \partial_2 = \partial_3 = \partial_4 = \partial_5$ 通过将估计的F-统计量与上文详述的临界下限值和上限值进行比较，得出替代值=0。表3给出了使用4的滞后顺序的上述估计输出。

3.2.3 | 诊断测试

在对上述模型和ARDL界限测试方法的动态长期和短期特性进行评估后，进行了一系列诊断测试以验证测试（见表3）。这些测试的第一类是Wald测试（短期诊断），它给出了3.7249的F-统计量和33.5240的卡方统计量（两者都拒绝了"无短期"的无效假设）。此外，序列相关性和

TABLE 3 Dynamic ARDL estimate, ARDL (1, 0, 4, 1, 4)

Long-run					
	larrivals	*llperson*	*ldcredit*	*lcpi*	*c_____*
β	0.3683**	−1.0776	0.6240**	0.0847*	0.2221
Short-run					
β	0.1609**	−10.6031**	0.6035*	0.0121**	
ECT (−1)	-0.4368				
p-Value	.0032*				
R	0.9757		Sum error of regression = 0.0161		
R-square	0.9641		F-statistic = 83.3859* (0.0000)		
Bound test (long-run evidence)					
				I0 Bound	I1 Bound
			1%	3.74	5.06
F-statistics = 8.7616*			2.5%	3.25	4.40
K = 4			5%	3.86	4.01
Wald test (short-run estimate)					
F-statistic	3.7249*				
p-Value	.0033				
χ^2	33.5240*				
p-Value	.0001				
Residual diagnostics					
Breusch-Godfrey SR LM test			Breusch-Pagan-Godfrey H test		
χ^2 (*p-value*)	.1013		.7180		
Normal (Jarque-Bera)	3.0548(0.2171)				
Skewness	0.0177				
Kurtosis	2.3746				

Note. Autoregressive distributed lad (ARDL) model employed is (1, 0, 4, 1, 4), β is the coefficient of the regressors, the *p*-value is the probability value and ECT is the error correction term also known as the adjustment parameter. I0 and I1 are lower and upper bounds of the bound test, respectively, χ^2 is the chi-square, SR LM is serial correlation Lagrange multiplier and H is heteroscedasticity. Number of models evaluated is 14,406.
*, **, and *** indicate 10%, 5%, and 1% statistical significance levels.

heteroscedasticity by Breusch-Godfrey serial correlation Lagrange multiplier test and Breusch-Pagan-Godfrey heteroscedasticity respectively were employed. The report of the test as shown in Table 3 implies failure to reject the null hypothesis for both no serial correlation and homoscedasticity, thus validating reliability of the results. In addition, while the normality test (by Jarque-Bera, 3.0548) suggests failure to reject the null hypothesis of normal distribution; the Skewness and Kurtosis present desired results (see Table 3). Moreover, the stability of the estimation is further validated through the cumulative sum (CUSUM) and CUSUM squared tests as indicated in Figure 1.

4 | RESULTS AND DISCUSSION

As observed from Table 1, international tourist arrivals and departures from the Republic of Cyprus have been on an increasing trajectory during the period under estimation. This indication coincides with the house price of the country being peaked at 113.52 in 2008, the year of the GFC. Although the years 2007, 2009, and 2010 witnessed an average rise in house price, the prices are averagely below the peak price in 2008. The estimated variables desirably show statistical evidence of normality except for the *arrivals* and the *cpi* as implied in Table 2. Also, as indicated in Table 2, there is statistical evidence of negative skewness from domestic credit (*dcreditt*), thus the deviations observed in the dynamics of the variables are largely positive.

Furthermore, the dynamic estimates illustrated in Table 3 posit interesting and expected findings that indicate that there is a significant adjustment speed of about 44% after disequilibrium. Prior to the dynamic estimation, the cointegration test (see Table A1 of the appendix) suggests a significant evidence of cointegration, thus indicating long-run dynamics. For instance, the long-run and short-run relationships between the house prices (*hp*) and the consumer price index (*cpi*) are significant and positive. The result implies that a 1% increase in the *cpi* is expected to cause about 8.5% and 1.2% increase in *hp* in the long-run and in the short-run, respectively. As such, the result directly corroborates the evidence of house price-"consumer price index" nexus opined by Abelson et al. (2005) and Tu (2000, 2004). Interestingly, the magnitude of the impact of domestic credit

FIGURE 1 (a) The CUSUM and (b) CUSUM of square tests of stability

made available by financial institutions to domestic investors is significant, positive, and almost unchanged in the course of time. The evidence of the impact of domestic credit on house price is related to the significant evidence of the "house price"-"domestic interest rate" nexus noted in selected OECD countries by Kishor and Marfatia (2017, 2018). On the other hand, land per person (*lperson*) is observed to have a significant and negative impact on *hp* in both the long-run and the short-run. This is an indication that as the land available per person increases; the price of housing expectedly reduces, suggesting that land availability is a vital factor toward mitigating undesirable price hikes of housing in Cyprus. The result validates the relationship between the dynamics of land (expressed as land use in other terms), population, and the house prices as detailed in extant studies (Alola & Alola, 2019; Ihlanfeldt, 2007; Katz & Rosen, 1987; Pashardes & Savva, 2009; Pollakowski & Wachter, 1990; Uzuner & Alola, 2019).

Additionally, the relationship between tourism activity and housing price in Cyprus as investigated in the current study is significant and positive (also see Table 3). Indicatively, a 1% increase in the number of the international tourist arrivals is expected to cause about a 37% and 16% increase in the house price in both the long-run and the short-run, respectively. This further informs that tourism activities in

the Republic of Cyprus are a catalyst for the hike in the price of housing in the country. Considering that earlier studies posit a positive relationship between house price and migration (Hämäläinen & Böckerman, 2004; Meen, 2003; Portnov et al., 2001; Alola & Alola, 2018a, b), the present study extends the attendant scholarship within the framework of tourism. The explanation for the positive nexus between house price and tourist arrivals in Cyprus could be linked to the high tendency of tourists buying residential properties and engaging in other property investment businesses.

Moreover, the ARDL bound testing result (see Table 3) further illustrates a significant evidence of a combined long-run relationship with an F-statistics of 8.762 against the lower bound (I, 0) and upper bound (I, 1) at 3.74 and 5.06 significance levels, respectively. In addition to the diagnostic inference, the short run estimate (the Wald test) which shows a significant estimate further validates that there is statistical evidence of short-run relationships among the indicators.

5 | CONCLUDING REMARK AND POLICY SUGGESTION

In underpinning the relationship between international tourist arrivals and house prices over the period 2005Q1 to 2016Q1, the present study further shows nexuses between the house prices and the land per person, the domestic credit, and the consumer price index in the Republic of Cyprus. Besides, the island of Cyprus which is regarded by the World Bank as a high income economy with tourism as one of the country's main economic sectors has about 3% economic growth rate. Expectedly, the current study posits a positive relationship between the house price (*hp*) and the tourism activity vis-à-vis international tourist arrivals (*arrivals*) in the country. Also, while a positive relationship is revealed between the house price, domestic credit, and consumer price index, the house price and land per person relationship is negative. Importantly, the nexus of the house price and *arrivals* is expectedly positive because Cyprus has significantly experienced an investment boom in the real estate and residential property market in the last decade (Cyprus Mail, July 2017). According to the Cyprus Mail, the real estate investment and residency permit policy introduced by the government to boost the investment confidence in the sector are likely responsible for motivating tourists' investments in residential property across the country.

5.1 | Policy suggestion

By implication, the policy of the government is expected to be geared toward ensuring that the house prices in the country are not abnormally high. The Republic of Cyprus has continued to strategically revisit a handful of policies that are targeted at boosting its economy, thereby easing the country's financial recession of the year 2012–2013. Both the country's "Scheme for Naturalization of Investors in Cyprus by exception" that is aimed at boosting its housing and the real estate market through foreign direct investment in Cyprus

图1 （a）稳定性的CUSUM和（b）CUSUM平方检验

金融机构向国内投资者提供的信息是重要的、积极的，而且随着时间的推移几乎没有变化。国内信贷对房价影响的证据与Kishor和Marfatia（2017年、2018年）在选定的经合组织国家指出的"房价"——即"国内利率"关系的重要证据有关。另一方面，从长期和短期来看，人均土地（lperson）对hp都有显著的负面影响。这表明，随着人均可用土地的增加；住房价格预期会下降，这表明土地可用性是缓解塞浦路斯住房价格上涨的关键因素。这一结果验证了现有研究（阿洛拉和阿洛拉，2019年；伊兰菲尔德，2007年；卡茨和罗森，1987年；帕沙德斯和萨瓦，2009年；波拉科夫斯基和瓦赫特，1990年；乌祖纳和阿洛拉，2019年）中详述的土地动态（用其他术语表示为土地利用）、人口和房价之间的关系。

此外，本研究中调查的塞浦路斯旅游活动与房价之间的关系是显著且积极的（另见表3）。从长期和短期来看，预计国际游客数量增加1%将分别导致房价上涨37%和16%。这进一步说明

塞浦路斯共和国是该国房价上涨的催化剂。考虑到早期的研究假设房价和移民之间存在积极关系（Hämäläinen & Böckerman, 2004；Meen, 2003；Portnov等人，2001；Alola & Alola, 2018a, b），本研究在旅游业的框架内扩展了随之而来的奖学金。塞浦路斯房价和游客人数之间的积极关系的解释可能与游客购买住宅物业和从事其他房地产投资业务的高趋势有关。

此外，ARDL界测试结果（见表3）进一步说明了组合长期关系的重要证据，在3.74和5.06显著性水平下，与下限（I，0）和上限（I，1）相比，F-统计量分别为8.762。除了诊断推断之外，短期估计（瓦尔德检验）显示了显著的估计，进一步验证了指标之间存在短期关系的统计证据。

5 | 结语及政策建议

为了巩固2005年第一季度至2016年第一季度国际游客人数与房价之间的关系，本研究进一步显示了塞浦路斯共和国房价与人均土地、国内信贷和消费价格指数之间的关系。此外，塞浦路斯岛被世界银行视为高收入经济体，旅游业是该国主要经济部门之一，经济增长率约为3%。预期的是，当前的研究假设房价（hp）和旅游活动与该国的国际游客人数（arrival）之间存在正相关关系。此外，虽然房价、国内信贷和消费价格指数之间存在正相关关系，但房价和人均土地的关系是负相关的。重要的是，房价和入住率之间的关系预计是积极的，因为塞浦路斯在过去十年中经历了房地产和住宅房地产市场的投资热潮（塞浦路斯邮报，2017年7月）。据《塞浦路斯邮报》报道，政府为增强该行业的投资信心而推出的房地产投资和居住许可政策可能是促使游客在全国范围内投资住宅地产的原因。

5.1 | 政策建议

言下之意，政府的政策预计将着眼于确保该国的房价不会异常高。塞浦路斯共和国继续从战略上重新审视旨在提振其经济的一些政策，从而缓解该国2012. 2013. 的金融衰退。该国的"塞浦路斯投资者入籍例外计划"旨在通过在塞浦路斯的外国直接投资提振其住房和房地产市场

(Cyprus Ministry of Interior, 2017) and the recently introduced strategic policies are targeted at tripling the tourism earning to the tune of €20 billion by 2030 as reported by Cyprus Mail (2017). Since housing prices do jointly move with their determinants (such as international tourist arrivals) in the long-run, it is expected that the stakeholder in the tourism, the real estate, and housing sectors engage proactive measures toward avoiding unnecessary adverse effects of the 'Naturalization of Investors' policy. Considering that an increase in land per person is expected to cause a decline in house price in the country, the land use policy of the country could be further reviewed in order to remedy the possible adverse effects of the 'Naturalization of Investors' policy.

Future studies can focus on assessing whether the established linkages withstand empirical scrutiny in other developing countries. In order to address the caveats of the current study, future investigation could look at whether house prices significantly influence tourists' arrivals. In addition, future research could also be positioned on employing the market classification of housing or the real estate and the property sector.

AVAILABILITY OF DATA
The data utilized for this study can be made available upon request.

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ORCID
Andrew A. Alola https://orcid.org/0000-0001-5355-3707
Uju V. Alola https://orcid.org/0000-0002-3926-6231

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（塞浦路斯内政部，2017年）和最近出台的战略政策旨在将旅游收入提高三倍，达到

据《塞浦路斯邮报》（2017年）报道，到2030年将达到200亿欧元。由于房价在长期内确实会与其决定因素（如国际游客）共同变动，预计旅游业、房地产和住房部门的利益相关者会采取积极措施，以避免"投资者自然化"政策带来不必要的不利影响。考虑到人均土地的增加预计会导致该国房价的下降，可以进一步审查该国的土地使用政策，以弥补"投资者归化"政策可能带来的不利影响。

未来的研究可以侧重于评估已建立的联系是否经得起其他发展中国家的经验审查。为了解决当前研究的警告，未来的调查可能会关注房价是否会显著影响游客的到来。此外，未来的研究还可以定位于采用住房或房地产和房地产行业的市场分类。

数据的可用性
本研究使用的数据可根据要求提供。

确认
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ORCID
安德鲁·A·阿洛拉 https://orcid.org/0000-0001-5355-3707
Uju V. Alola https://orcid.org/0000-0002-3926-6231

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AUTHOR BIOGRAPHIES

Andrew A. Alola (PhD Economics and assistant Professor) holds MSc in Applied Mathematics in Eastern Mediterranean University and a Bachelor degree in Mathematics at the University of Ilorin-Nigeria. Thereafter, he earned a Ph.D. degree in Economics from Eastern Mediterranean University. His areas of interest include Econometrics, Renewable Energy, Time and Panel data, and other evolving economic-related interests.

Professor Simplice A. Asongu holds a PhD from Oxford Brookes University and is currently the Lead Economist and Director of the African Governance and Development Institute (Yaoundé, Cameroon) and Lead Economist and Director of the European Xtramile Centre of African Studies(Liége, Belgium). He is also a:

Senior Research Fellow at the Africa Growth Institute (Cape Town, South Africa); PhD Supervisor at Covenant University (Ota, Nigeria), the University of Ghana (Accra, Ghana) and Midlands State University (Gweru, Zimbabwe); DBA Supervisor at Management College of Southern Africa (Durban, South Africa) and Research Associate at the University of South Africa (Pretoria, South Africa), University of Buea (Buea, Cameroon) and Oxford Brookes University (Oxford, UK). He is also an Associate Editor in some journals including the Journal of economic surveys, the Journal of African Business and the International Journal of Education Economics and Development.

Uju V. Alola holds a PhD degree in Tourism Management from Eastern Mediterranean University in Famagusta-Northern Cyprus. He also holds MSc in Marketing Management at Eastern Mediterranean Universityand Bachelor degree in the same field but at the Anambra State University of Nigeria. Currently, she teaches at Istanbul Gelisim University, Turkey, this is in addition to over seven years working experience in the hospitality management industry.

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作者传记

Andrew A. Alola（博士经济学和助理教授）持有地中海东部大学应用数学理学硕士学位，并在尼日利亚伊洛林大学获得数学学士学位。此后，他获得东地中海大学经济学博士学位。他的兴趣领域包括计量经济学、可再生能源、时间和面板数据，以及其他不断发展的经济相关兴趣。

Simplice A. Asongu教授拥有牛津布鲁克斯大学的博士学位，目前是非洲治理和发展研究所（喀麦隆雅温得）的首席经济学家和主任，以及欧洲Xtramile非洲研究中心（比利时利格）的首席经济学家和主任。他也是一个:

非洲增长研究所（南非开普敦）高级研究员；圣约翰大学（Ota，尼日利亚），加纳大学（阿克拉，加纳）和米德兰州立大学（GWULU，津巴布韦）博士生导师；DBA监督者管理学院南部非洲（德班，南非）和研究助理在南非大学（比勒陀利亚，南非），大学Buea（布亚，喀麦隆）和牛津布鲁克斯大学（牛津，英国）。他还是一些期刊的副主编，包括《经济调查杂志》、《非洲商业杂志》和《国际教育经济学与发展杂志》。

Uju V. Alola拥有北塞浦路斯法马古斯塔东地中海大学旅游管理博士学位。他还持有地中海东部大学营销管理学硕士学位，在同一领域的学士学位，但在尼日利亚的安娜布拉州立大学。目前，她在土耳其伊斯坦布尔格里西姆大学任教，这是她在酒店管理行业七年多工作经验的补充。
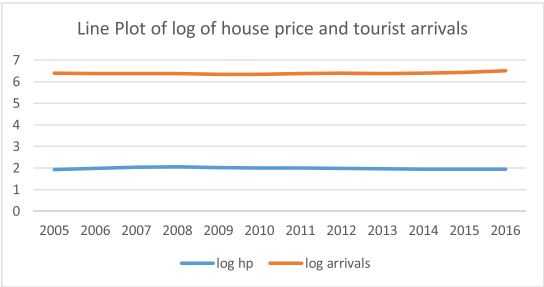
APPENDIX A

TABLE A1 Specification and Johansen cointegration test

Redundant variable test	t-Statistic (p-value)	F-statistic
With *larrivals*	1.9613 (.0595) ***	3.8470
With *llperson*	1.9275 (.0638) ***	3.7153
With *lcpi*	2.3641 (.0250) **	5.58895
With *ldomestic*	4.3495 (.0002) *	18.9180
No. of cointegration equations	Trace test	Maximum Eigenvalue test
None	206.3179* (0.0000)	60.3459* (0.0001)
At most 1	145.9720* (0.0000)	55.7361* (0.0000)
At most 2	90.2359* (0.0000)	37.5948* (0.0019)
At most 3	52.6411* (0.0000)	30.1811* (0.0020)
At most 2	22.4600* (0.0038)	21.9636* (0.0025)

Note. The estimate adopts the Schwarz information criterion (SIC) (maximum lag = 4). *, **, and *** indicate 10%, 5%, and 1% statistical significance levels. Also, *larrivals*, *llperson*, *lcpi*, and *ldomestic* are the logarithmic of the international arrivals, land per person, consumer price index, and domestic credit.

FIGURE A1 The visual presentation of Table 1, that is, line plot of the logarithm of the house price index and international tourist arrivals (arrivals) over the period 2005 and 2016