



ECONOMICS RESEARCH CENTRE
UNIVERSITY OF CYPRUS

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RESEARCH OUTPUT 2020

The Economics Research Centre (CypERC) belongs to the Department of Economics at the University of Cyprus. The Centre aims at high quality policy-oriented research in economics.

CypERC is managed by the Centre's Council and the Academic Council. The Centre's Council is composed of five to nine members from both the academic community and outside the academia; it advises the Director of the Centre on selecting research topics of interest to Cyprus. The Academic Council oversees the organisation and execution of research and consists of project coordinators and research fellows at CypERC.

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The views expressed in the CypERC publications are the authors' views and do not necessarily represent the CypERC and its sponsors.

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Professor Elena Andreou

CypERC Director

October 2020

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Introduction - Summary

The research activities of the Economics Research Centre (CypERC) in 2019 and most part of 2020, focused on a wide range of applied economic issues concerning Cyprus and Europe. Research funding at CypERC came from competitively earned grants from the European Union, the Cyprus Research Promotion Foundation, and the University of Cyprus, as well as from sponsorships from the Ministry of Finance, the Central Bank of Cyprus and the Hellenic Bank.

The research topics investigated at the Centre in 2019 include the following: the evolution of car ownership in Cyprus; the trends and disparities in economic inequality in Cyprus and the EU; the factors that determine bank lending standards in Cyprus; the optimal timing of greenhouse gas emissions abatement in Europe; the construction of residential property price indices for Cyprus; an impact assessment of the Cyprus Integrated National Energy and Climate Plan; the social protection system in Cyprus; the tax-benefit model for the European Union; inference in group factor models and heterogeneous intergenerational mobility.

Topics researched in 2020 include: the shadow economy in Cyprus, as well as its interconnection with financial crises; lending rate setting in a data-driven agent-based model; an analysis of public debt thresholds for Cyprus; intergenerational trajectories; the role of social interactions in preferences for redistribution; environmental and economic impacts of the national energy and climate plan of Cyprus; fuel price pass-through in Cyprus; students' expectations about higher education returns in Cyprus; economic aspects of COVID-19 and uncertainty proxies for Cyprus derived from survey data. Moreover, research in 2020 has dealt with the role of volatility factors in predicting the VIX and the volatility risk premium; mixed-frequency macro-finance factor models; endogeneity in semiparametric threshold regression and a threshold spatial Durbin model.

In 2020 the CypERC circulated commentaries on topical issues which covered the economic consequences of the pandemic through monitoring economic activity in real-time, and ideas for a green economic recovery in Cyprus.

Ongoing research projects in 2019 and 2020 include the construction of macroeconomic forecasts for Cyprus, Business and Consumer Surveys, the Cyprus Composite Leading Economic Index, the Survey of Health, Ageing, and Retirement in Europe (SHARE), productivity analysis and competitiveness rankings for Cyprus.

The dissemination of research results is mainly carried out through a bi-annual Journal, the Cyprus Economic Policy Review Journal, a bi-annual Newsletter, the quarterly bulletin "Economic Outlook", the monthly bulletin "Business and Consumer Surveys" and the monthly bulletin "Cyprus Composite Leading Index". A productivity bulletin is also published on a regular basis, usually annually, according to data availability. The Economic Policy/Analysis Papers present the methodologies underpinning research at the Centre, as well as detailed empirical results. The results of the research work carried out in the CypERC are also presented in meetings and conferences.

The CypERC continues to put emphasis on high-quality research, ongoing training of research staff as well as the creation of post-doctoral positions.

Activities 2019-2020 (October)

I. Administrative activities

I.1. Staff

During 2019 - 2020, CypERC employed a Director, an Assistant Director, 13 researchers (Special Scientists) and an administrative assistant.

In 2019 - 2020, seven faculty members of the Department of Economics participated in the Academic Council of the Centre - Prof. Christoforos Pissarides, Prof. Elena Andreou, Prof. Sofronis Clerides, Prof. Theofanis Mamuneas, Associate Prof. Andros Kourtellos, Associate Prof. Panayiota Lyssiotou and Assistant Prof. Nikos Theodoropoulos. The members of the Academic Council are research coordinators of programmes earned by CypERC, mainly funded under competitive conditions mainly by the European Union. These research programmes fund the employment of researchers at CypERC. In addition to bringing external funding to the University and offering employment to researchers, these programmes contribute to academic excellence and international dissemination of research carried out at the Centre and the Department of Economics, University of Cyprus.

In addition, during 2019- 2020 the Centre collaborated with eight academics, mostly faculty members of the Department of Economics of the University of Cyprus. The employment of academic advisors at the Centre has proved to be extremely useful as it strengthens cooperation between CypERC researchers and experienced academics and improves the quality of research as well as the training of young researchers. It also enhances the cooperation of the Centre with the Department of Economics and other research centres in Cyprus and abroad. Furthermore, collaboration between CypERC and academics helps to further broaden the range of topics researched, by providing specialised knowledge for the analysis of economic phenomena and economic policies both locally and internationally. The eight academic advisors at CypERC during 2019 - 2020 were the following: Emeritus Prof. Louis Christofides, Prof. Theofanis Mamuneas, Prof. Sofronis Clerides, Associate Prof. Andros Kourtellos, Associate Prof. Panayiota Lyssiotou, Assistant Prof. Nikos Theodoropoulos, Associate Prof. Theodoros Zachariadis, and Associate Prof. Christos Savva.

I.2 Funding of research activities

Funding at CypERC came from competitively earned grants from the Cyprus Research Promotion Foundation, the European Union and the University of Cyprus, as well as from sponsorships from the Ministry of Finance, the Hellenic Bank and the Central Bank of Cyprus. More specifically, funding in 2019 and 2020 was as follows:

(i) Sponsorships

Central Bank of Cyprus

Ministry of Finance

(ii) Earmarked Sponsorships

Central Bank of Cyprus and Ministry of Finance (2019) for the construction of forecasts for sectors of the Cypriot economy.

(iii) Contracted Research Projects

Title	Source of funding	Co-ordinator	Duration
Joint Harmonised EU Programme of Business and Consumer Surveys: Cyprus	(1) European Union (European Commission - DG-ECFIN) (2) Ministry of Finance (3) University of Cyprus	Prof. E. Andreou	2015-2021
The Survey of Health, Ageing and Retirement in Europe - European Research Infrastructure Consortium (SHARE-ERIC): Cyprus	(1) European Commission (SHARE-ERIC) (2) Ministry of Finance	Assistant Prof. N. Theodoropoulos	2016-2019
Regular maintenance of the EUROMOD tax-benefit microsimulation model and preparation of its transfer to the European Commission	European Commission	Associate Prof. P. Lyssiotou	2019
Mixed Data Sampling (MIDAS) models: Theory and Application	Research Promotion Foundation (RESTART 2016-2020, Excellence Hubs)	Prof. E. Andreou	2019-2021
Dynamic consumer behavior in car ownership	Research Promotion Foundation (RESTART 2016-2020, DIDAKTOR Post-Doctoral Research)	Prof. S. Clerides (Post-Doctoral researcher: A. Adamou)	2018-2020
Mixed Data Sampling models (MIDAS)	University of Cyprus	Prof. E. Andreou	2017-2019
The Econometrics of Intergenerational Mobility(MetricIMO)	Marie Sklodowska-Curie fellowship (European Union)	Associate Prof. Andros Kourtellos	2016-2019
Composite leading indicator	Hellenic bank	Prof. E. Andreou	2019-2021
Group factor models	Research Promotion Foundation (RESTART 2016-2020, International Collaborations Dual Targeting)	Prof. E. Andreou	2019-2021
Impact assessment of the Cyprus Integrated National Energy and Climate Plan	European Commission (Structural Reform Support Service)	Associate Prof. T. Zachariadis, Cyprus University of Technology. In collaboration with the	2018-2019

(iv) In-kind contributions

The Department of Economics contributed 50% of a Professor's working time to serve as the Director of the Centre. The University of Cyprus contributed a full-time permanent member of Special Teaching Staff to serve as Assistant Director and a full-time administrative assistant, and provided office spaces and equipment.

I.3 Dissemination of research results

The research output of the Centre is disseminated by publications distributed to a large number of electronic subscribers (more than 4000) including the media, domestic public and private organisations and businesses, international organisations with interest in the Cyprus economy, academics in Cyprus and abroad. These publications are available on CypERC's website (<http://ucy.ac.cy/erc/en/>). Currently the dissemination of research results is carried out via the following publications:

(i) Journal

Cyprus Economic Policy Review. The Cyprus Economic Policy Review is published bi-annually by CypERC. The objective of the Review is to publish high quality papers on European and global economic issues of interest to Cyprus, appealing to a broad audience of policymakers and practitioners. (<http://ucy.ac.cy/erc/en/publications/cyprus-economic-policy-review>)

(ii) Working paper series

Economic Policy/Analysis Papers. This series publishes research results along with the technical/analytical details (models/methods) accompanying them. The articles in this series are subject to a strict editorial procedure to ensure a high quality of content and presentation. They are distributed to a large number of interested recipients in Cyprus including policy makers, practitioners and academics. They are available on the website of CypERC together with their corresponding abstracts in both Greek and English. (<http://ucy.ac.cy/erc/en/publications/economic-policy-analysis-papers>)

(iii) Bulletins

"Business and Consumer Surveys". The monthly bulletin "Business and Consumer Surveys" presents the main results of Business and Consumer Surveys conducted in Cyprus. The bulletin discusses short-run changes in the business climate (Services, Retail Trade, Construction, Industry), as well as recent trends in consumers' perceptions and expectations about the financial condition of their households and the economy in general. The full text is available in Greek. The bulletin also provides the main results of the Surveys in English. (<http://ucy.ac.cy/erc/en/publications/bus-cons-surveys>)

"Cyprus Composite Leading Index". This monthly bulletin presents the changes of the "Cyprus Composite Leading Index". The CLEI is designed to provide early warning signals for the turning points of business cycles i.e., early evidence of the turns in economic activity. This index comprises of a number of leading economic activity variables whose changes tend to lead the

changes in the overall economic activity and which are evaluated on a regular basis. (<http://ucy.ac.cy/erc/en/publications/cyprus-composite-leading-economic-index-cclei>)

"Economic Outlook". CypERC has been publishing "Economic Outlook" on a quarterly basis since 2012. The bulletin presents short-term model-based forecasts for GDP growth and inflation in Cyprus. The forecasts are discussed in conjunction with recent economic developments, as well as with risks to the outlook for the Cyprus. The full text is available in English. The bulletin also provides a summary of the key points in Greek. (<http://ucy.ac.cy/erc/en/publications/economic-outlook>)

"Productivity Analysis". The bulletin presents labour productivity and total factor productivity indices for the Cyprus economy at the aggregate level as well as for sectors of economic activity. Furthermore, the bulletin presents comparisons between total factor and labour productivity and across sectors of the economy as well as cross-country comparisons, and offers policy recommendations for improving productivity. The bulletin is published on a regular basis according to data availability. The full text is available in English. The bulletin also provides an abstract in Greek with the main results. (<http://ucy.ac.cy/erc/en/publications/productivity-analysis>)

(iv) Newsletter

CypERC's Newsletter summarises research findings in a non-technical language and refers interested readers to the relevant Economic Policy/Analysis Papers and articles in the Cyprus Economic Policy Review. The Newsletter also informs readers about recent developments at CypERC and the Department of Economics of the University of Cyprus. CypERC's Newsletter is published biannually (March and October) in Greek accompanied by a summary in English. (<http://ucy.ac.cy/erc/en/publications/newsletter>)

Articles in the media. The material published in the bulletins of CypERC was widely covered by newspapers and new websites in Cyprus. Cypriot newspapers and websites were extensively reported CypERC publications.

(v) Commentary

"Commentary" is an occasional publication aiming at presenting results of research conducted at CypERC that are directly related to topical issues in the Cyprus economy. Most commentaries are available in Greek only. (<https://www.ucy.ac.cy/erc/en/publications/commentaries>)

Presentations

- Syrichas G., "Cyprus Economy: Outlook and Risks", Cyprus Economic Society Conference, February 2019, Nicosia, Cyprus.
- Pashourtidou N., Papamichael C. and Karagiannakis C., "Forecasting economic activity in sectors of the Cypriot economy", Ministry of Finance, April 2019, Nicosia, Cyprus.
- Sotiriou C., Michopoulos A. and Zachariadis T., "Understanding the optimal timing and the social benefits of energy efficiency measures for designing an effective climate policy". Summer Study of the European Council for an Energy Efficient Economy, June 2019, Presqu'île de Giens, France.

- Andreou E. and Demetriadou M., "The effect of Macroeconomic Uncertainty on key economic indicators and bank loans in Cyprus", International Association of Applied Econometrics (IAAE) conference: June 2019, Nicosia, Cyprus.
- Andreou E. and Ghysels E., "Seasonal Adjustment in High Dimensional Data", International Association of Applied Econometrics (IAAE) conference: June 2019, Nicosia, Cyprus.
- Sotiriou C. and Zachariadis T., "The importance of a carbon tax on timely and cost-effective decarbonization – A case study from Cyprus". 20th Global conference on Environmental Taxation, September 2019, Limassol, Cyprus.
- Zachariadis T., Sotiriou C., Taliotis C., Karmellos M., Fylaktos N., Giannakis E. and Andreou S., "Impact Assessment of the Energy and Climate Plan of Cyprus". Presentations at two public consultation events of the National Energy and Climate Plan of Cyprus, November 2019, Nicosia, Cyprus.
- Nikos Theodoropoulos, Country Team Leader, "SHARE: data and research results", the Ministry of Health, October 23, 2019.

I.4 Participation in workshops / meetings / working groups/ conferences

- Participation in the Seminar for Think Tanks and Academia representatives on the European Commission's Economic Agenda, March 12-13, 2019, Brussels, Belgium.
- European Commission National Productivity Boards (ECFIN-NPB) conference, May 2020.
- European Commission National Productivity Boards (ECFIN-NPB) conference, June 2020.
- Participation in the 2019 EUROMOD annual meeting in Milan in September 2019.
- Participation in "Survey of Health, Ageing and Retirement in Europe (SHARE) Wave 8 Post-FiRe and Kick-off COHESION Meeting", 20-21 September 2019, Budapest, Hungary.
- Participation in "Survey of Health, Ageing and Retirement in Europe (SHARE) Wave 8 Main TTT (Train-the-Trainer Meeting)", 30 September-2 October 2019, Frankfurt, Germany.
- Participation in the 9th Joint EC-OECD workshop on Business and Consumer Surveys, 14-15 November, OECD Boulogne-Billancourt, Paris, France.

I.5 Collaborations

Since 2017, CypERC acts as a Partner Institute of the IMD World Competitiveness Center for the annual edition of the IMD World Competitiveness Yearbook, CypERC contributes via the collection of the necessary hard data for Cyprus, i.e. about 60 indicators that cover economic performance, government efficiency, business efficiency, infrastructure and digitalization. CypERC is also responsible for disseminating the results in Cyprus via a Bulletin. More details can be found in the following address: <http://ucy.ac.cy/erc/en/collaborations>.

I.6 Social contribution

- Researchers (e.g. academics, students, analysts) studying issues relating to the Cypriot economy are often approach CypERC asking for information, data and studies on the Cypriot economy.
- Journalists, government officials and representatives of organized groups communicate with the Centre in order to obtain further information on the Centre's published research findings.

- The academic staff of the Centre:
 - Provide data to students of the Department of Economics of the University of Cyprus in order to conduct studies on the Cypriot economy.
 - Participate in meetings with policy makers and other private or public organizations to discuss issues relating to the Cypriot economy or topics concerning the formulation of economic policies.
 - Participate in SHARE-ERIC, the European Research Infrastructure Consortium (ERIC), for the creation and operation of research infrastructures in Europe.

II. Research activities 2019

CypERC produces rigorous analysis on issues of the Cypriot economy using novel and state-of-the-art techniques, building on the in-depth institutional knowledge of the local economy acquired at the Centre. Research activities focus on both microeconomic and macroeconomic topics, as well as on other specialized topics. This section of the report provides summaries of the research work conducted at CypERC in 2019, together with the names of people involved in the work.

II.1 The evolution of car ownership in Cyprus

A. Adamou, S. Clerides

We utilize data on car registrations and multiple household surveys to describe the evolution of car ownership in Cyprus over the last 20+ years. Car ownership expanded rapidly in the 1990s and 2000s, up until the financial crisis. Much of this is due to the importation of used vehicles; the magnitude of this segment is a unique feature of the Cyprus car market. As a result, Cyprus has a large and aging car fleet, and associated level of traffic and pollution. The financial crisis stemmed the increase in the size of the fleet but contributed to its further aging.

Deliverables

Adamou A. and S. Clerides, "The Evolution of Car Ownership in Cyprus", Economic Policy Paper No. 04-19, Economics Research Centre, University of Cyprus, December 2019.

II.2 Trends and disparities in economic inequality in Cyprus and the EU

A. Kourtellos, K. Petrou

The goal of this paper is to examine the recent trends and disparities in economic inequalities for Cyprus and draw comparisons with the other EU countries for the period 1995-2016. We provide new estimates of intergenerational mobility of education, study the relationship between mobility and income inequality, and investigate trends and inequalities in a range of macro-level and micro-level indicators. Our findings show that Cyprus is characterized by a relatively high degree of educational intergenerational persistence and moderate levels of income inequality. Recent trends in income inequality show a spike in top income inequality due to the recent economic crisis. We also find that Cyprus follows similar patterns as the EU average but generally lags behind the Nordic countries, especially for social protection benefits and educational outcomes. Finally, our findings show that the relative female labor force participation in Cyprus is similar to the EU average with small negative deviations from the average value for men's returns to skills and moderate positive deviations for assortative mating. Notably, Cyprus enjoys the second smallest percentage of single-headed households in the EU.

Deliverables

A. Kourtellos and K. Petrou, "Trends and disparities in economic inequality in Cyprus and the EU", Economic Policy Paper No. 05-19, Economics Research Centre, University of Cyprus, December 2019.

II.3 Probing the mechanism: lending rate setting in a data-driven agent-based model

G. Papadopoulos

The primary, empirical topic of this study is the investigation of the interest rate setting mechanism for consumer credit. Essentially, it tries to answer the question: “*Which rule better approximates banks’ interest rate setting in a country-specific, data-driven agent-based model?*”

This study follows the approach of Papadopoulos (2019) and extends the model in two dimensions; primarily, by replacing one of the input series with an endogenous, agent-specific rule and secondarily by broadening its application to an additional country.

The idea behind the replacement of an input series is that if one takes the remaining, realized series as given, then one can investigate which rule yields the most adequate approximation of the replaced series.

Combining the modelling choices from the agent-based modelling literature with the findings from the empirical studies, this paper attempts to discover the rule that potentially underlies banks’ consumer credit interest rate setting behavior. It examines three different interest rate setting mechanisms for three country scenarios.

The validation exercise reveals the model’s ability to match the historical timeseries of household consumption and consumer credit. Nevertheless, the analysis of the simulation results uncovers three generic patterns which extend beyond the determination of the specific mechanism per country. First, as expected, there is heterogeneity across country scenarios regarding both the mechanism family and its particular parameter figures that better approximate the observed data. Second, it seems that a simple, borrower-risk-only, mechanism outperforms its more complicated counterparts. Finally, an interesting result is the possible existence of a dynamic behaviour on the bank’s side, likely influenced by the prevailing economic conditions.

In particular, the results for Cyprus indicate that the borrower-risk-only mechanism dominates in the period post-2013. Interestingly, prior to that, a rule linking bank capital adequacy and charged lending rate with a decreasing function seems to perform better suggesting a possible change in the banking systems behavior due to the Global Financial Crisis of 2008 and its ramifications.

From a policy-simulation perspective, this model can provide valuable, country-specific insights regarding the interest rate transmission mechanism and the effect of various policies on lending rates and credit growth. It allows the implementation of alternative monetary policy scenarios or the introduction of macroprudential regulations and provides a quantitative assessment of their impact on the variables under focus.

In a methodological level, this study provides an example on how to use a data-driven ABM as a probing tool to discover the potential rules underlying agents’ behavior. It thus represents a small step towards the development of a fully-fledged macroeconomic ABM which is “closer to the data” than the current standard in the literature.

Deliverables

G. Papadopoulos, "Probing the mechanism: lending rate setting in a data-driven agent-based model", Economic Policy Paper No. 06-19, Economics Research Centre, University of Cyprus, December 2019.

II.4 The shadow economy in Cyprus: Evidence from the electricity consumption and currency demand methods

Ch. Andreou, E. Andreou, S. Michael, G. Syrighas

In the last decades, there has been a renewed interest in estimating the size of the shadow economy in many countries. The shadow economy results, among other things, in reduced tax revenues, lower quantity and quality of public goods and services and suboptimal policy decisions. The recent pandemic and its devastating effects on economic activity have provided an additional impetus in studying shadow economies. Public finances are under tremendous pressures in an environment of heightened public expenditures and reduced revenues. As a result, governments have a vested interest in knowing the size of the shadow economy and the additional revenue that can be extracted.

Estimation of the shadow economy is challenging due to its unobservable nature. Many methods have been employed to quantify the size of the shadow economy, broadly divided into micro (direct) and macro (indirect) approaches. While micro studies allow insights into the characteristics and structure of the shadow economy they are in most cases static in nature. In contrast, macro studies rely on macro indicators and are dynamic allowing comparisons over time and countries. Several studies attempted to estimate the shadow economy in Cyprus (Georgiou & Syrighas, 1994; Pashardes and Polycarpou, 2008, Fethi, and Katircioglu, 2006). Particularly, Georgiou and Syrighas (1994) utilized the currency approach similar to Tanzi (1980, 1983) to estimate the shadow economy in Cyprus for the period 1960-1990. Pashardes and Polycarpou (2008) used the micro household approach to uncover the extent to which Cypriot households underreport their income and which sources of income (e.g. self-employment, capital income, agriculture, etc.) are more responsible for tax evasion. Fethi et al. (2006) employed monetary and non-monetary methods (employment discrepancy; simple currency ratio; transaction and currency demand) over the period 1960-2003 to investigate the size of the Cypriot underground economy empirically. Other studies provide estimates of the shadow economy, some of them include Cyprus, derived from cross-sectional analyses using indirect approaches such as multiple indicators, multiple causes estimation (Buehn and Schneider, 2012; Dell'Anno et al., 2007; Medina, Jonelis, and Cangul, 2018; Hassan and Schneider, 2016; Wang, Lin, and Yu, 2006).

This study re-examines the level of the shadow economy in Cyprus using two different macro approaches; the energy consumption method (ECM) of Kaliberda and Kaufmann (1996) and the currency demand approach of Tanzi (1980, 1983). To the best of our knowledge, this is the first study that considers the energy consumption approach for estimating the shadow economy in Cyprus. The empirical analysis covers a more recent period, using quarterly data for the period 1995-2018, during which the Cypriot economy has undergone significant structural changes such as financial liberalization, the abolition of capital controls, accession to the European Union, the adoption of the Euro as well as the recent banking crisis.

This study estimates the size of the shadow economy during the period 1995-2018 in Cyprus to be in the range between 13% and 20% of GDP according to the currency demand approach.

These estimates are higher than those found in earlier studies using the same method for Cyprus. In particular, Georgiou and Syrichas (1994) estimates for the size of the shadow economy in Cyprus were between 2,7% - 10,3% of GDP for the period 1960-1990 and Fethi et al (2006) 4% -15% of GDP for the period 1960-2003. However, Alm and Embaye (2013) study of the shadow economy for 111 countries using the currency approach came up with even higher estimates for Cyprus in the range of 27% - 37% of GDP over the years 1985-2006. Turning to the electricity method, our study estimates a higher range for the size of the shadow economy in Cyprus of 26% - 34% of GDP compared to that of the currency method. The same applies when we compare the Cyprus estimates derived from electricity consumption approach with those of other EU Mediterranean countries for a subperiod. In particular, Missiou and Psychoyios (2017) utilizing the electricity approach over the period 2008-2013 estimated the size of the shadow economy between 20%-30% in Greece, 18%-21% in Portugal and 12%-18% in Spain. Summarizing, during the quarterly period 1995-2018, the two macro methods estimate the range of the shadow economy in Cyprus to be between 13% - 20% of GDP according to the currency demand approach and between 26% - 34% of GDP following the energy consumption approach.

Deliverables

Andreou, Ch., E. Andreou, S. Michael and G. Syrichas, " The Shadow Economy in Cyprus: Evidence from the Electricity Consumption and Currency Demand Methods", Economic Policy Paper No. 07-19, Economics Research Centre, University of Cyprus, December 2019.

II.5 What determines bank lending standards in Cyprus?

N. A. Michail, C. S. Savva

We study, for the first time in the existing literature, how lending standards and demand for loans affect and are affected by other macroeconomic factors in Cyprus. The results suggest that only house prices appear to affect lending standards, with a positive house price shock causing a tightening. House prices have the opposite impact on demand for loans, with an increase in the former having a positive effect on demand, while demand is inversely affected by the lending rate. Lending standards have a strong impact on the economy, as they register an effect on lending rates and loan growth, and subsequently on GDP. This highlights the importance of credit availability in the economy.

Deliverables

Michail A. N. and Chr. S. Savva, "What Determines Bank Lending Standards in Cyprus?", Economic Policy Paper No. 03-19, Economics Research Centre, University of Cyprus, September 2019.

Cyprus Economic Policy Review, Vol. 14, No. 1, pp 16-26 (2020).

CypERC Newsletter article, Issue 40, March 2020.

II.6 Optimal timing of greenhouse gas emissions abatement in Europe

Chr. Sotiriou, Th. Zachariadis

Decarbonization by the mid-21st century requires strong commitment to greenhouse emission abatement measures, but national emission reduction pledges are made for the medium term. Achieving medium term targets without taking into account the long term can lead to a lock-in

effect, binding countries in pathways that cannot lead to strong decarbonization. This paper sheds light in this issue by combining a theoretical approach with real-world engineering and cost data. We develop a constrained optimization model to examine least-cost greenhouse gas emission abatement pathways, taking into account a) emission reduction objectives for two years: 2030 and 2050; and b) the potential speed of implementation of each measure, which expresses technical and behavioural inertia in the deployment of a measure. We focus on European countries and economic sectors that are not subject to the EU Emissions Trading System. We derive relationships between 2030 abatement targets of varying ambition and the possibility for a country to achieve a strong 2050 target. We find that more ambitious EU-wide targets have to be set by 2030 so that Europe delivers deep decarbonization by 2050. Moreover, if air pollution costs are taken into account, strong decarbonization by 2050 has lower social costs than less ambitious policies.

Deliverables

Sotiriou Chr. and Th. Zachariadis, "Optimal Timing of Greenhouse Gas Emissions Abatement in Europe", Economic Policy Paper No. 02-19, Economics Research Centre, University of Cyprus, May 2019.

CypERC Newsletter article, Issue 39, October 2019.

II.7 Residential property price indices using asking prices: the case of Cyprus

S. Andreou, N. Pashourtidou

This paper uses micro data on property advertisements published in widely circulated newspapers and online to construct residential price indices for Cyprus. The sample covers the period from 2000Q1 to 2018Q2 and contains information on various property characteristics (e.g. property type, size, location). A regression model is estimated using rolling samples of 12, 20 and 40 quarters. We obtain six sub-aggregate price indices, i.e. for houses and flats located in the districts of Nicosia, Limassol, and in the remaining districts. Using the six sub-aggregate indices, we construct five aggregate price indices, i.e. for (i) houses, (ii) flats, (iii) Nicosia district, (iv) Limassol district, and (v) other districts, as well as an overall property price index for Cyprus. The estimated price indices are juxtaposed with other available property price indices in Cyprus, namely the indices published by the Central Bank, Eurostat, and the Royal Institution of Chartered Surveyors, as well as with a number of macroeconomic indicators relating to the property market.

The indices constructed in this paper tend to be associated with slightly larger quarterly percentage changes (higher growth and smaller contraction) compared to similar indices over common periods. The resulting indices are significantly correlated with the corresponding property price indices published by other organisations, and their agreement in the direction of quarterly changes is high. The estimated indices are found to contain leading information vis-à-vis other property price indices, particularly in the case of flats and the district of Limassol. Also, the estimated indices are highly correlated with many key macroeconomic variables, with the results suggesting that the former may lead developments in some macroeconomic series.

The properties of the proposed indices together with their timely nature in terms of data availability could make them a useful tool for monitoring the evolution of property prices as well as macroeconomic developments in Cyprus. The estimation of sub-aggregate indices

provides information on the key drivers (types, districts) of fluctuations in the domestic property market. As the proposed indices are model-based, the statistical significance of quarterly changes can be computed and confidence intervals can be constructed around these changes to provide an informed depiction of property price fluctuations.

The property price indices described in the paper were updated using data up to the first quarter of 2019; the updated indices were sent to CypERC sponsors.

Deliverables

S. Andreou, S. and N. Pashourtidou, "Residential property price indices using asking prices: the case of Cyprus", Economic Policy Paper No. 01-19, Economics Research Centre, University of Cyprus, April 2019.

CypERC Newsletter article, Issue 39, October 2019.

Time series of property price indices: 2000Q1 to 2019Q1, Dataset sent to CypERC sponsors.

II.8 Impact assessment of the Cyprus Integrated National Energy and Climate Plan: Socio-economic impacts

Th. Zachariadis, S. Andreou

The project involved an impact assessment of the integrated National Energy and Climate Plan (NECP), which the government of Cyprus submitted to the European Commission in early 2020. The assessment was compatible with the requirements as set out in Article 8 of the Regulation on the Governance of the Energy Union. The project funded by the European Commission's Structural Reform Support Service. It has been coordinated by the Cyprus University of Technology (CUT) and conducted in collaboration with the Cyprus Institute and Economics Research Centre (ERC). ERC has been involved as a subcontractor to CUT and was primarily responsible for the socio-economic aspects of the impact assessment.

The implementation of strong energy and climate policies typically leads to changes in the relative prices of energy commodities in comparison to a 'business as usual' price trajectory. These price changes in turn affect the cost of living of households in different ways. ERC focuses on analysing the distributional effects induced by policies of the Planned Policies and Measures Scenario (PPM) in comparison to the Existing Policies and Measures Scenario (WEM); this involves an assessment of how much Cypriot households of different income, location (urban and non-urban areas) and demographic characteristics are affected by the changes in prices of electricity and fuels due to the implementation of the PPM scenario.

Household demand for energy and the subsequent distributional effect of energy efficiency or renewable energy policies has been analysed in several countries. These studies rely, inter alia, on data from household expenditure surveys conducted annually by national statistical agencies; this enables the empirical estimation of detailed income and substitution patterns. However, in some countries (Cyprus being one of them) household expenditure surveys are conducted less frequently. This poses problems to performing empirical demand analysis, as price variation over time is limited. To overcome this problem, an alternative approach was developed and applied with data from Cypriot households by Pashardes et al (2014). This approach is based on the fact that price changes differ across goods, hence their effect can vary between households due to preference heterogeneity. In the case of energy, the unit cost is

made from the prices of items such as electricity, gasoline, gas, heating oil, solid fuels and renewable sources. To the extent that these items do not increase proportionately in price and their shares in consumption vary across households due to preference heterogeneity, then the unit cost of energy also varies across households. We used the same model in this study, simulating the effect of the price changes in electricity and automotive fuel in order to explore the welfare impact of the PPM scenario as compared to the 'business as usual' evolution foreseen in the WEM scenario.

In our case, by 2030, total welfare costs are expected to be around 0.05% of the income of poorer households or about 10-20 Euros'2015 per year, and correspondingly the welfare costs of richer households may amount to 15-30 Euros'2015 per year or 0.03-0.04% of their annual income. Rural households, which spend about 10% on average more on transport fuels, may experience a slightly higher cost than urban households (at the upper end of the range mentioned above), but all costs and welfare losses are projected to lie at very low levels. In conclusion, the analysis showed that the implementation of the PPM scenario is not expected to cause any substantial costs or benefits to households nor affect the distribution of income or poverty levels in the Cypriot society. Despite the considerable investments required and emission reductions achieved in the PPM scenario, there will be essentially no impact on energy affordability and social equity is projected to be negligible.

Deliverables

Zachariadis Th., Ch. Sotiriou, C. Taliotis, M. Karmellos, N. Fylaktos, E. Giannakis and S. Andreou, "Comprehensive Impact Assessment of the Planned Policies and Measures of the National Energy and Climate Plan of Cyprus", Draft report to European Commission, October 2019. [http://www.moa.gov.cy/moa/environment/environmentnew.nsf/all/8D6EF81F38772607C225829400343871/\\$file/SRSS-C2018.070 Deliverable 5 draft 21Oct2019.pdf?openelement](http://www.moa.gov.cy/moa/environment/environmentnew.nsf/all/8D6EF81F38772607C225829400343871/$file/SRSS-C2018.070%20Deliverable%205%20draft%2021Oct2019.pdf?openelement)

"Cyprus' Integrated National Energy and Climate Plan", Ministry of Agriculture, Rural Development and the Environment, Department of Environment, 2020. [http://www.moa.gov.cy/moa/environment/environmentnew.nsf/all/EE3E8BE9D5282E5CC22584F700273BD9/\\$file/submission.zip?openelement](http://www.moa.gov.cy/moa/environment/environmentnew.nsf/all/EE3E8BE9D5282E5CC22584F700273BD9/$file/submission.zip?openelement)

II.9 The social protection system in Cyprus: Recent initiatives and labour market implication

L. N. Christofides, Chr. Koutsampelas

This paper reviews the structure of the Social Protection System (SPS) in Cyprus, as well as the amounts spent per annum, in total and for each of the various functions it supports. We delve further into the functions and policies that most immediately relate to the labour market, paying particular attention to the support of the unemployed, those in financial need, and those who are sick and temporarily or permanently disabled. Important recent reforms are examined in depth, especially the Guaranteed Minimum Income programme and its connection with the pre-existing system of unemployment insurance. Lacking access to publicly available micro data on the use of various facets of the SPS, we consider ideas that could improve its fairness, effectiveness and sustainability, so that it can continue to support individuals in real need.

Deliverables

Cyprus Economic Policy Review, Vol. 13, No. 2, pp 3-47 (2019).

II.10 Inference in group factor models with an application to mixed - frequency data

E. Andreou, P. Gagliardini, E. Ghysels, M. Rubin

We derive asymptotic properties of estimators and test statistics to determine—in a grouped data setting—common versus group-specific factors. Despite the fact that our test statistic for the number of common factors, under the null, involves a parameter at the boundary (related to unit canonical correlations), we derive a parameter-free asymptotic Gaussian distribution. We show how the group factor setting applies to mixed-frequency data. As an empirical illustration, we address the question whether Industrial Production (IP) is still the dominant factor driving the U.S. economy using a mixed-frequency data panel of IP and non-IP sectors. We find that a single common factor explains 89% of IP output growth and 61% of total GDP growth despite the diminishing role of manufacturing.

Deliverables

Andreou, E., Gagliardini, P., Ghysels, E. and Rubin, M., 2019. Inference in Group Factor Models With an Application to Mixed-Frequency Data. Econometrica, 87, 1267-1305. doi:10.3982/ECTA14690

II.11. Heterogeneous Intergenerational Mobility with Social Influences

A. Konstantinidi, A. Kourtellos and Y. Sun

Using NLSY data we investigate whether the observed patterns of economic mobility (as measured by income and educational attainment) exhibit heterogeneity across socioeconomic groups and whether the nature of the heterogeneity can be explained by different levels of persistence in the intergenerational transmission of cognitive and non-cognitive abilities across these groups. In doing so we employ the varying coefficient model (VCM) to estimate nonparametric (local) measures of intergenerational mobility of those outcome variables. By local we mean that the persistence coefficients are modeled as smooth functions of log parental permanent income. Our findings show that intergenerational mobility exhibits nonlinear patterns. Individuals with different parental income are characterized by different degrees of intergenerational mobility. Moreover, we find evidence that suggests cognitive abilities play a role in explaining intergenerational mobility. These findings provide some support for a new class of family investment models that emphasize the role of such abilities in economic mobility.

Deliverables

A. Konstantinidi, A. Kourtellos and Y. Sun, "Heterogeneous Intergenerational Mobility with Social Influences", Working Paper, University of Cyprus, 2019. (<https://sites.google.com/view/kourtellos/working-papers>)

II.12 The Cyprus Composite Leading Economic Index (CCLEI): Methodology and results

E. Andreou, M. Tofini

The recent global economic crisis and pandemic as well as the uncertainty which continues to unfold globally, has revived the interest in analyzing business cycles and predicting their turning points. Composite Leading Economic Indices (CLEIs) is an important tool to monitor business

cycles providing leading information of turning points. International organizations such as the European Central Bank (ECB), the Organization for Economic Cooperation and Development (OECD), and the Conference Board (CB) and most developed countries have created Leading Economic Indices which they monitor systematically in order to anticipate the phase of the business cycle and the short-run outlook of future economic activity. Consequently, the present project aims at estimating the corresponding monthly Composite Leading Economic Index for the Cyprus economy (CCLEI) in order to provide early warning signals for the turning points of the economic activity in Cyprus on a monthly basis.

CLEIs combine information from multiple leading indicators in a single indicator and have the ability to yield more accurate prediction of the business cycles than a particular indicator, since there is no single verified and accepted cause of all observed business cycles. The CCLEI not only combines the information from a small number of indicators but also takes advantage of their mixed sampling frequency given that some of these indicators are available at daily, weekly or biweekly frequency and can provide more timely information. We select the leading indicators from a large set of variables following a number of statistical tests which provide strong and stable leading correlation for the GDP in Cyprus. The selected indicators that comprise the CCLEI are: the Brent Crude oil price, the euro area Economic Sentiment Indicator, the total sales of contracts, the number of tourist arrivals, the value of visa card transactions, the retail trade sales turnover volume index, and the volume index of electricity production. Monthly data frequency is used for all components of the CCLEI, except the Brent Crude oil price, the volume of electricity production and the tourist arrivals which are available at higher frequency and the GDP reference series which is available at low, quarterly frequency. All components refer to their most recent available data and since not all data are available for the same period, flash estimates are considered for the missing observations based on the latest available information in a series of various indicators in order to improve the timeliness of the CCLEI.

The specification and estimation of the CCLEI follows a model-based approach proposed by Aruoba, Diebold, and Scotti (ADS) in 2009, which is also used by the Philadelphia Federal Reserve Bank for regularly estimating the Business Conditions Index in the U.S. economy based on a variety of mixed-frequency stock and flow data which are available at very high frequencies (e.g. daily and weekly). An evaluation of the statistical relationship between the CCLEI and the Cyprus GDP, shows that the CCLEI based on the ADS approach has significant predictive ability of two and three quarters with respect to the upcoming performance of the Cyprus economic activity. The Economic Sentiment Indicator (ESI) in the euro area and oil series provide the highest statistically significant leading correlations with GDP relative to the rest of the domestic leading indicators. Furthermore, the Diffusion Index constructed based on the Conference Board methodology (BCI Handbook (2001)) and computed based on the components of the CCLEI shows that the components comprising the CCLEI can consistently determine turning points in the economy and thus proves their good historical performance in identifying business cycle chronologies and recessions. Consequently, the CCLEI is a reliable leading index of turning points in the Cypriot economy. The monthly performance of the CCLEI will be monitored and updated regularly as well as its leading components. The monthly bulletin of the CCLEI is published in which the index and its flash estimate are re-estimated providing timely information of the economic activity cycles in Cyprus. This project is funded by the Hellenic Bank and the bulletin is published since 12 of

December 2019. All monthly bulletins and report can be found at the Economics Research Centre (ERC) official website.

Deliverables

Summary Cyprus Composite Leading Economic Index (CCLEI). Available at:

<http://www.ucy.ac.cy/erc/el/publications/cyprus-composite-leading-economic-index-cclei>.

Methodological Report CCLEI. Available at: <http://www.ucy.ac.cy/erc/el/publications/cyprus-composite-leading-economic-index-cclei>.

CypERC Newsletter article, Issue 40, March 2020.

II.13 Tax-benefit microsimulation model for the European Union- EUROMOD

P. Lyssioutou, A. Polycarpou, E. Savva

The Economics Research Centre participated for the 9th year in the EUROMOD cooperation network. Assoc. Prof. Panayiota Lyssioutou (coordinator), Alexandros Polycarpou and Elena Savva composed the Cypriot EUROMOD team in 2019. The national team has prepared the country specific program files and generated the EUROMOD input data, provided uprating indexes for updating the momentary figures of the dataset, collected all the policy rules of the tax and benefit system in Cyprus and collected external statistics for use in the macro validation of the model. The national team also produced the EUROMOD country report for Cyprus. The report includes: a) a description of the EUROMOD input data and the adjustments made to the original EUSILC data, b) a documentation of the uprating factors, c) an overview of the Cypriot tax-benefit system, d) a description of the modelled tax-benefit instruments, and e) a macro validation of the output of the model in relation to external statistics. Elena Savva participated in the 2019 EUROMOD annual meeting in Milan in September 2019.

Deliverables

EUROMOD: Country Report. CYPRUS 2016-2019, Institute for Social and Economic Research, University of Essex, July 2019. Available at:

https://www.euromod.ac.uk/sites/default/files/country-reports/year10/Y10_CR_CY_Final_docx.pdf

II.14 Business and Consumer Surveys

C. Anaxagorou, C. Karagiannakis, N. Pashourtidou

The CypERC produces and publishes economic confidence indicators for the Cypriot economy on a monthly basis as part of the Joint Harmonised EU programme of Business and Consumer Surveys. Specifically, the results of Business and Consumer Surveys conducted in Cyprus are validated and analysed on a monthly basis. Confidence indicators for construction, industry, services, retail trade and consumers, and an overall economic sentiment indicator are computed, and their short-run changes and drivers are analysed. Recent trends in business activity and household financial conditions as perceived by firms and consumers, respectively, as well as expectations about future activity, prices, employment / unemployment are also analysed. Capacity utilisation indices for industry and services are produced on a quarterly basis. Various aspects of firms' investment perceptions and expectations in industry are analysed bi-annually, using data collected via the Investment Survey.

Moreover, the CypERC staff is responsible for training new project team members, deals with methodological aspects of the Surveys and provides feedback to the European Commission on

methodological issues. The main methodological tasks in 2019 are described in the following paragraphs.

In January 2019, the time series for the Economic Sentiment Indicator was revised due to a change in the components of the Consumer Confidence Indicator, following methodological improvements suggested by the Commission. The revised Consumer Confidence Indicator is comprised of assessments of and expectations about the financial condition of households, consumers' expectations about the general economic condition of the country and consumers' intentions of making major purchases.

In 2019, all the quantitative results from the investment survey for the period 2008 – 2018 were converted into qualitative terms and new qualitative results were recalculated as per request of the European Commission. The qualitative back-casted series were submitted to the European Commission in February. The results were used by the Commission in assessing whether the current quantitative formulation of the questions could be replaced by a qualitative one, in order to enhance the information content of the collected data and facilitate the extension of investment questions in the services sector.¹ The results show that the qualitative series are as good as the quantitative ones. The questions regarding firms' investment plans will be answered using qualitative options and will also be extended to the services sector as of 2021.

In 2019, CypERC participated in a testing phase for the introduction of a new question on uncertainty in the harmonised questionnaires launched by the European Commission. The testing phase in Cyprus covered the period March 2019 – August 2019 and three alternative versions of uncertainty questions were tested in both business and consumer surveys. Information about uncertainty was obtained by asking firms and consumers about the degree of predictability of their financial situation. The three versions of the questions were designed to explore issues such as the use or absence of a specific forecast horizon, the number of response options (four vs. three) and alternative wordings of the response options. The three versions were tested by splitting the monthly samples in three equally-sized sub-samples and randomly assigning one of the three versions of the question to each respondent. The response rates for Cyprus were high and similar across versions. Although the testing period was small, it was found that the peak of the confidence indicators tended to precede the minimum uncertainty level, but the lowest point of confidence tended to follow the maximum level of uncertainty recorded. The results were submitted to the Commission in September. The results were used by the Commission in determining the final formulation of the uncertainty questions. The results of the analysis across surveys and EU countries favoured a four-option response scale

¹ Friz, R. (2019), "Investment survey qualitative vs. quantitative results and way ahead", Available at https://community.oecd.org/servlet/jiveServlet/downloadBody/163343-102-1-288361/EC_Friz.pptx

without an explicit forecast horizon.² CypERC will introduce the questions on uncertainty in the monthly BSC questionnaires in May 2020.

Deliverables

*“Business and Consumer Surveys”, Monthly Bulletin, Issue 19/1 (January 2019)-19/12 (December 2019), in Greek. Available at: <http://ucy.ac.cy/erc/el/publications/bus-cons-surveys>
(Summary of key points in English available at: <http://ucy.ac.cy/erc/en/publications/bus-cons-surveys>)*

Data files submitted to the European Commission in predetermined format (regular BCS results, ad hoc data requests to support methodological improvements).

“BCS question on uncertainty: Cyprus” document prepared for the 9th Joint EC-OECD workshop on Business and Consumer Surveys, November 2019.

II.15 Macroeconomic forecasts for Cyprus

C. Anaxagorou, S. Andreou, C. Papamichael, N. Pashourtidou

Among the research activities at CypERC is the systematic production and publication of macroeconomic forecasts for the Cypriot economy. Short-term forecasts for GDP growth and inflation are constructed every quarter using state-of-the-art econometric techniques and a large database of domestic and foreign / international macroeconomic and financial indicators. The forecasts are analysed in conjunction with the recent domestic and international economic developments, and are accompanied by upside and downside risks to the outlook.

Moreover, forecasts for the growth rate of all the production-side components of GDP that appear in the quarterly National Accounts are computed on a quarterly basis. The forecasts cover the Gross Value Added in 10 sectors of economic activity (agriculture; industry; construction; trade; information and communication; financial and insurance; real estate; professional and administrative services; public administration, education and health; other services) as well as net taxes on products. Aggregate and component forecasts are computed under two approaches to forecasting GDP growth, namely a direct and a bottom-up approach. In the direct approach, unconstrained models for GDP growth are estimated to compute forecasts for the aggregate, while constrained component models are used to obtain the disaggregate forecasts, which add up to the GDP growth forecasts computed directly. In the bottom-up approach, unconstrained component models are estimated to compute growth forecasts for the components, as well as for GDP growth by adding up the unconstrained component forecasts. Since April 2019, the forecasts for the production-side components have been made available to the CypERC sponsors, following a presentation of the methodology and the pseudo out-of-sample and real-time performance. Updated forecasts for the growth rate of GDP and its production-side components are sent to the CypERC sponsors every quarter in a specialised file that includes forecasts by method and vintage and actual values by vintage, along with detailed explanations for users.

² Marc, B. (2019), “New uncertainty question: Results of the test phase and proposed way ahead”, Available at: https://community.oecd.org/servlet/liveServlet/downloadBody/163344-102-1-288362/Marc_EC_BCS2019.pdf

The quarterly forecasting tasks run parallel to (i) methodological tasks, which include improvements in the database, models and computer codes, and (ii) the training of new project team members. The methodological tasks undertaken in 2019 are described below.

Due to changes in the National Accounts data published by the Statistical Service, the procedures and codes for the computation of the following forecasts had to be modified: (i) GDP growth forecasts obtained under the bottom-up approach; (ii) sectoral growth forecasts constrained to add up to the GDP growth forecasts obtained directly. The change in the National Accounts data followed Eurostat (2013, ch. 16) i.e., the levels of the chain-linked volume components do not necessarily add up to the chain-linked aggregate (e.g. GDP), but the growth contributions of all components add up to the growth rate of the aggregate.³ The growth contributions of components are functions of the chain-linked aggregate and component levels, and annual deflators. These changes, therefore required additional National Accounts data to be incorporated in the computation of the growth forecasts.

In 2019, the dataset was significantly expanded to include new domestic and foreign series such as VAT revenues, exports by commodity category, new loans and variables from the ECB's Survey of Professional Forecasters. The new variables were extrapolated back to the start date of the database using other published series. Other tasks relating to the database included: revisions in the base years of domestic indicators and inclusion of more detailed descriptions of sources and variable definitions that improved the efficiency and accuracy of the data collection process. Moreover, in 2019 the documentation of the procedures followed (i.e. database updates, code description and usage, compilation of results) for the preparation of the quarterly bulletin (GDP growth and CPI inflation forecasts) and the computation of sectoral forecasts was extensively revised.

Deliverables

"Economic Outlook", Quarterly Bulletin, Issue 19/1 January 2019, 19/2 May 2019, 19/3 July 2019, 19/4 October 2019. Available at: <http://ucy.ac.cy/erc/en/publications/economic-outlook>

"Forecasts by Sector", File sent to CypERC sponsors on a quarterly basis.

"Forecasts: Growth rate of GDP and its production-side components, CPI inflation", Project documentation and revised GAUSS codes, September 2019.

II.16 Tourism prospects

C. Anaxagorou, C. Karagiannakis, N. Pashourtidou

The report analyses the results of a quarterly survey among firms providing tourist-related services in Cyprus, namely accommodation services (NACE Rev 2. code 55) and travel agencies, tour operators and related activities (NACE Rev 2. code 79).

The report provides information about firms' assessments of the current levels of bookings from abroad compared to the same period in the previous year; the assessments relate to total bookings as well as reservations by country of origin of tourists (United Kingdom, Russia, Germany, Greece). Firms' estimates/expectations regarding their total bookings from abroad for

³ Eurostat (2013), "Handbook on quarterly national accounts", Manuals and guidelines, 2013 edition.

the year as a whole (asked in March, June and September) or the next year (asked in December) are also discussed in the report. Firms' expectations are juxtaposed with data on tourist arrivals and tourist revenues from the Statistical Service.

The report presents information about firms' views on the main factors that affect their bookings from abroad (e.g. the economic conditions in the country of origin, the availability of flights/connections to Cyprus, tourists' perceptions of the price-quality of the tourist product) and discusses changes in the set of key factors between survey waves.

The results in 2019 showed that after the first half of the year, firms' estimates about their reservations in 2019 deteriorated markedly, which was in line with the slowdown in the growth rate of arrivals and the contraction of tourism revenues.

Deliverables

"Tourism prospects", December 2018, March 2019, June 2019, September 2019, Quarterly report prepared for the Ministry of Finance.

II.17 Competitiveness rankings for Cyprus

S. Andreou, N. Pashourtidou

CypERC acted as a Partner Institute of the IMD World Competitiveness Center for the 2019 edition of the IMD World Competitiveness Yearbook by contributing to the collection of the necessary data for Cyprus as well as by disseminating the results in Cyprus. In the 2019 IMD World Competitiveness Ranking, Cyprus ranked 41st in a group of 63 countries, remaining at the same place as in the 2018 ranking. In 2019, the position of Cyprus improved in terms of economic performance and business efficiency vis-à-vis 2018. Nevertheless, in 2019 Cyprus' rankings in terms of government efficiency and infrastructure deteriorated compared to 2018. In the 2019 IMD World Digital Competitiveness Ranking, Cyprus ranked 54th among 63 countries, remaining in the same position as in the 2018 ranking. Cyprus' position improved in terms of future readiness, while its ranking in terms of technology declined for the second consecutive year.

Deliverables

"Competitiveness rankings 2019: Cyprus", Bulletin available at: http://ucy.ac.cy/erc/documents/IMDWCY19_Cyprus.pdf

"Digital Competitiveness Ranking: Cyprus", CypERC Newsletter Issue 39, October 2019.

Data file submitted to the IMD World Competitiveness Center in predetermined format.

II.18 Survey of Health, Ageing, and Retirement in Europe (SHARE)

N. Theodoropoulos, A. Polycarpou, N. Empora

CypERC participates in the SHARE-ERIC network for the last four years. The aim of the SHARE is to collect longitudinal, cross-country, and multidimensional microdata for individuals aged 50 and older in order to analyze the process of population ageing in depth. Ass. Prof. Nikos Theodoropoulos (Country Team Leader, CTL) and Alexandros Polycarpou (Country Team Operator, CTO) composed the Cypriot SHARE since its inception. In September 2019, Neophyta Empora continued as the new CTO in Cyprus.

Cyprus participated for the first time in 2017, in the 7th wave of SHARE, together with the other countries that joined the European Union in 2004. From 2017 onwards, SHARE covers all European countries, as well as Israel. We have successfully completed the first wave of data collection for Cyprus (September 2017). SHARE is repeated every two years. The main data collection of the 8th wave of SHARE (8th wave in total, 2nd wave for Cyprus) started in mid-October 2019 and was scheduled to be completed in June 2020. The outbreak of the coronavirus in the middle of the 8th wave of data collection forced SHARE to suspend face-to-face interviews in all participating countries in March 2020.

During 2019, the national SHARE team participated in the SHARE Wave 8 Post-FiRe and Kick-off COHESION Meeting in Budapest, Hungary from 20-21 September 2019 and in the SHARE Wave 8 Main TTT (Train-the-Trainer Meeting) in Frankfurt, Germany from 30 September -2 October 2019. On October 15, 2019 the Cyprus team organised and implemented the national training session (NTS) during which the local survey agency was trained in order to correctly implement SHARE. The training session was held in Limassol, Cyprus. Finally, a presentation at the Ministry of Health by Nikos Theodoropoulos, was held in October 23, 2019, during which the SHARE data as well as research results were analysed. Finally, in collaboration with the previous one (CTO - Alexandros Polycarpou), a chapter about Cyprus as a new country in the SHARE database was prepared. The chapter has been published in a collective volume.

Deliverables

“Becoming a new SHARE country - Cyprus” (2019) Chapter 4 in Bergmann, M., Scherpenzeel, A., & Börsch-Supan, A. (2019). SHARE Wave 7 Methodology: Panel Innovations and Life Histories. Munich: MEA, Max Planck Institute for Social Law and Social Policy (Nikos Theodoropoulos and Alexandros Polycarpou), pp. 66-67. In the collective volume you can find all the relevant information about the 7th wave of SHARE and the 2nd for Cyprus.

Internet link:

http://www.share-project.org/fileadmin/pdf_documentation/MFRB_Wave7/SHARE_Methodenband_A4_WEB.pdf

More information on the SHARE project can be found at <http://www.share-project.org>.

III. Research activities 2020 (October)

This section of the report provides summaries of the research work that has been conducted at CypERC until October 2020.

III.1 Income under-reporting and the shadow economy in Cyprus: Evidence from household survey data

E. Andreou, G. Papadopoulos, G. Syrighas

Income under-reporting estimates based on households data as well as the size of the shadow economy are of interest to academics as well as policy makers. For that purpose, various methods have been developed using micro/survey data as well as aggregate/macro data. For a survey of the literature, the methods employed and their strengths and weaknesses, the recent

studies by Schneider (2014) and Schneider and Buehn (2018), among others, provide excellent references.

For Cyprus in particular, several studies have estimated income misreporting and the size of its black economy. Recent studies by Medina and Schneider (2018) using the MIMIC approach estimated the size of the shadow economy in Cyprus during the period 1991-2015 to be on average 31,3% of its GDP. In addition, in a recent study Andreou, Andreou, Michael and Syrighas (2020) use macro methods for the period 1995-2018 to estimate the shadow economy in Cyprus to be in the ranges of 13%-20% of the GDP following the currency demand method and 26%-34% of GDP according to the energy consumption approach.

This study complements the above results by applying a micro (indirect) method proposed by Pissarides and Weber (1989) on two household-level databases and estimates income under-reporting on Cyprus in the wake of the Global Financial Crisis and before its peak on the domestic economy in 2012/13. An earlier study by Pashardes and Polycarpou (2008) applied the Pissarides and Weber (1989) approach to estimate income under-reporting in Cyprus using the Household Budget Survey (HBS). Their results suggest that income under-reporting of the self-employed was around 40%, corresponding to an approximate size of the shadow economy of 8% of GDP in 2003. The objective of this paper is to provide an updated estimate of the income misreporting and the size of the shadow economy in Cyprus using the Pissarides and Weber model on data from both the Household Budget Survey (HBS) as well as the Household Finance and Consumption Survey (HFCS), given that both of these surveys were conducted in the same year in Cyprus and provide similar yet complementary information on households. The survey wave of 2009 has been used since it is common in both databases thus allowing the comparison and cross-checking of the results. Also, using data for 2009 is guided by the fact that the impact of the crisis of 2012/13 that hit Cyprus could bias the results.

The findings of this study suggest that for every 1 euro of income from self-employment received, the respective households report approximately 60 cents for taxation purposes. Both datasets point to the same direction, though the results from the HFCS are weaker, exhibiting wide bounds, possibly due to small sample issues. In comparison to previous studies for the Cypriot economy, the updated analysis for 2009 shows that income under-reporting has remained stable at least since 2002/3 when the study of Pashardes and Polycarpou (2008) estimated it to be in the range of 38% to 44%. Consequently, the level of the shadow economy has remained the same in the two years of these studies, 2003 and 2009.

Deliverables

Andreou, E., G. Papadopoulos and G. Syrighas, " Income under-reporting and the shadow economy in Cyprus: Evidence from household survey data ", Economic Policy Paper No. 04-20, Economics Research Centre, University of Cyprus, October 2020.

III.2 Public debt thresholds: An analysis for Cyprus

N. Michail, C. Savva

Public debt became notorious in the European Union since the Papandreou announcement in 2009, in which the Greek government admitted that the country had published erroneous public debt figures, and the revised numbers showed that Greece held one of the largest debt piles in the

world. More so, the country could not service it as it stood, and was forced to adjust its public finances using intense austerity measures, including a debt haircut, known as the PSI (Private Sector Involvement). For more details, see Xafa (2013).

The perils of Greece's public debt were not limited to the country. Soon enough (in 2011), Portugal was also forced to require a bailout, while the country's only way to get out of the crisis was also marked by intense austerity policies. Like Greece, Portugal's austerity policy had significant effects on the well-being of its citizens, as even hospitals decreased elective stay days, most likely due to reduced capacity (Perelman et al., 2015).

The European debt crisis progressed, other countries, such as Ireland, Italy, Spain, and Cyprus, followed suit, as their public debt stock increased to unsustainable levels. In every country, austerity measures were implemented, notably when the economies were already in a slump, exacerbating the already tight economic environment. Given that it took the countries at least three years to successfully exit their assistance programmes, the toll austerity measures had on the citizens of each country was significant (Antonakakis and Collins, 2014).

Thus, after the whole of Europe has witnessed first-hand the perils of public over-indebtedness, the question which remains unanswered is simple yet highly important: how much debt is too much debt?

The answer which attracted the most attention was that of Reinhart and Rogoff (2010), who imposed arbitrary debt levels at 30%, 60%, and 90% of GDP, and found that debt ratios above 90% of GDP were related to negative growth rates. This was also injected into the policy sphere, with European Central Bank presentations also suggesting that the empirical literature supports a 90% threshold rule (Checherita-Westphal and Jacquinot, 2019).

However, as Herndon et al., (2013) showed, Reinhart and Rogoff (2010) conclusions were the result of "selective exclusion of available data, coding errors and inappropriate weighting of summary statistics lead to serious miscalculations that inaccurately represent the relationship between public debt and GDP growth among 20 advanced economies" (page 2). In general, the authors' conclusions refute the Reinhart and Rogoff's claim that the relationship between public debt ratios and GDP growth is negative.

On a similar note, Panizza and Presbitero (2013) comment that there is no paper that can make a strong case for a causal relationship going from debt to economic growth. Furthermore, the authors also suggest that the presence of thresholds and, more in general, of a non-monotone relationship between debt and growth is not robust to small changes in data coverage and empirical techniques. Still, as Eberhardt and Presbitero (2015) note, using a static, non-linear model, they find some support for a negative relationship between public debt and growth, but no evidence for a similar, or common for that matter, debt threshold across countries.

In a further study examining for a non-linear effect, Égert (2015a,b) finds that a tipping of about 20% GDP can be found, even though other possibilities, such as a 50% debt threshold is also

found. For some countries including the United States, a nonlinear negative link can be detected at about 30% of GDP, while for others, no nonlinearities can be established. Finally, other papers find that strong threshold effects are only found on democracy, implying that higher debt results in lower growth for countries in the low-democracy regime (Kourtellos et al., 2013).

In the euro area, Gómez-Puig and Sosvilla-Rivero (2017) use a sample of 11 countries (not including Cyprus) to find that there appears to be little relationship between debt and growth after the Stability Growth Pact ceiling of 40% to 50%. Still, the specification used in the study is not suitable for threshold analysis, given that the threshold level is arbitrarily selected.

Overall, the above short review has provided insights as to how much importance is placed on the debt-growth relationship, especially for policymakers. Despite the importance of identifying whether a debt-growth threshold exists, and whether the relationship changes, there has been no study which has examined this for Cyprus.

To this end, we propose the use of a Smooth Transition Conditional Correlation (STCC) model, proposed by Berben and Jansen (2005) and Silvennoinen and Teräsvirta (2005), allowing us to test for potential non-linearities in the relationship between public debt and growth. Furthermore, the framework allows us to test whether the STCC specification is an adequate one, against a constant conditional correlation model (CCC) as per Berben and Jansen (2005) and Silvennoinen and Teräsvirta (2009).

With regards to variables, we propose the use of GDP growth as the dependent variable. Furthermore, we intend to use the unemployment rate as the dependent variable, given the known relationship between the two (Okun's law), with the aim of capturing the business cycle dynamics which are unrelated to the change in public debt. Then, given that we aim to examine whether additional debt spending will have an impact on growth, we also include the change in debt which, if the threshold conjecture is correct, should have a different sign once the threshold is surpassed. Finally, with regards to the threshold variable, we will include the Cyprus debt-to-GDP ratio, in an effort to examine if and where a threshold may lie.

Deliverables

Michail, N. and C. Savva, " Public debt thresholds: An analysis for Cyprus", Economic Policy Paper No. 02-20, Economics Research Centre, University of Cyprus, July 2020.

CypERC Newsletter article, Issue 41, October 2020.

III.3 Environmental and economic impacts of the National Energy and Climate Plan of Cyprus

T. Zachariadis, C. Taliotis, N. Fylaktos, M. Karmellos, E. Giannakis, S. Andreou

This paper provides a summary of the Impact Assessment of the National Energy and Climate Plan of Cyprus, which was submitted by the Cypriot government to the European Commission in January 2020. The analysis is based on detailed modelling of the national energy system in combination with simulations by macroeconomic and household demand models. The study has

produced numerous results describing the energy, environmental and economic impacts of different scenarios. This paper focuses on some key findings and recommendations that are of interest to economic policy makers. Results show that the planned energy and climate policies of the Cypriot government, while contributing to compliance of Cyprus with its legally binding energy and environmental obligations, can also yield economic benefits to society. However, they require strong political will to implement, and this especially applies to measures promoting sustainable transport. As further decarbonization measures will be needed in the coming years, the country can exploit business and investment opportunities arising from the global energy transition.

Deliverables

Cyprus Economic Policy Review, Vol. 14, No. 1, pp 1-15 (2020).

III.4 Fuel price pass-through in Cyprus

S. Charalambousa, S. Clerides

We analyse the pass-through of international oil price fluctuations to wholesale and retail fuel prices in Cyprus and test for the possibility of asymmetric pass-through (the “rockets and feathers” phenomenon). We analyse both the total adjustment of the general price level (from the international price to the average local retail price) and the intermediate stages: from the international price to the wholesale price and from the wholesale price to the retail price. We find no evidence of asymmetric price adjustment in the former channel, but we do find limited evidence of asymmetric adjustment in the latter channel

Deliverables

Cyprus Economic Policy Review, Vol. 14, No. 1, pp 27- 40 (2020).

III.5 The expectations of prospective students regarding the economic returns to higher education: Evidence from Cyprus

M. Eliophotou Menon, S. N. Andreou, E. Markadjis

The paper investigates the expectations of prospective university students in Cyprus in relation to the returns to higher education. Specifically, we estimate the expected rates of return to a higher degree and compare the estimates of respondents based on the intended field of study and country of study. Moreover, we estimate expected rates of return for students of different socioeconomic backgrounds. The data used for the estimation were collected from 2051 students in their final year of secondary education in Cyprus in January and February of 2013. The findings point to rational expectations on the part of prospective students. Of the four most popular country destinations, the highest rate of return was expected by respondents intending to study in the United Kingdom. As regards field of study, Medicine and related fields were associated with the highest rate of return. Children of higher parental educational and occupational levels expected higher rates of return. In regression analysis, several variables were significantly linked to the expected rate of return. These included the respondent's socioeconomic status, the field of study, the country of study (students intending to study in Cyprus expected lower rates), student ability, and urban/semi-urban residence. The paper

discusses the implications of the findings for educational planning and policy making in higher education.

Deliverables

Cyprus Economic Policy Review, Vol. 14, No. 1, pp 41- 56 (2020).

III.6 Economic aspects of COVID-19, numerical illustrations, and policy implications.

L. N. Christofides

The new virus SARS-Cov-2 has caught many governments unprepared. COVID-19 has typically given rise to 'lockdown' and isolation policies which aim to limit the spread of the virus and safeguard the capacity of medical systems to deal with this new illness. Relevant economic questions, including but not limited to the likely impact of these responses on GDP, arise. Because the initial confinement of labour and consequent loss of production in the 'nonessential' sectors constitute a supply shock, a reasonable first step to understand relevant economic implications and have a stab at 'forecasting' the impact on GDP is a production function approach. One such approach is fleshed out and illustrated using details from the Republic of Cyprus. The informational requirements are minimal, the approach flexible enough to help think about the circumstances in other countries, and pliable enough to take on board new information that may emerge about the virus and the treatment of the associated disease.

Deliverables

"Economic aspects of COVID-19, numerical illustrations, and policy implications", Economic Policy Paper No. 01-20, Economics Research Centre, University of Cyprus, May 2020.

Cyprus Economic Policy Review article, Vol. 14, No. 1, pp 41-56 (2020).

CypERC Newsletter article, Issue 41, October 2020.

III.7 Survey-derived proxies for uncertainty: the case of Cyprus

N. Pashourtidou

This paper uses business survey data to construct proxies for economic uncertainty for Cyprus at the sectoral and aggregate levels. The proxies considered are in the form of ex ante disagreement and ex post forecast errors. Proxies based on ex ante disagreement are estimated using the dispersion of optimistic and pessimistic responses provided by firms to expectation questions. Ex post forecast errors are derived by comparing expectations and realisations stated by individual respondents; the proxies are computed using the dispersion of ex post forecast errors. The proxies in the latter group are further decomposed into negative and positive uncertainty measures, depending on the direction of the errors. Uncertainty shocks measured by either ex ante disagreement or ex post negative forecast errors result in significant negative effects on sectoral confidence, employment and output; the negative effects are more pronounced and protracted in the sectors of construction and industry. At the aggregate level, proxies are

constructed using the most informative sectoral proxies and are compared to alternative measures from survey and non-survey data. Shocks to aggregate uncertainty proxies generate negative and significant effects on total employment and aggregate output, which are rather protracted.

Deliverable

Pashourtidou N., "Survey-derived proxies for uncertainty: the case of Cyprus", Economic Policy Paper 03-20, Economics Research Centre, University of Cyprus, August 2020.

III.8 Economic consequences of the pandemic: The Importance of monitoring economic activity in real-time

E. Andreou, G. Syrighas

The pandemic has created an unprecedented uncertain economic environment in which, however, economic agents are called upon to continue to operate and make appropriate economic decisions. International organizations, such as the US Federal Reserve Banks, recognize that in such an unprecedented event, historical data do not contain relevant information that can help us with predictions.

In light of the above, we have resorted to the use of different and complementary methods that place more emphasis on more recent higher frequency data. Specifically, we used the Composite Leading and Composite Coincident indices estimated at the Economic Research Centre as well as estimates for the GDP components both from the expenditure and production sides. We use real-time domestic and international economic activity indicators and financial indicators on a weekly and monthly basis to arrive at two scenarios with respect to the annual reduction of the Cyprus GDP. The first scenario envisages an annual GDP reduction of 7% and a second, relatively extreme, scenario with a reduction of 14% for 2020.

Deliverables

Commentary, Issue 32 (2020). Available at: <https://www.ucy.ac.cy/erc/el/publications/commentaries>

III.9 Ideas for a green economic recovery of Cyprus

T. Zachariadis

The economic recovery of Cyprus will need substantial financing from national and EU funds. Obviously economic stimulus measures will primarily aim at securing or even increasing employment – but this need not and should not take place with conventional approaches. This moment offers a great opportunity for economic policies to drive the transition to a low-carbon and resource-efficient society, by encouraging the development of innovative products and services that will reduce the environmental footprint of the economy and create green jobs for people of diverse skills and education levels. These policies should include generous public investments in electricity grids and sustainable mobility, as well as targeted support – through direct grants and enhanced state guarantees – to private investments which are aligned with the requirements of a circular and zero-carbon economy. The general recommendations offered in

this commentary can become more specific and be part of a comprehensive green economic recovery plan for Cyprus. In this way the Cypriot economy will get prepared for the transition to a strongly digitalised and environmentally challenging era, with multiple benefits for the living standards of the population.

Deliverables

Commentary, Issue 31 (2020). Available at: <https://www.ucy.ac.cy/erc/el/publications/commentaries>

CypERC Newsletter article, Issue 41, October 2020.

III.10 Economic aspects of COVID-19, numerical illustrations for Cyprus, and policy implications

L. N. Christofides

The new virus SARS-Cov-2 has caught many governments unprepared. COVID-19 has typically given rise to 'lockdown' and isolation policies which aim to limit the spread of the virus and safeguard the capacity of medical systems to deal with this new illness. Relevant economic questions, including but not limited to the likely impact of these responses on GDP, arise. Because the initial confinement of labour and consequent loss of production in the 'nonessential' sectors constitute a supply shock, a reasonable first step to understand relevant economic implications and have a stab at 'forecasting' the impact on GDP is a production function approach. One such approach is fleshed out and illustrated using details from the Republic of Cyprus. The informational requirements are minimal, the approach flexible enough to help think about the circumstances in other countries, and pliable enough to take on board new information that may emerge about the virus and the treatment of the associated disease.

Deliverables

Commentary, Issue 30 (2020). Available at: <https://www.ucy.ac.cy/erc/el/publications/commentaries>

CypERC Newsletter article, Issue 41, October 2020.

III.11 Predicting the VIX and the volatility risk premium: The role of short-run funding spreads volatility factors

E. Andreou, E. Ghysels

This paper presents an innovative approach to extract Volatility Factors which predict the VIX, the S&P500 Realized Volatility (RV) and the Variance Risk Premium (VRP). The approach is innovative along two different dimensions, namely: (1) we extract Volatility Factors from panels of filtered volatilities — in particular large panels of univariate ARCH-type models and propose methods to estimate common Volatility Factors in the presence of estimation error and (2) we price equity volatility risk using factors which go beyond the equity class namely Volatility Factors extracted from panels of volatilities of short-run funding spreads. The role of these Volatility Factors is compared with the corresponding factors extracted from the panels of the above spreads as well as related factors proposed in the literature. Our monthly short-run funding spreads Volatility Factors provide both in- and out-of-sample predictive gains for forecasting the

monthly VIX, RV as well as the equity premium, while the corresponding daily volatility factors via Mixed Data Sampling (MIDAS) models provide further improvements.

Deliverables

Andreou, E. and Ghysels, E., 29 April 2020. Predicting the VIX and the Volatility Risk Premium: The Role of Short-run Funding Spreads Volatility Factors. Journal of Econometrics, In press.

III.12 Mixed-frequency macro–finance factor models: Theory and applications

E. Andreou, P. Gagliardini, E. Ghysels, M. Rubin

This article presents tests for the existence of common factors spanning two large panels/groups of macroeconomic and financial variables, and the estimation of common and group-specific factors. New analytical results are derived regarding (i) the difference in the asymptotic distribution of the test statistics when aggregating the data first and then extracting the principal components (PCs), or vice versa, as well as (ii) the estimation of the common factor and its asymptotic distribution, extending the work of Andreou et al. (2019). We find that although there is no empirical evidence for one common factor, with constant loadings, in the United States during the period 1963–2017, there is evidence of one common macro–finance factor during the pre- and post-Great Moderation regimes. The aforementioned approaches of estimating PCs yield almost identical common and group-specific (financial and macro) factors which turn out to be significant in predicting key economic indicators, such as real Gross Domestic Product (GDP) growth and the CBOE Volatility Index, among others.

Deliverables

Andreou, E., Gagliardini, P., Ghysels, E. and Rubin, M., 2020. Mixed-Frequency Macro–Finance Factor Models: Theory and Applications. Journal of Financial Econometrics, 18(3), 585–628.

III.13 Endogeneity in semiparametric threshold regression

A. Kourtellos, T. Stengos, Y. Sun

This paper estimates semiparametric threshold regression models with endogenous threshold variables. Assuming diminishing threshold effects, we derive the consistency and limit distribution of our proposed estimator constructed from series approximation method for weakly dependent data. In addition, we propose a test for the endogeneity of the threshold variable. We assess the performance of our methods using Monte Carlo simulations.

Deliverables

A. Kourtellos, T. Stengos and Y. Sun, “Endogeneity in Semiparametric Threshold Regression”, Working Paper, University of Cyprus, 2020. (<https://sites.google.com/view/kourtellos/working-papers>)

III.14 Threshold spatial Durbin model

A. Konstantinidi, A. Kourtellos, Y. Sun

This paper develops a threshold social interaction model which introduces group- specific endogenous effects as well as contextual effects into a conventional spatial Durbin model. We

propose a two-step GMM estimator for the threshold and regression parameters, derive asymptotic theory, and provide bootstrap inference. Finally, we assess the performance of our methods using a Monte Carlo simulation and provide an empirical application on the role of peer effects on smoking initiation using Add Health data.

Deliverables

A. Konstantinidi, A. Kourtellos and Y. Sun, "Threshold Spatial Durbin Model", Working Paper, University of Cyprus, 2020. (<https://sites.google.com/view/kourtellos/working-papers>)

III.15 Intergenerational trajectories

S. Durlauf and A. Konstantinidi, A. Kourtellos

This paper studies the intergenerational transmission of well-being by focusing on the role of trajectories of exposures during childhood and young adulthood using PSID data. Our analysis shifts the focus from a single number that summarizes the intergenerational mobility to a curve that captures the intergenerational trajectory over the life-course of an individual. In doing so, we employ a functional data analysis approach that allows us to construct estimates of trajectories of intergenerational mobility. We find that parental investments are more productive in the early and late childhood or young adulthood, highlighting the importance of the timing of human capital investments. Furthermore, we uncover evidence of heterogeneity due to socioeconomic status and family structure that suggests that the timing of the shocks for the disadvantaged children is an important factor for their upward mobility.

Deliverables

S. Durlauf and A. Konstantinidi and A. Kourtellos, "Intergenerational Trajectories", Working Paper, University of Cyprus, 2020. (<https://sites.google.com/view/kourtellos/working-papers>)

III.16 The role of social interactions in preferences for redistribution

A. Kourtellos, K. Petrou

This paper investigates the role of social influences in preferences for redistribution using data from the General Social Survey. We employ social interaction models with a socioeconomic network structure and intertemporal feedbacks during the impressionable years. We find substantial evidence of both lagged endogenous and contextual effects that imply that the redistributive preferences are intertemporally dependent. Interestingly, controlling for individual income, the contextual effect of income is negative and strongly significant. Our results highlight the key role of fathers' education in the structure of the social network. We interpret our findings as suggestive evidence that social identity can explain attitudes towards redistribution. We also uncover evidence of threshold effects in preferences for redistribution that are consistent with the predictions of theoretical models that exhibit multiple equilibria. Finally, we show that our results extend to a range of other attitudes and beliefs, including politics, religion, and ethics.

Deliverables

A. Kourtellos and K. Petrou, "The Role of Social Interactions in Preferences for Redistribution", Working Paper, University of Cyprus, 2020. (<https://sites.google.com/view/kourtellos/working-papers>)

CypERC Newsletter article, Issue 41, October 2020.

III.17 The Cyprus Composite Leading Economic Index (CCLEI)

E. Andreou, G. Syrighas, M. Tofini

The Cyprus Composite Leading Economic Index (CCLEI) is designed to provide early warning signals for the turning points of the Cyprus business cycles i.e., early evidence of the turns in the Cyprus economic activity on a monthly basis. The construction of the CCLEI has been developed using the model-based approach proposed by Aruoba, Diebold, and Scotti (ADS) in 2009 which is also used by the Philadelphia Federal Reserve Bank for regularly estimating the Business Conditions Index in the U.S. economy. The CCLEI is based on a variety of mixed-frequency stock and flow data which are available at higher frequencies such as oil prices, electricity production and tourist arrivals and whose changes tend to lead the changes in the overall economic activity and which are evaluated on a regular basis. The leading indicators that have been selected from a large set of local and international leading indicators following a number of statistical tests and comprise the CCLEI are: the Brent Crude oil price, the euro area Economic Sentiment Indicator, the total sales of contracts, the number of tourist arrivals, the value of visa card transactions, the retail trade sales turnover volume index, and the volume index of electricity production. The CCLEI bulletin is published since 12 of December 2019 and features the monthly performance of the CCLEI based on the latest and revised data integrating the recent developments in the economic environment. Its monthly performance is compared to its monthly performance last year and discussion on the discrepancies in relation to the monthly performance from year to year as well as the possible development of the economy in the near term is provided.

The new virus SARS-Cov-2 has caught many governments unprepared. COVID-19 has typically given rise to 'lockdown' and isolation policies which aim to limit the spread of the virus and safeguard the capacity of medical systems to deal with this new illness. Relevant economic questions, including but not limited to the likely impact of these responses on GDP, arise. Because the initial confinement of labour and consequent loss of production in the 'nonessential' sectors constitute a supply shock, a reasonable first step to understand relevant economic implications and have a stab at 'forecasting' the impact on GDP is a production function approach. One such approach is fleshed out and illustrated using details from the Republic of Cyprus. The informational requirements are minimal, the approach flexible enough to help think about the circumstances in other countries, and pliable enough to take on board new information that may emerge about the virus and the treatment of the associated disease.

Deliverables

The CCLEI is a research project funded by the Hellenic Bank and all monthly bulletins and report are available at: <http://www.ucy.ac.cy/erc/el/publications/cyprus-composite-leading-economic-index-cclei>

CypERC Newsletter article, Issue 40, March 2020.

III.18 Business and Consumer Surveys

C. Anaxagorou, S. Andreou, M. Charalambous, E. Kalorkoti, N. Pashourtidou

The Economics Research Centre (CypERC) coordinates the conduct of Business and Consumer Surveys in Cyprus which are part of the Joint Harmonised EU Programme of Business and Consumer Surveys. The Surveys collect monthly data that record business executives' and consumers' perceptions of current economic conditions and expectations about the evolution of economic variables. The results of Business and Consumer Surveys for Cyprus are sent to the European Commission on a monthly basis in a predetermined format and according to a predetermined schedule; the results are used in the computation of EU and euro area aggregates. Also, Survey results are utilised by the European Commission, other international and local organisations, such as the Central Bank and the Ministry of Finance, in their economic reports for Cyprus.

Research at the Centre deals with the analysis of Business and Consumer Survey data and the construction of confidence indicators for sectors of economic activity, consumers and the economy as a whole. The results of the analysis are published in the Bulletin "Business and Consumer Surveys" (in Greek, accompanied by a summary in English) every month. The Bulletin presents short-term developments in the business climate in Services, Retail Trade, Construction and Manufacturing, formed by firms' views on their recent and future economic conditions (e.g. turnover, production, order books, stocks, employment, etc.). The Bulletin also presents trends in consumer confidence shaped by consumers' opinions about the recent and future financial conditions of their households and the economy in general.

Following a testing phase in 2019, a new question on the level of perceived uncertainty was introduced in all questionnaires in May 2020. The survey responses are used to construct direct measures of uncertainty. The interest in measuring uncertainty stems from empirical evidence showing that higher uncertainty has adverse effects on employment and activity, particularly investment. Monitoring the level of uncertainty in the economy via the relevant indicators is useful for both practitioners and policymakers, especially as the level of uncertainty could influence the effectiveness of economic policies.

A new proposal for the continuation of Business and Consumer Surveys in Cyprus was submitted to the European Commission in September 2020.

Deliverables

"Business and Consumer Surveys", Monthly Bulletin, Issue 20/1 (January 2020)-20/10 (October 2020), in Greek. Available at: <http://ucy.ac.cy/erc/el/publications/bus-cons-surveys>

Summary of key points in English available at: <http://ucy.ac.cy/erc/en/publications/bus-cons-surveys>

Data files submitted to the European Commission in predetermined format (regular BCS results and separate results on uncertainty).

III.19 Macroeconomic forecasts for Cyprus

C. Anaxagorou, S. Andreou, M. Charalambous, E. Kalorkoti, N. Pashourtidou

(i) GDP growth and inflation

One of the regular research activities at the Centre involves the construction of forecasts for GDP growth and inflation in Cyprus on a quarterly basis. The forecasts are constructed using modern econometric techniques and an extensive database of domestic and foreign/international indicators. The database of over 300 monthly and quarterly indicators is constantly updated and expanded, and the econometric techniques are regularly evaluated and modified if necessary. The forecasts are published four times a year in the Bulletin "Economic Outlook". The forecasts are analysed in conjunction with current domestic and international developments; upside and downside risks to the outlook for growth and inflation are also discussed.

(ii) Sectoral growth forecasts

Another regular activity is the construction of forecasts for the growth rate of the production-side components of GDP that appear in the quarterly National Accounts. The forecasts are updated every quarter and sent to the CypERC sponsors. The forecasts cover the Gross Value Added (GVA) in 10 sectors of economic activity (agriculture; industry; construction; trade; information and communication; financial and insurance; real estate; professional and administrative services; public administration, education and health; other services) as well as net taxes on products. Aggregate and component forecasts are constructed under two approaches to forecasting GDP growth, namely a direct and a bottom-up approach. In the direct approach, unconstrained models for GDP growth are estimated to compute forecasts for the aggregate, while constrained component models are used to obtain the disaggregate forecasts, which add up to the GDP growth forecasts computed directly. In the bottom-up approach, unconstrained component models are estimated to compute growth forecasts for the components; subsequently GDP growth forecasts are obtained by aggregating the unconstrained component forecasts. The construction of projections of GDP growth and the analysis of the outlook during the COVID-19 crisis has been considerably benefitted from the computation of forecasts at the sectoral level.

Deliverables

"Economic Outlook", Quarterly Bulletin, Issue 20/1 January 2020, 20/2 May 2020, 20/3 August 2020, 20/4 November 2020. Available at: <http://ucy.ac.cy/erc/en/publications/economic-outlook>

"Forecasts by Sector", File sent to CypERC sponsors on a quarterly basis.

III.20 Cyprus' competitiveness: IMD World Competitiveness Yearbook 2020

S. Andreou, N. Empora, N. Pashourtidou

The Economics Research Centre (CypERC), together with the Cyprus Employers and Industrialists Federation (OEB), acts as a Partner Institute of the IMD World Competitiveness Center for the 2020 edition of the IMD World Competitiveness Yearbook, including the Digital Competitiveness and Talent Rankings. CypERC contributes via the collection of the necessary hard data for Cyprus,

i.e. about 60 indicators that cover economic performance, government efficiency, business efficiency, infrastructure and digitalization. The data supplied to the IMD should conform to the definitions and time span required by the IMD for the computation of comparable competitiveness rankings across countries. OEB will collaborate with the IMD in the distribution of the opinion survey to business executives in Cyprus.

The results in the World Competitiveness Yearbook are sent to partner institutes before their release for preparing press releases for the local media. The results of competitiveness rankings for Cyprus are analysed in a specialised Bulletin (in Greek) prepared at CypERC and circulated electronically to a large mailing list that includes local media, policy makers, organisations, business, etc. The results on digital competitiveness for Cyprus are analysed in the CypERC Newsletter.

Deliverables

“Competitiveness rankings 2020: Cyprus”, Bulletin available at: http://ucy.ac.cy/erc/documents/IMDWCY20_Cyprus.pdf

“Digital Competitiveness Ranking: Cyprus”, CypERC Newsletter Issue 41, October 2020

Data file submitted to the IMD World Competitiveness Center in predetermined format.

CypERC Newsletter article, Issue 41, October 2020.

III.21 Sectoral productivity developments in Cyprus

N. Empora, Th. Mamuneas

An economy's productivity growth is a reflection of the performance of its individual sectors. In this bulletin we aim in assessing the performance of the Cyprus economy both at the aggregate and at the sectoral level. We do so by employing two of the most widely used measures of productivity, Total Factor Productivity (TFP) and labour productivity. These two measures are interrelated in that labour productivity growth can be attributed to movements in TFP growth and in the relative intensity of the use of capital and labour (capital deepening). We consider a total of ten aggregated industries or sectors, defined according to the classification of economic activities – NACE Rev.2, for the period between 1996 and 2018.

A particularly tough period for the Cyprus economy was the period of the European economic crisis. Over the years from 2007 to 2009, a period by the end of which the European economic crisis began to unfold, as well as up to 2014 is the worse in terms of productivity growth (TFP growth) for all sectors of the economy. The banking crisis that peaked in 2013 also affected sectoral performance. It is not until the last period of our sample, the years between 2015 and 2018, that the Cyprus economy showed a remarkable improvement in terms of productivity growth, both at the aggregate and at the sectoral level. This is mainly due to reforms (in the labour market and the public sector) that have taken place since the beginning of the crisis.

Cyprus' main productivity growth drivers are the Information and communication sector, the Financial and insurance sector and the Wholesale and retail trade transport, accommodation and food service sector. Productivity growth in these backbone sectors over the period 1996-2018 exceeded the productivity growth in all other sectors. On the other hand among the worst contributors to the economy's productivity growth are the Industry and the Agriculture,

forestry and fishing sectors. These two sectors are relatively small and their TFP growth is on average amongst the lowest relatively to the other sectors.

Policy reforms towards improved legal and institutional environment are crucial to the performance of the backbone sectors. Countries with deeper financial markets, flexibility in their labour markets, more skilled labour, and greater private investment in R&D, are also the countries whose high-tech industries are experiencing higher TFP growth. Further, labour market regulations, like strict employment protection legislation are known to depress productivity in low technology sectors. Labour market flexibility and efficient financial markets can ease the shift of labour and capital from less-to more-productive activities. Overall, policies introducing greater flexibility in the labour market, reforming the public sector to minimize bureaucracy and increase efficiency, as well as policies that support innovation through financial deepening and human capital investment, should be a priority in order to promote and sustain productivity and, consequently, economic growth.

Deliverables

Productivity Analysis Bulletin, Issue 20/1, March 2020. Available at: <http://ucy.ac.cy/erc/en/publications/productivity-analysis>

CypERC Newsletter article, Issue 40, March 2020.

III.22 Tourism prospects

C. Anaxagorou, S. Andreou, N. Pashourtidou

The report analyses the results of a quarterly survey among firms providing tourist-related services in Cyprus, namely accommodation services (NACE Rev 2. code 55) and travel agencies, tour operators and related activities (NACE Rev 2. code 79).

The report provides information about firms' assessments of the current levels of bookings from abroad compared to the same period in the previous year; the assessments relate to total bookings as well as reservations by country of origin of tourists (United Kingdom, Russia, Germany, Greece). Firms' estimates/expectations regarding their total bookings from abroad for the year as a whole (asked in March, June and September) or the next year (asked in December) are also discussed in the report. Firms' expectations are juxtaposed with data on tourist arrivals and tourist revenues from the Statistical Service.

The report presents information about firms' views on the main factors that affect their bookings from abroad (e.g. the economic conditions in the country of origin, the availability of flights/connections to Cyprus, tourists' perceptions of the price-quality of the tourist product) and discusses changes in the set of key factors between survey waves.

Deliverables

"Tourism prospects", December 2019, March 2020, June 2020, Reports prepared for the Ministry of Finance.

III.23 “Building Back Better” in Practice: A Science-Policy Framework for a Green Economic Recovery After COVID-19

Zachariadis Th., E. Giannakis, C. Taliotis, M. Karmellos, N. Fykaktos, M. Howells, W. Blyth and St. Hallegate

As current production and consumption patterns of humanity exceed planetary boundaries, many opinion leaders have stressed the need to adopt green economic stimulus policies in the aftermath of the COVID-19 pandemic, in line with the United Nations Sustainable Development Goals and the Paris Agreement on Climate Change. This paper provides an integrated framework to design an economic recovery strategy aligned with sustainability objectives through a multi-criterion, multi-stakeholder lens. The aim is to enable decisions by policymakers with the aid of transparent workflows that include both expert evidence that is based on quantitative open-source modelling, and qualitative input by diverse social actors in a participatory approach. We employ an energy systems model and an economic input-output model to provide quantitative evidence and design a multi-criteria decision process in which we engage stakeholders from government, enterprises, and civil society. As a case study, we select thirteen green recovery measures that are relevant for the European Union member state of Cyprus and assess their appropriateness with numerous criteria related to environmental sustainability, socio-economic and job impact, and climate resilience. The results highlight trade-offs between immediate and long-run effects, between economic and environmental objectives and between expert evidence and societal priorities. Importantly, we find that a ‘return-to-normal’ economic stimulus is not only environmentally unsustainable but also economically inferior to most green recovery schemes.

III.24 The link between secondary technical/vocational education and the labour market in Cyprus

Maria Eliophotou and Elias Margadjis

The paper aims at investigating the link between secondary technical/vocational education and the labour market in Cyprus. Specifically, we examine the following: the main problems faced by graduates of technical/vocational education in their transition from education to the labour market; the link between knowledge and skills acquired at school, and knowledge and skills required at the workplace; the degree to which technical/vocational education succeeds in preparing graduates for the labour market; changes that can enhance the employment of technical/vocational education graduates and their success in the labour market. Data were collected from both experts and technical education graduates through qualitative research. Experts included key personnel of the Department of Technical and Vocational Education at the Ministry of Education and Culture and other officials in the area of technical/vocational education. Graduates of technical/vocational education were selected through criterion sampling based on their specialisations and their years of labour market experience. According to the findings, technical/vocational education graduates enjoy a relatively smooth transition from education to the labour market, with short periods of unemployment, underemployment or employment in

non-related fields of study. Problems faced by technical/vocational education graduates after their employment included the lack of adequate preparation due to curriculum deficiencies and, to some extent, competition from foreign workers. The link between skills and knowledge acquired at school, and skills and knowledge required at the workplace was considered to be satisfactory even though the role of curriculum weaknesses was again highlighted. Respondents believed that the curriculum emphasised theory at the expense of practice and was not informed by recent developments to the greatest possible extent. Both officials and graduates were positive in their evaluation of technical/vocational education in Cyprus. However, they identified several weaknesses and provided suggestions for enhancing the link between technical/vocational education and the labour market. These included more training for graduates after labour market entry, changes in the curriculum and available infrastructure, and greater focus on student preferences. The findings are used as the basis for policy recommendations in the area of technical/vocational education in Cyprus.

Appendix: Publications 2019-2020

Economic Policy / Analysis Papers

Number	Title	Authors
06-20	The link between secondary technical/vocational education and the labour market in Cyprus	Maria Eliophotou and Elias Margadjis
05-20	Building Back Better" in Practice: A Science-Policy Framework for a Green Economic Recovery After COVID-19	Zachariadis Th., E. Giannakis, C. Taliotis, M. Karmellos, N. Fylaktos, M. Howells, W. Blyth and St. Hallegatte
04-20	Income under-reporting and the shadow economy in Cyprus: Evidence from household survey data	Elena Andreou George Papadopoulos George Syrighas
03-20	Survey-derived proxies for uncertainty: the case of Cyprus	Nicoletta Pashourtidou
02-20	Public Debt Thresholds: An Analysis for Cyprus	Nektarios A. Michail Christos S. Savva
01-20	Economic aspects of COVID-19, numerical illustrations, and policy implications	Louis N. Christofides
07-19	The Shadow Economy in Cyprus: Evidence from the Electricity Consumption and Currency Demand Methods	Christoforos Andreou Elena Andreou Stephanie Michael George Syrighas
06-19	Probing the mechanism: lending rate setting in a data-driven agent-based model	George Papadopoulos
05-19	Trends and disparities in economic inequality in Cyprus and the EU	Andros Kourtellos Kyriacos Petrou
04-19	The evolution of car ownership in Cyprus	Adamos Adamou Sofronis Clerides
03-19	What determines bank lending standards in Cyprus	Nektarios A. Michail Christos S. Savva
02-19	Optimal Timing of Greenhouse Gas Emissions Abatement in Europe	Chryso Sotiriou Theodoros Zachariadis
01-19	Residential property price indices using asking prices: the case of Cyprus	Sofia Andreou Nicoletta Pashourtidou

Articles in the Cyprus Economic Policy Review

	Title	Authors
Volume 14 Number 2 December 2020	Residential property price indices using asking prices: the case of Cyprus	Sofia N. Andreou Nicoletta Pashourtidou
	Assessing the gender wage gap in the culinary occupations in Cyprus	Pandelis Mitsis
	Income and wealth inequality in Cyprus: Empirical evidence from the household finance and consumption survey	Ioanna Evangelou Rosmari Hadjcharalambous Nektarios A. Michail
Volume 14 Number 1 June 2020	Environmental and Economic Impacts of the National Energy and Climate Plan of Cyprus	Theodoros Zachariadis Constantinos Taliotis Nestor Fylaktos Marios Karmellos Elias Giannakis Sofia Andreou
	What Determines Bank Lending Standards in Cyprus?	Nektarios A. Michail Christos S. Savva
	Fuel price pass-through in Cyprus	Sotiria Charalambous Sofronis Clerides
	The expectations of prospective students regarding the economic returns to higher education: Evidence from Cyprus	Maria Eliophotou Menon Sofia N. Andreou Elias Markadjis
	Economic aspects of COVID-19, numerical illustrations, and policy implications	Louis N. Christofides
Volume 13 Number 2 December 2019	The social protection system in Cyprus: Recent initiatives and labour market implications	Louis N. Christofides Christos Koutsampelas
	The impact of foreign demand on Cyprus house prices	Nektarios A. Michail George Thucydides
	The Impact of the Minimum Wage on Wages and Work in Cyprus	Pandelis Mitsis
	The issue of fixed book pricing: Evidence based on the Greek experience	Alexandra Kontolaimou Prodromos-Ioannis Prodromidis Ioanna Konstantakopoulou
Volume 13 Number 1 June 2019	Special issue in memory of Professor Panos Pashardes (1949 - 2017) Cyprus Economic Policy Review Editor (2007 - 2016)	Elena Andreou

Articles in the CypERC Newsletter (in Greek)

Issue	Title	Authors
Αρ. 41 Οκτ.2020	Οικονομικές πτυχές του COVID-19: Εκτιμήσεις και συμπεράσματα οικονομικής πολιτικής	Λούης Ν. Χριστοφίδης
	Διαχρονικές τάσεις και συγκριτική ανάλυση της οικονομικής ανισότητας σε Κύπρο και ΕΕ	Άντρος Κούρτελλος Κυριάκος Πέτρου
	Όρια δημόσιου χρέους: Ανάλυση για την Κύπρο	Νεκτάριος Α. Μιχαήλ Χρήστος Σ. Σάββα
	Ψηφιακή ανταγωνιστικότητα κυπριακής οικονομίας	Θεόδωρος Ζαχαριάδης
Αρ. 40 Μάρ.2020	Ψηφιακή ανταγωνιστικότητα κυπριακής οικονομίας	Νικολέττα Πασιουρτίδου
	Ο μηνιαίος Σύνθετος Προπορευόμενος Οικονομικός Δείκτης (ΣΠΟΔ) της Κύπρου	Έλενα Ανδρέου Μαγδαληνή Τοφινή
Αρ. 39 Οκτ.2019	Παράγοντες που επηρεάζουν τα πρότυπα δανειοδότησης στην Κύπρο	Νεκτάριος Α. Μιχαήλ Χρήστος Σ. Σάββα
	Παραγωγικότητα των τομέων της κυπριακής οικονομίας	Νεοφύτα Έμπορα Θεοφάνης Μαμουνέας
	Αξιολόγηση των πτυχών του συστήματος κοινωνικής προστασίας στην Κύπρο	Λούης Ν. Χριστοφίδης Χρήστος Κουτσαμπέλας
	Αναζήτηση της χρονικά βέλτιστης στρατηγικής για μείωση των εκπομπών αερίων του θερμοκηπίου	Χρύσω Σωτηρίου Θεόδωρος Ζαχαριάδης
Αρ. 38 Μάρ.2019	Δείκτες τιμών κατοικιών από στοιχεία αγγελιών: η περίπτωση της Κύπρου	Σοφία Ν. Ανδρέου Νικολέττα Πασιουρτίδου
	Εμπειρική εξέταση των καθοριστικών παραγόντων των αφίξεων τουριστών στην Κύπρο	Ανδρέας Αντωνόπουλος
	Ψηφιακή ανταγωνιστικότητα κυπριακής οικονομίας	Νικολέττα Πασιουρτίδου
	Η επίδραση των μέτρων λιτότητας στο μισθολογικό χάσμα δημόσιου/ιδιωτικού τομέα στην Ευρώπη	Μαρία Μιχαήλ Λούης Ν. Χριστοφίδης
Αρ. 38 Μάρ.2019	Οι εξελίξεις της παραγωγικότητας στην Κυπριακή οικονομία	Χαράλαμπος Καραγιαννάκης Θεοφάνης Μαμουνέας
	Ανάλυση κόστους-αποτελεσματικότητας μέτρων πολιτικής για τη μείωση των εκπομπών αερίων του θερμοκηπίου στην Κύπρο	Χρύσω Σωτηρίου Απόστολος Μιχόπουλος Θεόδωρος Ζαχαριάδης
	Παράγοντες που επηρεάζουν τα μη εξυπηρετούμενα δάνεια στην Κύπρο	Νεκτάριος Α. Μιχαήλ Χρήστος Σ. Σάββα

Issue	Title	Authors
Αρ. 32 Απρ.2020	Οικονομικές επιπτώσεις της πανδημίας: Η σημασία της παρακολούθησης της οικονομικής δραστηριότητας σε πραγματικό χρόνο	Έλενα Ανδρέου Γιώργος Συρίχας
Αρ. 31 Απρ.2020	Ιδέες για μια πράσινη επανεκκίνηση της κυπριακής οικονομίας / Ideas for a green economic recovery of Cyprus	Θεόδωρος Ζαχαριάδης/ Theodoros Zachariadis
Αρ. 30 Απρ.2020	Economic aspects of COVID-19, numerical illustrations for Cyprus, and policy implications	Louis N. Christofides

2019-2020

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