East Carolina University
Faculty Senate
RESEARCH/CREATIVE ACTIVITY GRANTS COMMITTEE

Application Cover Page for a 2008-2009 Research/Creative Activity Grant

Proposals are due in the Faculty Senate Office on Tuesday, January 18, 2008.

1. a. Name: Mohammad Reza Jahan-Parvar_____

   b. Department: Economics_____

   c. Academic Rank: Assistant Professor_____

2. Proposal Title: *The Curse of Natural Resources: A Study of Impact of High Oil Prices on Less Developed Oil Exporting Countries.*

3. Type of Grant: (check one)	a. Stipend of Research/Creative Activity		_____
	b. Project expense only		_____
	c. Stipend and Project Expense		☒
	d. Amount of project expense money requested:	US $ 3,000.00	
4. Type of Faculty position (check all that apply)	a. Full-time tenured or tenure-track		☒
	b. 12-month contract		_____
	c. Clinical		_____

5. I understand and accept the term and conditions set forth in the Research/Creative Activity Grants Committee guidelines.

   a. I understand that I must file a final report of the results of the project with the Faculty Senate office no later than September 1, 2009.
   b. I understand that publication, presentation, performance, or exhibit of work resulting from support of this project by ECU must carry a printed acknowledgment of this financial assistance by the University.
   c. I understand that if selected, receipt of funding is contingent upon receiving approval from IRB or Animal Care Committee.

M. R. Jahan-Parvar   Jan. 16, 2008

6. The applicant is a full-time tenured, tenure-track, or clinical faculty member who, I believe, can complete the proposed project.

Richard E Ericson   _1/17/2008_
          Signature of Unit Head   Date

7. Dates of previous University grants, final reports filed, publications, presentations, performances, external funding proposals, or related activities, including citations or publications directly resulting from each grant. (section may be expanded in length)

   1. ECU startup fund: US$ 8,520.00
      a. Final report filed, August 2007.
   2. Presentations:
      a. Western Economic Association: Seattle, WA June 2007
      b. University of Wisconsin, Milwaukee October 2007
      c. Southern Economic Association, New Orleans, LA, November 2007
      d. NC State University, scheduled, March 2008

8. List current grant/contract support and pending applications. Include project title, sponsor, your role in the project (PI or co-PI), the project period, award status (pending/current) and total funding level. Include in particular any current or pending funding related to the proposed research. (section may be expanded in length)

   1. Interdisciplinary and Multi-Institutional Cooperative Research Project:
      a. Funding Agency: University of North Carolina Research Competitiveness Fund
      b. Project Title: North Carolina Coastal Hazards: Economic Implications of Severe Storms and Sea Level Rise
      c. Role: Co-PI
      d. Project Period: Summer 2008
      e. Award Status: Pending
      Note: This project is unrelated to the proposal being submitted.

The Curse of Natural Resources: A Study of the Impact of High Oil Prices on Less Developed, Oil Exporting Countries

Abstract:

Do high oil windfall revenues cause higher levels of economic welfare in oil exporting countries? If these effects are permanent, the answer is yes. But if these effects are transient, then the inflow of revenues can cause a loss of competitiveness in export oriented industries or other sectors which compete with foreign made goods, for example, agriculture. This results in job loss and loss of diversified sources of income for the country. Once the boom is over the net welfare effect may very well be negative. Economic literature calls this scenario "the curse of natural resources" or "the Dutch disease".

Oil booms seem to be short lived. I propose to study the transient effects of oil windfalls on a diverse group of developing, oil exporting countries. If my empirical model captures these effects on exchange rates, then my model can be used for policy making. Based on adequacy of this methodology, the monetary authorities in developing, oil exporting countries can use this method to implement appropriate policies to avoid or mitigate the adverse effects of "the curse of natural resources".

Proposal Description

Problem Statement

During the last decade the price of a barrel of North Sea Brent crude petroleum has increased from a low of US $ 11.05 in March 1998 to US$ 100.03 in January 2008[1]. Consumers and producers in developed economies view this increase as a cost, most

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[1] Source: US Department of Energy website.

severely, but not exclusively, felt at gas stations or upon payment of energy bills. But for oil exporting, developing countries, high oil prices boost national revenues. The question to ask is: do high oil windfall revenues cause higher levels of economic welfare for people in oil exporting countries?

Economic theory warns us about welfare effects of large inflows of windfall revenues to a small, developing economy. In fact, there are two extensive lines of research titled "the curse of natural resources" (Sachs and Warner, 2001) and "the Dutch Disease" (Corden and Neary, 1982; Jahan-Parvar and Mohammadi, 2007) in open economy macroeconomics and development economics which specifically study this problem. In a nutshell, these studies argue that if the effects of windfall oil (or any other natural resource) revenues are transient, the inflow of revenue from a sector which is capital and technology intensive and typically highly dependent on foreign technology, investment, and demand, causes loss of competitiveness in export oriented industries or other sectors which may compete with foreign made goods (for example, agriculture or manufacturing). This outcome results in job loss and loss of diversified sources of income for the country and once the boom is over the net welfare effect may be negative. On the other hand, if the effects of increase in revenues are permanent, the economy will reallocate the sources of production. Some industries will vanish and the resources will be used in other sectors which can operate and compete in this new environment (Ebrahim-Zadeh, 2003).

Thus, to conduct a methodologically rigorous study of the welfare effects of oil price increases we need to a) isolate the channels for transmission of higher oil revenue effects, and b) determine whether these effects are transient or permanent. The

economic literature considers several channels. Edwards (1984) studies monetary channels through the balance of international payments. Corden and Neary (1982) study supply-side effects manifest through resource reallocation. Cordon (1984) studies demand-side (aggregate spending) channels. This study focuses on monetary effects and their influence on exchange rates, real and nominal, as a measure of loss of competitiveness in a sample of small, developing economies.

In two earlier studies, Jahan-Parvar and Mohammadi (2007, 2008) investigate the relationship between oil prices, inflation, and real exchange rates in several oil producing countries. Their results regarding "Dutch disease" type effects in nominal exchange rates through the monetary channel (inflation) for six oil producers shows that the more sophisticated the monetary policy making in the country in question, the less likely it is to suffer from a long-term "Dutch disease" problem. In that study, Nigeria proved to be the most susceptible country in the sample to Dutch disease and Norway the least.

In the other study, sixteen developed and developing countries are studied. The sample size is larger, and the study is concerned with detection of long run vs. short run differences in the dynamics of real exchange rates due to oil price shocks. Real exchange rates are defined as the value of a basket of traded goods of one country in terms of a basket of goods from a trading partner. In other words, how much of country A's goods need to be exchanged to buy a basket of country B's goods. In practice, this quantity is studied as the logarithm of price of a unit of domestic currency in terms of a foreign currency plus the difference between logarithm of price levels in home country and foreign country.

This study however does not investigate the possibility of short-term deviations from long-term trends. The results are again mixed, and highly suggestive of changes in the behavior of real exchange rates. That is, while long-run effects show evidence of a stable long-run co-movement between real exchange rates and oil prices, some evidence of local instability can be detected.

In this project, I plan to investigate the possibility of local deviations from long-term co-movements; hence the possibility of short-term transient effects of oil price increases on nominal and real exchange rates. If such effects can indeed be detected, then it is possible to isolate transient effects within long-term tests of Jahan-Parvar and Mohammadi (2007, 2008).

Specific Aims

Specifically, I plan to apply two sets of tests from very recent and highly active research in time series analysis to data collected on sixteen developing oil producers to investigate the power of these methods in detecting periods of seemingly non-stationary behavior in the time series of exchange rates and oil prices, then investigate whether oil prices have prediction power for these periods of instability in exchange rates. In other words, I want to study whether one can predict a period of transient loss of competitiveness due to appreciation of exchange rates if oil prices increase rapidly.

1) Apply the ARDL test to establish the existence and order of cointegration between oil prices and exchange rates:

In the first set of tests, the main issue is to find evidence of long-term co-movements between seemingly not cointegrated series of oil prices and real or nominal exchange rates. Cointegration refers to a property between time series when a linear combination

4

of two or more non-stationary series is itself stationary. This is done through the application of ARDL test of cointegration, developed by Pesaran et. al (2001). Notice that when testing for real exchange rates, oil prices need to be discounted using a suitable measure. Once the existence of a cointegrating relationship is established, and also for cases where no relationship is found, I am interested in testing for localized behavior of the series.

2) *Deviations from the long run cointegrating behavior:*

To detect periods of deviation, I apply a class of tests developed independently by Gourieroux and Robert (2001) and Rahbek and Shephard (2002), commonly referred to as "Autoregressive Conditional Root (ACR)" tests.

3) *"Granger causality" between oil prices and exchange rates within periods of*
   deviation:

"Granger causality" is a technique, developed by Clive C. Granger (1969) for determining whether one time series is useful in forecasting another. Ordinary regressions reflect mere correlations. Granger argued that there is an interpretation of a set of tests as revealing a version of causality. Once epochs of seeming non-stationarity in otherwise stationary processes are detected in the previous step, I test for "Granger causality" and conduct an impulse-response study to detect any predictive power of the oil price shocks on exchange rates and also the behavior of exchange rates after a shock occurs. A process is called stationary when its moments do not depend on time. That is once you have estimated the parameters characterizing the distribution of the variables then the moments of the distribution are fixed.

5

Methodology

The dominant methodology in many empirical studies in applied time series and open economy macroeconomics studies stationarity of variables for the whole sample. In general, this is a good strategy since often the researcher is concerned with long-term behavior of the economic variables, such as unemployment, money supply, interest rates, and other fundamental economic variables which economic theory predicts to follow long-term, stationary behavior. For some of these variables, this assumption is supported empirically. Exchange rates on the other hand are prone to short term volatility. Thus, it is of interest to study potential local deviations from long term behavior.

The study of stationarity of time series data typically involves testing the "unit roots". As an illustration, consider the following example of a univariate, first order autoregressive process with normally distributed errors:

$$y_t = \rho y_{t-1} + \varepsilon_t \qquad\qquad (1)$$

This equation is stationary when $|\rho|<1$. If this value is equal to one, then the process is not stationary. The parameter of interest in this process is ρ. Traditionally, researchers do not pay attention to whether ρ is fixed for the sample period or it may "jump" between different values, depending on some state of the nature taking place. This possibility is studied by Gourieroux and Robert (2001), Rahbek and Hansen (2002), and Rahbek and Shephard (2002) in "autoregressive conditional root model" or ACR. I follow the methodology introduced by Rahbek and Shephard (2002).

To illustrate how this case is different from equation (1), consider the following equation:

6

$$y_t = \rho^{s_t} y_{t-1} + \varepsilon_t \qquad\qquad (2)$$

This model can be reparametrized as an equilibrium correction model by taking the first difference:

$$\Delta y_t = s_t \pi y_{t-1} + \varepsilon_t \qquad\qquad (3)$$

Here s_t denotes "regimes" of ρ and takes values one or zero. Probability of s_t equal to one is a process which depends on y_{t-1}. In other words, if realization of a certain y_{t-1} implies that a certain state of the nature is prevailing, then s_t takes the value of one. Otherwise, it is equal to zero. If s_t is equal to zero, then the process behaves locally like a random walk, while if it is equal to one, then the process behaves like a stationary process of a certain order. These values need not be fixed to be just one and zero. They can be estimated from the data, and could denote regime switching between two stationary, but parametrically different models.

I plan to use the generalized, multivariate version of this method developed and introduced by Rahbek and Shephard (2002). The estimated model is a vector autoregression where the variables are oil prices, real or nominal exchange rates, and their lagged values. Parameters of these lagged values are assumed to follow the multivariate version of equation (2). The model is then estimated using maximum likelihood estimation technique. By plotting the time varying behavior of estimated s_t parameters, one can identify the seemingly non-stationary periods.

Once I have completed the previous step for nominal and real exchange rates, then I can perform Granger causality tests to test whether behavior of oil prices in that time locality is a predictor for behavior of exchange rates. Specifically, if oil price increases cause appreciation of the developing country's currency against its trade

7

partners, this result implies that transient oil price increases may lead to loss of competitiveness in the non-oil sector.

In the last step, an impulse-response study is conducted to gain insight into the behavior of exchange rates once there is a unit shock to the oil price. This study illustrates the *n*-step ahead hypothetical behavior of exchange rates, and hence provides a visual as well as analytical tool for policy makers to make decisions.

Expected Results

The combination of ACR, Granger causality and ARDL tests used in this study, represent an innovation in modeling the relationship between oil price increases, exchange rates, and loss of competitiveness. I expect to see more questions to answer, and a fruitful line of research generating many published papers and outside grants. This is an important line of research and many agencies pay attention to rigorous and reliable empirical studies in this field.

I do not expect to capture positive results for every country in the sample. The countries selected for this study differ in their levels of wealth, development, and structure of their political and monetary institutions. Not all of these countries may experience a destabilizing effect in their exchange rate regime due to oil price increases. But some may, and I am interested in those cases. I am interested in developing a tool, based on a reduced form econometric model, for policy makers to address potential destabilizing effects of oil price increases.

Literature Cited

Charemza, W. W., M. Lifshits and S. Makarova (2005), "Conditional testing for unit-root bilinearity in financial time series: some theoretical and empirical results," *Journal of Economic Dynamics and Control*, Vol. 29, Issues 1-2, pp. 63-96.

Corden, W. M. (1984) "Booming Sector and Dutch Disease Economics: Survey and Consolidation", *Oxford Economic Papers*, 36, pp.359-380.

Corden, W. M. and Neary, J. P. (1982) "Booming Sector and De-Industrialization in a Small Open Economy", *Economic Journal*, 92, pp.825-848.

Dueker, M., A. Serletis (2000), "Do Real Exchange Rates have Autoregressive Unit Roots? A Test under the Alternative of Long Memory and Breaks," Working Paper No. 2000-016A, Federal Reserve Bank of St. Louis.

Edwards, S. (1984) "Coffee, Money, and Inflation in Colombia", *World Development*, pp.1107-1117.

Ebrahim-Zadeh, C. (2003) "Back to Basics, Dutch Disease: Too much Wealth Managed Unwisely", *Finance and Development*, IMF Quarterly, Vol. 40, No.1

Gourieroux, C. and C. Y. Robert (2001) "Tails and Extremal Behavior of Stochastic Unit Root Models," Working Paper: CREST, CEPREMAP, University of Toronto and University Paris VII.

Granger, C. W. J. (1969). "Investigating causal relations by econometric models and cross-spectral methods," *Econometrica*, 37: 424-438.

Jahan-Parvar, M. R., and H. Mohammadi (2007) "Oil Prices and Competitiveness: Time Series Evidence from Six Oil Producing Countries," revised and resubmitted, *Journal of Economic Studies*.

Jahan-Parvar, M. R., and H. Mohammadi (2008) "Oil Prices and Real Exchange Rates: Long Run Dynamics, Short Run Effects, and Policy Implications," Working Paper, Illinois State University and East Carolina University.

Pesaran, M. H., Y. Shin, and R. J. Smith (2001) "Bounds Testing Approaches to the Analysis of Level Relationships," *Journal of Applied Econometrics*, Vol.16, pp.289-326.

Rahbek, A. and H. Hansen (2002), "Approximate Conditional Unit Root Inference," Journal of Time Series Analysis, Vol. 23, pp. 1-28.

Rahbek, A., and N. Shephard (2002) "Inference and Ergodicity in the Autoregressive Conditional Root Models," Working Paper, Nuffield College, University of Oxford.

Nelson, C., J. Piger, and E. Zivot (2001), "Unit Root Tests in the Presence of Markov Switching," *Journal of Business and Economic Statistics*, Vol. 19, No.9, pp. 404-415.

Sachs, J. D., and A. M. Warner (2001), "The curse of natural resources," *European Economic Review*, Vol. 45(4-6), pp.827-838.

East Carolina University
Faculty Senate
RESEARCH/CREATIVE ACTIVITY GRANTS COMMITTEE

Budget for Project Expenses with a 2007/2008 Research/Creative Activity Grant

Proposals are due in the Faculty Senate Office on Tuesday, January 16, 2006.

Item	Line Number	Requested Funding	Funds from Other Sources
1) **Research Assistants (University personnel only); Student wages**	1450	$	$
Description:			
2) **Travel (Mode/Sources, etc.)**	3100	$	$
Description:			
3) **Research/Creative Activity Supplies**	2300	$	$
Description:			
4) **Printing**	3400	$	$
Description:			
5) **Communication**	3200	$	$
Description:			
6) **Equipment**	5300	$	$
Description:			
7) **Other (Specify)**		$3,000.00	$
Description: **data collection, purchase.**			
Total		$3,000.00	$

*Identify Other Sources of Funding:

*A BRIEF JUSTIFICATION (ONE PAGE MAXIMUM) IS NEEDED
FOR ALL PROJECT EXPENSES.*

Budget Description and Justification:

1. Data:

    a. I know that I need to purchase black market exchange rate data for at least two countries in sample, Iran and Indonesia. Official and black market exchange rates do not agree and businesses use the black market rate. I will need funds to purchase black market data for other countries in sample. AT this point, I do not know what if the effective and relevant exchange rate in all countries. Cost of data: $ 1,500.00

    b. Data purchase for other series: license needed, $ 1,200.00

2. Ox family of software and Time Series Modeling v.4.25 extension package or newer: This software implements the ACR model and hence cuts the implementation time significantly. Otherwise, the code needs to be written from scratch. Cost of software: $ 200.00-300.00 (assuming exchange rate of 2 US dollars per Pound Sterling).

CURRICULUM VITAE
MOHAMMAD REZA JAHAN-PARVAR

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	East Carolina University		*Fax:* (252) 328-6743
	Greenville, NC 27858-4353		
Website:	http://personal.ecu.edu/jahanparvarm	**e-mail:**	jahanparvarm@ecu.edu

EDUCATION:

Ph.D., Economics (2007), University of North Carolina, Chapel Hill

M.S., Statistics (2003), University of North Carolina, Chapel Hill

M.S., Applied Economics (1999), Illinois State University, Bloomington-Normal

B.S., Economics (1997), Beheshti University (*National University of Iran*),
Tehran, Highest Distinction (Summa cum Laude)

PROFESSIONAL EXPERIENCE:

Assistant Professor, Department of Economics, East Carolina University (2006 - Present)

Instructor, Department of Economics, UNC (2004)

Instructor, Summer BRIDGE Program, UNC (2004)

Research Assistant, UNC: Professor A. Ronald Gallant (2001-04), Professor Richard Froyen (1999-2000)

Teaching Assistant, UNC (2000-01)

Teaching and Research Assistant, Illinois State University (1998-99)

WORKING PAPERS AND WORK IN PROGRESS:

Home Bias Puzzle Revisited: A General Equilibrium Solution Based on Model Mis-Specification (*Working Paper*)

Portfolio Choice with Multi Factor Stochastic Volatility (*Working Paper*)

An Empirical Investigation of Stock Market Behavior in Middle East and North Africa (*Working Paper*) with Ai-Ru Cheng and Philip Rothman

Oil Prices and Competitiveness: Time Series Evidence from Six Oil Producing Countries (*Revision Requested*), with Hassan Mohammadi

Portfolio Choice with Multi Factor Stochastic Volatility: Comparative Theoretical and Empirical Implications (*Work in Progress*) with Amarjit Budhiraja

Portfolio Choice and Demand for Robustness: A Martingale Solution (*Work in Progress*)

Do oil spot prices and oil futures have prediction power for the term structure of US interest rates? (*Work in Progress*) with Philip Rothman

Realized and Implied Volatility in Foreign Exchange European Options: Are Jump Tests Correctly Specified? (*Work in Progress*) with Ai-Ru Cheng

Asset Pricing in a Small Open Economy(*Work in Progress*) with Xuan Liu and Philip Rothman

Oil Prices and Real Exchange Rates: Long-Run Dynamics, Short-Run Dynamics, and Policy Implications (*Work in Progress*), with Hassan Mohammadi

RESEARCH GRANTS:

East Carolina University, New Faculty Startup Grant (2006-07), US$ 8,520.00

HONORS AND AWARDS:

Humane Studies Fellowship, Institute for Humane Studies (2002-03 and 2005-06)

Tuition Scholarship, Department of Economics, UNC (1999-04)

Invitee, Social Science Research Council: Workshop in Applied Economics (2000)

Lela Winegarner Fellowship, Illinois State University (1998-99)

First Rank in the Class of 1997, Beheshti University, Highest Distinction (Summa cum Laude)

Dean's List, Beheshti University

CONFERENCE PRESENTATIONS:

2007: Western Economic Association International, Southern Economic Association

2006: Western Economic Association International, SIAM Conference on Financial Mathematics and Engineering (Poster Session)

2005: Financial Management Association (Graduate Student Seminar)

SEMINARS:

2007: University of Wisconsin at Milwaukee, NC State University

2006: East Carolina University, Bank of Canada, HEC Montréal, Analysis Group, University of Arkansas at Little Rock

2004: Kenan-Flagler Business School, UNC Chapel Hill

2003-05: Duke University, Financial Econometrics Lunch Group

PROFESSIONAL SERVICE:

2007: Session Organizer and Chair: "Financial Markets in Emerging Economies," WEAI; Annual Meeting Program Committee Member, FMA; Discussant, SEA

2005: Discussant, FMA

REFEREE SERVICE:

Journal of Business and Economic Statistics

Journal of Economic Studies

Studies in Nonlinear Dynamics and Econometrics

UNIVERSITY SERVICE:

Research and Technology Committee (2006-08), ECU

Macroeconomics Search Committee (2006-07), ECU

Organizer (with Philip Rothman) Macro/Time Series/Finance Brown Bag Series (2007-Present), ECU

East Carolina University
RESEARCH/CREATIVE ACTIVITY GRANTS COMMITTEE
Checklist for a 2008-2009 Research/Creative Activity Grant

This required checklist must be submitted with the proposal <u>as the last page</u>.

I. Please check that you qualify for a Research/Creative Activity Grant:
- ☑ full-time tenured, tenure-track, or clinical faculty member at ECU
- ☑ not currently a candidate for an advanced degree
- ☑ not from the School of Medicine
- ☑ not a fixed-term or part-time faculty member
- ☑ completed all previous Final Report forms (If unsure, please call the Faculty Senate office at ext. 6537 for verification.)

II. Please check that you qualify for a stipend for research/creative activity if requested.
- ☑ do not hold a 12-month contract

III. Please check the following proposal requirements:
- ☑ Application Cover Page, including:
  - ☑ Applicant's name, school department, academic rank
  - ☑ Proposal title
  - ☑ Type of grant
  - ☑ Amount of project expenses, as applicable
  - ☑ Tenure status
  - ☑ 9-month or 12-month
  - ☐ IRB/animal use signatures
  - ☑ Applicant's signature and date
  - ☑ Applicant's unit head's signature and date
  - ☑ List of prior research/creative activity grants received
  - ☑ List of current/grant contract support and pending applications
- ☑ Narrative formatted along guidelines
- ☑ Abstract
- ☑ Description of proposal (8 doubled spaced pages max including abstract)
- ☑ Literature cited, if appropriate
- ☐ Appendices (4 pages max), if appropriate
- ☑ Budget, if appropriate
- ☑ Justification for support (2 page max for budget and justification)
- ☑ Vita (2 pages)
- ☑ Proposal checklist

IV. Please explain briefly any suggestions you have concerning the proposal guidelines and application format.