



UNIVERSITY OF
MARYLAND

Department of Economics
Tydings Hall, Room 3114D
College Park, Maryland 20742-7211
301.405.3544 TEL 301.405.3542 FAX

To: Dean of Research and Graduate Studies
From: Director of Graduate Studies in Economics
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This is to certify that the Doctoral Examining Committee has certified that Elif B. Osum made substantial contributions to the jointly authored work included in this dissertation.

(Chairman) Erkut Ozbay

(Director of Graduate Studies)
John Shen