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EMPIRICAL ANALYSIS OF THE SIZE AND GROWTH OF GOVERNMENT: WAGNER'S LAW AND BEYOND

by

Chi-ang Lin

A DISSERTATION

Presented to the Faculty of

The Graduate College at the University of Nebraska

In Partial Fulfillment of Requirements

For the Degree of Doctor of Philosophy

Major: Economics

Under the Supervision of Professor John E. Anderson

Lincoln, Nebraska

December, 1996

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Empirical Analysis of the Size and Growth of Government:

Wagner's Law and Beyond

BY

Chi-ang Lin

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EMPIRICAL ANALYSIS OF THE SIZE AND GROWTH OF GOVERNMENT: WAGNER'S LAW AND BEYOND

Chi-ang Lin, Ph.D.

University of Nebraska, 1996

Adviser: John E. Anderson

This study adopts a time series approach, which considers the nonstationarity property of data, to conducting empirical analysis of government size associated with Wagner's Law. Chapter Two examines Musgrave's version of Wagner's Law for Mexico. Using unit root and non-causality tests, evidence in support of Wagner's Law for Mexico can be clearly found. We show that the different temporal properties of the series must be carefully identified to obtain reliable results of non-causality tests.

Chapter Three (a) investigates the *bidirectional* impact between income and government size and (b) extends the empirical frontier of Wagner's Law to an open economy framework. We ascertain the bidirectional impact between income and government size *within* and *across* the G-7 countries. On an individual country basis, the prevalence of the bidirectional impact between income and government size is confirmed to a considerable extent. Thus, the results

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imply that income and government size are jointly determined. On examination of the two-country cases, a new *international* version of Wagner's Law is identified. We observe that a country's government size growth could positively depend on foreign income. On the other hand, we introduce an *aggregate production externality* concept to explain the phenomenon that the U.S government size has a positive impact on foreign income growth. We surmise that an externality input associated with the U.S. defense expenditures might enter the foreign aggregate production function.

Chapter Four applies two distinct time-series techniques, linear feedback measures and error correction models, to examine the U.S. expenditures-receipts nexus along with the government size issue. In a *nominal* sense, the application of error correction models primarily confirms that total expenditures and total receipts are caused by each other and the application of linear feedback measures, a new attempt in the literature, suggests that control of total receipts might be the key to the effective control of government size. Finally, we conclude that *empirical* specification of government size for whatever purpose should first consider the expenditures-receipts relation to ensure proper specification of government size.

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The six-year journey of graduate study in the U.S. has finally reached the end. During this lengthy process, I have incurred considerable debts to a number of people. I owe my greatest debt to my father, Mr. Hsu-chu Lin, whose constant sacrifice cannot be fully recompensed. My adviser, Professor John E. Anderson, is a flawless mentor, whose unfailing advice and comprehensive supervision are heartily acknowledged. I am also very grateful to Professor Mary G. McGarvey, who has devoted a great deal of time and effort to helping me. Further, I am indebted to Professor Craig R. MacPhee for his support, in many different ways, throughout my study. I also would like to express my gratitude to Professor Matthew J. Cushing, who has offered useful and constructive suggestions from time to time. A special vote of thanks is due to Professor Paul Shoemaker for his editorial comments on the entire manuscript. I also wish to thank my mother, Ms. Mei-yu Huang, and brother, Chi-yun, for their steadfast support. I must also acknowledge my wife, Hui-fong, and son, Yow-chang, who have suffered at several stages of my study. Finally, the completion of this work, I hope, is nothing more than the start of my research career.

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CHAPTER ONE

INTRODUCTION

1.0 Introduction

For the empirical investigation of the size and growth of government it is essential to first recognize what is meant by the term "government size." Several measures of government size, as a matter of fact, have been frequently used in the literature because no single measure can clearly explain the concept.

In the U.S., for example, if we measure government size as the ratio of total government expenditures (receipts) to GDP, we are able to observe a growing trend whether we use an expenditures or a receipts measure of the extent of government size. As shown in Table 1.1, total U.S. government expenditures (receipts) in 1994 as a percentage of GDP is 32.00 percent (30.69), up from 22.99 percent (25.39) in 1959.

On the other hand, if we measure government size as the ratio of government consumption expenditures (i.e., government purchases of final goods and services) to GDP (as shown in Table 1.2), total U.S. government consumption expenditures as a percentage of GDP has hardly grown at all

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since the late 1950s. Total government expenditures consist of government consumption expenditures and transfer payments.[1] Consequently, it is obvious that the ratio of transfer payments to GDP has grown for the U.S. over the 1959-1994 period. Therefore, empirical studies of "government growth" should be clearly classified according to the way government size is specified.

Furthermore, there are large differences in the pattern of government growth across countries even if observed with the same measure of government size. As Table 1.3 shows, using the Mark 5.5 version of the popular "Penn World Table" data set,[2] the size of government has grown for Mexico but has shrunken for Taiwan.[3] For the U.S., we observe a non-growing pattern of government size. For China, the size of government seems to be stable over time.

1.1 Literature Review of the Size and Growth of Government

Structural explanations of the size and growth of government in the literature can be divided into two

---

[1] In the U.S., transfer payments include unemployment compensation, social security and welfare benefits, interest payments on debt, and other transfers.

[2] Penn World Table Mark 5.5 is obtained from Internet. Other previous versions are sequentially available in Summers, Kravis, and Heston (1980, Mark 1), Kravis, Heston, and Summers (1982, Mark 2 was used), and Summers and Heston (1984, Mark 3, 1988, Mark 4, 1991, Mark 5). See Chapter Two for a more detailed explanation of this data set.

[3] This government size series contains no transfer payments component.

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strands.[4] The first strand posits that government activities fully reflect the preferences of citizens. Based upon Wagner's hypothesis of "increasing state activity", the size of government will become larger as income grows.[5] Empirical studies of Wagner's Law can be found, for instance, in Mann (1980), Ram (1986a,1987), Gemmell (1990), Nagarajan and Spears (1990), Gyles (1991), Murthy (1993,1994), Ashworth (1994), and Hayo (1994).

Baumol (1967) postulates that the public sector is labor-intensive and characterized by low technical progress. The relative costs of government-provided goods would rise over time and lead to government growth. Empirical testing of this so-called Baumol "cost disease" model can be found, for example, in Saunders and Klau (1985) and a modified model is presented in Baumol, Blackman, and Wolff (1985). Contrary to Baumol's explanation of government growth, Kau and Rubin (1981) argue that decreasing costs of tax collection over time result in government growth. More recently, West (1991) has tried to develop a more generalized theory of government size by integrating the government cost theories.

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[4] As most of the theories of government size are not mutually exclusive, it should be mentioned here that this dichotomy is by no means definitive. However, in terms of the scope and complexity of the topic, this distinction can give us a clear view of the developments in the literature. Mueller (1987) also uses a similar approach to explain the size and growth of government.

[5] Bird (1970) or Bird (1971) provides a full discussion of Wagner's Law.

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Another line of research is rooted in the models developed by Downs (1957), Black (1958), Borcherding and Deacon (1972), Bergstrom and Goodman (1973), and Borcherding (1985) that apply the "median voter" theorem to study the issue of government expenditures. The median voter is the decisive citizen who determines the amount of public goods in the community. If his (or her) income elasticity of demand for public goods is greater than one, then the size of government becomes larger as his (or her) income rises.

Studies that rely on the median voter, as in Roberts (1977) and Meltzer and Richard (1978,1981,1983), emphasize the difference between the mean and median income. Unlike previously discussed studies, they use the share of income redistributed by the government to explain government growth. Peltzman (1980) also relies on income distribution to explain government growth. They all find empirical support for their hypotheses of government size.

Also, the size of government might respond to the influence of interest (or pressure) groups. Becker (1983,1985) links interest group activity to government activity but avoids taking the political process into his model. Mueller and Murrell (1986) present empirical evidence that interest groups affect the size of government. Coughlin, Mueller, and Murrell (1990) develop an election

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model with unequal interest group influence, explicitly taking the political process into account.

The second major strand of explanation of government size presumes that government activities reflect the preferences of the government, or bureaucrats who run the government, rather than those of the citizens. Peacock and Wiseman (1961) use the "displacement effect" to explain government growth. "Social disturbances" such as wars increase the bureaucratic power and lead to a permanent rise in government size. Peacock and Wiseman (1979) claim that the displacement effect is, in fact, a *theory of structural breaks*. Empirical evidence of the displacement effect can be found in Diamond (1977).

Niskanen (1971,1975) develops a model of bureaucracy and hypothesizes that bureaucrats maximize their expected budgets. Romer and Rosenthal (1978, 1979, 1982) move a step further and develop a monopoly model that bureaucrats can use their monopoly power to threaten the voters so as to achieve a higher level of government expenditures.

A famous hypothesis in this framework is the so-called "Leviathan hypothesis", advanced by Brennan and Buchanan (1977,1978,1980). Brennan and Buchanan perceive the government as a monolithic revenue-maximizing entity that exploits its citizenry through excessive taxation. The

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