Do Popularity of Topics Spread From Core to Periphery Journals?

Debasis Bandyopadhyay[1]

Abstract

We examine the popularity of competing topics of macroeconomics by tracing publication frequencies of these topics as recorded in the EconLit database over the period from 1969 through 1996. We find some evidence in the data that the popularity of a topic in the core journals relative to the periphery journals decreases as the topic gets old. We, however, find that an increasing interest on a topic in the periphery journals Granger causes an increase in interest on the same topic in the core journals but not vice versa. The evidence, therefore, suggests that the popularity of topics do not gradually spread from the core journals to the periphery journals. Nevertheless, we find that one could economize their literature search by focusing on that smaller set of core journals.

Keywords: EconLit; Core Journals; Macroeconomic Topics; Spread of Popularity

JEL classification: All, A14, B22.

[1]Department of Economics, University of Auckland, Private Bag 92019, Auckland, New Zealand. Email for Debasis Bandyopadhyay: debasis@auckland.ac.nz

1. Introduction

In a recent study, Stigler, *et al* (1995) examine cross citation of journals by authors of various topics of economics using the *Social Sciences Citation Index* (SSCI) over the period from 1987-1990. The study identifies a set of nine core journals. It finds that those core journals get a higher frequency of citation by other journals than the frequency in which they cite others and hence concludes that the core journals intellectually influence other journals. An implication of this finding is that those core journals influence the publication profile of periphery journals. From this implication, one could make a few conjectures such as: 1. A topic is first initiated in the core journals and then the interest on the topic in the core journals relative to the periphery journals decreases as the topic gets older. 2. If an existing topic, old or new, receives additional attention in the core journal as reflected by the change in its publication frequency relative to other topics, the periphery journals follow in future by increasing the relative share of the publication frequency of that topic. 3. The set of core journals constitutes a representative sample of bigger population of all journals.

In this paper we examine the validity of the above three conjectures. The answers to the first two conjectures can be used to justify whether or nor popularity of topics in the core journals spread to the periphery journals and hence have important implications for incipient researchers in economics looking for topics that would generate significant popularity in future. The identification of future direction of interest on a topic could be especially important in areas of macroeconomics that have been experiencing a series of transitions. If the third conjecture is true, one can economize their literature search by focusing on a smaller set of journals. To test these three conjectures as statistical

hypotheses, unfortunately, a database from the SSCI is not useful since the SSCI only provide information about the communication between two journals within topics, ideas or problems. Consequently, we use a database from the Econlit.

The database for our study covers a period from 1969 to 1996. Using a key word search in the EconLit database we compare relative publication frequencies of competing topics of macroeconomics inside the same core journals identified by Stigler *et al* (1995) with those of all journals recorded by the EconLit. By doing this we attempt to trace the extent of interest in the profession regarding specific topics or ideas as opposed to specific authors or specific journals. We ask if the topics, when they are relatively new, generate relatively more popularity in the above set of core journals than in the periphery journals and if the interest on a topic in the core journals relative to the periphery journals gets less as the topic gets older. We argue that if the core journals introduce new topics and influence the publication profile of topics in the periphery journals then we would detect a general declining trend in the index of relative popularity on topics and ideas over time. In other words the index of relative popularity and the age of a topic will be negatively related. We find some evidence to support that evidence in the data that we looked at. In addition, if the core journals influence the rest then among the existing topics of all ages, an increase in interest on any existing topics in the core journals would rejuvenate popularity on those topics in the remaining journals. However, our analyses of the sample of 20 topics in macroeconomics show that an increase in interest on those topics in the core journals does not Granger cause a corresponding increase in interest in the periphery journals. On the contrary, we find that an increase in interest on those topics in the periphery journals Granger causes a corresponding increase in interest in the core journals. We conclude, therefore, that the popularity of topics in

macroeconomics do not spread from the core journals to the rest, at least for the 20 topics in macroeconomics that we consider. Despite this empirical result, the EconLit search reveals that the set of core journals does constitute a representative sample of the bigger population of all journals. This finding suggest that whether or not topics flow from the core journals to the periphery journals, one can nonetheless economize their literature search by focusing on a smaller set of journals.

2. Data and Methodology

We refer to the nine influential journals identified by Stigler, *et al* (1995) as the core journals[2] and the population of all journals recorded in the EconLit as all journals. Consequently, we refer to all journals excluding the core journal as the periphery journals. We identify each topic by a set of key words. We define, for each topic j at year t, an index of popularity by the weights c_t^j and p_t^j that measure, respectively, the percentage of core journal articles and that of periphery journal articles recorded in the EconLit under the specific key words representing the topic. Let r_t^j denote the ratio of c_t^j to p_t^j. By definition, the value of r_t^j represents relative popularity or, in particular, interest on topic j at year t inside the core relative to the periphery journals. Thus for each topic j at each year t we have two separate indices c_t^j and p_t^j of absolute popularity, respectively, in the core and periphery journals and one index of relative popularity between the twp sets of journals. The data sets used in this paper are annual observations from 1969 to 1996 for twenty macroeconomic topics which are listed in the appendix. These twenty topics represent leading ideas, major issues and key tools of analysis that are usually

[2] See the appendix for the list of them.

covered in an intermediate macroeconomics textbook such as Auerbach and Kotlikoff (1995), Barro (1993), and Mankiw (1994).

In this paper we ask three questions: How does the index r_t^j of relative popularity of a topic evolve over time? Does a change in interest on a topic as reflected by the change in its share of publication frequency in the core journals at any data leads to a corresponding change in interest on that topic in the periphery journals at some future date? Does the set of core journals constitute a representative sample of all journals? The first two questions are directly motivated from the findings by Stigler, *et al* (1995) where the nine core journals intellectually influence the periphery journals by exporting more references outwards. Consequently, one would believe the core journals influence the publication profile of periphery journals and hence the popularity of topics spread from the core journals to the periphery journals. There are three implications of the above manner in which popularity of topics flow in the literature. First, core journals innovate new topics. Second, the interest on the topics in the core journals relative to the periphery journals gets less when the topics become older. In other words, r_t^j is a decreasing function of the age of a topic and hence time t. Third, the popularity of a topic in the core journals has a positive effect on the interest on the same topic in the periphery journals in the next period. We have to stress, however, that none of these three questions by itself can answer the question whether or not there is the outward spread of topics from the core journals to the rest. The first two questions only concerns the pattern of relative popularity and says nothing about the communication between journals, while the third question does concern the direction of movement of topics between journals but not necessarily imply any time series pattern of relative popularity. A positive answer to the third equation could justify one's attempt to

economize the literature search by focusing on that smaller set of core journals.

To answer the first question we run the following OLS regression for each topic j[3] α and β depend on j. For simplicity of notation we omit subscript j from α^j and β^j

$$r_t^j = \alpha + \beta t + \epsilon_t^j. \tag{2.1}$$

If the core journals intellectually influence the periphery journals, as the main producers of new ideas the core journals tend to first introduce new topics while as the main consumers of existing ideas the periphery journals gradually pick up the popularities of the topics. Such a conjecture amounts to a negative value of β in equation (2.1). Hence, we test the hypothesis that $\beta = 0$ against $\beta < 0$.

To answer the second question, we do a Granger causality test between popularity on a topic in the core journals and that in the periphery journals. If the core journals influence the publication profile of the periphery journals, when a topic gets increasing popularity in the core journals in this period it tends to receive more popularity in the periphery journals in the following periods. This means that c Granger causes p but not the other way around. Hence, we run the following two OLS regressions for each topic j

$$p_t^j = \alpha + \beta_1 p_{t-1}^i + ... + \beta_l p_{t-l}^i + \gamma_1 c_{t-1}^j + ... + \gamma_l c_{t-l}^j + \epsilon_t^j \tag{2.2}$$

and

$$c_t^j = \alpha + \beta_1 c_{t-1}^i + ... + \beta_l c_{t-l}^i + \gamma_1 p_{t-1}^j + ... + \gamma_l p_{t-l}^j + \epsilon_t^j \tag{2.3}$$

In both equations, the optimal lag length l is chosen by the Schwartz information

[3] We should note that both

criterion (SIC) proposed by Schwartz (1969). Rejection of the point hypothesis that $\gamma_1 = ... = \gamma_l = 0$ in equation (2.2) implies that c Granger causes p while rejection of the joint hypothesis that $\delta_1 = ... = \delta_l = 0$ in equation (2.3) implies that p Granger causes c.

Finally, to answer the last question, we examine if the life-cycle of interest on a topic exhibits a similar pattern whether we look at the core journals or the periphery journals. We do this by running the following OLS regression for each topic j

$$p_t^j = \alpha + \beta_1 c_t^i + \epsilon_t^j \tag{2.4}$$

A positive β for each topic would imply a positive answer to the third question. Hence, we test the hypothesis that $\beta = 0$ against $\beta > 0$.

Of note is that c_t^j, p_t^j and r_t^j in the above regression models are highly serially correlated time series. It is known that in small samples the normality may not be a good approximation. If the normality assumption does not hold, the OLS standard error can not be used to make inference. Bootstrap is an appealing way to avoid excessive reliance on asymptotic normal distribution. In this paper we use bootstrap to obtain the bias-correlated and adjusted (BCa) percentiles of estimates with 1,000 of resamples. See Shao and Tu (1995) for more detailed descriptions of bootstrapping method.

3. Revised Methodology

Question one: How does the index $\left(\frac{c_t^j}{\mu+p_t^j}\right)$ of relative popularity of a topic evolve over time?

$$\frac{c_t^j}{\mu + p_t^j} = \alpha + \beta t + \varepsilon_t \tag{1}$$

μ is the minimum publication level in periphery journals on certain topic. To answer the first question we run the following OLS regression for each topic j.[4] If the core journals intellectually influence the periphery journals, as the main producers of new ideas the core journals tend to first introduce new topics while as the main consumers of existing ideas the periphery journals gradually pick up the popularities of the topics. Such a conjecture amounts to a negative value of β in equation (1). Hence, we test the hypothesis that $\beta = 0$ against $\beta < 0$.

Question two: Does a change in interest on a topic as reflected by the change in its share of publication frequency in the core journals at any date leads to a corresponding change in interest on that topic in the periphery journals at some future date?

To answer the second question we do a Granger causality test between popularity on a topic in the core journals and that in the periphery journals. If the core journals influence the publication profile of the periphery journals, when a topic gets increasing popularity in the core journals in this period it tends to receive more popularity in the periphery journals in the following periods. This means that c Granger causes p but not the other way around. Hence, we run the following two OLS regressions for each topic j

$$p_t^j = \alpha + \beta_1 p_{t-1}^j + ... + \beta_l p_{t-l}^j + \gamma_1 c_{t-1}^j + ... + \gamma_l c_{t-l}^j + \varepsilon_t \tag{2}$$

[4] We should note that μ, α and β depends on j. For simplicity of notation we omit subscript j.

and

$$c_t^j = \alpha + \beta_1 c_{t-1}^j + ... + \beta_l c_{t-l}^j + \delta_1 p_{t-1}^j + ... + \delta_l p_{t-l}^j + \varepsilon_t \tag{3}$$

In both equations, the optimal lag length l is chosen by the Schwartz information criterion (SIC) proposed by Schwartz (1969). Rejection of the joint hypothesis that $\gamma_1 = ... = \gamma_l = 0$ in equation (2) implies that c Granger causes p while rejection of the joint hypothesis that $\delta_1 = ... = \delta_l = 0$ in equation (3) implies that p Granger causes c.

Question three: Does the set of core journals constitute a representative sample of all journals?

Finally, to answer the last question, we examine if the life cycle of interest on a topic exhibits a similar pattern whether we look at the core journals or the periphery journals. We do this by running the following OLS regression for each topic j

$$p_t^j = \alpha + \beta c_t^j + \varepsilon_t \tag{4}$$

A positive β for each topic would imply a positive answer to the third question. Hence, we test the hypothesis that $\beta = 0$ against $\beta > 0$.

4. Empirical Results

In this section we present the empirical results from the testing three hypothesis *** for nineteen topics of macroeconomics. The sixth and seventh column of Table 1 present the point estimate of β and the t-statistics. Out of nineteen topics, thirteen topics offer a negative point estimate and four of them are significantly less than zero.[5] ***

[5] Using the same method, we also find that two topics have a significantly positive β.

The ninth and tenth column of Table 1 present the optimal lag length and p-value of the F-statistic from the hypothesis $\gamma_1 = ... = \gamma_l = 0$ in equation (2) while the eleventh and twelfth column present the optimal lag length and p-value of the F-statistic from the hypothesis $\delta_1 = ... = \delta_l = 0$ in equation (3). Noticeably, the optimal lag length tends to be small in both equations. Surprisingly, out of nineteen topics, for only three topics c Granger causes p.[6] On the other hand, however, for fifteen topics p Granger causes c. The result suggest that if a topic gains relatively more popularity in the periphery journals it also draws attention in the core journals in the following periods. The reverse is not true, however. An increase in the index of absolute popularity on a topic in the core journals does not necessarily increase the index of absolute popularity on that topic in the periphery journals in the following periods.

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The last two columns of Table 1 present the estimate of β and the t-statistics for estimation in equation (4). If the core journals constitute a representative sample of all journals, a significant positive relationship between c_t^j and p_t^j is expected over time. Noticeably, for all the topics, we have to reject $\beta = 0$ in favor of $\beta > 0$ at 1% present of significance level. Therefore, there is strong evidence that the core journals indeed constitute a representative sample of all journals. A consequence of this result is that one can economize their literature search by focusing on a smaller set of core journals as opposed to all journals. This last finding may indeed reflect a stable core that characterizes an underlying equilibrium allocation of popularity on topics across all journals in an environment where authors compete to maximize rent from their publications. It may not suggest, however, that the core journals influence the future profile of topics in

[6] They are human capital, life cycle and rational expection.

periphery journals. Nevertheless, to get a snap-shot of the profile of interesting topics in the profession one could economize his/her research by focusing on that smaller set of core journals.

Key words	β	t-stat	Lag	P-value	Lag	P-value	β	t-stat
aggregate demand	-0.037	-2.335*	1	0.350	1	0.000**	0.286	8.950*
business cycle	0.055	3.721	1	0.089	1	0.0000**	0.321	10.175*
debt or deficit	0.016	3.723	1	0.289	1	0.0000**	0.930	13.446*
demand for money	-0.035	-1.946*	1	0.357	1	0.187	0.101	2.974*
economic fluctuation	0.054	2.359	2	0.073	2	0.000**	0.239	6.898*
growth	-0.019	-4.481**	2	0.023*	1	0.000**	0.861	25.585*
human capital	-0.009	-1.449	1	0.584	1	0.000**	0.549	32.749*
inflation	0.004	0.757	1	0.815	1	0.001**	0.347	7.179*
interest rate	0.005	0.534	1	0.858	2	0.017**	0.616	22.453*
investment	-0.004	-1.075	1	0.583	1	0.006**	0.980	25.919*
life cycle	0.033	1.355	3	0.047*	1	0.000**	0.246	12.287*
macro*	-0.023	-4.931**	1	0.236	1	0.000**	0.973	9.083*
monetarism or quantity theory or velocity of money or equation of exchange or demand for money or money demand	-0.036	-2.81*	1	0.210	1	0.358	0.095	2.568*
efficiency wage or implicit contract or adverse selection or menu cost* or moral hazard or imperfect competition or credit rationing or equity rationing	-0.021	-0.885	1	0.923	1	0.001**	0.444	35.961*
permanent income	0.039	1.250	1	0.501	1	0.158	0.086	0.553*
Phillips curve	-0.023	-0.892	1	0.563	1	0.055	0.078	2.233*
rational expectation	-0.053	-1.897*	1	0.045*	1	0.026*	0.290	8.805*

Note: The 4^{th} and 5^{th} column present the point estimate of beta and the one tail t-statistic. The 6^{th} and 7^{th} present the optimal lag length and p-value of the F-statistic from the hypothesis $\gamma_1 = \gamma_2 = \ldots = \gamma_l = 0$ in equation (2.2). The 8^{th} and 9^{th} present the optimal lag length and p-value of the F-statistic from the hypothesis $\delta_1 = \delta_2 = \ldots = \delta_l = 0$ in equation (2.3). The last two columns present the estimate of beta and the t-statistic. For equation (2.1) and (2.4): 95% critical value of t-stat (df=30) is 1.697, *means significant at 95% in above table; 99% critical value of t-stat (df=30) is 2.457, **means significant at 99% in above table. For Equation (2.2) and (2.3): if p-value is less than 0.05, reject the null at 5% level, with*; if p-value is less than 0.01, one can reject null at 1% level, with **.

5. Empirical Results

In this section we present the empirical results from testing three hypotheses specified in Section 2 for twenty topics of macroeconomics. The second and third column of Table 1 present the point estimate of β and 95% percentile of $\hat{\beta}$ in equation (2.1). Out of twenty topics, thirteen topics offer a negative point estimate and ten of them are significantly less than zero[7]. The finding presents some evidence for the hypothesis that popularity on the topics in the core journals relative to the periphery journals decrease over time.

The fourth and fifth column of Table 1 present the optimal lag length and p-value of the F-statistic from the hypothesis $\gamma_1 = ... = \gamma_l = 0$ in equation (2.2) while the sixth and seventh column present the optimal lag length and p-value of the F-statistic from the hypothesis $\delta_1 = ... = \delta_l = 0$ in equation (2.3). Noticeably, the optimal lag length

[7] Using the same method, we also find that three topics have a significantly positive

tends to be small in both equations. Surprisingly, out of twenty topics, for only two topics c Granger causes p[8]. On the other hand, however, for sixteen topics p Granger causes c. the results suggest that if a topic gains relatively more popularity in the periphery journals it also draws attention in the core journals in the following periods. The reverse is not true, however. An increase in the index of absolute popularity on a topic in the core journals does not necessarily increases the index of absolute popularity on that topic in the periphery journals in the following periods.

The empirical results from the hypothesis testing on equations (2.1), (2.2), (2.3) are quite interesting. On the one hand, we find some evidence that the topics tend to be first initiated in the core journals and then popularity on the same topics in the core journals relative to the periphery journals decrease when the topics get older. On the other hand, we find very weak evidence that a gain of interest on a topic in the core journal leads to a gain in the periphery journal, but find very strong evidence that a gain of interest of a topic in the periphery journal leads to a gain in the core journal. The findings suggest that the popularity of topics do not spread from the core journals to the periphery journals. A plausible explanation of the results could be as follows: when topics or ideas exogenously received increased attention outside the core, several authors try to improve their professional career by publishing a repackaged version of those topics in the core journals.

The last two columns of Table 1 present the estimate of β and the 5% percentile of $\hat{\beta}$ in equation (2.4). If the core journals constitute a representative sample of all journals, a significant positive relationship between c_t^j and p_t^j is expected over time. Noticeably, for only one topic the point estimate of β is negative and for sixteen topics

[8] They are economic fluctuation and rational expectations.

we have to reject the hypothesis that $\beta = 0$ in favour of $\beta > 0$. Therefore, there is strong evidence that the core journals indeed constituted a representative sample of all journals. A consequence of this result is that one can economize their literature search by focusing on a smaller set of core journals as opposed to all journals. This last finding may indeed reflect a stable core that characterizes an underlying equilibrium allocation of popularity on topics across all journals in an environment where authors compete to maximize rent from their publications[9]. It may not suggest, however, that the core journals influence the future profile of topics in periphery journals. Nevertheless, to get a snap-shot of the profile of interesting topics in the profession one could economize his/her research by focusing on that smaller set of core journals.

6. Conclusion

Using the SSCI for the period 1987-1990, Stigler *et al* (1995) conclude that intellectual influence flows outwards from a smaller set of core to a wider set of periphery journals. Consequently, one would believe that the popularity of topics gradually spread from the core journals to the periphery journals. However, the hypothesis can not be tested using the SSCI because SSCI only provide information about communication between two journals. In this paper we, therefore, examine the above conjecture on the inflow of popularity of topics using a database from the EconLit. In particular, we examine the professional popularity on twenty topics of macroeconomics by tracing the relative proportion of publications as recorded in the EconLit database for the period 1969-1996. We find some evidence that an increase in interest on a topic in the pe-

[9] Laband and Piette (1994) also report evidence of existence of a stable core despite a decline in their influence on articles published in other journals.

riphery journals Granger causes an increase in interest on the same topic in the core journals but not vice versa. The finding suggests that the popularity of topics do not gradually spread from the core journal to the periphery journals. We find, however, that one could still economize their literature search by focusing on a small set of core journals identified by Stigler, *et al* (1995).

7. Appendix

Nine core journals:

American Economic Review, Journal of Political Economy, Quarterly Journal of Economics, Economic Journal, Econometrica, Journal of Economic Theory, Journal of Monetary Economics, Review of Economic Studies, Review of Economics and Statistics.

Twenty topics with corresponding key words (if any) in macroeconomics:

Aggregate Demand, Business Cycle, Debt or Deficit, Demand for Money, Economic Fluctuation, Growth, Human Capital, Inflation, Interest Rate, Investment, IS-LM, Life Cycle, Macro, Monetarism (Monetarism, Quantity Theory, Velocity of Money, Equation of Exchange, Demand for Money, Money Demand), Efficiency, Permanent Income, Phillips Curve, Rational Expectation, Saving, Unemployment.

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