

## Economic Development as Problem Solving

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February 2005

\*I thank Boyan Jovanovic for many helpful comments.

### Introduction

There has been a vast recent literature which has emphasized the role of human capital and knowledge on the economic growth process. This paper presents a model where the knowledge occurs through solving "problems." These problems which are partially idiosyncratic to the country. We think of a problem as a new technique or good. Each nation must master the problems associated with an activity in order to achieve productivity increases and growth. We will follow the tradition of learning by doing models where learning occurs after production on a good, or a particular type or grade of a good. Growth occurs by solving or learning about successively harder problems.

What is emphasized in this paper are two issues. First, as is well known, countries can improve their productivity and learn to produce new goods by observing other nations, especially as they solve their own production related problems. Solutions to one country's problem, however, only translate partially help solve one's own country's problems. The growth-enhancing effects of learning from others depends upon how closely related (or correlated) are the problems of one country with those of the others. Second, we introduce the concept of the "direction" of growth in our theoretical model. We consider a situation where countries could choose a number of different directions of growth. They choose the ones that are best for them, given their individual circumstances.

As regards first issue addressed by this paper, the learning from other nations, we are able to model a hypothesis which was described eloquently in the recent best-seller by Jared Diamond "Guns, Germs and Steel:" the East-West versus North-South Axes Hypothesis. A grossly simplified version of this hypothesis says that Europe developed faster than Africa because Europe has a wide East-West axis which allowed for a lot of shared learning among similar countries, an advantage lacked by Africa because of its lying on a North-South axis. On the East-West axis, the geography of countries is similar, so things learned or problems solved at one location are easily transferred to another location on the east-west axis. On a North South Axis however, learning at one site is not readily transferred to another site, because the geography quickly changes - in the African example, from dense forest at the equator, to savannah vegetation and then finally to desert in the North. Not only is the geography different, but perhaps there are natural barriers which will stop the movement of people - the desert for example may restrict movement of people and ideas from the Northern coast of Africa to the forest

regions. This paper will provide a model where, under some parameter values, this Axes hypothesis will be true.

Even if one accepts the Axes hypothesis, one need not obtain the conclusion that the implicit information sharing is always an unmitigated good thing. On the contrary, we will explore situations we will describe as a knowledge trap. In this situation, learning from others may distort the direction of learning and lead to the poorer countries remaining poor and for long run growth to be less than it could have been if learning from others was absent. Because the leading countries are solving their own problems and sharing the solutions with the followers, the followers skew their production and learning in the direction of the leaders. The followers drop some "unsolved" production activities in favor of those solved by the leaders. This results in the followers remaining followers forever.

We also point out that under some situations the leading nations could be better in the long run if the followers had not dropped some of those activities. Indeed, World optimality may require that the poor not be left too far behind on the technological ladders and, further, that the followers continue with production which is idiosyncratic to and better for the followers .

This issue of a knowledge trap is related to the debate on foreign aid and economic development of poorer countries. When outsiders advise locals on how to organize their internal economies, there are two issues related to learning. First, by solving problems for locals, the outsiders may be preventing the locals from benefiting from learning by doing. Second, the outsiders may be proposing solutions which work in their own countries, and which they are the most familiar with. With this external learning on outsider's technologies, the locals may, ex post, find it optimal to develop in the direction proposed by the outsiders. Under some parameter values this will lead to lower long term growth in comparison to if the locals had been allowed to develop their own economies using local methods.