Chapter 76
Intellectual Property Regulation, and Software Piracy, a Predictive Model

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ABSTRACT

In recent years, a number of studies have considered the impact of IPRs on software piracy, specifically TRIPS and more recently U.S. USTR 301 reporting, pursuant to the Trade Act. The work of Shadlen (2005) supports the assertion that a number of recent IPR reforms directly influence rates of copyright infringement. Shadlen (2005) is a significant study into the impact of the IPRs such as TRIPS, Out of Cycle reviews and USTR 301 reporting on software piracy. The study identified a number of key IPR reforms and sought to determine the impact of IPR reform differentials on observed piracy rates. The current study extends upon Shadlen (2005), comparing the pooled panel model framework to an alternative model of prediction, a backward propagation, multilayer perceptron network model. The analysis conducted herein focuses specifically on ASEAN member countries. The study employs the Garson (1991) and Goh (1995) methods of independent variable analysis to offer further insight into relative importance of the IPR reform variables.

INTRODUCTION

While a number of factors influence software piracy, there is little doubt that current piracy behaviours have a bearing on software piracy. This has been the basis for much research (Peace, Galletta & Thong, 2003; Seale, Polakowski & Schneider, 1998); however, little is known about the degree to which IPRs moderate copyright infringement rates, and in particular the pervasive problem of software piracy. It is likely that multilateral agreements, trade flows and pertinently intellectual property rights and enforcement activities all moderate the observed rates of piracy. Much of the research considering these matters is qualitative in nature. Kenneth Shadlen conducted a significant study into the impact of a number of IPR reforms, and macroeconomic variables on software piracy.[1] The study appeared to be impacted by

DOI: 10.4018/978-1-7998-3016-0.ch076

aggregation biases. Additionally, the Shadlen specifications did not address the existence of unit roots within the dataset. Shadlen (2005) considered software piracy over a ten-year period. Adopting a pooled panel regression model, the study asserted the significant of WTO cases and TRIPS to software piracy rates. .

The present study shall extend upon Shadlen's worthwhile research by firstly considering the direction and strength of the claimed associations noted by Shadlen (2005)[2], employing a highly sophisticated and accurate set of estimation techniques. The study shall employ a series of novel parametric estimation techniques that provide potentially superior estimators while accommodating the challenges of the available data. Pertinently, the study will then consider Shadlen's existing model and posit an alternative: a multilayer neural network model. This modelling technique can potentially provide more accurate predictive outcomes. An artificial neural network is best understood as a structure that seeks to replicate a neuron. Mathematically, it is simply a series of weighted, aggregative, non-linear values that have the potential to provide more accurate predictive outcomes than traditional parametric estimation techniques, as well as alternative non-parametric techniques.

Such methods are employed frequently in the social sciences but remain relatively uncommon within legal research. Importantly, there remains a genuine shortage of research considering pertinent empirical matters, such as the impact of IPRs and the role of trade dependence on piracy rates judicial outcomes; and an even greater dearth of literature positing practically framed deterministic models of judicial outcomes. The current study responds to both the noted dearth of deterministic research and the dearth of empirical work considering these matters.

The present study adopts a relatively uncommon predictive method in framing a software piracy prediction model, and as such, the paper will detail the manner in which such models can be employed in legal research generally, a further contribution of this chapter. The structure of the chapter is as follows: firstly, the chapter will introduce the extant software piracy research, detailing both the nature of the findings and the methods employed. The chapter will then offer an overview of the artificial neural network method and its potential benefits for intellectual property research. The following sections will detail the data, methodology, exploratory estimations and the findings of the research, as well as the potential implications for future research, noting the papers focus on ASEAN member countries.

SOFTWARE PIRACY AND EMPIRICAL METHODS, A PRÉCIS

The general definition of software piracy (for the sake of disambiguation) refers to an individual who illegally copies commercially available software, with the intent to avoid the software cost, or when an individual without authorisation creates copies of an organization's internally developed software for either personal use or distribution (Higgins & Makin, 2004; Straub, 1990; Britz, 2004). It is estimated that the cost of piracy exceeded 11 billion USD in 1997 (Software Piracy Report, 1997).

Andres (2006) investigated the degree to which inequality of income moderates national piracy rates across a sample of 34 countries. The study asserted that economic inequality appears to have both a negative and a significant effect on national rates of piracy. Furthermore, the research findings indicate that income and education are not important determinants of piracy rates (Andres, 2006). This assertion will be considered within the present study. The Andres (2006) study omits the potentially pertinent impact of trade relationships and USTR 301 reporting.