รายงานผลการวิจัย

RESEARCH REPORT SERIES

Number 25

Demand for Alcoholic Beverages in Thailand : A Cross-Sectional and Time Series Study on Demand for Mekhong Whisky

by

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THAMMASAT UNIVERSITY
BANGKOK

THAMMASAT UNIVERSITY November 1980

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July, 1980

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บทคัดย่อ

การศึกษานี้เพื่อจะทราบแบบแผนการบริโภค (consumption patterns) และอุปสงค์สำหรับแม่โขง ซึ่งเป็นสุราที่เป็นที่รู้จักกันแพร่หลายที่สุดในประเทศไทย การศึกษานี้ได้แบ่งออกเป็น ๓ ส่วน ส่วนที่หนึ่ง เป็นการศึกษาถึงการบริโภคสุราโดยทั่วไป ส่วนที่สอง เป็นการวิเคราะห์ในเชิงเศรษฐมิติแบบ cross section และส่วนที่สาม เป็นการวิเคราะห์เชิงเศรษฐมิติเช่นเดียวกัน แต่เป็นแบบ Time series ผลของการศึกษาสรุปได้ดังนี้.-

ส่วนที่หนึ่ง : การบริโภคโดยทั่วไป แม่โขงเป็นที่รู้จักดีทั่วประเทศ แต่การบริโภคแม่โขงเป็นปริมาณมากอยู่ในเมืองเป็นส่วนใหญ่ ในปี ๒๕๒๐ แม่โขงเฉพาะบริโภคในกรุงเทพฯ ประมาณ ๓๓.๔ เปอร์เซ็นต์ของจำนวนที่บริโภคทั่วประเทศ ถ้าจะดูในรูปของการบริโภครายเฉลี่ยต่อหัว และแบ่งตามภาคต่าง ๆ แล้ว จะพบว่า ในภาคกลาง ปริมาณบริโภคเฉลี่ยต่อหัวสูงที่สุด อันดับสองคือ ภาคเหนือ อันดับสามคือ ตะวันออกเฉียงเหนือ และอันดับสี่คือ ภาคใต้ เป็นที่น่าสังเกตุว่า ภาคใต้เป็นภาคที่การบริโภคต่อหัวต่ำที่สุด เป็นเพราะว่าการบริโภคสุราแม่โขงในสี่จังหวัดซึ่งนับถือศาสนาอิสลามนั้นต่ำมาก จึงทำให้อันดับของภาคใต้มาหลังสุด และอาจจะเป็นไปได้เช่นเดียวกันว่า การลักลอบสุราต่างประเทศเข้ามามีมากในภาคใต้ เพราะภูมิประเทศเป็นฝั่งทะเลยาวเหยียด ซึ่งง่ายแก่การลักลอบนำเข้า การบริโภคแม่โขงในภาคใต้จึงเป็นลักษณะพิเศษ ถ้าพูดโดยทั่วไปแล้วการบริโภคแม่โขงจะมีมากในเมือง ซึ่งประชาชนมีรายได้ค่อนข้างสูง เราจึงเชื่อสมมติฐานที่ว่า แม่โขงเป็นสินค้าบริโภคที่มีความยืดหยุ่นต่อรายได้สูง และการบริโภคมีความสัมพันธ์กับความเป็นเมือง (urbanization) ซึ่งมีรายได้ต่อหัวสูง

ขนาดของขวดแม่โขงมีความสำคัญต่อแบบแผนการบริโภคด้วย คือ แม่โขงขวดกลางนิยมแพร่หลายที่สุดในทุกภาค อย่างไรก็ตาม ภาคที่มีรายได้สูงกว่าบริโภคขวดใหญ่ ในสัดส่วนที่มากกว่าภาคที่มีรายได้ต่ำกว่า ในกรุงเทพฯ นิยมขวดใหญ่ในสัดส่วนที่ค่อนข้างสูง และขวดใหญ่ก็นิยมบริโภคในเมืองมากกว่าชนบท

ผู้ที่ซื้อสุราแม่โขงขวดเล็ก เมื่อคิดราคาต่อเทแล้ว จะเป็นผู้ที่ซื้อในราคาที่แพงที่สุด ทั้งนี้เพราะขวดเล็กราคาต่อเทสูงที่สุด ซึ่งเป็นจริงทั่งทั้งประเทศ ผู้ที่ยากจนซึ่งมักจะดื่ม

ขวดเล็กจึงเป็นผู้ที่ผู้ที่ซื้อแม่โขงในราคาที่แพงที่สุด แต่เป็นที่น่าสังเกตุว่าราคาขายปลีกของสุราแม่โขงในกรุงเทพฯ สูงกว่า ราคาในต่างจังหวัด ทั้ง ๆ ที่สุราแม่โขงแท้จริงแล้วผลิตในกรุงเทพฯ ดังนั้นจึงอาจชี้ให้เห็นว่า ปัจจัยทางด้านอุปทาน เช่น ค่าขนส่ง และโสหุ้ยในการผลิตมีส่วนในกำหนดราคาแม่โขงน้อยกว่าปัจจัยทางด้านตลาดและอุปสงค์

การลักลอบ และสุราเถื่อนเป็นปัจจัยหนึ่งที่สำคัญซึ่งจะตัดทิ้งเสียมิได้ โดยเฉพาะในจังหวัดซึ่งอยู่ใกล้ชายแดนไทย-เขมร และชายแดนไทย-มาเลเซีย เพราะเป็นที่น่าสังเกตุว่า การบริโภคต่อหัวค่อนข้างจะต่ำมาก อาจจะเนื่องจากการลักลอบนำสุราต่างประเทศเข้ามาบริโภคแทนแม่โขงอย่างแพร่หลายในจังหวัดเหล่านั้นก็ได้ และเป็นที่น่าสังเกตุว่าจังหวัดที่มีโรงกลั่นสุรามากจะมีระดับการทำผิดกฎหมายสูง (high level of illegal activity) ซึ่งอาจจะอธิบายด้วยเหตุผลนานาประการ อย่างไรก็ตาม การทำผิดกฎหมาย เช่น การลักลอบกลั่นสุราและมีน้อย ในจังหวัดที่นับถือศาสนาอิสลามในภาคใต้ แต่มีมากที่สุดในภาคเหนือ และนี่อาจจะเป็นเหตุผลสำคัญที่อธิบายว่า ทำไมราคาขายปลีกของสุราแม่โขงในท้องที่ภาคเหนือจึงมีราคาต่ำที่สุด

ในระหว่างปี ๒๕๑๒ - ๒๕๒๐ ภาคเหนือเป็นภาคที่บริโภคสุราแม่โขงเพิ่มขึ้นในอัตราที่สูงที่สุดกว่าภาคใด ๆ และการบริโภคสุราแม่โขงขนาดกลางเพิ่มขึ้นมากกว่าขนาดอื่น ๆ ภาคใต้เป็นภาคที่อัตราเพิ่มต่ำที่สุด

ถ้าหากจะเปรียบเทียบการบริโภคแม่โขงกับการบริโภคเบียร์แล้ว เราพบว่าภาคกลางเป็นภาคที่บริโภคเบียร์เฉลี่ยต่อหัวสูงที่สุด ภาคใต้อยู่ในอันดับรองลงมา ภาคเหนืออันดับสาม และภาคตะวันออกเฉียงเหนืออันดับสี่ ถ้าจะเอาการบริโภคแม่โขงเฉลี่ยต่อหัวหารด้วยการบริโภคเบียร์เฉลี่ยต่อหัวเป็นรายภาคแล้ว จะเห็นได้ว่า การบริโภคเบียร์ในภาคกลางและภาคใต้มากกว่าในภาคเหนือและตะวันออกเฉียงเหนือ นั่นก็หมายความว่า การบริโภคเบียร์โดยเฉลี่ยจะสูงในภาคที่มีรายได้ที่สูง และจะน้อยกว่าในภาคที่มีรายได้ต่ำกว่า เราจึงมีความเชื่อว่า เบียร์ในประเทศไทยถ้าพูดตามหลักเศรษฐศาสตร์แล้วเป็นสินค้าประเภท

ค่อนข้างจะฟุ่มเฟือย ในภาคตะวันออกเฉียงเหนืออัตราส่วนการบริโภคแม่โขงต่อหัวกับการบริโภคเบียร์ต่อหัวเท่ากับ ๑.๑๗

เมื่อมาพิจารณาราคาเบียร์ เราพบว่า ราคาเบียร์ขึ้นลงมิได้เป็นไปตามการเพิ่มหรือลดของอุปสงค์ในตลาดเท่าใดนัก ในภาคกลางซึ่งมีประชาชนบริโภคเบียร์ต่อหัวสูงที่สุด แต่ราคาเบียร์กลับต่ำกว่าภาคอื่น ๆ ซึ่งตรงข้ามกับภาคตะวันออกเฉียงเหนือซึ่งการบริโภคเบียร์ต่อหัวต่ำที่สุดกลับมีราคาสูงกว่า แม้ว่า เบียร์จะเสียค่าขนส่งค่อนข้างจะสูงกว่า แต่ระยะทางจากโรงงานถึงผู้บริโภคก็ไม่สามารถจะนำมาอธิบายความแตกต่างของราคา ณ จุดต่าง ๆ ได้เท่าใดนัก

ส่วนที่ ๒ การศึกษาการบริโภคแม่โขงโดยวิธี Cross Section

ในส่วนนี้จะมีการเปรียบเทียบในหลายท้องที่ในระยะเวลาเดียวกับ ผลการศึกษาชี้ให้เห็นว่า ในระยะสั้นราคาแม่โขงไม่เป็นตัวที่สำคัญเท่าใดนักในการกำหนดการบริโภค โดยเฉพาะราคาของแม่โขงขนาดใหญ่และขนาดกลาง แต่กรณีขวดเล็กราคามีความสำคัญในการกำหนดการบริโภคมาก ในกรณีขวดใหญ่และขวดกลางที่ราคามีความสัมพันธ์น้อยต่อการบริโภคอาจจะเนื่องมาจาก (๑) ตัวเลขที่เก็บมาไม่สมบูรณ์ (๒) รัฐบาลควบคุมราคาสุราตลอดเวลา การเปลี่ยนแปลง (price variations) มีน้อย ตามที่เชื่อกันว่าแม่โขงเป็นสุราที่ดื่มสำหรับคนในเมืองและประชาชนในชนบทบริโภคสุราที่ผลิตในท้องถิ่นมากกว่า การศึกษาของเราชี้ให้เห็นว่า ความเป็นเมือง (urbanization) เป็นปัจจัยตัวหนึ่งที่กำหนดการบริโภคแม่โขง โดยเฉพาะสุราแม่โขงขวดใหญ่มีความสัมพันธ์สูงกับความเป็นเมือง และขวดเล็กมีความกับความเป็นเมืองน้อยที่สุด

เป็นไปตามที่คาดหมายสำหรับตัวแปรรายได้ รายได้เป็นตัวกำหนดที่สำคัญในการบริโภคแม่โขง สัมประสิทธิ์ของรายได้สำหรับขวดใหญ่และขวดกลางใหม่พอ ๆ กัน ส่วนสำหรับขวดเล็กสัมประสิทธิ์มีเพียงครึ่งเดียวของขวดใหญ่และขวดกลาง ชี้ให้เห็นว่า

เมื่อรายได้เพิ่มขึ้นคนมีแนวโน้มจะดื่มขนาดใหญ่และขนาดกลางเพิ่มขึ้นมากกว่าขวดเล็ก สุราขาวที่ผลิตในประเทศเป็นสินค้าทดแทนกับแม่โขง โดยเฉพาะแม่โขงขวดใหญ่

คนไทยโดยปกติจะไม่สะสมสุราเพื่อได้บริโภคมากมาย ส่วนมากจะออกไปดื่มนอกบ้าน การศึกษาของเราชี้ให้เห็นว่า ต้นทุนในการเดินทางและติดต่อในการจะได้บริโภคแต่ละครั้งเป็นปัจจัยที่สำคัญอีกตัวหนึ่ง และเป็นต้นทุนที่แท้จริงในการดื่มสุราแม่โข่ง

สุราแม่โขงมีคู่แข่งไม่เฉพาะสุราที่ถูกต้องกฎหมาย สุราเถื่อนก็เป็นคู่แข่งกับแม่โขงด้วย โดยเฉพาะราคาต่ำกว่าแม่โขงทีเดียว แต่ว่าการดื่มสุราเถื่อนที่ผลิตขึ้นในท้องถิ่นเป็นภัยต่อสุขภาพสูงกว่า จึงทำให้การแข่งขันกับแม่โขงมีขอบเขตที่ลดน้อยลง

<u>ส่วนที่ ๓ : ก. การบริโภคเครื่องดื่มที่มันเมาโดยทั่วไป</u>

ในการศึกษาส่วนนี้เราได้ตัวเลขการสำรวจรายได้และรายจ่ายของสำนักงานสถิติ ๒๕๐๕ - ๒๕๐๖ และ ๒๕๑๑ - ๒๕๑๒ เพื่อจะหาความยืดหยุ่นการบริโภคต่อรายได้ เป็นการเปรียบเทียบระหว่างกรุงเทพมหานคร เมืองซึ่งไม่รวมกรุงเทพฯ และส่วนที่ไม่ใช่เมือง (Non - urban) ส่วนที่ไม่ใช่เมืองเป็นส่วนที่จนที่สุด และกรุงเทพฯ ก็รวยที่สุด เราพบว่าในปี ๒๕๐๕ - ๒๕๐๖ ความยืดหยุ่นต่อรายได้ในการบริโภคเครื่องดื่มมีนเมาทั้งหลายมีค่า ๐.๕๗๔๒ สำหรับกรุงเทพฯ ๐.๕๐๕๓ สำหรับในเมืองโดยทั่วไป และ ๐.๕๗๐๖ สำหรับท้องถิ่นที่ไม่ใช่เมือง จึงเป็นที่น่าสังเกตว่า เซคเตอร์ที่ค่อนข้างจะรวยมากเช่นกรุงเทพฯ และเซคเตอร์ที่ค่อนข้างจนมากที่ไม่ใช่เมือง มีสัมประสิทธิ์ความยืดหยุ่นต่อรายได้สูง

สัมประสิทธิ์ความยืดหยุ่นต่อรายได้สำหรับเครื่องดื่มมีนเมาทั้งหลาย สำหรับปี ๒๕๑๑ - ๒๕๑๒ เท่ากับ ๐.๘๐๒๔ ซึ่งใหญ่กว่าสัมประสิทธิ์ของปี ๒๕๐๕-๒๕๐๖ อย่างไรก็ตาม ตัวเลขนี้อาจจะไม่เปรียบเทียบกันได้ทีเดียว แต่ทิศทางของการเปลี่ยนแปลงน่าจะ

จะเป็นสิ่งที่น่าสนใจ และเป็นทิศทางที่ถูกต้อง

ส่วนที่ ๓ : ข การวิเคราะห์แบบ Time Serics

เราพยายามนำเอาตัวแปรต่าง ๆ มาทดสอบในการคำนวณที่จะว่าความยืดหยุ่นไขว้ สำหรับอุปสงค์ของแม่โขง เช่นนำราคาเบียร์ ราคาเครื่องดื่มธรรมดา (Soft Drinks) และราคาของวิสกี้ที่นำเข้าจากต่างประเทศ เราพบว่า โดยทั่วไปแล้วสัมประสิทธิ์ของความยืดหยุ่นไขว้ไม่มีนัยสำคัญทางสถิติ อย่างไรก็ตาม จากการศึกษาของเราชี้ให้เห็นว่า ราคาที่แท้จริงของแม่โขง กับรายได้ต่อหัวโดยแท้จริงเป็นตัวแปรที่มีนัยสำคัญทางสถิติ กล่าวคือ ถ้าราคาที่แท้จริงของแม่โขงเพิ่มขึ้นหนึ่งบาท ปริมาณแม่โขงที่บริโภคต่อหัวจะลดลงเท่ากับ ๐.๐๐๓๑๕๖๐๙ เท และถ้ารายได้ต่อหัวที่แท้จริงเพิ่มขึ้นหนึ่งบาท จะทำให้การบริโภคแม่โขงต่อหัวเพิ่มขึ้นเท่ากับ ๐.๐๐๐๒๗๑๗๕ เท

เมื่อเราทดสอบโดยใช้ลอก (log) ฟังค์ชั่น เราพบว่า ความยืดหยุ่นของอุปสงค์ต่อราคาแม่โขงเท่ากับ -๒.๒๑๕๕๘ และสัมประสิทธิ์ความยืดหยุ่นของอุปสงค์ต่อรายได้เท่ากับ ๑.๖๓๔๕๗ ซึ่งแสดงให้เห็นว่า ทั้งความยืดหยุ่นต่อราคาและรายได้ค่อนข้างจะยืดหยุ่นมาก (Elastic)

ในการคำนวณอุปสงค์ของสุราแม่โขง เราค่อนข้างจะผิดหวัง โดยเฉพาะเมื่อราคาของเบียร์และวิสกี้ ดูเหมือนว่าไม่มีบทบาทเท่าที่ควรในฟังค์ชั่นอุปสงค์ของแม่โขง ในที่สุดเราจึงทำวิธีที่เรียกว่า "Extraneous Variable" มาใช้ในการคำนวณ แต่เราก็ผิดหวังอีก เพราะราคาของเบียร์และราคาของวิสกี้ไม่แสดงบทบาทเท่าที่ควรในอุปสงค์ของแม่โขง แต่ราคาของแม่โขงเองยังเป็นตัวแปรที่สำคัญในการกำหนดการบริโภค มากกว่านั้นเรายังได้แปลงตัวแปรทุกตัวให้เป็นดัชนีแล้วใช้วิธี "Extraneous Variable" อีก และเราคำนวณความยืดหยุ่นของอุปสงค์ต่อราคาดัชนีเทียบเคียง (relation price index) เราได้สัมประสิทธิ์เท่ากับ -๓.๓๖๖๘๘ หมายความว่า เมื่อ

เราตัดผลที่เกิดจากรายได้ออกไป (Income Effict Elimination) แล้ว การเพิ่มขึ้นหนึ่งเปอร์เซนต์ของดัชนีราคาโดยเทียบเทียบ (relation price index) จะทำให้ปริมาณแม่โขงที่บริโภคต่อหัวลดลง ๓.๓ เปอร์เซนต์โดยประมาณ

ตัวแปรเกี่ยวกับเวลา (time trend variable) ได้นำมาใช้เพื่อเป็นตัวแทนการเปลี่ยนแปลงในรสนิยม จากการศึกษาของเราพบว่า อุปสงค์สำหรับแม่โขงได้เขยิบขึ้นเมื่อเวลาผ่านไป การเขยิบขึ้นของเส้นอุปสงค์อาจสามารถกลบเกลื่อนอิทธิพลจากตัวแปรอื่น ๆ ได้ แต่เราก็ลำบากถ้าจะวิเคราะห์ให้ละเอียดต่อไป เพราะจำนวน observations มีน้อย และการคำนวณมักจะพบปัญหา Multicollinearity ซึ่งเราได้แก้ไขภายในขอบเขตจำกัด

ABSTRACT

The objectives of this study are mainly to investigate consumption patterns of, and demand for, Mekhong, one of the most popular kind of Whisky in Thailand. The study has been divided into three parts, I. an overview of consumption patterns, II. cross-section analysis, and III. time-series investigations. The main findings are as follows.

Part I: Consumptions Patterns

Mekhong is popular in the whole country but consumption is concentrated largely in urban areas. In 1977, consumption in Bangkok alone was 33.8% of the total for the whole country. In per capita consumption by region, it was found that the central region ranked first, the North came second, the Northeast third and the South was last. It is interesting to note that the South is an exceptional case consumption in Muslim provinces is very low, accounting for much of the difference in ranking. Smuggling of foreign whisky to the South may also be a factor as it can be done easily with a long coastal border. With Mekhong consumption concentrated in urban areas in which relatively high-income people live, we seem to confirm an economic hypothesis that Mekhong is a high income elasticity goods and consumption is closely related to the degree of urbanization and high per capita income.

Bottle size of Mekhong seems to play a role in consumption patterns. That is the middle size of Mekhong is the most popular in all regions. However, richer regions seem to consume more of the bigger sizes than the poorer regions. The Bangkok region shows the highest proportion of the large size bottle, and large size bottles are consumed more in urban areas.

Drinkers of the small-sized bottle of Mekhong paid the highest price per tae. Price per tae is highest for the small bottles everywhere in the Kingdom. It is interesting to see that the retail price of Mekhong in Bangkok is higher than up-country despite the fact that Mekhong is produced in Bangkok. Accordingly transportation cost or other supply factors seem to play a smaller role in price determination than demand and other factors.

The illegal sector is a very important element that cannot be ignored, particularly in the provinces along the Thai-Cambodian border. Also the provinces along the Thai-Malay border show a very low ranking in Mekhong consumption, suggesting the important role of smuggling. In addition, provinces with distillery factories show a high level of illegal activity, which has many possible explanations. The illegal sector is not important in the four Muslim provinces, but is most important in the North. This may be a major factor explaining why the retail price of Mekhong is lowest in the North.

During the 1962-1977 period , the North showed the fastest rate of growth of Mekhong consumption for the whole country , with the rates of growth highest in the medium size bottles. The South shows the smallest rate of growth. In comparision between Mekhong and Beer consumption we found that the Central region shows the highest per capita consumption of Beer, the South , second , the North , third , and the Northeast , fourth . To compare Mekhong consumption with Beer consumption , the rates of consumption per capita of Mekhong to consumption per capita of Beer was calculated . The results indicated that Beer consumption per capita in the Central and in the South is larger than in the North and in the Northeast. /Beer consumption per capita in the higher-income regions is larger than in the poorer regions. Accordingly, we seem to confirm that Beer in Thailand is a luxury goods. In the Northeast the poorest region the rates of whisky to beer consumption is 5.91 , and the ratios are very small in the Central and in the South. Turning to the price of Beer are found that price behaves inconsistently with the demand situation . The Central region , with the highest per capita consumption shows relatively cheaper price , while the Northeast with the lowest per capita consumption shows relatively higher price. Although Beer is costly to transport , the distance from the brewery was found not to explain price variation consistently.

Part II : Cross - Sectional Study of Mekhong Consumption (1977)

In this part , comparisions are made for different areas and groups at the same time . The coefficients of the own price of Mekhong in the short run is not significant for the big and medium bottles, but for the

small bottle it is positive and significant . Generally speaking in the short run the price variable , shows a weak and insignificant relationship with consumption. This might be due to (1) an inaccuracy of the price data , (2) the fact that the government nominally controls the price. It is believed that Mekhong whisky is a drink for urban people while the rural people tend to consume more local whisky than Mekhong. Our study indicates that urbanization is an important element in Mekhong consumption. The coefficients of urbanization show significant and positive relationship. Particularly , the coefficients of the large bottle sales are larges while the small bottles show the weakest relationship with the medium size in between . As expected , the income variable shows a very consistent positive and significant relationship with consumption of Mekhong. For the large and medium sizes the magnitudes of the income variable coefficients are just about the same , but for the small size the coefficient is cut by half. Local white whisky appears to be a consistent substitute for Mekhong, particularly for the large bottles. Thai people do not keep a substantial amount of inventories, thus drinking whisky is usually done outside the home. Our study indicates that the cost of transaction is an important factor determine the real cost of whisky consumption. Mekhong whisky has competition not only from other formal substitutes but also from the informal sector which is partially illegal. The illegal sector has one advantage and also one disadvantage , that is price is very competitive but the health hazard is quite high .

Part III : (A) Consumption of Alcoholic Beverage in General

In one study we investigate consumption of Alcoholic Beverage in general by using Income Expenditure Surveys , 1962-1963 and 1968-1969 to find sectoral income-elasticities of demand for Bangkok , Urban excluding Bangkok , and non-urban , supposedly to be the poorest sector among the three. We found that in 1962-1963 the income elasticities of demand were 0.5792 for Bangkok , 0.5053 for urban areas generally , and 0.5706 for non-urban areas. So the extremely rich sector : Bangkok , and the extremely poor sector : non-urban have relatively high income-elasticity coefficients of demand for Alcoholic Beverages. Income - elasticity of demand for Alcoholic Beverage for 1968-1969 was 0.802911 which was largerthan that of the 1962-1963 period. Data may not be strictly comparable , but the general direction of change is probably correctly shown in these coefficients.

Part III : (B) Time - Series Analysis

A number of specifications were tested with time series data , over the period from 1964-1977 to determine the importance of cross effects among the demand for Mekhong and the prices of beer , soft drinks , and imported whiskys . In general the cross elasticities were not significant. The most straight forward specifications , however , gave reasonable results. If the real price of Mekhong increases by one unit the quantity of Mekhong consumed per adult falls by o.ooo315609 tae,

and an increase in real per capita income per adult by one baht would increase the amount of Mekhong consumed per adult by 0.000271775 tae . By using the nonlinear log-log regression, we found that the direct price elasticity of demand for Mekhong is - 2.21558 and the income elasticity is 1.63457 . That is to say both price and income elasticities of demand for Mekhong are elastic.

In the process of estimating the demand function over time it is disappointing that the prices of beer and whisky did not seem to play a large role in the demand for Mekhong. In the final stage we introduced the " extraneous variable " technique. Again , the outcome is that the prices of beer and whisky are still not important in the demand function of Mekhong , but the price of Mekhong itself is significant. The pure relative price index elasticity of demand for Mekhong is - 3.36688 , meaning that when the income effect has been eliminated from the quantity of Mekhong consumed , the increase in one per cent of the relative price index of Mekhong itself would reduce the quantity of Mekhong consumed by 3.3 per cent approximately. A time trend variable was introduced as a surrogate for changes in tastes. The demand function does appear to have shifted upward with respect to time , perhaps enough to dominate the effects of the other variables. As usual , however the analysis is complicated by the common problem of multicollinearity.

ACKNOWLEDGEMENTS

Many people and organizations have contributed in diverse ways to the completion of this research undertaking. Our major debt is to the research committee of the Faculty of Economics, Thammasat University for funding this research project that made this study possible and for their constructive suggestions.

Thanks are also due for our research assistants namely, Pornpen Vorasiha, Thanes Nitinansupakit, Tien Vongsakorn, and Wekhin Bunchuan, who compile needed data from many sources and processed the computer runs.

Among the organizations furnishing data essential to the study are Excise Department, Ministry of Finance; Department of Industrial Works, Ministry of Industry and Maharaj Company. Many thanks to these organizations for their cooperations.

The AIT Regional Computer Centre gave thorough and efficient service and deserves special thoughts.

INTRODUCTION

The research is divided into two parts. The first part deals with demand for Mekhong whisky utilizing the provincial data obtained from the Department of Industrial Works. This cross-sectional analysis contains a section on the overview of consumption patterns and demand equation studies through multiple regressions. The section on time-series deals with theoretical aspects, as well as empirical results.

Since there are very few previous studies, we do not claim this study to be final or conclusive and we therefore welcome comments and suggestions.

I. Analysis of Demand for Mekhong Whisky: Cross - Sectional Analysis

1.1 Overview

The overview of the consumption pattern review is divided into two parts: (1) the current situation in 1977 (the most up-to-date information), (2) the situation in 1965 which shows the changed pattern of consumption.

The Regional Breakdown of Mekhong Consumption

Mekhong whisky is considered to be urban whisky since from table 1 below the regional breakdown shows that Bangkok* alone in 1977 consumes 33.82% of the Mekhong whisky produced. The Central region came second in terms of the amount of whisky consumption, while the North-East ranks third, the North ranks fourth and the South comes in last.

Provincial Pattern of Mekhong Consumption

Table 2 below shows the provincial breakdown of Mekhong consumption, Bangkok as mentioned ranks first followed by Nakorn Ratchasima, Chonburi, Samut Prakarn and Udon Thani. Besides Bangkok, the second highest individual market share is only 4.46% of the total sale of Mekhong for the whole country.

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* Bangkok includes Thonburi

Regional Consumption per capita of Mekhong Whisky

This section looks at consumption per capita by weighting each provincial consumption with the number of adult people.* In table 3 below, the data shows that in terms of regional breakdown, the Bangkok region ranks first in terms of per capita consumption of Mekhong, the Bangkok Metropolitan area (without Bangkok) ranks second which means that the periphery areas of Bangkok are influenced to a great extent by Bangkok people.

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* Since we do not have census data for 1977, we use adult population in 1970 so the consumption per capital is slightly overestimated but since we do not judge the consumption per capita in terms of the actual magnitude, the figure is used for comparison among regions and among provinces.

Consumption

Table 1

Regional Consumption Pattern of Mekhong...1977 (unit = Tae)

Regions	Total Consumption of Mekhong ...1977.	%
Bangkok	1,131,771.1	33.82
Bangkok Metropolitan Areas excluding Bangkok	152,746.87	4.57
Central	737,214.97	21.92
North East	645,748.23	19.20
North	457,051.32	13.59
South	232,593.52	6.92
Whole Kingdom	3,363,125.9	100

Sources: Department of Industrial Works, Ministry of Industry

Table 2

The Ranking of the Market Share of Mekhong by Provinces, 1977 (%)

Provinces	(%) Total Consumption	Rank No.
Bangkok	33.82%	1
Nakhon Ratchasima	4.46%	2
Chon Buri	3.08	3
Samut Prakan	2.48	4
Udon Thani	2.22	5
Khon Kaen	2.04	6
Nakhon Sawan	1.91	7
Chiang Mai	1.91	7
Saraburi	1.71	9
Ubon Ratchathani	1.70	10
Nakhon Si Thammarat	1.64	11
Ayutthaya	1.40	12
Phetchabun	1.39	13
Nonthaburi	1.35	14
Ratchaburi	1.32	15
Songkhla	1.30	16
Nakhon Pathom	1.29	17
Prachuap Kiri Khan	1.24	18
Suphan Buri	1.22	19
Rayong	1.13	20

Table 2 (continued)

Province	% Total Consumption	Rank No.
Phichit	1.06	21
Lampang	1.05	22
Kanchanaburi	1.04	23
Chanthaburi	1.04	23
Chachoengsao	1.03	25
Prachin Buri	0.97	26
Buri Ram	0.96	27
Chiang Rai	0.95	28
Si Sa Ket	0.93	29
Petchaburi	0.87	30
Nakhon Phanom	0.86	31
Sakon Nakhon	0.86	31
Phitsanulok	0.82	33
Roi Et	0.82	33
Chaiyaphum	0.79	35
Surin	0.77	36
Surat Thani	0.75	37
Lop Buri	0.73	38
Kamphaeng Phet	0.72	39
Pathum Thani	0.71	40
Tak	0.70	41
Kalasin	0.68	42

Table 2 (continued)

Province	% Total Consumption	Rank No.
Ang Thong	0.67	43
Trat	0.67	43
Nong Khai	0.67	43
Maha Sarakham	0.60	46
Sing Buri	0.60	46
Phrae	0.58	48
Trang	0.58	48
Chai Nat	0.56	50
Chumphon	0.55	51
Uttaradit	0.55	51
Sukhothai	0.52	53
Samut Sakhon	0.50	54
Samut Songkhram	0.45	55
Loei	0.43	56
Nan	0.42	57
Lamphun	0.41	58
Yasothorn	0.41	58
Mao Hong Son	0.40	60
Yala	0.34	61
Narathirvat	0.29	62
Ranong	0.28	63

Table 2 (continued)

Province	% Total Consumption	Rank No.
Phang-nga	0.26	64
Pattani	0.24	65
Phuket	0.23	66
Uthai Thani	0.20	67
Phatthalung	0.19	68
Satun	0.16	69
Krabi	0.14	70

Sources: Department of Industrial Works, Ministry of Industry

One way of interpreting this pattern is through the high degree of urbanization where whisky drinking is for social occasions. Urban people tend to get together quite often for social drirking and more over it can be interpreted as a result of high income.

Table 3

Regional Average Consumption per capita of Mekhong ...1977

Regions	Mean
Bangkok	0.601
Bangkok Metropolitan Excluding Bangkok	0.3198
Central	0.1987
North-East	0.1104
North	0.1022
South	0.0989
Whole Kingdom	0.17806

Sources: Department of Industrial Works, Ministry of Industry

Method of Calculation

- Regions = $\frac{\text{Regional Consumption}}{\text{Regional Adult Population}}$

- Whole Kingdom = $\frac{\text{Total Consumption}}{\text{Adult Population (1970)}}$

The rest of the regions, the South, the North-East and the North show similar patterns of per capita consumption. That is, they consume about the same amount, although the North shows a slightly higher consumption while the North-East is the lowest. Since there has been some claim that the poor drink a lot because of misery, in our preliminary investigation this is not true. The poorest region seems to drink least which seems to confirm the economic hypothesis that whisky is a highly income-elastic good. The South, however, displays a unique pattern. Since per capita income is fairly high but consumption per capita is low the reason may be the Muslim religion. In order to test this we separate the four Muslim provinces from the whole Southern region.

Table 4

Consumption Per Capita of Mekhong by Provinces Especially in the Four Provinces of the South ... 1977

Provinces	Total Consumption Per Capita
Satun	0.0842
Pattani	0.0406
Yala	0.0965
Narathiwat	0.0506
Mean	0.0603

Sources: Department of Industrial Works, Ministry of Industry ... 1977

: Census from National Statistical Office, 1970

Table 4 shows that the effect of Muslim religion is very strong since the average per capita consumption of Mekhong whisky is only 0.0603. Therefore it seems not to be the South as such that drinks less Mekhong but the Muslim South which pulls down the average of the South.

The Ranking of per capita Consumption by Province

Table 5 shows the individual province ranking which shows that the highest per capita consumption seems to be centered around the central regions where the level of urbanization and per capita income is high.

Table 5

The Ranking of Consumption per capita of Mekhong by Provinces - 1977.

Provinces	Total Consumption Per Capita	Rank No.
Bangkok	0.601	1
Samut Prakan	0.4431	2
Trat	0.4173	3
Chon Buri	0.3404	4
Prachuap Kiri Khan	0.3170	5
Saraburi	0.2957	6
Ranong	0.2938	7
Chanthaburi	0.2863	8
Nonthaburi	0.2853	9
Rayong	0.2785	10

Table 5 (continued)

Provinces	Total Consumption Per Capita	Rank No.
Mao Hong Son	0.2225	11
Sing Buri	0.2095	12
Kanchanaburi	0.1994	13
Tak	0.1983	14
Nakhon Ratchasima	0.1899	15
Nakhon Pathom	0.1888	16
Pethum Thani	0.1834	17
Ang Thong	0.1828	18
Petchaburi	0.1822	19
Chachoengsao	0.177	20
Phetchabun	0.1664	21
Samut Songkhram	0.1663	22
Ayuttaya	0.1662	23
Ratchaburi	0.1641	24
Nakhon Sawan	0.1551	25
Samut Sakhon	0.1536	26
Nakhon Nayok	0.1519	27
Phichit	0.1512	28
Prachin Buri	0.1447	29
Chumphon	0.1441	30
Kamphaeng Pet	0.1358	31

Table 5 (continued)

Provinces	Total Consumption Per Capita	Rank No.
Phuket	0.1309	32
Udon Thani	0.1303	33
Suphan Buri	0.1302	34
Chai Nat	0.1282	35
Khon Kaen	0.1246	36
Songkhla	0.1230	37
Phang-nga	0.1168	38
Trang	0.1156	39
Nakhon Si Thammaret	0.1128	40
Surat Thani	0.1065	41
Chiang Mai	0.1065	41
Lampang	0.1064	43
Phitsanulok	0.1048	44
Uttaradit	0.1022	45
Nong Khai	0.0984	46
Yala	0.0965	47
Lop Buri	0.0963	48
Nakhon Phanom	0.0945	49
Phrae	0.0929	50
Sakon Nakhon	0.0926	51
Nan	0.0848	52

Table 5 (continued)

Provinces	Total Consumption Per Capita	Rank No.
Loei	0.0845	53
Satun	0.0841	54
Sukhothai	0.0809	55
Chaiyaphum	0.0786	56
Buri Ram	0.0785	57
Kalasin	0.0772	58
Lamphun	0.0767	59
Si Sa Ket	0.0741	60
Ubon Ratchathani	0.0733	61
Roi Et	0.0668	62
Uthai Thani	0.0656	63
Surin	0.0640	64
Maha Sarakham	0.0629	65
Krabi	0.0606	66
Chiang Rai	0.0535	67
Narathivat	0.0506	68
Pattani	0.0405	69
Phatthalung	0.0390	70

Sources: Department of Industrial Works, Ministry of Industry

: Census from National Statistical Offices, Adult Population 1970.

The Distribution of the Size of Mekhong Bottles Consumed by Region

One of the very interesting features of the consumption of Mekhong is the distribution of bottles which come in 3 sizes; small, medium and large. Table 6 shows the regional breakdown in terms of sizes of Mekhong.

Table 6

Regional Market Share of Consumption of Mekhong by Sizes - 1977.

Sizes / Regions	Small	Medium	Large	Total
Bangkok	9.79	46.03	44.18	100
Bangkok Metropolitan	11.22	46.61	42.17	100
Area Excluding Bangkok				
Central	5.83	51.04	43.13	100
North-East	4.93	58.51	36.56	100
North	5.31	54.10	40.99	100
South	11.74	54.72	33.54	100
Whole Kingdom	7.58	51.25	41.17	100

Sources: Department of Industrial Works, Ministry of Industry.

The Distribution of Size by Individual Provinces

Table 7 shows the distribution of sizes by province. The unique feature of the distribution is that for individual provinces. The proportion of medium size whisky can be as high as 82.28% for Si Sa Ket, or 78% for Lop Buri while for large bottles the proportion could be as high as 65% for Chainat.

Table 7

The Distribution of Size Pattern by Individual Provinces - 1977.

Provinces	Small	Medium	Large
Bangkok	9.78	46.03	44.19
Ang Thong	2.81	46.61	50.58
Lop Buri	11.88	78.68	9.44
Saraburi	3.51	49.91	46.58
Chai Nat	2.84	31.28	65.88
Sing Buri	4.41	43.10	52.49
Nakhon Sawan	6.55	51.69	41.76
Nakhon Ratchasima	6.27	51.04	42.69
Nonthaburi	11.30	46.49	42.21
Ayutthaya	4.02	59.14	36.84
Nakhon Nayok	6.18	46.29	47.53
Prachinburi	6.00	43.10	50.90
Chonburi	7.07	47.30	45.63
Chachoengsao	6.25	48.33	45.42

Table 7 (continued)

Provinces	Small	Medium	Large
Rayong	4.27	51.68	44.05
Chantaburi	6.11	66.24	27.65
Trat	10.14	53.82	36.04
Chaiyapum	1.79	53.79	44.42
Buriram	8.33	54.17	37.50
Surin	5.40	37.28	57.32
Si Sa Ket	3.40	82.28	14.32
Ubon Ratchathani	9.13	48.96	41.91
Yasothon	4.70	56.21	39.09
Udon Thani	4.23	76.13	19.64
Nong Khai	3.72	51.96	44.32
Sahon Nakhon	0.23	69.18	30.59
Nakhon Panom	1.90	69.51	28.59
Loei	6.18	43.59	50.23
Khon Kaen	6.11	52,79	41.10
Maha Sarakham	0.44	60.96	38.60
Roi Et	0.16	70.03	29.81
Kalasin	4.82	68.11	27.07
Lampang	4.87	49.54	45.56
Chiang Rai	1.82	44.05	54.13
Chiang Mai	7.66	46.92	45.49

Table 7 (continued)

Provinces	Small	Medium	Large
Lamphun	8.03	52.13	39.84
Mae Hong Son	8.19	49.49	42.31
Nan	2.69	51.27	46.03
Phrae	5.04	62.24	32.72
Uttaradit	5.14	45.73	49.39
Sukhathai	4.52	61.56	33.87
Tak	4.11	58.98	36.91
Phichit	5.09	64.53	30.38
Phechabun	3.80	71.23	24.97
Uthai Thani	1.19	50.98	47.84
Kamphaeng Phet	5.05	51.73	43.22
Samut Prakan	12.28	47.01	40.71
Pattum Thani	7.37	45.42	47.21
Ratchaburi	4.98	46.45	48.27
Samut Songkhram	6.42	53.43	40.15
Nakhon Pathom	5.09	43.76	51.15
Kanchanaburi	5.85	52.57	41.58
Suphan Buri	6.23	53.92	39.85
Samut Sakhon	8.42	46.72	44.82
Petchaburi	6.91	51.34	41.75
Prachuap Kiri Khan	5.54	55.40	39.06

Table 7 (continued)

Provinces	Small	Medium	Large
Nakhon Si Thammarat	15.17	56.61	28.22
Chumphon	3.54	52.48	43.08
Surat Thani	8.28	52.66	39.06
Ranong	16.30	40.62	43.08
Krabi	10.36	53.37	36.27
Phang-nga	11.31	46.79	41.90
Phuket	24.23	50.22	25.55
Songkhla	9.43	59.66	30.86
Trang	15.69	61.13	23.18
Phatthalung	5.67	51.06	43.27
Satun	10.00	60.83	29.17
Pattani	8.08	51.53	40.39
Yala	12.18	55.69	32.13
Narathirvat	12.62	46.26	41.12

Sources: Department of Industrial Works, Ministry of Industry.

It is clear from the table 6 that in terms of regional breakdown, the middle size Mekhong is the most important among all the regions and North East region ranks the highest while Bangkok region ranks the lowest. However the Bangkok region shows the highest proportion of the large size bottle which seems to indicate that big bottles are usually consumed more heavily in the urban areas where they are usually served for big parties and for special occasions.

The Pattern of Retail Price by Regions and Provinces

It is interesting to see whether there is any pattern emerging in terms of retail price of Mekhong across the provinces and to see whether price is determined by transport cost or structure of the market. Moreover we want to see whether price per tae among the three sizes shows any pattern. Table 8 shows a very interesting pattern in price variation. First, the price per tae is highest for the small bottles across the regions as well as across provinces.

Table 8

Average Retail Prices of Mekhong by Provinces and Regions - 1977.

(Unit = Baht/Tae)

Provinces	Small	Medium	Large
Bangkok *	1660.80	1571.73	1557.07
Bangkok Metropolitan excluding Bangkok			
Nonthaburi *	1635.20	1517.87	1544

Table 8 (continued)

Provinces	Small	Medium	Large
Pathum Thani	1386.67	1173.33	1200
Samut Prakan *	1619.20	1467.73	1433.60
Mean	1547.02	1386.31	1392.53
Central			
Lop Buri *	1661.87	1492.27	1466.40
Saraburi	1173.33	1173.33	1200
Chon Buri *	1620.27	1474.67	1434.93
Chanthaburi *	1678.93	1501.33	1476.53
Ratchaburi	1173.33	1120	1066.67
Petchaburi	1066.67	960	906.64
Nakhon Pathom *	1561.60	1428.27	1386.40
Prachuap Kiri Khan	1280	960	960
Mean	1402	1263.73	1237.20
North East			
Nakhon Ratchasima *	1582.93	1429.33	1360.27
Surin	1280	1173.33	1013.33
Ubon Ratchathani *	1673.60	1586.13	1569.60
Yasothorn	1173.33	1120	1040
Udon Thani *	1610.67	1540.27	1526.13
Nong Khai	1066.67	960	933.33
Khan Kaen *	1590.40	1523.20	1517.60

Table 8 (continued)

Provinces	Small	Medium	Large
Maha Sarakham	1333.33	1333.33	1333.33
Roi Et	997.33	917.33	890.67
Loei	1066.67	1013.33	933.33
Mean	1337.49	1259.63	1211.76
North			
Lampang	960	880	866.67
Phrae	1066.67	960	933.33
Phitsanulok *	1609.60	1398.40	1357.60
Kamphaeng Phet	1280	1155.73	1120
Chiang Mai *	1066.67	960	906.66
Phetchabun	960	1066.67	1066.67
Nakhon Sawan *	1520	1348.80	1281.87
Mean	1208.99	1109.94	933.25
South			
Nakhon Si Thammarat *	1619.20	1466.13	1303.20
Surat Thani *	1684.27	1480	1397.60
Ranong	1200	1100.90	1055.47
Songkhla *	1548.80	1494.40	1490.40
Satun	1066.67	960	906.66
Mean	1423,79	1300.29	1230.67

Sources: * By Dr. Vatchjittapan Report, Nida

: Non-asterisk through Questionnaires

The price pattern shows that it is not the transportation cost that determines the price of Mekhong since retail price of Mekhong is higher for the Bangkok area than up-country areas despite the fact that Mekhong is produced in Bangkok. It is the market structure that determines the price. The South shows a unique pattern, that is the price per tae for small bottles is highest except for the Bangkok region and this corresponds with the South possessing the highest proportion of small size Mekhong for the total consumption of whisky.

Pattern of Consumption of Local White Whisky by Province and Region

One of the interesting questions to ask is what are the substitute drinks for Mekhong. The answer is likely to be white whisky or beer. We start by looking closely at the role of local white whisky as a substitute drink for Mekhong. Table 9 shows per capita consumption of local white whisky. Bangkok Metropolitan region represented by Pathum Thani still ranks the highest, followed by the Central region and the rest of the regions show a similar consumption pattern. However, one interesting feature of this is that per capita consumption of local white whisky in comparison to the Mekhong per capita consumption is highest in the Northeast region (3.6 times) followed by Bangkok Metropolitan region and followed by the North and Central regions while the South came last.* This demonstrates clearly that local white whisky is a common drink in Thailand.

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* The comparison must be viewed with caution because the white whisky consumption data contained only 24 provinces while the Mekhong whisky data contained 70 provinces.

Table 9

Consumption per capita of White Whisky Pattern by Provinces and Regions - 1977.

Provinces	Consumption per capita of White Whisky - 1977
Bangkok Metropolitan Excluding Bangkok	
Pathum Thani	0.7324
Central	
Ratchaburi	0.3911
Prachuap Kiri Khan	0.4704
Petchaburi	0.4061
Nakhon Pathom	0.5649
Saraburi	0.7771
Chon Buri	0.8062
Chachoengsao	0.5509
Mean	0.5831
North East	
Kalasin	0.0760
Maha Sarakham	0.1385
Roi Et	0.4265
Loei	0.0217
Nong Khai	0.0666
Buri Ram	0.4826
Surin	0.9321
Mean	0.3723

Table 9 (continued)

Provinces	Consumption per capita of White Whisky - 1977
North	
Kamphaeng Phet	0.8109
Chiang Rai	0.0523
Phetchabun	0.4161
Phrae	0.1353
Lampang	0.1733
Lamphun	0.4294
Uttaradit	0.1772
Mean	0.2482
South*	
Ranong	0.4690
Satun	0.1487
Mean	0.2562
Whole Kingdom	0.3902

Sources: Questionnaires

: Census from National Statistical Office (Adult Population 1970)

Footnotes - The figure in the South includes the two provinces shown.

Table 10 shows the ranking of per capita consumption of Local white whisky by province in 1977.

Table 10

Ranking of Consumption per capita of White Whisky by Provinces - 1977.

Provinces	Consumption per capita of White Whisky	Rank No.
Surin	0.9321	1
Kamphaeng Phet	0.8109	2
Chonburi	0.8062	3
Saraburi	0.7771	4
Pathum Thani	0.7324	5
Nakhon Pathom	0.5649	6
Chachoengsao	0.5509	7
Buri Ram	0.4826	8
Prachuap Kiri Khan	0.4704	9
Ranong	0.4690	10
Lamphun	0.4294	11
Roi Et	0.4265	12
Phetchabun	0.4161	13
Petchaburi	0.4061	14
Ratchaburi	0.3911	15
Uttaradit	0.1772	16
Lampang	0.1733	17
Satun	0.1487	18

Table 10 (continued)

Provinces	Consumption per capita of White Whisky	Rank No.
Maha Sarakham	0.1385	19
Phrae	0.1353	20
Kalasin	0.0760	21
Nong Khai	0.0666	22
Chiang Rai	0.0523	23
Loei	0.0217	24

Sources: Questionnaires

: Census from National Statistical Office - 1970.

The Provincial Pattern of Local White Whisky Retail Price

Since it is hypothesized that the local white whisky can be a substitute for Mekhong therefore it is important to see the price distribution across the region as well as across provinces. Table 11 shows that the average of retail prices is lowest in the North while the rest of the regions do not show any significant differences.

Table 11

Retail Price of White Whisky Pattern by Provinces and Regions - 1977.
(Unit - Tae/Baht)

Province	Retail Price of White Whisky
Bangkok Metropolitan Excluding Bangkok	
Pathum Thani	480
Central	
Ratchaburi	464
Prachuap Kiri Khan	464
Petchaburi	416
Saraburi	464
Mean	452
North East	
Loei	496
Surin	368
Maha Sarakham	448
Buri Ram	416
Yasothorn	416
Nong Khai	496

Table 11 (continued)

Province	Retail Price of White Whisky
Mean	440
North	
Phrae	432
Lamphun	-
Payao	352
Chiang Rai	320
Lampang	320
Mean	356
South	
Satun	416
Ranong	432
Mean	424

Sources: From the Questionnaires

Pattern of per capita Income by Provinces

It is believed that per capita income by province is an important determinant of demand for Mekhong consumption. Table 12 shows ranking of per capita income across the provinces.

Table 12

Ranking of per capita Income by Provinces - 1977.

Provinces	per capita Income	Rank No.
Phuket	56,563	1
Samut Prakan	48,390	2
Ranong	27,105	3
Bangkok	22,869	4
Chonburi	21,016	5
Kanchanaburi	19,317	6
Phang-nga	16,837	7
Pathumthani	13,619	8
Rayong	12,225	9
Samut Sakhon	12,093	10
Saraburi	12,000	11
Trat	11,643	12
Petchaburi	10,652	13
Chanthaburi	10,411	14
Tak	10,325	15

Table 12 (continued)

Provinces	per capita Income	Rank No.
Nonthaburi	10,133	16
Songkhla	10,062	17
Ratchaburi	9,521	18
Nakhon Pathom	9,353	19
Ayutthaya	9,070	20
Trang	8,840	21
Prachuap Kiri Khan	8,754	22
Sing Buri	8,710	23
Suphan Buri	8,704	24
Chachoengsao	8,447	25
Yala	8,080	26
Chai Nat	7,396	27
Lop Buri	7,377	28
Satun	7,364	29
Chiang Mai	7,271	30
Mae Hong Son	7,268	31
Nakhon Nayok	7,097	32
Surat Thani	6,809	33
Samut Songkhram	6,802	34
Chumphon	6,665	35
Uttaradit	6,583	36

Table 12 (continued)

Provinces	per capita Income	Rank No.
Prachin Buri	6,526	37
Ang Thong	6,221	38
Krabi	6,177	39
Sukhothai	5,990	40
Lampang	5,980	41
Nakhon Si Thammarat	5,739	42
Phrae	5,706	43
Narathiwat	5,560	44
Uthai Thani	5,475	45
Phetchabun	5,388	46
Lamphun	5,232	47
Phatthalung	5,094	48
Pattani	5,064	49
Nakhon Sawan	5,018	50
Phitsanulok	4,928	51
Kamphaeng Phet	4,898	52
Phichit	4,751	53
Sakon Nakhon	4,587	54
Nan	4,473	55
Khon Kaen	4,365	56

Table 12 (continued)

Provinces	per capita Income	Rank No.
Nakhon Ratchasima	4,233	57
Chiang Rai	4,112	58
Udon Thani	4,082	59
Non Khai	3,793	60
Kalasin	3,718	61
Nakhon Phanom	3,575	62
Loei	3,462	63
Chaiyaphum	3,307	64
Buri Ram	3,260	65
Ubon Ratchathani	3,194	66
Yasothorn	3,138	67
Maha Sarakham	3,018	68
Surin	2,655	69
Roi Et	2,636	70
Si Sa Ket	2,180	71

Sources: National Economic and Social Development Board 1977.

The Degree of Urbanization Across the Provinces

It is believed that Mekhong is an urban drink since urban people have a higher income level as well as Mekhong is a drink for social functions- therefore it is believed that the higher the level of urbanization, the higher is per capita consumption. Table 13 shows the ranking of degree of urbanization by provinces.

Table 13

Ranking of Urbanization by Provinces - 1970.

Provinces	% of Urbanization	Rank No.
Bangkok	81.09	1
Phuket	34.36	2
Yala	21.21	3
Samut Sakhon	20.85	4
Samut Songkhram	18.79	5
Ranong	17.32	6
Samut Prakan	16.83	7
Chachoengsao	16.39	8
Songkhla	15.48	9
Tak	13,72	10
Petchaburi	13.63	11
Trang	12.93	12
Chanthaburi	12.81	13

Table 13 (continued)

Provinces	% of Urbanization	Rank No.
Monthaburi	12.63	14
Ratchaburi	12.44	15
Prachuap Kiri Khan	12.24	16
Saraburi	11.91	17
Chonburi	11.72	18
Narathiwat	11.06	19
Phang-nga	10.04	20
Ayutthaya	9.39	21
Pattani	8.86	22
Surat Thani	8.46	23
Trat	8.41	24
Nakhon Pathom	8.18	25
Chiang Mai	8.16	26
Nakhon Sawan	7.74	27
Lop Buri	7.70	28
Nakhon Si Thammarat	7.39	29
Prachin Buri	7.35	30
Ang Thong	7.31	31
Phitsanulok	6.89	32
Lampang	6.87	33
Phichit	6.78	34
Chumphon	6.65	35

Table 13 (continued)

Provinces	% of Urbanization	Rank No.
Satun	6.25	36
Sukhothai	5.93	37
Uthai Thani	5.92	38
Rayong	5.92	39
Krabi	5.87	40
Nan	5.71	41
Nakhon Ratchasima	5.60	42
Ubon Ratchathani	5.57	43
Sing Buri	5.47	44
Chai Nat	5.10	45
Udon Thani	5.05	46
Nakhon Nayok	5.02	47
Kanchanaburi	4.98	48
Phrae	4.80	49
Suphan Buri	4.77	50
Nong Khai	4.76	51
Uttaradit	4.74	52
Phatthalung	4.37	53
Mae Hong Son	3.82	54
Kamphaeng Phet	3.64	55
Lamphun	3.64	55

Table 13 (continued)

Provinces	% of Urbanization	Rank No.
Khon Kaen	3.64	55
Nakhon Phanom	3.61	58
Maha Sarakham	3.22	59
Phetchabun	3.21	60
Sakon Nakhon	3.17	61
Loei	3.12	62
Chiang Rai	3.08	63
Kalasin	2.62	64
Roi Et	2.58	65
Surin	2.16	66
Buri Ram	2.05	67
Chaiyaphum	1.98	68
Pathum Thani	1.87	69
Si Sa Ket	1.72	70

Sources: Census from N.S.O. --- 1970.

The Economics of the Illegal Sector

In order to understand the true picture of Mekhong consumption, an understanding of the illegal sector is very important. The Excise Department, Ministry of Finance has extensive data on the illegal sectors. The data which we use for our analysis is the amount of confiscation of illicit spirits in tae per capita.* Because the amount of confiscation is also in tae per capita we are able to show how important this illegal sector is when we compare it with consumption of Mekhong per capita. The problem with this method of comparison is that not all of the illegal sector activities have been captured and recorded therefore the activities that we report are only part of the total activities and we know that many illegal activities are going on without being caught. Nevertheless the data suggest the pattern and trend across regions and provinces and most importantly suggest the importance of the illegal sector at the minimum point. Even at the minimum point we can see that the illegal sector is such an important factor that it cannot be ignored. Another interesting feature in the study of illegal sector has to do with differential rates in confiscation per capita which needs further investigation. One possible hypothesis concerns different enforcement costs which have many possible explanations. The purpose of our investigation is not to study deeply and scientifically about these enforcement costs. The point is that further investigation about this relationship will yield a high rate of return. Table 14 shows the relative ranking of the importance

of the illegal sector (as measured by confiscation per capita) . The most interesting feature is that the top two provinces are on the Thai-Cambodian border.

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* We have information also concerning the number of arrests per capita as well as the amount of fines per capita but for our purpose we do not report the findings.

Table 14

Ranking of Confiscation per capita - 1977 . (Unit = Tae)

Provinces	Confiscation per capita	Rank No.
Trat	0.1538	1
Chanthaburi	0.1219	2
Tak	0.0960	3
Uttaradit	0.0796	4
Nakhon Pathom	0.0565	5
Samut Sakhon	0.0342	6
Rayong	0.0251	7
Prachuap Kiri Khan	0.0247	8
Sukhothai	0.0245	9
Phrae	0.0234	10
Chumphon	0.0214	11

Table 14 (continued)

Provinces	Confiscation per capita	Rank No.
Buri Ram	0.0214	11
Saraburi	0.0195	13
Phatthalung	0.0174	14
Ratchaburi	0.0169	15
Mae-Hong Son	0.0159	16
Ayutthaya	0.0158	17
Surin	0.0141	18
Nakhon Si Thammarat	0.0133	19
Songkhla	0.0125	20
Phichit	0.0124	21
Si Sa Ket	0.0122	22
Samut Songkhram	0.0120	23
Phitsanulok	0.0088	24
Nakhon Nayok	0.0076	25
Petchaburi	0.0068	26
Phetchabun	0.0067	27
Lop Buri	0.0062	28
Prachin Buri	0.0058	29
Chiang Mai	0.0056	30
Uthai Thani	0.0054	31

Table 14 (continued)

Provinces	Confiscation per capita	Rank No.
Nakhon Sawan	0.0052	32
Ranong	0.0051	33
Nan	0.0044	34
Nakhon Ratchasima	0.0044	34
Trang	0.0036	36
Kamphaeng Phet	0.0034	37
Ang Thong	0.0032	38
Chachoengsao	0.0032	38
Kalasin	0.0031	40
Kanchanaburi	0.0028	41
Udon Thani	0.0028	41
Nong Khai	0.0027	43
Maha Sarakham	0.0027	43
Khon Kaen	0.0025	45
Roi Et	0.0025	45
Lamphun	0.0025	45
Lampang	0.0024	48
Sing Buri	0.0023	49
Chai Nat	0.0023	49
Ubon Ratchathani	0.0022	51

Table 14 (continued)

Provinces	Confiscation per capita	Rank No.
Chaiyaphum	0.0021	52
Chiang Rai	0.0021	52
Chon Buri	0.0012	54
Nakhon Phanom	0.0009	55
Pattani	0.0007	56
Surat Thani	0.0007	56
Loei	0.0006	58
Sakon Nakhon	0.0006	58
Samut Prakan	0.0006	58
Phuket	0.0005	61
Pathum Thani	0.0005	61
Suphan Buri	0.0004	63
Bangkok	0.0003	64
Nonthaburi	0.0003	64
Yala	0.0003	64
Satun	0.0003	64
Narathiwat	0.0002	68
Krabi	0.0001	69
Phang-nga	0.0001	69

Sources: Census from National Statistical Office - 1970.
: Liquor Division , Excise Department, Ministry of Finance 1977 .

What is more important is that the provinces along Thai-Malay border show a very low ranking which also suggests the important role of smuggling. At the present time, there is not enough evidence. Another interesting feature is that those provinces/distillery factories are located where show high activities of the illegal sector.*

Table 15 shows the important role of the illegal sector in relation to the Mekhong consumption by regions which show that in the North and Central regions confiscations are at least 10% of the Mekhong consumption per capita while in the South it is 7.5% and the North-East is only 5.09%.

Table 15

Percent of Confiscation per capita to Consumption of Mekhong per capita by Region - 1977.

Regions	Average Confiscation per capita	Average Consumption of Mekhong per capita	%
Bangkok	0.0003	0.601	0.05
Bangkok Metropolitan Excluding Bangkok	0.0005	0.3198	0.16
Central	0.0183	0.1987	9.21
North-East	0.0052	0.1022	5.09
North	0.0106	0.1104	9.60
South	0.0075	0.0989	7.58

Sources: Liquor Division, Excise Department, Ministry of Finance 1977.
: Department of Industrial Works, Ministry of Industry - 1977.
: Census from National Statistical Office, 1970.

Footnotes - Average Consumption per capita = $\frac{\text{Total Consumption}}{\text{Adult Population}}$

- Average Confiscation per capita = $\frac{\text{Total Confiscation}}{\text{Adult Population}}$

* The sixteen provinces with distilleries show rankings in the top 32 provinces.

When we consider the four Muslim provinces which are shown in table 16, the illegal sector is not very important at all.

Table 16

Percent of Confiscation per capita to Consumption of Mekhong.

Per capita especially in the four Southern Provinces - 1977.

Provinces	Confiscation per capita	Consumption of Mekhong per capita	%
Satun	0.0003	0.0841	0.36
Pattani	0.0007	0.0405	1.73
Yala	0.0003	0.0965	0.31
Narathiwat	0.0002	0.0506	0.40
Mean	0.0003	0.0603	0.50

Sources: Department of Industrial Works, Ministry of Industry - 1977.

: Census from National Statistical Office - 1970.

: Liquor Division, Excise Department, 1977,

Another way to measure the importance of illegal sector is by comparing the amount of confiscation per capita to the consumption of white whisky per capita. Table 17 shows some interesting results. The illegal sector is still the most important in the North and this may be the factor explaining why the retail price of local white whisky is cheapest there. The cause , of course, is that the supply of illegal whisky holds down the price of legal whisky. An interesting finding is that the Central region ranks second in terms of its importance of illegal sector when it is compared with local white whisky consumption which is different than when it is compared with Mekhong consumption.

Table 17

Percent of Confiscation per capita to Consumption of White Whisky per capita by Regions - 1977. (Unit in tae) *

Regions	Average Confiscation per capita	Average Consumption of White Whisky per capita	%
Bangkok	-	-	-
Bangkok Metropolitan Excluding Bangkok	0.0005	0.7324	0.07
Central	0.0183	0.5831	3.13
North-East	0.0052	0.3723	1.40
North	0.0106	0.2482	4.27
South	0.0075	0.2562	2.92

Sources: Questionnaires

: Census from National Statistical Office - 1970.

* Since data on white whisky contained only 24 provinces - while the average confiscation data has 70 provinces , therefore the comparison must be viewed with caution .

: Liquor Division, Excise Department, Ministry of Finance - 1977.

- Average Confiscation per capita = $\frac{\text{Total Confiscation}}{\text{Adult Population}}$

- Average Consumption of White Whisky per capita = $\frac{\text{Total Consumption of White Whisky}}{\text{Adult Population}}$

Table 18 shows the ranking of individual provinces when compared to per capita consumption of whisky.

Table 18

Ranking Percent of Confiscation per capita to Total Consumption of Mekhong- in 1977.

Provinces	%	Rank No.
Uttaradit	77.89	1
Phatthalung	44.62	2
Chanthaburi	42.50	3
Trat	36.86	4
Sukhothai	30.38	5
Nakhon Pathom	29.93	6
Puri Ram	27.26	7
Phrae	25.19	8
Samut Sakhon	22.32	9

Table 18 (continued)

Provinces	%	Rank No.
Surin	22.03	10
Si Sa Ket	16.49	11
Chom Phon	14.85	12
Nakhon Srithammarat	11.79	13
Ratchaburi	10.29	14
Songkla	10.16	15
Ayutthaya	9.51	16
Rayong	9.01	17
Phitsanulok	8.40	18
Uthai Thani	8.23	19
Phichit	8.20	20
Prachuap Kiri Khan	7.79	21
Samut Songkhram	7.22	22
Mae Hong Son	7.15	23
Saraburi	6.59	24
Lopburi	6.44	25
Chiang Mai	5.26	26
Nan	5.19	27
Nakhon Nayok	5.00	28
Tak	4.84	29

Table 18 (continued)

Provinces	%	Rank No.
Maha Sarakham	4.29	30
Phetchabun	4.03	31
Kalasin	4.02	32
Prachin Buri	4.01	33
Chiang Rai	3.93	34
Roi Et	3.74	35
Phetburi	3.73	36
Nakhon Sawan	3.35	37
Lamphun	3.26	38
Trang	3.11	39
Ubon Ratchathani	3.00	40
Nong Khai	2.74	41
Chaiya Phum	2.67	42
Kamphaeng Phet	2.50	43
Nakhon Ratchasima	2.32	44
Lampang	2.26	45
Udon Thani	2.15	46
Khon Kaen	2.01	47
Chachoengsao	1.81	48
Chai Nat	1.79	49
Ang Thong	1.75	50

Table 18 (continued)

Provinces	%	Rank No.
Ranong	1.74	51
Pattani	1.73	52
Kanchanaburi	1.40	53
Singburi	1.10	54
Nakhon Phanom	0.95	55
Loei	0.71	56
Surat Thani	0.66	57
Sakhon Nakhon	0.65	58
Narathiwat	0.39	59
Phuket	0.38	60
Satun	0.36	61
Chonburi	0.35	62
Yala	0.31	63
Suphan Buri	0.3072	64
Phathum Thani	0.2726	65
Krabi	0.17	66
Samut Prakhan	0.1354	67
Nonthaburi	0.1051	68
Phang Nga	0.09	69
Bangkok	0.0499	70

Sources: Department of Industrial Works, Ministry of Industry.
: Liquor Division, Excise Department, Ministry of Finance - 1977.

Table 19 shows the importance of illegal sector to the consumption of white whisky by individual province.

Table 19

Percent of Confiscation per capita to Consumption of White Whisky per capita: 24 Provinces, 1977.

Provinces	Ratio	Ranking
Uttaradit	44.92	1
Phrae	17.29	2
Nakhon Pathom	10.00	3
Prachuap Kiri Khan	5.25	4
Buri Ram	4.43	5
Ratchaburi	4.32	6
Kalasin	4.08	7
Mong-Khai	4.05	8
Chiang Rai	4.02	9
Loei	2.76	10
Saraburi	2.50	11
Maha Sarakham	1.95	12
Petchaburi	1.63	13
Petchabun	1.61	14
Surin	1.51	15
Lampang	1.38	16
Ranong	1.09	17

Table 19 (continued)

Provinces	Ratio	Ranking
Roi Et	0.59	18
Chachoengsao	0.58	19
Lamphun	0.58	19
Kamphaengphet	0.42	21
Satun	0.20	22
Chonburi	0.15	23
Pathum Thani	0.07	24

Sources: Census from National Statistical Office, 1970.
: Questionnaires
: Liquor Division, Excise Department, Ministry of Finance, 1977.

Pattern of Mekhong Consumption in 1969

In the case of time series, we know the aggregate pattern of consumption over time, but with availability of data cross sectionally for all the provinces in 1969, we can obtain some interesting details of patterns of change over time since 1969.*

Table 20 shows the regional breakdown of consumption per capita in 1969.

* Data of consumption in 1969 are not complete, therefore only 40 provinces with complete data are reported.

Table 20

Average Consumption of Mekhong per capita by Regions and Whole Kingdom - 1969

Regions	Mean
Bangkok	0.2238
Bangkok Metropolitan Excluding Bangkok	0.0995
Central	0.0433
North-East	0.0222
North	0.0196
South	0.0304
Whole Kingdom	0.0451

Sources: Department of Industrial Works, Ministry of Industry
: Census from National Statistical Office - 1960.

Footnotes: (1) $\text{Mean} = \frac{\text{Total Consumption}}{\text{Adult Population}}$ (From Complete Data)

(2) We rejected the data from some provinces that was incomplete and therefore the regional data are averages of the number of provinces in that region for which the data were adequate.

The pattern in 1969 shows that Bangkok region ranks number one in terms of per capita consumption followed by Metropolitan area (without Bangkok) followed by the Central Plain, South, North and the North-East. In contrast to the pattern in 1977, the North has moved up in ranking while the South and the North-East moved down the ranking.* Table 21 shows the individual ranking of per capita consumption of Mekhong.

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* This comparison must be viewed with caution since only 40 provinces are available in 1969 compared to 70 provinces. However the remedy is to look at individual provinces.

Table 21

Ranking of Total Consumption of Mekhong per capita - 1969.*

Provinces	Total Consumption per capita	Rank No.
Bangkok	0.2238	1
Ranong	0.1083	2
Samut Prakan	0.1018	3
Chonburi	0.1006	4
Nonthaburi	0.0969	5
Saraburi	0.0622	6
Prachuap Kiri Khan	0.0602	7
Kanchanaburi	0.0586	8
Phang-nga	0.0471	9
Ratchaburi	0.0384	10

Table 21 (continued)

Provinces	Total Consumption per capita	Rank No.
Nakhon Pathom	0.0371	11
Satun	0.0366	12
Samut Sakhon	0.0360	13
Nakhon Si Thammarat	0.0349	14
Petchaburi	0.0348	15
Lop Buri	0.0331	16
Ayutthaya	0.0327	17
Phrachin Buri	0.0322	18
Nakhon Ratchasima	0.0321	19
Tak	0.0310	20
Krabi	0.0310	20
Chachoengsao	0.0307	22
Nakhon Phanom	0.0305	23
Chai Nat	0.0287	24
Yala	0.0273	25
Suphan Buri	0.0272	26
Nakhon Sawan	0.0261	27
Khon Kaen	0.0218	28
Phitsanulok	0.0205	29
Kamphaeng Phet	0.0202	30

Table 21 (continued)

Provinces	Total Consumption per capita	Rank No.
Lampang	0.0193	31
Phetchabun	0.0192	32
Nan	0.0182	33
Surat Thani	0.0181	34
Narathiwat	0.0170	35
Kalasin	0.0163	36
Surin	0.0159	37
Chiang Rai	0.0153	38
Sukhathai	0.0111	39
Si Sa Ket	0.0095	40

Sources: Department of Industrial Works, Ministry of Industry
: Adult Population from Census of National Statistical Office - 1960.

* In some provinces data reported covered consumption for only six or seven months. These provinces were omitted from this ranking.

Table 22

Distribution of Consumption of Mekhong by Bottle Size - 1969.

Provinces	Consumption Small	Consumption Medium	Consumption Large
Bangkok	12.34	45.58	42.08
Bangkok Metropolitan Excluding Bangkok			
Nonthaburi	14.26	41.58	44.15
Pathum Thani	-	-	-
Samut Prakan	22.85	42.98	34.17
Mean	18.56	42.28	39.16
North-East			
Kalasin	11.35	70.27	18.38
Khon Kaen	7.53	52.43	40.04
Nakhon Phanom	7.61	73.58	18.81
Nakhon Ratchasima	12.79	40.76	46.45
Si Sa Ket	9.39	58.87	31.74
Surin	15.99	41.80	42.21
Mean	10.78	56.29	32.93
Central			
Kanchanaburi	13.97	48.77	37.26
Suphan Buri	10.71	40.87	48.82
Ratchaburi	10.07	40.20	49.73
Prachuap Kiri Khan	12.91	39.48	47.61

Table 22 (continued)

Provinces	Consumption Small	Consumption Medium	Consumption Large
Petchaburi	10.87	39.57	49.57
Nakhon Pathom	13.70	43.93	42.37
Samut Sakhon	9.19	37.37	53.44
Sara Buri	6.98	47.30	45.72
Lop Buri	17.06	57.80	25.14
Ayutthaya	7.93	44.02	48.05
Chai Nat	9.28	37.11	53.61
Chon Buri	12.99	42.67	44.34
Prachin Buri	7.91	43.78	48.31
Chachoengsao	9.89	47.56	42.55
Mean	10.95	43.60	45.45
North			
Kamphaeng Phet	12.12	42.19	45.69
Chiang Rai	8.28	39.56	52.16
Tak	11.19	31.47	57.34
Nakhon Sawan	11.23	45.16	43.61
Nan	9.21	54.81	35.98
Phitsanulok	14.47	31.58	53.95
Phetchabun	11.40	50.78	37.82
Lampang	14.57	35.83	49.60

Table 22 (continued)

Provinces	Consumption Small	Consumption Medium	Consumption Large
Sukhathai	6.51	39.39	54.10
Mean	11.00	41.20	47.80
South			
Ranong	25.96	30.89	43.15
Surat Thani	27.25	38.66	34.09
Phang-nga	19.75	28.40	51.85
Nakhon Si Thammarat	6.08	67.63	26.19
Krabi	22.55	40.34	37.11
Satun	17.02	29.08	53.90
Yala	22.02	41.91	36.07
Narathiwat	25.10	28.28	46.62
Mean	20.72	38.16	41.12

Sources: Department of Industrial Works, Ministry of Industry.

Rate of Growth from 1969-1977 by Sizes and the Total Growth Rate

The change in the ranking in terms of regions can be shown by looking at the individual growth rates. Table 23 shows a very interesting pattern. The North shows the fastest rate of growth for the whole country. Rate of growth is highest among the medium size bottles. Bangkok region shows

a rate of growth lower than other regions except the South. The South seems to show the slowest rate of growth.

Table 23

Annual Growth Rate of Consumption per capita of Mekhong by Provinces and by Sizes Between 1969 and 1977.

Provinces	Growth Rate Small	Growth Rate Medium	Growth Rate Large	Growth Rate Total
Bangkok	4.11	5.42	5.63	5.36
Bangkok Metropolitan Excluding Bangkok				
Nonthaburi	4.60	6.47	5.61	5.86
Samut Prakan	4.60	8.47	8.93	7.98
Central				
Kanchanaburi	1.93	7.05	7.25	6.65
Suphan Buri	5.58	10.01	7.43	8.50
Ratchaburi	4.03	8.72	7.72	7.88
Prachuap Kiri Khan	3.97	10.85	7.95	9.02
Petchaburi	6.51	10.39	8.07	8.99
Nakhon Pathom	3.43	8.81	9.86	8.83
Samut Sakhon	7.40	9.07	6.93	7.88
Saraburi	4.79	8.76	8.56	8.46
Lop Buri	3.81	7.45	0.50	5.80
Ayutthaya	5.14	10.43	7.39	8.83
Chai Nat	1.71	7.17	9.24	8.13

Table 23 (continued)

Provinces	Growth Rate Small	Growth Rate Medium	Growth Rate Large	Growth Rate Total
Chonburi	3.31	7.18	6.77	6.62
Prachin Buri	6.56	7.91	8.28	7.99
Chachaengsao	7.10	9.60	9.89	9.51
North-East				
Kalasin	3.91	8.25	10.54	8.44
Khon Kaen	8.45	9.52	9.62	9.46
Nakhon Phanom	- 1.33	5.84	8.44	6.14
Nakhon Ratchasima	5.78	10.87	9.20	9.65
Si Sa Ket	5.55	12.95	6.85	11.15
Surin	1.83	6.99	9.23	7.56
North				
Kamphaeng Phet	5.73	11.46	10.06	10.34
Chiang Rai	- 0.98	7.34	7.06	6.80
Tak	4.62	14.63	7.68	10.09
Nakhon Sawan	6.83	10.40	9.43	9.67
Nan	1.64	8.04	9.64	8.35
Phitsanulok	4.12	11.34	7.73	8.86
Phetchabun	5.71	13.53	9.43	11.72
Lampang	3.36	11.04	8.79	9.27
Sukhothai	9.04	13.17	8.27	10.78

Table 23 (continued)

Provinces	Growth Rate Small	Growth Rate Medium	Growth Rate Large	Growth Rate Total
South				
Ranong	2.90	6.92	5.41	5.42
Surat Thani	3.18	11.30	10.33	9.62
Phang-nga	1.90	7.63	3.77	4.93
Nakhon Si Thammarat	11.38	5.38	6.79	6.37
Krabi	- 0.49	5.15	3.52	3.64
Satun	1.65	8.55	1.21	4.52
Yala	3.67	8.38	6.20	6.85
Narathiwat	2.16	8.60	5.26	5.92

Sources: Department of Industrial Works, Ministry of Industry

: Census from National Statistical Office, 1970 and 1960.

Provincial and Regional Pattern of Beer Consumption in 1977.

Since beer is regarded as a substitute to Mekhong consumption it is important to see the pattern of beer consumption. Unfortunately the questionaire sent back to us only contain data on 23 provinces - therefore the pattern must be viewed with caution. In Table 24 we show that in terms of regions, the central region shows the highest per capita consumption which seems to confirm our belief that beer in Thailand is a luxury good. The South ranks second and the North-East, the poorest region, shows the lowest consumption per capita.

Table 24

Ranking of Consumption of Beer per capita by Provinces and by Regions - 1977.

Regions	Consumption of Beer per capita	Rank No.
Bangkok Metropolitan Excluding Bangkok		
Pathum Thani	0.2249	8
Central		
Ratchaburi	0.2938	6
Prachuap Kiri Khan	0.3087	5
Nakhon Pathom	0.5447	3
Saraburi	0.2786	7

Table 24 (continued)

Regions	Consumption of Beer per capita	Rank No.
Chonburi	0.6126	2
Chachoengsao	0.3631	4
Mean	0.4199	
North-East		
Kalasin	0.0384	22
Maha Sarakham	0.0398	21
Roi Et	0.0709	16
Loei	0.0604	18
Nong Khai	0.0940	13
Buri Ram	0.0716	15
Surin	0.(661	17
Mean	0 .0630	
North		
Kamphaeng Phet	0.2064	9
Chiang Rai	0.0429	20
Phetchabun	0.1369	10
Phrae	0.0758	14
Lampang	0.1150	12
Lamphun	0.0045	23

Table 24 (continued)

Regions	Consumption of Beer per capita	Rank No.
Uttaradit	0.0587	19
Mean	0.0848	
South		
Ranong	0.7764	1
Satun	0.1331	11
Mean	0.3491	

Sources: Questionaires

: Census from National Statistical Office - 1970.

Mean: $= \frac{\text{Total Consumption}}{\text{Adult Population 1970}}$

Comparison of Consumption of Mekhong to per capita Beer Consumption

In Table 25 an interesting pattern emerges by comparison of consumption per capita of Mekhong and beer consumption. In the Central plain and South, this ratio less than 1 while for the North-East and the North the ratio is more than 1.

Table 25

Ratio of Consumption per capita of Mekhong to Consumption per capita of Beer by Provinces and by Regions - 1977.

Regions	Consumption per capita of Mekhong	Consumption per capita of Beer	Ratio:Mekhong to Beer
Bangkok Metropolitan Excluding Bangkok			
Pathum Thani	0.1834	0.2249	0.82
Central			
Ratchaburi	0.1641	0.2938	0.56
Prachuap Kiri Khan	0.3170	0.3087	1.03
Nakhon Pathom	0.1888	0.5447	0.35
Saraburi	0.2957	0.2786	1.06
Chonburi	0.3404	0.6126	0.56
Chachoengsao	0.1770	0.3631	0.49
Mean	0.2452	0.4199	0.58
North-East			
Kalasin	0.0772	0.0384	2.01

Table 25 (continued)

Regions	Consumption per capita of Mekhong	Consumption per capita of Beer	Ratio:Mekhong to Beer
Maha Sarakham	0.0629	0.0398	1.58
Roi Et	0.0668	0.0709	0.94
Loei	0.0845	0.0604	1.40
Nong Khai	0.0984	0.0940	1.05
Buri Ram	0.0785	0.0716	1.09
Surin	0.0640	0.0661	0.97
Mean	0.0739	0.0630	1.17
North			
Kamphaeng Phet	0.1358	0.2064	0.66
Chiang Rai	0.0535	0.0429	1.25
Petchabun	0.1664	0.1369	1.22
Phrae	0.0929	0.0758	1.23
Lampang	0.1064	0.1150	0.93
Lamphun	0.0767	0.0045	17.04
Uttaradit	0.1022	0.0587	1.74
Mean	0.0969	0.0848	1.14
South			
Ranong	0.2938	0.7764	0.38
Satun	0.0841	0.1331	0.63

Table 25 (continued)

Regions	Consumption per capita of Mekhong	Consumption per capita of Beer	Ratio: Mekhong to Beer
Mean	0.1546	0.3491	0.44

Sources: Department of Industrial Works, Ministry of Industry - 1977.

: Questionaires

: Census from National Statistical Office - 1970.

Comparison of per capita Consumption of White Whisky to per capita Consumption of Beer.

Table 26 shows the ratio among the provinces and among the regions between per capita consumption of white whisky and per capita consumption of beer. It's interesting to see that in North-East, the poorest region, the ratio is the highest at 5.91, while in the rich regions, the Central and the South, the ratio is very small and even less than 1 in the South region.

Table 26

Ratio of Consumption per capita of White Whisky to Consumption of Beer per capita by Provinces and by Regions - 1977.

Regions	Consumption per capita of White Whisky	Consumption per capita of Beer	Ratio: White Whisky/Beer
Bangkok Metropolitan			
Excluding Bangkok			

Table 26 (continued)

Regions	Consumption per capita of White Whisky	Consumption per capita of Beer	Ration:White Whisky/Beer
Pathum Thani	0.7324	0.2249	3.26
Central			
Ratchaburi	0.3911	0.2938	1.33
Prachuap Kiri Khan	0.4704	0.3087	1.52
Nakhon Pathom	0.5649	0.5447	1.04
Saraburi	0.7771	0.2786	2.79
Chonburi	0.8062	0.6126	1.32
Chachoengsao	0.5509	0.3631	1.52
Mean	0.6046	0.4199	1.44
North-East			
Kalasin	0.0760	0.0384	1.98
Maha Sarakham	0.1385	0.0398	3.48
Roi Et	0.4265	0.0709	6.02
Loei	0.0217	0.0604	0.34
Nong Khai	0.0666	0.0940	0.71
Buri Ram	0.4826	0.0716	6.74
Surin	0.9321	0.0661	14.10
Mean	0.3723	0.0630	5.91

Table 26 (continued)

Regions	Consumption per capita of White Whisky	Consumption per capita of Beer	Ratio: White Whisky/Beer
North'			
Kamphaeng Phet	0.8109	0.2064	3.93
Chiang Rai	0.0523	0.0429	1.22
Petchabun	0.4161	0.1369	3.04
Phrae	0.1353	0.0758	1.78
Lampang	0.1733	0.1150	1.51
Lamphun	0.4294	0.0045	95.42
Uttaradit	0.1772	0.0587	3.02
Mean	0.2482	0.0848	2.93
South			
Ranong	0.4690	0.7764	0.60
Satun	0.1487	0.1331	1.12
Mean	0.2562	0.3491	0.73

Sources: Questionnaires

: Census from National Statistical Office - 1970.

Comparison of per capita Consumption of White Whisky and Mekhong

Table 27 shows that the per capita consumption ratio is highest in the North-East, while the North and the Central plain together occupy second place while the South is the lowest.

Table 27

Ratio of Consumption per capita of White Whisky to Consumption per capita of Mekhong by Provinces and by Regions - 1977.

Regions	Consumption per capita of Mekhong	Consumption per capita of White Whisky	Ratio:White Whisky/Mekhong
Bangkok Metropolitan Excluding Bangkok			
Pathum Thani	0.1834	0.7324	3.99
Central			
Ratchaburi	0.1641	0.3911	2.383
Prachuap Kiri Khan	0.3170	0.4704	1.48
Nakhon Pathom	0.1888	0.5649	2.99
Saraburi	0.2957	0.7771	2.62
Chonburi	0.3404	0.8062	2.36
Chachoengsao	0.1770	0.5509	3.11
Mean	0.2452	0.6046	2.47
North-East			
Kalasin	0.0772	0.0760	0.98

Table 27 (continued)

Regions	Consumption Per Capita of Mekhong	Consumption Per Capita of White Whisky	Ratio: White Whisky/Mekhong
Maha Sarakham	0.0629	0.1385	2.20
Roi Et	0.0668	0.4265	6.38
Loei	0.0845	0.0217	0.26
Nong Khai	0.0984	0.0666	0.68
Ruri Ram	0.0785	0.4826	6.15
Surin	0.0640	0.9321	14.56
Mean	0.0739	0.3723	5.04
North			
Kamphaeng Phet	0.1358	0.8109	5.97
Chiang Rai	0.0535	0.0523	0.98
Petchabun	0.1664	0.4161	2.50
Phrae	0.0929	0.1353	1.46
Lampang	0.1064	0.1733	1.63
Lamphun	0.0767	0.4294	5.60
Uttaradit	0.1022	0.1772	1.73
Mean	0.0969	0.2482	2.56
South			
Ranong	0.2938	0.4690	1.60
Satun	0.0841	0.1487	1.77
Mean	0.1546	0.2562	1.65

Sources: Department of Industrial Works, Ministry of Industry - 1977.
Questionnaires.
Census from National Statistical Office - 1970.

Pattern of Retail Price of Singha Beer in 1977,

Table 28 shows the pattern of prices of beer among the regions and it appears that the price of the beer shows a unique characteristic with regard to thedemand situation. The highest per capita consumption region show a relatively cheaper price of beer while the North-East (lowest per capita consumption for beer) shows the highest average price for beer.

Table 28

Pattern of Retail Price of Beer by Regions and Provinces - 1977

Unit (Baht/Tae)

Regions	Retail Price	
	Small	Large
Bangkok Metropolitan Excluding Bangkok		
Pathum Thani	454.55	461.54
Central		
Petchaburi	416.97	423.08
Prachuap Kiri Khan	606.06	492.31
Ratchaburi	484.85	461.54
Sa:aburi	461.82	469.23
Mean	492.43	461.54
North-East		
Yasothorn	545.45	553.85

Table 28 (continued)

Regions	Retail Price	
	Small	Large
Nong Khai	484.85	523.08
Loei	606.06	615.38
Surin	484.85	523.08
Maha Sarakham	424.24	461.54
Mean	509.09	535.39
North		
Payao	424.24	430.77
Kamphaeng Phet	492.12	500
Phetchabun	545.45	553.85
Phrae	606.06	553.85
Lampang	545.45	523.08
Mean	522.66	512.31
South		
Satun	484.85	492.30
Ranong	504.85	500.00
Mean	494.85	496.15

Sources: Questionaries

: Average Retail Price of Beer - Small = 504.28

- Big = 502.26

1.2 Empirical Results

Data Sources

The most up to date information on consumption that can be obtained is in 1977. The following are the sources of data for each variable used.

Consumption The data on consumption of Mekhong Whisky by province in 1977 comes from the Department of Industrial Works, Ministry of Industry. The data contained the quantity of Mekhong sold in 1977 by months and by sizes of bottles, 187,5c.c for small, 375c.c for medium and 750c.c for the large bottle. The unit of measurement used is the tae which is equivalent to 20 litres. A similar set of data was also collected for 1969 to compare the pattern of consumption over time, but the data in 1969 are not complete.

Price of Mekhong The most important variable in our demand study is price of Mekhong. In our cross-section study the unit of analysis is a province and we need a market price of Mekhong by each province and by each price. Unfortunately the Excise Department does not collect data on these provinces. However we have been able to obtain the market price of Mekhong from two sources.

(1) questionnaires - we sent questionnaires to 70 provincial excise officers who run their office in each province - in the questionnaire we ask them to inform us about market prices of Mekhong whisky. Special emphasis is on market prices since by law Mekhong Whisky is subjected to price control. The method enables us to obtain the market price of Mekhong for 27 provinces, but the rest did not respond.

(2) The second source of data on prices were obtained from the study in 1979 of Dr. Vatchjittapan from National Institute of Development Administration. In this research, he has information about market prices for 20 provinces. He selected provinces with the highest number of retail stores per capita and for each region the total sale of provinces selected must be more than 35% of the total sale of that province.*

Price of Local White Whisky

The data of Local white whisky come from the questionnaires sent to the provincial excise officer. Since only 27questionnaires were returned, we supplemented them with additional information from the Excise Department.

Degree of Urbanization

The data comes from the census of 1970 conducted by National Statistial Office where for in each province the population is broken down into those who live within the municipal areas and those who live out side.

Per Capita Income

The per capita income data in 1977 come from the National Accounts Division of the NationalEconomic and Social Development Board.

The Illegal Sector

The data about the illegal sector are collected from the Excise Department. The data on the number of arrests, amount of fines in baht and quantity of confiscated whisky in tae by each province are available.

The Number of Retail Stores

The data on the number of retail stores for every province come from the research conducted by Dr. Vatchjittapan in 1977 which can also be obtained at the Excise Department.

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* For more detail please see Dr. Vatchjittapan's research.

* The data from Excise Department for price of local white shisky are calculated for 28 degree local white whisky.

Definition of the Variables

B = dependent variable, consumption of Mekhong per adult population by Tae and by sizes of bottles for each province in 1977,'

P = price of Mekhong per tae by sizes of bottles.

U = the ratio of urban population over the total population in each province which is $U/_{U+R}$, U is urban population, R is rural population.

T = is price of white (local) whisky per tae by each province in 1977,'

R = number of retail liquor stores per adult population for each province.

A = quantity in tae of confiscated illegal liquor in each province.

Y = per capita income for each province in 1977,

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1 Tae = 20 litres.

Regression Results

(1) The coefficient of the own price of Mekhong in the cross section regression shows that in the short run the price variable is not signifigant for the large and medium bottles. However the price variable for the small bottle is positive and significant which is opposite from expectations. However as in other previous studies, the own price variable does not seem to contradict our results namely price variable has a weak and insignificant relationship with consumption. Three things may be happening in Thailand. One is the accuracy of the price data which we obtain. Secondly the price of Mekhong is partially controlled by the government. Finally, the real price of Mekhong is a true index of price not the nominal price. Significant improvement can be obtained by using price per cc as a proxy for Mekhong price since we have information for sizes of bottles.

(2) It is believed that Mekhong whisky is a drink for urban people while rural poeple tend to consume more local whisky than Mekhong. Consequently U is used as a proxy for the level of urbanization for each province. The result confirms what we expect, showing that for all the sizes of Mekhong whisky the coefficient of U shows a significant and positive relationship. An interesting comparison is that the magnitudes of the coefficient for all sizes are not the same but demonstrate a certain pattern. The coefficient of the large size is largest, the small bottle shows the weakest relationship, and the medium size is in between.

(3) We expect that income is an important determinant for the consumption of Mekhong as already has been demonstrated in the time series results. As expected, the income variable shows a very consistent positive and significant relationship with consumption of Mekhong. Again an interesting point of comparison emerges which is that for the large and medium sizes the coefficients in the income variable are just about the same but for the small size bottle the magnitude is about half of the others.

(4) We know that local white whisky is a substitute for Mekhong whisky and the regression result seem to confirm our belief since for the big and medium sizes the coefficient of T shows a positive sign although the significance level is satisfactory for the big bottle only.

(5) As regards consumption of whisky, we know that Thai people do not keep a substantial amount of inventories since drinking whisky is usually done outside the home. Therefore, we expect that the cost of transactions is an important factor determining the real cost of whisky consumption. R is an index of the level of transaction cost. If R is high, the cost of is low therefore greater consumption of Mekhong is expected. It is expected that R will show a positive relationship. The result is encouraging for all sizes since all the signs are what we expected but the level of signifigance is somewhat unsatisfactory.

(6) We know that Mekhong whisky has competition not only from other formal substitutes but also from the informal sector which is a illegal sector. The illegal sector has one advantage and also one disadvantage - that

is price is very competitive but the health hazard is quite high. The degree of illegal activities is very difficult to obtain since it depends on the enforcement mechanism by authorities involved. For our purpose we used the quantity of tae of illegal liquor confiscated as a proxy for the illegal activities. The result we have is quite interesting since the large size relationship is positive and signifigant although the small size is negative and significant.

Cross Section Regression Results by Sizes of Mekhong Whisky (1977)

	Intercept	P	U	Y	T	R	A	R^2	D.f
(1)	-0.044173	.000007	0.2044	0.0000031	0.00012	0.165	0.0000025	0.85	22
	(-1.07173)	(0.5)	(4.7)*	(2.6)*	(1.4)	(0.1)	(1.5)		
(2)	0.000382	0.000024	0.1514	0.0000032	0.000011	1.4078	0.0000005	0.63	22
	(0.005387)	(1.03)	(2.1)**	(1.6)	(0.07)	(0.5)	(0.2)		
(3)	-0.0078107	0.000005	0.02088	0.0000016	-0.0000030	0.17	-0.00000083	0.93	22
	(-1.19481)	(2.67618)*	(3.12959)*	(9.01140)*	(-0.2245)	(0.7)	(-3.1)		

1. Means Big bottle (750 c.c.)
2. Means Medium (375 c.c.)
3. Means Small bottle (175 c.c.)

* 1% significance level
** 5% significance level

II. Analysis of Demand for Mekhong - Time - Series Analysis

2.1 Theoretical Background and Hypothesis

In addition to the numerous data problems encoutered in estimating demand functions for a particular class of goods there are well-known econometric difficulties of estimation. In time series the major problems are:*'

1) A small number of observations, limiting the degrees of freedom and large sampling error.
2) Multicollinearity because too many variables tend to move together.
3) Inability to account for changes in tastes.
4) Difficulties in accounting for the effects of changes in income distribution.
5) Identification; that is separating the effects of variables operating through supply functions from those which are true demand variables.
6) Difficulties in creating price indices.
7) Prices change infrequently and may in some respects be considered to be "administered".

Stone estimated demand functions for many commodities for the U.K. from time series for the period 1920-1938. The general function he estimated was of the form

$$\log x_{rt} = \alpha + \beta \log y_t + \gamma \log \frac{P_{rt}}{P_t} + \delta \log \frac{P_{st}}{P_t} + u_{rt}$$

where x_{rt} = consumption of the r^{th} product per equivalent adult in period t

y_t = real income per equivalent adult in period t

p_{rt} = price index of the r^{th} product in period t

p_{st} = price index of the related s^{th} product

p_t = price index of all other consumer goods in period t.

From family budget data, β was estimated from a log-log regression with no adjustments for aggregation or other complications. Using the estimate of β, b, he formed the synthetic variable from aggregate time series data:

$$z_t = \log x_{rt} - b \log y_t$$

and estimated the multiple correlation equations for that variable and the relative prices. He used year-to-year differences for all variables.

For spirits, his estimate of income elasticity was $\pm$ 0.80 + 0.21, own price elasticity was - 0.71 $\pm$ 0.16 and the elasticity for all other prices was also - 0.71 $\pm$ 0.16.*

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* For a summary of the technique see Klein, L. R., An Introduction to Econometrics, Prentice Hall, 1962, pp. 71-73. The full results are in R. Stone, The Measurement of Consumer Expenditure and Behavior in the United Kingdom 1920-1938, Cambridge University Press, 1954. The results are in Chapter XXI and the use of the "extraneous variable" b is discussed on pp. 303-309. A "cookbook" presentation of the procedure is provided by A. A. Walters, An Introduction to Econometrics, N.Y., W. W. Norton, 1968, pp. 223-235.

The major empirical study of demand relationships is now undoubtedly that of Houthakker and Taylor*. They followed what they call the "standard approach", which parallels that of Stone with the possible addition of some additional predictors. They note that since supply equations for simultaneous estimation are rarely available except for crops the "state of the art" limits us to single equation estimation. With little a priori justification for any particular functional form they tried four forms with nearly all commodities. These were:

$$\text{linear:} \quad q = \alpha + \beta x + \gamma p$$

$$\text{semi-log:} \quad q = \alpha + \beta \log x + \gamma \log p$$

$$\text{double-log:} \quad \log q = \alpha + \beta \log x + \gamma \log p$$

$$\text{inverse semi-log:} \quad \log q = \alpha + \beta x + \gamma p$$

where q is per capita consumption, x is per capita real disposable income and p is deflated price. Since they were interested in projection they retained a regression coefficient if it exceeded its standard error provided the sign was theoretically correct. Their major innovation was to introduce a dynamic model of "state adjustment" which essentially adapts techniques used for durable goods to non-durable goods where the rationale is habit formation.** The equation they reported for alcoholic beverages was:

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* H. S. Houthakker and L. D. Taylor, Consumer Demand in the United States: Analyses and Predictions, Second Edition, Cambridge, Mass., Harvard University Press, 1970.

** See Houthakker and Taylor, pp. 7 - 11.

$$q_t = \underset{(33.05)}{56.49} - \underset{(.1073)}{.3635}\, q_{t-1} + \underset{(.0049)}{.0146}\, x_t + \underset{(.4633)}{1.0462}\ (\%\ \text{pop} > 18)$$

q and x are defined in terms of expenditure. Price elasticities were not significant, and the short and long-run elasticities with respect to total expenditure are .2898 and .6207 respectively. A cross-section analysis yielded for expenditures an equation

$$q = \underset{(.373)}{-5.292} + \underset{(.040)}{1.155}\, y - \underset{(.060)}{.333}\, z$$

where q is expenditure, y is income after taxes and z is family size. Their attempts at fitting their dynamic model to alcoholic beverages did not yield significant results.

2.2 Empirical Results

1. Consumption of Alcoholic Beverage in General, by Sectors, and by Income Class

The study of this section is based on the 1962-1963 and the 1968-1969 Income-Expenditure Surveys of the National Statistical Office. The objective of the study is to find sectoral income-elasticities of demand for alcoholic beverage. The sectors to be considered are roughly divided into three:

(1) the relatively high-income sector: Bangkok,

(2) the relatively medium-income sector: urban excluding Bangkok and

(3) the relatively poor sector: non-urban.

The method of analysis is cross-section simple regression. The coefficients of income elasticities of demand derived from Appendix A_1 are as follows for the period 1961-63:

High-Income Sector:	Bangkok	0.5792
Medium-Income Sector:	Urban	0.5053
Low-Income Sector:	Non-urban	0.5706

The income-elasticity coefficients are low, but very interesting in the sense that the extremely rich sector: Bangkok, and the extremely poor sector: non-urban, have relatively high income-elasticity coefficients of demand for alcoholic beverages. That is to say the extremely low-income class spends a higher proportion of increases in income on alcoholic beverage than the medium-income class, and similarly for the extremely high income sector which spends a higher proportion of increases in income on alcoholic beverage than the medium-income class.

To support this, the Table below was estimated by using the 1962-63 and 1968-69 income-expenditure surveys.

RATIOS OF EXPENDITURE ON ALCOHOLIC BEVERAGE TO INCOME BY YEAR, AND INCOME CLASS

Income Class Mid-Point		Expenditure-Income Ratio 1962-1963	Expenditure-Income Ratio 1968-1969
Lower	1500.00	0.01105	0.00742
	4499.00	0.00582	0.00550
Medium	7499.50	0.00457	0.00480
Upper	10499.50	0.00464	0.00550
	13499.50	0.00476	0.00550

Source: Calculated from 1962-63, and 1968-69 income expenditure Surveys.

The figures in the table above speak for themselves of what we have already mentioned.

Income-elasticity of demand for alcoholic beverages for 1968-1969 period was estimated (see Equation 4 in the Appendix). The coefficient was 0.802911 which, undoubtedly, bigger than that of the 1962-63 period (0.5517 on average for 3 sectors). If the tendency is right then one could expect that the income-elasticity coefficient of demand for alcoholic beverage would become bigger and bigger with respect to time.

Price and Income Elasticities

In the demand study of Mekhong, we begin with the conventional specification of a demand function. A number of specifications were tested with time series data attempting to determine the importance of cross effects among the demand for Mekhong and the prices of beer, soft drinks and imported whiskeys. In general the cross-elasticities were not significant. The most straight forward specifications, however, gave reasonable results. For example the following two regressions show a reasonable fit.

1. $$Q_{mk} = 0.142475 - 0.000315609\ P_{mk} + 0.000271775\ \bar{Y}_r$$

$$(1.67363) \quad (-2.92449) \quad (2.08334)$$

$$R^2 = 0.8779$$

$$\text{Observations} = 13\ (1964\text{-}77)$$

$$SE = 0.010868$$

$$D\text{-}W = 1.4509$$

where Q_{mk} = Quantity of Mekhong Consumed per Adult

P_{mk} = Price of Mekhong/Tae

$\bar{Y}_e$ = Real Income/Adult.

1 Tae = 20 litres

2. $\text{Log } Q_{mk} = \underset{(-0.231543)}{-2.09429} - \underset{(-2.66454)}{2.21558} \log P_{mk} + \underset{(2.97016)}{1.63457} \log \bar{Y}_r$

$R^2 = 0.8939$

Observations = 13 (1964-1977)

SE = 0.17942

D-W = 1.9696

The price and income coefficients of these two equations are statistically significant at the .05 significance level. The equations indicate that the change in the price of Mekhong itself has more effect on the consumption of Mekhong than the income variable in both equations.

In equation 1 if the real price of Mekhong increases by one unit it will reduce the quantity of Mekhong consumed per adult by 0.000315609 tae and the increase in real per capita income of adult by one baht would increase the amount of Mekhong consumed per adult by 0.000271775 tae. From the log-log regression, considering the elasticity coefficient, the direct price elasticity of demand for Mekhong is -2.21558, and the income elasticity is 1.63457. That is to say both price - and income elasticities of demand for Mekhong are elastic. It is interesting to notice that the time series income elasticity of 1.63457 (estimated for 1964-1977)

is about double that of the cross section income elasticity of 0.802911 (estimated for 1968-1969) (See equation 4 in Appendix A1). However, the 0.802911 figure is the income elasticity for all alcoholic beverages, not particularly for Mekhong.

Pure Substitution Effect

In the process of estimating the demand function we are not quite happy with the outcome in time series, particularly, when the prices of beer and whisky did not seem to play a role in the demand function for Mekhong. In the final stage we introduced the "extraneous variable" technique introduced by Stone and Durbin as explained above. The main idea of this strategy is that we eliminate the income effect from the dependent variable*, then regressing the synthetic dependent variable, (the log of quantity consumed adjusted for income effects by the extraneous variable technique), on the logs of prices of the most likely substitutes, namely, beer, whisky and Mekhong's own price. The outcome is that the prices of beer and whisky are still not important in the demand function of Mekhong. Finally, we have made another trial by tranforming all the variables involved into indices. Then the extraneous variable strategy is applied again. The following are the outcomes.

$$3.\quad Z = \underset{(2.68045)}{8.01960} \quad \underset{(-2.14305)}{-2.30052} \log (P_{imk}) + \underset{(0.201623)}{0.156003} \log (P_{ib}) + \underset{(0.0497316)}{0.0235639} \log (P_{iw})$$

$$R^2 = 0.6804$$

$$S\text{-}E = 0.185278$$

$$D\text{-}W = 1.4934$$

* References for use of this technique are provided above.

4. $Z = \underset{(4.21352)}{10.9413} \underset{(-5.62041)}{- 3.36688} \log (P_{imk}) + \underset{(0.759034)}{0.562114} \log (P_{ib})$

$R^2 = 0.8073$

S-E = .188979

D-W = 1.6275

Z = Log (Quantity Index of Mekhong 1968 = 100) - 0.802911 log (Y_r)

Y_r = Real income per capita

P_{imk} = Price index of Mekhong 1968 = 100, divided by I_c and multiplied by 100 = relative price index of Mekhong

P_{ib} = Price index of beer, 1968 = 100, divided by I_c and multiplied by 100

I_c = Consumer price index without alcoholic beverages, October 1964 - September 1965 = 100

P_{iw} = Price of white whisky

Looking at Equation 3, the coefficients of the indices of the price of beer and whisky are not statistically significant although the sign indicates that they are substitutes. The coefficient of the index of the price of Mekhong itself is significant. Equation 4 is the outcome of another trial when the relative price index of whisky is eliminated. Still the coefficient of the relative price index of beer is not statistically significant, but R^2 has increased from 0.6804 to 0.8073 and the pure substitution effect of -2.30052 in equation 3 becomes -3.36688 meaning that the pure substitution effect has become stronger. The coefficient of -3.36688 may be called the pure relative price index elasticity of demand for Mekhong. That is to say when the income effect has been eliminated

from the quantity of Mekhong consumed, the increase in one percent of the relative price index of Mekhong itself would reduce the quantity of Mekhong consumed by 3.3 percent approximately.

3. Time Trend

Another trial of our study is to check the importance of a time trend in the demand for Mekhong. This can represent many things; availability, advertising, and tastes. As could be expected from the steady increases in the indices of the main variables, the following equation is probably a good indicator of the importance of time trend.

$$5.\quad \log Q_{mk} = \underset{(-0.841701)}{-3.27302} - \underset{(0.539939)}{0.238279} \log (P_{mk}) + \underset{(0.113474)}{0.0387216} \log Y_r + \underset{(6.66402)}{0.114508}\, T$$

$$R^2 = 0.9820$$

$$S\text{-}E = 0.0785942$$

$$D\text{-}W = 1.1880$$

It is clearly seen from the equation that the demand function has shifted upward with respect to time and that the other variables, price of Mekhong and income have been dominated. This means that other things rather than price and income have been influential in determining demand function for Mekhong. We are not inclined to dismiss the earlier determined significance of price and income variables, however.

Data Sources - Time Series

Items	Sources
1. Consumption of Mekhong 1960-1977	- Excise Department, Liquor and Tobacco Division, Ministry of Finance
2. Consumption of Beer Singh 1960-1977	- Boonrod Brewery
3. Total Population 1960-1977	- National Statistical Office
4. Adult Population	- National Economic Social Development Board
5. Consumption Price of Mekhong	- Department of Industrial Works Ministry of Industry
6. Wholesale Price of Mekhong	- Department of Industrial Works, Ministry of Industry
7. Retail Price of Mekhong	- Department of Industrial Works, Ministry of Industry
8. Wholesale Price of Beer Singh	- Boonrod Brewery
9. Average monthly of Household Expenditure-Survey (1962 - 1963) Bangkok and Thonburi Distribution by Income Class	- National Statistical Office
10. Average monthly of Household Expenditure Survey (1968 - 1969) Whole Kingdom Distribution by Income Class	- National Statistical Office
11. Price of White Whisky	- Excise Department, Liquor and Tobacco Division, Ministry of Finance

APPENDIX A

1. $D_2 = \underset{(-2.51260)}{457.272} + \underset{(3.06435)}{56.4063} \log (Y_2)^{\text{Bangkok}}$

$R^2 = 0.7013$

S-E = 46.4069

Observations = 5

Mean of Dependent Variable = 97.3833

D_2 = Real expenditure on tobacco and alcoholic beverages 2505-2506 Bangkok

Y_2 = Family income class in 1 year (No tax) 2505-2506 Bangkok

2. $D_2 = \underset{(-2.76853)}{171.326} + \underset{(3.58463)}{24.9387} \log (Y_3)^{\text{Urban excluded Bangkok}}$

$R^2 = 0.8107$

S-E = 14.0941

Observations = 5

Mean of Dependent Variable = 49.3500

D_2 = Real expenditure of tobacco and alcoholic beverage 2505-2506 Bangkok

Y_3 = Family income class in 1 year 2505-2506, for municipal areas and sanitary districts

3. $D_2 = \underset{(-2.83451)}{-173.671} + \underset{(3.55297)}{24.4734} \log (Y_4)^{\text{non urban}}$

$R^2 = 0.8080$

S-E = 13.9544

Observations = 5

Mean of Dependent Variable = 42.8880

D_2 = Real expenditure on tobacco and alcoholic beverage 2505-2506 Bangkok

Y_4 = Income class 2505-2506 non-municipal areas and sanitary districts.

4. $X_5 = \underset{(-10.9491)}{-3.45708} + \underset{(24.7399)}{0.802911} \log (Y)$

$R^2 = 0.9839$

S-E = 0.116342

D-W = 1.2710

Observations = 12

Data for 1968-1969

X_5 = log real expenditure

5. $D_m = \underset{(0.14559)}{0.049913} - \underset{(-0.009024)}{0.000819} \log P^r_{sod}$

$R^2 = 0.0000$

S-E = 0.019653

Observations = 13

DM = Per capita uantity of Mekhong consumed 2507-2520

P^r_{sod} = Real price of soda = price of soda/consumer price index W/O alcoholic beverages

6. $D_m = \underset{(2.27499)}{0.534840} - \underset{(-2.07631)}{0.109598} \log P_{pep}$

$R^2 = 0.3502$

S-E = 0.015843

Observations = 13

DM = Per capita quantity of Mekhong consumed 2507-2520

P_{pep} = Real price of Pepsi-cola = price of pepsi-cola/consumer

= price index W/O alcoholic beverages

7. $D_m = \underset{(1.97907)}{0.332960} - \underset{(-1.70163)}{0.063701} \log P_{\text{green spot}}$

$R^2 = 0.2658$

S-E = 0.16841

Observations = 13

DM = Per capita quantity of Mekhong consumed 2507-2520

$P_{\text{green spot}}$ = Real price of green spot/consumer price index W/O alcoholic beverages

8. $D_m = \underset{(-3.89230)}{-0.767333} + \underset{(4.13044)}{0.103858} \log Y_r$

$R^2 = 0.6808$

S-E = 0.011104

Observations = 13

DM = Per capita quantity of Mekhong consumed 2507-2520

Y_r = Real income per capita = per capita income/consumer price index

9. $D_m = \underset{(4.00408)}{25.8519} - \underset{(-4.48962)}{4.63978} \log P^r_{mk}$

$R^2 = 0.7159$

S-E = 0.227316

Observations = 13

D_m = Per capita quantity of Mekhong consumed 2507-2520

10. $D_m = \underset{(4.00408)}{8.20373} - \underset{(-4.48962)}{2.54597} \log P_{\text{pepsi-cola}}$

$R^2 = 0.4014$

S-E = 0.329957

Observations = 13

D_m = Per capita quantity of Mekhong consumed 2507-2520

$P_{\text{pepsi-cola}}$ = Real price of pepsi-cola/consumer price index W/O alcoholic beverages

11. $D_m = \underset{(0.622753)}{2.36097} - \underset{(-1.44988)}{1.22308} \log P_{\text{green spot}}$

$R^2 = 0.2082$

S-E = 0.379502

Observations = 13

D_m = Per capita quantity of Mekhong consumed 2507-2520

$P_{\text{green-spot}}$ = Real price of green-spot = price of green-spot/consumer price index W/O alcoholic beverages

12. $D_m = \underset{(-0.381606)}{-2.83912} - \underset{(-0.039511)}{0.077804} \log P^r_{\text{sod}}$

$R^2 = 0.0003$

S-E = 0.426416

Observations = 13

P^r_{sod} = Real price of soda = price of soda/consumer price index W/O alcoholic beverages

$D_m = \underset{(1.58722)}{6.38306} - \underset{(-2.24342)}{1.09967} \log P^r_{\text{whisky}}$

$R^2 = .3862$

S-E = .279233

Observations = 9

P_{whisky} = Real price of whisky = price of whisky/consumer price index W/O alcoholic beverages

13. $D_m = \underset{(0.147795)}{1.04393} - \underset{(-0.521158)}{0.430115} \log P_{hennessy}$

$R^2 = .0329$

S-E = .1755

Observations = 13

D_m = Per capita quantity of Mekhong consumed 2507-2520

$P_{hennessy}$ = Real price of Hennessy = price of Hennessy/consumer price index W/O alcoholic beverages.

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